

Adaptive foresight in the creative content industries: anticipating value chain transformations and need for policy action

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This paper discusses the approach adopted to carry out a techno-economic foresight on the creative content industries, within the European Perspectives on the Information Society project. The novelty of the methodology lies in the mix of tools used, the embedding in an adaptive foresight framework and the implementation of a real-time Delphi which lead to interesting methodological lessons. The project succeeded in defining scenarios for the creative content industries, offering distinct trajectories and raising different policy challenges. The impact of the foresight on policy was limited, as it did not lead to direct policy measures, nevertheless, it confirmed some issues of major importance to the various stakeholders.

THE INFORMATION AND communication technologies (ICT) sector accounted for about 5% of the size of the European economy and 3% of total employment in 2005 (Turlea *et al.*, 2009) about 5% of the size of the European economy and 3% of total employment in 2005 (Turlea *et al.*, 2009). In the period 2000–2003 this sector contributed to more than 25% of Europe's productivity growth, making it the leading sector in the EU economy both in terms of labour productivity (almost twice the whole economy average) and research and development (R&D) expenditure, thus contributing most to the development of the EU knowledge economy.

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At the same time creativity is a key driver of growth and competitiveness of the knowledge economy. In this context the creative content sector is expected to become a major source of next-generation jobs across the world. The creative industries are estimated to account for more than 7% of the world's gross domestic product and in OECD countries they have an annual growth rate of 5–20% (figures include advertising/marketing, as well as cultural content) (United Nations, 2004). The global entertainment and media industries were estimated to be worth US\$1,255 billion in 2004, North America leading with a 44.4% share, Europe, the Middle East and Africa coming second with a 33% share. New distribution channels, like broadband internet and wireless communications are driving growth in this industry. Furthermore Europe's strong cultural heritage provides a sound basis for this sector which is reflected in a 29% world market share (worth US\$130 billion) in 2000 (Aho Expert Group, 2006).

The growing adoption of ICT is having a momentous impact on all areas of the economy, changing the way goods are produced, distributed and consumed, transforming the creative content value chain (Marcus, 2005). ICT are an important driver for both the supply and demand side of the creative content industry. It is the symbolic, highly digitisable nature of the goods it produces combined

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with the creative environment in which content activities unfold that make the creative content sector a fertile ground for radical innovations or disruptions (Christensen, 1997; Rafi and Kampas, 2002). Those lead to significant changes both in everyday life and business models under the combined influence of technological, organisational and behavioural innovations.

These features are at the origin of the dynamism that characterises the creative content sector and its ability to deliver new services globally. The adoption of novel or significantly enhanced ICTs may lead to new services which will become key to competitive advantage in a knowledge-based society, causing disruptions in selected markets or creating brand new markets, potentially changing the competitive environment of entire countries. Disruptions are therefore as much a threat to inflexible older businesses as an opportunity for more flexible new entrants.

The current and likely future dynamics of the creative content industries represent a major challenge for the application of forward-looking methods to underpin and inform policy-making. ICT evolution has become so fast and pervasive that it is increasingly difficult to predict the emergence of new technologies or the evolution of existing ones, making traditional forecasting inadequate to identify the visions for tomorrow needed to inform today's policy-making. As a consequence, future-oriented technology analysis (FTA) approaches like foresight have gained growing attention in recent years in the

EU and worldwide, as a policy support tool used to inform and underpin strategy development and visioning, providing strategic forward-looking knowledge to policy-makers. However, even methodologies that have been developed to deal explicitly with a range of potential futures are reaching their limits in the face of the scope and pace of change in the creative content sector. Established FTA approaches tend to struggle with the double challenge of exploring future trajectories of extremely fast-changing areas like creative content while providing the level of specificity needed to derive meaningful policy implications and conclusions. As explained above, the creative content sector is characterised by huge uncertainties in scientific-technological as well as in socio-economic and institutional terms. When commissioning an FTA of the creative content sector in 2007–2008, the European Commission was expecting not only to understand better the disruptive transformations the creative content sector is likely to face in the years to come, but also to provide novel and concrete recommendations on how to deal with the upcoming challenges.

To address these demands, the EPIS project foresaw the design and implementation of a combination of methods to explore the future evolution of the creative content industries and also identify priority areas for R&D policy-making. The methodology developed was based on the adaptive foresight framework in order to do justice to both the exploratory and the policy-oriented nature of the exercise (Eriksson *et al.*, 2008). Moreover, rather than specifying all stages of the methodology in full detail at the outset, a stepwise approach was followed. It allowed new insights on the nature of potentially disruptive changes, which had been generated in a previous stage, to be taken into account, and allowed the methods to be used in the next stage of the FTA process to be specified. In other words, the methodological details were adjusted in 'real-time' depending on the knowledge generated in the course of the process. The overall process was based on five main stages, which seemed best suited to deal with the uncertainties which characterise the sector and its evolution. The use of the scenario technique turned out to be essential, as was the mix of both open participatory and restricted process elements to tackle sensitive policy issues. The high degree of uncertainty and the flexibility of the methodological approach also demanded that impact assessment (or even impact identification) became a cross-cutting rather than a separate task in order to be able to adjust the methods to be used in the light of the deeper understanding of likely impacts.

This paper describes and assesses the FTA process and methodology used to envision the future of the European creative content sector, as well as the quality of the main results achieved. Starting with a definition of the creative content industries, we present our methodology, analysing its most important

elements and showing how the implementation of those elements in combination enables us to disentangle the complexity of the disruptive forces influencing a sector in turmoil. We also highlight some of the outcomes of our research and demonstrate how the FTA and methodology chosen succeeded in building strategic knowledge in support of a sustainable European creative content sector in the future. We further draw some lessons about the impact of using this particular FTA approach on European Commission policy-making, as well as about the lessons learnt from the methodological approach developed for dealing with fast and potentially disruptive changes of both a scientific-technological and socio-economic nature.

Delineation of the creative content sector

The first challenge encountered when dealing with creative content industries is their diversity. The creative content sector comprises a wide range of heterogeneous activities with diverse levels of industrialisation and commoditisation (e.g. ranging from sculpture to advertising), and radically dissimilar value chains. Because of this diversity, it is not possible to propose a general framework capable of capturing, in a meaningful way, the nuances and idiosyncrasies of this rich variety of activities. This has made it necessary to pragmatically select a subset of them that appear to be particularly important considering the background of our project, with its focus on the impact of ICTs on the production and distribution of creative content goods.

We therefore defined the creative content sector as the collection of activities involving the creation and distribution of goods with an intrinsic cultural, aesthetic or entertainment value, which appears linked to their novelty and/or uniqueness. This definition (which, it should be noted, does not specify the direction of the linkage between 'novelty' and 'value') makes it possible to adopt a tolerant characterisation of our subject matter avoiding traditional differentiations between 'high' and 'low' cultural activities, or the use of attributes that are restrictive such as 'intellectual property' to identify them. It also establishes a clear separation between creative content and media industries (where the value of the content is closely linked to its accuracy and timeliness).

As a result we have focused our analysis on the following sub-sectors (Mateos-Garcia *et al.*, 2008): music recording and publishing, film production, broadcasting (radio and TV), computer games, publishing (newspapers and books) and cultural spaces (museums and libraries) (see Figure 1).

This looks actually like a heterogeneous bundle of activities, with very different historical roots. However, in most of the above sub-sectors there is a creative effort aimed at the production of the master copy of a good, which is relatively easy to duplicate and distribute digitally (digitise), and as such they follow a publishing or broadcasting model.

In general, this delimitation and definition of the creative content sector emphasises those types of creativity-based products and services that are characterised by a high degree of commoditisation and industrialisation, and that are addressed primarily to

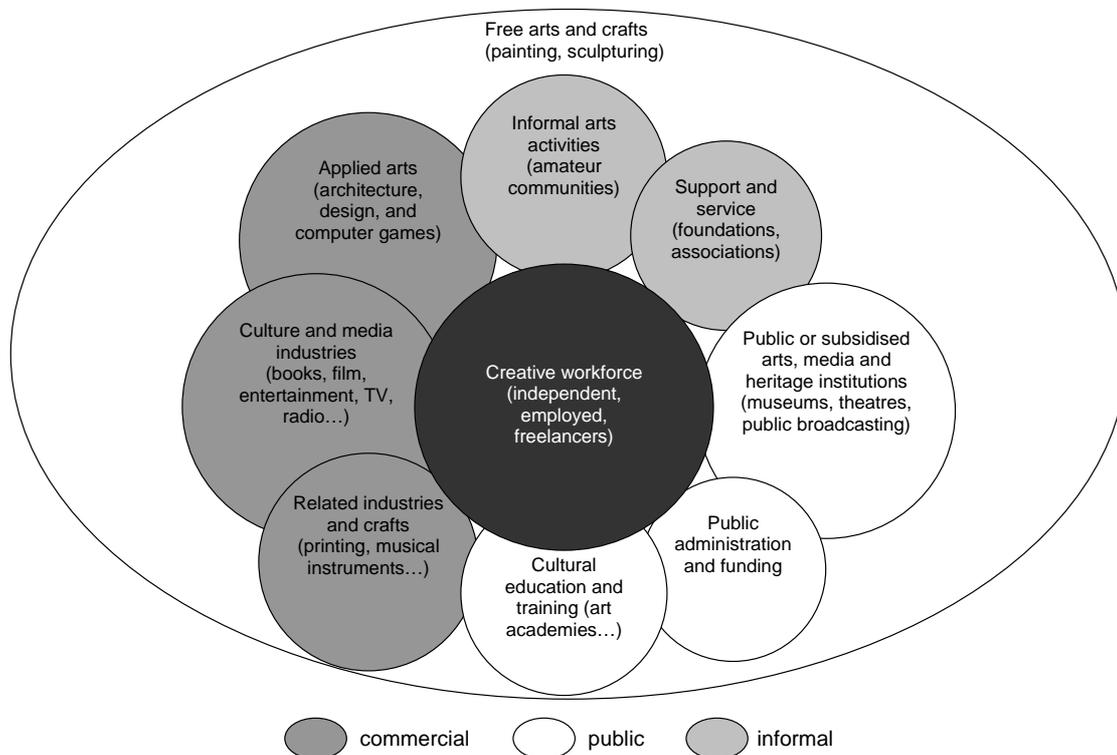


Figure 1. The creative content sector

Source: adapted from Wiesand and Söndermann (2005)

a mass audience. This definition allows us, for instance, to distinguish the creative content sector from the production of individual pieces of art.

Adaptive foresight applied to creative content

Choice of methodology

In order to achieve our objective of delivering forward-looking intelligence on the future evolution of the creative content industries, we opted for an adaptive foresight process: adaptive in terms of stressing the need to adapt to changing contextual developments (as opposed to stressing the ability to shape the future), in terms of assigning iterative monitoring and learning a central role in foresight, and in terms of adding a targeted strategy process to the usual open participatory processes of anticipation (Eriksson *et al.*, 2008). This methodology consists of five main building blocks as shown in Figure 2: a sector analysis, a Delphi survey, a scenario process leading to an analysis of issues and a final policy analysis.

A different level of participation was embedded at each stage of the above process. The sector analysis was carried out by the project team through literature review and expert interviews. The first findings

were then submitted for assessment by a large number of experts via a broad participatory tool, the Delphi survey. This fed into the scenario development, which was based on the close involvement of a restricted number of experts. The next stage was open to broader participation again, through a validation workshop where stakeholders from the various creative content sub-sectors and policy-makers were invited to give their views on the scenarios developed in order to reach a consensus as to the most likely developments and critical issues for further policy discussion. The final policy analysis stage was restricted to discussions with the client, i.e. the European Commission. The varying degrees of participation enabled us to handle better the complexity and uncertainties regarding the evolution of the creative content sector, as well as the diverse views of different stakeholders.

An impact assessment was possible (and necessary) to a varying extent at every stage of the process:

- In the initial sector analysis, impact chains were studied, although not in a systematic way, so as to gain an in-depth understanding of the sector and its transformation.
- The Delphi was meant to help reduce the uncertainties associated with some of the impacts we came across in the analysis.

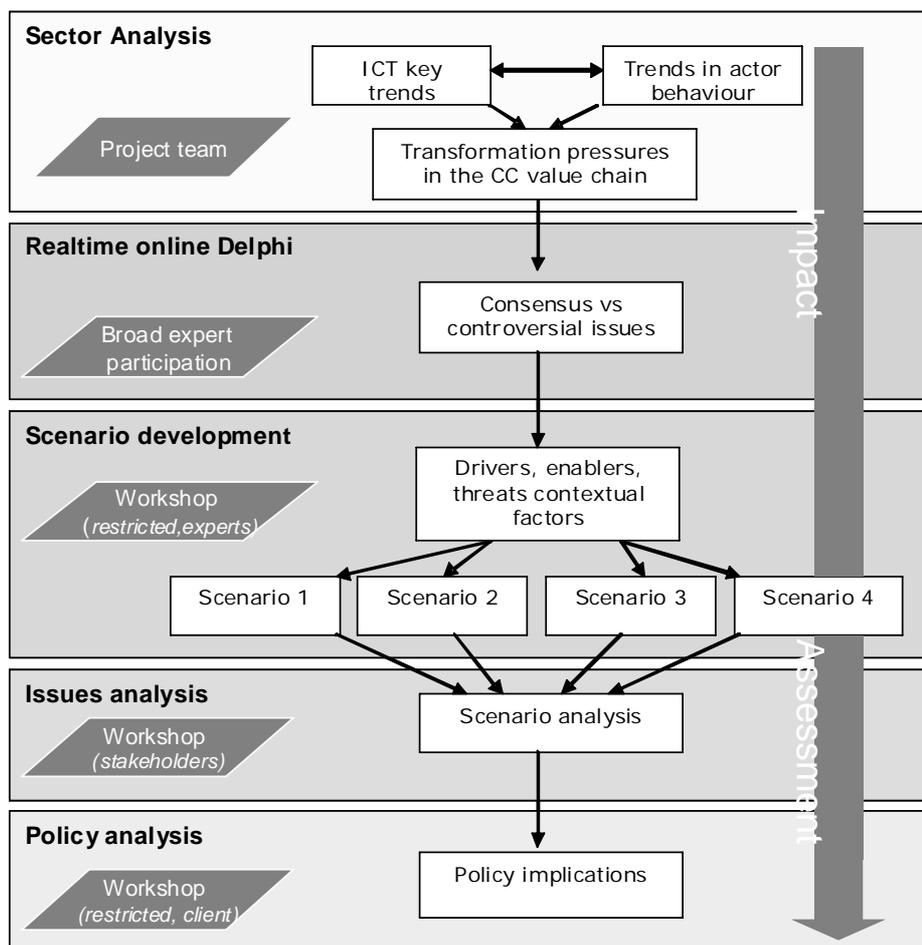


Figure 2. Overview of methodology building blocks

- The scenarios aimed to synthesise the insights about potential impacts (including the differences in opinion about the impacts of some trends). In order to tackle the diversity of the creative content sub-sectors, the scenarios addressed two levels, namely the creative content sector in general and specificities of at least some sub-sectors.
- After the scenario stage, we extracted 'key issues', which in the end made up the main dimensions for the overall impact assessment. In our case, these were mainly sub-dimensions of two sustainability dimensions, namely of the 'social' and the 'economic' ones. These two dimensions are regarded as particularly important and controversial in the case of the creative content sector. Moreover, in view of major uncertainties, any attempt at environmental impact assessment would have gone far beyond the scope of the project.
- The policy analysis phase aimed to look not only at the issues as such and potential European policies to address them, but also at differences in assessments and interests of stakeholders.

Each of the stages is explained in detail in the following sections.

Step 1: Sector analysis

The first step in our process is the analysis of the sector in terms of the actors, business models, technology trends, societal developments, and user behaviour influencing the evolution of the sector.

To start with we proceeded to define the scope of our research by analysing the characteristics of creative content goods. As mentioned earlier, the creative content sector being very diverse and heterogeneous it was necessary from the outset to focus on a sub-set of activities most likely to be impacted by ICT innovation and where creativity and culture play an important role. This led to the selection of music, books, video and films, games, museums and cultural spaces as the focus of our research.

Within these boundaries, we then analysed the key characteristics of the creative content value chain in a generic manner, looking at the role of the various actors in the value chain (e.g. publishers, retail etc.), investigating key aspects of the creative content goods, like the role of digitisation, intellectual property rights (IPRs) or channel diversification. This provided a general framework which we could apply to each of the specified creative content sub-sectors (see Box 1).

As the next step we analysed the three dimensions of content creation, content distribution and user interaction for each of the above activities (see Figure 3 enabled us to understand and describe the transition from traditional business models to online ones and identify the impacts of digitisation and other trends on the various steps in the value chain, as well as on the actors' strategies.

Having defined the industrial, business and technological characteristics of the creative content sector and its sub-sectors, we completed our understanding with an assessment of the European position both in qualitative and quantitative terms, based on the analysis of company documents, business and policy reports.

The first phase of our analysis gave us an understanding of ways in which ICT innovations challenge traditional value chain structures and business models, but further analysis was required to assess the role and impact of technology trends and user behaviour. This was done by reviewing emerging ICT innovations and identifying areas where these will have a significant effect on creative content. We described relevant technologies within our established framework, i.e. classifying them within creation, distribution and user interaction and we highlighted some essential trends of change, identifying opportunities and threats for the European industry in each of the sub-sectors. To complete the picture of the creative content sector, we analysed demand issues by using data from consumer surveys and developing case studies on failed instances of product introduction which helped to unveil the mismatch between consumer expectations and perceptions on the one hand, and the opportunities offered by a technology on the other.

The analysis was successful in providing a picture of emerging trends that impact the creative content sector. However, the picture that emerged was one of uncertainty, with two potentially dominant future situations. The first is characterised by growing opportunities for the sort of small, flexible and talented players that populate the European creative milieu, thriving in an open environment where ICTs innovation enables direct communication with distant or nascent audiences. The second involves the emergence of proprietary and convergent platforms for content selection and distribution. The risk of the first situation is that the overall size of the market for content may be smaller, more fragmented, and subject to a lower rate of growth precisely because of the absence of platform (mass markets) and commodity orientation. The risk of the second situation is in the negotiation for access, with the ensuing redistribution of revenue shares in favour of powerful platform owners, essentially gatekeepers of audiences in the new convergent context, thus excluding smaller players.

On the demand side our analysis revealed the contrast between the relatively stable, unchanging nature of consumer demands and the radical changes brought into the creative content sector by digital technologies, as well as the shift towards networked communities whereby people, especially the younger generations, constantly look for means to maintain social relationships real-time, wherever they are. In this context, customer expectations need to be carefully managed for a company to remain successful, and building trust and awareness are part

Box 1. The creative content sector on the move

Figure 3 shows the various stakeholders involved and the technology trends at work in the process of content creation, distribution and consumption in the case of video games. A similar analysis was carried out for books, music, audiovisual and cultural spaces. The results show variations in the interactions between technologies and actors along the various value chains for reasons inherent in the varying degree of digitisation in each sub-sector and the market structures that have prevailed in each domain until recently.

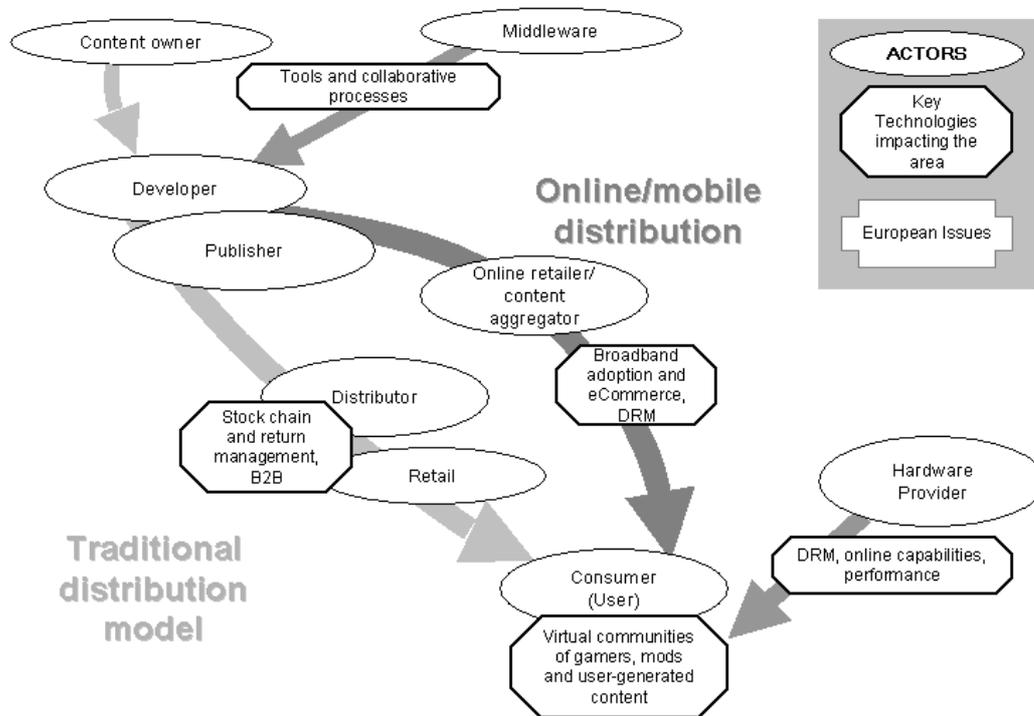


Figure 3. Actors and key technological areas in the video game sub-sector

Source: Mateos-Garcia *et al.* (2008)

Some key technology trends include:

- new business models with transformation of creative content goods into services;
- importance of communities of users as sources of talent, information, feedback and content via tools to create, access, reconfigure and share content;
- development of innovative tools for content creation, publication and online access; and
- increasing pressure on users' attention and increased difficulty to navigate content.

Important user demand trends:

- new patterns of use induced by new content delivery platforms vs. more constant patterns (e.g. sharing, social relationships, interactions);
- company–customer interactions shift towards more interconnected and less predictable behaviours;
- influence of user demographics (e.g. age and gender) on use patterns; and
- usability, interoperability, communication and attention.

of the equation. While demographics show clear patterns for the younger generations, any extrapolation is fraught with risks, as their attitudes may evolve when they become adults. Finally, content is more important to consumers than the technologies necessary to access or use it, and companies should not lose sight of this when defining their strategies and business models.

The above technology and social/societal trends and the way they interact with one another provide interesting insights for market players devising business plans, but they are equally relevant for policy-makers at the point of defining policies in support of the creative content sector development. However, the uncertainties over the direction of change and the radically

different consequences this could have on social and economic sustainability of the sector in Europe made it impossible after the analysis stage to draw any initial conclusions upon which we could base our policy analysis. The Delphi was therefore useful to address these uncertainties in more depth. In addition, as neither of the two possible future developments seemed to be more likely than the other it was necessary to add the (originally unforeseen) scenario process in order to address this systematically.

Step 2: Delphi survey

We used the Delphi method to elicit views from a wide-ranging audience on current and future trends

and related variants, uncertain issues, potential disruptions and the likelihood of possible identified trends/issues.

The EPIS-Delphi was implemented as an internet-based real-time Delphi (RT Delphi) (Gordon and Pease, 2006; Gordon, 2007). Like in a classical two-round Delphi survey, experts participated in a survey, in which they had to assess topics based on statements about the future. In a RT Delphi, the participants not only judge twice but they can change their opinion as often as they like when they see the aggregated results of the other participants. The RT Delphi is a way of addressing the problem of the generally large dropout rate in online surveys and allows all the answers to be taken into account until the end of the survey. An initial concern was the difficulty of controlling the sample and that more active persons might be able to influence the sample in an above-average way. However, our experience shows that results from RT Delphis tend to be robust.

Theses were developed in a rather conventional way using a mixture of analytical desk research and expert workshops by delineating and structuring the field, resulting in a set of 36 uncertain issues and open questions in six thematic blocks (see Table 1). Experts were asked to assess the importance of each thesis in different dimensions (economic, scientific, society, quality of life) and the possible actions that could speed up or strengthen the realisation of the thesis.

We invited 1,111 experts with a focus on creative content to participate in the Delphi survey that ran during June 2007. Of this total, 426 experts visited the Delphi website (38.3%) and 288 of them (25.9%) started filling out the questionnaire. Out of

these experts 124 (43%) returned to the questionnaire at least once in order to review the results and change their assessment as necessary (Friedewald *et al.*, 2007).

In a nutshell, the Delphi survey revealed only a small number of topics where experts did not reach a consensus about the likely future development. This information served as input for our subsequent scenario development.

The following issues turned out to be the most controversial:

- IPRs: the relevance of the current IPR concept under changing conditions, new ways to protect IPR and the issue of technical protection means like digital rights management systems;
- the structure of the creative content sector and the fundamental transformation process it is undergoing: of particular importance is the question of how new, innovative enterprises that experts regard as the drivers of technological and business changes can be supported in an environment that is currently dominated by a few globally active corporations;
- the relationship between voluntary and professional content creation activities and between profit-oriented businesses and cultural diversity (as represented by 'core' cultural activities and education); and
- the open issue of the likely development and importance of virtual worlds (like Second Life) and multiplayer online games (like World of Warcraft).

On the other hand, a consensus was reached on well-known factors such as universal access to broadband networks, computer literacy and ICT skills, which

Table 1. Extracts from Delphi theses

Media digitisation	Eight theses, e.g. <i>(2) Most people are actively engaged in participatory entertainment like interactive TV</i> <i>(3) More than 20% of all books are purchased in electronic form and not as printed copies</i>
Mobile media use	Eight theses, e.g. <i>(10) Most users of audio-visual content regularly consume them on mobile devices</i> <i>(11) Speech is the predominant means to interact with data and media capabilities of mobile devices</i>
Navigating in a digital world	Four theses, e.g. <i>(18) Individuals can reliably separate personal communications from advertising messages</i>
User-created content	Five theses, e.g. <i>(23) More than 20% of commercially offered video and music are user-produced</i>
Business in a digital world	Five theses, e.g. <i>(28) Cable TV and satellite TV network operators are the predominant distributors of video-on-demand over the internet</i> <i>(30) Content creation for educational purposes (e-learning) reaches a 20% share of the entire creative content market in Europe</i>
Political and legal issues	Six theses, e.g. <i>(32) Most media users accept digital rights management because it helps them to conveniently use and reproduce content legally</i> <i>(34) Most digital creative content is distributed under 'open' licenses such as the Creative Commons License or GNU General Public License</i>

Note: No consensus could be reached for the theses printed in italics

remain crucial for the future success of the creative content sector.

With hindsight a Delphi survey was possibly not the ideal research instrument, since it could not identify radically new developments. In this respect the use of techniques to identify weak signals would have improved the farsightedness of the theses although it would have increased the risk of including unrealistic topics in the survey. To achieve such an objective a method based on identifying weak signals would be required, a domain which is still in its infancy (Mendonça *et al.*, 2004; Ilmolaa *et al.*, 2006).

Step 3: Design of scenarios for the future

The sector analysis carried out as the first step of the process and complemented by the Delphi survey served as an input for a scenario-building workshop. The addition of a scenario process emerged at that point as a necessary new building block to our adaptive foresight methodology. A few selected experts with a background in the creative content industries and/or scenario building were invited to join the project team for a two-day workshop. It started with a general brainstorming on global trends and other socio-economic considerations that may characterise the context in which creative content will unfold in the future. As a second step possible dimensions for the scenarios' axes were discussed and an agreement was reached on the two dimensions that would characterise meaningful and sufficiently differentiated scenarios. Split into smaller groups, the participants were asked to sketch a storyline and identify the key characteristics of their respective scenarios. The project team completed a full-blown scenario description with the input from all participants after the workshop because of time constraints.

Four future scenarios In developing the four scenarios the workshop participants considered the impact of ICT innovation, user behaviours and other

factors on the transformation of the creative content industries. In particular the following elements were deemed to play a fundamental role in shaping the creative content industries of tomorrow:

- global trends, like the growing importance of Asian economies and their attitude to creative content;
- European lifestyles, which are characterised by a decline in national identities but the persistence of regional differences;
- demographics and digital divide issues; and
- the role of ICT as enablers for ubiquitous creativity.

Although they share the same basic assumptions, the four scenarios differ qualitatively from one another. We considered the framework conditions and technological characteristics (e.g. magnitude of sunk costs) that determine economic relations in the creative content sector, on the one hand, and the prevailing social values as reflected in attitudes towards (and thus demand for) new creative content products and services, on the other, as most pertinent and have therefore chosen those for positioning the four scenarios (see Figure 4). The boundaries between the scenarios are not fixed. They can represent situations which occur sequentially.

The *economic framework* (competitive markets and entrepreneurialism vs. oligopolistic and 'walled off' markets) and *social values* (positive public attitude of potential users towards and high demand for new creative content products and services vs. negative public attitude and lack of demand) were therefore derived as the axes used to define the four scenarios:

- *Incumbents take it all*: a closed and regulated market which is dominated by a few globally active companies.
- *Open innovation society*: a situation where all

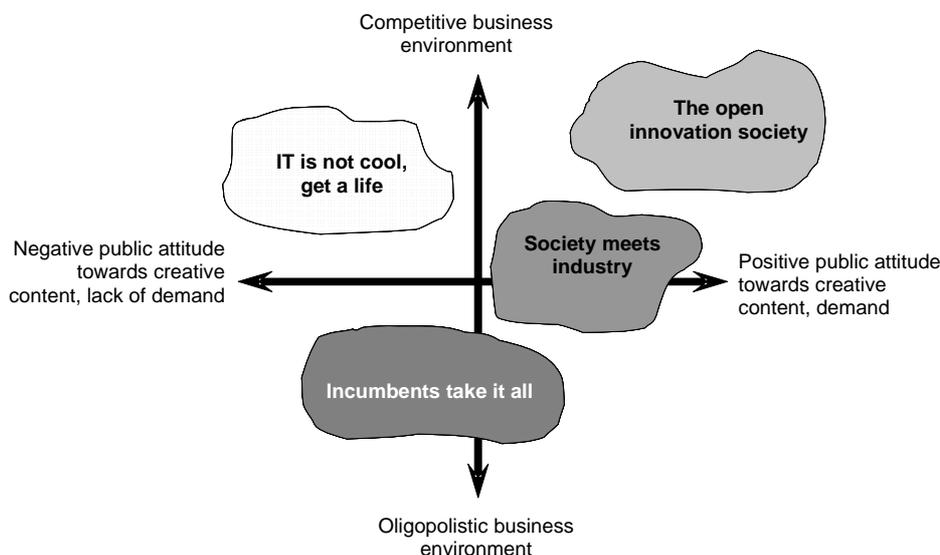


Figure 4. Positioning of the four scenarios

promises associated with user created content, social software and Web 2.0 are realised.

- *Society meets industry*: intermediate scenario between the previous two assuming that the creative content sector is transformed rather than revolutionised.
- *Information technology is not cool*: a future in which negative effects of ICT-based media production and distribution (e.g. spamming) have resulted in a widespread loss of popularity for the internet.

Each scenario was described focussing on common elements like global context, infrastructure, practices of content production, distribution and use, and interaction. The scenarios led to a modification and further specification of our initial list of issues relevant to the assessment of the impact of future socio-techno-economic trends on the sustainability of the creative content sector. The key point about these issues is that impacts will differ according to scenarios, as illustrated in more detail in the subsequent section.

Step 4: Analysis of issues

The fourth step of our methodology consisted of the analysis of the scenarios with a view to identifying issues that may have an impact on the future sustainability of the sector and may therefore require policy measures or could at least have policy implications. In order to reach our objective we made use of another workshop, which was attended by around 25 stakeholders, including representatives from some sub-sectors of the creative content industries, academia, policy-making etc. To structure our discussion we followed the common elements used in step 3 to systematically describe our scenarios (global context and key drivers, infrastructure, practices of content production and distribution, practices of content users, interaction, interfaces and institutions).

We therefore not only presented the scenarios' broad outlines but we also highlighted those key features likely to have implications for factors such as industry structure, players' strategies or the legal environment, should a particular scenario be realised. This approach was very helpful for stimulating discussions. However, depending on the creative content sub-sector the stakeholders represented and their role and relative position on these sub-sectors, they assessed the outcomes of the varying scenarios differently. Thus, the workshop was successful in identifying problem areas, raising concerns and eliciting different views, which in turn meant that no consensus on the future of the creative content industries could be achieved. This is probably a logical outcome in the light of the diversity that characterises the creative content sector and its sub-sectors, its current state of transformation and the uncertainties it is facing.

Nevertheless, the workshop helped us identify the most important issues (usability, user empowerment etc.) which would lead to different outcomes depending on which scenario were to be realised, with varying consequences for the development of the creative content industries, in particular in terms of growth, jobs, social inclusion or cultural diversity, and for the actors in the sector. Consequently, our impact assessment focused on four categories of issues (technology, regulatory, market and user related), each encompassing a number of sub-issues.

Key issues for the future success of the creative content industry Even though the scenarios reflect different, often contradictory trends and uncertainties about the future of the creative content industry, a number of important issues can be highlighted by looking across the scenarios. These issues may be technological, regulatory, market-related, user-related or of a broader societal nature. They will be decisive for the future pathway of the creative content sector. It is thus important to understand those factors and mechanisms that influence market uptake and diffusion along the creative content value chain (see Figure 5), and what obstacles need to be removed to strengthen the position of European actors in this sector.

By their very nature, the issues raised tend to be assessed in differing ways by the various actors in the creative content sector, reflecting their respective interests and perspectives. The high degree of diversity of the creative content sector represents an added difficulty in taking an EU-wide perspective, as diversity hinders the formulation of broad and coherent initiatives.

However, in spite of the diversity of the various creative content sub-sectors, the convergence of digital content and media has already given way to a growing convergence of future issues in these sub-sectors. Many of the challenges and obstacles are similar for all sub-sectors. Many are also related to similar or cross-cutting technological solutions as in the case of seamless (IPR-based) networks or mobile communications. There are also cultural challenges, implying that content is not a product like any other but also a cultural good and an expression of diversity in Europe.

Among the multitude of factors that are potentially important for successful future development of the content sector the following deserve particular attention:

- technology issues (e.g. usability, methods and tools for multi-channel production);
- regulatory issues (e.g. balance between monopoly and competition, digital rights);
- market-related issues (e.g. development of new, sustainable business models); and
- societal sustainability issues (e.g. user empowerment, cultural diversity).

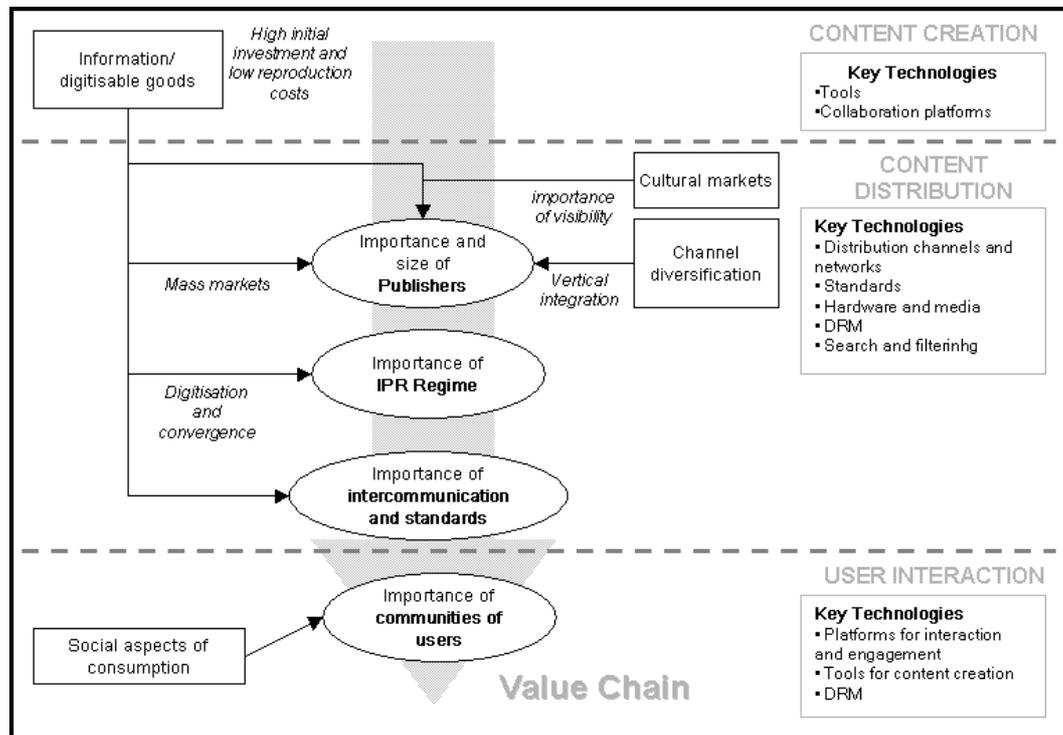


Figure 5. Creative content goods, impact on industrial structure and key technologies

Source: Mateos-García *et al.* (2008)

Step 5: Policy analysis

Our adaptive foresight on the creative content industries was concluded with a policy analysis, aimed at deriving policy options for a thriving creative content sector in Europe in the future. This was done in closed discussion with the client, i.e. European policy-makers who were involved in the various workshops throughout the process, and at the end of the process to assess the results of the exercise.

The overall objective of the FTA had been to provide the policy-making process with strategic intelligence by taking a prospective view towards the evolution of ICT and, in particular, identifying the potential for disruptions, leading to policy formulation and recommendations for European and national policies, in particular R&D policy.

While all the steps leading to the policy analysis revealed important findings on potential directions of change and consequently possible challenges for policy-making, the main difficulty encountered was to tailor the results to some of the specific needs of the client, i.e. R&D policy setting. In fact many of the issues identified in our research relate to policy areas which are not specific to the R&D agenda, and those that are R&D related may already be tackled through EU Framework programmes or other European Commission initiatives, although in a wider context than that of the creative content sector alone. Nonetheless, we feel that the issues identified are crucial to ensure a thriving European creative content sector in the future and they needed to be brought to the attention of our client. In that sense the policy analysis stage fulfilled its objectives to a large extent.

However, the above finding raises the question of the appropriateness of carrying out a FTA on such a diverse sector with a specific policy area like R&D in mind. Many of the policy issues linked to the evolution of the creative content industries are of a cross-cutting nature (e.g. skills, cultural diversity, three-dimensional technologies, next generation networks etc.) and are dealt with in different areas of the European Commission.

Challenges for policy-making The challenge for policy-makers and regulators is to help create an environment which facilitates the potentially positive developments identified in some of the scenarios, while protecting citizens and consumers from the potential disadvantages. In other words, an environment that balances unimpeded access to content and fair remuneration between categories of rights holders while fighting the fragmentation of the creative content sector, a fragmentation partly justifiable due to language and national identity barriers. Awareness of the issues and challenges raised subsequently will be decisive for fulfilling this task.

The policy issues that have been identified include fostering ICT and creative skills:

- new initiatives to provide incentives for ICT training and skills development;
- promoting study programmes and curricula combining technical, business and creative skills;
- teaching the teachers;
- encouraging women to engage in creative content activities;
- raising awareness, especially among younger generations, of the value of creativity; and

- mediating between skills and demand for skills.

They also include fostering innovation, for instance:

- supporting R&D for infrastructure;
- facilitating mobile content development;
- accelerating broadband penetration;
- developing mechanisms to monitor trends and measure impacts;
- promoting further innovation-oriented public procurement; and
- adopting further measures to encourage new entrants.

Conclusion

The methodological setup of the FTA described and analysed in this paper is anchored in the adaptive foresight framework, which enables us to reconcile the exploratory nature of the exercise (i.e. envisioning the future of a sector in disruption such as the creative content sector) with the need to derive conclusions for policy-making. Generally, we can conclude that the methodological design, based on a series of stages whereby each new stage is adjusted based on the findings of the earlier stage worked rather well. As illustrated by the case study analysed in this paper, the methodological setup succeeded in generating forward-looking perspectives on the creative content sector, building on a consolidated understanding of how the sector works and likely future trends. It also made it possible to adapt successfully to changing requirements and insights during the process, for instance by adding a scenario development phase late on in the project. This became necessary because the range of possible futures turned out to be broader than was initially expected. However, the well-justified and adapted combination of methods was not completely appropriate to answer some of the client's ambitious policy-related demands. For instance, identifying activities and business models likely to contribute to creative content growth in the future and deriving conclusions for R&D policy turned out to be beyond the reach of the approach. This is as much due to the inherent limitations of our abilities to look into the future and of the possibilities of what FTA can deliver as it is to the client's unrealistic expectations. It is essential to accept that the future is opaque, uncertain and unpredictable, and that we must learn to handle uncertainty, in particular in fast changing sectors like the creative content sector. Pretending to be more precise than serious FTA allows would be both methodologically questionable and unethical.

A second observation is that it proved to be necessary to engage with practitioners early on in the process of data gathering and analysis to ensure that the research focus reflected their main priorities. However, practitioners may try to preserve the status quo, depending on their market position. The chal-

lenge is to grasp the current situation and emerging trends by involving those who know best, the practitioners, while ensuring a plausible new picture of the future can be shaped which they themselves may not be willing to accept at the outset. In other words, one has to find the balance between the 'feasibility' and 'surprise' dimensions, which is crucial in rapidly changing sectors like the creative content sector, where the fast pace of change can rapidly make any foresight outcomes obsolete.

As to the adequacy of the methodology for shaping a vision of the creative content sector as such, we can conclude that the process helped raise key issues and controversies relevant to the sector as depicted by the four scenarios. Although exploratory in nature, the latter reflect major differences of opinion among the stakeholders over the expected and desired future of the sector. As such, the process is, in part, responsible for making these differences explicit and bringing them to the surface. They relate to technology, market, regulatory, user-related and societal issues. For instance, the role of incumbents compared to that of user-based communities is seen differently by different stakeholders. Associated with this are the often opposed views on management of IPRs and the challenge that loosening them could pose for prevailing business models, while opening up opportunities for small enterprises and amateurs to develop innovative products and services. Recent developments regarding digital content copyrights will further influence the assessment of this issue. Another important example concerns content quality and, as reflected in the scenarios, the extent to which quality is expected to determine the future of several segments of the creative content sector.

Such differences make it difficult to draw clear, unequivocal policy implications. Controversial positions may call into question current political agendas, and make the definition of new ones difficult. It is therefore no surprise that the FTA policy impact was rather limited in the sense that it did not lead to any direct policy measures or specific initiatives. This is coherent with the methodological approach of adaptive foresight that foresees a phase of internal debate of policy implications by the client (or other stakeholder), and thus leaves the drawing of consequences (e.g. revising agendas) to their discretion. In this case, particular attention was paid to the implications of the exercise on European research policy priorities. On certain areas a consensus on their importance for the future was easy to reach, like with display technology, human-computer interfaces or creativity enhancing tools. The need for standardisation and technical platforms to facilitate research and innovation in certain thematic areas was also widely accepted, even if the associated IPRs issues are still controversial. The next step, however, on the need for European (research) policy action in these areas, would require looking at expected market and system failures, an issue that is difficult to address in view of the uncertainty characterising the sector.

With regard to the impact assessment aspect of the methodology, we can conclude that it is unrealistic to have a fixed framework from the outset when dealing with a sector in flux and where uncertainties are so high that even experts have trouble imagining impacts (as the strong discrepancies in trend impact assessments show). In this sense, addressing emerging issues and their potential impact throughout all stages makes sense as it helps improve our understanding step-by-step.

Finally, the creative content sector foresight became a particular challenge because of the high degree of uncertainty in all (technological, economic, social and structural) dimensions, which were very difficult to capture. Existing methodologies, even when combined in innovative ways and adjusted in the course of the process, reach their limits and point to the need for new approaches for exploring the future of such fast-changing areas. This need to explore new methodological inroads becomes even more pressing if an FTA is expected, as in our case, to generate knowledge and insights to feed directly into formulation of current-day policy options.

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References

- Aho Expert Group 2006. Creating an Innovative Europe: Report of the Independent Expert Group on R&D and Innovation appointed following the Hampton Court Summit chaired by Eski Aho. EUR 22005. Luxembourg: Office for Official Publications of the European Communities.
- Christensen, C M 1997. *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Boston, MA: Harvard Business School Press.
- Eriksson, E A and K M Weber 2008: Adaptive foresight. Navigating the complex landscape of policy strategies. *Technological Forecasting and Social Change*, **75**(4), 462–482.
- Friedewald, M, von Oertzen, J and Cuhls, K 2007: European Perspectives on the Information Society: Delphi Report. EPIS Deliverable 2.3.1. Available at <<http://epis.jrc.ec.europa.eu/>>, last accessed 28 January 2010.
- Gordon, T J 2007. Energy forecasts using a 'Roundless' approach to running a Delphi study. *Foresight: The Journal of Future Studies, Strategic Thinking and Policy*, **9**(2), 27–35.
- Gordon, T J and A Pease 2006. Delphi 2: An efficient, 'round-less' Delphi. *Technological Forecasting and Social Change*, **73**(4), 321–333.
- Ilmolaa, L and O Kuusibb 2006. Filters of weak signals hinder foresight: monitoring weak signals efficiently in corporate decision-making. *Futures*, **38**(8), 908–924.
- Marcus, C 2005. Future of Creative Industries: Implications for Research Policy. Working Document EUR 21471. Brussels: European Commission.
- Mateos-García, J, A Geuna, A, W E Steinmueller *et al.* 2008. The Future Evolution of the Creative Content Industries: Three Discussion Papers. Luxembourg: Office for Official Publications of the European Communities (Scientific and Technical Research series, EUR 23633 EN).
- Mendonça, S, M Pina e Cunha, J Kaivo-oja and F Ruff 2004. Wild cards, weak signals and organisational improvisation. *Futures*, **36**(2), 201–218.
- Price Waterhouse Coopers 2006. Global Entertainment and Media Outlook: 2006–2010. Global Overview. New York: Price-waterhouseCoopers LLP
- Rafi, F and P Kampas 2002. How to identify your enemies before they destroy you? *Harvard Business Review*, **80**(11), 115–123.
- Turlea, G, S Lindmark, L Picci *et al.* 2009. The 2009 Report on R&D in ICT in the European Union. JRC Scientific and Technical Reports 23832 EN. Luxembourg: Office for Official Publications of the European Communities.
- United Nations 2004. Creative Industries and Development. Report TD(XI)/BP/13. São Paulo: United Nations Conference on Trade and Development. Available at <<http://www.unctad.org/Templates/Download.asp?docID=4850&intltemID=2068&lang=1>>, last accessed 28 January 2010.
- Wiesand, A J and M Söndermann 2005. The 'Creative Sector': An Engine for Diversity, Growth and Jobs in Europe. An Overview of research finding and debates prepared for the European Cultural Foundation.

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