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Copyright and Innovation: Fit for Digitization?

By Christian Handke, Yann Girard and Anselm Mattes

It is contentious to what extent the existing copyright system contributes to the positive development of the regulated sectors of society. The present report shows that substantially more musical works and movies have been released in recent years than before the diffusion of digital copying technology. At the same time, the average quality of these works has been stable according to user assessments. Countries with stronger copyright protection do not exhibit greater supply of new works. Accordingly, the relatively strict copyright protection in some countries does not seem to promote the supply of new creative works.

The present report also considers whether user-generated content (UGC) complements or substitutes professional content. An increasing supply of valuable UGC is not reflected in official economic statistics. In all probability, copyright protection promotes user-generated content less than professional content. As a result, substituting professional content with "amateur material" could reduce the socially desirable strength of copyright protection. However, we find that almost half of all works available on YouTube are professional content. Professional works are watched and recommended more frequently than the average. In addition, a large proportion of UGC on YouTube draws on professional works. There is little evidence that professional content would be widely replaced. It follows that UGC could also be supported by an efficient copyright system, which strengthens the supply of professional content without excessively limiting its further use as input for UGC.

In Germany the cultural and creative industries, which are strongly affected by copyright, account for almost four percent of the labor force work and for almost 2.4 percent of economic output.¹ Copyright also affects markets for information and communications technology (ICT) and telecommunications. In the context of digitization, it is controversial whether the existing copyright system is efficient.

This report² deals with two topics. First, promoting innovation is the primary objective of copyright from an economic perspective. There have been few systematic empirical studies on whether this goal is achieved in practice. Using up-to-date data from 13 countries, we determine whether there are differences in the supply of new creative works in countries with varying degrees of copyright protection. Second, a great amount of non-commercially motivated UGC is widely available today. Favorable copyright conditions for UGC may vary considerably from those for professional content. A crucial question is whether UGC depends on a strong supply of professional content that creative amateurs can build on. Examining 500 YouTube videos, we explore to what extent UGC is based on professional copyright works.

Copyright from an Economic Perspective

Product Innovation in the Copyright Industries

According to the economic literature, copyrights (including related performers' rights) are a means of increasing

¹ Federal Ministry of Economic Affairs and Energy, *Monitoring zu ausgewählten wirtschaftlichen Eckdaten der Kultur- und Kreativwirtschaft 2012* (Berlin: BMWi, 2014).

² The basis of the present article is a study conducted by DIW Econ in conjunction with Prof. Christian Handke (University Rotterdam) on behalf of the Commission of Experts for Research and Innovation (Expertenkommission Forschung und Innovation, EFI): C. Handke, Y. Girard, and A. Mattes, "Fördert das Urheberrecht Innovation? Eine empirische Untersuchung," *Studien zum deutschen Innovationssystem*, No. 16 (Berlin: Expertenkommission für Forschung und Innovation (EFI), 2015).

the supply of new creative works.³ For copyright-based industries, creating new works is fundamental. The major part of demand for music recordings and films is for novelties and thousands of new albums, films and other types of copyright works are released annually.

New creative works protected by copyright law meet the basic definition criteria for product innovations. On the one hand, they differ from other existing products in a way that is relevant for consumers. On the other hand, they have a positive value.⁴

Product innovation in copyright-based industries—the generation of new music recordings, movies, video games, novels, and so on—is referred to as “content generation”. The key indicators of this type of innovation are the number of new works supplied, their consumption and appreciation. Creative works tend to have the characteristics of public goods.⁵ On the one hand, copyright works lose little of their value for individual users when they are used by other users (non-rivalry). On the other hand, a large proportion of the value of creative works is appropriated by those who do not provide any direct rewards to the copyright holders, as for instance in the case of unauthorized copying (there is limited excludability). Consequently, the market value of creative works represents only a small part of the overall social value.

Economics of Copyright: A Balancing Act

Three aspects determine the actual copyright protection that transpires in practice: copyright law, private or public enforcement measures, and the development and dissemination of copying technology. Copyright protection can be measured by the extent of unauthorized reproduction and distribution without the explicit permission of the copyright holders. Actual copyright protection has declined with the diffusion of digital copying technology. In response, a number of copyright re-

forms and enforcement measures aimed at fostering copyright protection.

Since creative works are often effectively public goods, incentives to create new works may not suffice to approximate the socially desirable supply of creative content. Effective copyright protection can reduce this problem. It gives copyright holders temporary exclusive rights to works. Protected from competitors with virtually identical works, copyright holders can more easily recoup the development costs of creative works and generate profits.

Assuming a constant supply of creative works, there is a preponderance of disadvantages to copyright protection. It increases the share of welfare gains that falls to the copyright holders but at the expense of users. The conventional assumption in economics is that such shifting of welfare between stakeholders leaves combined social welfare remains unaffected. However, maintaining the copyright system entails costs for the public sector and there are also transaction costs from trading rights, which would not occur without copyright.

It is more likely that copyright promotes social welfare in the long term: greater rewards to rights holders leads to greater incentives to create valuable new works. In the long run, users might thus also benefit from a reasonable level of copyright protection.

It is important to note that effective copyright protection does not only increase rewards to creators and rights holders. Copyright also increases the costs of creating new works that build on preceding creations.⁶ Creators usually draw on components of works protected by other copyright holders. Follow-up creators either have to work around existing rights or need to identify rights holders and strike a licensing contract. By the same logic, strict copyright protection associated with high transaction costs may restrict the development of new methods of distributing and using copyright works.

It can therefore be misleading to see copyright as a simple balancing mechanism in which strong copyright protection always promotes the welfare of creators at the expense of users. The objective of a welfare-maximizing copyright policy should be to find a balance between (a) the expected future value of additional works created because of copyright protection, and (b) the access, administrative, and transaction costs arising from effective copyright protection. Copyright protection may be too low for the long-run interests of users if the supply of valuable works recedes due to unauthorized use. Copyright

³ See W. Johnson, “The economics of copying,” *Journal of Political Economy* 93 (1985): 158–74; W. Landes and R. Posner, “An Economic Analysis of Copyright Law,” *Journal of Legal Studies*, vol. 18 (1989): 325–363; R. Towse, C. Handke, and P. Stepan, “The economics of copyright law: a stocktake of the literature,” *Review of Economic Research on Copyright Issues* 5 (1) (2008): 1–22.

⁴ There is demand for creative works for all uncertainty and concentration of demand on a minority of “hits.” It is not possible to always anticipate which works will ultimately become hits, see R. Caves, *Creative Industries; Contracts Between Art and Commerce* (Cambridge: Harvard University Press, 2000). Moreover, in 2010, German residents spent an average of 581 minutes per day viewing or listening to media content (83 minutes of which was spent on the Internet, excluding streaming or downloading of music), the majority of which are protected by copyright, see H. Reitze and C.-M. Ridder, *Massenkommunikation*, 8th ed., (Baden-Baden: Nomos, 2011).

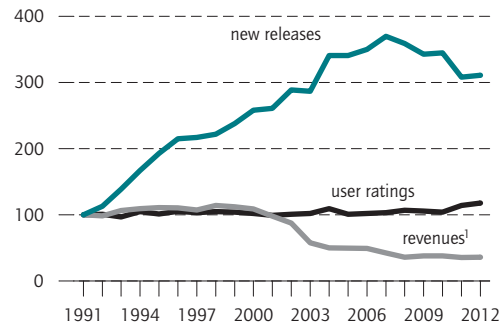
⁵ This is especially true of films and sound recordings. Other creative works such as theatre performances, however, are usually excludable goods.

⁶ Landes and Posner (1989), *op. cit.*

Figure 1

Market for Recorded Music in Germany

Index 1991 = 100

¹ in real terms

Sources: Musicbrainz; IFPI; Statistisches Bundesamt 2014.

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While revenues dropped sharply in the early 2000s, the supply of new creative works increased at constant quality.

protection might be too strong for today's creative individuals if it makes follow-up innovation more difficult.

For the further development of copyright policy, it is important to assess the extent to which legislation and enforcement measures achieve their intended effect without giving rise to excessive costs and unintended negative consequences. This is not just a question of the legitimate interests of the copyright holder in protecting their intellectual property and retaining a fair share of the value of protected works. It is also about the interests of users and distributors and societies' interest in quickly developing efficient distribution technologies for creative works. A central issue in this balancing act is to what extent copyright achieves its primary objective of increasing the supply of new creative works.⁷

Empirical Results Regarding the Effect of Copyright on the Supply of Works

Since the late 1990s, many households have access to digital copying technology suitable for the mass distribution of copyrighted works. Shortly thereafter, music industry revenues from the sale of recordings started declining substantially, falling by almost half in virtually all developed countries. A series of studies has shown that the distribution of digital copying technology

⁷ It is theoretically possible that markets generate an excessive range of product variants (see K. Lancaster, "Socially optimal product differentiation," *American Economic Review* 65(4) (1975): 567-585). However, due to the characteristics of creative works public goods and frequent unauthorized use on the Internet, the quantity and/or quality of the range of copyrighted works is probably below the socially desirable level.

has reduced the income of copyright holders for music recordings.

Figure 1 shows key indicators of the market for recorded music in Germany since 1991. It illustrates that revenue from the sale of authorized copies of recorded music to consumers has fallen by more than 50 percent since the early 2000s. In contrast, the supply of new creative works increased almost continuously over the observation period. Average user rating of music recordings from the individual years has remained virtually unchanged throughout the same period. This descriptive analysis indicates no direct negative association between revenues of copyright holders' and the supply and quality of new works. This surprising result is confirmed by other empirical research.⁸

The discrepancy between theoretical predictions and empirical evidence is striking. Based on theory one would expect a negative impact of copyright infringements on rights holder revenues and on the supply of new creative works. Instead, the supply of new creative works has increases substantially over recent years, in spite of extensive unauthorized copying and falling revenues to the record industry from sales of authorized copies. To be sure, there have only been a handful of systematic studies on this subject to date. For a reliable assessment, further research is needed, covering longer periods, more countries and specific variations in copyright protection.

Characteristics of Copyright Industries and Product Innovation in Them

The literature on the economics of cultural and creative industries and copyright identifies a number of characteristics that deviate from conventional industries. Some of these may help explain how an increasing supply of material can be accompanied by greater unauthorized use and lower revenues for copyright holders.

⁸ Three published studies to date have examined the effect of unauthorized digital copying on the supply of creative works. In Germany, there has been a long-term growth trend in new music albums since the early 1990s: C. Handke, "Digital copying and the supply of sound recordings," *Information Economics and Policy* 24 (1) (2012): 15-29. No significant change is apparent with the diffusion of digital copying technology and declining sales between 1999 and 2006. The variety of supply has continued and increasing listening time suggests there was no substantial decline in quality. Waldfogel examines the quality of new music recordings in the US based on their position in the charts (J. Waldfogel, "Bye, Bye Miss American Pie? The Supply of New Recorded Music Since Napster," National Bureau of Economic Research Working Paper, no. 16,882 (2011)) and found no significant trend deviation with the proliferation of digital copying technology. Nevertheless, Waldfogel also notes that the supply of new music albums in the US has increased significantly since 2000 despite file-sharing sites and declining revenues in the music industry (J. Waldfogel, "Copyright Research in the Digital Age: Moving from Piracy to the Supply of New Products," *The American Economic Review* 102 (3) (2012): 337-342).

Digitization Simplifies Production and Distribution of New Content

Digitization probably lowers the development and deployment costs of creative works. This should increase the supply of works. Costs might also fall as a result of the development of more efficient ICT and shorter supply chains. A similar effect can also occur when the market power of leading companies declines due to increased competition. The question is whether the supply of creative works would have developed even more positively with stronger copyright protection. It is difficult to separate the effect of copyright protection from the broader impact of rapid technological change.

Intrinsic Motivation of Creative Individuals

There is also extensive evidence that creators are intrinsically motivated, so that supply is relatively inelastic to changes in rights holders' pecuniary revenues.⁹ The wide range of UGC, in particular, suggests that a plentiful supply of at least simple creative works with no major financial development costs is produced with very low pecuniary incentives.

Unauthorized Copying as a means to Sample Content

Furthermore, unauthorized copies are not perfect substitutes for authorized copies. Unauthorized users often have a low willingness to pay for works so there may be little sales displacement from unauthorized copying. Unauthorized copies are sometimes used to sample works and the willingness to pay for authorized copies or other goods provided by the copyright owner may even increase after sampling.¹⁰ Also, simplified and more diverse product searches may increase the contestability of the market for creative works by reducing the advantages of established suppliers.¹¹

Copyright and Innovations in the Film Industry

The following section analyzes the development of product innovation in the film industry in the context of

⁹ There is extensive evidence for intrinsic, non-pecuniary incentives to create, see Caves, *Creative Industries*; R. Towse, "Copyright and artists: a view from cultural economics," *Journal of Economic Surveys* 20 (4) (2006): 567–585.

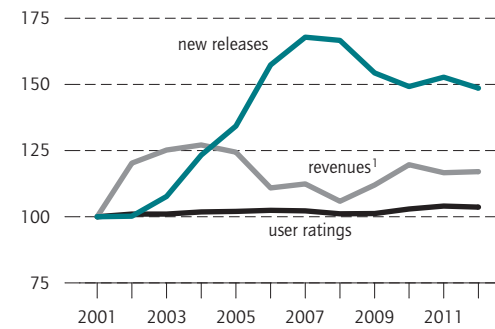
¹⁰ See J. H. Mortimer, C. Nosko, and A. Sorensen, "Supply responses to digital distribution: Recorded music and live performances," *Information Economics and Policy* 24 (1) (2012): 3–14.

¹¹ In contestable markets the market power of incumbents is restricted if excessive profits will attract competitors to enter the market.

Figure 2

Market for Films in Germany

Index 2001 = 100



¹ in real terms

Sources: IMDb; IVF Yearbook 2003 to 2013 – Europe: the Industry Overview; Statistisches Bundesamt 2014.

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In the film industry the number of new releases increased whereas there was virtually no change in perceived product quality.

copyright.¹² The film industry is one of Germany's most economically important copyright-based industries. In 2012, it had a turnover of approximately 2.7 billion euros, which was three times larger than the music industry, for example.¹³

Figure 2 plots sales, the number of new releases, and average user ratings of new publications in the German market for films since 2001. The film industry in Germany developed relatively well during the observation period, although sales dipped from 2005 to 2008. Since then, sales have remained stable and, in recent years, have been more than 20 percent higher than in 2001. The number of new film releases per year has also increased by about 50 percent since 2001. However, growth is less pronounced and less consistent than for music recordings.

Figure 3 plots average sales, releases and ratings for a set of European countries.¹⁴ Overall, sales between 2001 and 2012 fell by more than 20 percent. According to the IMDb database, the number of new film releases has risen relatively steadily since 2001. At the same

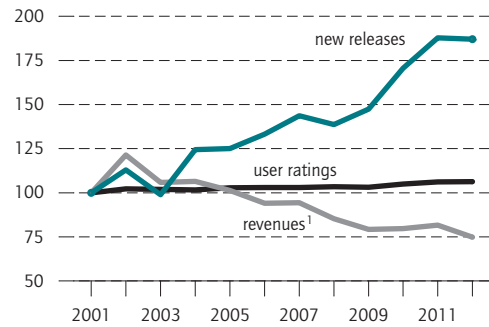
¹² The present report takes a closer look at the film industry. Additional findings on the music industry and the video game industry can be found in the underlying study by Handke, Girard, and Mattes, "Fördert das Urheberrecht Innovation?".

¹³ This report focuses on data from the primary market, in which authorized copies of movies are sold to end consumers (for example, on DVD or as a download) and on revenues for the film industry from cinematographic performances. Other sources of income, such as licensing of films to television stations, are not included.

¹⁴ The comparison countries included are Belgium, Denmark, France, Ireland, Italy, Croatia, Netherlands, Poland, Sweden, Hungary, UK, Norway, Switzerland, and Spain. The selection of data was based on data availability.

Figure 3

Market for Films in a Set of 13 Countries
Index 2001 = 100



¹ in real terms

Sources: IMDb; IVF Yearbook 2003 to 2013 – Europe: the Industry Overview; Statistisches Bundesamt 2014.

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Again there is a positive trend of new releases with constant quality while revenues fall.

time, the average rating of movies released in the relevant year has remained constant.

To determine the impact of copyright protection on the development of the film industry, Table 1 shows the findings of multiple regression analyses. The dependent variables are sales per capita in the primary film market, the number of new releases per year, and average annu-

al user rating of these releases in a year. The independent variables are four different indicators for digitization and unauthorized copying, as well as additional control variables (see Box 1). The analysis for the period 2005 to 2011 shows a positive relationship between sales per capita from film releases, broadband penetration, and the private copying levy (specification 1). The proliferation of fast Internet connections appears to have had a positive impact on film industry revenues, in contrast to the situation in the music industry. The BSA Software Piracy Index shows a negative, albeit insignificant, relationship. There is also a negative association with inclusion in the ‘black-list’ of the US State Department due to insufficient copyright protection (301 Report), which is significant at the ten-percent level.

Turnover in the film industry can be divided into video sales and box office sales. This distinction is important because cinematographic presentations are more excludable than video sales or rentals, and are therefore more difficult to replace with unauthorized copies. Box office revenues should thus be less affected by copyright protection than video sales. In specifications (2) and (3), copyright indicators are only regressed on video and box office sales per inhabitant. The significance of the three copyright indicators arises only in connection with video sales (specification 2). There is no significant association with box office sales.

The number of new releases shows no significant association with copyright indicators (specification 4). The

Table 1

Impact of copyright protection on the development of the film industry: regression results^{1, 2}

	revenues per capita			number of new releases ³	average user ratings ³
	Video and box office	only video	only box office		
box office Specification	(1)	(2)	(3)	(4)	(5)
broadband penetration	0.199*	0.238**	-0.039	-0.007	-0.001
private copying levy	2.303**	2.468**	-0.165	-0.032	0.004
Software Piracy Index	-0.205	-0.277	0.072	-0.012	-0.003
301 Special Report	-2.855***	-2.517**	-0.339	0.027	-0.0138*
GDP per capita	Ja	Ja	Ja	Ja	Ja
Countries	Ja	Ja	Ja	Ja	Ja
Years	Ja	Ja	Ja	Ja	Ja
Observations	79	79	79	79	66
R ²	0.764	0.797	0.518	0.32	0.458
Adj. R ²	0.725	0.763	0.44	0.184	0.348

¹ Belgium, Croatia, Denmark, France, Germany, Hungary, Italy, Netherlands, Norway, Poland, Portugal, Sweden, and Spain; 2005 to 2011.

² fixed effects regression, clustered standard errors at the country level, monetary values in real terms, levels of significance: * p < 0,1; ** p < 0,05; *** p < 0,01.

³ in logs.

Sources: IVF Yearbook 2003 to 2013 – Europe: the Industry Overview (revenues); IMDb (new releases and user ratings); calculations by DIW Econ.

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Copyright protection has an impact on video sales but not on the number of new releases.

Box 1

Copyright Protection Indicators

Since no high-quality, direct indicator of actual copyright protection is available across a number of countries, indirect indicators must be used to estimate copyright strength. Since the available indicators each have different advantages and disadvantages, the empirical analysis takes several indicators into account.

Availability of Copying Technology

Broadband Internet connections facilitate unauthorized copying. The proliferation of broadband Internet connections in households, as documented by Eurostat, is thus a useful indicator of de facto copyright protection.

We also consider data on private copying levies. In many countries charges apply on the sale of goods that are often used for the reproduction of copyrighted works, such as a blank CDs or DVDs, MP3 players, CD or DVD writers, printers, and photocopiers, and the like. The conventional name "private copying levy" should not obscure the fact that it is a tax on copying technology and thus provides some indication on the diffusion of copying technology.

Unauthorized Use

The Global Software Piracy Index compiled by the Business Software Alliance (BSA) is a measure of the unauthorized use of reproducible creative works in the software sector and is available for several years and countries. Certainly, the BSA Index is not a direct measure of the unauthorized use of other copyrighted works such as music recordings or films. However, this index should depend on the same factors—for example, on the strength of copyright protection, the proliferation of digital ICTs, demographic developments, or cultural and social factors—as copyright protection for other creative works. We thus expect a strong correlation with the unauthorized use of other, copyrighted works, and use the BSA index as a convenient indicator of copyright protection.

Other Indicators

The annual *301 Report* by the US State Department is a more comprehensive indicator. This report lists countries that, in the view of the US government, blatantly violate trade agreements. The protection of intellectual property is an important part of these reports and includes lists of countries that, in the US government's opinion, have inadequate copyright protection.

quality of the new releases seems not to be affected by country-specific copyright protection characteristics either (specification 5), the only exception being a potential negative association with inclusion in the *301 Report*, which is just about significant.

Overall, there is little evidence that differences in copyright protection would have had an effect on product innovation in the film industry.

User-Generated Content (UGC)

A noteworthy development in the creative industries is the greater participation of end users in production processes. Content creation is often intrinsically motivated. The boundary between amateur and a professional production is fuzzy and many creators change status over time. What is new about UGC is that amateur productions are now also easily accessible to all Internet users.

By definition, creators of UGC derive little direct income from supplying works (see Box 2). Accordingly, strong copyright protection can restrict the development and proliferation of user-generated content. On the one

hand, amateurs are intrinsically motivated or unable to enforce and commercially exploit their rights. On the other hand, strict copyright protection increases the risk that amateurs run into legal difficulties if they publish works based on professional works. The growing importance of UGC to added value in copyright-based industries is therefore very likely to affect the optimal level of copyright protection.

One key question is how UGC impacts on demand for professional content. On the one hand, UGC competes with professional content for the limited spare time of users and could displace demand for professional works. From a welfare economics perspective, the adaptation of supply and production processes and supply to changing market conditions are positive in functioning markets.

However, it is feared that markets for creative works are subject to market failure and that an 'amateurisation' will undermine the supply of high-quality cultural works. However, UGC could also increase interest in professional content. For example, UGC may contain many reviews and parodies of popular professional works that may generate positive attention. In order to empirically analyze the extent to which UGC replaces

Box 2

User-Generated Content (UGC)

User-Generated Content (UGC) has been defined as follows: "Content made publicly available over the Internet, which reflects a certain amount of creative effort, and which is created outside of professional routines and practices," (OECD 2007); or "not the principal source of earned income to the creator."¹

This gives rise to four criteria:

- Distribution over the Internet.
- Original creativity and not a mere reproduction of existing content.
- Content generation occurs with no direct involvement by established professional companies in the traditional copyright-based industries, such as publishers, record companies, film production companies, etc.
- The producers of UGC do not expect to earn a living with income from the sale of content.

¹ Office of Communications (Ofcom) *Report for Ofcom: The Value of User-Generated Content* (2013), accessed April 3, 2014, stakeholders.ofcom.org.uk/binaries/research/research-publications/content.pdf.

This definition remains vague. For its empirical implementation in our research on video on the popular Internet platform YouTube, we developed an ordinal categorization to better determine the popularity of UGC relative to professional content.

We distinguish UGC from professional content based on whether works (images and/or sound) are marketed outside the Internet platform at a positive price. This is not the case in a solely amateur video, for instance, in a film recorded by a private individual of a cat playing where the video is not for sale by the copyright holder. Professional content, by contrast, is made available for sale by the copyright holder at a certain price, albeit possibly in a different media format; it is, in other words, commercial content. There are a mixed cases, where images and sounds from UGC and professional content are combined in a single video. A typical example is a self-recorded film to which an amateur creator has added a professionally marketed soundtrack.

In the case of professional content, the video and audio tracks are virtually identical to an existing commercial work. Here, an important distinction is whether or not the video was uploaded to YouTube with the acknowledgement of the copyright holder (or on behalf of the copyright holder).

professional content, we took a sample of the content on YouTube — an important platform for UGC — and categorized the content into professional content, UGC, and mixed forms (see Box 2). For each of these videos, we recorded the upload year, the number of views, and the number of likes/dislikes recorded by users. The results are shown in Table 2.

Professional content is the largest group with a share of 46 percent. UGC has a share of 33 percent. On average, professional content was accessed over four times more than UGC. In contrast, the average number of "likes" for professional content and for UGC is similarly high, so the ratio of "likes" to views is greater for UGC. This is perhaps not only due to the quality of the videos but also due to greater motivation to leave positive feedback for amateurs than for professionals.

Overall, professional content makes up a considerable share of YouTube material. It would be an exaggeration to claim that professional content is largely being replaced. In addition, a substantial minority of UGC in the broader sense, including the mixed forms, builds directly on the repertoire of commercial works. In the long

run, this part of UGC probably depends on an ample supply of new, valuable professional works. UGC is not yet associated with a reduction in supply of professional material. The growing dissemination and consumption of UGC demonstrates that these types of works are of considerable value, adding to professional content.

Conclusions

Considering the supply of new creative works, it is clear that the development of music and film in recent years has been more positive than the heated debates on the dangers of digital copying would have us believe. Based on the available data, digital copying does appear to have had a negative effect on innovation in terms of content creation. However, a high degree of uncertainty remains. First, data restrictions do not allow us to draw very firm conclusions. Second, it is difficult to distinguish the impact of copyright from the impact of broader technological change with digitization.

The extensive use and appreciation of UGC shows that this content is a valuable addition to the professional supply of copyright works. The copyright system should re-

Table 2

Professional and User-generated Content on YouTube (Sample)

	Videos	Views	Views per video	Likes	Likes per Video
User-generated content	166	6,748,299	40,652	27,423	165
mixed form (UGC and professional content)	103	12,161,192	118,070	730	7
Professional	231	38,502,567	166,678	44,975	194
Total	500	57,412,096	325,400	73,128	146
		Shares in percent			Likes per 1 000 views
User Generated Content	33	12	-	38	4
mixed form (UGC and professional content)	21	21	-	1	60
Professional	46	67	-	62	1
Total	100	100	-	100	1

Source: Handke, C., Girard, Y., Mattes, A. (2015), *op. cit.*

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User-generated content does not replace professional content, but instead builds on professional works.

strict UGC as little as possible. However, it cannot be inferred from our findings that a general abolition of copyright protection would make sense. UGC is based largely on professional content. Therefore, UGC might benefit from more efficient copyright protection that fosters the supply of professional content.

Copyright policy strikes a complex balance between conflicting interests. Social acceptance of the existing copyright system is low. Many copyright holders argue for more effective copyright protection. Widespread unauthorized copying documents the ignorance of users or their conscious resistance to copyright standards. The findings presented here show that commonly voiced assumptions have no solid basis. There is no solid evidence that the diffusion of digital copying technology fundamentally would have damaged the supply of new works. Neither does it appear that UGC will replace professional content, which would call into question the conventional economic justification for copyright.

Further empirical work is needed to strengthen the evidence-base for copyright policy. The further development of online databases will facilitate research in the foreseeable future. The next important steps include studying specific aspects of the copyright system, such as: (1) the duration of copyright protection; (2) regulations regarding private copying and notices according to civil law; (3) the reasonable level of public investment in law enforcement; (4) the regulation of collecting societies such as the German Society for Musical Performing and Mechanical Reproduction Rights (GEMA); (5) determining reasonable compensation for different forms of distribution; and (6) competition policy with the emergence of highly concentrated online platforms through which creative works are disseminated.

The good news is that despite all apparent difficulties, the supply of creative works has developed positively in the copyright industries considered in this report. Copyright policy should support this positive development as much as possible.

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