![CReATE — ICT-Innovations in Creative Industries]

ICT-Innovations in Creative Industries

Create the Future

Joint Research Agenda
for ICT Innovations in Creative Industries

MFG Baden-Württemberg mbH

Research Agenda prepared for EU-Project CReATE

MFG Innovation Agency for ICT and Media | STEINBEIS-EUROPA-ZENTRUM | CSP innovazione nelle ICT | REGIONE PIEMONTE | POLITECNICO DI TORINO | imaginove | Advantage West Midlands www.advantagewm.co.uk

SEVENTH FRAMEWORK PROGRAMME

The creative industries are a key sector in the Europe of tomorrow. They are developing and evolving rapidly. A crucial driving force for this development is ICT technologies. Using innovative IT solutions in growing areas of the creative sector – such as advertising, digital media, games and interactive design – opens up manifold competitive advantages for research, development and business.

Since March 2008, the CReATE project consortium has been developing strategies to improve cooperation at both regional and European levels to enhance the innovative capabilities of small- and medium-sized companies from the creative sector. The CReATE consortium is led by MFG Baden-Württemberg and comprises besides the Steinbeis-Europa-Zentrum (SEZ) from Stuttgart European partners from Piemonte (CSP, PTO, Regione Piemonte), Rhône-Alpes (Imaginove) and West Midlands (AWM).

Table of content

Table of charts

List of abbreviations

RTDI	Technological Development and Innovation
ICT	Information and Communication Technologies
R&D	Research and Development
GDP	Gross Domestic Product
HCI	Human Computer Interaction
3D	3 Dimension
2D	2 Dimension
UGC	User-generated content
SME	Small and medium enterprise
3DI	3D Internet
HDHR	High definition haptic rendering
IPR	Intellectual Property Rights
IP	Intellectual Property
BPM	Business Process Management
PC	Personal Computer
HD	High Definition
P2P	Peer to Peer
HR	High Resolution
SMS	Short message service
AR	Augmented Reality
MMOG	Massively Multiplayer Online Game

Preface

Creative Industries are an emerging lead market in the European knowledge economy.[1] Creative businesses and services leverage innovation, and thus have the potential to become an integral part of European innovation policy. This policy builds on existing European strengths such as our heritage, creativity and diversity to make Europe more innovative and therefore encourages innovation mainly driven by societal and user needs.[2]

However, while many global challenges are common to all EU countries, Europe's Research, Technological Development and Innovation (RTDI) landscape still remains fragmented. In order to stay globally competitive, Europe is in need of a common and transregional research and innovation landscape, which connects regional strengths, considering that innovation happens mostly in regional processes. Also Creative Industries are strongly influenced and pushed by regional cluster strengths. One of the big challenges ahead will be to intertwine Europe's cultural heritage with its regional economic and technological capacities in order to create a competitive European Single Market. The recently published Green Paper on Cutlure and Creative Industries by the EU ackknowledges the important role of Creative Industries concerning ICT innovations and visa versa.[3] Within this context, the Creative Industries are the key sector for pushing regional strengths within an innovative European eco-system.

For this reason, four leading European regions in the fields of Creative Industries and ICT have worked together in the CReATE project. Funded by the Regions-of-Knowledge programme, CReATE harnesses the potential of ICT for new Creative Industries' businesses and services as well as raises and better coordinates public and private RTDI investments for ICT innovations in Creative Industries.

In a coordinated participatory process at regional and trans-regional level about 250 regional stakeholders from Creative Industries businesses, ICT R&D organisations and related public administrations were involved in the creation of the regionally backed and trans-regionally aligned Joint Research Agenda for promoting ICT innovations in Creative Industries across Europe. According to the agreed CReATE model (see chart 1) as

---

1   Cf. Aho, E. et al. (2006): Creating an Innovative Europe. Report of the Independent Expert Group on R&D and Inno vation appointed following the Hampton Court Summit and chaired by Esko Aho. Luxembourg. This report declares the Creative Industries as one of the most important sectors for innovation in Europe.

2   Cf. SEC (2009) 501 final: Design as driver of user-centred innovation.

3   European Commission (2010): Green Paper - Unlocking the potential of cultural and creative industries, p 17.

important part of the methodological framework, the project partners

- analysed their regional ICT and Creative Industries competences and shortages,
- identified relevant global and European trends and drivers related to ICT innovations in Creative Industries,
- derived specific opportunities (promising future application areas based on ICT innovations) for their Creative Industries businesses, and
- agreed on regional research priority areas for respective ICT innovations in Creative Industries

Moreover, the identified fields of research and policy actions are assumed to be relevant for many European regions beyond CReATE. The project always followed a European multi-regional and multi-actor approach, as it was the goal to create an agenda for the European knowledge economy by connecting regional trans-regional views. The CReATE Joint Research Agenda outlines a common vision of future ICT-driven Creative Industries across Europe and presents the relevant ICT related research topics. It concludes with advice for harnessing cross-regional synergies and for

chart 1: The CReATE approach

optimising and complementing existing policies and funding streams. Within the field of ICT and Creative Industries, technological aspects including research outputs are subject to constant and rapid change. Therefore, the presented agenda can be considered as a groundbreaking first step, which needs to be updated on a regular basis due to the short innovation cycles. Nonetheless, the CReATE agenda describes research priorities, which are significant for future research programmes as well as for policy planning at regional, national and European level on a medium term perspective. The topics collected in this research agenda may enforce the European Creative Industries sector and strengthen Europe's competitiveness in the future.
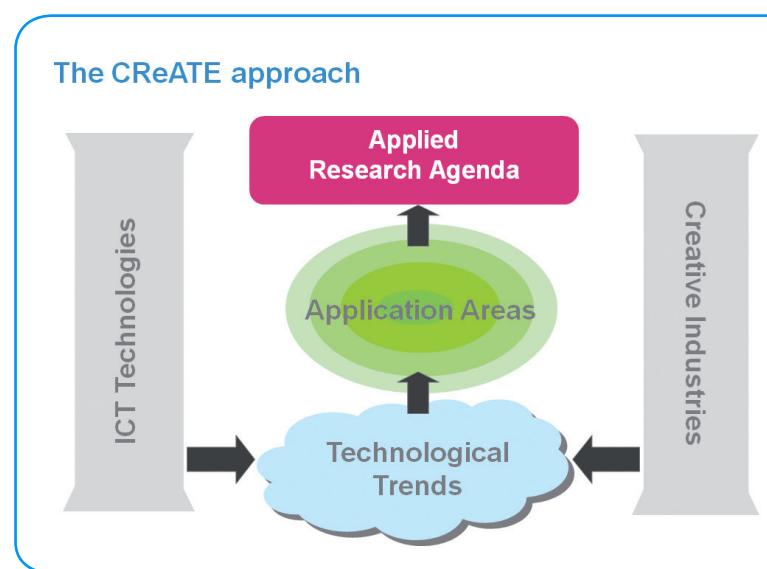
Executive Summary

Technological trends are emerging and lead to new products and consumer groups, distribution channels and consumption habits. This provokes pressure to keep up with the paradigm shift towards a digital eco-system. Within this digital eco-system, Creative Industries will play a major role in preparing economy and society for the challenges lying ahead. Combined with information and communication technologies (ICT), Creative Industries are a dynamic motor for economic and social innovations.

Making new technologies more relevant to consumers and helping to develop new markets[4], they are thus a key factor for economic recovery. Additionally, due to its structural conditions – dominated by micro, small and medium enterprises – the sector is a strong basis for regional success contributing to a prosperous European Single Market.[5] Last but not least, for regions a vivid creative sector is a starting point to foster economic development, because as a matter of fact creative companies, entrepreneurs and investment tend to follow where creative talents settle.[6]

Once the economic force of Creative Industries was showcased by several studies, the topic was high on the agenda throughout Europe. And in 2008, the European Commission assigned the CReATE consortium to support the identification of promising research field and programmes. As a major outcome, the CReATE Joint Research Agenda delivers now a valuable contribution for pushing forward Creative Industries and adapting current support programmes. Thus the Joint Research Agenda presents a solid basis to build up a joint European research and innovation landscape.

Nowadays, Creative Industries are at the focus of strategic developments, on European level[7] as well as on regional level[8]. Therefore, the Joint Research Agenda gives valuable input for the ongoing process: Currently, the Europe 2020 strategy gives a vision for

---

4   Cf. KEA (2009): The impact of Culture on Creativity.
5   Cf. KEA (2009): The impact of Culture on Creativity.
6   Cf. KEA (2008): Newsletter No 14 – Creativity: driving local economic development.
7   Year of Creativity and Innovation, see www.create2009.europa.eu.
8   e.g. see Government policy statement of Minister President Stefan Mappus, 10 March 2010, where Creative Industries are explicitly mentioned as focus of attention.

social market economy for the 21st century, where solutions from Creative Industries can contribute to smart, sustainable and inclusive growth.[9] These discussions are also nurtured by ideas on how the potential of Creative Industries can be unlocked[10] and how the framework conditions for the content industry as one of the main player of Creative Industries can be improved[11]. Additionally, the CReATE results are finalised at a time, where current support and framework programmes are defined for the period beyond 2013 like the Competitiveness and Innovation Framework Programme, Eighth Framework Programme or European Regional Development Fund.

The Joint Research Agenda, jointly developed together with Creative Industries experts from four leading creative regions[12], gathers the most promising research fields at the crossroads of Creative Industries and the ICT sector. In short, the topics are:

Research topics

Visual and interactive experience

- Virtual environments
- 3D visual animation
- Real-time visualisation and interaction
- High resolution displays environments
- Haptic computing
- User-friendly immersive environments
- User-centred design of continuous interfaces

Tools of productivity & intelligent automation

- Semantic software for automated recognition, assembling and indexing
- Interactive artificial intelligence
- Enhanced procedural generation tools for digital content and prototyping

Digital distribution

- Encryption
- Data compression & decompression
- New business models
- Cross-platform distribution

Mobility & interoperability

- Data streaming systems
- Augmented reality solutions
- Web security for online data exchange
- Interoperability of mobile & other devices
- Location based / personalised mobile service

User-producer-interaction in development

- Collaborative production & user-generated content
- Web technology for online collaboration
- Interactive testing environments

---

9   Cf. European Commission (2010): Europe 2020 - A strategy for smart, sustainable and inclusive growth.

10   Cf. European Commission (2010): Green Paper - Unlocking the potential of cultural and creative industries.
     Cf. DG Entreprise and Industry (2010): Bolstering Europe's creative industries.

11   Cf. DG INFSO and DG MARKT (2009): Creative Content in a European Digital Single Market: Challenges for the Future.

12   The Joint Research Agenda is based on the following four regions: Baden-Wuerttemberg (D), Piemonte (I), Rhône-Alpes (F), West Midlands (UK), for the CReATE methodology see annex 1.

Based on the identified research topics, the Joint Research Agenda takes one step ahead and proposes concrete actions in order to implement the CReATE outcomes. The analysis shows how support programmes need to be adapted and how they should be complemented by new elements specially tailored to the creative sector. Thereby, the recommendations developed during the CReATE research process focus on breaking policies silos and re-directing funding schemes within five areas of action:

In the field of general framework conditions recommendations are given how the economic eco-system can be improved for the requirements of the Creative Industries. Those general aspects are complemented by actions in the area research & skills, where is is shown how research can be fostered at the intersection of creativity and technology. These aspects are complemented by recommendations how funding and support schemes can be made more accessible for creative researchers and which actions improve business interactions between researchers and companies. The CReATE recommendations also include clustering activities showing how networking and clustering can improve the performance of Creative Industries.

Based on those recommendations the Joint Research Agenda closes by introducing three concrete and transferable approaches which can be adopted by regions in order to strengthen regional Creative Industries.[13]
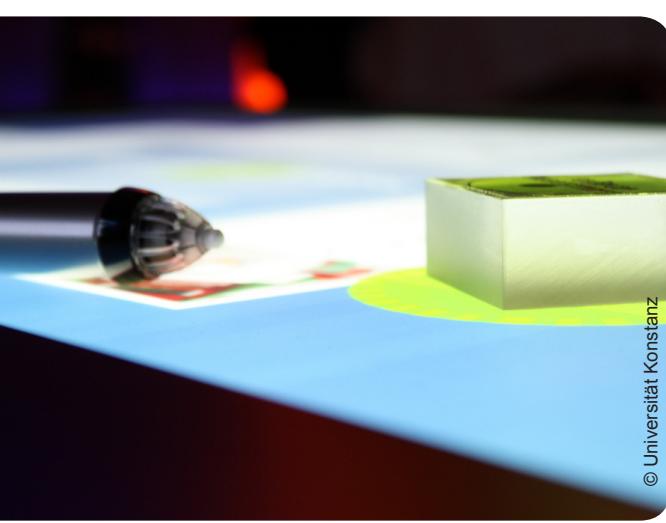
© Universität Konstanz

All parts of the presented CReATE Joint Research Agenda deliver a solid basis for overcoming economic challenges and paving the way to prosperous Creative Industries within Europe. Thereby, the inspiring influences will reach by far beyond the sectoral boarders, as fruitful connections and spill-over effects between Creative Industries and ICT will boost Europe's competitiveness. Being more than the sum of its parts, the agenda explicitly shows that both areas can learn and profit from each other: Creative Industries are customers and users of new innovative ICT applications, while ICT can learn from Creative Industries about usable and tailored application. Together, both sectors boost existing European strengths such as our heritage, creativity and diversity to make Europe more innovative and competitive.

---

13 For the detailed description of the transferable CReATE approach, see CReATE Toolkit on www.lets-create.eu

The Joint Research Agenda presents a vision 2020 where Creative Industries have unlimited possibilities thanks to advanced ICT solutions and where applicable business models are established. The visionary outlook of Creative Industries is followed by a chapter presenting the main research priorities of the future derived from the four CReATE regions. The topics are all depicted in the same structure: first an introduction to the topic in order to have a common view, followed by a selection of application fields. Complemented is each topic then by research fields which need to be strengthened. Before concluding, the Joint Research Agenda focuses on recommendations fostering the implementation of the previously described topics. By raising public efforts to support innovation in creative industries, e.g. through tailored R&D funding, the establishment of open innovation labs and international collaboration, the competitiveness of Europe can be increased significantly.

1 Creative Industries – current situation and future developments

Creative Industries 2010

Creativity is on everyone's lips these days. Companies known for the most creative, innovative products and services outflank competitors by far, illustrated by globally successful and highly innovative firms like Apple, Nintendo or similarly prospering enterprises.

Creative Industries: six segments

- music composition and production
- film, television and video
- animation and computer games (entertainment software)
- writing, publishing and print media
- advertising, graphic design and marketing
- architecture, visual arts and design

Comprehension of Creative Industries by the CReATE Consortium, similar to the use of the term by the Queensland Government, Australia.

The fusion of creativity and technology is considered to be a crucial success factor of those celebrated players. In this causal connexion a new economic force currently prospers on a fertile ground where creative workers come up with cutting-edge ideas and concepts. Nowadays, the Creative Industries[14] and related business sectors produce massive effects on the market, on purchasing power and also on society, as creativity arises from the midst of it.

By now, surveys and elicitation of data have impressively proven that the creative branches are one of the emerging lead markets of the European economy and are hence vital to meet the targets of the Lisbon Strategy for Growths and Jobs[15] and Europe 2020 strategy for smart, sustainable and inklusive growth[16]. For the first time, in 2006 a study published by the European Commission quantified the socio-economic impact of the sectors at EU level. The cultural and creative sectors had a turnover of more than over €654 billion in 2003, outranging car manufacturing, and contributed to 2.6% of the EU GDP representing close to 6 million jobs.[17] Additionally, a study by NESTA found out that Creative Industries stimulate innovation, as a company spending double the average amount on creative products is 25% more likely to produce product innovations.[18]

For the economic and social development, the interconnection of ICT and Creative Industries offers tremendous chances, not only because both are cross-sectional, higly innovative and essential for digital society. In Europe, the framework conditions are

---

14   Cf. Queensland Government.
15   Cf. Lisbon Treaty.
16   Cf. European Commission (2010): Europe 2020 - A strategy for smart, sustainable and inclusive growth.
17   Cf. European Commission (2006): The economy of culture in Europe.
18   Cf. NESTA (2008): Creating Innovation.

extremely promising: As Europe's creativity arises from its multiculturalism and rich cultural heritage, the fruitful combination of this creative power with world class ICT research from university and research organisations can unleash its creative and innovative potential.[19]

Global trends and sector drivers of future development

Currently, strong and sustainable shifts can be observed, altering economy and society likewise. Diverse components have been identified to play an important role in the triumph of the Creative Industries in Europe and beyond borders.

ICT innovations in Creative Industries will contribute to overcome the strong differentiation between technology based innovations and non-technology based innovations (e.g. service innovations), as for the future Creative Industries both factors are deeply intertwined as one production circle: technological innovations will lead to new creative services which then requires new hard- and software applications.

To start with, among these shifts every-day web usage shall be highlighted, building the framework for the rise of social networks and capabilities for global exchange and col-

---

19   Cf. KEA (2009): The impact of culture on creativity.

laboration in real time. All generations will witness the ongoing development of human computer interaction (HCI), as well as leverage of gaming environments and common creation of creative content.

Resting upon the identified trends of future economic and societal development, future application areas can be deduced from current developments: Mobile advertising, interactive design and 3D training in virtual worlds are – among others – the most promising future application areas relevant for the Creative Industries by means of ICT technologies.

Furthermore, of major importance are new criteria and methods that lead to the realization of these application areas: Laying the path for the ideas and products of tomorrow, creative enterprises have to work in close cooperation with their target groups and include them in all phases of production. Part of this strategy is an open innovation and value creation process that avails of user-generated content (UGC). Additionally delocalization and open source models will shape future application areas into dynamic labs and hubs of ongoing innovation.

Information and communication technologies already are constant companions in science, economy and politics. It is not possible to imagine one without the other, and that also underlines the huge impact of ICT on the Creative Industries, such as the search for future market perspectives and business models. New products and services are brought to the market more customized, more effective and faster benefitting from advanced tools for technology transfer and commercialisation along the value chain.

Another impact of ICT on the Creative Industries is observable with a scrutinizing view on the shifts in training and education and with regards to scientific staff in research institutions and universities: ICT skills are requested and conveyed increasingly in the Creative Industries. Exemplarily, computer science and information technology courses of studies compose an increasing ratio of the scientific curriculum in creative study courses. Also, disciples get acquainted with technological essentials and processes, thus developing media competence earlier. The required qualifications knowledge workers must yield in the employment market amount to a more flexible adaptation of ICT skills on the one hand and a readjusted human resources strategy on the other. In addition

to that, new tools and methods, e.g. agile methods for project management need to be established.

Besides those trends promising prosperous connections between creative sectors and ICT, several obstacles impede this vision turning into reality. Three main inhibiting factors are worth mentioning here:

- Currently, a knowledge gap between Creative Industries and ICT hamper fruitful cooperations, as languages, mindsets and the overall understanding of business profoundly differs in both fields.
- The way, people live, consume and work is deeply shifting and evolving quickly in the digital society. Rapid developments in the ICT sector require a multidisciplinary and holistic approach to innovation. The urge for new business models developed by creative entrepreneurs will grow.
- Improvements have to be reached in matching offer and demand between ICT and Creative Industries: attractive ICT solutions being affordable, available and usable for Creative Industries will boost both sides. Additionally, user involvements within all stages of the product development are too weak by now, as practices and procedures for involvement are not yet established.

The presented Joint Research Agenda can be considered as a first step for interconnecting ICT with Creative Industries in order to trigger new products and services. It also is a call for action addressed to policy and policy makers on European and state level, to regional institutions, cluster and support institutions as well as to researchers, with the goal

- to intertwine CI and ICT by developing a common ground between both sectors,
- to address ICT research topics with high economic potential for creative industries,
- to finally bring the joint vision for Creative Industries to reality.

2 Joint vision – Creative Industries 2020

Imagine…

… going to concerts were yesterday's way to experience live music. Now, you immerse into an interactive jam session, where you enter the stage with your favourite band.

… you don't have to decide where to play your new game: whatever platform you chose, wherever you are – mobile phone, console, browser, PC – one button and the adventure takes off.

… no more lengthy slide shows when your relatives return from their holidays: as the pictures are automatically assembled in a story board and completed by audible story lines and other audio material, you will experience thrilling 3D shows.

… you never have to manually arrange your music collection, the pictures of your last holiday or your tax declarations from the last decade. It is all done by new semantic indexing programmes which automatically structures the data to your convenience.

… you read your personalized newspaper during breakfast – fed with the most recent, user-generated content it comes freshly to your flexible digital display, which comes along with the retro-looking newspaper surface.

… you never have to struggle with badly fitting clothes again – online and interactive you design your own style. The future fitting room combines your clothes with yourself in an augmented reality presentation. If you like it, you can directly manufacture it instantly on your 3D printing device

The stories illustrate our vision for the year 2020 which needs some action connecting ICT and Creative Industries to become finally reality. Behind those stories lies the vision that in a few years, we all live in an eco-system where Creative Industries have unlimited possibilities to realise their ideas and concepts thanks to advanced ICT solutions.

This means, without any barriers, both areas are intermingled and interconnected profiting from its differences while having a common understanding of each other. In this future world, creative people use ICT achievements naturally. Cooperations, joint projects and the gained knowledge about each other have lead to a common understanding

between both sectors. Users being involved from early stage of the development process have helped to adjust ICT applications that are both functional and stylish as well as easy to use and affordable. Additionally, they can be tailored, composed or adapted according to the needs of its creative end-user without expert knowledge and serving now every niche of the creative market. By then, also new ways to reward creative and technological innovations have been established: e.g. platforms are set up as infrastructures for business deals, payment systems are installed to remunerate for products and services in a digital environment.

© Filmakademie Ludwigsburg - The Gap

For bringing vision to reality, actions are needed. The CReATE project partners and stakeholders from four regions have joint forces to strengthen the research potential as well as the technological progress and to increase related investments from EU, national and regional funds. Based on in-depth research including regional analysis identifying capacities and needs, the Joint Research Agenda proposes actions for bringing alive this vision. Firstly, the presented Agenda gives an overview on research topics, which need to become the centre of attention within the time coming. Secondly, it gives recommendations on how to facilitate intra- and transregional cooperation and knowledge exchange between cluster development agencies, researchers and industry. Particular attention is given to the potential impact on small and medium sized enterprises – including micro-companies – in the creative branches. If systematically developed and facilitated (e.g. by research programmes), they have the force to unleash economic growth.

3 Research Agenda for ICT innovations in Creative Industries

The Joint Research Agenda for ICT innovations presents core topics for applied research with relevance to Creative Industries and gives strategic direction to boost Creative Industries in Europe now and in the future. Thereby, the topics are of added value for the Creative Industries as well as for the ICT sector: Creative Industries benefit from new technological achievements of the ICT sector by receiving more and better tools for turning their ideas into reality. ICT provides creative people better possibilities to connect with other creative people or customers worldwide, which leads to a better knowledge transfer, global cooperations and products that are tailored according to the customers' wishes. On the other hand, the ICT sector obains with the Creative Industries a new field of applications which is very open minded for new approaches and concepts. Creative Industries can therefore be seen as an inspiration for ICT research in order to develop more user-friendly and applicable tools for the creative sector and beyond.

3.1. Main technological research priorities for Creative Industries

The analysis of four regions revealed overlapping as well as complementing competences and therefore picture strategic direction for future collaboration in the field of Creative Industries. For triggering business in Creative Industries the relevant research fields can be clustered in five main research priorities which are as follows:

CReATE research priorities

1 Visual and interactive experience

2 Tools of productivity & intelligent automation

3 Digital distribution

4 Mobility & interoperability

5 User-producer-interaction in development

The ICT-related research topics are not only listed but are detailed with backed-up insights in order to identify areas where efforts need to be channelled. Therefore, the CReATE Joint Research Agenda is driven by the question: What are the main techno-

logical research topics, which will promote the creation of value and stimulate creative economy within the future Creative Industries? The identified research trends can be aligned to the following areas of value creation:

Generating new products and servies for changing markets and customers

Visual and interactive experience: new visual dimensions and digital interaction between humans and computers

Images are hugely powerful and a crucial way of conveying information. 3D Internet, virtual worlds, simulations and computer-generated imagery create a richer visual experience, enabling previously abstract concepts to be presented to users realistically in real time and compelling quality. It is also possible to navigate computers and data conveniently and intuitively using voice input, movement and facial expressions, for example. This seamless merging of the real and virtual user environment will be an important feature of the way we live and work in the future. New ways of distributing and deploying software, e.g. Software as a Service, complement the emerging technologies.

Developing intelligent and efficient processes of product and service generation

Tools of productivity & intelligent automation: improved productivity and semantic software

Automation speeds up production and development processes and boosts flexibility. As a result, prototypes can be designed more quickly and 2D visualisations automatically converted to 3D. Semantic software can be used to recognise correlations between digital data and present them in a user-friendly way. There will be strong demand in future for intelligent tools which combine web and database content with greater precision to create attractive information sets. Especially in content production, automatic generation, real-time space audio calculation, multithreading programming and automatic indexing of data will increase tomorrow's productivity.

Establishing new distribution channels and business models

Digital distribution: new distribution channels on the world wide web

Digital distribution channels and the collective availability of user-generated content represent a challenge for traditional business models within the Creative Industries by offering exciting new markets and revenue streams. Fast developments in collaborative production and distribution can be observed, for example, in the area of online games and video on demand. On the other hand, trends like cloud computing change the software industries, developing form production and selling to software services. All in all, there is a strong need to try out new product and service strategies, as well as to resolve licensing and copyright issues.

Providing the ‚right' framework conditions

Mobility & interoperability: a new level of flexibility in the mobile age

The capabilities of mobile devices and communication networks continue to grow, with users also increasingly demanding any time, any place access to information and thus, requesting new services and products from creative industries. Location-related and personalised mobile services offer a way of meeting this need. The requirement here is for user-friendly, intuitive solutions and multifunctional devices that can handle all data formats and support high data transmission rates.

Creating collaborative production and testing environments

User-producer interaction in development: new production methods featuring user-generated content

Companies and institutions alike benefit from the creativity of the masses. They can involve their staff and customers in innovation processes, as well as in planning and production of content and services – from adding valuable knowledge content to wikis and printing selected books on demand to viral marketing campaigns that reach new target groups and markets.

3.2. Core topics of the research priorities

3.2.1. Visual and interactive experience

The power of visual communication and visualization is the major trend that hits the Creative Industries within the next years and in a long time scale. The common awareness and attention towards our social and technological environments are driven more and more by the eye and shaped by symbols, which requires a range of new technologies to create virtual or 3D environments, to render data in real-time or to develop advanced tools for interaction.

© Xavier Sivecas

Semiotics · 3D Internet · Motion Capture · Animation · User-Centred Design · Movie · Software-As-A-Service · Immersive Environments · Ergonomics · Powerwalls · High Resolution · Virtual Reality · Games · Training Worlds · Movements · Interaction · User Interaction · Virtual Environments · Haptic Computing · Entertainment · Interoperability · Haptic Rendering · Human-Computer-Interaction · Photo-Realistic · Computer Graphics · Rendering · Real-Time · User-Friendliness · Virtual Prototyping · Computer Simulation · Giga-Pixel · Head-Mounted Systems · Interfaces · 3D Technologies · Augmented Reality · Virtualization

a) Virtual environments

Virtual environments are computer-simulated environments. Often, the term is used to describe a wide variety of applications, as virtual environments or in general virtualization can be a medium as well as a tool handling complex and abstract data.

Fields of application

- Virtual prototyping in production
- Virtualization and high quality visualization of products, e.g. for sales/marketing or architectural constructions
- Immersive environments (showrooms, classrooms, shopping malls, music, design, automotive)
- Collaboration and networking between enterprises (collaborative virtual environments)
- Personalized avatars, e.g. 3D models of user's face and shape
- Motion capture with video recorders

Fields of research

- Real-time-rendering and computer graphics
- Visual computing on powerwalls
- Image analysis and signal processing
- Input devices for interaction
- Augmented Reality technologies
- Web based image and interaction enabling technologies
- Technologies to facilitate immersion in to the virtual environments, e.g. Web3D, Flash3D
- 3D software technologies

b) 3D visual animation

Visual animation is about rapid display of a sequence of images usually simulating movements. A wide range of applications is possible (from industry production to artistic animation), whereby the challenges are not only in motion pictures but in integrating existing production processes, while talking into account artistic demands.

Fields of application

- Market communication for online shops
- Support on new visual paths, e.g. interactive museums
- Integration of computer-animated actors in movie applications
- Modelling of artificial actors in all fields of entertainment productions
- Automatic rendering for animators that still allowing temporal creativity

Fields of research

- Applications and technologies for facial animation
- Visual effects and global illumination
- Technologies for non-photorealistic rendering and photo-realistic rendering
- Dynamic real-time animation
- Game engines technologies
- Methods for re-mixing 2/3D technologies

c) Real-time visualisation and interaction

Real-time applications or environments as fields of computer graphics refer to software as well as hardware solutions that produce and analyze images and stimulations in general in real time. Real-time environments simplify the development of web applications, being more and more important for creative content developers.

Fields of application

- Real-time visualization of large and medium-scale urban environments
- Medical applications, e.g. support for surgeons
- Interactive immersive games
- Real-time 3D Internet for online shops

Fields of research

- High resolution real time 3D photorealistic rendering
- Multi sensory real-time rendering in augmented and virtual reality environments for 3D, 3D Internet and global illumination technologies
- Testing and integration of game engines for other use than games
- Raytracing in real-time

d) High resolution display environments

High resolution displays and the huge amount of data corresponding to those require new and efficient methods of visualization. This relates to the generation, the processing and the transmission of data as well as perception-oriented visualisation.

Fields of application

- Visual product selling (e.g. showroom, architectural construction, classrooms, museums)
- Prototyping in design, especially objects in original sizes
- All fields of entertainment productions (movie theatre, theatre, opera, entertainment parks)

Fields of research

- Giga-pixel displays and immersive environments
- Efficient pixel-based model generation
- User interaction for high resolution displays
- Information visualisation

e) Haptic computing

Haptic computing describes technologies which make it possible to exchange properties between real and virtual space and to gain total utility out of both. The haptic feedback by tactile components or the haptic perception is crucial for manipulation of virtual objects and brings uncountable advantages for the Creative Industries.

Fields of application

- Human computer interaction technologies
- Product pre-visualisation in architecture and marketing (clothes, haircut etc.)
- Haptic solutions for animation products, TV formats (e.g. animation „smile") and realistic look and feel of products and services (shoes, materials of clothes, etc.)
- Interaction within computer games, e.g. Wii

Fields of research

- Human computer interaction
- High definition haptic rendering (HDHR)
- Product design, 3D technologies
- Usability research, semiotics and ergonomics

f) User-friendly immersive environments

This field describes the design and evaluation of virtual environments. The immersive character of these environments can be achieved by using different techniques, which all support the user's immersion or involvement in the scene. For Creative Industries, it will be more and more important to provide technologies and tools for immersive interaction as well as test platforms.

Fields of application

- Virtual experience for product presentations: realistic, immersive, easy-to-use, real-time 3D showrooms which need less physical resources by offering at the same time more choices for the customer
- Digital storage of cultural heritage, e.g. museum environments in classrooms, mixed reality exhibitions
- Blended interactive environments for marketing, e.g. for fairs or (informational) architecture
- Enhancement of user-friendliness of immersive environments, e.g. no client dependence, user rules and guidelines, authenticity, mass-market appeal
- Informed virtual environments (e.g. display sensations like temperature, vibration e.g. for architectural models)
- Virtual prototyping environments
- New visual solutions for market communication, e.g. for sales support
- Virtual training worlds

Fields of research

- Cognitive ergonomics, human computer interaction
- Location based applications
- Photorealistic rendering
- Reliable standards in open data security
- Multi-platform contents and applications
- Intellectual Property Rights (IPR): training and legal support
- Head mounted systems
- Digital worlds

g) User-centred design of continuous interfaces

User-centred design of continuous interface describes an approach where new tools and applications lead to intuitive human computer interaction. During the development process of interfaces, users' needs, but also cognitive factors (such as perception, memory, learning or problem-solving) are taking into account leading to improved applications.

Fields of application

- 3D displays, interacting with the user in real-time
- Product pre-visualisation in architecture and marketing (clothes, haircut etc.)
- Haptic solutions for animation products, TV formats (e.g. animation „smile") and realistic look and feel of products and services (shoes, clothes textures, etc.)
- Collaboration and networking between enterprises
- Interoperability of different interfaces and devices

3.2.2. Tools of productivity & intelligent automation

© Korff en van Mierlo
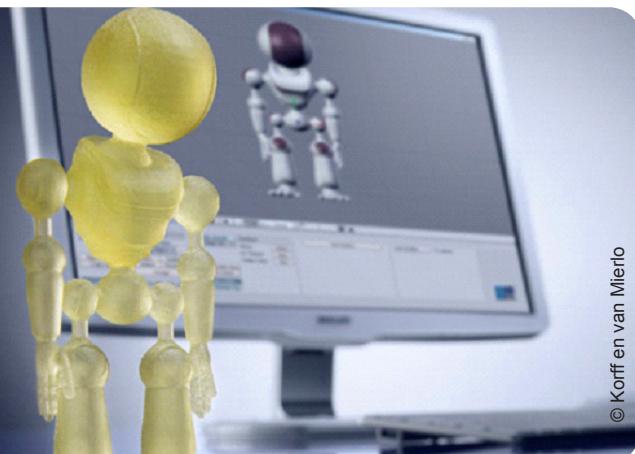
Intelligent automation and advanced tools of productivity speed up production and development processes whilst on the same time boost flexibility. This field includes semantic software which is used to analyse correlations between digital data and display them in a user-friendly way. In the future, there will be a strong demand for tools for intelligent interaction, rapid and direct 3D prototyping – a trend of high importance for the cost-sensitive Creative Industries.
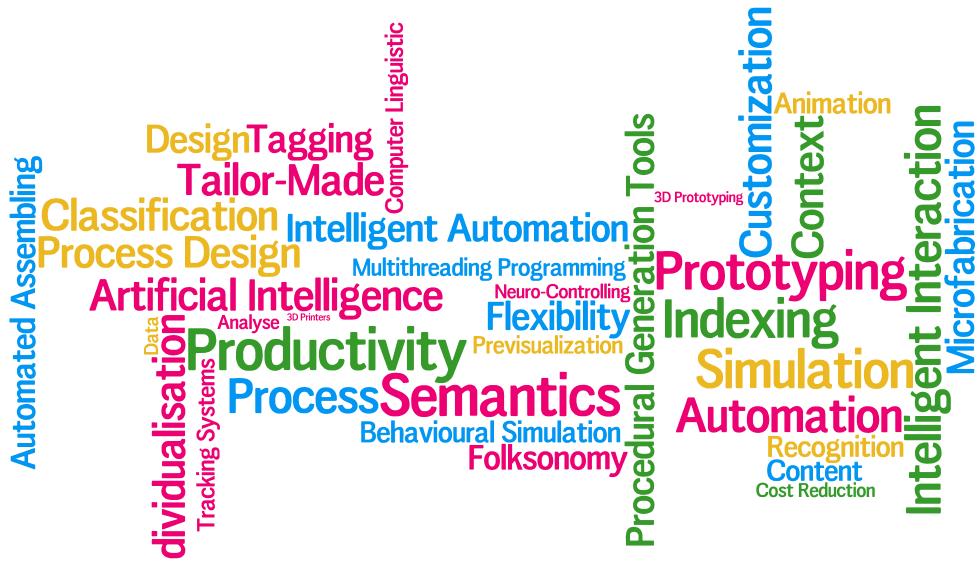
a) Semantic software for automated recognition, assembling and indexing

Semantic software leads to a real understanding of the content beyond applications or sources. Semantic applications are used to identify context (e.g. within pictures), recognise correlations between digital data and present them in a user-friendly way. The field includes application for the automated processing and indexing of all kind of contents, all crucial for content driven Creative Industries.

Fields of application

- Semantic search for creative content
- Application modes of tagging, e.g. social tagging (by folksonomy) or semantic tagging of text, images and movies, to be used in digital libraries, film industry and publishing
- Semantic intelligent agents, for automated context recognition and content classification e.g. in music, film, pictures and texts

- Semantic intelligent agents for market research and market watch, e.g. for usage of public relations and marketing agencies
- Automated assembling and re-use of creative content enabling user-specific content delivery while saving time and money (e.g. creative content in animation and videogame identities)

Fields of research

- Automated context recognition and tagging in order to have semantic/context-aware content classification
- Automated indexation of contents to reuse and create new content, to gain in productivity, applications for training & analyzing of situation
- Web-based tools to aid multi-platform development
- Technologies allowing content developers to embed "intelligence" into their contents and to make it easier to port across platforms

b) Interactive artificial intelligence

Artificial intelligence describes the science and engineering of making intelligent machines, especially intelligent computer programs. It is part of computer science concerned with making computers behave like humans.

Fields of application

- Artificial intelligence tools for interaction with users, especially in marketing, e.g. "speaking" ads in public spaces
- Artificial intelligence in games, e.g. intelligent modulation of difficulty level
- Artificial actors in movies which autonomously act in a realistic way

Fields of research

- Behavioural simulation of autonomous and artificial agents
- Robotics
- Behavioural studies
- Neuro-controlling
- Tracking systems
- Computer linguistic

c) Enhanced procedural generation tools for digital content and prototyping

Automation speeds up production and development processes and boosts flexibility. Automation and simulation plays here a central role as well, as a result, prototypes can be designed more quickly, e.g. 2D visualisations automatically converted to 3D or objects can directly be produced by 3D printers.

Fields of application

- Prototyping or tailor-made products by using 3D printers
- Animation and spatial sound integration
- Ergonomic and functional testing as well as test fitting in product design

- Pre-visualization of creative products for architecture, buildings, construction sites or design
- Rapid prototyping in games and animation with the challenge not to loose artistic impact due to the re-use of components, but allowing individual and customized products at a reasonable prize

Fields of research

- Rapid prototyping
- Hard- and software for 3D printers
- 3D micro-fabrication
- Laser and scanning technologies
- 3D model retrieval

3.2.3. Digital distribution

© Jörg F. Müller
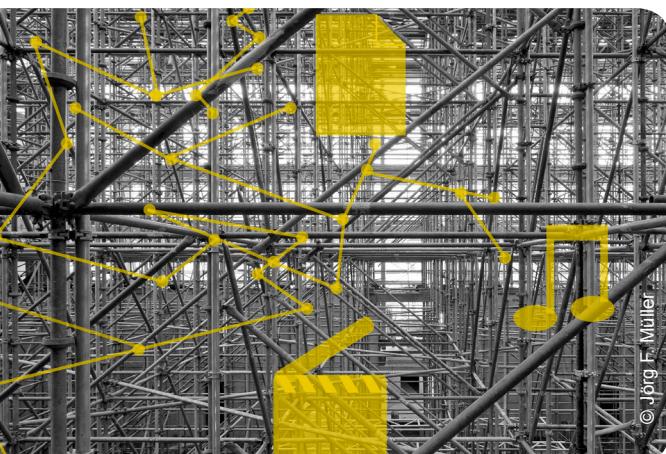
Creative web society is revolutionizing the distribution of content: based on the ubiquity of information, not only new ways to create content are emerging. Even more important, there is a need to try out new approaches to spread content (e.g. peer-2-peer distributions like BitTorrent or eDonkey), to create revenue streams for creative outputs (e.g. micro-payment) as well as to consume content (e.g. streaming of videos).

a) Encryption

Encryption is a method using an algorithm to transform information in a way that only the authorized receiver can understand the message. Thinking of Creative Industries, advanced techniques of encryption are of high importance to control privacy settings (e.g. social networks), access to creative content (e.g. IPR) or protect the authenticity of communication in collaborative work spaces.

Fields of application

- Smart protection systems for social networks
- Control access to content, e.g. to secure IPR and monetary rewards
- Secure mobile data transmission for creative collaborators
- Protected cloud computing for creative micro-enterprises (flexibility & cost minimization)
- Secure storage & transfer via digital channels for all forms of content (esp. publishing, film, games; satellite distribution)

b) Data compression & decompression

Data compression is the reversible conversion of data into a format that requires fewer bits by using an algorithm. With special regards to the Creative Industries, this field needs attention as new solutions are required thinking of the ever-present internet and its mobile use as well as the explosion of available information. There are two forms of data compression, both of significant importance for the Creative Industries: Lossless compression means that the original data can be recovered without any data loss (e.g. archives), whereas lossy compression accepts the loss of quality, often unrecognizable for the user (e.g. photo, music).

Fields of research

- Fast compression and decompression technologies for mobile use
- Cost-saving storage of data (e.g. archives and databases for creative content)
- Development of standards and compability of compression methods
- Open standards for data compression

c) New business models

The core question for Creative Industries is: How do content developers make a business out of their ideas? In the digital world, ways to reward creators for their products and services must be found and established. Thereby, the new business models must take into account the specific needs of creative content and lead to fair monetary reward schemes for artworks like music, videos or games. The topic is closely linked to the protection of Intellectual Property and encryption (see above).

Fields of application

- Business development for creative entrepreneurs, e.g. as part of business strategy, marketing and sales
- Remuneration models for creative content on mobile devices
- Micro-payments for creative contents
- Paid content models and standardized remuneration schemes by global rights administration in terms of IP protection and valuation
- Seamless integration of paid content on free platforms
- Streaming technologies (esp. for music and music distribution without download possibility)
- Business process management (BPM) for content exchange between print & online in publishing sector

d) Cross-platform distribution

Cross-platform distribution describes the seamless integration of different interfaces (e.g. from audio to video to games) for distribution. In contrary to present interfaces by using cross-platform distribution ways there is either no media disruption or the change of platform is unnoticeable to the user. The digital convergence highlights an essential area for the Creative Industries, as it affects single areas like games as well as development within each area, e.g. game development for different interfaces (Wii, Playstation, PC, etc.).

- Quality protection guaranteeing authenicity
- Real-time translation of digital content

Fields of research

- Interface design with strong focus on usability and multiplatform use
- Real-time applications for data synchronization and data exchange
- Compability of devices (e.g. regarding use, encryption method etc.)
- Standards for interfaces to allow exchange of data and applications
- Data mining and information visualisation

3.2.4. Mobility & interoperability

The capabilities of mobile devices and communication networks continue to grow, with users also increasingly demanding access to information at any time and any place. Location-related and personalised mobile services offer ways of meeting this need. Solutions require user-friendly, intuitive applications and multifunctional devices that can handle all data formats and support huge amounts of data in real time.

© Bärbel Maleske-Velten
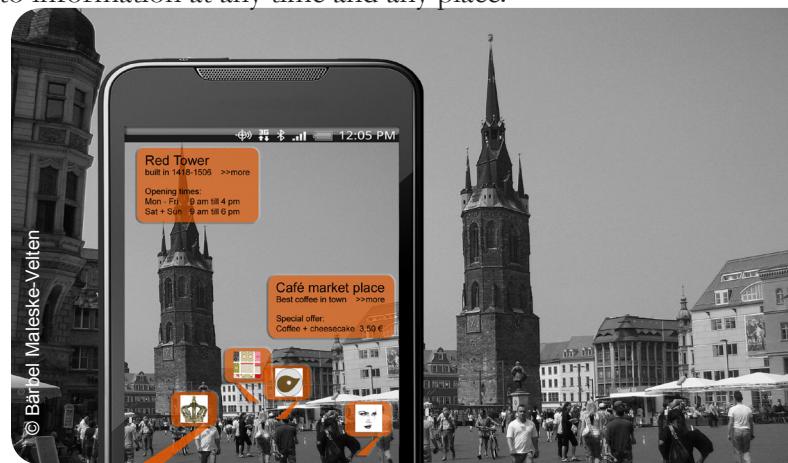
a) Data streaming systems

Data stream model are based on multimedia, respectively individual data items which are continuously received by an end-user. As the data transmission can happen in multiple, rapid, time-varying, possibly unpredictable and unbounded streams, new applications and technologies are needed for the mobile creative generation.

Fields of application

- Transmission of high definition (HD) videos
- Enhancement of peer to peer (P2P) technologies & platforms for large data transmission architecture, film, games etc.
- Enhancement of streaming capabilities with focus on high definition, high resolution, real-time videos (esp. for film, games etc. and in context with user-generated content)

- Matching creative contents and mobile technologies
- Developing solution to allow content producers to broadcast at low-cost on mobiles
- New business models related to P2P that can help content developers maximise their IP
- Streaming of creative content as opportunity to leverage IP

Fields of research

- High capacity / next generation networks (e.g. transmission of HD videos)
- Enhancement of peer to peer technologies & platforms for large data transmission, corresponding to HD videos, graphics, models, prototypes
- Improving quality of mobile streaming and life streaming
- Cloud computing
- Grid and distributed computing
- Enhancement of peer to peer technologies & platforms for large data transmission
- Distributed systems technologies
- Mobil data stream processing
- Flexible communication protocols which dynamically minimize the communication costs depending on the type of context
- Context-aware applications

b) Web security for online data exchange

Web security can be described as a system which allows identification and secure data transmission including monetary transactions. From the users' point of view, is crucial to protect personal data from unauthorized use, improve usability and lead to low barriers for every-day-use.

Fields of application

- Payment systems for mobile content consumption,
- Mobile identification for access to play lists, etc.
- Secure systems for business-critical computations
- Cloud computing with improved service availability, data confidentiality, reputation fate sharing, etc.

Fields of research

- Research into next generation security protocols
- Encryption technologies
- Context aware systems
- Solving complexities of multi-party trust considerations and mutual auditability
- Cloud computing security

c) Interoperability of mobile & other devices

Interoperability describes the use of content on different mobile platforms without extra development, manual conversion or individual adaptation. Transferring digital content from stationary to mobile devices is a key task for the future Creative Industries.

Fields of application

- Social networks, accessible via mobile, netbook, games console, portable game device, etc. with seamless usage possibilities
- New music instrument interfaces, mobile as well as web-based (e.g. online guitar for music industry)

- Distributed, open production facilities
- Transferring digital content from stationary to mobile devices (esp. important for publishers and all content creators)
- Integration of semantic information (location, activity, interests, etc) with social network data (from Twitter, Facebook, LinkedIn, etc) to enable intelligent yet easy-to-use communication for individuals as well as for groups
- Interoperable applications among digital TV, web and mobiles

Fields of research

- Seamless / open standards (e.g. for codecs, player / software / apps)
- Procedures and algorithms for automated mobilisation of applications or content
- Business models which include multiplatform use of one application/software
- Model data across hybrid system boundaries
- Interoperability of mobile clients and services redundancy elimination
- Reduction of needed storage space

d) Location based / personalised mobile services

Location based services are solutions based on the physical location of the customer. Due to its connection to the user's geographical position, a huge amount of new tailor-made applications are possible, e.g. tracking locations, maps or touristic information, but also real-time information about the current whereabouts of friends. Location-based content delivery can be used in entertainment (games, documentaries etc.) or educational purposes.

Fields of application

- Location-based content delivery, e.g. for marketing
- Matching creative contents and mobile technologies
- Exploit nomadic use to promote local cultural heritage and tourism
- Personalization of mobile devices
- Mobile matchmaking for marketing, e.g. use case: location-based services for museums that contact potential visitors strolling by via SMS

Fields of research

- Positioning systems with more accuracy (esp. in areas with no reliable satellite-positioning)
- Automated context-aware content delivery
- Micro-payment models for mobile applications
- Mash-ups of existing applications
- Geo-based systems
- Surveys on customer-based technological developments of context-aware mobile data services
- Context-based communications to distribute messages selectively among users within a certain context, e.g. users located in certain geographic areas

e) Augmented Reality solutions

Augmented Reality (AR) describes the merging of the view of a physical real-world environment with virtual computer-generated imagery or information. As Augmented Reality solutions offer real-time semantic context information in association with the real surrounding, they are of high interest for content development in creative industries, e.g. in the game sector. Today, AR solutions are especially used to increase attention and value of classic creative products, like magazines, fashion, or music.

Fields of application

- Location recognition and intelligent combination of real and virtual objects
- Enhanced user-experience in games, marketing, for content delivery in order to access new markets and optimise content delivery
- AR solutions in arts, exhibitions, tourism, publishing and marketing (e.g. cross-channel content) as well as in architecture (construction sites) and pervasive gaming
- Automated content identification and additional content/information delivery (e.g. music identification)

Fields of research

- Image recognition
- Image interpretation
- Database connection / compression technologies
- Context aware information delivery
- Visualisation of virtual and real image

3.2.5. User-producer-interaction in development

© Judith Kraft

Companies and institutions alike benefit from the creativity of the masses. Staff as well as customers can participate in innovation processes. This can happen, for example, in planning and production of content and services – reaching from adding valuable knowledge content to wikis and printing selected books on demand to viral marketing campaigns that reach new target groups and markets.

Individualisation
Online Collaboration
Co-Creation
Software-As-A-Service
Crowdsourcing
Interactive Testing Environments
Testing Process
Participation
Joint Development
Rewards
Platforms
Open Innovation
Involvement
Beta Testing
Peers
User-Generated Content
Wikis
Living Labs
Virtual Reality
Design
Collaborative Production
Feedback
Viral Marketing
Collaborative Engineering
User
Customer
Infrastructure
Workspaces
Incentives
Interaction
Wisdom Of Crowds
Peer Production

a) Collaborative production & user-generated content

Collaborative peer production describes a new way of interactive production where the creative energy of large numbers of people is involved by using new digital and open innovation platforms. Collaborative production is closely linked with the topic of user-generated content, where end-users are involved in the creative process.

Fields of application

- Online platforms for interactive creation of value, e.g. in films, games, entertainment
- Crowd-sourcing – user involvement and interaction in processes (e.g. design,
- archives)
- Open innovation in product design & development (fashion, design, movies, games)
- Collaborative engineering
- Viral marketing and individual design

Fields of research

- Software development for new collaboration tools
- Setting up collaboration with big players in ICT market for testing
- Reward models and remuneration for collaborating peers
- Technological infrastructure for open innovation labs
- Joint brand development technologies

b) Web technology for online collaboration

Web technologies for online collaboration are tools helping people to jointly work on projects. With regards to the special needs of Creative Industries, tools for online collaboration are highly important, as they can gather creative energy from different persons which would otherwise not have been able to work on the same idea.

Fields of application

- Collaborative working environments for creative minds
- Collaborative content creations tools, e.g. virtual live jamming applications in music and film
- Audiovisual collaboration for video games
- Integrative technologies for web-based collaboration for all kinds of digital content
- SaaS for video games, e.g. OnLive
- Game development within communities (MMOG, social gaming)
- Crowd-sourcing in design
- Joint brand development / marketing

Fields of research

- Web-based tools and collaborative workspaces
- Test user collaboration on different platforms with traditional media and new creative collaboration tools
- Technologies to allow creative industries to produce without developing
- Create standards for online collaboration
- 3D-Printing technologies including hardware

c) Interactive testing environments

Interactive testing environment describes innovative approaches to involve users in the production and testing process of new products and services. Within the context of the Creative Industries, the concept of Living Labs should be enhanced and brought to a next level closing the gap between ideas and solutions.

Fields of application

- Platforms where users can give input and ideas for development which can lead to higher success rate if product comes to market or increase customer loyalty
- Testing environments for digital products and application before they are released to the market

Fields of research

- Testing environments including research, business and consumers
- Devices for mobile and immediate feedback from users
- Virtual Living Labs / beta-testing
- Virtual and augmented reality

4 Recommendations for implementation – bringing the vision to reality

The research priorities of the Joint Research Agenda, which were elaborated on the regional level and trans-regionally aligned, will serve as a sound basis for optimising regional, national and European support schemes in the field of ICT innovations in Creative Industries. Thus, the CReATE Joint Research Agenda contributes significantly to research policy setting and offers recommendations to solve many crucial points in the strategy of ICT R&D and Innovation in Europe.[20]

The recommendations were developed during the CReATE research process and are a condensed outcome of the stakeholder workshops, expert discussions and the regional and trans-regional studies. Besides initiating concrete actions, breaking policy silos and generating awareness for the sector's need is one main aim. The presented policy recommendations give hints how to streamline support programmes and to adapt them in a way that Creative Industries are included.

4.1. Steps towards optimising policies and programmes

As the CReATE Joint Research Agenda aims at unleashing Europe's economic potential at the intersection of creativity and technologies, it goes beyond the pure identification of research topic for future research efforts. It also presents concrete areas where existing support policies and programmes are to be adapted to the requirements of the Creative Industries as well as where new support schemes are to be established.[21] All in all, four fields of actions were identified and aligned with the call for improvements within the general framework:

Framework conditions for research to business

| Research & skills | Access to funding | Business interaction | Clustering opportunities |
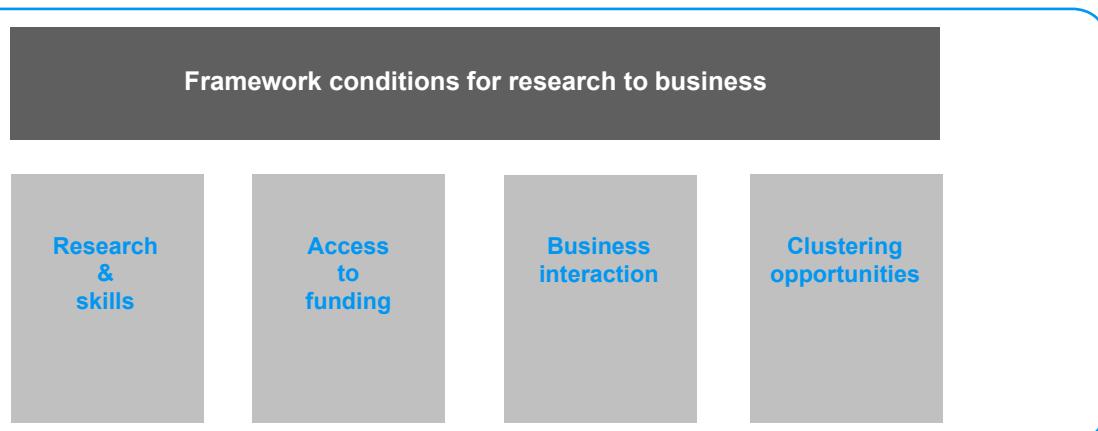
chart 2: Framework conditions for research to business

---

20   Cf. European Commission (2009)116: A Strategy for ICT R&D and Innovation in Europe: Raising the Game.
21   see Annex 2.

The general framework conditions focus on the question how the economic eco-system can be made more suitable for the prosperity of Creative Industries. Additionally, concrete actions are needed in four critical fields.

- Research & skills: How can research be fostered at the intersection of creativity and technology?
- Access to funding: How can funding and support schemes be more accessible for creative researchers and businesses?
- Business interaction: Which actions are needed to improve interaction between researchers and entrepreneurs or companies?
- Clustering opportunities: How can clustering activities strengthen the performance of Creative Industries?

Framework conditions for research to business	
Policy issues	**Policy actions**
Harnessing the ICT potential for development, production and distribution of innovative services and products of Creative Industries means to open up new markets. The exposed promising ICT-driven markets and businesses for Creative Industries within the Joint Research Agenda are ready to grow fast but stunted through existing barriers.	⊃ **Facilitate the emergence of new markets for Creative Industries triggered by ICT-based innovative solutions.** ⊃ **Focus especially on lower market entry barriers for SMEs.**
The nature of innovation and the characteristics of R&D-projects in Creative Industries differ massively from established manufacturing industries. Current support actions do not acknowledge the small scale, agility, short-term orientation of innovation processes in Creative Industries.	⊃ **Adjust research and business support schemes to the specific characteristics of Creative Industries e.g. project-based, small scale support.**
A better coordination of trans-governance-level (from regional to European level) and trans-policy (e.g. Research&Innovation, Education, Enterprise, Structural) is vital to jointly tackle challenges lying ahead. The pooling of resources is necessary to develop world-class clusters in the European Union,[22] and in particular to converge the activities towards joint R&D programming.	⊃ **Better coordinate and optimise the use of regional, national and European resources in the relevant policy areas.** ⊃ **Lower formal admission criteria of divisions to allow interdisciplinary collaboration.**
The role of creativity should also be taken into consideration also by other complementing policy fields. By integrating people from other sectors, new market niches for Creative Industries will be developed.	⊃ **Establish a European creativity working group for connecting Creative Industries' policies with other sectors' policies.**

chart 3: Policy action: Framework conditions for research to business

---

22 Cf. European Commission (2008)652: Towards world-class clusters in the European Union: Implementing the broad-based innovation strategy.

Research and skills	
Policy issues	**Policy actions**
ICT technologies will boost the Creative Industries, respectively outstanding creative products and services. However, ICT research is not yet well aware of the Creative Industries as promising application area.	➲ **Promote and establish research programmes within the frame of the European Joint Research Agenda in order to foster Creative Industries in Europe.**
Applied research needs hubs for innovative ideas, which centers on the identified trends, tagging new forms of interaction, user-experience and collaboration. Small companies often lack playground for risky R&D activities.	➲ **Establish interdisciplinary trans-organisational labs[23] in order to test new products and services.**
Mutual knowledge transfer is needed for transferring new technological achievements. Creative Industry companies often miss the latest technological trends, while research lacks knowledge about the creative industries' market needs.	➲ **Initiate a series of think tank events focusing on the initialisation and development of project ideas between ICT research organisations and Creative Industries firms.**
Due to structural conditions Creative Industry enterprises often lack financial and human resources to pursue R&D projects. This prevents them from applying for established research programmes.	➲ **Support research motivated companies by adjusting funding and support schemes to the needs of Creative Industries.**

chart 4: Policy action: Research and skills

23   For example, the Living Lab approach of the European Commission relies on Foresight-type exercises, in particular at the early stage of defining specific research priorities and identifying public and private research funding. The Living Lab concept is tightly linked to the second pillar 'Strengthening innovation and investment in ICT research' of i2010, the EU policy framework for the information society and media.

Access to funding	
Policy issues	**Policy actions**
Innovation voucher schemes build links between universities, research institutions and SMEs. However, the existing voucher schemes are not suitable for Creative Industries, as they are often tailored for production industry.	➲ **Link innovation vouchers systems including allocation to regional agencies knowing the needs and capacities of the players.** ➲ **Adapt and test innovation voucher schemes that take into account the special requirements of Creative Industries.**
Creative Industries have huge potential to generate spill-over effects. However, the benefits of creative services are not yet on the agenda of companies from other sectors.	➲ **Stimulate the demand side by providing business-to-business vouchers: companies from other sectors receive a Creative Voucher in order to receive creative services.**
Funding opportunities for creative projects are rare and scattered, separated and hidden behind innumerable institutions, branches, public authorities and bureaucracy, which is hard to manage, especially for SMEs and freelancers.	➲ **Establish points of services for information regarding access to funding that are ideally equipped with competencies with decision making power.**
ICT-driven innovations boost the creation of highly competitive value added businesses and services. The fusion of creativity and technology is often inhibited by formal separation of branches and therefore cuts off economic success.	➲ **Support projects which combine creativity and technological expertise.**
Currently, there is no European Joint Technology Initiative for Creative Industries.[24] Therefore R&D projects are too much scattered and detached from each other.	➲ **Encourage the re-orientation of public and private R&D investments into strategic fields with high priority for sustainable jobs and growth such as into the topics identified in this Joint Research Agenda.** ➲ **Establish a Joint Technology Initiative for Creative Industries.**
Rapid actions are very relevant to innovate in the digital economy due to its very short innovation cycles. Current funding schemes are not suitable for Creative Industries, because of barriers such as long-term periods and high co-financing rates.	➲ **Encourage iterative meetings with regional funding administrators.** ➲ **Establish micro-financing tools compatible with short innovation cycles and including recoupment.**
Enterprises within the creative economy often struggle with the financing of the development of demonstrators respectively showcases. They often can't become active beforehand because of an investment gap and assets. This evokes risks of lower attractiveness to potential investors regarding showcases.	➲ **Establish public start-up funding for research and technology driven preproduction and prototyping projects (wireframes, mock-ups etc.) in Creative Industries.**

chart 5: Policy action: Access to funding

---

24 The Joint Technology Initiatives funded under FP7 have shown the potential of public-private partnerships for spee ding up innovation by sharing technology development strategies, pooling resources and streamlining processes.

Business interaction	
Policy issues	**Policy actions**
The creative sector as an emerging area has a newcomer rate above the average compared to classic sectors. Those newcomers are often overstrained with decision-making, knowledge of the market, product development, up-taking technologies, IP-related issues, etc.	➲ **Establish and improve systems of knowledge transfer between experienced entrepreneurs and new comers, including incentives for these mentors.**
Creative Industries, especially SMEs lack updated information on trends and consumer behaviour in digital economies, often because of scarcity of resources. This leads to problems regarding market entries.[25]	➲ **Provide information on market information, consumer trends, technological trends and innovations, roadmaps as well as good practices across Europe.**
Creative workers focus very much on their creative performance compared to business or process management requirements. This often weakens their position during customer acquisition, tender preparation, contract negotiations as well as during claim management – which can lead to reduced profitability and productivity, independent of qualitative aspects.	➲ **Encourage and provide training opportunities on business management for Creative Industries.** ➲ **Establish and brand a certificate of "creative project management", in order to strengthen trust between creative workers and potential clients.**
Standardization will be more and more critical for technology-based creative services and products. Cross-national cooperations of enterprises, science parks and research institutes developing and testing standards are crucial for a broad and successful acceptance and implementation of those.	➲ **Encourage test bed alliances between companies, researchers and users to develop common and open standards.**
Human interaction as part of the business environment is essential to initialise and develop project ideas between customer and performer, between ICT research organisations and Creative Industries companies alike.	➲ **Initiate match making platforms and marketplaces for the share of interests, know-how and contacts.**

chart 6: Policy action: Business interaction

25   Cf. KEA (2009): The impact of culture on creativity.

Clustering opportunities	
Policy issues	**Policy actions**
Creative expertise is often hidden by other innovations. But to attract potential clients as well as other creative workers' settling, business opportunities have to be visible, known and internationally accredited.	⮩ **Develop regional and city brands on creativity through international fairs, reference projects, events, etc.**
Enterprises with a need for a special creative service often do not know whom to address. The other way round creative workers often do not have enough resources to manage customer acquisition and marketing of their services.	⮩ **Establish cluster organisations as creative broker agencies to foster procurement of creative services and expertise.**
Different business cultures, languages and mindsets among ICT and Creative Industries representatives often prevent innovative collaboration.	⮩ **Enable a dialog-oriented and forward-looking approach within clusters, in order to identify challenges and opportunities as well as aspired products, services, business models and in order to gather structured information about specific competences and skills.**
Creative Industries have specialised competencies which might be complementary to other regions. The potential of cross-regional exchange and collaboration is often underemployed.	⮩ **Support inter-cluster collaboration projects.** ⮩ **Use the interplay of regional and trans-regional perspectives to recognise new opportunities for regional development and to identify trans-regional synergies.**
Networking is absolutely essential to players of the Creative Industries. However, international project consortia are rare, especially in Creative Industries.	⮩ **Establish a series of cross-cluster study visits to and from the regions to discuss Creative Industries and corresponding R&D interests**.

chart 7: Policy action: Clustering opportunities

4.2. Concepts for regional and trans-regional projects

The research topics identified in the Joint Research Agenda offer high potential for future market success of European Creative Industries on international markets. Regions, which want to strengthen or develop Creative Industries in their area, will benefit from picking up particular research topics of the Joint Research Agenda and starting projects with the existing creative key actors. Therefore, the Agenda proposes - besides policy recommendations - also project-based approaches to strengthen Creative Industries. In

particular, Creative Industries can be strengthened and supported in their competitiveness by concepts for establishing

- Applied research labs
- Cluster collaboration approach and
- Entrepreneurial business services.

Applied research labs

On the regional level, public authorities and innovation agencies can establish applied research labs. These labs offer Creative industries' firms temporary playgrounds for developing prototypes, wireframes or mock-ups in close collaboration with regional research organisations, collaborating companies. Additionally, the applied research lab should be complemented by living lab concept integrating customers within the innovation process. Regional authorities are supposed to enable Creative Industries to participate in these labs as agile and flexible means to become more research-oriented, risk-friendly and hence innovative.
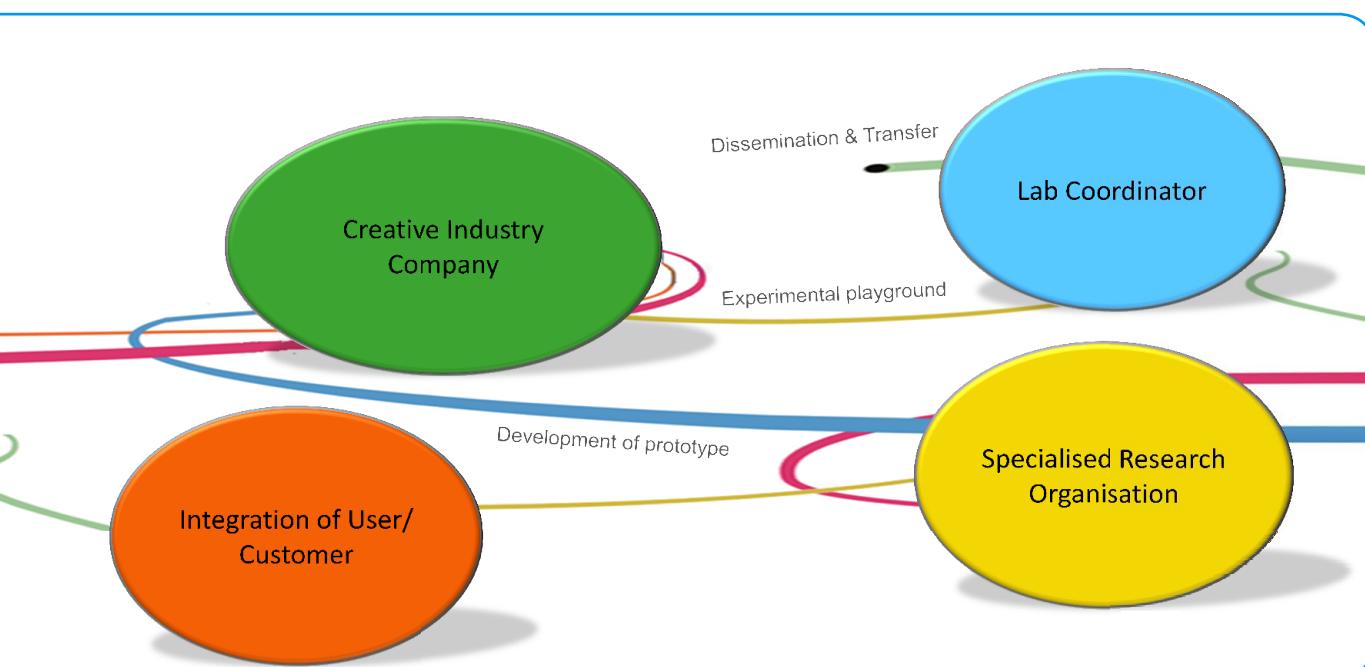

chart 8: Applied research labs

Cluster collaboration approach

Creative Industries cluster offer high potential of being seedbeds for innovation and increased market success. However, seldom creative industry clusters are yet accompanied by an ICT-cluster within the same region. Regions are recommended to analyse their cluster base thoroughly, identify strengths in their regional creative sector on the one hand and ICT-areas on the other. Moreover, inter-cluster-collaboration, brought to life by concrete projects, gives regional actors the means to leverage complementary knowledge and capacities. The Joint Research Agenda and the CReATE Global Synthesis Report lay path for collaboration within R&D projects building on the capacities and needs of the clusters respectively.
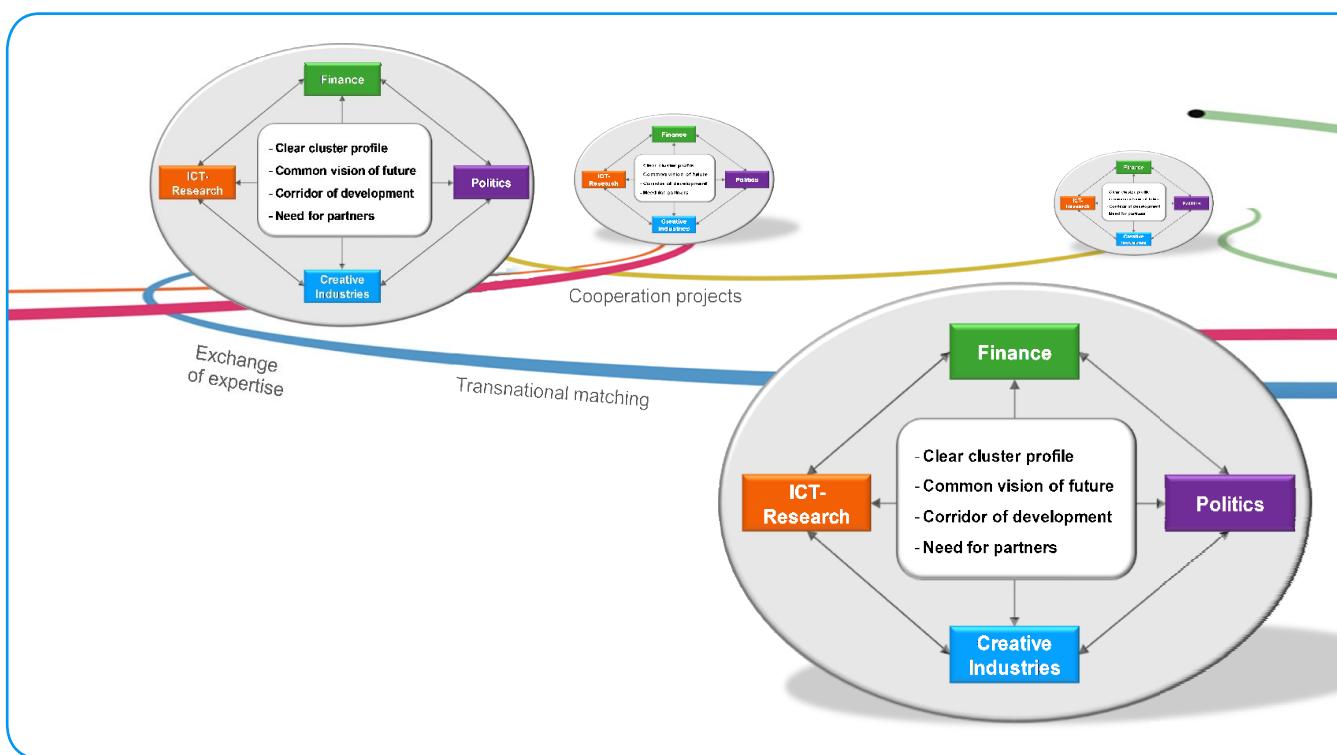

chart 9: Cluster collaboration approach

Entrepreneurial business services

Companies in Creative Industries need special conditions to kick-off and grow successfully. Already existing support mechanism cannot be transferred one by one to the creative sectors, adaptations and new concepts are needed. Regional innovation agencies and regional developers are challenged to develop a set of support tools for Creative Industries. The proposed entrepreneurial business services focus on four core topics – networking, qualification, competitiveness and internationalisation – which in combination offer a starting point for pushing regional Creative Industries.


Networking
- Matchmaking for Creative Industries and ICT
- Collaboration platform
- Meeting spaces for creative youngsters

Internationalisation
- Study visits + delegations
- International lobbying + representations
- International cooperation projects

Qualification
- Entrepreneurial skill training
- Trend roadshows
- Start-up & growth consultancy

Competitiveness
- One- Stop- Agency for Creative Industries
- Innovation vouchers and micro-financing
- Co-working spaces

chart 10: Entrepreneurial business services

5 Conclusion

Supporting Creative Industries by suitable means will have enormous boosting effects on Europe's economy and competitiveness. As a key sector for reaching the goals of the European strategy for sustainable growths, Creative Industries play a vital role in supporting economic recovery. Being dominated by small and medium enterprises, creative businesses have numerous spill-over effects to their local business environment, but also positive influences beyond pure economic benefits – thinking of aspects like quality of life, city image and creative events which raise the attractiveness of regions for talents. All in all, this means: actions to further develop Creative Industries are needed. To the current discussion and re-shaping of the support landscape in Europe, the presented Joint Research Agenda contributes in two ways. Firstly, the agenda presents the five topics which will drive future Creative Industries and other sectors as well.

1. As images are hugely powerful, visual and interactive experience will become more and more dominant.
- Application areas include a broad variety from production and prototyping, games and entertainment to touristic or general information visualisation.
- To boost this field, research efforts need to focus on 3D technologies, augmented reality as well as high-resolution and real-time applications. The challenge will also be to offer advanced interaction interfaces, including haptic computing or the installation of user-friendly immersive environments.

2. Tools of productivity and intelligent automation will play a powerful role in speeding up production and increase productivity of creative industries.
- Advanced ICT applications offer flexible and efficient solutions regarding prototyping and scalability as well as classification and storage for users from Creative Industries and beyond.
- For future growth, research needs to put an emphasis on tools for rapid and virtual prototyping, but also on context recognition and semantic applications improving technologies for analysing and indexing content automatically.

3. The digitalisation both of economy and society will lead to new ways of digital distribution:

- As a consequence, distribution channels and possibilities will massively change, challenging not only Creative Industries to find business models which guarantee rewards for their creative products and services.
- Research needs to be pushed especially to develop advanced access and security standards enhancing privacy control and identity management. Additionally, peer-to-peer technologies and platforms need to be further elaborated in order to allow collaborative working processes. As products and services will have to be usable and transferable to different equipments, compatibility and interface standards need to be improved.

4. Mobility and interoperability of applications will be a common requested by consumers.

- Application areas of mobile technologies range from mobile access to creative content to collaborative working environments, all requiring new product and services.
- Research efforts have to push forward streaming technologies, services related to location-based information and augmented reality. For all mobile and flexible applications including cloud computing technologies enhanced security technologies and access solutions have to be developed. And, of course, applied research results are necessary to ensure interoperability between mobile interfaces and stationary use.

5. As frontiers between user and producer are vanishing more and more, user-producer-interaction in development will become a standard procedure.

- Effectively integrating consumers in all steps, including early stages, of the production line will be the main and most powerful application of new user-producer technologies and platforms.
- Research needs to pick up the challenge to develop the technical conditions for collaborative environments including reward models, improved virtual prototyping and testing surroundings.

Besides those five research topics, the CReATE JRA has secondly recognised a strong urge to adapt, improve or set up new support schemes for Creative Industries, as current schemes are not sufficient. Therefore, the Joint Research Agenda proposes actions that will help to overcome existing barriers prevent and help the sector to unfold its enormous potential.

- Framework conditions must be adapted to the special requirements of Creative Industries, being aware of their rapid innovation cycles, their project-based working habits and their micro-financing requirements.
- Research schemes have to focus promising research fields, which allow effective knowledge transfer, interdisciplinary approaches as well as business and user involvement.
- Funding programmes have to be channelled to the identified research fields and adopted to the needs of the sector: small and micro companies in need of flexible, unbureaucratic, project-based financing schemes.
- Support schemes for business interaction need to offer attractive ways to connect researchers to creative companies as well to improve the understanding of different mindsets in ICT and Creative Industries.
- Cluster support actions must take into account that international exchange activities are often very weak in Creative Industries, lacking contacts, time and expertise. Cross- and inter-cluster activities can boost creative competitiveness.

The vision that we all live in an eco-system where Creative Industries have unlimited possibilities thanks to advanced ICT solutions needs decisive actions to become real. Within this world, Creative Industries and ICT sector benefit from each other: the creative people profit from enhanced ICT tools and the ICT sector is inspired by the possibilities required by the creative class.

Besides the mutual benefits for Creative Industries and ICT sector, also regions applying the CReATE method will profit in multiple ways: first of all, it helps regions to understand and develop their true economic potential and raises their profile and importance nationally, trans-nationally and internationally. Additionally, collaboration between businesses, government and research institutions within each region can be strengthened improving the capabilities of small and medium enterprises from the creative sector.

Having created a common ground between ICT and Creative Industries, now next steps need to be taken. Therefore, the Joint Research Agenda serves as a valuable basis for joint European actions on the on hand, and on the other hand, for regions within Europe to push Creative Industries locally.

> *„If you do not design the future someone or something else will design it for you."*
> Dr. Edward de Bono, Ambassador of European Year of Creativity and Innovation

Bibliography

Aho, E. et al. (2006): Creating an Innovative Europe. Report of the Independent Expert Group on R&D and Innovation. Available: http://ec.europa.eu/invest-in-research/pdf/download_en/aho_report.pdf. Last accessed 16 April 2010.

Commission of the European Communities (EC). COM (2010) 2020: Europe 2020 - A strategy for smart, sustainable and inclusive growth. Available: http://ec.europa.eu/eu2020/pdf/COMPLET%20EN% 20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf. Last accessed 13 July 2010.

Commission of the European Communities (EC) COM (2010) 183: Green Paper - Un locking the potential of cultural and creative industries. Available: http://ec.europa.eu/culture/our-policy-development/doc/GreenPaper_creative_industries_en.pdf. Last accessed 13 July 2010.

Commission of the European Communities (EC). COM (2009) 116: A Strategy for ICT R&D and Innovation in Europe: Raising the Game. Available: http://ec.europa.eu/information_society/ newsroom/cf/itemdetail.cfm?item_id=4698. Last accessed 19 April 2010.

Commission of the European Communities (EC). SEC (2009) 501 final: Design as driver of user-centred innovation. Available: http://ec.europa.eu/enterprise/news room/cf/document.cfm?action= display&doc_id=2784&userservice_id=1. Last accessed 19 April 2010.

Commission of the European Communities (EC). COM (2008) 652: Towards world-c lass clusters in the European Union: Implementing the broad-based innovati on strategy . Available http://ec.europa.eu/ enterprise/policies/innovation/files/com_2008_652_en.pdf. Last accessed 16 April 2010.

DG Entreprise and Industry (2010): Bolstering Europe's creative industries. Available: http://ec.europa.eu/enterprise/e_i/news/article_10043_en.htm. Last accessed 13 July 2010.

DG INFSO and DG MARKT (2009): Creative Content in a European Digital Single Market: Challenges for the Future - A Reflection Document of DG INFSO and DG MARKT. Available: http://ec.europa.eu/avpolicy/docs/other_actions/col_2009/reflection_paper.pdf. Last accessed 13 July 2010.

Europe. Gateway to the European Union (2009): Treaty of Lisbon. Taking Europe into the 21st century. Available: http://europa.eu/lisbon_treaty/index_en.htm. Last accessed 09 April 2010.

KEA (2009): The impact of Culture on Creativity – A Study prepared for the European Commission. Available: http://ec.europa.eu/culture/key-documents/doc/study_impact_cult_creativity_06_09.pdf. Last accessed 19 April 2010.

KEA (2008): Newsletter No 14 – Creativity: driving local economic development. Available: http://www.keanet.eu/news/news14.pdf. Last accessed 13 July 2010.

KEA (2006): The economy of culture in Europe – Study prepared for the European Commission http://ec.europa.eu/culture/key-documents/doc873_en.htm. Last accessed 19 April 2010.

NESTA (2008): Creating Innovation. Do the creative industries support innovation in the wider economy? Available: http://www.nesta.org.uk/library/documents/Report%20-%20Creative %20Innovation%20v5.pdf. Last accessed 13 July 2010.

Stefan Mappus (2010): Government policy statement of Minister President Stefan Mappus: „Neue Chancen, alte Stärken – Der Baden-Württemberg-Weg ins neue Jahrzehnt". Available: http://www.baden-wuerttemberg.de/fm7/1899/100310_Mappus_ Regierungserklaeung_ Protokollfassung.pdf. Last accessed 13 July 2010.

Queensland Government (2007): About Creative Industries. Available: http://www.industry.qld.gov.au /dsdweb/v4/apps/web/content.cfm?id=6738 Stand: 01/10/08. Last accessed 25 March 2010.

CReATE Background Paper on ICT and Creative Industries, Deliverable 1.1 Cassarino, I., Geuna, A. (2008): Background paper on ICT and Creative Industries. Available: http://www.lets-create.eu/fileadmin/_create/downloads/BGP_ICT_and_ Creative_ Industries_2008.pdf. Last accessed 19 April 2010.

CReATE Background Paper on Strategic Cluster Development, Deliverable 1.2

Clar, G., Sautter, B., Hafner-Zimmermann, S. (2008): Strategic Cluster Development: Applying Strategic Policy Intelligence to create a Joint Research Agenda. Available: http://www.lets-create.eu/fileadmin/_create/ downloads/del-1-2_cluster-back ground-paper_revised_final.pdf. Last accessed 19 April 2010.

CReATE Global Synthesis Report, Deliverable 2.2

Zaboura, N.: Global Synthesis Report on inter-regional Research Priorities and main Policy Recommendations. Available: http://www.lets-create.eu/fileadmin/_create/ downloads/CReATE_ global_synthesis_ report_final.pdf. Last accessed: 19 April 2010.

CReATE Regional Analyses, Deliverable 2.1

Creative Regions: Regional Analysis on Future Trends for Digital Creative Industries. Available: http://www.lets-create.eu/downloads.html. Last accessed: 19 April 2010.

Image sources

Illustration CReATE trend „Visual and interactive experience" (p. 20): Image of the reactable (www.reactable.com). Photographer: Xavier Sivecas; Illustration CReATE trend „Tools of productivity & intelligent automation" (p. 27): www.shapeways.com. Image: Korff en van Mierlo; Illustration CReATE trend „Digital distribution" (p. 31): Image of the reading room of the state library, Berlin. Photographer: Jörg F. Müller, jfm-fotodesign Berlin; Illustration CReATE trend „Mobility & interoperability" (p. 37): Image of the market place in Halle (www.ka-hal.de/halle.htm). Photographer: Dr. Bärbel Maliske-Velten; Illustration CReATE trend „User-producer-interaction in development (p. 43): Laboratory of the Westfaelische Wilhelms-Universität (www.uni-muenster.de/journalisten/galerie/labor.html). Photographer: Judith Kraft; Other Illustrations (p. 5, 7): University of Konstanz, Blended Interaction Design; (p. 14): Filmakademie Ludwigsburg - The Gap, Photographer: Florian Mühlegg/ Stefan Kolbe; All tagclouds are created with wordle (www.wordle.net).

Annex

Annex 1: Conceptual framework of the CReATE methodology

The conceptual framework of the CReATE methodology is based on the policy life-cycle approach and targeted at the trans-regional creation of a Joint Research Agenda for promoting ICT innovations in Creative Industries across Europe. The creation of such a Joint Research Agenda demands the consideration of global technological and market trends and developments (Foresight) as well as the assessment of promising application areas for future businesses. To mobilise and gain the commitment of the key stakeholders for the implementation of the trans-regional Joint Research Agenda the CReATE process carefully looked at taking into account the capacities and needs as well as existing policies within and across the regions right at the beginning.

To create a regionally backed and trans-regionally aligned Joint Research Agenda, the project partners developed a common methodological framework based on the regional foresight and cluster policies background paper . According to the agreed CReATE model (see Chart 1) as important part of the methodological framework, the CReATE partners started their regional activities with a sound analysis of the key stakeholders and the regional needs, capacities and policies in the two pillars of the CReATE model: the ICT research and the Creative Industries.

Based on the background paper on ICT innovations in Creative Industries , the partners also identified first trends and drivers which were supposed to have a great impact on the development of the regional Creative Industries.
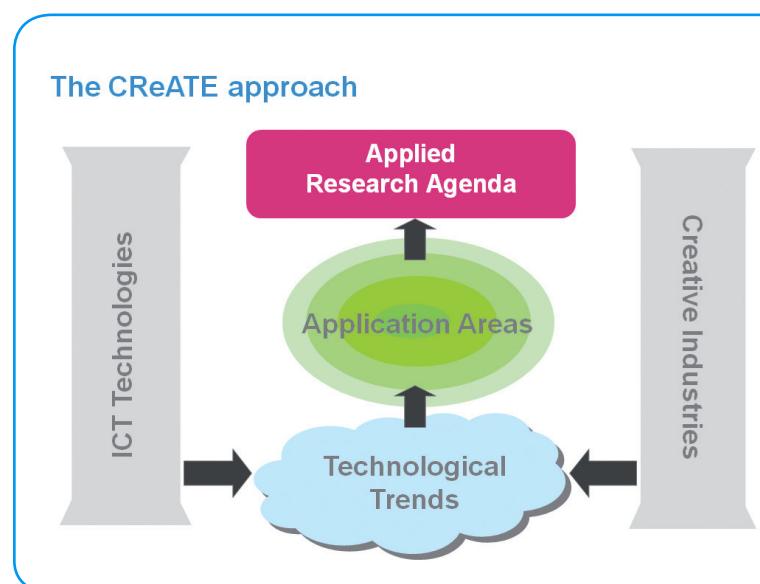

chart 1: The CReATE approach

In a second step, in two stakeholder workshops held in each region the key stakeholders – coming from ICT, Creative Industries and public administration –

• discussed and validated the generated regional knowledge base,
• assessed promising future ICT-related application areas in the Creative Industries, and identified corresponding regional priority areas for applied research.

All the results of these regional activities are composed in four regional analysis reports, which comprise insights into the regional infrastructure, the fields of excellence and aspiration and moreover regional policies and support measures that target the creative and technological branches. Next to the identified future trends and application areas these reports also provide the regional research priority areas that were matched and cross-regionally prioritized during a project internal conference. The Global Synthesis Report summarizes the results of the regional analysis and research priority setting phase of the CReATE project and represented an important milestone towards the Joint Research Agenda for promoting ICT Innovations in Creative Industries across Europe.

Annex 2: Funding opportunities

The following chapter gives an overview on currently available funding opportunities for joint projects within the CReATE research areas. It is focused on European programmes and can only serve as a guideline for the search of funding – an in-depth analysis is needed for each project, its context and its partners or participating regions.

Lifelong Learning (LLP)

The programme enables individuals at all stages of their lives to pursue stimulating learning opportunities across Europe. It is an umbrella programme integrating various educational and training initiatives. LLP is divided in four sectorial sub programmes and four so called ‚transversal‘ programmes.

The promotion of ICT for learning, linkable with CReATE, is one of the four key activities of the LLP's transversal programme, supporting actions that address general issues concerning two or more educational sectors.

Priorities for the key activity are set annually. The current focus is on:

- Multilateral projects to encourage innovation and creativity in learning and teaching and boost the use of new ICT tools and trends, particularly for groups at risk of exclusion such as early school leavers, ethnic minorities and elderly people (http://eacea.ec.europa.eu/llp/ka3/ict_multilateral_projects_en.php)

- Multilateral Networks to promote greater linking up and connectivity between learning communities and to foster creativity and innovation through the use of ICT (http://eacea.ec.europa.eu/llp/ka3/ict_multilateral_networks_en.php).

Seventh Framework Programme

The Seventh Framework Programme (FP7) bundles all research-related EU initiatives together under a common roof playing a crucial role in reaching the goals of growth, competitiveness and employment; along with a new Competitiveness and Innovation Framework Programme (CIP), Education and Training programmes, and Structural and Cohesion Funds for regional convergence and competitiveness.

The Seventh Framework Programme (FP7) is designed to support a wide range of participants: from universities, through public authorities to small enterprises and researchers in developing countries. The broad objectives of FP7 have been grouped into four categories: Cooperation, Ideas, People and Capacities. For each type of objective, there is a specific programme corresponding to the main areas of EU research policy. All specific programmes work together to promote and encourage the creation of European poles of (scientific) excellence (www.cordis.europa.eu/fp7/home_en.hmtl).

- FP7 - Cooperation:
  The specific programme on ‚Cooperation‘ supports all types of research activities carried out by different research bodies in trans-national cooperation and aims to gain or consolidate leadership in key scientific and technology areas (expected for June 2010 the Work Programme on ICT 2011-2012).

Across all these themes, support to trans-national cooperation will be implemented through:

    o Collaborative research

    o Coordination of national research programmes

    o Joint Technology Initiatives

    o Technology Platforms

- FP7 - Capacities:

  The Commission's proposals for the FP7 - Capacities programme aim to enhance research and innovation capacities throughout Europe and ensure their optimal use. The Capacities programme operates in seven broad areas:

      o Research infrastructures

      o Research for the benefit of SMEs

      o Regions of knowledge and support for regional research-driven clusters

      o Research potential of Convergence Regions

      o Science in society

      o Support to the coherent development of research policies

      o International cooperation

The 'Science in society' initiative aims to stimulate a harmonious integration of scientific and technological endeavour and associated research policies in European society. It will encourage Europe-wide reflection and debate on science and technology and their relation with society and culture.

Competitiveness and Innovation Framework Programme (CIP) – ICT PSP (2007-2013)

With SMEs as its main target, the Competitiveness and Innovation Framework Programme (CIP) supports innovation activities, provides better access to finance and delivers business support services in the regions. It encourages a better take-up and use of information and communication technologies (ICT) and helps to develop the information society (www.ec.europa.eu/cip).

The Information and Communication Technologies Policy Support Programme (ICT-

PSP) aims at stimulating a wider uptake of innovative ICT-based services and the exploitation of digital content across Europe by citizens, governments and businesses, in particular SMEs.

Funding goes mainly to pilot actions, involving both public and private organisations, for validating in real settings, innovative and interoperable ICT-based services in areas such as:

  o ICT for a low carbon economy and smart mobility;

  o Digital Libraries;

  o ICT for health and inclusion;

  o Open Innovation for future Internet-enabled Services in "smart"Cities;

  o ICT for improved services for citizens and businesses;

  o Multilingual web and Internet evolution.

Networking actions for sharing experiences and preparing the deployment of innovative ICT-based solutions in such areas are also supported, as well as the monitoring of the Information Society through benchmarking, analyses and awareness raising actions.

Digital Libraries:

The theme Digital Libraries intends to support activities, aiming to improve the accessibility, use and preservation of Europe's rich and diverse cultural and scientific heritage in the online environment. It further supports experiments with open access to scientific information and explore new paradigms for accessing and using this information.

Open Innovation for future Internet-enabled Services in "smart" Cities:

Building on existing user-driven innovation initiatives in Europe, the aim is to ensure wider implementation of open platforms for the provision of Internet-enabled services in cities. These platforms should help develop innovation ecosystems accelerating the move towards „smart" cities and providing a wide range of opportunities for new, higher quality, and sustainable services for citizens and businesses.

EUROSTARS

A Eurostars project is a European research and development project. It can address any technological area, but must have a civilian purpose and be aimed at the development of

a new product, process or service. A Eurostars project is collaborative, meaning it must involve at least two participants (legal entities) from two different Eurostars participating countries (http://www.eurostars-eureka.eu/search.do).

Its purpose is to provide funding for market-oriented research and development with the active participation of specifically research and development performing small and medium-sized enterprises (R&D-performing SMEs). The Eurostars Programme will improve availability of joint national and EC funding for Eurostars-approved international research projects, led by R&D-performing SMEs, in any area of technology.

Annex 3: Recommended links

Studies and information
- CReATE Download Area
  Studies, Regional Analyses Reports,
  http://www.lets-create.eu/downloads.html (Last accessed 16 April 2010).
- MFG European Reporter
  Blog and newsletter on European calls and activities of the MFG Innovation Agency for ICT and Media
  http://blog.mfg.eu/ (Last accessed 16 April 2010)
- KEA European Affairs
  http://www.keanet.eu/ecoculturepage.html (Last accessed 16 April 2010)

Creative networks
- European Interest Group on Creativity and Innovation (EICI)
  http://www.creativity-innovation.eu (Last accessed 16 April 2010)

EU related links
- Website on activities and projects promoted within FP7 Regions of Knowledge,
  http://ec.europa.eu/research/regions/index_en.cfm (Last accessed 16 April 2010)
- European Communities (2009): European Year of Creativity and Innovation 2009.
  Available: http://create2009.europa.eu/ (Last accessed 16 April 2010).