THE IMPACT OF ICT INNOVATION IN CREATIVE USER ENGAGEMENT IN THE CULTURAL SECTOR: AN OVERVIEW OF INNOVATIVE DYNAMICS, TECHNOLOGICAL DEVELOPMENTS AND AREAS OF APPLICATION IN THE BOOK, MUSIC, AUDIOVISUAL AND VIDEO GAME SUBSECTORS.

Juan Mateos-Garcia, Ed Steinmueller and Aldo Geuna.

1- Introduction

The engagement of formerly passive consumers in activities of content creation and technological innovation lies at the core of what has been defined as the 'Web 2.0' phenomenon, exemplified by the growth of communities such as Wikipedia, YouTube or Myspace, the popularity of blogs as a media for self-publishing, and the success of the Open Source movement[1]. According to traditional accounts of this phenomenon, technological developments in infrastructure and tools have created the conditions that enable and motivate users to engage in innovative and creative activities with outcomes, it is argued, often of a higher quality than those achieved by traditional companies.

In this paper we establish some basic innovative dynamics in the area of Information and Communication Technology (ICT), as well as social aspects of consumption and use which explain the emergence of this phenomenon, and illustrate its importance in the context of the creative content industries. Our goal is to highlight technological and social trends that drive creative activities by users, and identify areas where their impact is being (or is likely to become) particularly important[2].

In the context of this paper we use the term 'Creative User Engagement' to refer to a broad range of activities that include the creation of resources about content and content collections, creation of new content, and development of tools to be used in creative activities, and in the transmission and storage of their outputs[3]. They share two common traits: first, they constitute, to a smaller or larger degree a shift away from passive modes of participation in content consumption implicit in the traditional top-down 'broadcasting model', and second, they are undertaken by individuals or communities who could be defined as amateurs and hobbyists, this is, they do not profit from the direct sale of the resources, content goods and technologies they produce. It is important to highlight that the absence of a sale does not imply that users who engage in this broad range of activities do not benefit economically from them, through for example enhancements in their reputation and visibility which makes it possible for them to, for example, display advertising in their sites, exact consultancy fees or sell ancillary products[4].

Having bounded the phenomenon that concerns us we undertake, in section 1, a topical review of outcomes of processes of social change and technical innovation in the ICT context that have led to the emergence of a broad range of technologies which facilitate Creative User Engagement. These technologies are described in Section 2, paying special attention to their impact on the activities of the creative content sector, which is further illustrated with examples for the Book, Music, Audio-visual and Video Game sub-sectors. We conclude the paper with some cautions regarding the future emergence of a 'web 2.0 economy', and identifying some policy implications.

2- ICT Innovative dynamics, Culture Goods and Creative User Engagement

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[1] For some accounts of the success of user-generated content and innovations see Surowiecki, James 2004: 'The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economies, Societies and Nations', Weber, S. 2004: 'The Success of Open Source'. Harvard University Press, or Tapscott, D. and Williams, A. 2006: 'Wikinomics: How Mass Collaboration Changes Everything' Penguin.

[2] Given the breadth of the field we are covering, the description of our subject of analysis in certain areas will be necessarily impressionistic. We do not, for example, elaborate on the models presented to explain the superiority of user-centric methods for content and technology development over those carried out inside companies, or describe the social structures which emerge in user communities in order to co-ordinate their structures, both of which constitute essential research issues which nevertheless fall outside the scope of the present paper.

[3] This way we try to bring toether innovative activities usually classified as 'user-centric innovation' (Von Hippel 2007: 'Democratizing Innovation'. MIT Press; Harvard, Mas,) and content and resource creation and modification usually encompassed inside the web2.0 category,

[4] See Lerner and Tirole 2002: 'The Simple Economics of Open Source' Journal of Industrial Economics, 52 (June 2002) 197-234 for a discussion of the economics of reputation (also referred to as 'career concerns' in Open Source software development.

The places and the rates at which the adoption of innovative technologies occur are determined by the complex interaction of technological, business and social factors, what we call its techno-economic trajectory. A trajectory can be perceived, at any moment in time, as a direction of incremental change anchored by relatively stable modes of production that utilise installed stocks of capital. Over an interval of time, however, a trajectory is subject to radical shifts as a consequence of the discontinuities produced by changes in technological paradigm[5]. Changes in paradigm occur when novel technologies, which improve production processes and enable the development of new products throughout the economy, appear and become pervasive. For example, the emergence of the 'Information Societies' paradigm is based on increasingly powerful and sophisticated ICT infrastructures and the numerous adjustments in business methods, organisation and objective that have accompanied its emergence.

In this section we focus on that source of change, the ICT sector in order to present some essential features of its techno-economic trajectory that explain the emergence of Creative User Engagement in a broad range of areas, paying special attention to the special features of cultural goods which make industries within the creative content sector particularly susceptible to these processes.

Hardware and bandwidth unbounded

The rapid pace of improvement in hardware performance, associated with the 'Moore's Law' trajectory of improvement in integrated circuit (IC) devices drives innovation in the sector by permitting a continuing increase in computing power and reductions in the cost of ICT devices and in the networks that link them together. This trajectory has also increased the portability and, in some cases, reduced the power requirements of electronic devices used to capture, store, view or listen to creative content.[6] We could say that we currently live in an environment of post-hardware and bandwidth scarcity.

This phenomenon is particularly relevant for the creative content sector, which is engaged in the production of highly digitisable goods whose consumption involves important cultural, market, and social aspects. The widespread availability of cheap devices with growing data storage, processing and acquisition capabilities creates an environment with a myriad of opportunities for the development of new production modes, which in some cases are not based on the generation of revenues for the distribution of content, but on economics of reputation or the sale of ancillary products such as those we have referred to before[7]. The very low costs of information reproduction challenge existing channels for distribution of content and provide an impetus for the creation of new services that add value to information that is reproduced in different formats and transmitted through different and often new channels.

Similarly, peer-to-peer based services including BitTorrent or Skype have emerged and become successful because of the abundance of broadband resources into which they tap in order to provide mass markets with innovative services (fast downloading and VoIP telephony) at very cheap (or even free) prices[8].

ICT technologies as given

New generations take pervasive technologies for granted, that is, not as technologies, but as a part of the environment. This generalisation, which ignores important distributional and digital divide issues, is more rigorously stated as learning about ICT use (and reconfiguration) has become progressively easier for the younger people in our societies. In a context in which the complexity of devices has become greater and user interfaces have often not kept pace, it is not that ICT's that have become easier to use. Users who have, to a extent, become better at using (and used to) them: over the past decade (or, for some, a longer period) people have substantially improved their 'digital literacy' and many are capable of a growing array of self-production activities including self publication via blogs,

[5] Dosi, G 1982, "Technological paradigms and technological trajectories", Research Policy, Vol. 11, No. 3
[6] This has been referred to as the 'democratisation of innovation by Von Hippel, E 2005: 'Democratizing Innovation'. Downloadable book available at http://web.mit.edu/evhippel/www/democ.htm
[7] See Lerner and Tirole (op. cit. p. 1)
[8] Although the explosion in demand for bandwidth brought forward by the growing use of streaming and p2p services such as YouTube or Skype has started exerting pressure on the capacities of the networks that support them. See Deloitte 2007: 'Telecommunications Predictions- TMT Trends 2007' Available at http://www.deloitte.com/dtt/cda/doc/content/UK_TMT_Telecoms_Predictions_2007%281%29.pdf)

forums and wikis, and increasingly sophisticated interpersonal communication (such as Skype video phone connection) and exchange of media content (often outside legal boundaries, using peer to peer technologies).

Innovation at the edges

The prevalence of the Internet, a communication infrastructure regulated by public, open standards creates a system with many opportunities for innovation "at the edges": the absence of central gatekeepers with the right to decide what kinds of devices or systems can be connected to the network, or exact fees from such connection, reduces barriers to entrance by new, in some case small or amateur actors with innovative ideas. [9] This process is reinforced by the existence of an environment where the abundance of inexpensive, relatively powerful hardware creates constant opportunities for experimentation and reconfiguration carried out by users increasingly endowed with the necessary skills.

ICT Innovation within this decentralised model have, and will continue to exert, a considerable influence on the structure and evolution of dominant (or possible, or sustainable) business models in the Creative Content sector. These new business models may not evolve in the direction desired by incumbents such as mass media conglomerates, or they may conflict with legal regulations. The recent cracking of the Digital Rights Management (DRM) measures established to protect the distribution of copyrighted content via next generation DVDs constitutes an example of the sort of unbridled, decentralised process of innovation being carried out by actors operating outside conventional industrial channels, motivated by non-commercial incentives and oblivious or hostile to Intellectual Property (IP) frameworks.

Creative Content Goods as information

Creative Content is an information good, and as such its production presents a cost structure characterised by high fixed and low marginal costs[10]: the investment necessary for the production of the first ("master") copy of a creative content good is high, but once this task is accomplished, producing additional copies is relatively inexpensive[11]: For example, once a piece of music has been recorded, the costs of producing extra copies (i.e. pressing Compact Discs) are very low[12]. This creates the need for a relatively high investment at an early stage of the creative process, which has traditionally led to the emergence of publishers, who specialise in the funding of creative content production and distribution[13]. It also creates incentives for profit maximising actors to try and reach as large a market possible by publishing content goods with a broad appeal.

On the other hand, the informational nature of Creative Content Goods makes them particularly easy to digitise, manipulate and transmit using ICT tools: as we will show, ICT innovations in the area have altered this cost structure enhancing user possibilities to engage in content production and distribution activities,

Social aspects of Creative Content Consumption

Creative content goods present important social aspects: their inherently symbolic nature opens up important spaces for consumer commentary, reinterpretation and formation of identity. This special characteristic, not so strongly present in other kinds of goods, has led to the emergence of communities of consumers who engage intensely with creative content goods. An example of these would be the fan sub-cultures of the 1950s, some of the earliest adopters of print media (fanzines), postal and, eventually ICT networks for the purpose of discussing, reviewing, and in some cases, distributing 'amateur content' created by 'fans' themselves.

[9] Lessig, L. 2002: "The Future of Ideas", New York: Vintage Books.
[10] Caves (op. cit. p. 11)
[11] This is a consequence of the symbolic nature of information goods, and of the advances in content reproduction technologies, in which we focus below in this same sub-section.
[12] Peitz, M. and Waelbroeck, M. 2004: "An Economist's Guide to Digital Music". CESIFO Working Paper No. 1333.
[13] The presence of this phenomenon in the area of distribution (i.e. once a distribution channel is set-up, the additional cost of distributing additional copies of a good is relatively low) leads to processes of consolidation in this area, and raise barriers to entry.

3- The impact of ICT Innovation in the Creative Content Sector and the place of Creative User Engagement

In the previous section we have described a number of features of the unfolding ICT techno-economic paradigm that have created conditions where users can engage in creative activities at a scale and scope unheard of in the past. Here we focus on identifying specific technological trends which appear as manifestations of the innovative dynamics of this paradigm enabling Creative User Engagement in the context of the Creative Content industries. We argue that these innovative processes are altering the cost structure of the industry and leading to the development of new forms of content creation and distribution which in many cases challenge dominant business and institutional models (based on the sale of cultural commodities and control over their physical distribution and intellectual property), and identify the role played by creative users at different stages of the value chain.

Cheap tools

Advances in software and hardware have brought forward the emergence of families of highly sophisticated and powerful, relatively inexpensive and easy to use tools and suites for content creation and modification, ranging from text and image editors or animation software development kits to digital cameras and recording and sound editing technologies through which talented creators can produce creative content goods of a professional quality with a reduced need to resort to external funding.[14] The impact of these new tools, which continue improving, becoming cheaper and more user-friendly, cannot be understated[15]: they have opened up opportunities for participation in creative activities by social pools of talent which had so far remained untapped, blurring traditional boundaries between 'authors' and 'users'. The outcome of this process has been a surge in the quantity (although not necessarily the quality, inasmuch talent remains a scarce resource) of creative content goods available.

It should be noted that although these tools enhance the creative potential of individuals, in some cases their fruitful utilisation requires skill-sets which go beyond those that can be in most cases acquired through experimentation 'at home'. This raises important issues related to the need to provide education and training as a way of enhancing the competitiveness of creative content industries[16].

Collections of Open Source software

The Open Source movement has provided content creators with powerful, freely available, and, perhaps more importantly, highly customisable and extensible tools. The adoption of its legal instruments to the field of content, through the definition of the Creative Commons license, has given rise to the emergence of large repositories of free content which can be accessed, modified and incorporated into new creative works by anyone who desires to do so, contributing again to lower the barriers to participation in creative activities and favouring the elaboration of innovative amalgams of content and technologies, often referred to as 'mash-ups' (an example of which would be the BBC Digital Archive currently under testing)[17]. Open Source could, in this context, be argued to create positive externalities by enabling content creators and publishers to fulfil the diffusion and distribution potential associated to the emergence of high capacity digital distribution and reproduction networks.

Platforms for collaboration and communication

The broader, contextually richer nature of emerging high capacity communication channels (such as Voice over Internet Protocol or virtual worlds including Second Life), and the growing adoption of Electronic Data Interchange, Version Control tools, content management and bug tracking systems

[14] It is important to note that the piracy of these tools and their downloading via peer-to-peer networks has enhanced their availability.

[15] There tend to be a trade-off between number of available features (power and flexibility) in a tool and its ease of use, which could conceivably be bypassed through the implementation of innovative user interfaces able to adapt to the preferences and capabilities of an user in order to provide her with a suitable level of functionality (technology example).

[16] Inasmuch more powerful tools are required for the creation of high quality content 'meals' (as compared to 'content snacks') better suited for the creation of revenues in the highly competitive entertainment marketplace.

[17] The adoption of 'boiler-plate' license models also reduces the transaction costs in which content creators need to incur in order to use (or license) proprietary tools and content (see Benkler, Y. 2002: 'Coase's Penguin, or Linux and The Nature of the Firm', Yale Law Journal 112 (3).

and wikis have given rise to new possibilities for decentralised networks to engage in the creation of modular goods composed of a wide range of assets. Although this trend has been particularly visible in processes of outsourcing of routinisable functions by creative actors[18], the technological platforms we have described, in many cases freely available as Open Source software also make it possible for decentralised communities of users to create virtual spaces for communication, collection of resources and co-ordination of creative activities.

A Brave new digital world

In the previously described context of improved storage and transmission capabilities, and growing broadband penetration, the trend towards increased online availability of digital creative content is becoming stronger. This process challenges the position of incumbent players who have, in the past, relied on their control over physical channels for distribution and commercialisation of creative content goods using traditional, top-down publishing/broadcasting models, and opens up new opportunities for smaller content creators, in some cases uder themselves, who can establish direct linkages with audiences or peers adopting flexible, more interactive models for distribution enabled by the online medium. The increasing availability of highly customisable, user-friendly (in many cases Open Source) Content Management Systems make it possible for small actors to, simultaneously, manage their assets, present a 'professional face' in the web and promote the emergence of user communities around their products.

In the area of publication, digital-only releases are becoming a growingly important strategy for the creation and distribution of content avoiding the costs and risks associated to physical production. An example of such phenomenon would be the success of unsigned act Koopa, who managed to reach the UK top 40 without resorting to mainstream distribution and marketing techniques[19]. In the audiovisual area, digital distribution of feature films through Video on Demand (VOD) and platforms such as IndieFlix has emerged as an important channel for audience-building, especially for "independent" films created by communities of enthusiasts and auteurs[20].

Making sense of it all

We have already pointed out that lower barriers to content creation and access brought forward by the widespread uptake of self-publishing tools, digital platforms for content distribution, as well as eCommerce and database solutions for the commercialisation and management of virtual inventories of physical goods have resulted in a flood of creative content, available through a panoply of online catalogues, stores and auction sites. Although in principle this process makes it possible for niche providers to find, or in some cases, create an audience, and for the most demanding of customers to locate what she is looking for, this same process threatens to, simultaneously bury these small creators under a flood of information where the only emergent islands would be 'inhabited' by those actors with the financial might necessary to purchase visibility via promotional campaigns and advertising[21]. In this situation, it is the users of networks themselves who have engaged in resource classification and review activities with the goal of providing signposts aiding in the navigation of the vast amounts of content available in online environments.

For example, virtual communities and weblogs provide 'guides', 'resources' and 'reviews' for particular social groups and user communities, with their activities funded through advertising-supported and, in some cases, subscription based models. Their usefulness is however limited by the extent to which they can scale their activities in a context of exponential growth in the amount of content available: additionally, as their number increases, the searching and filtering problem re-emerges, in this occasion *applied to them*.

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[18] See IBM 2004: 'Media and Entertainment 2010' available at http://www-935.ibm.com/services/us/imc/pdf/ge510-3569-01f-media-2010.pdf and Serapian 2006: 'Project post-mortem: Stubbs the Zombie' available at http://gamasutra.com/features/20060811/seropian_01.shtml for examples of the benefits and barriers to the adoption of this model.

[19] BBC News 2007: "Unsigned band set to crash charts". 10 January 2007. Available at http://news.bbc.co.uk/2/hi/entertainment/6248535.stm . The move towards digital distribution is reflected in the recent creation of a digital singles chart

[20] The Age 2005: "Will internet video kill the television star?" Available at http://www.theage.com.au/news/technology/will-internet-video-kill-the-television-star/2005/10/08/1128563033411.html

[21] Paraphrasing the Leopard by Giuseppe Tomassi di Lampedusa, everything would change so it remains the same.

Folksonomies such as Digg, Diigo, Technorati or Delicio.us constitute another family of socio-technical innovation, in many cases undertaken by users themselves with the goal of filtering relevant news, content, communities and resources in the web: they supply any participant willing to do so with the tools necessary for tagging and evaluating online content and news, in some cases establishing peer-rating systems to score the reliability of their suggestions[22].

In the music sector Radio on Demand sites such as LastFM, Pandora or Myspace (and, to a extent, networks of mp3 blogs) have become important tools for the promotion of music content in a stream format: they implement features for content browsing, filtering and discovery based on a diversity of methodologies (analysis of content structure in Pandora, reputation and references in the Myspace) helping artists raise their profile and promote their products without the need to resort to marketing services of music publishers

Peer to peer

Peer to Peer technologies are being growingly used for the distribution of digital content, both legally and illegally: their main advantage is the leveraging of distributed computing resources, which make it possible to reduce bandwidth requirements and increase the quality of the services being provided[23]. BitTorrent, Joost and Mashbox constitute three examples of this trend: inasmuch the content being made available through them is a stream, or protected by DRM, there is no reason why these systems should not be able to provide efficient content distribution services for a diversity of purposes without the need for right owners to relinquish control over it[24].

On the other hand, the failure of the music industry at establishing legal alternatives to illegal music file-sharing networks have put into question the viability of traditional models for content distribution based on the sale of physical products (Compact Discs) or digital downloads. This has raised the credibility of alternative options such as the adoption of blanket license models analogous to those currently in use in commercial radio and music venues, where file-sharers would pay a periodic fee directed to a common pool to be afterwards distributed between content creators and publishers according to a ranking of sharing intensity established by automated monitoring of networks or samplers of users (e.g. Nielsen Families).

Close encounters with the user community

The Internet has become a fertile ground for the emergence of user communities, and increased the visibility of the most important ones, which in a context of enhanced possibilities for communication, have often established close relationships with content providers: these virtual communities of fans have become sources of feedback and ideas, initiators of 'buzz' about new products in broader markets and, in some cases, pools from which companies recruit talent.

The emergence of evolutionary models for the release of content incorporating user feedback would be an example of this trend, growingly common in the video games and television sector: these strategies are based, on the former case, on the use of ICT infrastructures for the distribution of 'fragments' of content (e.g. game levels) into the community, whose members adopt, in some cases, the role of 'beta-testers' or co-developers, providing content creators with feedback, information about problems using Customer Relationship Management and bug tracking tools such as those mentioned previously. In other occasions, these strategies are implemented in a more limited way, for example through the creation of less sophisticated channels for interaction between both content creators and user communities, such as for example online forums or blogs. For example, in the case of the book sub-sector, characterised by mature distribution channels, which in many cases hamper communication, between publishers and end-users, the adoption of online communication strategies including blogs, mailing lists and Internet forums constitute an opportunity for these actors to gauge demand and reduce publishing risks.

[22] The Amazon review system is organised along similar lines.
[23] They present the added advantage of creating linkages between users by incorporating social networking features which facilitate the location of relevant content through processes of referral.
[24] For example, Mashbox,, a commercial p2p service currently under development, with participation by Universal and EMI, has the goal of facilitating the distribution of music for preview purposes and its eventual purchase, an implicit acceptance of the usefulness of p2p networks for the diffusion and 'discovery' of creative content samples which can afterwards be monetized.

In addition to establishing new channels for the introduction of customer feedback into the content creation process, these evolutionary strategies make it possible for companies to turn what used to be discrete products with a limited shelf-life into continuous streams of services through, for example, the release of core functionalities and extensions that can be purchased at a premium price, or subscribed to (an strategy adopted by Bungie with its Oblivion video game). This development contributes, to an extent, to reduce the risks of content creation and publication by decreasing the initial investment necessary for the creation of the 'master copy' of a good and enabling the tweaking of its features in response to demand. On the other hand, it can in some cases decrease the satisfaction of customers who expect a finished, complete and bug-free experience when they purchase a creative content good[25].

Virtual Worlds

The emergence of Virtual worlds, such as Second Life, where users are provided with content production tools and scripting languages, and means to exchange this content (through the establishment of in-world currencies and markets) enables the implementation of highly innovative IPR configurations and business models characterised by the transformation of users into content creators, and, of platform providers into meta-content providers (with the role of building and maintaining a socio-technical infrastructure able of supporting user activities, in an effort that growingly turns them into services providers)[26].

Some of these virtual worlds have been experimenting with innovative business models based on the provision of maintenance services, incremental content updates to subscribers and digital marketplaces to facilitate exchanges of user-produced content. Although congestion problems caused by large population sizes are being addressed through increases in storage capacities, it seems probable that in the foreseeable future we will witness the emergence of new providers who adopt p2p and open source structures for their distribution.

The self-publishing paradigm

We have already discussed the role that weblogs and other self-publishing technologies fulfil as tools for content browsing and filtering, this is, as sources of information about the quality of creative content goods which facilitate their location by customers. In addition to this function, they can also be used by individuals in order to create content, such as for example, novels serialised as instalments in a blog, or chapters in a user-generated video repository: this development blurs the barriers between content creator and user, as part of a process which might require a re-conceptualisation of the nature of authorship, moving away from definitions based on publication to more tolerant ones which characterise it in terms of the presence of an audience[27]. In addition to opening up avenues for the identification of talent, the use of these tools might lead to the materialisation of new business models for content creation based on advertisement, donations, subscription fees, the sale of ancillary products (e.g. merchandising), or the creation of new revenue streams for the content creators in terms of, for example, talks and conferences.

In addition to the examples of social networking sites such as Myspace, which provide amateurs and unsigned bands with hosting services where they can make their music available, as well as Video on Demand sites exemplified by YouTube, this model is starting to become progressively more important the area of video games, where forthcoming products will provide users with tools to create their own characters, as well as other assets[28].

4- Conclusions and Implications

The above discussion illustrates how technological developments are transforming the user from member of a passive audience for creative content to a new set of roles (which we have summarised under the category of 'creative user engagement'), many of which challenge the existing vocabulary.

[25] EDGE 2007 'What's in a Game?'. March issue 2007.
[26] The political processes through which rules and criteria for participation in these worlds are established should not be overlooked. See Mateos-Garcia, J. and Steinmueller: 2006: 'Open, but how Much?'. Presented at DIME Conference on Communities of Practice, Durham 2006.
[27] Hjort-Andersen, C. 2000: 'A Model of the Danish Book Market'. Journal of Cultural Studies Vol. 24 Issue 1.
[28] IGN 2007: 'Will Wright on Designing Spore. Available at http://uk.pc.ign.com/articles/762/762907p1.html

Users are not only co-producers of content, they are coming to play a much more active role in the selection, editing, re-combination, and referencing of creative content. Users are becoming editors of their own access to creative content, evolving from the 'bookmark' era in which the location of individual WWW sites was saved for future reference to an era where many of them are making active commentary and collection of content in ways that might better be described as constructing personal libraries or museums of creative content. Correspondingly, these activities are being conducted increasingly in spaces shared with other users. The social nature of these activities providing further enhancement of the value and incentive to participate in the activities of producing, collecting, annotating, promoting, editing, and presenting creative content.

This explosion of user-centred activity exists in an uneasy symbiosis with more traditional models of creative content publication and distribution. Much of what a user references or commentates may in fact be the 'property' of others. When these user activities are extended to collection and re-distribution of content, there are often direct conflicts with the intellectual property business model of creative content production and distribution. Revisions of the intellectual property-based business models is clearly underway in the form of improved access to pay-to-view and pay-to-own models of distribution as well as accommodations to user interest in being able to transfer material between platforms. These revisions significantly extend what users can do in their own digital spaces but largely ignore the interest of users in sharing and exchange that appear to be an equally important feature of recent developments. One consequence is that users have begun to shift their attention to sources of creative content that are not encumbered by restrictions with regard to sharing, editing, and re-compilation. This may serve to reduce the audience for commercially published creative content and highlights the need for publishers to consider either further accommodations to traditional practice or radically new models for extracting value from their creative content assets.

For those engaged in creating content, these developments present a dilemma. It is not obvious, for example, that there is a single ruler by which to measure the quality of creative content that would assure that 'professional' production – i.e. production within the traditional publishing model – will prevail over the proliferation of content produced by actors with a much more heterogeneous range of motivations. One can imagine, for example, that a highly skilled creative artist such as a musician might choose to use the new capabilities for building audiences for live performances and other activities capable of producing revenue, eschewing entirely the publish-for-profit model of engaging in 'professional' activity. Correspondingly, the processes of reference and promotion empowered by new technologies may create reputation and audience for the creative content of those to whom revenue is not an objective at all. In short, technological developments have significantly altered the competitive dynamics of creative content industries. More traditional models are being disrupted, not only the most publicised of challenges, the infringement of copyright, but also by the interests of users in creating and distributing content as a social activity, capabilities which the new technologies empower and which users apparently welcome as an alternative to existing models of creative content production and distribution.