TECHNISCHE UNIVERSITÄT DRESDEN

Dresden Center for Digital Linguistics

International Summer School

Digitization and its Impact on Society

TU Dresden, September 29 to October 5

READER

Coordination: Dresden Center for Digital Linguistics, Joachim Scharloth, Noah Bubenhofer, Yvonne Krämer

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- Thomas Bürger, Saxon State and University Library Dresden (SLUB)
- Wolfgang Donsbach, Chair of Communication Studies I, Institute of Media and Communication, TU Dresden
- Katrin Etzrodt, Institute of Media and Communication, TU Dresden
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- Joachim Scharloth, Professur für Angewandte Linguistik, Institut für Germanistik, TU Dresden
- Eric Schoop, Lehrstuhl für Wirtschaftsinformatik insb. Informationsmanagement, Faculty of Business and Economics
- Marcel Thum, Chair of Public Economics, TU Dresden

Web: http://linguistik.zih.tu-dresden.de/digitization/
E-Mail: summerschool.gsw@tu-dresden.de

MILITÄR HISTORISCHES MUSEUM Dresden

Wilfried Bernhardt (State Secretary of Justice and for European Affairs)

KEYNOTE	**16:00 – 16:20**

About:

Dr. Wilfried Bernhardt, 59, has been Saxony's State Secretary for Justice and European Affairs since December 2009. Prior to this, the lawyer was head of IT at the German Ministry of Justice, and a member of the federal government's IT advisory board.

Keynote: **Digitization in Politics and Administration**

Volker Grassmuck (Lüneburg)

KEYNOTE	**16:20 – 17:30**

About:

Prof. Volker Ralf Grassmuck is a media sociologist, free-lance author and activist, has conducted research on the knowledge order of digital media, on copyright and the knowledge commons at Free University Berlin, Tokyo University, Humboldt University Berlin and University of São Paulo and is currently directing the project "Public Service Media 2.0" at the Centre for Digital Cultures (CDC) of Leuphana University Lueneburg. He was project lead of the conference series Wizards-of-OS.org and of the copyright information portal iRights.info, co-founded mikro-berlin.org, privatkopie.net and Compartilhamento Legal.org and blogs at vgrass.de. (Foto: Berit Schuck)

Keynote: **Ups and Downs in the Digital society**

Monday (09/ 30/2013)
The Digitization of Our World: Data, Linking and Data Mining

Jörg Noenning (Dresden)

WORKSHOP	**9:00 – 10:30**

About:

Prof. Dr.-Eng. Jörg Rainer Noenning (*1973) is Junior Professor for Knowledge Architecture at TU Dresden (Dresden University of Technology) in Germany. He has studied at Bauhaus University Weimar, University of Technology Cracow, and Waseda University Tokyo. Between 1996 and 2001 he has studied and worked in Japan, among others with Osamu Ishiyama and Arata Isozaki in Tokyo. In 2001 he joined TU Dresden as a Research Associate and taught and

lectured at several universities in Europe (Copenhagen, I´Aquila, Berlin), Asia (Tokyo, Hongkong, Guangzhou, Hanoi, Tehran), USA (MIT) and Africa (Luanda). His doctorate was accomplished in 2007 at Bauhaus University Weimar. Since 2006, he is ERASMUS visiting professor at Universita degli Studi dell I´Aquila (Italy). Publications include the books "*Shaking the foundations – Japanese Architects in Dialogue*" (1999), the series "*PAO: Experimental Architecture*" (2007-12), the edition "*Arata Isozaki – Welten und Gegenwelten*" (2010) and more than 50 papers and articles. His lab with approx. 15 researchers works on several research projects funded by European and German government, the German Research Council, as well as from industries. Mr Noennig has won several competition prizes and academic scholarships, among them the Grand Prize of the European Association for Architectural Education (EAAE) and the Tokyo Process City Urban Design Competition. Since 2007, Mr Noennig is married to Yoco Fukuda; they have two children (5 / 4 years).

Contact details: joerg_rainer.noennig@tu- dresden.de

Workshop description: Digital City

With impulse speeches and moderated group discussion, the session "Digital City" will elaborate on the relationship of built urban "hardware" and digital ("soft") environments as corresponding components of today´s urban environments. Two impulse arguements will be delivered: 1) Dumb physicalurban hardware and infrastructures are currently being enhanced into so-called "Smart Cities", or "Intelligent Environments". 2) "Digital Online Platforms" become substitutes for places and activities that used to be core functions of cities, e.g. communication, production, and trade. The implications of both arguements will be discussed and supported by visualization techniques from the field of "Knowledge Architecture".

Keywords: Platform, Environment 1.0 / 2.0, Big Data, Smart City, Architecture

Recommended Reading:

Noenning, Jörg Rainer and Amir Mazandarani: Smart Cities as Places of Low Friction: Intersystemic Coordination as a Measure for Urban Smartness and Intelligence.

Abstract:

Not only the term "Smart City" has become a commonplace, but also the attributes "smart" and "intelligent" as descriptions for complex technological systems and networked structures. In urbanism these terms still lack a profound definition, and there are only few reliable interpretations of "smartness" and "intelligence" related to the notion of a "smart city". Addressing the urgent need for a clarification and definition, the paper explains the need for smartness and intelligence as a counter- reaction to increasing dynamics of complex systems and escalating coordination problems ("inter-systemic friction"). On that background, the demand for intelligence and smartness in urban contexts can be explained from frictions caused by the rapid evolution of uncoordinated urban systems. By recourse to General Systems Theory, the paper puts forward a definition of "smart" based on the reduction of inter- systemic friction. It lines out two distinct modes of (urban) systems friction and puts them into relation to technology management and human perception.

Keywords: Smart City, Intelligent City, Urban Systems, Complexity, Systems Theory, Friction

About:

Susanne Haaf is a lecturer at the Freie Universität Berlin, MA programme Edition Philology since 2011. Between 2007 and 2011 she has been working as a research assistant at the Berlin-Brandenburg Academy of Sciences and Humanities, Deutsches Textarchiv & CLARIN-D (http://www.deutschestextarchiv.de/; http://www.clarin-d.de) and at the Heidelberg Academy of Sciences and Humanities, Bucer-Forschungsstelle; edition project: Martin Bucers Deutsche Schriften, vol. 15 (published: Guetersloh, 2011) . From 2005 to 2008 she participated in the edition project Der Zürcher Sommer 1968 (published: Zurich, 2008). From 2001 to 2007 Susanne Haaf studied German Philology and Computational Linguistics at the Universities of Heidelberg and Zurich; degree: Magistra Artium.

Contact details:

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Workshop description: Introduction to TEI-XML

This workshop gives an introduction to the current, XML-based encoding guidelines of the Text Encoding Initiative (TEI), a "consortium which collectively develops and maintains a standard for the representation of texts in digital form."[1] Currently, the TEI has become a de facto standard for the encoding of texts, e. g. for editorial or corpus linguistic purposes.[2] One of the motivations of scholars to resort to the TEI guidelines for text annotation is the possibility of interchange and interoperability between different text related projects.

In the course of the workshop we will consider different ends of text encoding. Hence, we will discuss the balancing act between the flexibility of encoding formats on the one hand, in order to fulfill different text digitization intentions, and the necessity of sticking to existing text digitization standards, on the other hand, for the sake of interoperability and interchange. The TEI guidelines will be introduced by means of their general idea, structure, contents and scope. Participants will get to know different TEI formats (e. g. the DTA base format[3]), and learn, how to adjust the TEI schema to the necessities of their respective projects using the ODD format. Furthermore, we will take a look at the TEI inventory for the recording of metadata.

An exercise will enable participants to create their own TEI annotation for a given text, using the DTA base format.

Participants are kindly asked to download and install the current version of the XML-editor oXygen (http://www.oxygenxml.com) and to get a valid license for it (a four weeks trial license can be obtained from the oXygen-homepage, as well). If for any reason the acquisition of the oXygen-XML-editor poses any problems please try to get another XML editor or contact haaf@bbaw.de.

References:
[1]   http://www.tei-c.org
[2]   Cf. Stührenberg, Maik: The TEI and Current Standards for Structuring Linguistic Data, in: jTEI 3 (2012), p. 2.
[3]   Cf. http://www.deutschestextarchiv.de/doku/basisformat.

Recommended Reading:

A Gentle Introduction to XML. In: TEI P5: Guidelines for Electronic Text Encoding and Interchange, Version 2.5.0 (26th July 2013). Published by the TEI Consortium, ed. by Lou Burnard and Syd Bauman, originally ed. by C. M. Sperberg-McQueen et al. Virginia 2013, chapter v, pp. xxvii-xlv, http://www.tei-c.org/release/doc/tei-p5-doc/en/html/SG.html.

Alexander Geyken, Susanne Haaf, Frank Wiegand: *The DTA 'base format': A TEI-Subset for the Compilation of Interoperable Corpora.* In: 11th Conference on Natural Language Processing (KONVENS) – Empirical Methods in Natural Language Processing, Proceedings of the Conference. Edited by Jeremy Jancsary. Wien, 2012 (= Schriftenreihe der Österreichischen Gesellschaft für Artificial Intelligence 5), http://www.oegai.at/konvens2012/proceedings/57_geyken12w/57_geyken12w.pdf.

John Unsworth: Computational Work with Very Large Text Collections. Interoperability, Sustainability, and the TEI. In: Journal of the Text Encoding Initiative 1 (2011), http://jtei.revues.org/215.

(Full texts available in the attached *Section 2*)

Katrin Etzrodt and Rebecca Renatus (Dresden)

WORKSHOP   11:00 – 12:30

About:

Katrin Etzrodt is a research assistant at the project „Software Engineering of Social and Ubiquitous Media"at the Institute of Media and Communication, TU Dresden. Previously she has been working as a reasearch assistant at several other projects such as "Emerging Communication and Media", „Career Entry and Development of Graduates in Economics at TU Dresden" or „Dresden Graduates Analysis." Etzrodt has further been engaged in different pedagogical and creative employment concerned with the documentation of events and the organization of film projects.

Rebecca Renatus is a research assistant at the project "Media use and Media literacy of young migrants in Saxony, Germany and at the project "Software Engineering of Social and Ubiquitous Media" at the Department of Media and Communication, TU Dresden. Prior to this, she has been working as Junior Research Manager (Division media and FMCG) responsible for planning, organizing and conducting national and international qualitative and quantitative market research projects in the field of media. She has also been working as a student research assistant at the project "Personality and learning development of primary school student (PERLE)" (Prof. Dr. Gabriele Faust / Prof. Dr. Frank Lipowski), as a research assistant responsible for project "Enhancement of metacognitive skills in learn- oriented programmes for children" an as a working student at Division media and FMCG. She studied Sociology at the Universities of Chemnitz and Bamberg.

Publications and talks:

Schenk, S., Ohme, J., Seifert, C. & Renatus, R. (2013). Reflections on new challenges to television research in today's digital media environment. Conference of International Association of Media and Communications. Dublin, Ireland, 25-29 June 2013. (Presentation)

Faust, G., Lotz, M. & Renatus, R. (2010). Vermittlung von Lesestrategien im Anfangsunterricht der Grundschule. 74th Conference of the association of empirically pedagogical research. Jena, Germany, 13-15 Sept. 2010. (Poster Presentation)

Schlote, E. & Renatus, R. (2010). Wie kommt das Ei ins Essigglas? Wie Kinder-Wissenssendungen Metakognition fördern können. In: Televizion, 23, 1. (Publication)

Workshop description: **Scientific Blogging// Presentation of Summer School'S blog**

The goal of the workshop is to discuss the use of social media tools such as blogs, messaging and wiki platforms for scientific researchers. The social web has revolutionized the way people communicate. Microblogging, instant messaging, video conferencing and web meetings and other forms of communication and collaboration have become a part of people's daily lives around the world.

However, the use of social media in a scientific context still is quite unpopular. How are social media practices influencing researcher's work? Our aim is to provide theoretical as well as practical insights into this arena.

The workshop will consist of two parts. Part one introduces participants to the concept scientific blogging as well as scientific analyses. The second part studies practical examples and experiences of blogging scientists, main tools and basic knowledge for blogging and the introduction of the summer school blog.

The workshop offers basic knowledge of using blogs for scientific writing. The participants will create content to accompany the Summer School 2013. Previous knowledge on the topic is not required.   Please bring your own notebook or tablet device for the practical part of the program

Recommended Reading:

Bik HM, Goldstein MC (2013): An Introduction to Social Media for Scientists. PLoS Biol 11(4): e1001535. URL: http://www.plosbiology.org/article/info%3Adoi%2F10.1371%2Fjournal.pbio.1001535; doi:10.1371/journal.pbio.1001535.

<div align="right">(Full text available in the attached Section 3)</div>

Noah Bubenhofer (Dresden)

WORKSHOP   11.00 - 12.30

About:

Dr. Noah Bubenhofer is a member of the academic staff at the Chair of Applied Linguistics, Technische Universität Dresden and head of the recently founded Dresden Center for Digital Linguistics. In addition, he is co-founder of SEMTRACKS, the „Laboratory for Computer Based Meaning Research".

In his PhD-thesis „Muster an der sprachlichen Oberfläche" (patterns at the linguistic surface), he developed corpus linguistic methods for discourse and cultural analysis. As a linguist, he is mainly interested in computer based semantic text analysis and the relation between text and discourse, society and culture.

In the project „Tracking Meaning on the Surface" categories were modelled for the description of semantic imprints using a data-driven approach. In doing so, the project explored possible applications of these models for the semantization of the Internet and the methodology of social sciences and cultural studies.

Noah Bubenhofer is also co-leader of the project "Text+Berg digital" (www.textberg.ch) where a series of yearbooks by the Swiss Alpine Club (SAC) is being digitised and transformed into a deeply annotated corpus.

More information on Noah Bubenhofer can be found at the following sources:

http://www.bubenhofer.com

http://www.semtracks.org

Workshop description: Basics of Text Mining

In a digital world, the text data available in electronic format is increasing constantly. Therefore means of quantitative text analysis are both an opportunity and a challenge for a lot of scientific disciplines. Techniques of Natural Language Processing (NLP) and corpus linguistics allow a wide range of quantitative analyses of text. It is not only possible to search for keywords and measure their distribution in texts, but also to use statistics to reveal the

patterns of their usage. This is the fundament to answer questions in the domains of digital humanities, social sciences and cultural studies.

In this workshop we will get in touch with the basics of text mining for purposes in digital humanities, social sciences and cultural studies. It's a hands-on workshop where the participants will work with the Open Corpus Workbench (cwb.sourceforge.net) and online text corpora to gain insights, how corpus linguistics and text mining could be fruitful for their own research.

Please bring your own laptop with Internet access to be able to follow the workshop. No prerequisites in corpus linguistics and text mining are required.

Charlotte Schubert (Leipzig)

KEYNOTE   17:30 - 18:30

About:

Prof. Charlotte Schubert is a professor of Ancient History at the Department of History, University of Leipzig. She studied Ancient History, Classical Archaeology and German Studies in Bonn. Schubert obtained her Phd in Ancient History and her habilitation in the History of Medicine. She recieved the Heisenberg fellowship. Among other occupations she has been coordinating the scientific network eXChange (BMBF) [Digital Humanities Project with 5 sub-projects], the project "Das Portal eAQUA" the scientific network eAQUA (BMBF) [Digital Humanities Project with 8 sub- projects]] She has also been working as project director at the Collaborative Research Centre 586 (DFG). Her most important publications comprise (2010-2012): „Perikles. Tyrann oder Demokrat?" (Stuttgart 2012, Reclam Sachbuch), „Solon und die Entstehung der Demokratie in Athen" (UTB Profile. 2012). Zufall, Koinzidenz und Kontingenz bei Herodot (in: Historische Zeitschrift 295/2, 2012, 297-329 (zus. mit K. Sier)), „Amazonen und Transvestiten. Zur Konstruktion von Mythen, Riten und Krankheiten" (in: Ch.Schubert/ A. Weiß (Hrsgg.)), „Amazonen zwischen Skythen und Griechen" (Berlin 2012 (Beiträge zur Altertumswissenschaft, De   Gruyter), „Die Ordnung des politischen Raums. Bemerkungen zur kleisthenischen Phylenreform" (in: Von Sklaven, Pächtern und Politikern, Festschrift für Reinhold Scholl, Hrsg. v. L.Popko, N. Quenouille, M. Rücker, Berlin 2012, (APF Beiheft 33), 102-118), „Die Bedeutung von Narrativität für die griechische Historiographie: Ein Versuch anhand von zwei Beispielen aus der Antike" (in: Ethnologisch-Archäologische Zeitschrift 51, 1/2 (2010), S. 30–47 [publ.2012]), „Anacharsis der Weise. Nomade, Skythe, Grieche" (Tübingen 2010, Leipziger Studien zur Klassischen Philologie, Narr Verlag) and „Formen der griechischen Historiographie: Die Atthidographen als Historiker Athens"(In: Hermes 2010).

Keynote: Quotation and Fragment in the Age of Digitization

Recommended Reading:

essay on quotation and fragmentation in our series *Working Papers No.7*:
http://www.uni-
leipzig.de/~order/content/index.php?option=com_content&task=view&id=161&Itemid=151

or:
http://www.academia.edu/2921444/Zitate_und_Fragmente_Die_kulturelle_Praxis_des_Zitier
ens_im_Zeitalter_der_Digitalisierung

Tuesday (01/ 10/ 2013)

The Regulation of Data Streams: Online Platforms and Platform Neutrality, Intellectual Property and Freedom of Information

Guido Westkamp (London)	
WORKSHOP	**09:00 – 10:30**
KEYNOTE	**16:30 – 17:30**

About:

Prof. Guido Westkamp is Professor in Intellectual Property and Comparative Law and course director for the University of London LLM courses "Intellectual Property in the Digital Millennium", 'Intellectual Property Transactions' and 'Intellectual Property in the Creative Industries'. He is also the academic director for the MSc in Intellectual Property Management and course director for the MSc Copyright and Designs course. He further coordinates the European Intellectual Property Institutions Network (EIPIN) at CCLS.

Guido Westkamp studied Law at the Universities of Münster/Germany (1992-1997) and London (QM) (1994-95), and English and Russian Languages in Berlin (1991-1992) and Münster (1992-94). He is a qualified German attorney and previously worked for international firms in IT/IP law. First German State Examination Hamm 1997; Second German State Examination Düsseldorf 2000; LLM Intellectual Property (London) 2001; Dr. jur. (Münster) 2002 (scl); Certificate in English Law (Münster) 1997; Intermediate Examination, English Philology (Münster) 1993.

Visiting positions include posts at the Universities of Münster (Germany), Alicante (Spain), Hong Kong, TU Dresden (Germany), Wroclaw (Poland) and Skopje (Macedonia). His work includes pre-accession consultancy on Intellectual Property law in new EU member states, management of EU funded projects and professional training in Intellectual Property. He was also involved in the evaluation of the Directive on Copyright in the information society (EC Commission) and is a frequent speaker at international conferences and workshops.

Guido held a generous grant from the Westfield Trust to conduct a research project on the implications of human rights on copyright law (2008-2010).

Keynote: Intellectual Property Rights in the Digital Age

Workshop description: **Copyright and Information Freedom: Legislative Rigidity and Judicial Flexibility**

The workshop will allow participants to discuss current topics impacting upon copyright protection, in particular as regards the notions of reproduction, making available and communication. We will also explore the status of limitations on copyright, including some analysis of the use of limitations as provisions that may permit third parties to offer valued-added services. There will be particular emphasis on the decsison of the Court of Justice in "Infopaq" (which is included in the materials) and its impact upon attempts to create a more flexible understanding of copyright as the right that ultimately defines and shapes control over communications on the internet.

Recommended Reading:

The case of "Infopaq" as treated by the European Court of Justice

(Full texts available in the attached *Section 4*)

Frank Becker (Dresden)

WORKSHOP **09:00 – 10:30**

About:

Frank Becker has been fascinated by computers since his childhood. After studying at the TU Dresden and University of Surrey (England) he's worked as a system administrator and software developer at multiple tech companies. He helped to found the Chaos Computer Club Dresden (c3d2) and likes to give talks at various Open Source or CCC events. He is also a podcaster producing for Pentamedia.org and the Python podcast.

Workshop description: **The Technical Basics oft he Internet in Easy Words**

No doubt, we live in the Information Age. The backbone that drives that development is the Internet. Some features of it's design make quite distinct from other communication networks. Most importantly, they determine what is feasible. Thus, they shape the Information Age and it's impact on society.

On the other hand, most of it's users know very little about what happens on the wires that connect the Internet users. That's a pity. Often it helps to understand technical problems as well as it's general impact on applications build on top of it.

This workshop tries to explain how a data packet travels through the Internet around the world. There is no prior knowledge necessary. It's the intend that the participants will gain a basic understanding of the technical foundation of the Internet.

Recommended Reading:

Please install the **wireshark** and **nmap** software on your laptop.

Sven Guckes (Berlin)	
WORKSHOP	**11:00 – 12:30**

About:

Sven Guckes, maths&cs, freelancer, lives in Berlin. Sven is an advocate of Free Speech and Free Software, with a focus on text tools and efficiency of user interfaces.

Workshop: Creative Commons

Recommended Reading:

Creative Commons. http://en.wikipedia.org/wiki/Creative_Commons

Alexander White (Tsinghua)	
WORKSHOP	**11:00 - 12:30**
KEYNOTE	**15:00 - 16:30**

About:

Alexander White is an assistant professor at the Tsinghua University School of Economics and Management.

Workshop : Economics of Online Platforms

Keynote: Economics of Online Platforms

Wolfgang Donsbach und Lutz Hagen (Dresden)

WORKSHOP   **09:00 – 10:30**

KEYNOTE (Hagen)   **14:00- 15:00**

About:

Prof. Wolfgang Donsbach is professor of communication and founding as well as current director of the Department of Communication at Dresden University of Technology, Germany. He has taught at the universities of Dortmund, Mainz and Berlin in Germany, and was a visiting professor at Columbia University, Syracuse University (both USA), University of Navarra (Spain), and Harvard University. He was president of the World Association for Public Opinion Research (1995-1996) and the International Communication Association (2004-2005). Donsbach was managing editor of the *International Journal of Public Opinion Research* between 1999 and 2007 and one of the editors since then. He is the general editor of the 12-volume *International Encyclopedia of Communication* (Wiley-Blackwell 2008). In 2007 he received WAPOR's Helen-Dinerman-Award for extraordinary achievements in public opinion research and in 2008 the David Swanson Award in Political Communication sponsored by ICA's Political Communication Division. In 2010 he was elected as an ICA Fellow. His main research interests are in journalism, political communication, public opinion, and exposure to communication. More information about Donsbach can be found on his website www.donsbach.net.

About:

Prof. Lutz Hagen is a professor of Communications Studies at the Institute of Media and Communication, TU Dresden.

Keynote:

Workshop description:

Digital democracy? How the forms, content and quality of political communication change due to online media (Wolfgang Donsbach, Lutz Hagen)

In this workshop we will discuss what digitization and online communication bring to the democratic process. Since the beginning of digitization different observers have made different predictions about the effects of online communication. These predictions relate to mainly three dimensions: citizens' participation, the quality of the political discourse, and the quality of media content. The first dimension includes political interest and activities of political communication, the second the deliberativeness and openness of the political discourse, and the third the validity and balance of descriptions of political reality. In other

words: Has the internet made more people interested in politics? Has it led to more exchange or to more "echo chambers"? Has it improved or jeopardized the quality of the news?

In the workshop we will discuss these assumptions and some of the available evidence. The organizers of the workshop will give an introduction and share some of their own research. Participants, insofar they have worked on one or several of these aspects, will be able to also share their research and/or hypotheses.

Recommended Reading:

Donsbach, W. (2013). Journalism as the new knowledge profession and consequences for

journalism education. Journalism. (Published online before print July 2, 2013). doi: 10.1177/1464884913491347

Baum, M. A., & Groeling, T. (2008). New media and the polarization of American political

discourse. Political Communication, 25, 345–365.

Snow Bailard, C. (2012). Testing the Internet's Effect on Democratic Satisfaction: A Multi-

Methodological, Cross-National Approach. Journal of Information Technology & Politics, 9:2, 185-204 To link to this article: http://dx.doi.org/10.1080/19331681.2011.641495

Christoph Bieber (Duisburg Essen)

WORKSHOP   09:00 - 10:30

About:

Prof. Christoph Bieber is Professor of Political Science at the NRWSchool of Governance, University of Duisburg-Essen, Germany. The position is funded by the Johann-Wilhelm-Welker-Stiftung, where the main area of research is ethics in political management and society. Previously he was an Assistant Professor of Political Science at the Justus-Liebig-University of Giessen. His dissertation thesis on Political Projects on the Internet: Computer-Mediated Communication and the Political Public Sphere was published in 1999. He has published widely on the effects of online communication for political actors. His books include "Politik digital. Online zum Waehler" (2010) and "Unter Piraten. Erkundungen in einer neuen politischen Arena" (ed. with Claus Leggewie, 2012). He blogs at http://internetundpolitik.wordpress.com and on Twitter he is known as @drbieber

Workshop description:

Liquid Democracy and innovative practices of political participation

The concept of "Liquid Democracy" has been widely discussed as a new form of modernizing the process of political decision-making. A set of various techniques and platforms have been introduced and developed by the german "Piratenpartei", which still is the most important political actor on the field of digital political communication. Elements of the concept may include online-discussion of issues, collaborative writing of party manifestos, online polling or even delegating votes to trusted members during intra-party decision-making. The proliferation of ideas and applications of "Liquid Democracy" into the german political landscape in combination with the electoral success of the Piratenpartei in four state elections since 2011 has lead to reactions of established parties and political institutions, trying to implement modern forms of digital communication and participation into their organizational processes. Still being in early stages of experimentation, "Liquid Democracy" may be able to influence the modes of communication among party elites, officials, members and external supporters, as well as communication between governmental structures and citizens. After a short introduction into the concept, the workshop tries to examine different applications based on the ideas of "Liquid Democracy". Small groups of 3-4 participants each focus on a single project, and describe its context of usage, the main characteristics and the special features of the respective application

Projects/Cases may include the following examples, but can be supplemented with submissions by the participants:

- enquetebeteiligung.de (discussion/deliberative platform of the German Bundestag)

- https://lqfb.piratenpartei.de (discussion/consultation platform of the German Piratenpartei)

- liquid-friesland.de (regional open government platform)

- https://dielinke.adhocracy.de/instance/dielinke (collaborative discussion of a party manifesto)

- https://liqd.net/projekte/zukunftsdialog/ ("future dialog" of the SPD delegation in the German Bundestag)

A concluding plenary session will integrate the findings of the group discussions.

Recommended Reading:

Adler, Anja (2013): Liquid Democracy als Social Software für Parteien. In: Social Media. Motor einer neuen Bewegungs- und Partizipationskultur? Forschungsjournal Neue Soziale Bewegungen (26/2). S. 71-83.

Daniel, Luis (2013): Democratizing Policymaking Online: Liquid Feedback. In: The Government Lab, 10.6.2013. Online unter http://www.thegovlab.org/democratizing-policymaking-online-liquid-feedback/.

Dobusch, Leonard/Pick, Yussi (2012): Liquid Democracy in Theorie und Praxis. In: blog acht, 12.6.2012. Online unter http://www.thegovlab.org/democratizing-policymaking-online-liquid-feedback/

kurzes einführendes video, das in einer aktualisierten Vortragsfassung den Start für den workshop markiert:
http://www.uni-due.de/kleine-form/bieber.php

Video in englischer Sprache, das knapp in den Gegenstand einführt: http://www.youtube.com/watch?v=fg0_Vhldz-8.

älterer, einführenden Beitrag über die Entstehung der Piratenpartei in englischer Sprache: http://www.cosmopolis.globalist.it/Detail_News_Display?ID=23896

Nishant Shah (Bangalore)

KEYNOTE   15:00 - 16:00

About:

Dr. Nishant Shah is the co-founder and Director-Research at the Centre for Internet and Society, Bangalore, India. He is an International Tandem Partner at the Centre for Digital Cultures, Leuphana University, Germany and a Knowledge Partner with the Hivos Knowledge Programme, The Netherlands. In these varied roles, he has been committed to producing infrastructure, frameworks and collaborations in the global south to understand and analyse the ways in which emergence and growth of digital technologies have shaped the contemporary social, political and cultural milieu. He is the editor for a series of monographs on 'Histories of Internet(s) in India' that looks at the complicated relationship that technologies have with questions of gender, sexuality, body, city, governance, archiving and gaming in a country like India. He is also the principle researcher for a research programme that produced the four-volume anthology 'Digital AlterNatives With a Cause?' that examines the ways in which young people's relationship with digital technologies produces changes in their immediate environments.

His Ph.D. thesis titled 'The Technosocial Subject: Cities, Cyborgs and Cyberspace' builds a framework to examine the technosocial identities that are produced at the intersection of law, digital technologies and everyday cultural practices in emerging information societies like India. Nishant was an Asia Research fellow looking at the cost and infrastructure of building IT Cities like Shanghai. He is the author of a recent thought-piece titled 'Whose Change is it Anyway? – Towards a future of digital technologies and citizen action in emerging information societies' that seeks to revisit the debates around digital activism and change in the global context. His current interests are in critically intervening in debates around Digital Humanities and conditions of change mediated by technologies.

Nishant is on the steering committee of the MacArthur Foundation's Digital Media and Learning Project (USA) as well as on the Media Art Histories collective (Latvia). He has been deeply involved with the Inter-Asia Cultural Studies Consortium (Taiwan/S. Korea/Hong

Kong) and is one of the key partners of the global [Network of Centres for Internet and Society](#) housed at the Berkman Centre for Internet & Society, USA. His work is committed to encouraging multi-stakeholder dialogue and hence he regularly does public consultations and trainings for civil society and NGOs, governments, academic partners and private corporate entities. He is a regular speaker at events like [Re:publica](#) and [Video Vortex](#) He is a regular columnist with India's leading English language newspaper *[The Indian Express](#)*. His [academic and research publications](#) reflect his political stance on open access and open knowledge infrastructure and are all available for free download and distribution under open license.

Keynote: Habits of Living: Data, Life and Society in Network Societies

Recommended reading:

1. http://cis-india.org/raw/histories-of-the-internet/blogs/leap-of-rhodes
2. http://ci-journal.net/index.php/ciej/article/view/929/955
3. http://www.metamute.org/community/your-posts/violence-knowledge-cartels
4. http://dmlcentral.net/blog/nishant-shah/big-data-peoples-lives-and-importance-openness

Thursday (03/ 10/ 2013)
John|Jane Doe and You: Right of Personality and Informational Self-Determination

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Anne Lauber- Rönsberg (Dresden)

WORKSHOP   09:00 - 10:30

About:

Dr. Anne Lauber- Rönsberg is a research assistant at the Institute of Intellectual Property, Competition and Media Law (TU Dresden) regularly lecturing on copyright law, civil law and media law. She studied law at the Universities of Passau, Heidelberg and Lausanne (Switzerland). She received her LL. M. at the University of Edinburgh (UK) and took her Bar exam in Berlin. Her research interests are intellectual property law, in particular copyright law; personality rights and media law. In 2011 she obtained her PhD degree. The PhD thesis focussed on the private use of copyrighted works in Germany and the UK and was awarded prices by the collecting society VG Wort and the Technical University Dresden in 2012.

Selected Publications:

- „Gerichtsberichterstattung zwischen Kommunikationsfreiheiten und Persönlichkeitsrechten – Aktuelle Entwicklungen im deutschen und britischen Recht", ZUM 2013, p. 264 (mit P. Hanske)

- „Rechtliche Rahmenbedingungen für Personenbewertungsportale", in; Tagungsband DSRI Hernstakademie, OlWIR 2013 (forthcoming)

- „Raubkopierer und Content-Mafia: Die Debatte um das Urheberrecht", Aus Politik und Zeitgeschichte (APuZ) 41–42/2012, p. 32

- „Urheberrecht und Privatgebrauch – eine rechtsvergleichende Untersuchung des deutschen und des britischen Rechts", Nomos, 2011

Contact details:

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Workshop description: Personality Rights in the Digital Environment

Web 2.0-services, e.g. social networks, blogs and websites such as "rottenneighbours.com" and "ratemyprofessors.com" enable citizens to participate in the public communication process. From a legal point of view, they raise fundamental questions with regard to the protection of the private sphere. Due to the changes of the media landscape, the process of digitization requires to re-examine the equilibrium between data protection and personality rights vis-à-vis the fundamental right to freedom of speech. Furthermore, it is questionable to which degree individuals have the authority to dispose of their personality rights. The workshop will discuss these questions on the basis of short case studies.

Recommended Reading:

Felix Lohmeier (Dresden)

WORKSHOP   09:00 - 10:30

Felix Lohmeier is the Head of the IT department at the Saxon State and University Library Dresden (SLUB). After participating in various internet ventures in the area of computer games and networks during the Dot-com bubble, he studied European Ethnology, Politics and Psychology in Göttingen. His master's thesis dealt with cultural conditions of emerging digital research infrastructures. He joined the library world in 2009 by joining the research project TextGrid that develops a Virtual Research Environment for the Humanities. During that time, he immersed himself in the Digital Humanities and how libraries may support digital research. In 2012 he joined the SLUB Dresden as Head of Information Services and subject librarian for Sociology. By switching to the IT department in February 2013 he was able to refocus on digital research infrastructures. His research interests are all variants of Openness (Open Access, Open Data, Open Science, Open …) as well as agile methods for software

engineering and management. Currently he is involved in projects concerned with current research information systems and Altmetrics. (http://www.felixlohmeier.de)

Workshop description:

Digitizing the Library: How Open Content Opens Up New Avenues of Research

Participants at this event will learn how libraries are transforming collection items (manuscripts, printed books, sheet music, maps, sound recordings, photography, etc.) from historical media to digital surrogates. The new presentation and discovery possibilities facilitated by this transformation not only transcends established media and institutional borders but, more importantly, opens up new avenues of research and teaching. The event will deal furthermore with important resulting questions from this analysis: How are original collection items and their virtual representations affected by their multiple reproductions in virtual research and learning environments? What does it mean for the function of libraries and museums in relation to research and learning? At the very least, digitizing the Library generates a series of pertinent and exciting new questions that will be hopefully further clarified during the workshop.

Recommended Reading:

- Monastersky, Richard (March 27, 2013): Publishing frontiers: The library reboot. http://www.nature.com/news/publishing-frontiers-the-library-reboot-1.12664
- Nissila, Jussi; Braybrooke, Kaitlyn; Vuorikivi, Timo (Ed.) (February 22, 2013): The Open Book. http://archive.org/details/TheOpenBook
- Neylon, Cameron (April 13, 2013): What's the right model for shared scholarly communications infrastructure? http://cameronneylon.net/blog/whats-the-right-model-for-shared-scholarly-communications-infrastructure/

Martin Degeling (Bochum)	
WORKSHOP	**11:00 - 12:30**

About:

Martin Degeling (M.Sc.) is research assistant at the Ruhr-University in Bochum. His research interests are privacy and data-protection in CSCW contexts as well as design of socio-technical systems. He studied applied computer science in Bochum and is working on a PhD thesis discussing the effects of big data on privacy and informational

In this workshop we want to discuss implications of "big data", especially with respect to "informational self-determination" and privacy.

Big data has become one of the major buzzword especially in the IT industry during the past years. In the words of the evangelists, data is becoming the "new resource" that drives and is necessary for innovations today. One field of big data is the analysis of data measuring human behavior to analyze, influence and often also predict how groups and individuals behave. Fields of application vary largely from marketing to traffic control or even healthcare.

One of the implications of understanding and describing data as a "resource" is that it seems to occur naturally and would therefore be free to use for those who "mine" it. In addition the data-resource is neutral and objective in what it describes. This wording masks the processes of data collection and pre-processing and is used to hide its algorithms and often also its results from the public. Nevertheless, in marketing campaigns or credit scoring, big data analysis is based on (pseudynomized) personal information that "belonged" to someone, but is abstracted and combined to profiles of individuals to predict and influence their future behavior.

The workshop will discuss how the question of "Who knows what about me?", that characterized informational self-determination as an individual right in Germany, has to be rephrased to fit the development of such predictive analytics.

Based on the example of behavioural advertising the workshop will discuss different perspective from economics (e.g. price discrimination), policy making (the discussion about regulating profiling in the european data protection) and IT (Online Behavioural Targeting, Scoring).

Recommended Reading:

Duhigg, C. "How Companies Learn Your Secrets." The New York Times. (2012, February 16)

> Available at: https://www.nytimes.com/2012/02/19/magazine/shopping-habits.html or http://charlesduhigg.com/how-companies-learn-your-secrets-part-1/

Danna, Anthony, and Oscar H. Gandy Jr. "All that glitters is not gold: Digging beneath the surface of data mining." Journal of Business Ethics 40.4 (2002): 373-386.

> Availabe at: http://www.asc.upenn.edu/usr/ogandy/DM%20published.pdf

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Juan Garcés (Dresden)

WORKSHOP **11:00 - 12:30**

About:

Dr. Juan Garcés is Head of Information Services at the Saxon State and University Library in Dresden, where he also coordinates the library's involvement in Digital Research. After studying theology in Giessen and Marburg, Germany, he received

a doctorate in Biblical Studies from the University of Stellenbosch, South Africa, in 2003. He has since gained experience in the field of Digital Humanities as analyst, consultant, and adviser for digitally-based international research projects, particular in the field of Greek texts. Before coming to Dresden, he coordinated the Göttingen Centre for Digital Humanities at Göttingen University, worked for the ReScript Project at the Institute of Historical Studies, University of London, and as Project Manager of the Greek Manuscripts Digitisation Projects at the British Library. His grounding in Digital Humanities comes from the Centre for Computing in the Humanities, King's College London, which awarded him an MA in Digital Humanities. He is one of the founding members of the Digital Classicist (http://www.digitalclassicist.org/), the organiser of the Open Source Critical Editions workshop, and co-author of 'Open Source Critical Editions: a Rationale' (in: Text Editing, Print, and the Digital World, eds. Marilyn Deegan and Kathryn Sutherland, Ashgate Press, 2009).

Contact details:

juan.garces@slub-dresden.de

Workshop description: Digital Research Beyond Texts: Understanding and Analysing Digital Images and Sound

The analysis of digital images and sound files (and, of course, of audio-visual files) might still be going through an experimental phase, it is nevertheless one of the most exciting fields of the digital research of culture. How does one profit from the rapidly growing mass of images, sound and audio-visual data available over the web? The answer has to go beyond using the computer as a more convenient playback device. This event will introduce basic technological aspects and analytical concepts by means of selected case studies. The aim will be to better understand the potentials, limits, and innovative questions answered by means of computational analysis of said material.

Recommended Reading:

Melissa M. Terras, Image to Interpretation: An Intelligent System to Aid Historians in Reading the Vindolanda Texts, Oxford Studies in Ancient Documents, Oxford: Oxford Unviversity Press,   2006.

---, Digital Images for the Information Professional, Aldershot & Burlington (VT): Ashgate, 2008.
International Association of Sound and Audiovisual Archives Technical Committee, Guidelines on the Production and Preservation of Digital Audio Objects, ed. by Kevin Bradley. Second edition 2009. <http://www.iasa-web.org/tc04/audio-preservation>

Ruth-E. Mohrmann (eds.), Audioarchive: Tondokumente digitalisieren, erschließen und auswerten, Münster/New York/Munich/Berlin: Waxmann, 2013.

Eric Schoop und Thomas Köhler (Dresden)

WORKSHOP   09:00 - 10:30

About:

Prof. Eric Schoop is a professor of Business Information Technology and Information Management at the Factulty of Business and Economics, TU Dresden.

About:

Prof. Thomas Köhler is a professor of Educational Technology at the Institute of Vocational Education, Faculty of Education, TU Dresden.

Workshop:

Developing the Knowledge Society: how to bridge the gap between formal and informal learning processes

Klaus Tochtermann (Hamburg)

KEYNOTE   14:00 - 15:00

About:

Prof. Klaus Tochtermann, PhD is the acting director of the German National Library of Economics Leibniz Information Center for Economics in Kiel. Tochtermann studied Computer Science in Kiel and Dortmund where he obtained his Phd in Computer Science. In 2002 he wrote his habilitation on „Applied Information Processing and Communication" at the Graz University of Technology. Among other occupations he has been working as Postdoc, Texas A&M University, Center for the Study of Digital Libraries (USA), Head of Department at the Research Institute for Applied Knowledge Processing (Ulm), as the

Managing Director of Austria's Competence Centre for Knowledge Management, Know-Centre Graz, and as a university professor in Computer Science at Graz University of Technology. His main research interests are Knowledge Management and Knowledge Transfer, Web 2.0, Semantic Technologies and Science 2.0. Among other fellowships and professional affiliations he is an authorized representative for EU affairs on behalf of the Executive Board of the Leibniz Association, member of the Supervisory Board of the Know-Center – Graz (Austria), member of the Board of Directors of TrentoRise – Trento (Italy) member of the Scientific Advisory Board at the Malaysian Institute of Microelectronic Systems, MIMOS (IT- Research Institute, Malaysia), member of the Scientific Advisory Board of the Bruno Kessler Foundation (FBK), Italy, member of the Advisory Board of the Global Economic Symposium (GES), visiting professor at the Universiti Teknologi MARA (Malaysia), Steering Board GOPORTIS – Leibniz Library Network for Research Information, Advisory Council, Scientific Libraries at the Ministry of Science, Economy and Transport, Schleswig-Holstein and a member of several national and international expert committees as well as a Programme Committee member of numerous high-level international conferences for Knowledge Management, Knowledge technology and Business Information Technology. His most recent publications comprise:

„**Is the Web Turning Us into Dummies?"** (2013) (mit Hermann Maurer) In: Proceedings of ED-MEDIA 2013 – AACE World Conference on Educational Media and Technology, 24-27 June 2013, Victoria, Canada; Chesapeake, VA: AACE, pp. 2524-2534, 2013
„**A Data Restore Model for Reproducibility in Computational Statistics"** (2013) (mit Daniel Bahls und Benjamin Zapilko) 13th International Conference on Knowledge Management – I-KNOW 2013 to be published in ACM ICPS
"Exploring Scientific Publication and Cross-domain Linked Dataset for Similarity – A Case Study" (2013) (mit Atif Latif) In: International Journal of Advancements in Computing Technology, ISSN 2005-8039, Vol. 5, No. 11, pp. 179-187, 2013
„**Ein Netzwerk aus Forschenden, Leserschaft und Computern"** (2013) In: wissenschaftsmanagement. Zeitschrift für Innovation, Bonn: Lemmens Verlags- & Mediengesellschaft, 2, 19 (2013), S. 20-23.

Contact details:

ZBW - Deutsche Zentralbibliothek für Wirtschaftswissenschaften
Leibniz-Informationszentrum Wirtschaft
(German National Library of Economics
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24105 Kiel
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Location Hamburg:
Neuer Jungfernstieg 21
20354 Hamburg
Telephone: +49-40-42834-351

Keynote: **Science 2.0: How the Social Web is Changing Research and Publication Processes**

ATTACHMENTS

SECTION 1

Smart Cities as Places of Low Friction: Intersystemic Coordination as a Measure for Urban Smartness and Intelligence

Jörg Rainer Noennig[1], Amir Mazandarani[2]

[1]*TU Dresden, 01062 Dresden, Germany, joerg.noennig@mailbox.tu-dresden.de*
[2] *TU Dresden, 01062 Dresden, Germany, amir.mazandarani@tu-dresden.de*

Not only the term "Smart City" has become a commonplace, but also the attributes "smart" and "intelligent" as descriptions for complex technological systems and networked structures. In urbanism these terms still lack a profound definition, and there are only few reliable interpretations of "smartness" and "intelligence" related to the notion of a "smart city". Addressing the urgent need for a clarification and definition, the paper explains the need for smartness and intelligence as a counter-reaction to increasing dynamics of complex systems and escalating coordination problems ("inter-systemic friction"). On that background, the demand for intelligence and smartness in urban contexts can be explained from frictions caused by the rapid evolution of uncoordinated urban systems. By recourse to General Systems Theory, the paper puts forward a definition of "smart" based on the reduction of inter-systemic friction. It lines out two distinct modes of (urban) systems friction and puts them into relation to technology management and human perception.

Keywords

Smart City, Intelligent City, Urban Systems, Complexity, Systems Theory, Friction

1. The Call for "Smart Cities"

"Smart" and "intelligent" have become popular terms in the recent past, not to say commonplaces. Whatever is being invented and put to market, beyond a certain technological level it will be most certainly labelled "smart" or "intelligent". There is a plethora of descriptions of what "smart" things are. At the core of these notions are usually references to some kind of intelligence, the application of ICT, some form of strategic and knowledge management, a certain effectiveness, and efficiency in operations. However, besides the enormous diversity of these "smart" notions and definitions, there is a stunning incongruity and often circular argumentation: smart refers to intelligence, and intelligent is what shows smart behaviour. Thus, no meaning is added by the attributes of "smart" or "intelligent". This may be due to lacking reflection on the epistemic and systemic background of the matter in case: the dynamics of complex networked systems.

What is more, there is an especially popular application of the qualities of "smart" and "intelligent" as it comes to the "city of the future", to 21st century urban development, and to regional planning and management. In this context, the attributes are certainly among the most preferred ones, alongside with terms like "sustainable", "innovative" or "ecological". This paper aims to explain why this preference is no coincidence. Nonetheless, just as the case is in technological discussions, also in the urbanism there is no agreed-upon terminology; the usage of "smart" and "intelligent" still is widely arbitrary.

Nonetheless, we should not ignore the ubiquitous call for smartness and intelligence, and exclude it from discussion only for reasons of ill-defined terminology. Rather, we ought to understand the demand behind this call: What background demand makes this all-too-general and outworn notion still so important?

Our assumption is that a close look at systems dynamics and their relationship to human society may deliver a profound notion of "smart systems" - a definition that escapes circular argumentation, and that can be applied to urban systems and city structures too. By juxtaposing general systems discussion on the one hand, and urban systems on the other, we may finally arrive at some definite interpretation of "smartness" and "smart cities". Thus the article purposefully switches in the following paragraphs between two lines of argument: 1) a theoretical inquiry on the nature of complexity and system dynamics, 2) an interpretation of these findings for the description of urban systems.

2. Pathdependency and Rationality in Systems Evolution

As systems theory and philosophy of technology indicate, complex socio-technical systems develop along highly determined yet autonomous paths. There are two major philosophical concepts that can explain how - also on urban level - an "unintelligent" and increasingly acute mismatch of systems comes about: path-dependency, and systems rationality.

The concept of technical-economic path dependency [1], [2] explains that innovation emerges within determined corridors, or "paths", that are defined by a complex socio-technological-economic interplay, formed by stable and hard-to-change constellations of producers, users, stakeholders, preinvestments, and also by implicit cultural and epistemic conditions. This has immediate implications for the type of innovations (breakthrough, disruptive, radical etc.) and their success rate in the market or in society. In other words: path-dependency defines to a large extent in which direction the development of systems, societies, and technologies will advance, and what kind of new products, processes, or services have chances for success. Take for example path-dependency in the development of pharmaceuticals: Due to the pre-existence of large scale R&D facilities, hospital networks and political lobbies, alternative forms of medicine and treatments (e.g. Chinese medicine, Traditional Herbal Treatment) are excluded from market and industries, though some of them have proofed being astonishingly effective.

What is more, a range of studies on intelligence structures [3], systems theory [4], and organizational behavior [5] have pointed out that advanced socio-technological systems establish their own forms of rationality and decision making. As they were established for a certain goals and tasks, these systems - if well-structured and organized - not only behave rationally according to these purposes, but they also maximize the probability of their future existence, or "survival", by adjusting and re-configuring their environment as well as developing their initial programme further and modifying themselves accordingly. Examples may be political or administrative systems, which have lost their original purpose, but still proliferate and expand, differentiating in more segments and departments, creating new tasks that only they themselves are able to solve.

The combination of such pre-determined systems evolving on high technological level on the one hand, and their relative ignorance towards other evolving systems on the other, creates a critical situation which is significant for technologically advanced countries. There is a

growing divergence between the rapidly developing technological structures in the modernized world, each of which follows its own independent track of progress.

3. Diverging Evolution of Urban Systems

The phenomenon of evolving systems divergence can be directly translated to urban functions. The development of a city´s various technical, social, and infrastructural systems - e.g. mobility, production, or health care - are as much subject to path-dependency and systems rationality as any other complex and well-established system.

Many urban systems have seen dynamic development and innovations in the recent past. Mobility: Sensor electronics and mechatronics have changed the way how people and vehicles move, navigate, and sense each other. Medicine: New forms of diagnostics, medication, and monitoring (e.g. tele-surgery, regenerative tissue-engineering, vaccination) have changed health care and wellbeing. Industrial production: New forms of manufacturing and mechanization (e.g. rapid prototyping, robots) allow us to assemble most complicate products in smallest number in a minimum of time.

Yet there are no doubts that such systems are also bound to specific developmental paths, which often block them from meaningful integration and convergence with other systems. Mobility: Although the effects on a larger scale are obvious, the manufacturing and utilization of cars now sweeps the markets of developing countries and mega-scale urban agglomerations. The result is environmental pollution, traffic collapses, increased diseases etc. - Modern globalized industrial production, bound for increased productivity and economical efficiency, moves to low-cost countries, thus deserting former industrial centres, bringing about unemployment and social disruption. Health care, always subject to socio-political debate, now seeks solutions to problems such as stress caused by mobility, mental burnout, or overweight - all side-effects of modern work life. However, it is gridlocked into the logics of national politics, pension systems, and pharmaceutical industries.

4. Friction between Urban Systems

Above mentioned examples are to illustrate the problems arising from systems locked-in on their developmental track while evolving with highest dynamics. Clearly such urban conditions can be hardly called "smart". Especially if the problems arising here stem from the incongruent, independent, and accelerated advance of individual systems. In other words: Inter-systemic friction emerges.

What is more, though uncoordinated, the systems at stake get more and more interlinked and networked. Systems of systems emerge. In this process the "dissonances" and "disparities" become multiplied and strikingly apparent - they appear in ever more places and occasion, and in amplified manner. The frictions turn into "system pain". Such mismatches in systems development have been a long time neglected, but due to globalization and the advance of networking technology they have become eminent effects in the past years. We may assume: The faster the development of socio-technological systems proceeds, the more gaps and incompatibilities appear between them. In times of fast developing systems, of accelerated innovation and production, the a-synchronicity and un-coordination increases to large extents.

What was called "inter-systemic frictions" is evident in urban systems. Cities are some of the most complex systems. Cities in total, but also many of their technological subsystems are quickly developing and changing, either for the better or the worse. Former industrial centres dilapidate and decay, whereas second or third order cities rapidly grow into megacities. These are the places where frictions between uncoordinated technologies and between divergent cultures become most obvious. It is in the globalized cities, where the pains of accelerated development strike first and foremost.

To rely on the before-mentioned examples: Mobility and traffic in city planning is rarely coordinated with health care and production systems. One knows such disconcerted scenarios from daily experience: As workplaces and tasks are increasingly changing, people have to travel to distant locations. Work mobility becomes more individualized, traffic increases and larger infrastructures are needed. Traffic jams stop people from being at work in time (which might be e.g. the manufacturing of automobiles). What is more, air pollution, noise, and danger of traffic accidents increase. Increased workload and production performance create pressure at the workplace too. People get stressed and turn physically ill - thus becoming cases for social insurance or hospitalisation. A vicious circle, although all separate systems perfectly develop on their own.

5. Human as a Sensor for Systems´ Frictions

The crucial issue in such scenarios is the fact that inter-systemic friction is being recognised, before all, in the human actors involved in these systems, be them individual or collective. Technological systems themselves do not suffer from lack of coordination and synchronization; developed systems are rational and complete in themselves. Rather it is the humans who directly experience incompatibilities and disparities. For humans, dissonant technological systems are stress factors, triggers of illness, unhappiness, and mischief. A-synchronicity is harmful to human health; it generates not only psychological but also physical diseases.

On the individual human level this is when, for example, the communication demands conflict with production requirements, when health consciousness conflicts with work obligations, when mobility does not correspond with safety etc. But also on collective level system incompatibilities manifest themselves via humans. The dissonances of social and urban systems regularly fill newspapers and TV shows: social friction in urban quarters, breakdown of environmental and economical systems, lack of security and trust.

5.1. First-Level Pains: Dissonances

A closer observation reveals that there are two types of problems, or "pains", arising from this phenomenon of divergent technological development.
The technical dissonance and un-coordination between developed systems may be called "First-level pains". Fast-evolving structures, though harmonized within themselves, may become incompatible to other fast evolving systems. In other words: they are ignorant to other systems, blind. The problems arising from such kind of constellation are often indicated as "increasing complexity": what is being termed "complexity" is the expression for the un-coordination of dynamic, extensive, and interlinked systems.

Complexity as a kind of "inter-systemic noise" can be clearly found in urban scenarios. For example, the advance of urban transportation and logistics on the one hand, and the revolutions in work style and organization through ICT on the other, do not all too closely match. Also, aspects of wellbeing and welfare are rarely negotiated with industrial demands. There are many examples for mismatching urban systems. Most important, however, is the fact that such inter-systemic urban dissonances become apparent through the discomfort of human societies (groups, teams, families etc.) who are trying to compensate the emerging incompatibilities. Once these compensations become too demanding to the human side, a call for "smart" or "intelligent" systems arises, asking for smooth integration of the various systems without painful side-effects for human actors. This demand for smooth integration is at the very heart of most "intelligence" or "smartness" discussions.

5.2. Second-Level Pains: Disparity

Whereas the first level pain is already a definite challenge for the human individual as well as for society, there may be a more critical second level still. Here, the notion "Second-level pain" is to address the increasing distance between technological systems and human beings.

As was stated before, integrated and advanced technological systems develop high grades of autonomy and independency. System theory shows that systems unfold "Eigenrationalität" which aims for system survival and stability. Intelligent systems propel themselves, allowing ever less influence from the human side. Autopilot systems in transportation, but also complex administrative procedures may serve as examples. As human rationality is bounded, artificial intelligence and technological reasoning become a substantial need [6]. Then, there is a turning point when the rationality of systems supersedes the rationality of humans. In many cases, human turns out to be the weakest element within complex networks and high-risk environments. Consequently, the human controller is getting displaced by machine intelligence and automatic control.

For instance: Megacity agglomerations of millions of inhabitants are rarely human - yet they proliferate faster than ever. Manufacturing vehicles that kill hundred-thousands of people every year are not very human - yet car production is still increasing. Exposing millions of workers to desk- and computer work is not healthy - yet this is the dominant work style of the future. And so on. Social sciences have coined the term "Posthumanism" for this form of alienation [7]. The world of advanced technological (urban) systems is not primarily a place for humans anymore.

6. Counter-Reaction: Demand for "Intelligence" and "Smartness"

The human displacement within technology-driven environments, however, is getting noticed by individuals and societies. The natural counter-reaction is a renewal of human-centered approaches. In technological development, in social and political systems, there is the somewhat anachronistic demand for a new "human-centeredness". Unlike the discovery of the Renaissance - which established man as the new centre figure of the universe - this new call comes from the discovery that man has been displaced from his former central position by machinery and systems intelligence that he himself has created.

What is demanded from this position is the re-integration of human needs within technological systems. It is exactly here where the most critical demand for smart solutions emerges. The ubiquitous demand for "intelligent" solutions must be regarded a natural response to frictions between conflicting technological systems ("dissonance"), and the call for "smartness" a response to frictions between technology and human agency ("disparity"). These frictions are sensible by two explicit kinds of pain: 1) the un-coordination of rapidly developing networked systems are recognised on the side of humans as "noise"; 2) the increasing discrepancy between human affairs and the eigen-rationality of technological system development is being felt as a serious feeling of displacement and lack of control. The overall results are stress, illness, exhaustion, and alienation.

7. Towards a Definition of Smart / Intelligent Cities

Based on the arguments given above, a preliminary definition of "smartness" and "intelligence" resp. "smart / intelligent city" can be delivered. Firstly, the request for "intelligence" targets at systems being aware of each other, at technological cross-information for the sake of smooth coordination. It is a general matter of communication and problem solving. As long as systems collide because they do not recognise each other there cannot be intelligence. An "intelligent city" is thus a system of systems cross-communicating for the sake of technological smoothness.

However, technologically harmonized systems do not necessarily befit human needs and behaviour. Systems are "smart" only when harmonised with human society, that is: if they avoid friction, or painful experience, on the human side. For this, awareness of environment and situation-consciousness is necessary. Smart implies a complex sense of context. Things are "smart" when specifically responding to environmental conditions, part of which is human behaviour. "Smart" is smoothly networked ("intelligent") technology that establishes a pain-free relation with humans. A smart city is a place that intelligently arranges itself in accordance to human circumstances. The reduction of friction between technological systems, and between systems and man (First Level Pains, Second Level Pains) is a reliable indicator for "smartness".

References

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SECTION 2

The DTA 'base format': A TEI-Subset for the Compilation of Interoperable Corpora

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Abstract

This article describes a strict subset of TEI P5, the DTA 'base format', which combines the richness of encoding non-controversial structural aspects of texts while allowing only minimal semantic interpretation. The proposed format is discussed with regard to other commonly used XML/TEI schemas. Furthermore, the article presents examples of good practices showing how external corpora can either be converted into the DTA 'base format' directly or after cautiously extending it. Thus, the proposed encoding schema contributes to the paradigm shift recently observed in corpus compilation, namely from private encoding to interoperable encoding.

1 Introduction

Up to the end of the 1990s corpus compilation on the basis of the *Guidelines of the Text Encoding Initiative* (TEI; most recent release: P5, cf. Burnard and Baumann, 2012) was mainly a project specific activity. Corpus documents were validated against a project specific document grammar, (possibly) private character encodings were used, and the documents were transformed into proprietary formats in order to get indexed for full text retrieval. In that era of project specific encoding, exchange of documents across projects was not a primary goal, and, in general, character encoding problems as well as differences in the document type grammar (DTD) were obstacles to a broader exchange of data. With the advent of XML and Unicode, documents encoded according to the recommendations of the TEI became interchangeable, or, more precisely, documents encoded in TEI P5 could be safely exchanged on different platforms without worrying about incompatibilities of character encoding. However, differences in structural encodings still remained. The large flexibility of using the TEI Guidelines to encode similar semantic phenomena with different XML elements is one major reason for this problem: for example, there are several ways to encode the hierarchy of sections in documents, either with numbered division elements (`<div1>`... `<div7>`) elements or by enumerating the hierarchy with numeric @n-values: `<div n="1">`, `<div n="2">`, etc. Likewise, there are different ways to encode information about person names (`<persName>`, `<name type="person">`, `<rs type="person">`), several ways to link text passages (`<ref>`, `<ptr>`, `@corresp`, `@next`/`@prev`,...) etc. However, the main reason for differences in structural encoding resides in the fact that different projects use different subsets of the TEI according to their needs. Problems like these become apparent when the attempt is made to carry out specific tasks with the exchanged data on another platform together with another document collection.

Problems occur on several levels, the first one being the difficulty to create a common style sheet across different document collections encoded in different TEI P5 schemas in order to present all document collections uniformly on the web. Another problem concerns the exchange of TEI metadata: Due to the flexibility of the TEI tag set, the structure of TEI Headers may dif-

fer considerably, which forces harvesting mechanisms exploiting this information in a uniform way to deal with a lot of different cases. This is obviously not the idea of a standard. Examples 1 and 2 illustrate this fact: the information about an author of a work can be either underspecified (Ex. 1) or very detailed (Ex. 2). However, both are valid according to the TEI Header specification.

Example 1

```
<author>Ernst, Ferdinand</author>
```

Example 2

```
<author>
  <persName>
    <forename>Ferdinand</forename>
    <surname>Ernst</surname>
  </persName>
</author>
```

Furthermore, machine-exploitable extraction of document components such as 'retrieve all letters of the document collection' or 'display all quotations in a chapter' pose an enormous problem since division types or entity encoding for quotes do not have to be realized in an ubiquitous way across document collections. Clearly the problem is even worse for complex XPath queries or for data mining tasks where ubiquitous encoding is a necessary prerequisite. To sum up: at present, document collections encoded in TEI can be exchanged only by accepting the loss of interoperability on one or several of the above-mentioned levels. These problems are widely acknowledged (cf. e.g. Ramsay et al., 2011: p. 1-4; Pytlik Zillig, 2009: p. 187 seq.; Unsworth, 2011: p. 1 seq.; Stührenberg, 2012: p. 141 seq.).

More recently, several attempts were made to increase the interoperability among different document collections by creating common formats. Therefore, subsets of TEI P5 were created reducing the tei_all tag set to a considerably smaller number of elements and attributes (cf. Day, 2010: p. 1). The TEI consortium recommends such customizations of the TEI inventory according to the individual needs of projects instead of taking the whole TEI tagset as a basis for the annotation of a corpus (Burnard and Baumann, 2012: ch. 15.5, 23.2). TEI formats like TEI Lite (Burnard and Sperberg-McQueen,

2006), TEI Tite (Trolard, 2011) or the *Best Practices for TEI in Libraries* (TEI SIG on Libraries, 2011; henceforth: TEI-Lib) are promoted.[1] In addition, several corpus and data curation projects have developed other TEI- or TEI-related formats according to their particular purposes, e.g. TEI Analytics developed by the MONK project (cf. Unsworth, 2011; Pytlik Zillig, 2009; Pytlik Zillig et al., 2012; henceforth: TEI-A), IDS-XCES by the Institute for the German Language in Mannheim and *TextGrid's Baseline Encoding for Text Data in TEI P5* (TextGrid, 2007–2009; henceforth: TextGrid's BE). These formats have been designed to allow for the basic structuring of all written texts and therefore serve as a starting point from which more detailed, possibly project specific text structuring could start.

The remainder of this paper starts with a short presentation of the above-mentioned subsets of the TEI (section 2). In section 3, we motivate the creation of a TEI format for the "Deutsches Textarchiv" (DTA), the DTA 'base format'[2] (henceforth: DTA-BF). Section 4 presents examples of good practice illustrating how different external corpora can be converted into the DTA-BF, thus being interoperable in a wider context, e.g. as part of the text corpora provided by the large European infrastructure project CLARIN.[3] We conclude with a short summary and some ideas about future prospects.

2 Comparison between existing TEI Encoding Formats

In this section, we compare some (well-known) existing XML annotation formats, which are fully or partially based on the TEI Guidelines, namely the above-mentioned formats TEI Tite, TEI Lite, TEI-Lib, TEI-A, IDS-XCES, and TextGrid's BE. The formats are evaluated with respect to their applicability for the annotation of historical corpora such as the "Deutsches Textarchiv".

All of the mentioned encoding formats have in common their attempt to unify large amounts of – possibly different – texts. However, considerable differences persist. TEI Tite and TEI-

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[1]Cf. www.tei-c.org/Guidelines/Customization.

[2]www.deutschestextarchiv.de/doku/basisformat.

[3]Common Language Resources and Technology Infrastructure; www.clarin.eu.

Lib are complementary in the sense that they provide annotation guidelines for text digitization undertaken by libraries. While TEI Tite was created to allow for basic text structuring undertaken by external vendors, therefore intending "to prescribe *exactly* one way of encoding a particular feature of a document in as many cases as possible" (Trolard, 2011: ch. 1; Day, 2010: p. 16), TEI-Lib is intended "to support in-house encoding that adheres as closely as possible to common TEI practice and library standards yet still leaves room for variation in local practice" (TEI SIG on Libraries, 2011: ch. 2; cf. Dalmau/Schlosser, 2010: p. 355 seq.). Both formats are therefore especially suited to the task of annotating large amounts of heterogeneous text material in a library context. TEI Lite pursues a similar goal, being meant to "meet 90 % of the needs of 90 % of the TEI user community" (Burnard and Sperberg-McQueen, 2006: Prefatory note), but without being restricted to library usage. TEI-A results in a customization which is supposed to be suitable for the annotation of diverse texts from variable sources, as well, but has a different starting point than TEI-Lib, TEI Tite and TEI Lite, since it was created as a format to bring together texts which were already annotated individually (Pytlik Zillig, 2009: p. 188 seq.). Similarly, TextGrid's BE is intended as basic encoding format enabling the intertextual search within TextGrid (TextGrid, 2007-2009: p. 6.). Finally, IDS-XCES serves as an encoding scheme for the IDS corpus texts. It is originally based on XCES, the XML adaption of CES, which was extended, partially with respect to the TEI Guidelines, according to the requirements of the IDS corpora (Institute for the German Language Mannheim, 2012; Stührenberg, 2012: p. 175-180).

Despite their individual genesis and purpose there is a set of structuring elements common to all of the named formats. E.g. the text of a document is divided into a `<front>`, a `<body>`, and a `<back>` area, paragraphs are structured as such using the element `<p>`, verse (at some point) should be encoded using `<lg>` and `<l>`, speech acts in a drama are encoded with the `<sp>` element etc. Such analogies show that there is a commonplace structuring level, which might be classified as level-1-encoding, or as, what the TEI

P5 *Recommendations for the Encoding of Large Corpora* subsume under "required" elements, demanding that "texts included within the corpus will always encode textual features in this category, should they exist in the text" (Burnard and Baumann, 2012: ch. 15.5). Still, in some cases the selections of TEI P5 elements differ. E.g. only TEI-A offers tagging solutions for screenplays, such as `<view>` and `<camera>`. Furthermore, the flexibility of the TEI specification allows that semantically similar phenomena are addressed differently by the encoding formats. E.g. TEI Lite, TEI Tite, and TEI-Lib allow for the encoding of additions and deletions which were performed on the source document by providing the elements `<add>` and `<del>`, whereas TextGrid's BE offers the elements `<addSpan>` and `<delSpan>` for this purpose.

The appropriate selection of elements is just one factor for the evaluation of annotation formats. Almost equally important is the appropriate choice of attributes and their corresponding values, ideally expressed as a fixed value set. In addition, there are more general factors to be taken into account with regard to the practical applicability in specific project contexts, namely the determination of annotation levels, solutions to the provision of metadata, comprehensive guidelines on text transcription and editorial interventions as well as the documentation of the format itself. Last but not least annotation formats differ in their degree of conformance to the TEI Guidelines - is the format a strict subset of TEI-P5 or does it make use of extensions.

Tables 1 and 2 summarize the commonalities and differences between the annotation formats considered here with respect to the abovementioned factors. These factors serve as a guideline for the discussion of the DTA base format that is presented in the next section.

3 The DTA 'base format'

This section discusses the DTA-BF, a customization of the TEI P5 tag set, created for the encoding of (historical) German text in large text corpora. The format emerged from previous work on a TEI P5 corpus project, the DWDS corpus (Geyken, 2007). The DWDS corpus is a cor-

	TEI P5 subset	documentation	element-wise attribute selection	fixed/recommended attribute values	levels
TEI Tite	no	yes, mainly element-wise	class-wise	no	no
TEI Lite	yes	yes	class-wise; some element-wise recommendations for attributes	no	no
TEI for Libraries	yes	yes	selection of generally recommended attributes	no	yes[a]
TEI Analytics	no	yes, element-wise; but examples include undocumented elements	yes	in some cases (e.g. recommended values for `@unit` and `@part`; fixed values for `@scope`)	no
TextGrid's Baseline Encoding	yes	yes, but examples include undocumented elements	in some cases (e.g. for inline elements)	in some cases	no
IDS-XCES	no	only changes to XCES are communicated; no documentation of the usage of elements	yes	in some cases	no
DTA 'base format'	yes	yes	yes	yes	yes

[a]levels are not strictly cumulative

Table 1: Comparison of annotation formats – part 1

pus of the 20th century German language of written text. It is roughly equally distributed over time and over five genres: journalism (approx. 27 % of the corpus), literary texts (26 %), scientific texts (approx. 22 %) and functional texts (approx. 20 %), as well as a smaller number of transcripts of spoken language (5 %). The focus of encoding was put on the non-controversial structural aspects of the documents with the goal to facilitate cross-document full text retrieval for linguistic purposes.[4] With the start of the project *Deutsches Textarchiv*[5] (DTA) in 2007, the TEI P5 compliant schema had to be extended considerably for two main reasons: faithful page per page presentation of the entire works, and the necessity to deal with older prints, thus having to cope with additional structural variation. The DTA project works on building a text corpus for the historical New High German. Within seven years of work, a selection of 1,300 texts of different text types, originating from the 17th to 19th century, are being digitized and annotated according to the TEI P5 Guidelines. Linguistic analyses are added to

the digitized text sources in a stand-off format for further corpus research.

The goal of the DTA-BF is to provide a homogeneous text annotation for a collection of historical texts being heterogeneous with respect to the date of their origin (1650–1900) and text types (literary texts, functional texts, scientific texts). To achieve this, the DTA-BF follows some overall restrictions, this way combining the different benefits of the named formats.

In the remainder of this section we show how the DTA-BF deals with the factors mentioned in section 2 ensuring the quality of corpora encoded according to the DTA-BF as well as the applicability of the DTA-BF for other projects.

3.1 Selection of Elements, Attributes, and Values

The selection of DTA-BF elements corresponds to a large extent to the tagset of TEI Lite. However, unlike TEI Lite, the DTA-BF also provides a restricted set of attribute values in order to minimize the possibility of using different tagging solutions for similar structural phenom-

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	inline metadata	solutions for editorial interventions[a]	transcription guidelines	text type specific encoding guidelines[b]
TEI Tite	no	no	no	newspapers
TEI Lite	yes	CN; AD-ST; AD-Ed (except `<supplied>`); AE	no	no
TEI for Libraries	yes	CN (except `<reg>`, `<orig>`); AD-ST; AD-Ed (except `<supplied>`)	instructions for quotation marks and hyphens	interviews
TEI Analytics	yes	CN; AD-ST (except `<del>`); AD-Ed (no `<gap>`, `<unclear>`; `<supplied>` is not documented, but used in examples)	no	screenplays
TextGrid's Baseline Encoding	yes	CN; AD-ST (`<addSpan>`, `<delSpan>` instead of `<add>`, `<del>`); AD-Ed (except `<supplied>`); AE	no	dictionary entries
IDS-XCES	no[c]	CN (except `<choice>`, `<sic>`; `<corr>` with `@sic`); AD-Ed (except `<unclear>`, `<supplied>`); AE (except `<expan>`; `<abbr>` with `@expan`)	no	spoken language (e.g. dialogues, speeches, debates, interviews)
DTA 'base format'	yes	CN; AD-Ed (except `<unclear>`; usage of `<supplied>` instead); AE	yes	funeral sermons, newspapers

[a] I.e. correction and normalization (CN; includes `<choice>`, `<sic>`, `<corr>`, `<reg>`, `<orig>`); deletions, and additions: in the source text (AD-ST; includes `<add>`, `<del>`), editorial (AD-Ed; includes `<gap>`, `<unclear>`, `<supplied>`); abbreviations and expansions (AE; `<choice>`, `<abbr>`, `<expan>`)

[b] Other than prose, verse, drama, letter

[c] A metadata format is provided, which contains TEI Header elements as well as a considerable amount of other elements

Table 2: Comparison of annotation formats – part 2

ena.[6] This goal is explicitly expressed by the TEI Tite guidelines, as well.[7] However, only some recommendations for attribute values are given, whereas no firm value lists are integrated in the TEI Tite schema. Other formats, such as TEI-Lib, explicitly decided against the restriction of attribute values.[8]

In our opinion, it is crucial to provide a detailed specification not only of elements but of corresponding attributes and values as well to mini-

mize ambiguities of the tag set. Therefore, each of the 105 TEI P5 elements currently contained by the DTA-BF tagset[9] is provided with a fixed list of possible attributes and values. The selection of attributes specified for each element is restricted not only class-wise but element-wise. Attribute values may occur within the DTA-BF in three different ways:

1. In general, the DTA-BF prescribes a fixed set of possible values for each attribute, thus being even more restrictive than TEI Tite. E.g. possible values for the `@unit` attribute of the element `<gap>` are: `"chars"`, `"words"`, `"lines"`, or `"pages"`. The selection of values in the DTA-BF can either apply for an attribute in every possible context or depend on the surrounding element.

2. In rare cases, where attribute values cannot

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[6]The necessity of minimal semantic ambiguity of the tagset has been pointed out by Unsworth (2011: § 7).

[7]"Tite is meant to prescribe exactly one way of encoding a particular feature of a document in as many cases as possible, ensuring that any two encoders would produce the same XML document for a source document" (Trolard, 2011: ch. 1).

[8]Cf. e.g. the statement of TEI-Lib about possible `@type`-values: "Constructing a list of acceptable attribute values for the `@type` attribute for each element, on which everyone could agree, is impossible. Instead, it is recommended that projects describe the `@type` attribute values used in their texts in the projects ODD file and that this list be made available to people using the texts" (TEI SIG on Libraries, 2011: ch. 3.8.1).

[9]I.e. about 80 elements used for the annotation of the texts themselves plus 25 additional elements needed specifically for the representation of metadata within the TEI Header.

be reduced to a fixed set, restrictions are made with respect to the data type. E.g. the value of the attribute `@quantity` within the element `<gap>` has to be a non-negative integer (`data.count`).

3. Finally, there are cases, in which attribute values cannot be restricted by the schema at all. E.g. the value of `@n` in `<pb>` may consist of alphanumeric characters (e.g. `<pb n="16">`, `<pb n="XVI">`) as well as strings (e.g. `<pb n="[16]">`). In such (rare) cases value restrictions are given in the DTA-BF guidelines.

The DTA-BF has been designed to cover all annotation requirements for a basic structuring of the large variety of historical texts that are dealt with in the DTA. On this common structural level each typographically marked segment in the source text (centered, printed in bold or italics, printed with an individual typeface, smaller or larger letters) is labelled preferably with one basic semantic category (citation, poem, title, note etc.) or, if a semantic function cannot easily be assigned, with the formal category describing the typographical characteristics of the respective text segment. Fig. 1 shows the combination of semantic (`<lg>`, `<l>`) and formal (`<list rendition="#leftBraced #rightBraced">`, `<item>`) tagging.

3.2 Annotation Levels

As stated above, the DTA-BF is supposed to serve as a guideline for the homogeneous annotation of heterogeneous historical corpus texts. However, the necessity of a homogeneous format for the annotation of historical text seems to be opposed to the fact, that different projects usually have different needs as for how detailed text structuring should be. This problem is aggravated by the fact that text structuring becomes more labor intensive the more detailed it is. To address this problem, the TEI *Recommendations for the Encoding of Large Corpora* advise users who wish to create language corpora to define four levels of text annotation (required, recommended, optional, and proscribed) when determining a subset of TEI elements appropriate to the anticipated needs of the project (Burnard and Bauman, 2012: ch. 15.5).
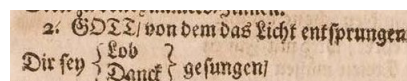

```
<lg n="2">
  <head>2.</head>
  <l>GOTT/ von dem das Licht
  ent&#x17f;prungen/</l><lb/>
  <l>Dir &#x17f;ey
    <list rendition="#leftBraced
    #rightBraced">
    <item>Lob</item><lb/>
    <item>Danck</item>
    </list>
  ge&#x17f;ungen/</l><lb/>
  [...]
</lg>
```

Figure 1: Friedrich Rudolph Ludwig von Canitz: Gedichte. Berlin, 1700. Image 16.
www.deutschestextarchiv.de/canitz_gedichte_1700/16

Like TEI-Lib, the DTA-BF defines different encoding levels according to the depth of text structuring, thus categorizing all available DTA-BF elements due to different text structuring necessities and depths. In accordance with the TEI Guidelines but in contrast to TEI-Lib (TEI SIG on Libraries, 2011: ch. 1), the levels 1 to 3 of the DTA-BF are strictly cumulative.[10] The first level represents the least common denominator for text structuring, therefore containing elements that are mandatory for basic semantic text annotation. The elements in level 2 are strongly recommended but not mandatory. Level 3 contains optional elements, which can be used for in-depth semantic text structuring, but are not applied extensively throughout the DTA core corpus.[11] Thus, the obligation to use the provided elements decreases with the increase of levels and, in connection with that, the depth of text structur-

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[10]For an overview on the DTA-BF elements and their corresponding levels cf.
www.deutschestextarchiv.de/doku/basisformat_table.

[11]However, the DTA-BF remains an annotation format for the structuring of historical corpus texts, esp. serving linguistic purposes. Projects, which aim at providing historical critical editions of texts, will need further annotation possibilities (e.g. an inventory for a critical apparatus as specified in chapter 12 of the TEI guidelines; cf. Burnard and Baumann, 2012: ch. 12). Such projects might want to start off with the DTA-BF for annotation and extend it according to their requirements.

ing. The fourth level contains an exception list of elements which should be avoided in favor of a different solution provided by the DTA-BF.

3.3 Metadata

Like TEI-Lib (TEI SIG on Libraries, 2011: ch. 4.1), the DTA-BF provides a TEI Header customization which allows to express rich bibliographic metadata for each corpus text. The DTA-BF metadata specification focuses on the bibliographic description of written corpora. We provide conversion routines to other standards such as the Component Metadata Infrastructure CMDI[12], which is the recommended metadata format in CLARIN.[13]

3.4 Text Transcription and Editorial Interventions

In addition to the DTA-BF, extensive transcription guidelines are provided in order to support common transcription practices for each text in the DTA corpus.[14] To this end, furthermore, the DTA-BF contains regulations for possible editorial interventions. From the TEI formats mentioned above, only the TEI-Lib guidelines point out the necessity of transcription guidelines, but limit their advice to the handling of punctuation and hyphenation problems (TEI SIG on Libraries, 2011: ch. 3.2).

3.5 Documentation

The DTA-BF comes with a detailed documentation[15] explaining the usage of each element, attribute, and value according to the possible annotation needs in text structuring. The documentation contains examples taken from the DTA corpus and illustrates typical encoding scenarios as well as exception cases.

There is also an ODD[16] specification for the DTA-BF together with a corresponding RNG schema[17] generated with TEI-ROMA.[18]

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[12]Cf. www.clarin.eu/cmdi.

[13]Cf. footnote 3.

[14]Cf. www.deutschestextarchiv.de/doku/richtlinien.

[15]Cf. www.deutschestextarchiv.de/doku/basisformat.

[16]One document does it all; cf. www.tei-c.org/Guidelines/Customization/odds.xml.

[17]Cf. www.deutschestextarchiv.de/basisformat.odd; www.deutschestextarchiv.de/basisformat.rng.

[18]Cf. www.tei-c.org/Roma.

3.6 Relation to the TEI Guidelines

Like TEI Lite, TEI-Lib, and TextGrid's BE, the DTA-BF is a strict subset of the TEI P5 tag set. It is therefore entirely compatible with the TEI P5 Guidelines in that they are only customized by selection, but not extended in any way.

4 Lifecycle of the DTA 'base format' within DTAE

DTA Extensions (DTAE) is a module of the DTA project with the goal to integrate digitized historical German texts drawn from external sources into the DTA core corpus. There are two prerequisites for those texts: they need to be considered as influential with respect to the goal of the DTA to compile a historical reference corpus, and they have to dispose of a high transcription quality.

External resources may be transcribed either in a word processing or HTML environment – a case we do not discuss here since it has no effect on the DTA-BF – or more often (as more and more philological projects adopt the TEI) be encoded in a customized TEI P5 format. In this case, a transformation of the customized TEI schema into the DTA-BF has to be specified. In general, all texts are subject to a quality assurance phase before being published in the DTA environment (Geyken et al., 2012; Haaf et al., 2012). For this task, a web-based distributed quality assurance platform has been implemented (Wiegand and Geyken, 2011), where users can proofread texts page by page and report different kinds of errors. As a result of the conversion and correction process, material from heterogeneous corpus formats is made accessible in the context of one homogeneous, high-quality text corpus.

So far, corpus texts from 10 external projects with a total of 200,000 pages were integrated into the DTA corpus after being converted into the DTA-BF, including *Blumenbach online*, *AEDit*, and *Dinglers Polytechnisches Journal*.[19]

We distinguish three cases for the integration of external TEI-encoded corpora into the DTA environment: 1. The conversion of the customized TEI schema into the DTA-BF can be done automatically, since the DTA-BF provides a semanti-

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[19]Cf. www.deutschestextarchiv.de/doku/dtae for the full list of DTAE projects.

cally equivalent solution. 2. The solution adopted in the customized TEI schema corresponds to a text phenomenon which has not been considered by the DTA-BF so far and which in turn leads to a modification of the DTA-BF. 3. The external text corpus cannot be automatically converted, either because the underlying TEI schema is too flexible thus leading to structuring ambiguities (cf. section 1), or because the schema is applied inconsistently over the text collection. Since this last case requires manual intervention, it is only considered for external texts which are stable, either because the project is finished, or because the quality of the transcription and the structural encoding is sufficient, which means no additional annotation work is likely to be carried out on the source text.

The customized TEI schema of the project *Dinglers Polytechnisches Journal* may serve as an example for the first case. This schema defines missing transcriptions due to illegibility of the text source as follows:[20]

```
<unclear reason="problem">
 [Fehlender Text
  (engl.: missing text)]
</unclear>
```

Even though the DTA-BF does not include the TEI element `<unclear>`, this expression can easily be converted into the equivalent of the DTA-BF annotation:

```
<gap reason="illegible"/>
```

The following two examples illustrate the second case, i.e. modifications of the DTA-BF according to the requirements of external corpus projects:

The *Blumenbach online* project provides editorial figure descriptions (`<figDesc>`), a kind of additional information about the source text given by the editor. Such additional information was not foreseen by the DTA-BF. Since the `<figDesc>` is only a special case of an editorial comment, the DTA-BF element `<note>` was extended by the attribute-value combination `@resp="editorial"`. With this extension, we were able to preserve the figure descriptions

of the edited Blumenbach texts and to generally allow for editorial comments elsewhere.

Furthermore, modifications of the DTA-BF may become necessary due to the integration of new (special) text types in the DTA corpora. E.g. in the context of the DFG funded project *AEDit Frühe Neuzeit (Archiv-, Editions- und Distributionsplattform für Werke der Frühen Neuzeit)* the *Forschungsstelle für Personalschriften* (*Academy of Sciences and Literature in Mainz*) is currently digitizing funeral sermons of the former municipal library in Wrocław. The digitized texts are being annotated according to the DTA-BF. The addition of new specific `@type`-values for `<div>` elements became necessary in order to allow for the naming of different text types within a funeral sermon. The new values added to the existing value selection were prefixed `fs` in order to limit their usage to the document type "funeral sermon" (e.g. `fsSermon`, `fsConsolationLetter`, `fsCurriculumVitae`, `fsEpitaph` etc.).

However, possible modifications of the DTA-BF are considered carefully in order to avoid negative effects on the annotation consistency of the DTA corpus.

5 Conclusion and further prospects

In this article, we have presented the DTA 'base format', a strict subset of TEI P5. The DTA-BF has been designed and developed with the goal to cope with a large variety of text types of written German corpora. It is a reasonable common denominator for a large reference corpus of the historical New High German ranging from 1650 to 1900. It goes without saying that the success of the DTA-BF is largely dependent on its adoption by other projects, namely the number of documents encoded in the format. Establishing the usage of the DTA-BF in a broader context may be supported considerably within a large infrastructure such as provided by CLARIN and, for the German context, CLARIN-D, where major text corpus providers are gathered pursuing the goal to define policies which guarantee the interoperability of resources which are integrated into the infrastructure. The *Berlin-Brandenburg Academy of Sciences and Humanities* (BBAW) as a partner of the CLARIN-D project, as a future CLARIN Center, and as the coordinator of

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[20]Cf. dingler.culture.hu-berlin.de/article/pj003/ar003042 for an example.

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the work package 'Resources and Tools' plays an important role in the discussion process. In addition, a CLARIN-D corpus project has recently been started with the goal to curate already existing corpus texts of the 15th to 19th century and to integrate them into the CLARIN-D infrastructure by using the DTA-BF as a starting point, thus enabling the DTA-BF to evolve in an environment of even more heterogeneous text resources. The project partners of this CLARIN-D curation project are the BBAW (coordination), the *Herzog August Library of Wolfenbüttel*, the *Institute for the German Language Mannheim*, and the *University of Gießen*.

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TEI P5:
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by the TEI Consortium

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The TEI Guidelines

edited by Lou Burnard and Syd Bauman

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5 A Gentle Introduction to XML

The encoding scheme defined by these Guidelines is formulated as an application of the Extensible Markup Language (XML) (Bray et al. (eds.) (2006)). XML is widely used for the definition of device-independent, system-independent methods of storing and processing texts in electronic form. It is now also the interchange and communication format used by many applications on the World Wide Web. In the present chapter we informally introduce some of its basic concepts and attempt to explain to the reader encountering them for the first time how and why they are used in the TEI scheme. More detailed technical accounts of TEI practice in this respect are provided in chapters *23. Using the TEI*, *1. The TEI Infrastructure*, and *22. Documentation Elements* of these Guidelines.

Strictly speaking, XML is a *metalanguage*, that is, a language used to describe other languages, in this case, *markup* languages. Historically, the word *markup* has been used to describe annotation or other marks within a text intended to instruct a compositor or typist how a particular passage should be printed or laid out. Examples include wavy underlining to indicate boldface, special symbols for passages to be omitted or printed in a particular font, and so forth. As the formatting and printing of texts was automated, the term was extended to cover all sorts of special codes inserted into electronic texts to govern formatting, printing, or other processing.

Generalizing from that sense, we define *markup*, or (synonymously) *encoding*, as any means of making explicit an interpretation of a text. Of course, all printed texts are implicitly encoded (or marked up) in this sense: punctuation marks, capitalization, disposition of letters around the page, even the spaces between words all might be regarded as a kind of markup, the purpose of which is to help the human reader determine where one word ends and another begins, or how to identify gross structural features such as headings or simple syntactic units such as dependent clauses or sentences. Encoding a text for computer processing is, in principle, like transcribing a manuscript from *scriptio continua*[3]; it is a process of making explicit what is conjectural or implicit, a process of directing the user as to how the content of the text should be (or has been) interpreted.

By *markup language* we mean a set of markup conventions used together for encoding texts. A markup language must specify how markup is to be distinguished from text, what markup is allowed, what markup is required, and what the markup means. XML provides the means for doing the first three; documentation such as these Guidelines is required for the last.

The present chapter attempts to give an informal introduction to those parts of XML of which a proper understanding is necessary to make best use of these Guidelines. The interested reader should also consult one or more of the many excellent introductory textbooks and web sites now available on the subject.[4]

5.1 What's special about XML?

XML has three highly distinctive advantages:

1. it places emphasis on descriptive rather than procedural markup;

2. it distinguishes the concepts of syntactic correctness and of *validity* with respect to a *document type definition*;

3. it is independent of any one hardware or software system.

These three aspects are discussed briefly below, and then in more depth in the remainder of this chapter.

XML is frequently compared with HTML, the language in which web pages have generally been written, which shares some of the above characteristics. Compared with HTML, however, XML has some other important features:

- XML is *extensible*: it does not consist of a fixed set of tags;

- XML documents must be *well-formed* according to a defined syntax;

- an XML document can be formally *validated* against a schema of some kind;

- XML is more interested in the meaning of data than in its presentation.

5.1.1 Descriptive markup

In a descriptive markup system, the markup codes used do little more than categorize parts of a document. Markup codes such as <para> or \end{list} simply identify a portion of a document and assert of it that 'the following item is a paragraph', or 'this is the end of the most recently begun list', etc. By contrast, a procedural markup system defines

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[3]In the 'continuous writing' characteristic of manuscripts from the early classical period, words are written continuously with no intervening spaces or punctuation.

[4]New textbooks and websites about XML appear at regular intervals and to select any one of them would be invidious. some recommended online courses include http://www.w3schools.com/xml/default.asp and http://www.ibm.com/developerworks/edu/x-dw-xmlintro-i.html.

what processing is to be carried out at particular points in a document: 'call procedure PARA with parameters 42, b, and x here' or 'move the left margin 2 quads left, move the right margin 2 quads right, skip down one line, and go to the new left margin,' etc. In XML, the instructions needed to process a document for some particular purpose (for example, to format it) are sharply distinguished from the markup used to describe it.

Usually, the markup or other information needed to process a document will be maintained separately from the document itself, typically in a distinct document called a *stylesheet*, though it may do much more than simply define the rendition or visual appearance of a document.[5]

When descriptive markup is used, the same document can readily be processed in many different ways, using only those parts of it which are considered relevant. For example, a content analysis program might disregard entirely the footnotes embedded in an annotated text, while a formatting program might extract and collect them all together for printing at the end of each chapter. Different kinds of processing can be carried out with the same part of a file. For example, one program might extract names of persons and places from a document to create an index or database, while another, operating on the same text, but using a different stylesheet, might print names of persons and places in a distinctive typeface.

5.1.2 Types of document

A second key aspect of XML is its notion of a *document type*: documents are regarded as having types, just as other objects processed by computers do. The type of a document is formally defined by its constituent parts and their structure. The definition of a 'report', for example, might be that it consisted of a 'title' and possibly an 'author', followed by an 'abstract' and a sequence of one or more 'paragraphs'. Anything lacking a title, according to this formal definition, would not formally be a report, and neither would a sequence of paragraphs followed by an abstract, whatever other report-like characteristics these might have for the human reader.

If documents are of known types, a special-purpose program (called a *parser*), once provided with an unambiguous definition of a document type, can check that any document claiming to be of that type does in fact conform to the specification. A parser can check that all elements specified for a particular document type are present and no others, that they are combined in appropriate ways, correctly ordered, and so forth. More significantly, different documents of the same type can be processed in a uniform way. Programs can be written which take advantage of the knowledge encapsulated in the document type information, and which can thus behave in a more 'intelligent' fashion.

5.1.3 Data independence

A basic design goal of XML is to ensure that documents encoded according to its provisions can move from one hardware and software environment to another without loss of information. The two features discussed so far both address this requirement at an abstract level; the third feature addresses it at the level of the strings of data characters that make up a document. All XML documents, whatever languages or writing systems they employ, use the same underlying character encoding (that is, the same method of representing as binary data those graphic forms making up a particular writing system).[6] This encoding is defined by an international standard,[7] which is implemented by a universal character set maintained by an industry group called the Unicode Consortium, and known as Unicode.[8] Unicode provides a standardized way of representing any of the many thousands of discrete symbols making up the world's writing systems, past and present.

Most modern computing systems now support Unicode directly; for those which do not, XML provides a mechanism for the indirect representation of single characters by means of their character number, known as *character references*; see further *v.6.1 Character References*.

5.2 Textual structures

A text is not an undifferentiated sequence of words, much less of bytes. For different purposes, it may be divided into many different units, of different types or sizes. A prose text such as this one might be divided into sections, chapters, paragraphs, and sentences. A verse text might be divided into cantos, stanzas, and lines. Once printed, sequences of prose and verse might be divided into volumes, gatherings, and pages.

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[5]We do not here discuss in any detail the ways that a stylesheet can be used or defined, nor do we discuss the popular W3C Stylesheet Languages XSLT and CSS. See further Berglund (ed.) (2006), Clark (ed.) (1999), and Lie and Bos (eds.) (1999).

[6]See *Extensible Markup Language (XML) 1.0*, available from `http://www.w3.org/TR/REC-xml`, Section 2.2 Characters.

[7]ISO/IEC 10646-1993 *Information Technology — Universal Multiple-Octet Coded Character Set* (UCS)

[8]See `http://www.unicode.org/`

Structural units of this kind are most often used to identify specific locations or refer to points within a text ('the third sentence of the second paragraph in chapter ten'; 'canto 10, line 1234'; 'page 412', etc.) but they may also be used to subdivide a text into meaningful fragments for analytic purposes ('is the average sentence length of section 2 different from that of section 5?' 'how many paragraphs separate each occurrence of the word *nature*? how many pages?'). Other structural units are more clearly analytic, in that they characterize a section of a text. A dramatic text might regard each speech by a different character as a unit of one kind, and stage directions or pieces of action as units of another kind. Such an analysis is less useful for locating parts of the text ('the 93rd speech by Horatio in Act 2') than for facilitating comparisons between the words used by one character and those of another, or those used by the same character at different points of the play.

In a prose text one might similarly wish to regard as units of different types passages in direct or indirect speech, passages employing different stylistic registers (narrative, polemic, commentary, argument, etc.), passages of different authorship and so forth. And for certain types of analysis (most notably textual criticism) the physical appearance of one particular printed or manuscript source may be of importance: paradoxically, one may wish to use descriptive markup to describe presentational features such as typeface, line breaks, use of whitespace and so forth.

These textual structures overlap with one another in complex and unpredictable ways. Particularly when dealing with texts as instantiated by paper technology, the reader needs to be aware of both the physical organization of the book and the logical structure of the work it contains. Many great works (Sterne's *Tristram Shandy* for example) cannot be fully appreciated without an awareness of the interplay between narrative units (such as chapters or paragraphs) and presentational ones (such as page divisions). For many types of research, the interplay among different levels of analysis is crucial: the extent to which syntactic structure and narrative structure mesh, or fail to mesh, for example, or the extent to which phonological structures reflect morphology.

5.3   XML structures

This section describes the simple and consistent mechanism for the markup or identification of textual structure provided by XML. It also describes the methods XML provides for the expression of rules defining how units of textual structure can meaningfully be combined in a text.

5.3.1   Elements

The technical term used in XML for a textual unit, viewed as a structural component, is *element*. Different types of elements are given different names, but XML provides no way of expressing the meaning of a particular type of element, other than its relationship to other element types. That is, all one can say about an element called (say) <blort> is that instances of it may (or may not) occur within elements of type <farble>, and that it may (or may not) be decomposed into elements of type <blortette>. It should be stressed that XML is entirely unconcerned with the *semantics* of textual elements, because these are considered to be application dependent. It is up to the creators of XML vocabularies (such as these Guidelines) to choose intelligible element names and to define their intended use in text markup. That is the chief purpose of documents such as the TEI Guidelines. From the need to choose element names indicative of function comes the technical term for the name of an element type, which is *generic identifier*, or GI.

Within a marked-up text (a *document instance*), each element must be explicitly marked or tagged in some way. This is done by inserting a tag at the beginning of the element (a *start-tag*) and another at its end (an *end-tag*). The start- and end-tag pair are used to bracket off element occurrences within the running text, in rather the same way as different types of parentheses or quotation marks are used in conventional punctuation. For example, a quotation element in a text might be tagged as follows:

```
... Rosalind's
remarks <quote>This is the silliest stuff that ere I heard
of!</quote> clearly indicate ...
```

As this example shows, a start-tag takes the form <quote>, where the opening angle bracket indicates the start of the start-tag, 'quote' is the generic identifier of the element that is being delimited, and the closing angle bracket indicates the end of the start-tag. An end-tag takes an identical form, except that the opening angle bracket is followed by a solidus (slash) character, so that the corresponding end-tag is </quote>.[9] The material between the start-tag and the

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[9] Because the opening angle bracket has this special function in an XML document, special steps must be taken to use that character for other purposes (for example, as the mathematical less-than operator); see further section *v.6.1 Character References*.

end-tag (the string of words 'This is the silliest stuff that ere I heard of' in the example above) is known as the *content* of the element. Sometimes there may be nothing between the start and the end-tag; in this case the two may optionally be merged together into a single composite tag with the solidus at the end, like this: <quote/>.

5.3.2 Content models: an example

An element may be *empty*, that is, it may have no content at all, or it may contain just a sequence of characters with no other elements. Often, however, elements of one type will be *embedded* (contained entirely) within elements of a different type.

To illustrate this, we will consider a very simple structural model. Let us assume that we wish to identify within an anthology only poems, their headings, and the stanzas and lines of which they are composed. In XML terms, our *document type* is the *anthology*, and it consists of a series of *poem*s. Each poem has embedded within it one element, a *heading*, and several occurrences of another, a *stanza*, each stanza having embedded within it a number of *line* elements. Fully marked up, a text conforming to this model might appear as follows:

```
<anthology>
  <poem>
    <heading>The SICK ROSE</heading>
    <stanza>
      <line>O Rose thou art sick.</line>
      <line>The invisible worm,</line>
      <line>That flies in the night</line>
      <line>In the howling storm:</line></stanza>
     <stanza>
      <line>Has found out thy bed</line>
      <line>Of crimson joy:</line>
      <line>And his dark secret love</line>
      <line>Does thy life destroy.</line></stanza></poem>
<!-- more poems go here --></anthology>
```

It should be stressed that this example does *not* use the names proposed for corresponding elements elsewhere in these Guidelines: the above is thus *not* a valid TEI document.[10] It will, however, serve as an introduction to the basic notions of XML. Whitespace and line breaks have been added to the example for the sake of visual clarity only; they have no particular significance in the XML encoding itself. Also, the line

```
  <!-- more poems go here -->
```

is an XML *comment* and is not treated as part of the text.

As it stands, the above example is what is known as a *well-formed* XML document because it obeys the following simple rules:

1. there is a single element enclosing the whole document: this is known as the *root element* (<anthology> in our case);

2. each element is completely contained by the root element, or by an element that is so contained; elements do not partially overlap one another;

3. a tag explicitly marks the start and end of each element.

A well-formed XML document can be processed in a number of useful ways. A simple indexing program could extract only the relevant text elements in order to make a list of headings, first lines, or words used in the poem text; a simple formatting program could insert blank lines between stanzas, perhaps indenting the first line of each, or inserting a stanza number. Different parts of each poem could be typeset in different ways. A more ambitious analytic program

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[10]The element names here have been chosen for clarity of exposition; there is, however, a TEI element corresponding to each, so that this example may be regarded as TEI conformable in the sense that this term is defined in *23.4. Conformance*.

could relate the use of punctuation marks to stanzaic and metrical divisions.[11] Scholars wishing to see the implications of changing the stanza or line divisions chosen by the editor of this poem can do so simply by altering the position of the tags. And of course, the text as presented above can be transported from one computer to another and processed by any program (or person) capable of making sense of the tags embedded within it with no need for the sort of transformations and translations needed for files which have been saved in one or other of the proprietary formats preferred by most word-processing programs.

As we noted above, one of the attractions of XML is that it enables us to make up our own names for the elements rather than requiring us always to use names predefined by other agencies. Clearly, however, if we wish to exchange our poems with others, or to include poems others have marked up in our anthology, we will need to know a bit more about the names used for the tags. The means that XML provides for this is called a *namespace*. In our simple example, the tags just contain a simple name. As we shall see, it is also possible to use tags that include a *qualified name*, that is, a name with an optional prefix identifying the set of names to which it belongs. For example, we have defined an element <line> for the purpose of marking lines of verse. Another person might, however, define an element called <line> for the purpose of marking typographic lines, or drawn lines. Because of these different meanings, if we wish to share data it will be necessary to distinguish the two 'line' components in our marked-up texts. This is achieved by including a *namespace prefix* within the markup, for example like this:

```
<my:line>This is one of my lines</my:line>
<!-- ... -->
<yr:line>This is one of your lines</yr:line>
```

This feature is particularly important if we have different definitions of what a 'line' is, of course, but there are many occasions when it is useful to distinguish groups of tags belonging to different 'markup vocabularies'; we discuss this further below (*v.6.3 Namespaces*). One particularly useful namespace prefix is predefined for XML: it is xml and we will see examples of its use below.

Namespaces allow us to represent the fact that a name belongs to a group of names, but don't allow us to do much more by way of checking the integrity or accuracy of our tagging. Simple well-formedness alone is not enough for the full range of what might be useful in marking up a document. It might well be useful if, in the process of preparing our digital anthology, a computer system could check some basic rules about how stanzas, lines, and headings can sensibly co-occur in a document. It would be even more useful if the system could check that stanzas are always tagged <stanza> and not occasionally <canto> or <Stanza>. An XML document in which such rules have been checked is technically known as a *valid* document, and the ability to perform such validation is one of the key advantages of using XML. To carry this out, some way of formally stating the criteria for successful validation is necessary: in XML this formal statement is provided by an additional document known as a *schema*.[12]

5.3.3   Validating a document's structure

The design of a schema may be as lax or as restrictive as the occasion warrants. A balance must be struck between the convenience of following simple rules and the complexity of handling real texts. This is particularly the case when the rules being defined relate to texts that already exist: the designer may have only the haziest of notions as to an ancient text's original purpose or meaning and hence find it very difficult to specify consistent rules about its structure. On the other hand, where a new text is being prepared to an exact specification, for entry into a textual database of some kind for example, the more precisely stated the rules, the better they can be enforced. Even in the case where an existing text is being marked up, it may be beneficial to define a restrictive set of rules relating to one particular view or hypothesis about the text—if only as a means of testing the usefulness of that view or hypothesis. A schema designed for use by a small project or team is likely to take a different position on such issues than one intended for use by a large and possibly fragmented community. It is important to remember that every schema results from an interpretation of a text. There is no single schema encompassing the absolute truth about any text, although it may be convenient to privilege some schemas above others for particular types of analysis.

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[11]Note that this simple example has not addressed the problem of marking elements such as sentences explicitly; the implications of this are discussed in section *v.4 Complicating the issue*.

[12]The older terms *Document Type Declaration* and *Document Type Definition*, both abbreviated as DTD, may also be encountered. Throughout these Guidelines we use the term *schema* for any kind of formal document grammar.

XML is widely used in environments where uniformity of document structure is a major desideratum. In the production of technical documentation, for example, it is of major importance that sections and subsections should be properly nested, that cross-references should be properly resolved and so forth. In such situations, documents are seen as raw material to match against predefined sets of rules. As discussed above, however, the use of simple rules can also greatly simplify the task of tagging accurately elements of less rigidly constrained texts. By making these rules explicit, the scholar reduces his or her own burdens in marking up and verifying the electronic text, while also being forced to make explicit an interpretation of the structure and significant particularities of the text being encoded.

5.3.4 An example schema

A schema can be expressed in a number of different ways; frequently-encountered methods include the Document Type Definition (DTD) language which XML inherited from SGML; the XML Schema language (`http://www.w3.org/XML/Schema`) defined by the W3C; and the RELAX NG language (`http://relaxng.org/`) originally developed within the OASIS Technical Committee and now an ISO standard[13]. In this chapter, and throughout these Guidelines, we give examples using the 'compact syntax' of RELAX NG, but the specifications within these Guidelines are expressed in a way that is largely independent of the specific language in which a schema generated from them is expressed.[14] Although we will use the RELAX NG compact syntax for illustration in what follows, the reader should bear in mind that analogous concepts are expressed differently in other schema languages.

The following schema might be used to validate our example poem:

```
anthology_ p = element anthology { poem_ p+ }
poem_ p = element poem { heading_ p?, stanza_ p+ }
stanza_ p = element stanza {line_ p+}
heading_ p = element heading { text }
line_ p = element line { text }
start = anthology_ p
```

Note that this is not the only way in which a RELAX NG schema might be written;[15] we have adopted this idiom, however, because it matches that used throughout the rest of the Guidelines.

A RELAX NG schema expresses rules about the possible structure of a document in terms of *patterns*; that is, it defines a number of named patterns, each of which acts as a kind of template against which an input document can be matched. The meaning of a pattern is expressed in a schema by reference to other patterns, or to a small number of built-in fundamental concepts, as we shall see. In the example above, the word to the left of the equals sign is the pattern's name, and the material following it declares a meaning for the pattern. Patterns may also be of particular types; the ones that interest us here are called *element patterns* and *attribute patterns*. In this example we see definitions for five element patterns. Note that we have used similar names for the pattern and the element which the pattern describes: so, for example, the line `anthology_p = element anthology {poem_p+}` defines an element pattern called `anthology_p`, the value of which defines an element called `anthology`. These naming conventions are arbitrary; we could use the same name for the pattern as for the element, since the two are syntactically quite distinct. The name, or *generic identifier*, of the element follows the word 'element', and the *content model* for the element is given within the curly braces following that. Each of these parts is discussed further below.

The last line of the schema above tells a RELAX NG validator which element (or elements) in a document can be used as the root element: in our case only <anthology>. This enables the validator to detect whether a particular document is well-formed but incomplete; it also simplifies the processing task by providing an 'entry point'.

Generic identifier

Following the word 'element' each pattern declaration gives the generic identifier (often abbreviated to GI) of the element being defined, for example *poem*, *heading*, etc. A GI may contain letters, digits, hyphens, underscore characters, or full

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[13]ISO/IEC FDIS 19757-2 Document Schema Definition Language (DSDL) -- Part 2: Regular-grammar-based validation -- RELAX NG

[14]See further *22. Documentation Elements* and *23.5. Implementation of an ODD System*. In practice, the only part of a TEI element specification not expressed using TEI-defined syntax is the content model for an element, which is expressed using the RELAX NG schema language for reasons of processing convenience. RELAX NG uses its own XML vocabulary to define content models, which is adopted by the TEI for the same purpose.

[15]For a good tutorial introduction to RELAX NG, see van der Vlist (2004).

stops, but must begin with a letter.[16] Uppercase and lowercase letters are quite distinct: an element with the GI <foo> is *not* the same as an element with the GI <Foo>; the root element of a TEI-conformant document is <TEI>, *not* <tei>.

Content model

The second part of each declaration, enclosed in curly braces, is called the *content model* of the element being defined, because it specifies what may legitimately be contained within it. In RELAX NG, the content model is defined in terms of other patterns, either by embedding them, or (as in our examples above) by naming or referring to them. The RELAX NG compact syntax also uses a small number of reserved words to identify other possible contents for an element, of which by far the most commonly encountered is `text`, as in this example: it means that the element being defined may contain any valid character data, but no elements. If an XML document is thought of as a structure like a family tree, with a single ancestor at the top (in our case, this would be <anthology>), then almost always, following the branches of the tree downwards (for example, from <anthology> to <poem> to <stanza> to <line> and <heading>) will lead eventually to `text`. In our example, <heading> and <line> are so defined, since their content models say `text` only and name no embedded elements.

Occurrence indicators

The declaration for <stanza> in the example above states that a stanza consists of one or more lines. It uses an *occurrence indicator* (the plus sign) to indicate how many times something matching the pattern `line_p` may be repeated. There are three occurrence indicators: the plus sign, the question mark, and the asterisk or star. The plus sign means that the pattern can match one or more times; the question mark means that it may match at most once but is not mandatory; the star means that the pattern concerned is not mandatory, but may match more than once. Thus, if the content model for <stanza> were `{line_p*}`, stanzas with no lines would be possible as well as those with more than one line. If it were `{line_p?}`, again empty stanzas would be countenanced, but no stanza could have more than a single line. The declaration for <poem> in the example above thus states that a <poem> cannot have more than one heading, but may have none, and that it must have at least one <stanza> and may have several.

Connectors

The content model `{heading_p?, stanza_p+}` contains more than one component, and thus needs additionally to specify the order in which these patterns (<heading_p> and <stanza_p>) may appear. This ordering is determined by the *connector* (the comma) used between its components. The comma connector indicates that the patterns concerned must appear in the sequence given. Another commonly encountered connector is the vertical bar, representing alternation. If the comma in this example were replaced by a vertical bar, then a <poem> would consist of either a heading or just stanzas—but not both!

Groups

In our example so far, the components of each content model have been either single patterns or `text`. It is quite permissible, however, to define content models in which the components are lists of patterns, combined by connectors. Such lists may also be modified by occurrence indicators and themselves combined by connectors. To demonstrate these facilities, let us expand our example to include non-stanzaic types of verse. For the sake of demonstration, we will categorize poems as one of the following: *stanzaic*, *couplets*, or *blank* (or *stichic*). A blank-verse poem consists simply of lines (we ignore the possibility of verse paragraphs for the moment),[17] so no additional elements need be defined for it. A couplet is defined as a <firstLine> followed by a <secondLine>.

```
couplet_ p = element couplet {firstLine_ p, secondLine_ p}
```

The patterns firstLine_p and secondLine_p define elements <firstLine> and <secondLine> (which are distinguished to enable studies of rhyme scheme, for example[18]); these will have exactly the same content model as the existing <line> element. We will therefore add the following two lines to our example schema:

---

[16] In XML, a single colon may also appear in a GI, where it has a special significance related to the use of *namespaces*, as further discussed in section *v.6.3 Namespaces*. The characters defined by Unicode as *combining characters* and as *extenders* are also permitted, as are logograms such as Chinese characters.

[17] It will not have escaped the astute reader that the fact that verse paragraphs need not start on a line boundary seriously complicates the issue; see further section *v.4 Complicating the issue*.

[18] This is however a rather artificial example; XPath, for example, provides ways of distinguishing elements in an XML structure by their position without the need to give them distinct names.

```
firstLine_ p = element firstLine {text} secondLine_ p = element secondLine {text}
```

Next, we can change the declaration for the <poem> element to include all three possibilities:

```
poem_ p = element poem
{ heading_ p?, (stanza_ p+ | couplet_ p+ | line_ p+) }
```

That is, a poem consists of an optional heading, followed by one or several stanzas, or one or several couplets, or one or several lines. Note the difference between this declaration and the following:

```
poem_ p = element poem
{heading_ p?, (stanza_ p | couplet_ p | line_ p)+ }
```

The second version, by applying the occurrence indicator to the group rather than to each element within it, would allow a single poem to contain a mixture of stanzas, couplets, and lines.

A group of this kind can contain `text` as well as named elements: this combination, known as *mixed content*, allows for elements in which the sub-components appear with intervening stretches of character data. For example, if we wished to mark place names wherever they appear inside our verse lines, then, assuming we have also added a pattern for the <name> element, we could change the definition for <line> to

```
line_ p = element
line { (text | name_ p )* }
```

Some XML schema languages place no constraints on the way that mixed content models may be defined, but in the XML DTD language, when `text` appears with other elements in a content model, it must always appear as the first option in an alternation; it may appear once only, and in the outermost model group; and if the group containing it is repeated, the star operator must be used. Although these constraints do not apply to (for example) schemas expressed in the RELAX NG language, all TEI content models currently obey them.

Quite complex models can easily be built up in this way, to match the structural complexity of many types of text. As a further example, consider the case of stanzaic verse in which a refrain or chorus appears. Like a stanza, a refrain consists of repetitions of the line element. A refrain can appear at the start of a poem only, or as an optional addition following each stanza. This could be expressed by a pattern such as the following:

```
refrain_ p = element refrain {line_ p+}
poem_ p = element poem    {heading_ p?, ( line_ p+ | (refrain_ p?, (stanza_ p,
refrain_ p?)+ )) }
```

That is, a poem consists of an optional heading, followed by either a sequence of lines or an unnamed group, which starts with an optional refrain and is followed by one or more occurrences of another group, each member of which is composed of a stanza followed by an optional refrain. A sequence such as *refrain - stanza - stanza - refrain* follows this pattern, as does the sequence *stanza - refrain - stanza - refrain*. The sequence *refrain - refrain - stanza - stanza* does not, however, and neither does the sequence *stanza - refrain - refrain - stanza*. Among other conditions made explicit by this content model are the requirements that at least one stanza must appear in a poem, if it is not composed simply of lines, and that if there is both a heading and a stanza they must appear in that order.

Note that the apparent complexity of this model derives from the constraints expressed informally above. A simpler model, such as

```
poem_ p =
element poem {heading_ p?, (line_ p | refrain_ p | stanza_ p)+ }
```

would not enforce any of them, and would therefore permit such anomalies as a poem consisting only of refrains, or an arbitrary mixture of lines and refrains.

5.4   Complicating the issue

In the simple cases described so far, we have assumed that one can identify the immediate constituents of every element in a textual structure. A poem consists of stanzas, and an anthology consists of poems. Stanzas do not float around unattached to poems or combined into some other unrelated element; a poem cannot contain an anthology. All the elements of a given document type may be arranged into a hierarchic structure like a family tree, with a single ancestor at one end and many children (mostly the elements containing simple text) at the other. For example, we could represent an anthology containing two poems, the first of which contains two four-line stanzas and the second a single stanza, by a tree structure like the following figure:
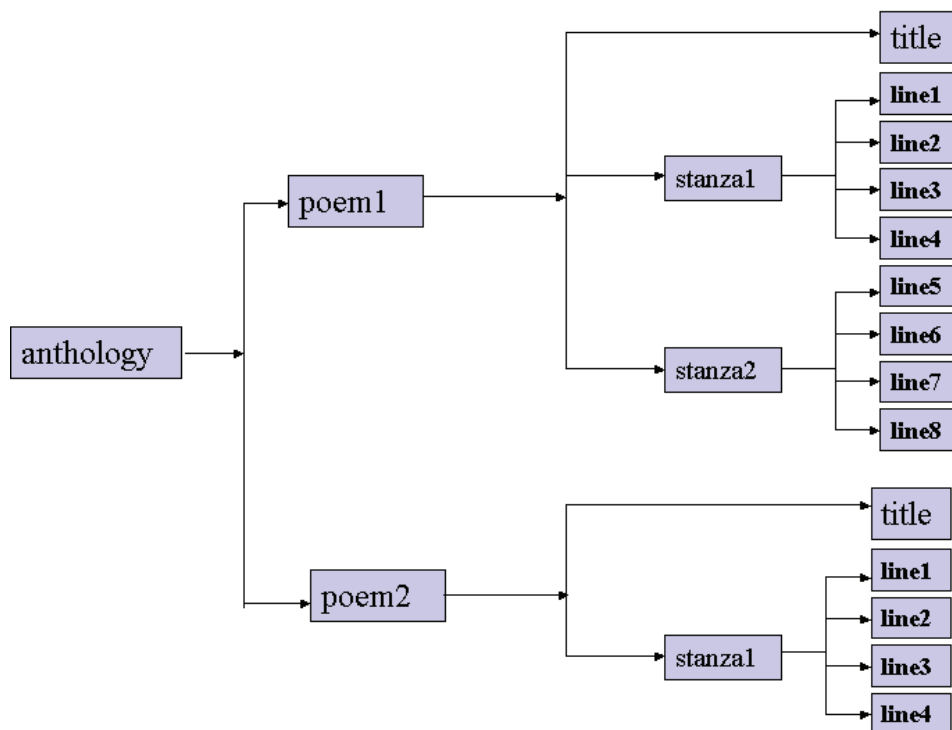
This graphic representation of the structure of an XML document is close to the abstract model implicit in most XML processing systems. Most such systems now use a standardized way of accessing parts of an XML document called *XPath*.[19] XPath gives us a non-graphical way of referring to any part of an XML document: for example, we might refer to the last line of Blake's poem as `/anthology/poem[1]/stanza[2]/line[4]`. The square brackets here indicate a numerical selection: we are talking about the fourth line in the second stanza of the first poem in the anthology. If we left out all the square-bracketted selections, the corresponding XPath expression would refer to all lines contained by stanzas contained by poems contained by anthologies. An XPath expression can refer to any collection of elements: for example, the expression `/anthology/poem` refers to all poems in an anthology and the expression `/anthology/poem/heading` refers to all their headings.

---

[19] The official specification is at Clark and DeRose (eds.) (1999); many introductory tutorials are available in the XML references cited above and elsewhere on the Web: good beginners' tutorials include `http://www.w3schools.com/xpath/default.asp` and `http://www.zvon.org/xxl/XPathTutorial/`, the latter being available in several languages.

The solidus within an XPath expression behaves in much the same way as the solidus or backslash in a filename specification: it indicates that the item to the left directly contains the item to the right of it. In XPath it is also possible to indicate that any number of other items may intervene by repeating the solidus. For example, the XPath expression `/anthology/poem//line[1]` will refer to the first line of each poem in the anthology, irrespective of whether it is in a stanza.

Clearly, there are many such trees that might be drawn to describe the structure of this or other anthologies. Some of them might be representable as further subdivisions of this tree: for example, we might subdivide the lines into individual words, since in our simple example no word crosses a line boundary. Surprisingly perhaps, this grossly simplified view of what text is (memorably termed an *ordered hierarchy of content objects* (OHCO) view of text by Renear *et al.*[20]) turns out to be very effective for a large number of purposes. It is not, however, adequate for the full complexity of real textual structures, for which more complex mechanisms need to be employed. There are many other trees that might be drawn which do *not* fit within the anthology model which we have presented so far. We might, for example, be interested in syntactic structures or other linguistic constructs, which rarely respect the formal boundaries of verse. Or, to take a simpler example, we might want to represent the pagination of different editions of the same text.

In the OHCO model of text, representation of cases where different elements overlap so that several different trees may be identified in the same document is generally problematic. All the elements marked up in a document, no matter what namespace they belong to, must fit within a single hierarchy. To represent overlapping structures, therefore, a single hierarchy must be chosen, and the points at which other hierarchies intersect with it marked. For example, we might choose the verse structure as our primary hierarchy, and then mark the pagination by means of empty elements inserted at the boundary points between one page and the next. Or we could represent alternative hierarchies by means of the pointing and linking mechanisms described in chapter *16. Linking, Segmentation, and Alignment* of the Guidelines. These mechanisms all depend on the use of *attributes*, which may be used both to identify particular elements within a document and to point to, link, or align them into arbitrary structures.

5.5 Attributes

In the XML context, the word *attribute*, like some other words, has a specific technical sense. It is used to describe information that is in some sense descriptive of a specific element occurrence but not regarded as part of its content. For example, you might wish to add a status attribute to occurrences of some elements in a document to indicate their degree of reliability, or to add an identifier attribute so that you could refer to particular element occurrences from elsewhere within a document. Attributes are useful in precisely such circumstances.

Although different elements may have attributes with the same name (for example, in the TEI scheme, every element is defined as having an attribute named n), they are always regarded as different, and may have different values assigned to them. If an element has been defined as having attributes, the attribute values are supplied in the document instance as *attribute-value pairs* inside the start-tag for the element occurrence. An end-tag cannot contain an attribute-value specification, since it would be redundant.

The order in which attribute-value pairs are supplied inside a tag has no significance; they must, however, be separated by at least one whitespace (blank, newline, or tab) character. The value part must always be given inside matching quotation marks, either single or double[21].

For example:

```
<poem xml:id="Poem1" status="draft"> ... </poem>
```

Here attribute values are being specified for two attributes previously declared for the <poem> element: xml:id and status. For the instance of a <poem> in this example, represented here by an ellipsis, the xml:id attribute has the value P1 and the status attribute has the value draft. An XML processor can use the values of the attributes in any way it chooses; for example, a <poem> in which the status attribute has the value draft might be formatted differently from one in which the same attribute has the value revised; another processor might use the same attribute to determine whether or not poem elements are to be processed at all. The xml:id attribute is a slightly special case in that, by convention, it is always used to supply a unique value to identify a particular element occurrence, which may be used for cross-reference purposes, as discussed further below (*v.5.2 Identifiers and indicators*).

---

[20]See Renear et al. (1996).

[21]In the unlikely event that both kinds of quotation marks are needed within the quoted string, either or both can also be presented in escaped form, using the predefined character entities ' or "

5.5.1   Declaring attributes

Attributes are declared in a schema in the same way as elements. As well as specifying an attribute's name and the element to which it is to be attached, it is possible to specify (within limits) what kind of value is acceptable for an attribute.

In the compact syntax of RELAX NG, an attribute is defined by means of an attribute pattern, like the following:

```
att.status = attribute status {"draft" | "revised" | "published"}
```

This defines a new pattern, called `att.status`, whose value is an attribute pattern defining an attribute named status. Attribute names are subject to the same restrictions as other names in XML; they need not be unique across the whole schema, however, but only within the list of attributes for a given element.

A pattern defining the possible values for this attribute is given within the curly braces, in just the same way as a content model is given for an element pattern. In this case, the attribute's value must be one of the strings presented explicitly above.

The attribute pattern definition must be included or referenced within the definition for every element to which the attribute is attached. We therefore modify the definition for the `poem_p` pattern given above as follows:

```
poem_ p = element poem {att.status?, heading_ p?, stanza_ p+}
```

In RELAX NG, an element pattern simply includes any attribute patterns applicable to it along with its other constituents, as shown above. Attribute patterns can also be grouped and alternated in the same way as element patterns, though this particular feature is not widely used in the TEI scheme, since it is not available to the same extent in all schema languages. Because a question mark follows the reference to the `att.status` pattern in our example, a document in which the status attribute is not specified will still be valid; without this occurrence indicator the status attribute would be required.

Instead of supplying a list of explicit values, an attribute pattern can specify that the attribute must have a value of a particular type, for example a text string, a numeric value, a normalized date, etc. This is accomplished by supplying a pattern that refers to a *datatype*. In the example above, because a list of acceptable values is predefined, a parser can check that no <poem> is defined for which the status attribute does not have one of draft, revised, or published as its value. By contrast, with a definition such as

```
att.status =
attribute status {text}
```

a parser would accept almost any unbroken string of characters (`status="awful"`, `status="awe-ful"`, or `status="12345678"`) as valid for this attribute. Sometimes, of course, the set of possible values cannot be predefined. Where it can, as in this case, it is generally better to do so.

Schema languages vary widely in the extent to which they support validation of attribute values. Some languages predefine a small set of possibilities. Others allow the schema designer to use values from a predefined 'library' of possible datatypes, or to add their own definitions, possibly of great complexity. A 'datatype' might be something fairly general (any positive integer), something very specific or idiosyncratic (any four-character string ending with "T"), or somewhere between the two. In the RELAX NG schemas used by the TEI, general patterns have been defined for about half a dozen datatypes (using the W3C Schema Datatype Library, `http://www.w3.org/TR/xmlschema-2/`, and discussed further in *1.4.2. Datatype Macros*). In addition to the two possibilities already mentioned—plain text or an explicit list of possible strings—other datatypes likely to be encountered include the following:

boolean   values must be either true or false

numeric   values must represent a numeric quantity of some kind

date   values must represent a possible date and time in some calendar

Two further datatypes of particular usefulness in managing XML documents are commonly known as `ID`—for identifier—and `URI`—for Universal Resource Indicator, or pointer for short. These are discussed in the next section.

5.5.2 Identifiers and indicators

It is often necessary to refer to an occurrence of one textual element from within another, an obvious example being phrases such as 'see note 6' or 'as discussed in chapter 5'. When a text is being produced the actual numbers associated with the notes or chapters may not be certain. If we are using descriptive markup, such things as page or chapter numbers, being entirely matters of presentation, will not in any case be present in the marked-up text: they will be assigned by whatever processor is operating on the text (and may indeed differ in different applications). XML therefore predefines an attribute that may be used to provide any element occurrence with a special identifier, a kind of label, which may be used to refer to it from anywhere else: since it is defined in the XML namespace, the name of this attribute is xml:id and it is used throughout the TEI schema. Because it is intended to act as an identifier, its values must be unique within a given document. The cross-reference itself will be supplied by an element bearing an attribute of a specific kind, which must also be declared in the schema.

Suppose, for example, we wish to include a reference within the notes on one poem that refers to another poem. We will first need to provide some way of attaching a label to each poem: this is easily done using the xml:id attribute. Note that not every poem need carry an xml:id attribute and the parser may safely ignore the lack of one in those that do not. Only poems to which we intend to refer need use this attribute; for each such poem we should now include in its start-tag some unique identifier, for example:

```
<poem xml:id="Rose"> ... </poem>
<poem xml:id="P40"> ... </poem>
<poem> ... </poem>
```

Next we need to define a new element for the cross-reference itself. This will not have any content—it is only a pointer—but it has an attribute, the value of which will be the identifier of the element pointed at. This is achieved by the following definition:

```
poemRef_ p = element poemRef {attribute target {anyURI}, empty}
```

The <poemRef> element has no content, but a single attribute called target. The value of this attribute must be a pointer or web reference of type anyURI;[22] furthermore, because there is no indication of optionality on the attribute pattern, it must be supplied on each occurrence—a <poemRef> with no referent is an impossibility.

With these declarations in force, we can now encode a reference to the poem whose xml:id attribute specifies that its identifier is Rose as follows:

```
Blake's poem on the sick rose
<poemRef target="#Rose"/> ...
```

A processor may take any number of actions when it encounters a link encoded in this way: a formatter might construct an exact page and line reference for the location of the poem in the current document and insert it, or just quote the poem's title or first lines. A hypertext style processor might use this element as a signal to activate a link to the poem being referred to, for example by displaying it in a new window. Note, however, that the purpose of the XML markup is simply to indicate that a cross-reference exists: it does not necessarily determine what the processor is to do with it.

The target of a URI can be located anywhere: it may not necessarily be part of the same document, nor even located on the same computer system. Equally, it can be a resource of any kind, not necessarily an XML document or document fragment. It is thus a very convenient way of including references to non-XML data such as image files within a document. If, for example, we wished to include an illustration containing a reproduction of Blake's original in our anthology, the most appropriate method would probably be to define a new element called (for the sake of argument) <graphic> with a target attribute of datatype URI:

---

[22]The word 'anyURI' is a predefined name, used in schema languages to mean that any *Uniform Resource Identifier* (URI) may be supplied here. The accepted syntax for URIs is an Internet Standard, defined in `http://tools.ietf.org/html/rfc3986`. anyURI is one of the *datatypes* defined by the W3C Schema datatype library.

```
graphic_ p = element graphic {att.url, empty} att.url =
attribute url {anyURI}
```

With these additions to the schema, we can now represent the location of the illustration within our text like this:

```
<poem>
  <graphic
     url="http://en.wikisource.org/wiki/Image:Blake_sick_rose.jpg"/>
</poem>
```

By providing a location from which a reproduction of the required image can be downloaded, this encoding makes it possible for appropriate software able to display the image as well as record its existence.

Attributes form part of the structure of an XML document in the same way as elements, and can therefore be accessed using XPath. For example, to refer to all the poems in our anthology whose status attribute has the value draft, we might use an XPath such as /anthology/poem[@status='draft']. To find the headings of all such poems, we would use the XPath /anthology/poem[@status='draft']/heading.

5.6   Other components of an XML document

In addition to the elements and attributes so far discussed, an XML document can contain a few other formally distinct things. An XML document may contain references to predefined strings of data that a validator must resolve before attempting to validate the document's structure; these are called *entity references*. They may be useful as a means of providing 'boilerplate' text or representing character data which cannot easily be keyboarded. An XML document may also contain arbitrary signals or flags for use when the document is processed in a particular way by some class of processor (a common example in document production is the need to force a formatter to start a new page at some specific point in a document); such flags are called *processing instructions*. And, as noted earlier, an XML document may also contain instances of elements taken from some other *namespace*. We discuss each of these three cases in the rest of this section.

5.6.1   Character References

As mentioned above, all XML documents use the same internal character encoding. Since not all computer systems currently support this encoding directly, a special syntax is defined that can be used to represent individual characters from the Unicode character set in a portable way by providing their numeric value, in decimal or hexadecimal notation.

For example, the character *é* is represented within an XML document as the Unicode character with hexadecimal value 00E9. If such a document is being prepared on (or exported to) a system using a different character set in which this character is not available, it may instead be represented by the character reference é (the x indicating that what follows is a hexadecimal value) or é (its decimal equivalent). References of this type do not need to be predefined, since the underlying character encoding for XML is always the same.

To aid legibility, however, it is also possible to use a mnemonic name (such as eacute) for such character references, provided that each such name is mapped to the required Unicode value by means of a construct known as an *entity declaration*. A reference to a named character entity always takes the form of an ampersand, followed by the name, followed by a semicolon. For example an XML document containing the string 'T&C' might be encoded as T&C.

There is a small set of such character entity references that do not have to be declared because they form part of the definition of XML. These include the names used for characters such as the ampersand (amp) and the open angle bracket or less-than sign (lt), which could not easily otherwise be included in an XML document without ambiguity. Other predeclared entity names are those for quotation marks (quot and apos for double and single respectively), and for completeness the closing angle bracket or greater-than sign (gt).

For all other named character entities, a set of entity declarations must be provided to an XML processor before the document referring to them can be validated. The declaration itself uses a non-XML syntax inherited from SGML; for example, to define an entity named eacute with the replacement value é, the declaration could have any of the following forms:

```
<!ENTITY eacute "é">
```

or, using hexadecimal notation:

```
<!ENTITY eacute "&#xe9;">
```

or, using decimal notation:

```
<!ENTITY eacute "&#233;">
```

Entities of this kind are useful also for *string substitution* purposes, where the same text needs to be repeated uniformly throughout a text. For example, if a declaration such as

```
<!ENTITY TEI "Text Encoding Initiative">
```

is included with a document, then references such as `&TEI;` may be used within it, each of which will be expanded in the same way and replaced by the string 'Text Encoding Initiative' before the text is validated.

5.6.2 Processing instructions

Although one of the aims of using XML is to remove any information specific to the processing of a document from the document itself, it is occasionally very convenient to be able to include such information—if only so that it can be clearly distinguished from the structure of the document. As suggested above, one common example is the need, when processing an XML document for printed output, to include a suggestion that the formatting processor might use to determine where to begin a new page of output. Page-breaking decisions are usually best made by the formatting engine alone, but there will always be occasions when it may be necessary to override these. An XML processing instruction inserted into the document is one very simple and effective way of doing this without interfering with other aspects of the markup.

Here is an example XML processing instruction:

```
<?tex \newpage ?>
```

It begins with `<?` and ends with `?>`. In between are two space-separated strings: by convention, the first is the name of some processor (`tex` in the above example) and the second is some data intended for the use of that processor (in this case, the instruction to start a new page). The only constraint placed by XML on the strings is that the first one must be a valid XML name; the other can be any arbitrary sequence of characters, not including the closing character-sequence `?>`.

A construct which looks like a processing instruction (but is not) is the *XML declaration* which can be supplied at the beginning of an XML document, for example:

```
<?xml version="1.0" encoding="iso-8859-1"?>
```

The XML declaration specifies the version number of the XML Recommendation applicable to the document it introduces (in this case, version 1.0), and optionally also the character encoding used to represent the Unicode characters within it. By default an XML document uses the character encoding UTF-8 or UTF-16; in this case, the 16-bit characters of Unicode have been mapped to the 8-bit character set known as ISO 8859-1; any characters present in the document but not available in the target character set will therefore need to be represented as character references (*v.6.1 Character References*). The XML declaration is purely documentary, but if it is wrong many XML-aware processors will be unable to process the associated text.

5.6.3 Namespaces

A valid XML document necessarily specifies the schema in which its constituent elements are defined. However, a well-formed XML document is not required to specify its schema (indeed, it may not even have a schema). It would still be useful to indicate that the element names used in it have some defined provenance. Furthermore, it might be desirable to include in a document elements that are defined (possibly differently) in different schemas. A cabinet-maker's schema might well define an element called <table> with very different characteristics from those of a documentalist's.

The concept of *namespace* was introduced into the XML language as a means of addressing these and related problems. If the markup of an XML document is thought of as an expression in some language, then a namespace may be thought of as analogous to the lexicon of that language. Just as a document can contain words taken from different languages, so a well-formed XML document can include elements taken from different namespaces. A namespace resembles a schema in that we may say that a given set of elements 'belongs to' a given namespace, or are 'defined by' a given schema. However, a schema is a set of element definitions, whereas a namespace is really only a property of a collection of elements: the only tangible form it takes in an XML document is its distinctive *prefix* and the identifying *name* associated with it.

Suppose for example that we wish to extend our anthology to include a complex diagram. We might start by considering whether or not to extend our simple schema to include XML markup for such features as arcs, polygons, and other graphical elements. XML can be used to represent any kind of structure, not simply text, and there are clear advantages to having our text and our diagrams all expressed in the same way.

Fortunately we do not need to invent a schema for the representation of graphical components such as diagrams; it already exists in the shape of the Scalable Vector Graphics (SVG) language defined by the W3C.[23] SVG is a widely used and rich XML vocabulary for representing all kinds of two-dimensional graphics; it is also well supported by existing software. Using an SVG-aware drawing package, we can easily draw our diagram and save it in XML format for inclusion within our anthology. When we do so, we need to indicate that this part of the document contains elements taken from the SVG namespace, if only to ensure that processing software does not confuse our <line> element with the SVG <line>, which means something quite different.

An XML document need not specify any namespace: it is then said to use the 'null' namespace. Alternatively, the root element of a document may supply a default namespace, understood to apply to all elements which have no namespace prefix. This is the function of the xmlns attribute which provides a unique name for the default namespace, in the form of a URI:

```
<anthology>
<!-- anthology markup elements here --></anthology>
```

In exactly the same way, on the root element for each part of our document which uses the SVG language, we might introduce the SVG namespace name:

```
<anthology>

<!-- anthology markup elements here -->
  <svg xmlns="http://www.w3.org/2000/svg">
<!-- SVG markup elements here --></svg>
<!-- more anthology markup elements here --></anthology>
```

Although a namespace name usually uses the URI (Uniform Resource Identifier) syntax, it is not treated as an online address and an XML processor regards it just as a string, providing a longer name for the namespace.

The xmlns attribute can also be used to associate a short prefix name with the namespace it defines. This is very useful if we want to mingle elements from different namespaces within the same document, since the prefix can be attached to any element, overriding the implicit namespace for itself (but not its children):

---

[23]The W3C Recommendation is defined at http://www.w3.org/Graphics/SVG/.

```
<anthology
   xmlns:svg="http://www.w3.org/2000/svg">

<!-- anthology markup elements here -->
  <svg:svg>
<!-- SVG markup elements here --></svg:svg>
<!-- more anthology markup elements here --></anthology>
```

There is no limit on the number of namespaces that a document can use. Provided that each is uniquely identified, an XML processor can identify those that are relevant, and validate them appropriately. To extend our example further, we might decide to add a linguistic analysis to each of the poems, using a set of elements such as <aux>, <adj>, etc., derived from some pre-existing XML vocabulary for linguistic analysis.

```
<anthology
   xmlns:gram="http://www.gram.org"
   xmlns:svg="http://www.w3.org/2000/svg">

<!-- anthology markup elements here -->
  <svg:svg>
<!-- SVG markup elements here --></svg:svg>
  <line>
    <gram:itj>O</gram:itj>
    <gram:nom>Rose</gram:nom>
    <gram:pron>thou</gram:pron>
    <gram:aux>art</gram:aux>
    <gram:adj>sick</gram:adj></line></anthology>
```

Marked Sections

We mentioned above that the syntax of XML requires the encoder to take special action if characters with a syntactic meaning in XML (such as the left angle bracket or ampersand) are to be used in a document to stand for themselves, rather than to signal the start of a tag or an entity reference respectively. The predefined entities &, <, and > provide one method of dealing with this problem, if the number of occurrences of such things is small. Other methods may be considered when the number is large, as in an XML document like the present Guidelines, which contains hundreds of examples of XML markup. One is to label the XML examples as belonging to a different namespace from that of the document itself, which is the approach taken in the present Guidelines. Another and simpler approach is provided by one of the features inherited by XML from its parent SGML: the 'marked section'.

A marked section is a block of text within an XML document introduced by the characters <![CDATA[and terminated by the characters]]>. Between these rather strange brackets, markup recognition is turned off, and any tags or entity references encountered are therefore treated as if they were plain text. For example, when we come to write the users' manual for our anthology, we may find ourselves often producing text like the following:

```
   Here is an example of the use of the <gi>line</gi> element:
   <![CDATA[<line>....</line>]]>
```

5.7   Putting it all together

In this chapter we have discussed most of the components of an XML document and its associated schema. We have described informally how an XML document is represented, and also introduced one way of representing the rules a RELAX NG validator might use to validate it. In a working system, the following issues will also need to be addressed:

- how does a processor determine the schema (or schemas) that should be used to validate a given XML document instance?

- if a document contains entity references that must be processed before the document can be validated, where are those entities defined?

- an XML document instance may be stored in a number of different operating system files; how should they be assembled together?

- how does a processor determine which stylesheets it should use when processing an XML document, or how to interpret any processing instructions it contains?

- how does a processor enforce more exact validation than simple datatypes permit (for example of element content)?

Different schema languages and different XML processing systems take very different positions on all of these topics, since none of them is explicitly addressed in the XML specification itself. Consequently, the best answer is likely to be specific to a particular software environment and schema language. Since this chapter is concerned with XML considered independently of its processing environment, we only address them in summary detail here.

5.7.1   Associating entity definitions with a document instance

In *v.6.1 Character References* we introduced the syntax used for the definition of named character entities such as `eacute`, which XML inherited from SGML. Different schema languages vary in the ways they make a collection of such definitions available to an XML processor, but fortunately there is one method that all current schema languages support.

As well as, and following, the XML declaration (*v.6.2 Processing instructions*), an XML document instance may be prefixed with a special `DOCTYPE` statement. This declarative statement has been inherited by XML from SGML; in its full form it provides a large number of facilities, but we are here concerned only with the small subset of those facilities recognized by all schema languages.

Here is an example DOCTYPE statement which we might consider prefixing to the final version of our anthology:

```
<!DOCTYPE anthology [
<!ENTITY mdash "&#2014;">
<!ENTITY legalese "This document is available under a Creative Commons
Share and Enjoy Licence">
]>
```

Any XML processor encountering this statement will use it to add the two named entities it defines to those already predefined for XML. Before the document instance itself is validated, any references to these entities will be expanded to the character string given. Thus, wherever in the document instance the string `&legalese;` appears, it will be replaced by the formulation above. This makes life a little easier for those keyboarding our anthology.[24] The word `anthology` following the string DOCTYPE in this example is, of course, the name of the root element of the document to which this declaration is prefixed; however, only an XML DTD processor will take note of this fact.

5.7.2   Associating a document instance with its schema

In the past, different schema languages adopted entirely different attitudes to this question, leading to a variety of different methods of associating schemas with document instances. However, a W3C Working Group Note, *Associating Schemas with XML documents*, (`http://www.w3.org/TR/xml-model/`) now provides a standardized method of doing this through the use of a processing instruction:

```
<?xml-model href="http://www.tei-c.org/release/xml/tei/custom/schema/relaxng/tei_ all.rng"?>
```

The href *pseudo-attribute* points to the location of the schema. This is the only mandatory pseudo-attribute, but others can be added to give more information about the schema:

```
<?xml-model href="burgess.rng"
title="Anthony Burgess Project Schema"
schematypens="http://relaxng.org/ns/structure/1.0"
type="application/xml"
?>
```

---

[24] And, indeed, for those responsible for deciding the licensing conditions if they change their minds later.

See the XML Model WG Note for more information on the pseudo-attributes available and how to use them.

A document instance may be valid according to many different schemas, each appropriate to a different processing task. All of these may be expressed in the same way:

```
<?xml-model href="tei_ tite.xsd" type="application/xml" ?>
<?xml-model href="checkNames.sch" type="application/xml" schematypens="http://purl.oclc.org/dsdl/schematron"
?>
```

This example includes a standard schema in XML Schema format, along with a schematron schema which might be used for checking the format and linking of names.

Any modern XML processing software tool will provide convenient methods of validating documents which are appropriate to the particular schema language chosen. In the interests of maximizing portability of document instances, they should contain as little processing-specific information as possible.

5.7.3 Assembling multiple resources into a single document

As we have already indicated, a single XML document may be made up of several different operating system files that need to be pulled together by a processor before the whole document can be validated. The XML DTD language defines a special kind of entity (a *system entity*) that can be used to embed references to whole files into a document for this purpose, in much the same way as the character or string entities discussed in *v.6.1 Character References*. Neither RELAX NG nor W3C Schema directly supports this mechanism, however, and we do not discuss it further here.

An alternative way of achieving the same effect is to use a special kind of pointer element to refer to the resources that need to be assembled, in exactly the same way as we proposed for the illustration in our anthology. The W3C Recommendation *XML Inclusions* (XInclude)[25] defines a generic mechanism for this purpose, which is supported by an increasing number of XML processors.

5.7.4 Stylesheet association and processing

As mentioned above, the processing of an XML document will usually involve the use of one or more stylesheets, often but not exclusively to provide specific details of how the document should be displayed or rendered. In general, there is no reason to associate a document instance with any specific stylesheet and the schema languages we have discussed so far do not therefore make any special provision for such association. The association is made when the stylesheet processor is invoked, and is thus entirely application-specific.

However, since one very common application for XML documents is to serve them as browsable documents over the Web, the W3C has defined a procedure and a syntax for associating a document instance with its stylesheet (see `http://www.w3.org/TR/xml-stylesheet/`). This Recommendation allows a document to supply a link to a default stylesheet and also to categorize the stylesheet according to its *MIME type*, for example to indicate whether the stylesheet is written in CSS or XSLT, using a specialized form of processing instruction.

Assuming therefore that we have made a CSS-conformant stylesheet for our anthology and stored it in a file called `anthology.css` which is available from the same location as the anthology itself, we could make it available over the Web simply by adding a processing instruction like the following to the anthology:

```
<?xml-stylesheet href="anthology.css" type="text/css"?>
```

Multiple stylesheets can be defined for the same document, and options are available to specify how a web browser should select amongst them. For example, if the document also contained a directive:

```
<?xml-stylesheet href="anthology_ m.css" type="text/css" media="mobile"?>
```

a different stylesheet called `anthology_m.css` could be used when rendering the document on a handheld device such as a mobile phone.

Most modern web browsers support CSS (although the extent of their implementation varies), and some of them support XSLT.

---

[25]`http://www.w3.org/TR/xinclude/`.

Content validation

As we noted above, most schema languages provide some degree of datatype validation for attribute values (*v.5.1 Declaring attributes*). They vary greatly in the validation facilities they offer for the content of elements, other than the syntactic constraints already discussed. Thus, while we may very easily check that our <stanza> elements contain only <line> elements, we cannot easily check that <line> elements contain between five and 500 correctly-spelled English words, should we wish to constrain our poetry in such a way. Also, because attributes and elements are treated differently, it is difficult or impossible to express co-occurrence constraints: for example, if the status of a poem is draft we might wish to permit elements such as <editorialQuery> within its content, but not otherwise.

The XML DTD language offers very little beyond syntactic checking of element content. By contrast, a major impetus behind the design and development of the W3C schema language was the addition of a much more general and powerful constraint language to the existing structural constraints of XML DTDs. In RELAX NG the opposite approach was taken, in that all datatype validation, whether of attributes or element content, is regarded as external to the schema language. For attributes, as we have seen, RELAX NG makes use of the W3C Schema Datatype Library (but permits use of others). Because RELAX NG treats both elements and attributes as special cases of patterns, the same datatype validation facilities are available for element content as for attribute values; it is unlike other schema languages in this respect. In addition, for content validation, a different component of DSDL known as Schematron can be used. Schematron is a pattern matching (rather than a grammar-based) language, which allows us to test the components of a document against templates that express constraints such as those mentioned above.

Like other XML processors, Schematron uses XPath to identify parts of an XML document; in addition, it provides elements that describe assertions to be tested and conditions which must be validated, as well as elements to report the results of the test.

John Unsworth

Computational Work with Very Large Text Collections

Interoperability, Sustainability, and the TEI

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John Unsworth

Computational Work with Very Large Text Collections

Interoperability, Sustainability, and the TEI

1   The "I" in TEI sometimes stands for interchange, but it never stands for interoperability. Interchange is the activity of reciprocating or exchanging, especially with respect to information (according to Wordnet), or if you prefer the Oxford English Dictionary, it is "the act of exchanging reciprocally; giving and receiving with reciprocity." It's an old word, its existence attested as early as 1548. Interoperability is a much newer word with what appears to be military provenance, dating back only to 1969, meaning "able to operate in conjunction." The difference is worth dwelling on for a moment since it's important to the discussion here: for the interchange of encoded text you need an agreed-upon interchange format to which and from which various encoding schemes are capable of translating their normal output. Interoperability, on the other hand, implies that you can take the normal output from one system and run it, as is, in a different system—or to put it another way, the difference between an interchange format and an interoperable format would be that various systems actually operate directly on the interoperable format, while an interchange format is just a way-station between two other formats, each of which is required by different target systems. Even if there's a single interoperable format, then, it has to be a common or baseline representation that is technically valid and intellectually acceptable in multiple systems. The conditions for interoperability would be some combination of flexibility and shared purpose in the systems, strictness in encoding, and consistency in practice. The TEI has a role to perform at each position in this combination, but it hasn't always embraced these roles, with respect to interoperability.

2   In the P4 Guidelines, the word "interoperability" only appears twice, once in Volume 1 of the print edition in connection with Unicode, and once in Volume 2, in connection with Z39.50 (Bath Profile). On the other hand, interchange has been a core goal of the TEI from the earliest meetings at Vassar College in 1988 where the effort to produce the TEI Guidelines began. The first principle emerging from those meetings is that

> 1. The guidelines are intended to provide a standard format for data interchange in humanities research. (TEI 1988)

3   In fact, TEI is an acronym with two possible expansions: it can stand for the "Text Encoding Initiative," when it refers to the activity of producing and maintaining the Guidelines, but in the title of those Guidelines, it stands for "Text Encoding and Interchange." Interchange is the subject of an entire chapter in the TEI Guidelines, as well—Chapter 30 (P4), "Rules for Interchange," the headnote to which says:

> This chapter discusses issues related almost exclusively to the use of SGML-encoded TEI documents in interchange. XML-encoded TEI documents may be safely interchanged without formality over current networks, largely without concern for any of the issues discussed here. This chapter has not therefore been revised, and will probably be withdrawn or substantially modified at the next release. (p. 647)

4   This would seem to indicate that, at least in the universe of TEI, XML has solved the problem of interchange. One significant way in which it has done so is to require Unicode for character representation. In the pre-Unicode era in which Chapter 30 was first written, character encoding was the major concern in the area of interchange especially when the interchange might take place over a network:

> Current network standards allow—indeed, require—gateway nodes to translate material passing through the gateway from one coded character set into another, when the networks joined by the gateway use different coded character sets. Since there is no universally satisfactory translation among all coded character sets in common use, the transmission character set will normally be

the subset which is satisfactorily translated by the gateways encountered in transit between the sender and the receiver of the data. (p. 647)

5   TEI tackled this level of the problem by developing writing system declarations and entity references—strategies later adopted by HTML.

6   Beyond the character-encoding level of the problem, interchange advice in TEI P4 and earlier consisted mostly of recommendations to expand minimized tags and supply omitted tags. Since tag minimization and tag omission are not allowed in XML, and since Unicode is required, this chapter's advice on encoding and formatting of marked-up documents is now unnecessary. And by the same token, these features of XML take us (in theory) a step closer to being able to achieve some functional level of interoperability across text collections, at least for particular well-defined purposes. If this is true, this will be important when one wants to work at library scale with documents produced by different projects, publishers, or libraries. However, those who have tried to move from interchange to interoperability have quickly discovered that it's an extremely difficult step to take successfully.

7   In a part of the MONK project (http://www.monkproject.org) called Abbot, we did take this step successfully, and we learned some things in the process. First and foremost, we learned that even within a single project, there may be significant deviations from the norms of tagging and transcription established for that project: this ranges from apparently unmotivated variations in the application of attribute values to apparently random behavior in transcribing and encoding documentary features like line-end hyphens. For the fullest discussion of the challenges met and overcome by Abbot, see Brian L. Pytlik Zillig's essay "TEI Analytics: Converting Documents into a TEI Format for Cross-Collection Text Analysis" in *Literary and Linguistic Computing* (2009). TEI-A (for "TEI Analytics") is a TEI customization developed for the MONK project,[1] and it is deliberately strict and stripped down. TEI-A is related to TEI Tite (Trolard 2009), a customization developed for use with keyboarding vendors. Both are intended to allow minimal variation and require minimal interpretation. As Brian notes in his LLC essay:

> If one were setting out to create a new literary text corpus for the purpose of undertaking text analysis work, the most sensible approach might be to begin with one of TEI's pre-fabricated tagsets (TEI Corpus, perhaps). In the case of the MONK project, however, we are beginning with collections that have already been tagged using diverse versions of TEI with local extensions. TEI-A is therefore designed to exploit common denominators in these texts while at the same time adding new markup for data structures useful in common analytical tasks (e.g. part-of-speech tags, lemmatizations, word tokens, and sentence markers). The goal is to create a P5-compliant format that is designed not for rendering but for analytical operations such as data mining, principal component analysis, word frequency study, and n-gram -analysis. (188-189)

8   Brian goes on to talk about the "schema harvesting" technique that is embodied in Abbot, consisting of a meta-stylesheet which is used to analyze the input text and identify TEI-A elements that are either similar or identical to the elements in the input text; the result of this analysis is a second stylesheet, automatically generated by the first, that contains XSL templates for converting the input documents into TEI-A format. Files that fail validation after running through this second stylesheet are set aside for further (human) analysis, after which stylesheet logic might be extended and the process re-run or (in rare cases) files might be edited by hand. Brian writes:

> All processes are initiated by the Abbot program in the following sequence:
>
> 1. Use the MonkMetaStylesheet.xsl stylesheet to read the TEI-A schema
>
> 2. Generate the XMLtoMonkXML.xsl stylesheet, as a result of the prior task
>
> 3. Convert the input collection to TEI-A
>
> 4. Parse the converted files against the MONK schema and log any errors
>
> 5. Move invalid files to a quarantine folder
>
> These steps are expressed in a sequence of Unix shell scripts, and all source files are retained in the processing sequence so that the process can be tuned, adjusted, and re-run as needed without data loss. (191)

9   Getting the world to adopt TEI-A probably isn't the answer to interoperability problems, though. As general as it is, TEI-A has a purpose in mind other than interoperability, namely analysis. A better choice might be TEI Tite, which has its purpose comfortably behind it, as soon as its texts come into existence. But it would be easy to get from one to the other. TEI Tite was developed (by Perry Trolard) as a sort of union-set of encoding practices in large libraries (Michigan, Virginia, Indiana) that contract out for substantial amounts of text-encoding. It focuses on non-controversial structural aspects of the text, and on establishing a high-quality transcription of that text.

10   Abbot, for its part, seeks to deduce similarities in the encoding practices of those entities that contributed text to the MONK project, namely ProQuest's *Early English Books Online* and *Eighteenth-Century Collections Online*, the University of North Carolina at Chapel Hill Libraries' *Documenting the American South*, the Indiana University Digital Library Program's *Wright American Fiction*, ProQuest's *Nineteenth-Century Fiction*, the University of Virgina Library's *Early American Fiction*, and Martin Mueller's Shakespeare texts. The input formats here varied quite a bit, but they included both SGML and XML with both entity references and Unicode for character encoding. As Brian notes:

> Local text collections vary not because archive maintainers are unaware of the importance of standards or interoperability but because particular local circumstances sometimes demand customization. The nature of the texts themselves may necessitate a custom solution, or something about the storage, delivery, or requirements for display may favor particular tags or particular structures. Local environments also require particular metadata conventions (even within the TEI header). (188)

11   Or as I put it, in a talk at the NEH back in 2007:

> Once you start to aggregate these resources and combine them in a new context and for a new purpose, you find out, in practical terms, what it means to say that that their creators really only envisioned them being processed in their original context—for example, the texts don't carry within themselves a public URL, or any form of public identifier that would allow me to return a user to the public version of that text. They often don't have a proper Doctype declaration that would identify the DTD or schema according to which they are marked up, and if they do, it usually doesn't point to a publicly accessible version of that DTD or schema. Things like entity references may be unresolvable, given only the text and not the system in which it is usually processed. The list goes on: in short, it's as though the data has suddenly found itself in Union Station in its pajamas: it is not properly dressed for its new environment. So, there's some benefit to the library, and to the long-term survivability and usefulness of their collections, or publishers' collections, to have them used in new ways, in research. (Unsworth 2007)

12   In interchange scenarios, as long as you can get from schema A to schema B by some agreed-upon intermediate step, it doesn't matter that the source texts from the two environments are incompatible in their markup. In an interoperability scenario like MONK, you are trying to bring texts from a number of different sources into a kind of lowest-common-denominator format that can then actually be used in processing.

13   In fact, though, in the MONK project the TEI-A format isn't the last stop: it's a stage in a process with more specific goals than interoperability. The TEI-A produced by Abbot is subsequently processed through Morphadorner,[2] which tokenizes, marks sentence boundaries, extracts named entities, and provides trainable part-of-speech tagging. The result of that process is fed to another program, called Prior,[3] which feeds the texts into a MySQL database —the final representation and the one that is queried for statistical information about the texts. However, we keep the TEI-A and TEI-A "morphadorned" states of the text as well, and in MONK we call on the former to provide a reading text for the user of the system at various points in the analysis process.[4]

14   I think, actually, that this is what interoperability looks like, or will look like in the future: it's a state or a stage in the processing of data, and not necessarily (perhaps not often) the final state or stage. To attain it, you have to supervise the process, mindful of the need to produce an opportunity for interoperability. If libraries and scholarly projects that require the keyboarding or OCR of texts could use a common format (like TEI Tite) as the target of that stage of the process, and if that could be saved and made available for other purposes, it would allow other

projects and processes to pick up those texts and either process them in that state or process them from a predictable source format into some more heavily tagged format that supports a more specific purpose. Interoperability, I'm suggesting, is a plateau and a publication, and it's a matter of influencing the workflow for what you and others do so that it passes through that plateau and undertakes that publication. I'm not suggesting that TEI-A is necessarily the spec to use here—more likely, it would be something like TEI Tite, meant as spec for vendors and now stipulated as the output format for TEI members who wish to take advantage of the AccessTEI member benefit (a discount on keyboarding services offered by Apex CoVantage).[5] No doubt, in most cases this output will receive further processing for particular purposes and for the local environment, but if TEI members, libraries, and publishers using specifications similar to TEI Tite could learn to think about the Tite output as having a purpose of its own, namely interoperability, that would go a long way toward solving the kinds of problems that we encountered in MONK and that are certain to be encountered by anyone else who tries to make texts from different sources work (and play) together.

15   Interoperability is not just a matter of text format, though: it's also very much a matter of license conditions. In the MONK project our final act was to present MONK to the public in two instances. The first instance[6] is available to all users: it includes about 50 million words of American literary text from North Carolina, Indiana, and Virginia, plus the Shakespeare texts. The second instance[7] is available only to users with login privileges at a CIC Institution:[8] it provides access to a corpus of 150 million words that includes licensed material from ProQuest and Cengage. Login is negotiated through InCommon, which is an Internet2 implementation of the Shibboleth authentication protocol that has been set up at each CIC institution. All of those universities license the ProQuest materials, so permission for this re-presentation of their materials was not hard to get; however, only about half of them licensed the Cengage materials, so special permission was required from Cengage to allow them all uniform access to a single instance of MONK. Thankfully, that permission was provided; otherwise, it would have been a good deal more complicated to sort out who was allowed access to what.

16   This solution to the problem of heterogeneous access to licensed material is not scalable, obviously: there isn't time for each new research project to negotiate access in the way that we did, and there's no guarantee that other publishers would agree, as these did. In this connection, "scale" is represented by the Google Books project, which aims to digitize all printed books. As of October 2009, Google would admit to having scanned 10,000,000 books (Brin 2009), but Google estimates that there are about thirteen times that many books out there (Taycher 2010), so they're far from done. The scalable solution might come out of the Google Books Settlement agreement, if a settlement is ever finalized.

17   The proposed agreement (Case No. 05 CV 8136-DC 2009), which has preliminary approval from the courts, calls for Google to set up two research centers in which public domain and copyrighted works would be available for computational research, on the condition that the use of copyrighted material is "non-consumptive" (Case No. 05 CV 8136-DC 2009, section 7.2.d). Non-consumptive research is defined in the settlement as:

> …research in which computational analysis is performed on one or more Books, but not research in which a researcher reads or displays substantial portions of a Book to understand the intellectual content presented within the Book. Categories of Non-Consumptive Research include:
>
> (a) Image Analysis and Text Extraction—Computational analysis of the Digitized image artifact to either improve the image (*e.g.*, de-skewing) or extracting textual or structural information from the image (*e.g.*, OCR).
>
> (b) Textual Analysis and Information Extraction—Automated techniques designed to extract information to understand or develop relationships among or within Books or, more generally, in the body of literature contained within the Research Corpus. This category includes tasks such as concordance development, collocation extraction, citation extraction, automated classification, entity extraction, and natural language processing.
>
> (c) Linguistic Analysis—Research that performs linguistic analysis over the Research Corpus to understand language, linguistic use, semantics and syntax as they evolve over time and across different genres or other classifications of Books.

(d) Automated Translation—Research on techniques for translating works from one language to another.

(e) Indexing and Search—Research on different techniques for indexing and search of textual content. (Case No. 05 CV 8136-DC 2009, section 1.93)

18   The uses defined in (b) and (c) would cover all of what we did in MONK, and everything I can envision as falling under the general heading of text-mining. However, the notion that you can, for example, do supervised learning in text-mining without reading or displaying substantial portions of the book or understanding its intellectual content is more than a little implausible, and the whole idea of non-consumptive research, should it survive, will need to be refined in light of actual research and research use-cases. In any case, the settlement has not been finalized and the judge under whom it was negotiated has been promoted to a higher bench, so the whole thing may start over, or the suit may be withdrawn.

19   Even if that happens, though, HathiTrust is considering proposals for a research center that would leverage their shared digital repository which was set up by many of the libraries that participate in the Google Books project (Hagedorn, York, and Levine 2009). I am involved in a HathiTrust proposal submitted jointly by Scott Poole at the University of Illinois and Beth Plale at Indiana University under consideration by the HathiTrust Executive Committee as of this writing. At this time, the HathiTrust includes 7.1 million books, about 24% (or about 1.7 million) of which are in the public domain (HathiTrust 2010). By comparison, MONK included about 1500 titles, so even the public-domain content of the HathiTrust component of the Google Books collection is over 1,000 times the size of MONK. That counts as scale.

20   Working with only that portion of the potential research corpus, you could still seriously pursue the research goals spelled out in the HathiTrust RFP:

- aggregation/distillation – "raw texts or abstracts covering particular topics or types of materials are reduced to subsets or databases of interest that can be used by one or multiple researchers"
- development of tools for research – for "textual analysis, entity extraction, aggregation of data, and the representation and analysis of results"
- collaboration – the Center must offer the ability to share processes, results, and communication with individuals and groups in a secure manner.
- Miscellaneous additional needs and concerns of researchers, e.g.
  - "The ability to include additional data."
  - "The ability to have access to both raw and pre-processed texts" (HathiTrust 2010, 7–10)

21   and complexity envisioned here will raise challenges in that area. One possible strategy for sustainability in this case would be to connect the maintenance of a research corpus, institutionally, to the maintenance of rights information. Another proposal in the Google Books Settlement that may survive even if the settlement agreement does not is the establishment of a non-profit clearinghouse for settling claims against money earned by the use of orphan works—those works that are in copyright, but for which a copyright holder cannot be located. A conservative estimate puts the number of orphan works in the Google Books collection at about 580,000 (Cairns 2009),[9] but some estimate the number in the millions. If the rights clearinghouse and the research host site were connected, the activity of the first might contribute to the sustainability of the second. Even if that subsidy were prohibited or constrained (as it would be, under the proposed settlement), the two activities obviously need to be conducted with awareness of one another, so that it's clear what rights conditions apply to what works. And even if there's no cross-subsidy, a research center could support itself with a combination of budgeted funds in research proposals that use the resource, plus institutional support.

22   These are the bits of an emerging cyberinfrastructure for disciplines that work with text. Characteristically, they include standards, strategies, organizations (like scholarly societies), institutional structures (like libraries and perhaps publishers, as well as research and its funders), and commercial players (including at least software developers and publishers, in

this case). These characteristic bits also include moments of production, transmission, storage, representation, and analysis. And because cyberinfrastructure is also a social structure, it is a process. The TEI has a leading role to play at several points in that process, including of course as a standard, but also as a standards organization that interacts with institutional structures and commercial players. TEI competes—whether it wants to or not—in intellectual and institutional ways with various other disciplines and institutional commitments.

23 In general, one area of competition is in the academic recognition of computational research into ontologies. As more and more material has been digitized, people have begun to work toward what Tim Berners-Lee and others call the "semantic web" (2001). The Semantic Web Conference is a high profile academic event, but it is also a very large and fairly commercial event, and semantic web topics are discussed not only in AI and other CS contexts, but also as the foundation of business activities. Semantics, in this case, depends on ontology, and ontology is therefore "one of the pillars of the semantic web."[10] The Text Encoding Initiative has been doing the ontology of literary and linguistic texts since 1987. TEI has an Ontology SIG, in fact, that it should probably fund to represent TEI in semantic web contexts. TEI may have been here first, but it is coming from behind in terms of institutional recognition or functional centrality in semantic web contexts, possibly for the same reason that we seemed late to arrive at the Hypertext Ball when it was first thrown, by the World Wide Web. Neither the semantic web nor the web itself is a pure and well thought-out system, and they're both over-commercialized already. But the TEI has a lot to offer both—and in fact, has offered it to the Web, the point of continuity being Michael Sperberg-McQueen, former North American Editor of the TEI, and his work for the World Wide Web Consortium on the XML standard.

24 We need to make a similarly important contribution, perhaps with more recognition, in the development of the semantic web, or at least in developing what is understood by that term. Doing this may help the TEI to track and participate in proposals for the research use of our expanding corpus of digital cultural heritage material in the form of text. By participating, we can assert the needs and the ontological views of a diverse humanities user community, and we can do that with more historical perspective and more authority than any other organization I can think of. If the TEI were to participate in such proposals, we could help to ensure that the emergent research environment is TEI-friendly, something that will serve the interests of the humanities research community. Through this participation in research proposals and in the research center, we can also contribute to the sustainability and the interoperability of a research corpus. And if TEI is part of doing that, the TEI will also be sustainable, and participation in the TEI will be increased. Simple things like reminding users of the potential interoperability of texts produced through AccessTEI, and perhaps maintaining a record of whose institutions produced what texts with which access rights, would allow us to begin to carve out a role in the rights discovery and maintenance part of this ecology as well.

25 Finally, although we will certainly need research efforts like Abbot in order to move toward interoperability in the very large corpora of the near future, we need organizations like the TEI itself even more, and we need the TEI to have a vision and a strategy for asserting its role in the semantic web—by engaging early and often with emerging text-research centers and collections, and by promoting the potential interoperability of the materials produced through its AccessTEI service.

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Notes

1 The TEI-A schema can be retrieved at http://www.monkproject.org/downloads/texts/schemata.gz and documentation is available online at http://segonku.unl.edu/teianalytics/TEIAnalytics.html.

2 See http://morphadorner.northwestern.edu/.

3 See http://monkproject.org/docs/monk-datastore-doc/doc-files/prior.html.

4 With respect to the need to read, see the discussion below, on the subject of non-consumptive research.

5 For more information, see http://www.apexcovantage.com/content-solutions/accessTEI-digitization.asp.

6 See http://monkpublic.library.illinois.edu/monkmiddleware/public/index.html.

7 See https://monk.library.illinois.edu/secure/mainMenu.html.

8 For a list of CIC institutions, see http://www.cic.net/home/AboutCIC/CICUniversities.aspx.

9 See http://personanondata.blogspot.com/2009/09/580388-orphan-works-give-or-take.html.

10 In the Semantic Web wiki entry on Ontology (Ontology 2010), we learn that there is no universally accepted definition of ontology, raising the specter of recursion.

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Abstract

This essay will address the challenges and possibilities presented to the Text Encoding Initiative, particularly in the area of interoperability, by the very large text collections (on the order of millions of volumes) being made available for computational work in environments where the texts can be reprocessed into new representations, in order to be manipulated with analytical tools. It will also consider TEI's potential role in the design of these environments, these representations, and these tools. The argument of the piece is that interoperability is a process as well as a state, that it requires mechanisms that would sustain it, and that TEI is one of those mechanisms.

Index terms

Keywords : interchange, interoperability, text-mining

SECTION 3

Perspective

An Introduction to Social Media for Scientists

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Online social media tools can be some of the most rewarding and informative resources for scientists—IF you know how to use them.

In many ways, the fast-paced evolution of the internet parallels the move toward "big data" in science. In less than a decade, online tools have exploded in popularity and witnessed rapid expansion (Figure 1), with an increasing number of scientists now looking to take advantage of these web-based resources (see Box 1 and Table 1 for an overview and comparison of existing tools). Social media portals in particular undergo regular reinvention and transformation, with different tools becoming popular for different populations [1]. Although a number of guides exist online, many researchers still feel overwhelmed and hesitant toward the virtual world, lacking sufficient information and guidance through formal scientific channels such as peer-reviewed journals. To better familiarize researchers with existing internet resources, here we discuss prospective benefits that can stem from online science conversations, explain how scientists can efficiently and effectively harness online resources, and provide an overview of popular online tools.

Research Benefits from an Online Presence

In the age of the internet, social media tools offer a powerful way for scientists to boost their professional profile and act as a public voice for science. Although the type of online conversations and shared content can vary widely, scientists are increasingly using social media as a way to share journal articles, advertise their thoughts and scientific opinions, post updates from conferences and meetings, and circulate information about professional opportunities and upcoming events. Google searches

now represent the standard approach for discovering information about a topic or person—whether it be search committees collecting information about faculty candidates, graduate students searching out prospective labs, or journalists on the hunt for an expert source. Consequently, in today's technology-driven world, lack of an online presence can severely limit a researcher's visibility, and runs the risk that undesirable search results appear before desirable ones (however, this scenario is easily rectified; see Box 2). A growing body of evidence suggests that public visibility and constructive conversation on social media networks can be beneficial for scientists, impacting research in a number of key ways.

Online Tools Improve Research Efficiency

Seasoned internet users are often adamant that online tools can increase their productivity and lead to overall improvements in their personal research efficiency. Unfortunately for data-driven scientists, the majority of present evidence is anecdotal. Twitter has helped busy academics keep up with new research developments, prepare teaching materials, and offer guidance for graduate students (http://bit.ly/VsyERg, http://bit.ly/UTAQ1i, http://bit.ly/VN6hyf). In one extreme case, when faced with a looming deadline for obtaining export permits, Facebook helped researchers identify thousands of fish specimens in under a week [2]. Other

researchers use online activities as a way to organize their thoughts and research notes (e.g., online lab books; http://bit.ly/W3f4LL), or to foster creativity and hone their writing skills [3].

Online communities can be especially useful for niche topics where community members have specific needs or require specialized interactions. For example, blog updates and discussion forums can offer user support for software (e.g., programs written in R, http://www.r-bloggers.com), while communities of taxonomists may benefit from a wiki devoted to a particular group of organisms (e.g., the Octopus News Magazine Online for cephalopods, http://www.tonmo.com). Research-focused portals can also result in content curation—amalgamating disparate resources into an organized whole and weeding out untrustworthy sources. Futhermore, citizen science projects (http://www.scistarter.com) and online scientific games (e.g., Foldit for protein structure [4]) assist scientists by allowing members of the general public to make unique and meaningful contributions to ongoing research projects.

The increasing use of online resources may eventually transform and expand the culture of science as a whole. Blogs and social media tools offer an ideal medium for extended scientific conversations (both preprint commentary, such as at http://arXiv.org, and postpublication review) and enable fast-paced discussions of topics that scientists "want and need to discuss"

The Perspective section provides experts with a forum to comment on topical or controversial issues of broad interest.
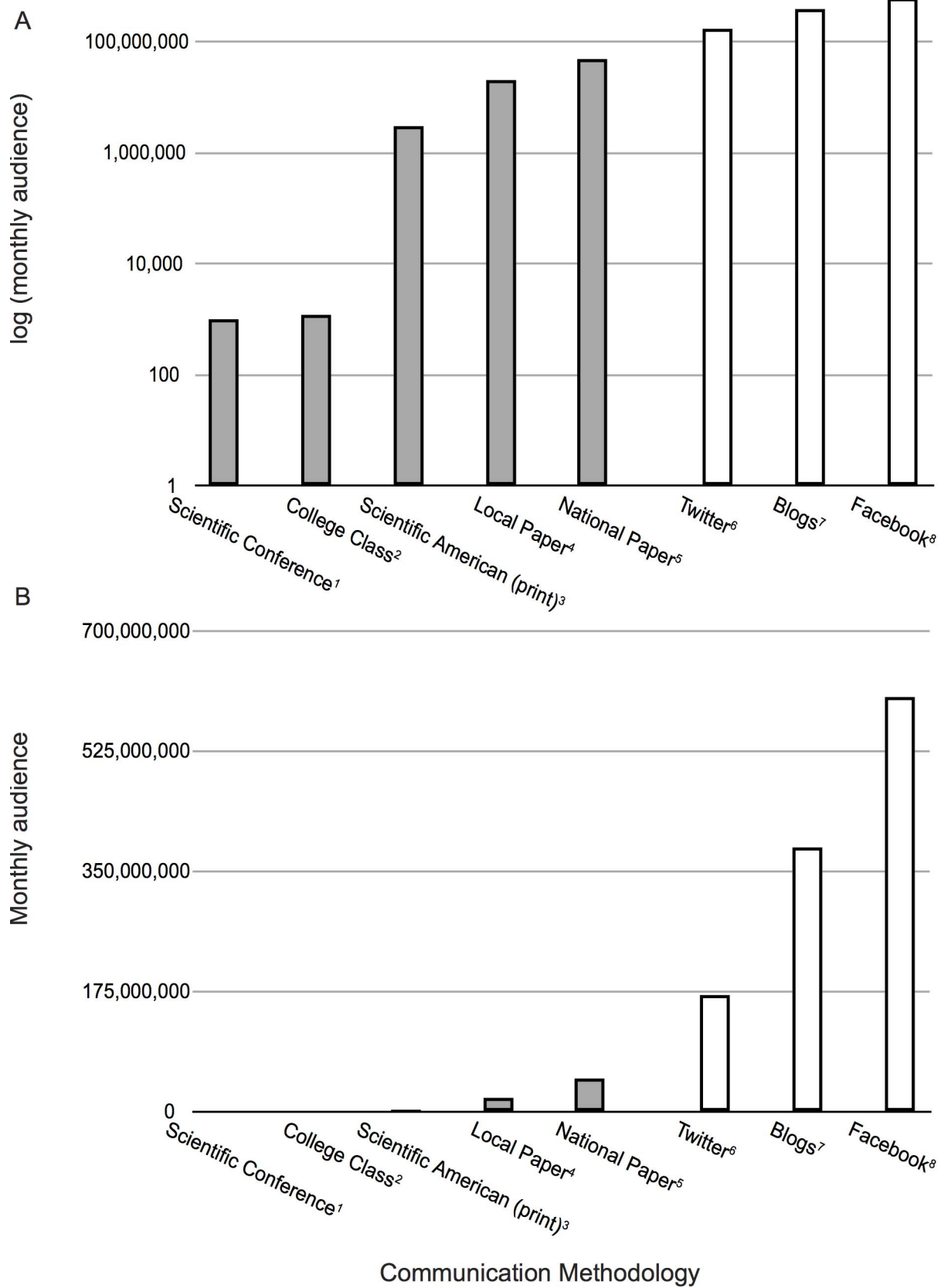
A

B

Communication Methodology

Figure 1. Monthly audience by communication methodology shown on A) log scale and B) linear scale. Filled bars indicate traditional methodologies and unfilled bars indicate online methodologies. Data sources are as follows: 1. estimate; 2. estimate; 3. Scientific American (http://bit.ly/Z0dkaF); 4. San Diego Union-Tribune (http://bit.ly/WusyhV); 5. New York Times (http://bit.ly/14aktDi); 6. Twitter (http://tcrn.ch/146wWsy); 7. Wordpress

Box 1. Online Tools & Resources

Blogs - Traditional, long-form online narrative. Wordpress (http://wordpress.com) and Blogger (http://blogger.com) are two of the most popular sites to offer free blog hosting, including easy graphical interfaces for constructing posts and changing blog layouts. If you aren't sure if blogging is for you, or if you only have a few posts in mind, it is reasonable (and common practice) to enquire about a guest post on an established blog with a built-in audience.

RSS Feeds - Type of URL that allows users to automatically mine blog/website updates without the need for a web browser. RSS aggregators such as Google Reader are a streamlined and practical way to keep track of new and relevant content. Aggregated RSS feeds can additionally be imported and synced with dedicated apps; for example, MobileRSS is one useful software tool that can be used to access Google Reader feeds on smartphones and tablet devices.

Apps - Software used on mobile devices. Apps are especially useful as mobile social networking platforms (e.g., using Twitter, Tumblr, or Facebook apps to post updates while attending scientific conferences), synchronized data repositories (e.g., apps for organizing PDF libraries, address books, or RSS feeds), or as a gateway to connecting people with nature (e.g., popular apps such as Audubon Guides and Starwatch).

Twitter (http://twitter.com)- Social networking site that limits posts to 140 characters. Twitter is useful for in-the-moment conversations, customized news streams, and building and maintaining communities. Devices such as hashtags, a phrase beginning with a hash/pound sign (e.g., use #longreads when linking to lengthy online articles), allow users to aggregate tweets according to topic. For example, conference attendees will create a specific hashtag for a particular event, such as #asm2012 for the General Meeting of the American Society for Microbiology that took place in San Francisco (June 16–19, 2012). Tweets incorporating #asm2012 became so popular during the conference that this hashtag was listed as "trending" on the main Twitter homepage—a rare but impressive feat for online scientific discussions.

Facebook (http://www.facebook.com) - The most widely used social media site. There are divided opinions about Facebook, and researchers tend to view this site two ways: 1) They create a public profile that may reach a different audience than Twitter or blogs, or 2) They eschew using Facebook for research-related purposes at all, perhaps maintaining private profiles for only their closest friends and family (don't get offended if they don't accept your friend request!).

Tumblr (http://www.tumblr.com) - A microblogging site that can publish any type of media very easily and quickly. Users post photos, videos, or short quotes as opposed to long written narratives. Tumblr offers automatic forwarding of new posts to Facebook and Twitter accounts.

Pinterest (http://pinterest.com) - A photo-only microblogging site where users define themed "boards" for posting content (e.g., food, art, marine fish). Pinterest is a new and emerging social media site whose user demographics are significantly different from other portals (82% women [15]). "Pins" can also be shared via Facebook and Twitter. Oregon State University's Superfund program maintains a Pinterest board on science communication (http://bit.ly/WbDUHd).

Storify (http://storify.com) - A way to aggregate and organize tweets, videos, blog posts, and other media. Storify is especially useful for compiling media on discrete discussions and preserving tweets before they become archived by Twitter. For example, if there is a panel discussion or academic seminar, a Storify can be created that includes live tweets from the audience, videos of the panelists, and links to their publications, websites, and social media profiles.

Linking communities - Include Digg (http://digg.com), StumbleUpon (http://www.stumbleupon.com), MetaFilter (http://www.metafilter.com), and more. These are content aggregation sites that recommend new and interesting content to subscribers.

(e.g., topics where peer review is not suitable or necessary [5]; http://bit.ly/WLeajr). It is also increasingly common for blog posts to serve as the basis for peer-reviewed manuscripts (this article, as well as examples cited in [5]). Author Jeremy Fox [5] argues that the online scientific community could become a powerful force for promoting important causes and connecting with policymakers; such impacts have already been seen in the economics community, where blog posts and online discussions led to groundbreaking policy decisions at the US Federal Reserve.

Online Visibility Helps Track and Improve Scientific Metrics

There is mounting evidence to suggest that an active online presence may directly impact a researcher's credentials as measured through traditional metrics. One UK researcher observed that tweeting and blogging about her own papers led to spikes in the number of article downloads, even for older literature that had been available for years without much previous attention (http://bit.ly/LxpbDz). For articles deposited in the preprint server arXiv, Twitter mentions were positively correlated with rapid article downloads and citations appearing only months after deposition [6]. It is presently unclear as to whether tweeting leads to long-term increases in citations or merely highlights high-quality science that would garner numerous citations even in the absence of social media coverage. However, Eysenbach [7] reported that highly tweeted journal articles were 11 times more likely to be highly cited versus articles without strong social media coverage. Priem et al. [8] additionally demonstrated that journal articles come in drastically different "flavors," in terms of the way that they are disseminated and consumed among the research community. Social media and article-level metrics may thus be particularly important for unveiling research impacts that cannot be reflected in traditional scientific metrics; for example, Priem et al. noted that some articles may be rarely cited, but heavily read and downloaded by academics.

Social Media Enhances Professional Networking

Online discussions can lead to tangible, real-world social interactions. Before ever meeting in person, conversations on Twitter can serve as an icebreaker once two

Table 1. Comparison of Online Tools.

Platform	Pros	Cons
Blogs	• Longevity; posts are accessible via search engines • Robust platform for building an online reputation	• Time investment for preparing thoughtful posts • Posts should be disseminated and advertised via other platforms
Twitter	• Low time investment, short posts • Ability to rapidly join in on online conversations • The most current source for breaking news and topical conversation	• Posts are quickly buried under new content • Twitter does not make its archive database accessible to search • Gaining followers can be a slow and difficult process
Facebook	• Established juggernaut in the social media world • Ability to create "groups" and "pages" for a person or cause	• Privacy concerns • Frequent changes to layout, features, and settings
Google+	• Integration with Google tools • Easily manage privacy/visibility by grouping contacts into "circles"	• User base not unique compared to other sites • Users still unsure how to use it

Box 2. Advice for New Users

In academia, there is often a particular stigma attached to online activities. Actively maintaining an online profile and participating in social media discussions can be seen as a waste of time and a distraction from research and teaching duties. We believe this perception is misguided and based on incorrect interpretations of what scientists are actually doing online. When used in a targeted and streamlined manner, social media tools can complement and enhance a researcher's career. When exploring online tools for the first time, new users can maximize their reach by considering the following points:

Explore online guides to social media

● The Superfund program at Oregon State University maintains an exhaustive list of resources (blog articles, videos, how-to guides) focused on science and social media: http://bit.ly/WkdN0G. We recommend this site as a good jumping-off point for new users.

Establish a professional website (at minimum)

● To establish an online presence and avoid undesirable Google search results, at minimum researchers should set up a personal website that lays out their specific research projects and areas of expertise, searchable by colleagues, journalists, and the public alike.

● Although professional websites can be established through your university/institute, external hosts (a free site at http://wordpress.com or a custom paid domain) offer more flexibility and are easier to access and maintain.

● If desired, a website can be supplemented with social media accounts (e.g., Twitter and Google+ profiles), which will also appear high in Google search results.

Locate pertinent online conversations

● Find people with common interests; follow the social media that they link to and that links to them.

● Use established social networks (e.g., a base of Twitter or LinkedIn contacts) or a means of notification (RSS feeds or personal messages from colleagues/acquaintances) to get started.

● It is completely acceptable to "unfollow" people or groups if their information is not relevant or useful.

● It can be beneficial to read first without contributing ("lurking") to learn logistics and basic etiquette of different social media platforms.

Navigate the deluge of online information

● Strictly maintaining and organizing online accounts is an effective way to filter information (e.g., grouping people using Twitter lists and Google+ circles).

● Similar efficiency can be achieved by tracking and prioritizing the most relevant blogs and articles for reading (e.g., using RSS services such as Google Reader that can be accessed and synced to mobile devices via apps such as MobileRSS).

● Popular content is often heavily reposted and shared; the most important articles and conversations will usually reach you at some point.

● Explore multiple social media tools and related sites/apps for managing online accounts (Box 1). Find ones that you prefer with the appropriate features; consistent use of fewer tools is better than spreading yourself too thin across too many platforms.

● Don't be afraid to ask for help; there are many friendly and established communities who are willing and eager to assist new users.

Interact with diverse participants

- Effective social media use *requires* engagement with the audience.
- New users must be open to engaging with people outside one's own professional background or realm of scientific expertise.
- Tone of discussions can vary wildly, from cordial (e.g., conversations about fascinating species) to highly argumentative (e.g., politically sensitive topics such as climate change).
- Users striving to impose a specific viewpoint on their audience (e.g., #arseniclife, http://nbcnews.to/152OCTH) or that are perceived to promote discrimination/sexism (e.g., #womenspace, http://bit.ly/KnEPRy) often face significant backlash and outrage.

Reach your audience

- Online communication methods only reach people who are interested in talking about science online.
- Mainstream media continues to represent the most effective platform for disseminating scientific information to broad audiences; 66% of Americans get their news through television, 43% through the internet, 31% through newspapers, and 19% through radio (participants were allowed to name two sources; 2011 Pew poll, http://goo.gl/g2j45).
- Online communities, conversations, and user demographics (sex ratios, racial demographics [15–17]) can vary across different tools, with surprisingly little overlap. Using multiple tools may be necessary to achieve one's goals. Notably, many people shy away from using Facebook in light of lingering concerns about privacy (http://nyti.ms/KkwbDE).
- The majority of established bloggers (72% of 126 blogs surveyed [3]) use Twitter as a complementary outlet for disseminating new blog posts to followers.

people finally meet in a conference or workshop setting. The online world can also broaden a scientist's impact in the research world. Tweeting from conferences (discussing cutting-edge research developments, linking to journal articles or lab websites, e.g., http://bit.ly/11CGRGL) can introduce other scientists to valuable content, and consequently provide networking opportunities for users who actively post during meetings. Because Twitter serves as an information filter for many scientists, publicizing articles on social media can alert researchers to interesting studies that they may not have otherwise come across (e.g., research in journals tangential to their field or within-discipline publications they do not normally read). Journalists and scientists following a conference tweet stream may be additionally introduced to new groups of researchers (particularly early-career scientists or those scientists who are new to Twitter) with relevant and related interests; conference tweeting can thus serve to enhance in-person networking opportunities by expanding these activities to online spheres. For example, a researcher (who asked to remain anonymous) followed HMB and MCG's live tweets from the 2012 Ocean Sciences Meeting and discovered that a scientific question forming the basis of an unsubmitted grant proposal had already been answered. This saved the researcher the effort of submitting a proposal that was unlikely to be funded.

Broadening "Broader Impacts"

Along with forging links between scientists, online interactions have the potential to enhance "broader impacts" by improving communication between scientists and the general public [9]. An established track record and well-thought-out online outreach strategy can satisfy broader impacts criteria that are increasingly required by funding agencies such as the National Science Foundation. Blogs were being touted as an important outlet for scientists as early as 2006, when researchers were urged to "contribute informed opinions to environmental debates and develop a collective presence in the blogosphere, thereby increasing its inherent credibility" [10]. In some respects, the internet can be a more powerful force than traditional channels—when content goes "viral," the reach can be truly global. Two projects aimed at changing the perception of science and scientists themselves have recently gone viral in the online science world: the hashtag #iamscience (soon to be turned into a book and podcast) and "This is What a Scientist Looks Like" (http://bit.ly/SayFt2). These initiatives are meant to raise scientists' profiles, dispel ubiquitous stereotypes, and highlight the unconventional career paths followed by most scientists. Such campaigns would be difficult to pursue within the formalized structure of research and academia.

Defining Goals and Choosing among Online Tools

The internet represents an increasingly vast toolbox, and it can be difficult to choose among the long list of "core" resources (Box 1). For those starting out, it is critical to first define what you want to achieve, and then set out to use the tools that are best targeted toward this goal (Figure 2 provides an overview flowchart to help initially define these goals, while Figure 3 lists some common fears for new users; online tools are most effective when customized and used for a specific purpose (http://bit.ly/13J7AAS). Do you want to disseminate information about a discrete event, such as a field expedition? Do you want to build a community of your scientific peers? Do you want to communicate your science to a nonscientist audience? To save time and target the most efficient resources, it is important to think about the timeline of your goals and the time commitment you are willing or able to make. In addition, each social media portal offers unique features, which can complement each other when content is shared between sites.

The next step is to choose online tools that will be maximally beneficial for your specific needs. Blog posts are long form and long-term projects. They require greater initial time investments—crafting and editing posts can take hours—but blog content can be widely disseminated, linked via search engine terms, and provide an "expert" information source that is accessible for years to come. At Deep Sea News, a marine science blog where HMB and MCG are both scientific contributors (http://deepseanews.com), website analytics reveal that most users arrive at the blog via generalized search queries such as "deep sea" and are directed to archived posts with informative content. For example, a January 2011 post entitled "Deep Sea 101: What is the Deep Sea?" is a popular search engine–driven entry point to the blog.

So You Want To Communicate Science Online

Who do you want to talk to?

Colleagues

You know your colleagues don't read blogs. Isn't there a listserv somewhere?

My tech-savvy colleagues who have their own blogs & 8,000 Twitter followers!

The general public! I'm ready to communicate SCIENCE!

By this I mean the relatively small subset of the general public who are reading about science on the internet, who are not necessarily representative of the overall public.

Why do you want to talk to them?

Nobody's talking about what I care about! I want to create new content!

I'm lonely. I want to find people that care as much about my area as I do.

So much cool stuff but it's scattered all over the internet!

Curation

Community

Creation

Work with your organization's Public Information officers

Minimal Time

Facebook

Google+

Guest post on established blog

Moderate Time

Pinterest

Tumblr

Twitter

Life-Sucking Yet Strangely Satisfying

Write for established blog
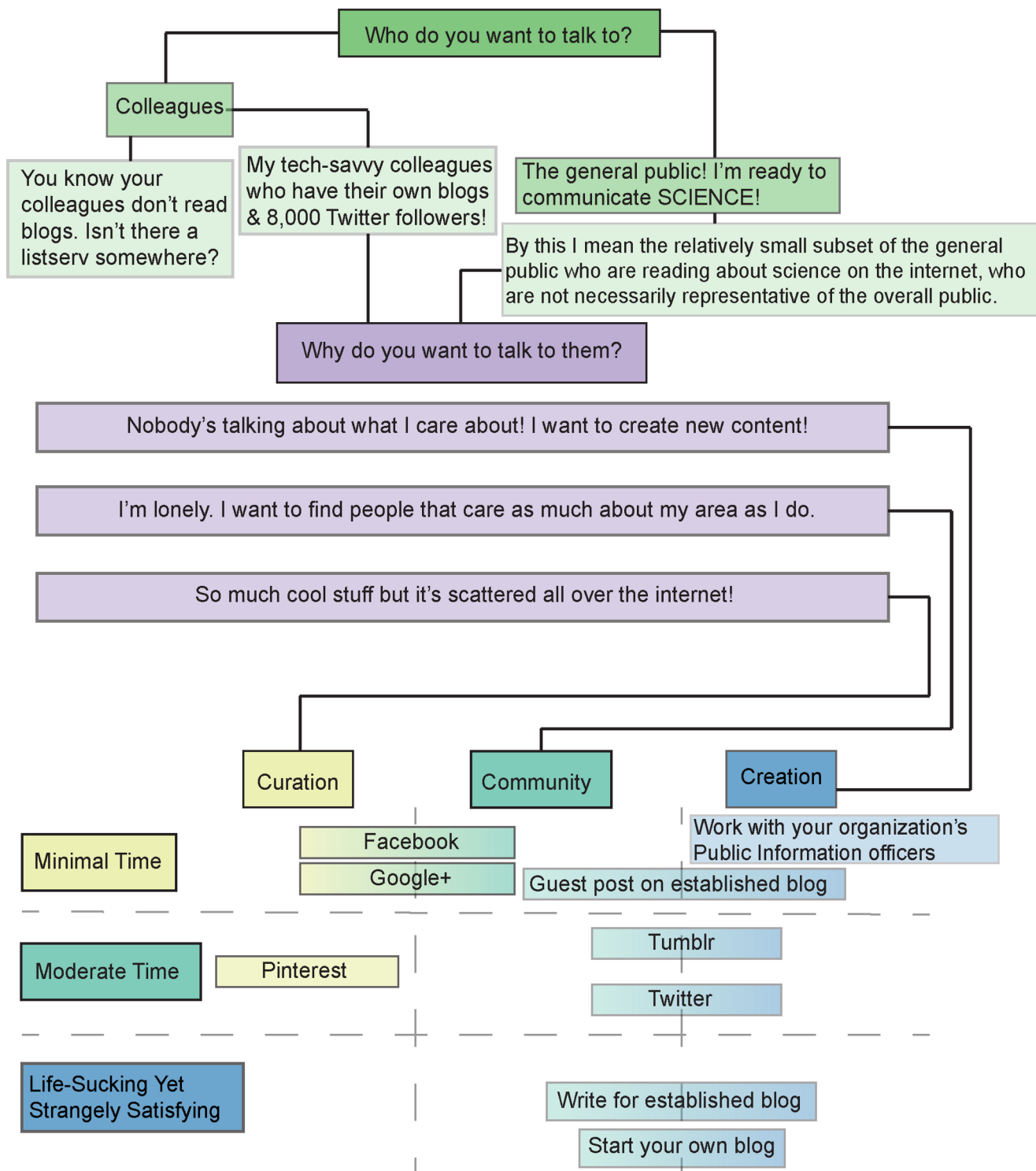
Start your own blog

Figure 2. Flowchart showing a decision tree for scientists who are interested in communicating online. An earlier version of this flowchart appeared in a guest post by MCG in *Nature*'s Soapbox Science blog (http://goo.gl/AeKjJ). doi:10.1371/journal.pbio.1001535.g002
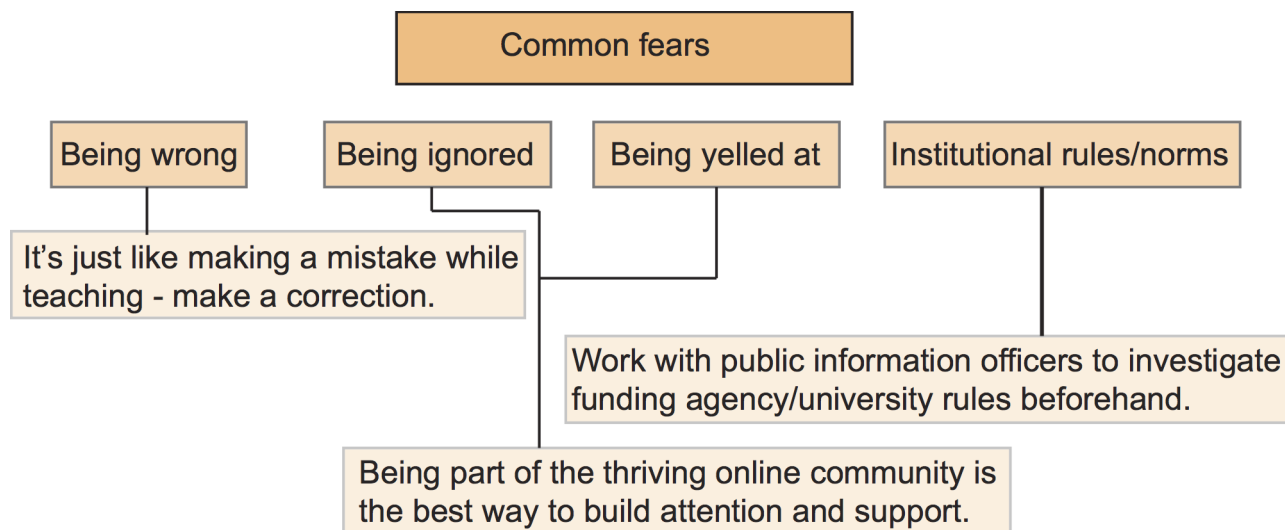
Figure 3. Common online communication fears and suggested solutions. An earlier version of this figure appeared in a guest post by MCG in *Nature's* Soapbox Science blog (http://goo.gl/AeKjJ).
doi:10.1371/journal.pbio.1001535.g003

Twitter, on the other hand, is short form and ephemeral—its true appeal lies in the zeitgeist. Twitter users share information and converse in real time, such as through discussions that occur while following a live event (conference talks or workshop discussions tagged with unique keywords, referred to as hashtags; see Box 1) or while remotely participating in a shared activity (e.g., #FridayNightScience, an online outlet for escaping the often-solitary nature of scientific research). Users should note that Twitter itself quickly archives "old" content—for example, tweets amalgamated under a popular conference hashtag may no longer be visible or accessible via searches after a few days. To some extent, using tweet-timing tools (e.g., http://bufferapp.com) can be harnessed to maximize viewership. When Twitter is used correctly, participants should feel that they have an up-to-the-minute personalized news feed and are participating in relevant and meaningful conversations.

Regardless of the platform, social media interactions require two-way conversations (see Box 2). Joining one of the many preexisting scientific conversations can simultaneously disseminate your own content, expand your online network, and raise your professional visibility. An easy entry point is the ScienceOnline conglomerate (http://scienceonline.com), an enthusiastic group of science communicators ranging from tenured professors to freelance journalists [9,11,12].

Long-term Needs and Outlook

Social media and internet-based resources are increasingly ubiquitous. Thus, there is a pressing need for scientific institutions to offer formalized training opportunities for graduate students and tenured faculty alike to learn how to effectively use this new technology. Such training should address common misconceptions about social media platforms and help researchers identify an online repertoire that works best for their specific needs and goals. Organizations such as COMPASS (http://www.compassonline.org) can be called in to offer social media training workshops for scientists, and books such as *Escape from the Ivory Tower* [13] are succinct reference texts offering advice and guidance for interacting with a variety of media sources.

One barrier impacting tool adoption and training opportunities is the fact that online tools are commonly viewed as "uncharted territory." The novelty of these resources often clouds our understanding of their measurable impacts and long-term utility, particularly in regards to research productivity and science communication/education efforts. In order to understand and refine online tools, appropriate and quantitative metrics are needed. Without high-quality data, it will be impossible to understand the true reach of these tools and discover the most effective uses of different platforms. The altmetrics movement (http://bit.ly/W3gRAD) has sprung up in response to

this scenario, aiming to provide a means to measure the true impact of scientific research (social media discussion, journalistic coverage, etc.), as opposed to the perceived value of the venue (e.g., a journal) where research findings may be published. New tools for tracking a researcher's output include Google Scholar profiles (http://scholar.google.com), ImpactStory (http://impactstory.org), and the Open Researcher and Contributor ID (ORCID) initiative (http://orcid.org). In addition, publishers such as PLOS are increasingly offering article-level metrics that log the number of article views, PDF downloads, social media discussions, and associated blog/media coverage.

Social media continues to evolve, grow, and undergo metamorphosis. The use of online tools and cutting-edge technology is growing among scientists, but their adoption and acceptance remains limited across the wider research community. In a 2011 study, only 2.5% of UK and US academics had established a Twitter account [14]. As the benefits become more apparent and dedicated metrics are developed to supplement scientists' portfolios, social media may soon become an integral part of the researcher's toolkit.

Acknowledgments

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SECTION 4

Status: 🄲 Positive or Neutral Judicial Treatment

259 Infopaq International A/S v Danske Dagblades Forening

Case C-5/08

Court of Justice of the European Communities (Fourth Chamber)

16 July 2009

[2009] E.C.D.R. 16

K. Lenaerts (President of the Chamber) T. von Danwitz , R. Silva de Lapuerta , G. Arestis and J. Malenovský (Rapporteur):

July 16, 2009 [1]

Data; Denmark; EC law; Newspapers; Reproduction right; Statutory interpretation; Transient copying

H1 *What constitutes " reproduction" under art.2 of Directive 2001/29 — What constitutes a " temporary and transient reproduction" under art.5 of Directive 2001/29 — Held data capture process, which consists of temporary storing and printing, comes within the concept of reproduction— The elements reproduced must be the expression of the intellectual creation of their author— The act of printing is not a transient reproduction.*

H2 Infopaq operates a media monitoring and analysis business which consists primarily in drawing up summaries of selected articles from Danish daily newspapers and other periodicals. The articles are selected on the basis of certain subject criteria agreed with customers and the selection is made by means of a " data capture process" . The data capture process comprises the five phases including the following: scanning of all selection pages of publications; the translation of such images into text files that can be processed digitally; and the processing of such text files into " captured" search words or phrases. At the end of the entire process, all files are deleted, save the data comprising of searched words or phrases extracted from the articles. The summaries are sent to customers by email.

H3 Danske Dagblades Forening (DDF) is a professional association of Danish daily newspaper publishers, whose function is to assist its members with copyright issues. In 2005, DDF complained to Infopaq about this data capture process which it alleged led to four acts of reproduction of newspaper articles. Infopaq disputes this as it claims that the acts of reproduction at issue in the main proceedings are transient in nature, since they are deleted at the end of *260* the electronic search process. Infopaq brought an action against DDF before the Danish Eastern Regional Court for a declaration that Infopaq is entitled in Denmark to do the above procedure without the consent of DDF or of its members. The Court dismissed the action and Infopaq brought an appeal before the referring court.

H4 The Court of Appeal decided to stay the proceedings and a reference was made to the Court of Justice in relation to the interpretation of arts 2(a) and 5 of Directive 2001/29 on the harmonisation of certain aspects of copyright and related rights in the information society, with the following questions:

(1) Can the storing and subsequent printing out of a text extract from an article in a daily newspaper, consisting of a search word and the five preceding and five subsequent words (i.e. 11 words), be regarded as acts of reproduction which are protected (art.2)?

(2) Is the context in which temporary acts of reproduction take place relevant to whether they can be regarded as " transient" (art.5(1))?

(3) Can a temporary act of reproduction be regarded as " transient" where the reproduction is processed, for example, by the creation of a text file on the basis of an image file or by a search for text strings on the basis of a text file?

(4) Can a temporary act of reproduction be regarded as " transient" where part of the reproduction, consisting of one or more text extracts of 11 words, is stored?

(5) Can a temporary act of reproduction be regarded as " transient" where part of the reproduction, consisting of one or more text extracts of 11 words, is printed out?

(6) Is the stage of the technological process at which temporary acts of reproduction take place relevant to whether they constitute " an integral and essential part of a technological process" (art.5(1))?

(7) Can temporary acts of reproduction be an " integral and essential part of a technological process" if they consist of manual scanning of entire newspaper articles whereby the latter are transformed from a printed medium into a digital medium?

(8) Can temporary acts of reproduction constitute an " integral and essential part of a technological process" where they consist of printing out part of the reproduction, comprising one or more text extracts of 11 words?

(9) Does " lawful use" (art.5(1)) include any form of use which does not require the rightholder's consent?

(10) Does " lawful use" (art.(1)) include the scanning by a commercial business of entire newspaper articles, subsequent processing of the reproduction, and the storing and possible printing out of part of the reproduction, consisting of one or more text extracts of 11 words, for use in the business's summary writing, even where the rightholder has not given consent to those acts? *261*

(11) What criteria should be used to assess whether temporary acts of reproduction have " independent economic significance" (art.(1)) if the other conditions laid down in the provision are satisfied?

(12) Can the user's efficiency gains from temporary acts of reproduction be taken into account in assessing whether the acts have " independent economic significance" (art.(1))?

(13) Can the scanning by a commercial business of entire newspaper articles, subsequent processing of the reproduction, and the storing and possible printing out of part of the reproduction, consisting of one or more text extracts of 11 words, without the rightholder's consent be regarded as constituting " certain special cases which do not conflict with a normal exploitation" of the newspaper articles and " not unreasonably [prejudicing] the legitimate interests of the rightholder" (art.5(5))?

H5 **Held by the Court of Justice as follows:** (1) An act occurring during a data capture process, which consists of storing an extract of a protected work comprising 11 words and printing out that extract, is such as to come within the concept of reproduction in part within the meaning of art.2 of Directive 2001/29 , if the elements reproduced are the expression of the intellectual creation of their author; it is for the national court to make this determination. (2) The act of printing out an extract of 11 words, during a data capture process such as that at issue in the main proceedings, does not fulfil the condition of being transient in nature as required by art.5(1) of Directive 2001/29 and, therefore, that process cannot be carried out without the consent of the relevant rightholders.

H6 In respect of the first question, under art.2(5) and (8), Berne Convention , the protection of certain subject-matters as artistic or literary works presupposes that they are intellectual creations. Under art.1(3) of Directive 91/250 , art.3(1) of Directive 96/9 and art.6 of Directive 2006/116 , works such as computer programs, databases or

photographs are protected by copyright only if they are original in the sense that they are their author's own intellectual creation. Copyright within the meaning of art.2(a) of Directive 2001/29 is liable to apply only in relation to a subject-matter which is original in the sense that it is its author's own intellectual creation. The various parts of a work thus enjoy protection under art.2(a) of Directive 2001/29 , provided that they contain elements which are the expression of the intellectual creation of the author of the work. With respect to the scope of such protection of a work, Directive 2001/29 requires that the acts covered by the right of reproduction be construed broadly. That requirement of a broad definition is also to be found in art.2 which uses expressions such as " direct or indirect" , " temporary or permanent" , " by any means" and " in any form" .

H7 As regards newspaper articles, their author's own intellectual creation is evidenced clearly from the form, the manner in which the subject is presented and the linguistic expression. Newspaper articles are literary works covered by Directive 2001/29 . Such works consist of words which, considered in isolation, are not as such an intellectual creation of the author who employs them. It is only through the choice, sequence and combination of those words that the author may express his creativity in an original manner and achieve a result which is an intellectual *262* creation. It may not be ruled out that certain isolated sentences, or even certain parts of sentences in the text in question, may be suitable for conveying to the reader the originality of a publication by communicating to that reader an element which is, in itself, the expression of the intellectual creation of the author of that article.

H8 The reproduction of an extract of a protected work which comprises 11 consecutive words is such as to constitute reproduction in part within the meaning of art.2 of Directive 2001/29 , if that extract contains an element of the work which, as such, expresses the author's own intellectual creation; it is for the national court to make this determination.

H9 In relation to questions 2– 12, art.5 of Directive 2001/29 exempts an act of reproduction only if it fulfils five conditions set out in the provision, that is, the act: is temporary, or transient or incidental; it is an integral and essential part of a technological process; the sole purpose of that process is to enable a transmission in a network between third parties by an intermediary of a lawful use of a work or protected subject-matter; and the act has no independent economic significance. These conditions are cumulative. The exemption must be interpreted in the light of art.5(5) of Directive 2001/29 , i.e. the exemption is to be applied only in certain special cases which do not conflict with a normal exploitation of the work or other subject-matter and do not unreasonably prejudice the legitimate interests of the rightholder. (Editor's note: the " three step test" .)

H10 An act can be held to be " transient" within the meaning of the second condition laid down in art.5(1) of Directive 2001/29 only if its duration is limited to what is necessary for the proper completion of the technological process in question, it being understood that that process must be automated so that it deletes that act automatically, without human intervention, once its function of enabling the completion of such a process has come to an end. The storage and deletion of the reproduction must not be dependent on discretionary human intervention, particularly by the user of protected works.

H11 Here, the first two acts of reproduction may be held to be transient as long as they are deleted automatically from the computer memory. In relation to the third act of reproduction (the storing of a text extract of 11 words), it is up to the national court to ascertain whether the deletion of that file is dependent on the will of the user of the reproduction and whether there is a risk that the file might remain stored once the function of enabling completion of the technological process has come to an end. In respect of the last act of reproduction in the data capture process, Infopaq is making a reproduction outside the sphere of computer technology, and it is not a transient act. It is printing out files containing the extracts of 11 words and thus reproduces those extracts on a paper medium. The data capture process is apparently not likely itself to destroy that medium, the deletion of that reproduction is entirely dependent on the will of the user of that process.

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H12 **Cases referred to:**

Commission of the European Communities v Spain (C-36/05) [2006] E.C.R. I-10313

Criminal Proceedings against Kapper (C-476/01) [2004] E.C.R. I-5205; [2005] All E.R. (EC) 257

Sociedad General de Autores y Editores de Espana (SGAE) v Rafael Hoteles SL (C-306/05) [2006] E.C.R. I-11519; [2007] E.C.D.R. 2

Stichting ter Exploitatie van Naburige Rechten (SENA) v Nederlandse Omroep Stichting (NOS) (C-245/00) [2003] E.C.R. I-1251; [2003] E.C.D.R. 12; 3 C.M.L.R. 36; [2003] E.M.L.R. 17

H13 **Legislation referred to:**

Directive 2001/29 on the harmonisation of certain aspects of copyright and related rights in the information society arts 2, 5 [2001] OJ L167/10

Agreement on Trade-Related Aspects of Intellectual Property Rights art.9(1)

Berne Convention for the Protection of Literary and Artistic Works (Paris Act of July 24, 1971), as amended on September 28, 1979 arts 2, 9

Directive 91/250 on the legal protection of computer programs art.1 [1991] OJ L122/42

Directive 96/9 on the legal protection of databases art.3(1) [1996] OJ L77/20

Directive 2006/116 on the term of protection of copyright and certain related rights art.6 [2006] OJ L372/12

Law No.395 on copyright (lov nº395 om ophavsret) of June 14, 1995 (*Lovtidende* 1995 A, p.1796), as amended and consolidated by, inter alia, Law No.1051 (lov nº1051 om ændring af ophavsretsloven) of December 17, 2002 (*Lovtidende* 2002 A, p.7881).

H14 **Representation**

For Infopaq International A/S: A. Jensen (advokat).

For Danske Dagblades Forening: M. Dahl Pedersen (advokat).

For the Austrian Government: E. Riedl (acting as Agent).

For the Commission of the European Communities: H. Krämer and H. Støvlbæk (acting as Agents).

JUDGMENT [2]

1 This reference for a preliminary ruling concerns, first, the interpretation of art.2(a) of Directive 2001/29 of the European Parliament and of the Council of May 22, 2001 on the harmonisation of certain aspects of copyright and related rights in the information society [2001] OJ L167/10 and, secondly, the conditions for exemption of temporary acts of reproduction within the meaning of art.5 of that Directive.

2 The reference was made in the context of proceedings between Infopaq International

A/S (Infopaq) and Danske Dagblades Forening (DDF) concerning the dismissal of its application for a declaration that it was not required to obtain *264* the consent of the rightholders for acts of reproduction of newspaper articles using an automated process consisting in the scanning and then conversion into digital files followed by electronic processing of that file.

Legal context

International law

3 Under art.9(1) of the Agreement on Trade-Related Aspects of Intellectual Property Rights (the TRIPs Agreement), as set out in Annex 1C to the Marrakesh Agreement establishing the World Trade Organisation, which was approved by Council Decision 94/800 of December 22, 1994 concerning the conclusion on behalf of the European Community, as regards matters within its competence, of the agreements reached in the Uruguay Round multilateral negotiations (1986-1994) [1994] OJ L336/1:

> " Members shall comply with Articles 1 through 21 of the Berne Convention (1971) and the Appendix thereto. …" .

4 Article 2 of the Berne Convention for the Protection of Literary and Artistic Works (Paris Act of July 24, 1971), as amended on September 28, 1979 (the Berne Convention) reads as follows:

> " (1) The expression ' literary and artistic works' shall include every production in the literary, scientific and artistic domain, whatever may be the mode or form of its expression, such as books, pamphlets and other writings; …

> (5) Collections of literary or artistic works such as encyclopaedias and anthologies which, by reason of the selection and arrangement of their contents, constitute intellectual creations shall be protected as such, without prejudice to the copyright in each of the works forming part of such collections.

> …

> (8) The protection of this Convention shall not apply to news of the day or to miscellaneous facts having the character of mere items of press information."

5 Under art.9(1) of the Berne Convention , authors of literary and artistic works protected by that convention are to have the exclusive right of authorising the reproduction of those works, in any manner or form.

Community law

6 Article 1 of Council Directive 91/250 of May 14, 1991 on the legal protection of computer programs [1991] OJ L122/42 provided: *265*

> " 1. In accordance with the provisions of this Directive, Member States shall protect computer programs, by copyright, as literary works within the meaning of the Berne Convention for the Protection of Literary and Artistic Works . …

> …

> 3. A computer program shall be protected if it is original in the sense that it is the author's own intellectual creation. No other criteria shall be applied to determine its eligibility for protection."

7 Article 3(1) of Directive 96/9 of the European Parliament and of the Council of March 11, 1996 on the legal protection of databases [1996] OJ L77/20 provides:

> " In accordance with this Directive, databases which, by reason of the selection or arrangement of their contents, constitute the author's own intellectual creation shall be protected as such by copyright. No other criteria shall be

applied to determine their eligibility for that protection."

8 Directive 2001/29 states the following in recitals 4, 6, 9 to 11, 20 to 22, 31 and 33 in the preamble thereto:

" (4) A harmonised legal framework on copyright and related rights, through increased legal certainty and while providing for a high level of protection of intellectual property, will foster substantial investment in creativity and innovation, including network infrastructure …

(6) Without harmonisation at Community level, legislative activities at national level which have already been initiated in a number of Member States in order to respond to the technological challenges might result in significant differences in protection and thereby in restrictions on the free movement of services and products incorporating, or based on, intellectual property, leading to a refragmentation of the internal market and legislative inconsistency. The impact of such legislative differences and uncertainties will become more significant with the further development of the information society, which has already greatly increased transborder exploitation of intellectual property. This development will and should further increase. Significant legal differences and uncertainties in protection may hinder economies of scale for new products and services containing copyright and related rights. …

(9) Any harmonisation of copyright and related rights must take as a basis a high level of protection, since such rights are crucial to intellectual creation. …

(10) If authors or performers are to continue their creative and artistic work, they have to receive an appropriate reward for the use of their work …

(11) A rigorous, effective system for the protection of copyright and related rights is one of the main ways of ensuring that European cultural creativity and production receive the necessary resources and of *266 safeguarding the independence and dignity of artistic creators and performers.

…

(20) This Directive is based on principles and rules already laid down in the Directives currently in force in this area, in particular Directives [91/250] … and [96/9] , and it develops those principles and rules and places them in the context of the information society. The provisions of this Directive should be without prejudice to the provisions of those Directives, unless otherwise provided in this Directive.

(21) This Directive should define the scope of the acts covered by the reproduction right with regard to the different beneficiaries. This should be done in conformity with the *acquis communautaire* . A broad definition of these acts is needed to ensure legal certainty within the internal market.

(22) The objective of proper support for the dissemination of culture must not be achieved by sacrificing strict protection of rights or by tolerating illegal forms of distribution of counterfeited or pirated works.

…

(31) A fair balance of rights and interests between the different categories of rightholders, as well as between the different categories of rightholders and users of protected subject-matter must be safeguarded. …

…

(33) The exclusive right of reproduction should be subject to an exception to allow certain acts of temporary reproduction, which are transient or incidental reproductions, forming an integral and essential part of a technological process

and carried out for the sole purpose of enabling either efficient transmission in a network between third parties by an intermediary, or a lawful use of a work or other subject-matter to be made. The acts of reproduction concerned should have no separate economic value on their own. To the extent that they meet these conditions, this exception should include acts which enable browsing as well as acts of caching to take place, including those which enable transmission systems to function efficiently, provided that the intermediary does not modify the information and does not interfere with the lawful use of technology, widely recognised and used by industry, to obtain data on the use of the information. A use should be considered lawful where it is authorised by the rightholder or not restricted by law."

9 According to art.2(a) of Directive 2001/29 :

" Member States shall provide for the exclusive right to authorise or prohibit direct or indirect, temporary or permanent reproduction by any means and in any form, in whole or in part:

(a) for authors, of their works."

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10 Article 5 of the same Directive provides:

" (1) Temporary acts of reproduction referred to in art.2, which are transient or incidental [and] an integral and essential part of a technological process and whose sole purpose is to enable:

(a) a transmission in a network between third parties by an intermediary, or

(b) a lawful use

of a work or other subject-matter to be made, and which have no independent economic significance, shall be exempted from the reproduction right provided for in art.2.

…

5. The exceptions and limitations provided for in paragraphs 1, 2, 3 and 4 shall only be applied in certain special cases which do not conflict with a normal exploitation of the work or other subject-matter and do not unreasonably prejudice the legitimate interests of the rightholder."

11 According to art.6 of Directive 2006/116 of the European Parliament and of the Council of December 12, 2006 on the term of protection of copyright and certain related rights [2006] OJ L372/12:

" Photographs which are original in the sense that they are the author's own intellectual creation shall be protected in accordance with art.1 [which specifies the duration of the rights of an author of a literary or artistic work within the meaning of art.2 of the Berne Convention]. No other criteria shall be applied to determine their eligibility for protection. Member States may provide for the protection of other photographs."

National law

12 Articles 2 and 5(1) of Directive 2001/29 were transposed into Danish law by paras 2 and 11a(1) of Law No 395 on copyright (lov n°395 om ophavsret) of June 14, 1995 (*Lovtidende* 1995 A, p.1796), as amended and consolidated by, inter alia, Law No 1051 (lov n°1051 om ændring af ophavsretsloven) of December 17, 2002 (*Lovtidende* 2002 A, p.7881).

The dispute in the main proceedings and the questions referred for a preliminary ruling

13 Infopaq operates a media monitoring and analysis business which consists primarily in drawing up summaries of selected articles from Danish daily newspapers and other periodicals. The articles are selected on the basis of certain subject criteria agreed with customers and the selection is made by means of a " data capture process" . The summaries are sent to customers by email.

14 DDF is a professional association of Danish daily newspaper publishers, whose function is inter alia to assist its members with copyright issues.

15 In 2005 DDF became aware that Infopaq was scanning newspaper articles for commercial purposes without authorisation from the relevant rightholders. *268* Taking the view that such consent was necessary for processing articles using the process in question, DDF complained to Infopaq about this procedure.

16 The data capture process comprises the five phases described below which, according to DDF, lead to four acts of reproduction of newspaper articles.

17 First, the relevant publications are registered manually by Infopaq employees in an electronic registration database.

18 Secondly, once the spines are cut off the publications so that all the pages consist of loose sheets, the publications are scanned. The section to be scanned is selected from the registration database before the publication is put into the scanner. Scanning allows a TIFF (Tagged Image File Format) file to be created for each page of the publication. When scanning is completed, the TIFF file is transferred to an OCR (Optical Character Recognition) server.

19 Thirdly, the OCR server translates the TIFF file into data that can be processed digitally. During that process, the image of each letter is translated into a character code which tells the computer what type of letter it is. For instance, the image of the letters " TDC" is translated into something the computer can treat as the letters " TDC" and put in a text format which can be recognised by the computer's system. These data are saved as a text file which can be understood by any text processing program. The OCR process is completed by deleting the TIFF file.

20 Fourthly, the text file is processed to find a search word defined beforehand. Each time a match for a search word is found, data is generated giving the publication, section and page number on which the match was found, together with a value expressed as a percentage between 0 and 100 indicating how far into the text it is to be found, in order to make it easier to read the article. Also in order to make it easier to find the search word when reading the article, the five words which come before and after the search word are captured (extract of 11 words). At the end of the process the text file is deleted.

21 Fifthly, at the end of the data capture process a cover sheet is printed out in respect of all the pages where the relevant search word was found. The following is an example of the text of a cover sheet:

" 4 November 2005 – *Dagbladet Arbejderen* , page 3:

TDC: 73% ' a forthcoming sale of the telecommunications group TDC which is expected to be bought' ."

22 Infopaq disputed the claim that the procedure required consent from the rightholders and brought an action against DDF before the Østre Landsret (Eastern Regional Court), claiming that DDF should be ordered to acknowledge that Infopaq is entitled in Denmark to apply the abovementioned procedure without the consent of DDF or of its members. After the Østre Landsret dismissed that action, Infopaq brought an appeal before the referring court.

23 According to the Højesteret, it is not disputed in this case that consent from the

rightholders is not required to engage in press monitoring activity and the writing of summaries consisting in manual reading of each publication, selection of the relevant articles on the basis of predetermined search words, and production of a manually prepared cover sheet for the summary writers, giving an identified *269 search word in an article and its position in the newspaper. Similarly, the parties in the main proceedings do not dispute that genuinely independent summary writing per se is lawful and does not require consent from the rightholders.

24 Nor is it disputed in this case that the data capture process described above involves two acts of reproduction: the creation of a TIFF file when the printed articles are scanned and the conversion of the TIFF file into a text file. In addition, it is common ground that this procedure entails the reproduction of parts of the scanned printed articles since the extract of 11 words is stored and those 11 words are printed out on paper.

25 There is, however, disagreement between the parties as to whether there is reproduction as contemplated by art.2 of Directive 2001/29 . Likewise, they disagree as to whether, if there is reproduction, the acts in question, taken as a whole, are covered by the exemption from the right of reproduction provided for in art.5(1) of that Directive.

26 In those circumstances, the Højesteret a decided to stay the proceedings and to refer the following questions to the Court of Justice for a preliminary ruling:

" (1) Can the storing and subsequent printing out of a text extract from an article in a daily newspaper, consisting of a search word and the five preceding and five subsequent words, be regarded as acts of reproduction which are protected (see Article 2 of Directive 2001/29)?

(2) Is the context in which temporary acts of reproduction take place relevant to whether they can be regarded as ' transient' (see Article 5(1) of Directive 2001/29)?

(3) Can a temporary act of reproduction be regarded as ' transient' where the reproduction is processed, for example, by the creation of a text file on the basis of an image file or by a search for text strings on the basis of a text file?

(4) Can a temporary act of reproduction be regarded as ' transient' where part of the reproduction, consisting of one or more text extracts of 11 words, is stored?

(5) Can a temporary act of reproduction be regarded as ' transient' where part of the reproduction, consisting of one or more text extracts of 11 words, is printed out?

(6) Is the stage of the technological process at which temporary acts of reproduction take place relevant to whether they constitute ' an integral and essential part of a technological process' (see Article 5(1) of Directive 2001/29)?

(7) Can temporary acts of reproduction be an ' integral and essential part of a technological process' if they consist of manual scanning of entire newspaper articles whereby the latter are transformed from a printed medium into a digital medium?

(8) Can temporary acts of reproduction constitute an ' integral and essential part of a technological process' where they consist of printing out part of the reproduction, comprising one or more text extracts of 11 words?

*270

(9) Does ' lawful use' (see Article 5(1) of Directive 2001/29) include any form of use which does not require the rightholder's consent?

(10) Does ' lawful use' (see Article 5(1) of Directive 2001/29) include the scanning by a commercial business of entire newspaper articles, subsequent

processing of the reproduction, and the storing and possible printing out of part of the reproduction, consisting of one or more text extracts of 11 words, for use in the business's summary writing, even where the rightholder has not given consent to those acts?

(11) What criteria should be used to assess whether temporary acts of reproduction have ' independent economic significance' (see Article 5(1) of Directive 2001/29) if the other conditions laid down in the provision are satisfied?

(12) Can the user's efficiency gains from temporary acts of reproduction be taken into account in assessing whether the acts have ' independent economic significance' (see Article 5(1) of Directive 2001/29)?

(13) Can the scanning by a commercial business of entire newspaper articles, subsequent processing of the reproduction, and the storing and possible printing out of part of the reproduction, consisting of one or more text extracts of 11 words, without the rightholder's consent be regarded as constituting ' certain special cases which do not conflict with a normal exploitation' of the newspaper articles and ' not unreasonably [prejudicing] the legitimate interests of the rightholder' (see Article 5(5) of Directive 2001/29)?"

The questions referred for a preliminary ruling

Preliminary observation

27 It should be noted as a preliminary point that the need for uniform application of Community law and the principle of equality require that where provisions of Community law make no express reference to the law of the Member States for the purpose of determining their meaning and scope, as is the case with art.2 of Directive 2001/29 , they must normally be given an autonomous and uniform interpretation throughout the Community (see, in particular, Stichting ter Exploitatie van Naburige Rechten (SENA) v Nederlandse Omroep Stichting (NOS) C-245/00 [2003] E.C.R. I-1251 at [23], and C-306/05 SGAE [2006] E.C.R. I-11519 at [31]).

28 Those considerations are of particular importance with respect to Directive 2001/29 , in the light of the wording of recitals 6 and 21 in the preamble to that Directive.

29 Consequently, the Austrian Government cannot successfully contend that it is for the Member States to provide the definition of the concept of " reproduction in part" in art.2 of Directive 2001/29 (see, to that effect, with respect to the concept of " public" as referred to in art.3 of the same Directive, Sociedad General de Autores y Editores de Espana (SGAE) v Rafael Hoteles SL (C-306/05) E.C.R. I-11519 at [31]).

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The first question

30 By its first question, the national court asks, essentially, whether the concept of " reproduction in part" within the meaning of Directive 2001/29 is to be interpreted as meaning that it encompasses the storing and subsequent printing out on paper of a text extract consisting of 11 words.

31 It is clear that Directive 2001/29 does not define the concept of either " reproduction" or " reproduction in part" .

32 In those circumstances, those concepts must be defined having regard to the wording and context of art.2 of Directive 2001/29 , where the reference to them is to be found and in the light of both the overall objectives of that Directive and international law (see, to that effect, SGAE , [34] and [35] and case-law cited).

33 Article 2(a) of Directive 2001/29 provides that authors have the exclusive right to authorise or prohibit reproduction, in whole or in part, of their works. It follows that protection of the author's right to authorise or prohibit reproduction is intended to

cover " work" .

34 It is, moreover, apparent from the general scheme of the Berne Convention , in particular arts 2(5) and (8) , that the protection of certain subject-matters as artistic or literary works presupposes that they are intellectual creations.

35 Similarly, under arts 1(3) of Directive 91/250 , 3(1) of Directive 96/9 and 6 of Directive 2006/116 , works such as computer programs, databases or photographs are protected by copyright only if they are original in the sense that they are their author's own intellectual creation.

36 In establishing a harmonised legal framework for copyright, Directive 2001/29 is based on the same principle, as evidenced by recitals 4, 9– 11 and 20 in the preamble thereto.

37 In those circumstances, copyright within the meaning of art.2(a) of Directive 2001/29 is liable to apply only in relation to a subject-matter which is original in the sense that it is its author's own intellectual creation.

38 As regards the parts of a work, it should be borne in mind that there is nothing in Directive 2001/29 or any other relevant Directive indicating that those parts are to be treated any differently from the work as a whole. It follows that they are protected by copyright since, as such, they share the originality of the whole work.

39 In the light of the considerations referred to in [37] of this judgment, the various parts of a work thus enjoy protection under art.2(a) of Directive 2001/29 , provided that they contain elements which are the expression of the intellectual creation of the author of the work.

40 With respect to the scope of such protection of a work, it follows from recitals 9– 11 in the preamble to Directive 2001/29 that its main objective is to introduce a high level of protection, in particular for authors to enable them to receive an appropriate reward for the use of their works, including at the time of reproduction of those works, in order to be able to pursue their creative and artistic work.

41 Similarly, recital 21 in the preamble to Directive 2001/29 requires that the acts covered by the right of reproduction be construed broadly.

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42 That requirement of a broad definition of those acts is, moreover, also to be found in the wording of art.2 of that Directive, which uses expressions such as " direct or indirect" , " temporary or permanent" , " by any means" and " in any form" .

43 Consequently, the protection conferred by art.2 of Directive 2001/29 must be given a broad interpretation.

44 As regards newspaper articles, their author's own intellectual creation, referred to in [37] of this judgment, is evidenced clearly from the form, the manner in which the subject is presented and the linguistic expression. In the main proceedings, moreover, it is common ground that newspaper articles, as such, are literary works covered by Directive 2001/29 .

45 Regarding the elements of such works covered by the protection, it should be observed that they consist of words which, considered in isolation, are not as such an intellectual creation of the author who employs them. It is only through the choice, sequence and combination of those words that the author may express his creativity in an original manner and achieve a result which is an intellectual creation.

46 Words as such do not, therefore, constitute elements covered by the protection.

47 That being so, given the requirement of a broad interpretation of the scope of the protection conferred by art.2 of Directive 2001/29 , the possibility may not be ruled out that certain isolated sentences, or even certain parts of sentences in the text in question, may be suitable for conveying to the reader the originality of a publication such as a newspaper article, by communicating to that reader an element which is, in

itself, the expression of the intellectual creation of the author of that article. Such sentences or parts of sentences are, therefore, liable to come within the scope of the protection provided for in art.2(a) of that Directive.

48 In the light of those considerations, the reproduction of an extract of a protected work which, like those at issue in the main proceedings, comprises 11 consecutive words thereof, is such as to constitute reproduction in part within the meaning of art.2 of Directive 2001/29 , if that extract contains an element of the work which, as such, expresses the author's own intellectual creation; it is for the national court to make this determination.

49 It must be remembered also that the data capture process used by Infopaq allows for the reproduction of multiple extracts of protected works. That process reproduces an extract of 11 words each time a search word appears in the relevant work and, moreover, often operates using a number of search words because some clients ask Infopaq to draw up summaries based on a number of criteria.

50 In so doing, that process increases the likelihood that Infopaq will make reproductions in part within the meaning of art.2(a) of Directive 2001/29 because the cumulative effect of those extracts may lead to the reconstitution of lengthy fragments which are liable to reflect the originality of the work in question, with the result that they contain a number of elements which are such as to express the intellectual creation of the author of that work.

51 In the light of the foregoing, the answer to the first question is that an act occurring during a data capture process, which consists of storing an extract of a protected work comprising 11 words and printing out that extract, is such as to *273* come within the concept of reproduction in part within the meaning of art.2 of Directive 2001/29 , if the elements thus reproduced are the expression of the intellectual creation of their author; it is for the national court to make this determination.

Questions 2 to 12

52 If the acts at issue in the main proceedings do come within the concept of reproduction in part of a protected work within the meaning of art.2 of Directive 2001/29 , arts 2 and 5 of that Directive make it clear that such reproduction may not be made without the consent of the relevant author, unless that reproduction satisfies the conditions laid down in art.5 of that Directive.

53 In that context, by questions 2– 12, the referring court asks, essentially, whether acts of reproduction occurring during a data capture process, such as that at issue in the main proceedings, satisfy the conditions laid down in art.5(1) of Directive 2001/29 and, therefore, whether that process may be carried out without the consent of the relevant rightholders, since it is used to draw up summaries of newspaper articles and consists of scanning those articles in their entirety to produce a digital file, storing an extract of 11 words and then printing out that extract.

54 Under art.5(1) of Directive 2001/29 , an act of reproduction may be exempted from the reproduction right provided for in art.2 thereof only if it fulfils five conditions, that is, where:

— the act is temporary;

— it is transient or incidental;

— it is an integral and essential part of a technological process;

— the sole purpose of that process is to enable a transmission in a network between third parties by an intermediary of a lawful use of a work or protected subject-matter; and

— the act has no independent economic significance.

55 It must be borne in mind that those conditions are cumulative in the sense that non-compliance with any one of them will lead to the act of reproduction not being exempted pursuant to art.5(1) of Directive 2001/29 from the reproduction right provided for in art.2 of that Directive.

56 For the interpretation of each of those conditions in turn, it should be borne in mind that, according to settled case-law, the provisions of a Directive which derogate from a general principle established by that Directive must be interpreted strictly (Criminal Proceedings against Kapper (C-476/01) [2004] E.C.R. I-5205 at [72], and Commission of the European Communities v Spain (C-36/05) [2006] E.C.R. I-10313 at [31]).

57 This holds true for the exemption provided for in art.5(1) of Directive 2001/29 , which is a derogation from the general principle established by that Directive, namely the requirement of authorisation from the rightholder for any reproduction of a protected work.

58 This is all the more so given that the exemption must be interpreted in the light of art.5(5) of Directive 2001/29 , under which that exemption is to be applied only *274 in certain special cases which do not conflict with a normal exploitation of the work or other subject-matter and do not unreasonably prejudice the legitimate interests of the rightholder.

59 In accordance with recitals 4, 6 and 21 in the preamble to Directive 2001/29 , the conditions laid down in art.5(1) thereof must also be interpreted in the light of the need for legal certainty for authors with regard to the protection of their works.

60 In the present case, Infopaq claims, first, that the acts of reproduction at issue in the main proceedings fulfil the condition relating to transient nature, since they are deleted at the end of the electronic search process.

61 The Court finds, in the light of the third condition referred to in [54] of this judgment, that a temporary and transient act of reproduction is intended to enable the completion of a technological process of which it forms an integral and essential part. In those circumstances, given the principles set out in [57] and [58] of this judgment, those acts of reproduction must not exceed what is necessary for the proper completion of that technological process.

62 Legal certainty for rightholders further requires that the storage and deletion of the reproduction not be dependent on discretionary human intervention, particularly by the user of protected works. There is no guarantee that in such cases the person concerned will actually delete the reproduction created or, in any event, that he will delete it once its existence is no longer justified by its function of enabling the completion of a technological process.

63 This finding is supported by recital 33 in the preamble to Directive 2001/29 which lists, as examples of the characteristics of the acts referred to in art.5(1) thereof, acts which enable browsing as well as acts of caching to take place, including those which enable transmission systems to function efficiently. Such acts are, by definition, created and deleted automatically and without human intervention.

64 In the light of the foregoing, the Court finds that an act can be held to be " transient" within the meaning of the second condition laid down in art.5(1) of Directive 2001/29 only if its duration is limited to what is necessary for the proper completion of the technological process in question, it being understood that that process must be automated so that it deletes that act automatically, without human intervention, once its function of enabling the completion of such a process has come to an end. 65 In the main proceedings, the possibility cannot be ruled out at the outset that in the first two acts of reproduction at issue in those proceedings, namely the creation of TIFF files and text files resulting from the conversion of TIFF files, may be held to be transient as long as they are deleted automatically from the computer memory.

66 Regarding the third act of reproduction, namely the storing of a text extract of 11 words, the evidence submitted to the Court does not permit an assessment of whether

the technological process is automated with the result that that file is deleted promptly and without human intervention from the computer memory. It is for the national court to ascertain whether the deletion of that file is dependent on the will of the user of the reproduction and whether there is a risk that the *275 file might remain stored once the function of enabling completion of the technological process has come to an end.

67 It is common ground, however, that, by the last act of reproduction in the data capture process, Infopaq is making a reproduction outside the sphere of computer technology. It is printing out files containing the extracts of 11 words and thus reproduces those extracts on a paper medium.

68 Once the reproduction has been affixed onto such a medium, it disappears only when the paper itself is destroyed.

69 Moreover, since the data capture process is apparently not likely itself to destroy that medium, the deletion of that reproduction is entirely dependent on the will of the user of that process. It is not at all certain that he will want to dispose of the reproduction, which means that there is a risk that the reproduction will remain in existence for a longer period, according to the user's needs.

70 In those circumstances, the Court finds that the last act in the data capture process at issue in the main proceedings, during which Infopaq prints out the extracts of 11 words, is not a transient act within the meaning of art.5(1) of Directive 2001/29 .

71 There is, moreover, nothing in the case-file submitted to the Court— and nor has it been pleaded— that such an act is liable to be incidental in nature.

72 It follows from the foregoing that that act does not fulfil the second condition laid down in art.5(1) of Directive 2001/29 ; accordingly, such an act cannot be exempted from the reproduction right provided for in art.2 thereof.

73 It follows that the data capture process at issue in the main proceedings cannot be carried out without the consent of the rightholders and, consequently, it is not necessary to consider whether the four acts which make up that process fulfil the other conditions laid down in art.5(1) .

74 Consequently, the answer to questions 2– 12 is that the act of printing out an extract of 11 words, during a data capture process such as that at issue in the main proceedings, does not fulfil the condition of being transient in nature as required by art.5(1) of Directive 2001/29 and, therefore, that process cannot be carried out without the consent of the relevant rightholders.

Question 13

75 In the light of the answer given to questions 2– 12, it is not necessary to answer question 13.

Costs

76 Since these proceedings are, for the parties to the main proceedings, a step in the action pending before the national court, the decision on costs is a matter for that court. Costs incurred in submitting observations to the Court, other than the costs of those parties, are not recoverable.

Order

On those grounds, the Court (Fourth Chamber) hereby rules:

1. An act occurring during a data capture process, which consists of storing an extract of a protected work comprising 11 words and printing out that extract, is *276 such as to come within the concept of reproduction in part within the meaning of art.2 of Directive 2001/29 of the European Parliament and of the Council of May 22, 2001 on the harmonisation of certain aspects of copyright and related rights in the information society , if the elements thus reproduced are the expression of the intellectual creation

of their author; it is for the national court to make this determination.

2. The act of printing out an extract of 11 words, during a data capture process such as that at issue in the main proceedings, does not fulfil the condition of being transient in nature as required by art.5(1) of Directive 2001/29 and, therefore, that process cannot be carried out without the consent of the relevant rightholders.

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1. Paragraph numbers in this judgment are as assigned by the court.
2. Language of the case: Danish.

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European Union Cases

Court of Justice

Opinion of Advocate General Trstenjak delivered on 12 February 2009. Infopaq International A/S v Danske Dagblades Forening. Reference for a preliminary ruling: Højesteret - Denmark. Copyright - Information society - Directive 2001/29/EC - Articles 2 and 5 - Literary and artistic works - Concept of 'reproduction' - Reproduction 'in part' - Reproduction of short extracts of literary works - Newspaper articles - Temporary and transient reproductions - Technological process consisting in scanning of articles followed by conversion into text file, electronic processing of the reproduction, storage of part of that reproduction and printing out. Case C-5/08.

European Court Reports 2009 page I-06569

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Text

Directive 2001/29

Articles 2 et 5

Harmonisation de certains aspects du droit d'auteur et des droits voisins dans la société de l'information

Droit de reproduction

Exceptions et limitations

Actes de reproduction provisoires

Veille et analyse des medias

Extraits d'articles de journaux composés de onze mots

OPINION

I - Introduction

1. This case raises the sensitive issue of the balance between the protection of copyright and technological development in the information society. The protection of copyright should not on the one hand prevent the normal functioning and the development of new technologies, but on the other hand it is necessary to ensure an adequate protection of copyright in the information society. Technological development allows in fact faster and easier reproduction of works, for which reason protection of copyright must adapt to this technological development.

2. The questions referred to the Court in this case concern first of all whether the storing and printing of extracts from newspaper articles, where the extract is composed of the search word and the five preceding and five subsequent words, in the same order as in the newspaper article, can be regarded as reproduction within the meaning of Article 2 of Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society (2) ('Directive 2001/29'). The questions also concern whether the production of those extracts, which covers the scanning of newspaper articles leading to the creation of an image file and the conversion of this image file into a text file, and the storing of a extract consisting of 11 words, are permitted on the basis that they are reproduction activities which fulfil the conditions of Article 5(1) of Directive 2001/29. By its questions, the national court wishes to know, lastly, whether the acts of reproduction in this case fulfil the conditions of Article 5(5) of Directive 2001/29.

3. Those questions have been raised in the context of proceedings between Infopaq International A/S ('Infopaq') and the professional association of Danish daily newspaper publishers, in which Infopaq requested the national court to find that for the production of extracts from newspaper articles which

are composed of search words and the five preceding and five subsequent words it does not require authorisation from the holders of copyright over the newspaper articles.

II - Legal framework

4. Recitals 4, 5, 9, 10, 11, 21, 22, 31 and 33 in the preamble to Directive 2001/20 provide:

'(4) A harmonised legal framework on copyright and related rights, through increased legal certainty and while providing for a high level of protection of intellectual property, will foster substantial investment in creativity and innovation... .

(5) Technological development has multiplied and diversified the vectors for creation, production and exploitation. While no new concepts for the protection of intellectual property are needed, the current law on copyright and related rights should be adapted and supplemented to respond adequately to economic realities such as new forms of exploitation.

...

(9) Any harmonisation of copyright and related rights must take as a basis a high level of protection, since such rights are crucial to intellectual creation. Their protection helps to ensure the maintenance and development of creativity in the interests of authors, performers, producers, consumers, culture, industry and the public at large. Intellectual property has therefore been recognised as an integral part of property.

(10) If authors or performers are to continue their creative and artistic work, they have to receive an appropriate reward for the use of their work, as must producers in order to be able to finance this work. ... Adequate legal protection of intellectual property rights is necessary in order to guarantee the availability of such a reward and provide the opportunity for satisfactory returns on this investment.

(11) A rigorous, effective system for the protection of copyright and related rights is one of the main ways of ensuring that European cultural creativity and production receive the necessary resources and of safeguarding the independence and dignity of artistic creators and performers.

...

(21) This Directive should define the scope of the acts covered by the reproduction right with regard to the different beneficiaries. This should be done in conformity with the acquis communautaire. A broad definition of these acts is needed to ensure legal certainty within the internal market.

(22) The objective of proper support for the dissemination of culture must not be achieved by sacrificing strict protection of rights or by tolerating illegal forms of distribution of counterfeited or pirated works.

...

(31) A fair balance of rights and interests between the different categories of rightholders, as well as between the different categories of rightholders and users of protected subject-matter must be safeguarded. The existing exceptions and limitations to the rights as set out by the Member States have to be reassessed in the light of the new electronic environment. Existing differences in the exceptions and limitations to certain restricted acts have direct negative effects on the functioning of the internal market of copyright and related rights. Such differences could well become more pronounced in view of the further development of transborder exploitation of works and cross-border activities. In order to ensure the proper functioning of the internal market, such exceptions and limitations should be defined more harmoniously. The degree of their harmonisation should be based on their impact on the smooth functioning of the internal market.

...

(33) The exclusive right of reproduction should be subject to an exception to allow certain acts of temporary reproduction, which are transient or incidental reproductions, forming an integral and essential part of a technological process and carried out for the sole purpose of enabling either efficient transmission in a network between third parties by an intermediary, or a lawful use of a work or other subject-matter to be made. The acts of reproduction concerned should have no separate economic value on their own. To the extent that they meet these conditions, this exception should include acts which enable browsing as well as acts of caching to take place, including those which

enable transmission systems to function efficiently, provided that the intermediary does not modify the information and does not interfere with the lawful use of technology, widely recognised and used by industry, to obtain data on the use of the information. A use should be considered lawful where it is authorised by the rightholder or not restricted by law.'

5. Article 2 of Directive 2001/29, entitled 'Reproduction right', provides:

'Member States shall provide for the exclusive right to authorise or prohibit direct or indirect, temporary or permanent reproduction by any means and in any form, in whole or in part:

(a) for authors, of their works;

...'

6. Article 5 of Directive 2001/29, entitled 'Exceptions and limitations', provides:

'1. Temporary acts of reproduction referred to in Article 2, which are transient or incidental [and] an integral and essential part of a technological process and whose sole purpose is to enable:

(3)

(a) a transmission in a network between third parties by an intermediary, or

(b) a lawful use

of a work or other subject-matter to be made, and which have no independent economic significance, shall be exempted from the reproduction right provided for in Article 2.

...

3. Member States may provide for exceptions or limitations to the rights provided for in Articles 2 and 3 in the following cases:

...

(c) reproduction by the press, communication to the public or making available of published articles on current economic, political or religious topics or of broadcast works or other subject-matter of the same character, in cases where such use is not expressly reserved, and as long as the source, including the author's name, is indicated, or use of works or other subject-matter in connection with the reporting of current events, to the extent justified by the informatory purpose and as long as the source, including the author's name, is indicated, unless this turns out to be impossible;

(d) quotations for purposes such as criticism or review, provided that they relate to a work or other subject-matter which has already been lawfully made available to the public, that, unless this turns out to be impossible, the source, including the author's name, is indicated, and that their use is in accordance with fair practice, and to the extent required by the specific purpose;

...

(o) use in certain other cases of minor importance where exceptions or limitations already exist under national law, provided that they only concern analogue uses and do not affect the free circulation of goods and services within the Community, without prejudice to the other exceptions and limitations contained in this Article.

...

5. The exceptions and limitations provided for in paragraphs 1, 2, 3 and 4 shall only be applied in certain special cases which do not conflict with a normal exploitation of the work or other subject-matter and do not unreasonably prejudice the legitimate interests of the rightholder.'

7. Article 2 of Directive 2001/29 was transposed into Danish law by Article 2 of the Ophavsretslov (Law on copyright) (4) which provides:

'1. Subject to the limitations laid down in this law, copyright shall entail the exclusive right to dispose of the work by reproducing it and by making it accessible to the public, whether in the original or modified form, in translation, in adaptation into another literary or artistic form or into other technology.

2. Any direct or indirect, temporary or permanent reproduction, in whole or in part, by any means and in any form shall be considered as reproduction. The recording of the work on devices which can reproduce it, shall also be considered as a reproduction.

...'

8. Article 5(1) of Directive 2001/29 was transposed into Danish law by Article 11bis(1) of the Ophavsretslov, which provides:

'It shall be permitted to make temporary copies which

(i) are transient or incidental;

(ii) are an integral and essential part of a technological process;

(iii) have as their sole purpose to enable a transmission of a work in a network between third parties by an intermediary, or a lawful use of a work; and

(iv) have no independent economic significance.'

III - Facts, main proceedings and questions referred for a preliminary ruling

9. Infopaq operates a media monitoring and analysis business. The media monitoring consists of drawing up summaries (5) of selected articles from Danish daily newspapers and other periodicals. The articles are selected on the basis of subject criteria agreed with Infopaq's customers; the summaries are then sent to customers by email. On request, Infopaq also sends hardcopy clippings of newspaper articles to its customers.

10. The articles are selected on the basis of a 'data capture process' which has five stages.

11. In the first stage, basic information in respect of each publication is registered manually by Infopaq employees in an electronic database.

12. In the second stage, they scan the publications. Before the scanning, the spine of the publication is cut off so that all the pages are loose sheets; the selected extract is then scanned. On the basis of the scanning, an image file (6) is created for each page of the publication. The image file is then transferred to an Optical Character Recognition server. (7)

13. In the third stage, the Optical Character Recognition server converts the image file into a text file. To be more precise, the image of each letter is converted into an 'ASCII code', (8) which allows the computer to recognise each individual letter. Thus, for example, the image of the letters TDC is converted into something the computer can recognise as the letters TDC. The image of a word is therefore converted into an actual word which is saved as a text file and which can be understood by any text processing programme. The process using the Optical Character Recognition server is completed by deletion of the image file.

14. In the fourth stage, the text file is processed to find predefined search words. Each time the search word appears in the text, it is saved in a file giving the title of the publication, the section and the page in which the word in question is found. In addition, the file indicates a value, expressed as a percentage between 0 and 100, which indicates where the search word is to be found in the text. To further simplify finding the word when the article is later read, the five words preceding and following the word are indicated. This stage concludes by deletion of the text file.

15. During the fifth and sixth stages of the process, a document is printed out for each page of the newspaper in which the search word appears; this document contains the search word and the five words which precede and follow it. The national court gives an example of such a document:

'4 November 2005 - Dagbladet Arbejderen, page 3:

TDC: 73% forthcoming sale of the telecommunications group TDC, which is expected to be bought.'

16. The Danske Dagblades Forening ('DDF') is the professional association of Danish daily newspapers whose function is to assist its members with any questions concerning copyright. In 2005, DDF became aware that Infopaq was producing extracts from press articles, without authorisation from the copyright holders - it informed Infopaq of this.

17. Infopaq disputed the claim that it required authorisation from the copyright holders to carry out its

business and consequently brought an action against DDF before the Østre Landsret to obtain a declaration that it had the right to apply the 'data capture process' without the consent of DDF or its members. The Østre Landsret dismissed the action as unfounded, for which reason Infopaq lodged an appeal before the referring court (Højesteret).

18. In its order, t he national court states that it is not disputed in this case that consent from the copyright holders is not necessary in so far as monitoring of the written press and the drawing up of summaries of newspaper articles is involved, if a person physically reads each publication, if the articles are selected manually on the basis of predefined search words and if, on that basis, a document is produced manually, indicating the search word in the article in question and the position of that article in the publication. Nor is it disputed that, in itself, the drawing up of summaries does not require the consent of copyright holders.

19. It is thus not disputed in this case that the 'data capture process' involves two acts of reproduction, namely:

(1) the scanning of newspaper articles on the basis of which an image file is created and (2) the conversion of the image file into a text file. The national court states moreover that this process also involves the continual reproduction of the articles thus processed as (3) the search word is stored with the five words which precede and follow it and (4) those 11 words are then printed out. The national court makes clear that the parties in the main proceedings disagree as to whether the acts referred to in (3) and (4) constitute reproduction within the meaning of Article 2 of Directive 2001/29.

20. Under those circumstances, the national court, by order of 21 December 2007, stayed the proceedings and referred the following questions to the Court of Justice for a preliminary ruling:

(9)

'(1) Can the storing and subsequent printing out of a text extract from an article in a daily newspaper, consisting of a search word and the five preceding and five subsequent words, be regarded as acts of reproduction (10) which are protected by Article 2 of Directive 2001/29/EC of the European Parliament and of the Council on the harmonisation of certain aspects of copyright and related rights in the information society (OJ 2001 L 167, p. 0010)? (11)

(2) Is the context in which temporary acts of reproduction take place relevant to whether they can be regarded as transient (see Article 5(1) of Directive 2001/29)?

(3) Can a temporary act of reproduction be regarded as transient where the reproduction is processed, for example, by the creation of a text file on the basis of an image file or by a search for text strings on the basis of a text file?

(4) Can a temporary act of reproduction be regarded as transient where part of the reproduction, consisting of one or more text extracts of 11 words, is stored?

(5) Can a temporary act of reproduction be regarded as transient where part of the reproduction, consisting of one or more text extracts of 11 words, is printed out?

(6) Is the stage of the technological process at which temporary acts of reproduction take place relevant to whether they constitute an integral and essential part of a technological process (see Article 5(1) of Directive 2001/29)?

(7) Can temporary acts of reproduction be an integral and essential part of a technological process if they consist of manual scanning of entire newspaper articles whereby the latter are transformed from a printed medium into a digital medium?

(8) Can temporary acts of reproduction constitute an integral and essential part of a technological process where they consist of printing out part of the reproduction, comprising one or more text extracts of 11 words?

(9) Does lawful use (see Article 5(1) of Directive 2001/29) include any form of use which does not require the rightholder's consent?

(10) Does lawful use (see Article 5(1) of Directive 2001/29) include the scanning by a commercial business of entire newspaper articles, subsequent processing of the reproduction, and the storing and possible printing out of part of the reproduction, consisting of one or more text extracts of 11 words,

for use in the business's summary writing, even where the rightholder has not given consent to those acts?

(11) What criteria should be used to assess whether temporary acts of reproduction have independent economic significance (see Article 5(1) of Directive 2001/19) if the other conditions laid down in the provision are satisfied?

(12) Can the user's efficiency gains from temporary acts of reproduction be taken into account in assessing whether the acts have independent economic significance (see Article 5(1) of Directive 2001/29)?

(13) Can the scanning by a commercial business of entire newspaper articles, subsequent processing of the reproduction, and the storing and possible printing out of part of the reproduction, consisting of one or more text extracts of 11 words, without the rightholder's consent, be regarded as constituting certain special cases which do not conflict with a normal exploitation of the newspaper articles and not unreasonably [prejudicing] the legitimate interests of the rightholder (see Article 5(5) of Directive 2001/29)?'

IV - Procedure before the Court

21. The order for reference was received at the Court on 4 January 2008. In the context of the written procedure, Infopaq, DDF and the Commission submitted observations. During the hearing on 20 November 2008, Infopaq, DDF and the Commission made oral statements and replied to the Court's questions.

V - Arguments of the parties

A - First question referred

22. Infopaq considers that the storing and subsequent printing of an extract from the text of a newspaper article which contains the search word and the five words which precede and follow it do not constitute partial acts of reproduction within the meaning of Article 2 of Directive 2001/29. Infopaq points out that Directive 2001/29 does not lay down a minimum threshold for the number of words below which there is no longer reproduction in part, even though such a de minimis threshold must in any case exist. Infopaq considers that the 11 words which are stored and printed do not go beyond the particular minimum number which is the prerequisite for the existence of a reproduction in part.

23. The Commission and DDF on the contrary take the view that the storing and subsequent printing of an extract from the text of a newspaper article which contains the search word and the five words which precede and which follow it are acts of reproduction which are protected by Article 2 of Directive 2001/29.

24. The Commission considers that the storing and printing of an extract from an article are forms of reproduction. It states that it is apparent from Article 2 of Directive 2001/29 that the exclusive reproduction right of authors covers also reproduction in part and that an extract of an article consisting of 11 words constitutes reproduction in part within the meaning of that article.

25. DDF states, like the Commission, that the storing and printing of an extract from an article consisting of 11 words constitutes reproduction in part within the meaning of Article 2 of Directive 2001/29. DDF points out that when the search words appear a number of times in an article, large parts of that article will be reproduced; to illustrate this point it submits an article in which two search words with the five words which precede and follow them are underlined. It disagrees with the position of the Austrian Government, (12) that the part of the work of the author which is reproduced must in itself fulfil the conditions in that regard in order that it can be defined as a work. It considers that the fact that the meaning and the conditions for the existence of a work are not harmonised in Directive 2001/29 does not prohibit the Court from interpreting the meaning of reproduction in part of a work. The assessment of the question of whether in this case there is reproduction in part of a work must take place independently of the conditions laid down by national law for the existence of a work.

26. The Austrian Government takes the view that Article 2 of Directive 2001/29 certainly gives authors the exclusive right of reproduction in part of the work, but it does not define the meaning of work nor give guidelines as to the specific circumstances under which such a work is protected. In so far as the conditions governing the protection of works are not harmonised by Community law, it is necessary according to the Austrian Government to assess them on the basis of national law. Taking account of that fact, the Austrian Government points out that the part of the work which is reproduced must fulfil

in itself the conditions required for it to be defined as a work.

B - Second to twelfth questions referred

27. Infopaq and the Austrian Government consider that the process of production of extracts from articles must be considered as a temporary act of reproduction within the meaning of Article 5(1) of Directive 2001/29; this process is permissible as it fulfils all of the conditions laid down by that article: first, because a transient act is involved, secondly, because that act is an integral and essential part of the technological process, thirdly, because its sole purpose is to allow the lawful use of the work or of the subject-matter of related rights and, fourthly, because that act has no independent economic significance.

28. Infopaq states with regard to the first condition, ('transient' act) that Article 5(1) of Directive 2001/29 is not limited only to temporary acts of reproduction in the form of browsing and the making of 'cache' copies. The condition that the act must be 'transient' only concerns the duration of the temporary act of reproduction and acts of reproduction the duration of which is less than or equal to 30 seconds must be considered as 'transient'.

29. Concerning the second condition ('integral and essential part of a technological process'), Infopaq considers that it can clearly be seen from the meaning of integral part that the stage of the technological process at which the temporary act of reproduction takes place is irrelevant.

30. Concerning the third condition ('lawful use'), Infopaq states that it does not follow from Article 5(1), nor from recital 33 in the preamble to Directive 2001/29, that 'lawful use' means only use of the Internet in the form of browsing and the making of 'cache' copies. 'Lawful use' means any use of a work in respect of which the consent of the copyright holder is not necessary. Moreover it is not important as regards 'lawful use' to know who uses the work; this can be the end-user or any other person. The decisive factor for the reply to the question of whether there is 'lawful use' is whether in the context of the proceedings in question an original of the publication is being used which was obtained lawfully.

31. Concerning the fourth condition ('independent economic significance'), Infopaq states that the question of independent economic significance must be considered from the point of view of the author. Moreover, as regards that condition, it is sufficient to find whether the temporary act of reproduction has an independent economic significance and not whether the whole technological process has such a significance. Infopaq points out that the final purpose of the technological process which it uses is the production of summaries which is in itself lawful and does not infringe the copyright of the publications; the temporary acts of reproduction in the form of image files and text files do not, in themselves, have independent economic significance for the rightholders. If the 'independent economic significance' were contingent on the copyright holder's not receiving remuneration, there would, according to Infopaq, be a contradiction with the purpose of Article 5(1) of Directive 2001/29.

32. The Austrian Government, like Infopaq, believes that the conditions of Article 5(1) of Directive 2001/29 are fulfilled and states that these conditions are not limited to intermediate copies which are stored during transmission between the different programmes (software) on the Internet. In its opinion, the creation of an image file and its conversion into a text file are 'transient' acts because these reproductions are of short duration; these acts are at the same time also an 'integral and essential part of a technological process'. The Austrian Government also considers that the use of the works is 'lawful' because the extracts from newspaper articles do not fulfil the conditions for copyright protection. The process used by Infopaq has the sole purpose of producing extracts from newspaper articles on the basis of search words, for which reason they do not, according to the Austrian Government, have 'independent economic significance'.

33. DDF and the Commission consider on the contrary that the conditions of Article 5(1) of Directive 2001/29 are not fulfilled.

34. DDF states that Article 5(1) of Directive 2001/29 must be interpreted in the light of the purpose of that Directive and refers in this respect to recitals 9 and 10 in the preamble to the Directive, from which it is apparent that its purpose is to ensure a high level of protection for authors who must receive appropriate reward for the use of their works. The provisions of the Directive which ensure that protection must be interpreted widely, whilst the provisions which provide for exceptions to that protection must be interpreted strictly.

35. DDF considers concerning the first condition ('transient' act), that the acts of reproduction are not transient because the reproductions are lasting and are not deleted, while the definition of 'transient' means that the reproductions are of short duration.

36. Concerning the second condition ('integral and essential part of a technological process'), DDF states that the purpose of that condition is to exclude reproductions which are automatically produced in the context of such a process. In the present case, the reproductions are not however produced automatically because the scanning of the articles and conversion of an image file into a text file are only a transient stage in the technical processing of these texts. This is therefore not an intermediate technological process. Moreover, the reproduction of 11 words is not an 'integral and essential part of a technological process' because those 11 words are printed out.

37. Concerning the third condition ('lawful use'), DDF is of the view that use which would otherwise be unlawful cannot become lawful under Article 5(1) of Directive 2001/29. According to DDF, the present case concerns an unlawful use.

38. Concerning the fourth condition ('independent economic significance'), DDF points out that this condition concerns the fact that the use of the reproduction in the present case cannot have independent economic significance either for the user (namely Infopaq) or for the rightholder. DDF states that the reproductions have independent economic significance for Infopaq because it would require DKK 2 to 4 million if the reproduction work was manual rather than automated. The reproductions also have independent economic significance for DDF's members because they could receive increased remuneration through the granting of licences for the reproduction of their works.

39. The Commission likewise considers that in the present case the conditions of Article 5(1) of Directive 2001/29 are not fulfilled.

40. Concerning the first condition ('transient' act), the Commission is of the view that temporary acts of reproduction are transient if their duration is short, for example a reproduction made during browsing on the Internet. The Commission considers that it is necessary, when deciding whether acts of reproduction are transient, to take into account the technological process in the context of which the reproduction takes place and in particular whether a lasting reproduction has been made or not during that process. In the context of the process used by Infopaq, a lasting reproduction consisting of the 11 printed words has been made and consequently the fact that the image and text files created are deleted when the 11 words are printed does not mean that the act of reproduction is transient. The Commission further points out that the fact that the part of the reproduction which contains one or several extracts of 11 words is printed is irrelevant in assessing whether the temporary act of reproduction can be considered as transient.

41. Concerning the second condition ('integral and essential part of a technological process'), the Commission believes that the stage of the technological process during which the temporary acts of reproduction are made is irrelevant to whether they must be considered as an 'integral and essential part of a technological process'. The Commission points out that Infopaq physically checks the reproduction several times during the process and that it may have copies stored in paper or electronic form for a long time after having sent the extracts to its customers. The electronic copies moreover allow use which goes beyond simple electronic transmission in a network; in the present case, the electronic copies are in fact the basis for the creation of the text files. The Commission also considers that those temporary acts of reproduction cannot be an 'integral and essential part of a technological process' if they cover manual scanning of entire newspaper articles whereby the latter are converted from a printed medium into a digital medium as this procedure goes well beyond what is necessary to produce an extract. The Commission is also of the view that printing of an extract is not a temporary act of reproduction and therefore cannot be an 'integral and essential part of a technological process'.

42. Concerning the third condition ('lawful use'), the Commission is of the view that 'lawful use' does not only cover all types of use which do not require the copyright holder's consent but on the contrary also types of use which the rightholder authorises or which are not covered by the exclusive right of the copyright holder or fall within the exceptions to the exclusive right. It also states that the process for the production of extracts used by Infopaq is not a lawful use of the works because it involves modification of the work with the objective of creating a short text extract.

43. Concerning the fourth condition ('independent economic significance'), the Commission points out that the criteria for assessing that condition stem from recital 33 in the preamble to Directive 2001/29

and that pursuant thereto acts of reproduction do not have 'independent economic significance' if they do not modify the information and if they do not interfere with lawful use of the technology which is widely recognised and used by industry to obtain data on the use of the information. The Commission also considers that the process used by Infopaq allows it to increase its productivity because such production of extracts is much quicker and cheaper; according to the Commission it is necessary to take ac count of this fact when assessing whether the acts have 'independent economic significance'.

C - Thirteenth question referred

44. Infopaq considers concerning the thirteenth question that Article 5(5) of Directive 2001/29 does not lay down independent conditions which could be fulfilled in addition to the conditions of Article 5(1) of that directive; if the conditions of Article 5(1) are fulfilled, it is not necessary to examine the conditions of Article 5(5) of the Directive.

45. The Austrian Government considers that the conditions of Article 5(5) of Directive 2001/29 are fulfilled, but it does not provide reasons for its position.

46. DDF considers concerning the thirteenth question that the acts of reproduction do not fulfil the conditions of Article 5(5) of Directive 2001/29. Infopaq uses those acts of reproduction to reduce its costs vis-à-vis its competitors. According to DDF, acts of reproduction are moreover so extensive and significant that they cannot be regarded as normal exploitation of a work; they unreasonably prejudice the legitimate interests of copyright holders who could obtain remuneration by granting licences authorising such a use.

47. The Commission considers that in principle it is unnecessary to reply to the thirteenth question because Infopaq's activities do not fall within the exception in Article 5(1) of Directive 2001/29, but it nevertheless offers a reply to that question. It states that Article 5(5), known as the 'three-step test', is comparable to Article 13 of the TRIPS Agreement. The Commission points out that in principle the 'three-step test' of Article 5(5) must be applied separately from the assessment on the basis of Article 5(1), and that the condition of Article 5(5) which concerns 'normal exploitation of the work' is similar to the condition of Article 5(1) of Directive 2001/29 according to which the temporary act of reproduction must have 'independent economic significance.' The fundamental question as regards the two conditions referred to is therefore whether the acts of reproduction allow the electronic transmission of data without independent economic significance or whether they add such a significance which goes beyond the transmission of data. In so far as the acts of reproduction in the present case do have economic significance for Infopaq, this is not a matter of normal exploitation of a work, for which reason the conditions of Article 5(5) are not fulfilled in the Commission's view.

VI - Assessment of the Advocate General

A - Introduction

48. The present case concerns the interpretation of the scope of the reproduction right and the exceptions and limitations to the reproduction right as regulated by Directive 2001/29, which harmonises certain aspects of copyright and related rights in the information society. (13) The reproduction right represents the essence of copyright, (14) the author's exclusive right to authorise or prohibit the reproduction of his work. The scope of the author's exclusive right vis-à-vis the reproduction depends on the scope of the definition of reproduction of a work.

49. In the past it was easier to define reproduction, given the limited number of methods of reproduction, (15) but with the development of information technology and the possibility of digital reproduction, there are now more possibilities of easier and faster reproduction. Because reproduction is easier and faster it is necessary, on the one hand, to ensure adequate protection of copyright; that protection must however and on the other hand be flexible enough not to hinder the development or the normal functioning of the new technologies. (16) In order to reply to the questions referred in the present case, it is necessary to take as a basis an appropriate balance between protection of copyright which is sufficiently high and at the same time sufficiently flexible.

50. The questions referred by the national court in the present case can be classified into three categories which will also be followed in the structure of this Opinion. The first category, which covers the first question referred, concerns the interpretation of the concept of 'reproduction' contained in Article 2 of Directive 2001/29. The second category, which covers the second to twelfth questions referred, concerns the interpretation of the exception to the reproduction right in Article 5(1) of that directive which, under certain conditions, authorises a temporary act of reproduction. The third

category, which covers the thirteenth question referred, concerns the interpretation of Article 5(5) of the Directive, under which the exceptions and limitations to the right of reproduction can only apply in certain special cases which are not contrary to a normal exploitation of a work or other subject-matter and do not unreasonably prejudice the legitimate interests of the rightholder.

51. In this Opinion, I will first briefly set out the essential characteristics of the process of production of extracts from newspaper articles before replying to the questions referred in the context of the analysis of the three categories.

B - Essential characteristics of the process for the production of extracts from newspaper articles used by Infopaq

52. As stated by the national court, it is undisputed in the present case that the process for the production of newspaper articles (that is, the 'data capture process'), as used by Infopaq, undoubtedly covers two acts of reproduction, namely (1) the creation of an image file on the basis of the scanning of newspaper articles and (2) the conversion of the image file into a text file. However, there is no consensus on whether the reproduction also covers (3) the storing of each search word with the five words which precede and follow it and (4) the printing of those 11 words.

53. I will therefore deal below with the question whether the storing of the search word with the five words which precede and follow it and the printing of these 11 words constitutes reproduction within the meaning of Article 2 of Directive 2001/29.

C - Interpretation of Article 2 of Directive 2001/29 (first question referred)

54. By its first question, the national court asks essentially if the storing and subsequent printing of an extract from the text of a newspaper article containing the search word and the five words which precede and follow it can be considered as a reproduction within the meaning of Article 2 of Directive 2001/29.

55. Article 2 of Directive 2001/29 provides that Member States must provide for 'the exclusive right to authorise or prohibit direct or indirect, temporary or permanent reproduction by any means and in any form, in whole or in part' for authors and for their works. It follows therefore from this article that the reproduction of works is not possible without the authorisation of the author, irrespective of whether reproduction of all or part of those works is at issue. Article 2 of Directive 2001/29 does not however define 'reproduction' just as it does not define when and under what conditions reproduction is 'partial'; for this reason I will examine the two concepts in the context of the analysis of the first question.

56. As is apparent from the case-law of the Court of Justice, it is necessary, when defining the concepts of 'reproduction' and 'reproduction in part', to take into account the fact that the requirement of uniform application of Community law means that the concepts and conditions of provisions of Community law must be given an autonomous and uniform interpretation throughout the Community where, as in the case of the provisions of Directive 2001/29, there is no express reference to the law of the Member States for the purpose of determining their meaning and scope. (17) Given this requirement, I believe that 'reproduction' of a work can de defined as fixation of the work in a given information medium. (18) 'Reproduction in part' can then be understood as fixation of part only of a work in a given information medium.

57. It is apparent moreover from the wording of Article 2 of the Directive that the concept of 'reproduction' should be construed broadly because it covers reproduction which is 'direct or indirect' and 'temporary or permanent', and reproduction 'by any means and in any form' and 'in whole or in part'. The requirement for a broad interpretation also follows from recital 21 in the preamble to that directive, which provides that the Directive must define 'the scope of the acts covered by the reproduction right with regard to the different beneficiaries' and that 'a broad definition of these acts is needed to ensure legal certainty within the internal market'. The broad definition of reproduction is necessary to ensure the high level of protection of copyright which Directive 2001/29 seeks to establish. (19) An argument in favour of a broad interpretation of 'reproduction in part' can also be derived from the broad interpretation of 'reproduction', if 'reproduction' is interpreted broadly it is necessary a maiori ad minus to interpret broadly all types of reproduction, including reproduction in part because only in this way can a high level of protection of copyright be ensured.

58. The interpretation of 'reproduction in part' must not however be an absurd or excessively technical one according to which any form of reproduction of a work would be included no matter how minimal

or insignificant a fragment of the work it is. I believe it is necessary, in interpreting that concept, to strike a balance between a technically inspired interpretation and the fact that the reproduction in part must also have a content, a distinctive character and - as part of a given work - a certain intellectual value, for which reason it is necessary to give it copyright protection. I consider that, to determine whether in a given case there is reproduction in part, it is appropriate to take two aspects into account. First, it is necessary to establish whether the reproduction in part is actually identical to a part of the original of the work (element of identification). In the case of reproduction in part of a newspaper article, that means specifically that it is necessary to determine whether the same words are found in the reproduction as in the newspaper article and whether those words are in the same order. Second, it must be established whether one can, on the basis of the reproduction in part, recognise the content of the work or determine with certainty that it is an exact reproduction in part of a given work (element of recognition). In the case of reproduction in part of a newspaper article, that means that one can establish with certainty that the reproduced extract in question is indeed taken from a given newspaper article. (20) One cannot therefore define reproduction in part in a strictly quantitative manner (21) or on the basis of a de minimis criterion, which would determine in a precise manner what percentage of a work must be reproduced in order to constitute reproduction in part or, in the present case, how many words of a given work suffice to constitute reproduction in part. (22) The existence of reproduction in part must be established on an individual basis.

59. According to the criteria laid down in point 58, I believe that in the present case the storing and subsequent printing of an extract from a text from a newspaper article which includes the search word and the five words which precede and follow it can be defined as reproduction in part of that article within the meaning of Article 2 of Directive 2001/29. Both the criterion of identification and the criterion of recognition are in fact fulfilled.

60. First, in the present case, the 11 words which are printed in the extract are the same as the 11 words in the newspaper article; their order is also the same as in the article. Secondly, the sequence of 11 words is in my opinion long enough - comparing the extract with the newspaper article - to allow it to be stated that that sequence of words in the extract indeed comes from a given newspaper article. It must be emphasised that, in the present case, the extracts composed of the search word and the five words which precede and follow it have precisely the purpose of facilitating for the reader the location of the search word in the article. (23)

61. It must moreover be noted in the present case that Infopaq prints, for each article, the search word and the five words which precede and follow it each time that the word appears in the article. Thus, as DDF rightly points out, (24) most of a newspaper article may therefore be printed which undoubtedly means reproduction in part of that article within the meaning of Article 2 of Directive 2001/29.

62. In view of the arguments put forward, in my view the reply to the first question referred is that the storing and subsequent printing of an extract from a newspaper article which contains the search word and the five words which precede and follow it must be considered as a reproduction within the meaning of Article 2 of Directive 2001/29.

D - Interpretation of Article 5(1) of Directive 2001/29 (second to twelfth questions referred)

63. The national court asks several questions concerning the interpretation of Article 5(1) of Directive 2001/29, for which reason I will consider them together. These are the second to twelfth questions referred by which the national court asks essentially whether the process of production of extracts from newspaper articles as used by Infopaq may be applied without the authorisation of the copyright holders as it falls within the exception laid down in Article 5(1) of Directive 2001/29, which under certain conditions exempts temporary acts of reproduction from the reproduction right.

64. In the context of the following line of argument, I will first set out the content and the purpose of Article 5(1) of Directive 2001/29, before analysing the individual conditions in that article and the questions pertaining thereto.

1. Content and purpose of Article 5(1) of Directive 2001/29

65. Directive 2001/29 provides in Article 5(1) for an exception to the reproduction right for certain temporary acts of reproduction. Under Article 5(1), acts of reproduction which fulfil the following conditions are exempted from the reproduction right:

- the act of reproduction must be temporary;

- that temporary act of reproduction must also fulfil the four following conditions: first, it must be transient or incidental, secondly, it must be an integral and essential part of a technological process, thirdly, its only purpose must be to enable either a transmission in a network between third parties by an intermediary, or a lawful use of a work or of related rights and, fourthly, the act must have no independent economic significance.

66. The exception in Article 5(1) was included in Directive 2001/29 in order to exclude from the broad definition of reproduction right certain temporary acts of reproduction which are an integral part of a technological process; their sole purpose is to enable another form of use of a given work. (25) Recital 33 in the preamble to Directive 2001/29 gives as examples of temporary acts of reproduction which must be excluded from the reproduction right browsing and the making of 'cache' copies including those which enable transmission systems to function effectively. (26) Those acts of reproduction are authorised according to that recital 'provided that the intermediary does not modify the information and does not interfere with the lawful use of technology, widely recognised and used by industry, to obtain data on the use of the information'. If such acts were not excluded from the broad definition of the reproduction right, that would mean that in the case of new technologies it would be necessary to obtain the authorisation of the copyright holder for any reproduction even if it was of short duration and technically necessary. (27) In practice, that would mean for example that it would be necessary to obtain the authorisation of the copyright holder for each act of caching, (28) which allows the normal use of information technology and the Internet thanks to the automatic creation of temporary copies of digital data. (29) Having regard to the foregoing, I would like to clarify that the exception in Article 5(1) of Directive 2001/29 does not concern only temporary acts of reproduction which take place on the Internet, but on the contrary all acts of reproduction which fulfil the general conditions referred to in that article. (30)

67. I also note that, in the context of the analysis of Article 5(1) of Directive 2001/29, it is necessary to clearly distinguish between, on the one hand, temporary acts of reproduction in respect of which it is necessary to examine whether they fulfil the conditions of that article and, on the other hand, the forms of use of a given work which those acts make possible. Thus, for example, acts of caching enable Internet users to read and inform themselves as to the content of the network. The temporary storing in the RAM memory of a computer (31) allows the user to create a copy of an audio or video recording. In the analysis of the basis of Article 5(1) of Directive 2001/29, it is always necessary to distinguish between temporary acts of reproduction and the final form of use of a given work which these temporary acts of reproduction make possible. That distinction will be particularly important for the analysis of the third condition of Article 5(1), pursuant to which temporary acts of reproduction must enable lawful use of the work. (32)

2. Condition for the application of Article 5(1): temporary acts of reproduction

68. It is clear from Article 5(1) of Directive 2001/29 that the exception provided for therein authorises only temporary acts of reproduction. The condition for the application of that exception is that a given act of reproduction is temporary;

I will examine whether that temporary act of reproduction also fulfils the other conditions of that article. Before examining whether the process for the production of extracts from newspaper articles used by Infopaq fulfils the individual conditions of that article, I must therefore examine which acts of reproduction of that process could even be defined as temporary acts of reproduction.

69. A number of acts of reproduction can be identified in the process of production of extracts from newspaper articles as used by Infopaq. The newspaper articles are first scanned, creating an image file which is then converted into a text file; it is clear from the facts that the image file is deleted after having been converted into a text file, the latter is deleted after the production of the extract from the newspaper article. The search words from the newspaper articles processed in this way and the five words which precede and follow them are then stored and printed.

70. The scanning and conversion of the image file into a text file are therefore only preparatory acts for the storing and printing of an extract of 11 words from a newspaper article. The image and text files are deleted during the process or directly afterwards, at the end of the process for the production of extracts. The scanning and the conversion of the image file into a text file can therefore, in my opinion, be defined as temporary acts of reproduction.

71. Concerning the question whether the storing of an extract of 11 words from a newspaper article can be defined as a temporary act of reproduction, in my opinion there is not enough information in

the order for reference. The national court, in its order, states merely that the search word and the five words which precede and follow it are stored, (33) but it does not indicate for how long those words remain stored in the computer's memory. That fact should therefore be clarified by the national court.

72. However one defines the storing of the extracts of 11 words, the printing of that article cannot in my opinion be defined as a temporary act of reproduction. The printing on paper must in fact be treated as a lasting reproduction. (34) Lasting reproduction does not, of course, mean unlimited in time because it may be destroyed, but the user of that reproduction alone decides when to destroy it. I note concerning the printing of the extract that this is not an act which only enables another use of the work, the situation which the exception provided for in Article 5(1) of Directive 2001/29 is aimed at. The printing of an extract from a newspaper article is the final reproduction in the process for the production of extracts as applied by Infopaq, for which reason, in the present case, it is particularly important to know whether the final reproduction is a lawful use of the work, (35) which the temporary acts of reproduction, carried out in the context of that process, make possible.

73. I will examine below whether the scanning of articles, the conversion of image files and text files and the storing of extracts of 11 words which enable the printing of extracts of 11 words fulfil the conditions of Article 5(1).

3. Examination of the four conditions of Article 5(1) of Directive 2001/29

a) First condition: temporary acts (second to fifth questions)

74. The first condition that a temporary act of reproduction must fulfil in the context of Article 5(1) is that it must be transient or incidental. As the national court's questions in fact concern only whether the acts of reproduction in the present case are transient acts, I will limit myself to the interpretation of that condition and will not analyse whether these acts are incidental. The second to fifth questions referred concern the interpretation of the condition of transient act.

75. The national court has expressed the second question in such a way that it asks whether the circumstances under which temporary acts of reproduction take place are relevant to whether they can be regarded as transient within the meaning of Article 5(1) of Directive 2001/29. It does not specify however in the order for reference to which circumstances the question refers. It is not clear whether the national court has in mind the forms of reproduction (by scanner, Optical Character Recognition software and storage), the duration of existence of the reproduction or other circumstances. As I do not know precisely to which circumstances the national court refers and cannot therefore provide a simple affirmative or negative answer to the question, it seems appropriate to reformulate it in order to be able to offer a useful response.

76. It is therefore necessary to reformulate the second question in such a way that the national court asks which circumstances are relevant for the purposes of determining whether given temporary acts of reproduction can be considered as transient within the meaning of Article 5(1) of Directive 2001/29.

77. By its third question, the national court asks whether a temporary act of reproduction can be regarded as transient within the meaning of Article 5(1) of Directive 2001/29, if the reproduction is produced by the processing of a text file on the basis of an image file or by a search for text strings on the basis of a text file. The third question must also be partially reformulated as the national court asks whether an act of reproduction is temporary if the reproduction is produced by a search for 'text strings on the basis of a text file'. As the mere search for text strings is not a reproduction, it is necessary to understand by the third question that the national court asks whether a temporary act of reproduction can be considered as transient if the reproduction is produced for example by the processing of a text file on the basis of an image file.

78. By its fourth question, the national court asks essentially whether a temporary act of reproduction (36) can be considered as transient within the meaning of Article 5(1) of Directive 2001/29 if part of the reproduction, consisting of one or more text extracts of 11 words, is stored.

79. By its fifth question, the national court asks essentially whether an act of reproduction can be considered as transient within the meaning of Article 5(1) of Directive 2001/29 if part of the reproduction, consisting of one or more text extracts of 11 words, is printed.

80. To reply to these questions, it is first necessary to examine the significance of the fact that a temporary act of reproduction is transient.

81. An act of reproduction is transient in my opinion where the reproduction only exists for a very

short period. (37) Of course, the question which immediately arises is what the difference is between a transient act of reproduction and a temporary act of reproduction. In my view, the difference is that a transient act of reproduction lasts for a very brief period while a temporary act of reproduction can last for a longer period. (38) Transient acts of reproduction are therefore temporary acts of reproduction which last for an exceptionally short time, which are ephemeral and which at the same time disappear after arising. (39) The duration of temporary acts of reproduction is certainly limited in time but can be longer than the duration of transient acts of reproduction. (40) It is of course very difficult, if not completely impossible, to determine exactly from the outset for how long a reproduction must exist for it to be definable as transient; that must be determined on a case-by-case basis and taking into account all of the circumstances of the case.

82. In my view the answer to the second question referred is therefore that the decisive factor which is relevant to whether a given act of reproduction can be considered as transient within the meaning of Article 5(1) of Directive 2001/29 is that the reproduction only lasts for a very brief period, even if it is necessary during the assessment to take into account all of the circumstances of the individual case.

83. In the present case, the image file which is created during the scanning of the newspaper article, like the text file which is created when the image file is converted, is subsequently deleted when the extract from the newspaper article is produced. Infopaq states in its written observations that the required duration is, at the most, 30 seconds. In my view, it can be found in the present case, on the basis of the fact that the required duration is exceptionally short and that the two files are deleted, that transient acts of reproduction are involved.

84. The answer to the third question referred must in my view therefore be that if a temporary act of reproduction is carried out by processing a text file on the basis of an image file and if those two files are deleted, in circumstances such as those of the present case, that act of reproduction must be considered as transient within the meaning of Article 5(1) of Directive 2001/29.

85. Concerning the storing of an extract from a newspaper article, I have already indicated at point 71 of this Opinion that the national court, in its order, does not state for how long the extract of 11 words is stored.

86. The answer to the fourth question referred must in my view therefore be that the national court must, on the basis of the criteria laid down in the reply to the second question referred, determine whether the act of reproduction can be considered as transient within the meaning of Article 5(1) of Directive 2001/29, where part of the reproduction which consists of one or more extracts of 11 words is stored.

87. Concerning the printing of an extract from a newspaper article, I have already indicated at point 72 of this Opinion that in that case the act of reproduction is not temporary and that act cannot therefore a fortiori be considered as a transient act of reproduction.

88. In my view the answer to the fifth question referred should therefore be that an act of reproduction cannot be considered as transient within the meaning of Article 5(1) of Directive 2001/29 if, in circumstances such as those of the present case, part of the reproduction which consists of one or more extracts of 11 words is printed.

b) Second condition: integral and essential part of a technological process (sixth, seventh and eighth questions)

89. The second condition which must be fulfilled by a temporary act of reproduction in the context of Article 5(1) is that it must be an integral and essential part of a technological process. The interpretation of that condition in connection with the scanning and conversion of an image file into a text file is the subject of the sixth and seventh questions referred, while the eighth question referred concerns the printing of an extract from a newspaper article. The national court does not ask explicitly whether the storing of an extract from a newspaper article is also an integral and essential part of a technological process.

90. By its sixth question, the national court asks essentially whether the stage of the technological process at which temporary acts of reproduction take place is relevant to whether they can be considered as an integral and essential part of a technological process within the meaning of Article 5(1) of Directive 2001/29.

91. By its seventh question, the national court asks essentially whether temporary acts of

reproduction can be an integral and essential part of a technological process within the meaning of Article 5(1) of Directive 2001/29, if they cover manual scanning of entire newspaper articles whereby the latter are transformed from a printed medium into a digital medium.

92. By its eighth question, the national court asks essentially whether temporary acts of reproduction can be an integral and essential part of a technological process within the meaning of Article 5(1) of Directive 2001/29 if they consist of a printed reproduction which contains one or more text extracts of 11 words.

93. For the reply to the sixth and seventh questions, it is first necessary to examine when a given act of reproduction is an integral and essential part of a technological process. (41) It should in particular be examined to what extent the interpretation of the condition that the temporary act of reproduction must be an integral and essential part of a technological process must be restrictive. It is apparent from legal commentators that the fundamental dilemma when interpreting that condition is whether the act of reproduction constitutes an integral and essential part of a technological process only when that act is a necessary element of the technological process and therefore without which that technological process would not be possible, or whether other acts which are not a necessary element of that technological process also fall within that category. (42)

94. In my opinion - and in that of the majority of legal commentators (43) - it is not necessary for the act of reproduction to be an indispensable element of a given technological process for it to constitute its integral and essential part. This may be seen from the explanatory memorandum to the proposal for Directive 2001/29, in which the Commission states that the purpose of Article 5(1) is to exclude temporary acts of reproduction 'which technology dictates'. (44) It may also be deduced that the stage of the technological process at which the temporary act of reproduction takes place is irrelevant.

95. The answer to the sixth question referred must in my view therefore be that the stage of the technological process at which temporary acts of reproduction take place is irrelevant to whether they constitute an integral and essential part of a technological process within the meaning of Article 5(1) of Directive 2001/29.

96. To reply to the seventh question in this case, it is necessary to examine what, in the context of the process for the production of extracts from newspaper articles, constitutes a technological process. Does technological process cover only the scanning and the conversion of the image file into a text file or on the contrary does it cover the entire process for the production of extracts from newspaper articles?

97. In my view, the technological process in this case covers the entire process for the production of extracts from newspaper articles. The scanning and the conversion of the image file into a text file, and the storing and printing of the search word with the five words preceding and following it therefore fall within that process. All of the elements mentioned are therefore part of the same technological process. From that point of view, the scanning of articles and the conversion of the image file into a text file are in any case an integral and essential part of the technological process.

98. The answer to the seventh question referred must in my view therefore be that where temporary acts of reproduction consist of manual scanning of entire newspaper articles whereby the latter are transformed from a printed medium into a digital medium, in circumstances such as those of the present case, those acts of reproduction constitute an integral and essential part of a technological process within the meaning of Article 5(1) of Directive 2001/29.

99. To reply to the eighth question, it is necessary to clarify whether the printing of a reproduction consisting of one or more text extracts of 11 words can be an integral and essential part of a technological process within the meaning of Article 5(1) of Directive 2001/29. As I have already indicated at point 97 of this Opinion, the printing of an extract from a newspaper article must in principle also be considered as an integral and essential part of a technological process. It must however be noted in that respect that printing is not a temporary act of reproduction, for which reason it does not fulfil the condition for the application of Article 5(1) of Directive 2001/29.

100. The answer to the eighth question referred must in my view therefore be that, in circumstances such as those of the present case, the printing of an extract is not a temporary act of reproduction, for which reason it cannot fall within Article 5(1) of Directive 2001/29 and consequently it is irrelevant whether that act of reproduction can be an integral and essential part of a technological process.

c) Third condition: acts the purpose of which is to enable a lawful use (ninth and tenth questions)

101. The third condition of Article 5(1) requires that the sole purpose of the temporary act of reproduction is to enable either transmission in a network between third parties thanks to an intermediary, or a lawful use of the work. As it is clear that in the present case there is no transmission in a network, and as the question referred only concerns the part of the third condition which concerns lawful use of the work, I will concentrate in my analysis on examining the condition of lawful use. The ninth and tenth questions referred concern the condition of lawful use.

i) General remarks on the condition of lawful use (ninth question)

102. By its ninth question, the national court asks whether lawful use of a work within the meaning of Article 5(1) of Directive 2001/29 covers any form of use of a work which does not require the copyright holder's consent.

103. To reply to the ninth question referred, it is necessary to clarify the meaning of the condition of lawful use of a work within the meaning of Article 5(1) of Directive 2001/29.

104. It is apparent from recital 33 in the preamble to Directive 2001/29 that the use of a work is considered to be lawful (45) 'where it is authorised by the rightholder or not restricted by law'. It may be concluded on the basis of that recital that the use of a work is lawful in three cases. First, the use is lawful where it is a form of use of a work for which the copyright holder's authorisation is not required - for example the reading of newspaper articles. If however there is use of a work in a form of reproduction such as that in the present case or another form of use for which in principle the copyright holder's authorisation is required, (46) the use is lawful; secondly, if the copyright holder has explicitly authorised the use; or, thirdly, if that use is authorised pursuant to one of the exceptions and limitations laid down in Article 5(2) and (3) (47) of Directive 2001/29, if the Member State in question has transposed that exception or limitation into national law and if it meets the requirements of Article 5(5) of the Directive.

105. The answer to the ninth question referred in my opinion is therefore that the lawful use of a work within the meaning of Article 5(1) of Directive 2001/29 covers any form of use of a work which does not require the copyright holder's consent or which is explicitly authorised by the copyright holder; in the event of use of a work in the form of a reproduction, the copyright holder's consent is not required if the reproduction is authorised on the basis of one of the exceptions laid down by Article 5(2) and (3) of Directive 2001/29, if the Member State concerned has transposed that exception or limitation into national law and if the reproduction meets the requirements of Article 5(5) of Directive 2001/29.

ii) Lawful use in the present case (tenth question)

106. By its tenth question, the national court asks whether the lawful use of a work within the meaning of Article 5(1) of Directive 2001/29 covers the scanning by a commercial business of entire newspaper articles, the subsequent processing of the reproduction and the storing and possible printing of the reproduction consisting of one or more text extracts of 11 words, for use in the business's summary writing, even where the copyright holder has not authorised that activity. The tenth question must in my view be reformulated, (48) and I will therefore set out below the reasons for the reformulation.

- Reformulation of the tenth question

107. The tenth question referred is set out in such a way that the condition of lawful use concerns all of the acts of reproduction which take place during the process of production of extracts from newspaper articles used by Infopaq. Formulated in this way, the question referred follows from a misunderstanding of Article 5(1) of Directive 2001/29. In fact the condition of lawful use of a work cannot be interpreted as meaning that the temporary acts of reproduction must constitute in themselves a lawful use of the work; that condition must on the contrary be understood as meaning that the temporary acts of reproduction must enable another use of the work which must itself be lawful. To take an example: if an education establishment makes a copy during a course and for illustration purposes - that is, a reproduction - of a given work, such as a video recording of an educational programme, and during that act of reproduction a copy of the video recording is temporarily registered in the RAM memory of the computer, that temporary copy which is created in the RAM memory enables a reproduction for illustration purposes during the course which is lawful pursuant to Article 5(3)(a) of Directive 2001/29. (49) The temporary copy which is created in the RAM memory is however lawful only if all of the other conditions of Article 5(1) of Directive 2001/29 are fulfilled, that is, if it is transient or incidental, if it is an integral and essential part of a technological process and if it has no independent economic significance. If the condition of lawful use of Article

5(1) of Directive 2001/29 were to be interpreted as meaning that the temporary act of reproduction had to be a lawful use, that would mean that, for the purposes of the lawfulness of that temporary act of reproduction, the other conditions of that article would no longer need to be fulfilled and Article 5(1) of Directive 2001/29 would be devoid of purpose.

108. When analysing Article 5(1) of Directive 2001/29, it is therefore necessary to clearly distinguish between the temporary acts of reproduction which must fulfil all of the conditions of that article and the final act of reproduction or another form of use of the work which those temporary acts of reproduction make possible and which must constitute a lawful use of the work. In the present case, the use of the work, that is, the newspaper article, takes the form of the printing of an extract from a newspaper article composed of 11 words.

109. It is not explicitly indicated in the order for reference whether those extracts from newspaper articles are used as an internal basis for the drafting of summaries of newspaper articles or only to assist in the choice of newspaper articles summaries of which are drawn up. There is no information in the order for reference as to the method of production of summaries or whether they may contain a word-for-word quotation of the extract of 11 words. As the facts are not clear, it cannot be ruled out that Infopaq sends the extracts of 11 words directly to its customers, thus allowing them to deduce from the context which newspaper articles would be of interest to them. In any case, the extracts of 11 words are used in that way or in another in the context of Infopaq's commercial activity of drawing up summaries of newspaper articles.

110. Apart from that, it cannot in my view be claimed in the present case that the drawing up of summaries, which Infopaq sends to its customers, constitutes a use of the work and that the condition of lawful use of the work within the meaning of Article 5(1) of Directive 2001/29 is fulfilled, to the extent that the drawing up of summaries is permissible under Danish law. One cannot understand from the present case that the process of production of extracts from newspaper articles, as used by Infopaq, makes possible the drawing up of summaries. It is certainly true that the process for the production of those extracts simplifies, probably to a significant extent, the drawing up of summaries, but it cannot be maintained that it makes it possible. Infopaq could also produce summaries of press articles entirely without the use of the extracts of 11 words prepared beforehand. The drawing up of summaries is moreover not necessarily the consequence of the process for the production of the extracts of 11 words, for which reason one cannot interpret the drawing up of summaries as the last stage of the process for the production of the extracts which the latter makes possible.

111. The tenth question referred must therefore be understood as meaning that the national court asks essentially whether the scanning of entire newspaper articles, the subsequent processing of the reproduction and the storing of the work, consisting of one or more text extracts of 11 words, enables a lawful use of the work within the meaning of Article 5(1) of Directive 2001/29, in so far as the text extracts of 11 words are printed and used in the business's activity of drawing up summaries of newspaper articles, although the holder of the relevant rights has not given authorisation.

- Analysis of and reply to the tenth question

112. For an analysis of this question, the general point may first be made that the use of newspaper articles in the form of a reproduction in part, that is, of extracts of 11 words, is lawful in two cases: if the copyright holder explicitly authorises that reproduction in part, or if that reproduction in part can be justified on the basis of one of the exceptions and limitations to the reproduction right laid down by Directive 2001/29 in Article 5(2) and (3), if Denmark has provided for them in national law and if it fulfils the requirements of Article 5(5) of that Directive.

113. In the present case, it is evident from the facts that the copyright holders have not given their authorisation for the production of the extracts from newspaper articles and the production of those extracts cannot be lawful on that basis. I will therefore examine below whether in the present case the use of newspaper articles in the form of the reproduction of extracts from those newspaper articles can be lawful under one of the exceptions and limitations of Article 5(2) and (3) of Directive 2001/29. I will examine whether that act of reproduction meets the requirements of Article 5(5) of Directive 2001/29 in the context of the reply to the thirteenth question referred, which concerns the interpretation of Article 5(5) of that Directive.

114. Two points should be made concerning the exceptions and limitations to the reproduction right contained in Article 5(2) and (3). First, the exceptions and limitations contained in Article 5(2) and (3) are optional and the Member States only transpose them into national law if they choose to. This is

evident from the introductory sentence to Article 5(2) and (3) of the Directive, which provides that the Member States 'may' provide for exceptions and limitations. (50) In the present case, the national court has not provided any information as to the exceptions and limitations which are provided for in national legislation in Denmark, for which reason I will merely analyse in this Opinion how the various exceptions and limitations should be interpreted; the final analysis on the basis of those exceptions and limitations has however to be carried out by the national court. In the present case, the national court will therefore have to examine which of the exceptions and limitations provided for in Article 5(2) and (3) of Directive 2001/29 have been provided for by Denmark in its national legislation and establish whether a reproduction in part of newspaper articles in the form of extracts of 11 words can constitute a lawful use of the newspaper articles.

115. Secondly, the exceptions and limitations provided for in Article 5(2) and (3) of Directive 2001/29 are - as is apparent from recital 32 (51) - listed exhaustively, which means that the Member States cannot introduce into national law exceptions and limitations other than those laid down by the Directive. Denmark cannot therefore make provision in its national law for the reproduction in part of newspaper articles in the form of extracts from those articles to be permissible in so far as it is used in the production of summaries, if that action is not permissible on the basis of one of the exceptions and limitations to the reproduction right laid down by Article 5(2) and (3) of Directive 2001/29.

116. The only exception which could prima facie be relevant in the present case is that provided for in Article 5(3)(c), (52) which authorises reproduction in the press and the use of a work in connection with the reporting of current events. (53) That article provides for two exceptions to the reproduction right. The first exception that it authorises is 'reproduction by the press, communication to the public or making available of published articles on current economic, political or religious topics... in cases where such use is not expressly reserved, and as long as the source, including the author's name, is indicated'. The second exception that it authorises is 'use of works or other subject-matter in connection with the reporting of current events, to the extent justified by the informatory purpose and as long as the source, including the author's name, is indicated, unless this turns out to be impossible'.

117. The fact remains, in my view, that none of the exceptions provided for in Article 5(3)(c) of Directive 2001/29 - even if Denmark has provided for them in its national legislation - can justify a reproduction in part of newspaper articles in the form of extracts of 11 words.

118. The first exception which is provided for in Article 5(3)(c) cannot justify such reproduction as it is not reproduction in the press as newspapers and magazines traditionally come under. (54) The present case does not concern distribution to the public or making published articles available to the public. (55) Communication to the public in fact includes transmission or retransmission of a work to the public by wire or wireless means, including broadcasting. (56) Making available to the public means on the contrary making available a work to members of the public who are not present at the place where the act of publication originates. (57) Even if Infopaq sent its customers extracts from newspaper articles by email, this would not constitute communication to the public (58) or making available to the public. (59)

119. The reproduction in part of newspaper articles in the form of extracts thereof cannot therefore be justified on the basis of the second exception provided for in Article 5(3)(c) of the Directive, which authorises the reporting of current events. That exception in fact authorises the use of works in connection with the independent activity of providing information on current events;

(60) a given work may therefore be used in the context of providing information on a given current event. Moreover, if it was allowed that newspaper articles could be reproduced on the basis of the exception which authorises reporting of current events, that would run counter to the purpose of the first exception provided for in Article 5(3)(c), which specifically concerns reproduction, communication to the public and making available of articles on current economic, political or religious topics or other subject-matter of the same character and which, as regards those articles, constitutes the lex specialis in relation to the second exception in that article.

120. The reproduction in part of newspaper articles cannot therefore constitute lawful use of those newspaper articles on the basis of one of the exceptions and limitations provided for in Article 5(2) and (3) of Directive 2001/29.

121. The answer to the tenth question referred must in my view therefore be that the scanning of entire newspaper articles, subsequent processing of the reproduction and the storing of the

reproduction which contains one or more text extracts of 11 words, in circumstances such as those of the present case, do not enable a lawful use of the work within the meaning of Article 5(1) of Directive 2001/29, as the text extracts of 11 words are printed and used in the business's activity of writing of summaries of newspaper articles, although the rightholder has not authorised that activity.

d) Fourth condition: activities which have no independent economic significance (eleventh and twelfth questions)

122. The fourth condition that a temporary act of reproduction must fulfil pursuant to Article 5(1) of Directive 2001/29 to make it possible to exclude it from the reproduction right is that it must have no independent economic significance. (61)

123. The eleventh and twelfth questions referred concern the interpretation of that condition. By its eleventh question, the national court asks what criterion should be applied to assess whether temporary acts of reproduction have independent economic significance within the meaning of Article 5(1) of Directive 2001/29. By its twelfth question, it asks whether the user's efficiency gains due to temporary acts of reproduction can be taken into account in assessing whether those acts have independent economic significance within the meaning of Article 5(1) of Directive 2001/29.

124. The condition of independent economic significance is not defined in Directive 2001/29. Nor can the meaning of that condition be clarified from the explanatory memorandum to the proposal for the Directive, from which it is apparent that acts of reproduction which have independent economic significance are not covered by the Directive. (62) It is appropriate, when interpreting that condition, to clarify what is meant by stating that a given act of reproduction has economic significance, what is meant by stating that that economic significance is independent, and the person in respect of which (63) that act of reproduction must have independent economic significance.

125. Economic significance means that the temporary act of reproduction must involve an economic advantage for the person who carries it out; indirectly - or, if the copyright holder receives adequate compensation - that that act of reproduction also confers an economic advantage on the copyright holder. (64) The economic advantage may be, for example, a profit or a reduction in costs, an increase in productivity or similar advantages. (65)

126. The key issue in determining whether that economic significance is independent is in my opinion whether the economic advantages stem from the temporary acts of reproduction. There would, for example, be such independent economic significance if Infopaq sent to its customers, in addition to summaries of newspaper articles, scanned copies of those newspaper articles for which it received payment, or if Infopaq's customers had access to the scanned copies, for example via an Internet link. There would also be independent economic significance if Infopaq carried out scanning of newspaper articles as such which it sent to its customers by email and for which it received remuneration from its customers. (66) The mere possibility that Infopaq could obtain a concrete economic advantage from those two acts of reproduction is not sufficient to fulfil the condition of independent economic significance; the company must actually carry out that activity.

127. The answer to the eleventh question referred must in my opinion therefore be that in assessing whether temporary acts of reproduction have independent economic significance within the meaning of Article 5(1) of Directive 2001/29, it is necessary to establish whether an economic advantage stems directly from the temporary acts of reproduction.

128. In the present case, the scanning of newspaper articles, the conversion of the image file into a text file and the storing of extracts (67) from newspaper articles mean for Infopaq a reduction in costs, an increase in productivity and saving of time. It is not disputed that those acts of reproduction have economic significance for Infopaq, but in my opinion they do not have independent economic significance. In the present case, for there to be independent economic significance, it is not sufficient that the act of reproduction only contributes, in a general manner, to making Infopaq more efficient in the production of extracts. The scanning, the conversion of the image file into a text file and the storing of extracts from newspaper articles are in fact only part of a larger process for the production of extracts and do not have independent economic significance. (68) In the present case, the independent economic significance of the scanning, the conversion of the image file into a text file and the storing of extracts from newspaper articles must be assessed separately from the economic significance that the final printing of extracts from newspaper articles has for Infopaq. In my opinion it must therefore be found that the scanning of articles, the conversion of the image file into a text file and the storing of extracts do not have independent economic significance.

129. In my opinion the answer to the twelfth question referred is therefore that the user's efficiency gains from temporary acts of reproduction in circumstances such as those of the present case cannot be taken into account in assessing whether those acts have independent economic significance within the meaning of Article 5(1) of Directive 2001/29.

4. Conclusion concerning the interpretation of Article 5(1) of Directive 2001/29

130. On the basis of the analysis of the conditions of Article 5(1) of Directive 2001/29 and of the replies to the second to twelfth questions referred, I find that it is not possible to justify, on the basis of the exceptions to the reproduction right provided for in Article 5(1) of that Directive, the acts of reproduction which are produced during the process for the production of newspaper articles as used by Infopaq. This means in practice that Infopaq must obtain the copyright holder's consent to the production of the extracts.

E - Interpretation of Article 5(5) of Directive 2001/29 (thirteenth question referred)

131. By its thirteenth question, the national court asks essentially whether the scanning by a business of entire newspaper articles, subsequent processing of the reproduction and the storing and printing of the reproduction, which consists of one or more text extracts of 11 words, without the rightholder's consent, can be regarded as special cases which are not contrary to a normal exploitation of the newspaper articles and do not unreasonably prejudice the legitimate interests of the rightholder within the meaning of Article 5(5) of Directive 2001/29.

132. Given that I have already established during the analysis of the conditions provided for in Article 5(1) of Directive 2001/29 that the acts of reproduction in the present case do not fulfil the conditions of that article of the Directive, in principle it is not necessary to investigate whether those acts of reproduction fulfil the conditions provided for in Article 5(5). Article 5(5) of Directive 2001/29 in fact sets out additional conditions which acts of reproduction must fulfil, if they fulfil the conditions provided for in Article 5(1). In case the Court finds that the acts of reproduction carried out by Infopaq fulfil the conditions provided for in Article 5(1) of Directive 2001/29, I will briefly examine below whether those acts of reproduction fulfil the conditions provided for in Article 5(5) of the Directive.

133. In the present case, in my opinion it is necessary, when analysing Article 5(5) of Directive 2001/29, to distinguish once more between final acts of reproduction - the printing of extracts from newspaper articles - and the acts of reproduction which those final acts of reproduction make possible - the scanning of newspaper articles, the conversion of the image file into a text file and the storing of the extract from the newspaper article. If the Court in fact finds during its consideration of Article 5(1) of Directive 2001/29 that the final act of reproduction which the temporary acts of reproduction make possible can constitute a lawful use of the work under one of the exceptions and limitations to the reproduction right provided for in Article 5(2) and (3) of the Directive, it would be necessary as regards fulfilment of the condition of lawful use to examine whether that final act of reproduction fulfilled the conditions provided for in Article 5(5) of the Directive. Only then would the condition of lawful use provided for in Article 5(1) of the Directive actually be fulfilled. It is only when that condition is fulfilled - along with all of the other conditions provided for in Article 5(1) of Directive 2001/29 - that one can examine whether the conditions of Article 5(5) of the Directive are also fulfilled by the acts of reproduction which enable that final use. I will therefore first examine below whether the final act of reproduction (the printing of extracts from newspaper articles) fulfils the conditions of Article 5(5) of Directive 2001/29 before further looking at whether those conditions are fulfilled by the acts of reproduction which that act makes possible (scanning of newspaper articles, conversion of the image file into a text file and storing (69) of the extract from the newspaper article).

1. Does the printing of extracts from newspaper articles fulfil the conditions provided for in Article 5(5) of Directive 2001/29?

134. It is apparent from Article 5(5) of Directive 2001/29 that the exceptions and limitations provided for in that article apply, first, only in clearly specified special cases which, secondly, are not contrary to a normal exploitation of the work and which, thirdly, do not unreasonably prejudice the legitimate interests of the rightholders. (70) Those conditions are cumulative. The conditions provided for in Article 5(5) of Directive 2001/29, which are regularly referred to by legal commentators as the 'three-step test', (71) were included in the Directive following the model of international treaties, in particular Article 9(2) of the Berne Convention, (72) Article 10 of the World Intellectual Property Organization Copyright Treaty (73) and Article 13 of the TRIPS Agreement. (74) As is apparent from recital 44 in the preamble to Directive 2001/29, the exceptions and limitations provided for by the

Directive must be applied in a manner consistent with international obligations. (75) Article 5(5) of Directive 2001/29 must therefore be interpreted taking account of those international treaties.

135. The first condition provided for in Article 5(5) of Directive 2001/29 is that the exceptions and limitations apply only in particular given cases. That condition means that the exceptions and limitations must be clearly defined and must be based on specified particular objectives. (76) Concerning the exception provided for in Article 5(3)(c), the particular objective on which that exception is based is informing the public about current events; it is however also the case that that this exception does not exclude the at least indirectly commercial objective of providing information on current events. (77)

136. If the Court finds that the reproduction of extracts from newspaper articles constitutes a lawful use pursuant to Article 5(3)(c) of Directive 2001/29, that would implicitly be on the assumption that the reproduction of extracts from newspaper articles constitutes informing the public. It can certainly be stated that that reproduction in part of newspaper articles in the form of extracts does not correspond entirely to that objective and that its primary objective is commercial, the provision of information being a secondary objective. However, when, for example, a journal publishes an article from another journal, when one hears on the radio a part of a newspaper article or records a certain part of an exhibition during a television programme on that exhibition, these media use the works not only to inform the public, but also on the contrary for commercial advantage. One can therefore, in my opinion, also state concerning the reproduction of extracts from newspaper articles that, when they are used to draw up summaries of those articles, they are used to inform the public. In my opinion it can therefore be found that this is a special case within the meaning of the first condition of Article 5(5) of Directive 2001/29. The first condition of Article 5(5) of Directive 2001/29 is therefore fulfilled as regards the printing of extracts from newspaper articles.

137. The second condition provided for in Article 5(5) of Directive 2001/29 requires that the particular cases in which the exceptions and limitations apply are not contrary to a normal exploitation of the work. The normal exploitation of newspaper articles means that the newspapers in which the articles are published are sold and that a profit is made therefrom; the economic advantages which may be made from newspaper articles must go to the copyright holders. (78) If the effect on the newspaper market is noticeable and the sale of newspapers diminishes, this goes against normal exploitation. (79)

138. The reproduction of extracts from newspaper articles allows Infopaq to identify rapidly which articles are important and of which a summary must be drawn up. Infopaq can thus draw up summaries of all newspaper articles, for which reason its customers no longer need to buy newspapers. (80) The reproduction of extracts from newspaper articles therefore in my opinion affects the normal exploitation of those newspapers and the second condition of Article 5(5) of Directive 2001/29 is consequently not fulfilled.

139. The third condition provided for in Article 5(5) of Directive 2001/29 is that the particular cases in which the exceptions and limitations apply do not unreasonably prejudice the legitimate interests of the rightholders. In the context of the third condition, the mere effect on the legitimate interests of the rightholders - who are ultimately affected by each exception and limitation - is not sufficient; that effect cannot on the contrary be unjustified. (81) On this occasion the quantitative and qualitative nature of the effect must be taken into account. (82)

140. In the present case, an extract from a newspaper article is produced for all of the articles containing the relevant search words. If the search word appears frequently in those articles, that means quantitatively that extracts from newspaper articles may be produced for numerous articles. If several different search words appear in the same article, that also means that several extracts may be produced for an article. I have already found when analysing the second condition of Article 5(5) of Directive 2001/29 that the reproduction of those extracts has an indirect effect when summaries are produced on the sale of the newspaper articles, for which reason the copyright holders also have a legitimate interest in the profits made by Infopaq. Given that the extracts are produced for a large number of articles, that constitutes in my opinion an unreasonable prejudice to the legitimate interests of the rightholders. In my view it must therefore be found, concerning the printing of extracts from newspaper articles, that the third condition provided for in Article 5(5) of Directive 2001/29 is not fulfilled either.

141. The consequence of the fact that the printing of extracts from newspaper articles does not fulfil the third and fourth conditions provided for in Article 5(5) of Directive 2001/29 is that it cannot

constitute a lawful use of the newspaper articles within the meaning of Article 5(1) of that directive.

2. Do temporary acts of reproduction fulfil the conditions of Article 5(5)?

142. As I found in point 141 of this Opinion that the printing of extracts from newspaper articles cannot constitute a lawful use of newspaper articles, it should be found that the scanning, the conversion of the image file into a text file and the storing (83) of extracts from newspaper articles do not enable a lawful use of the work and that thus they do not fulfil the conditions provided for in Article 5(1) of Directive 2001/29. In so far as those acts of reproduction cannot be justified on the basis of Article 5(1) of Directive 2001/29, they cannot be justified independently on the basis of the conditions provided for in Article 5(5) of that Directive. The conclusion must therefore be that the temporary acts of reproduction do not fulfil the conditions of Article 5(5) of that directive.

3. Conclusion concerning the interpretation of Article 5(5) of Directive 2001/29

143. Having regard to the analysis undertaken of Article 5(5) of Directive 2001/29, in my opinion the answer to the thirteenth question referred should be that the scanning by a commercial business of entire newspaper articles, the subsequent processing of the reproduction, and the storing and printing of part of the reproduction, consisting of one or more text extracts of 11 words, in circumstances such as those of the present case, cannot be considered as particular cases which are not contrary to a normal exploitation of newspaper articles and do not unreasonably prejudice the legitimate interests of the rightholder within the meaning of Article 5(5) of Directive 2001/29.

F - Conclusion

144. The analysis undertaken in this Opinion has shown that all of the acts carried out by Infopaq in the context of the process for the production of extracts from newspaper articles are acts of reproduction within the meaning of Article 2 of Directive 2001/29. Those acts of reproduction cannot be permissible on the basis of an exception to the reproduction right as provided for by Article 5(1) of Directive 2001/29 and they do not fulfil the requirements of Article 5(5) of that directive. Infopaq must therefore obtain the copyright holder's consent to carry out those acts.

VII - Conclusion

145. Having regard to all of the foregoing, I suggest that the Court reply as follows and in the same order to the questions referred by the Højesteret, in the circumstances of the case:

(1) The storing and subsequent printing of an extract from a newspaper article which contains the search word and the five words which precede and follow it must be considered as a reproduction within the meaning of Article 2 of Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society.

(2) The decisive factor which is relevant to whether a given act of reproduction can be considered as transient within the meaning of Article 5(1) of Directive 2001/29 is that the reproduction only lasts for a very brief period, even if it is necessary during the assessment to take into account all of the circumstances of the individual case.

(3) If a temporary act of reproduction is carried out by processing a text file on the basis of an image file and if those two files are deleted, in circumstances such as those of the present case, that act of reproduction must be considered as transient within the meaning of Article 5(1) of Directive 2001/29.

(4) The national court must, on the basis of the criteria laid down in the reply to the second question referred, determine whether the act of reproduction can be considered as transient within the meaning of Article 5(1) of Directive 2001/29, where part of the reproduction which consists of one or more extracts of 11 words is stored.

(5) An act of reproduction cannot be considered as transient within the meaning of Article 5(1) of Directive 2001/29 if, in circumstances such as those of the present case, part of the reproduction which consists of one or more extracts of 11 words is printed.

(6) The stage of the technological process at which temporary acts of reproduction take place is irrelevant to whether they constitute an integral and essential part of a technological process within the meaning of Article 5(1) of Directive 2001/29.

(7) Where temporary acts of reproduction consist of manual scanning of entire newspaper articles whereby the latter are transformed from a printed medium into a digital medium, in circumstances such as those of the present case, those acts of reproduction constitute an integral and essential part of a technological process within the meaning of Article 5(1) of Directive 2001/29.

(8) In circumstances such as those of the present case, the printing of an extract is not a temporary act of reproduction, for which reason it cannot fall within Article 5(1) of Directive 2001/29 and consequently it is irrelevant whether that act of reproduction can be an integral and essential part of a technological process.

(9) The lawful use of a work within the meaning of Article 5(1) of Directive 2001/29 covers any form of use of a work which does not require the copyright holder's consent or which is explicitly authorised by the copyright holder; in the event of use of a work in the form of a reproduction, the copyright holder's consent is not required if the reproduction is authorised on the basis of one of the exceptions laid down by Article 5(2) and (3) of Directive 2001/29, if the Member State concerned has transposed that exception or limitation into national law and if the reproduction meets the requirements of Article 5(5) of Directive 2001/29.

(10) The scanning of entire newspaper articles, subsequent processing of the reproduction and the storing of the reproduction which contains one or more text extracts of 11 words, in circumstances such as those of the present case, do not enable a lawful use of the work within the meaning of Article 5(1) of Directive 2001/29, as the text extracts of 11 words are printed and used in the business's activity of writing of summaries of newspaper articles, although the rightholder has not authorised that activity.

(11) In assessing whether temporary acts of reproduction have independent economic significance within the meaning of Article 5(1) of Directive 2001/29, it is necessary to establish whether an economic advantage stems directly from the temporary acts of reproduction.

(12) The user's efficiency gains from temporary acts of reproduction in circumstances such as those of the present case cannot be taken into account in assessing whether those acts have independent economic significance within the meaning of Article 5(1) of Directive 2001/29.

(13) The scanning by a commercial business of entire newspaper articles, the subsequent processing of the reproduction, and the storing and printing of part of the reproduction, consisting of one or more text extracts of 11 words, in circumstances such as those of the present case, cannot be considered as particular cases which are not contrary to a normal exploitation of newspaper articles and do not unreasonably prejudice the legitimate interests of the rightholder within the meaning of Article 5(5) of Directive 2001/29.

(1) .

(2) - OJ 2001 L 167, p. 0010.

(3) - This footnote only concerns the Slovenian version of this Opinion.

(4) - Bekendtgørelse af lov om ophavsret, No 763 of 30 June 2006 (consolidated version of the Law on copyright, No 763 of 30 June 2006). The translation into English of the consolidated version of the Danish Law on copyright is available on the website of the Danish Minister for Culture at: www.kum.dk/sw832.asp.

(5) - The order for reference does not explain how these summaries are drawn up or what their exact content is. It is also not clearly indicated what the link is between these summaries and the clippings of newspaper articles composed of the search word and the five words preceding and following it (see point 15 of this Opinion). It is not explicitly indicated anywhere in the order for reference that the extracts of 11 words are used exclusively for internal purposes, or whether it is also possible that these extracts are sent to Infopaq's customers.

(6) - This is a TIFF (Tagged Image File Format) file.

(7) - This is an OCR (Optical Character Recognition) server.

(8) - ASCII is the acronym for American Standard Code for Information Interchange.

(9) - This footnote only concerns the Slovenian version of this Opinion.

(10) - This footnote only concerns the Slovenian version of this Opinion.

(11) - In its questions, the national court uses the expression 'Infosoc Directive' for Directive 2001/29; 'Infosoc' is the abbreviation of the English expression 'information society'. Because of the subsequent use of the abbreviation for that Directive in this Opinion I will use the expression 'Directive 2001/29'.

(12) - For the Austrian Government's position, see point 26 of this Opinion.

(13) - Directive 2001/29 places particular emphasis on protection of copyright and related rights in the information society but is not limited to that area. Its purpose is, on the one hand, through harmonisation of certain aspects of copyright and related rights in the information society, to participate in the functioning of the internal market and, on the other hand, to implement certain international obligations in this area. Concerning the latter point, this means primarily, as may be seen from recital 15 in the preamble to Directive 2001/29, the implementation of obligations under two international conventions adopted in the context of the World Intellectual Property Organisation (WIPO), the 'WIPO Copyright Treaty' and the 'WIPO Performances and Phonograms Treaty'. See, in the legal literature, for example, Lehmann, M., 'The EC Directive on the Harmonisation of Certain Aspects of Copyright and Related Rights in the Information Society - A Short Comment', International review of industrial property and copyright law, No 5/2003, p. 0521.

(14) - See, to that effect, the Green Paper 'Copyright and related rights in the information society' COM(95) 382 final p. 49; Vivant, M., 'Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society', in Lodder, A.R., Kaspersen, H.W.K. (eds), Edirectives: Guide to European Union Law on E-Commerce, Kluwer Law International, Haag 2002, p. 0098; Lehmann, M., op. cit. (footnote 13), p. 0523, footnote 18.

(15) - See, to that effect, the Green Paper 'Copyright and related rights in the information society' COM(95) 382 final.

(16) - Allowing the development and normal functioning of new technologies means, for example, that reproduction which is technically necessary for the normal functioning of the Internet or for the use of software is authorised. That is clearly apparent from, for example, recital 33 in the preamble to Directive 2001/29, under which it is necessary to exclude from the reproduction right acts which enable browsing and the making of 'cache' copies; the requirement that the reproduction right does not make impossible the normal functioning of new technologies also follows from other directives such as Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programmes (OJ 1991 L 122, p. 0042), which provides in its 17th recital that 'the exclusive rights of the author to prevent the unauthorised reproduction of his work have to be subject to a limited exception in the case of a computer program to allow the reproduction technically necessary for the use of that program by the lawful acquirer'.

(17) - See, for example, Case C-306/05 SGAE [2006] ECR I11519, paragraph 31; Case C-357/98 Yiadom [2000] ECR I9265, paragraph 26; and Case C-245/00 SENA [2003] ECR I1251, paragraph 23.

(18) - See, in the legal literature, for example, Vivant, M., op. cit. (footnote 14), p. 0098, who defines reproduction as 'fixation' of the work in a medium. Kritharas, T., 'The Challenge of Copyright in Information Society. Copyright on the Internet: Current Legal Aspects', Revue hellénique de droit international, No 1/2003, p. 0022 (with references to United Kingdom case-law) descibes the reproduction right in graphic terms: 'What is worth copying is, prima facie, worth protecting [by copyright]'.

(19) - The objective of a high level of protection is apparent in particular from recital 9 in the preamble to Directive 2001/29, which provides that '[a]ny harmonisation of copyright and related rights must take as a basis a high level of protection, since such rights are crucial to intellectual creation'; this objective also follows indirectly from recitals 4 and 10. Recital 4 provides that '[a] harmonised legal framework on copyright and related rights, through increased legal certainty and while providing for a high level of protection of intellectual property, will foster substantial investment in creativity and innovation'; recital 10 in the preamble to the Directive provides that authors must 'receive an appropriate reward for the use of their work' and that '[a]dequate legal protection of intellectual property rights is necessary in order to guarantee the availability of such a reward'. The requirement of a high level of protection which allows them to receive an appropriate reward for the use of their work is confirmed by the case-law: see in that respect SGAE, op. cit. (footnote 17), paragraph 36.

(20) - The reproduction in part of an image can also be given as an example. If the image represents a figure on a white background, it cannot be determined on the basis of the photograph (that is, the reproduction), part of which is a white background, which image it is. If however there is in the photograph a part of a figure and it is clear that it is an exact reproduction of that image, there is reproduction in part. I will also give a more extreme example: if in the extracts from newspaper articles produced by Infopaq there was only one word, for example 'and' or only the name of a given company, it would not be possible to state which newspaper article that extract came from and in that case there would not be reproduction in part.

(21) - I note as a comparison, concerning problems in determining the length of quotations, that in the context of commentaries on Article 10(1) of the Berne Convention for the Protection of Literary and Artistic Works (of 9 September 1886, completed at Paris on 4 May 1896, amended at Berlin on 13 November 1908, completed at Berne on 20 March 1914, amended at Rome on 2 June 1928, at Brussels on 26 June 1948, at Stockholm on 14 July 1967, at Paris on 24 July 1971, and amended on 28 September 1979), which authorises quotations, the question of an upper permissible limit in respect of quotations was excluded and it has been stated that it would be difficult to apply a quantitative limitation on length. See for example Ricketson, S., Ginsburg, J.C., International Copyright and Neighbouring Rights. The Berne Convention and Beyond, Vol. I, Oxford University Press, New York 2005, p. 0788, section 13.42; Ricketson, S., The Berne Convention for the protection of literary and artistic works: 1886-1986, Centre for Commercial Law Studies, Queen Mary College; Kluwer, London 1987, p. 0493, section 9.23.

(22) - For poems and well-known quotations, a few words suffice to constitute reproduction. Thus for example the quotation 'Et tu, Brute?' contains only three words, but there can be no doubt that this is a reproduction in part of the words of the play 'Julius Caesar' by William Shakespeare. If on the contrary as an example three words are taken from an extract from a newspaper article mentioned by the national court (see point 15 of this Opinion) - 'sale of a telecommunications group' - it is very difficult to state with certainty that it is a specific reproduction in part from a given newspaper article.

(23) - See point 14 of this Opinion.

(24) - See point 25 of this Opinion.

(25) - Explanatory memorandum to the proposal for a European Parliament and Council Directive on the harmonisation of copyright and certain related rights in the information society, COM(97) 628 final, p. 0029, paragraph 3.

(26) - Examples of acts of reproduction which must be excluded under Article 5(1) are also cited in the report from the Commission to the Council, the European Parliament and the Economic and Social Committee on the application of Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society, SEC(2007) 1556, p. 0003: reproductions on internet routers, reproductions created during browsing, in RAM (Random Access Memory) memory or in cache memory.

(27) - See, to that effect, for example Lehmann, M., op. cit (footnote 13), pp. 523-524.

(28) - Hugenholtz, P.B., 'Caching and Copyright: The Right of Temporary Copying', European Intellectual Property Review, No 10/2000, p. 0482 - he defines 'caching' as the 'automatic creation of temporary digital copies of data... in order to make the data more readily available for subsequent use'.

(29) - Kritharas, T., op. cit. (footnote 18), p. 0034, states that Directive 2001/29, by virtue of Article 5(1), excludes the creation of 'cache' copies from the reproduction right. See, for example, Hugenholtz, P. B., op. cit. (footnote 28), p. 0482 et seq., who, from the point of view of the protection of copyright, analyses different types of prememorisation (caching).

(30) - This point is also confirmed by the explanatory memorandum to the proposal for a European Parliament and Council Directive on the harmonisation of certain aspects of copyright and related rights in the information society, COM(97) 628 final, p. 0029, paragraph 3, from which it is apparent that the exception in Article 5(1) concerns the Internet as well as acts of reproduction not taking place on the Internet. Thus, for example, Plaza Penadés, J., 'Propiedad intelectual y sociedad de la información (la Directiva comunitaria 2001/29/CE)', in de Paula Blasco Gascó, F. (ed.), Contratación y nuevas tecnologías, Consejo General del Poder Judicial, Madrid 2005, p. 0147.

(31) - RAM memory (Random Access Memory) functions in such a way that the data are temporarily stored there to enable the functioning of the computer; when the user switches off the computer the data stored in the RAM are deleted. See, to that effect, Kritharas, T., op. cit. (footnote 18), p. 0022; Westkamp, G., 'Transient Copying and Public Communications: The Creeping Evolution of Use and Access Rights in European Copyright Law', George Washington International Law Review, No 5/2004, p. 1057, note 2.

(32) - See point 101 et seq. of this Opinion.

(33) - This information is given by the national court in paragraph 2 of the order for reference describing the process for the production of extracts from newspaper articles.

(34) - See the study 'Study on the implementation and effect in Member States' laws of Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society', Institute for Information Law, University of Amsterdam, Netherlands, 2007, available at: http://ec.europa.eu/internal-market/copyright/docs/studies/infosoc-study-en.pdf, p. 0023, which considers lasting reproduction to mean a 'tangible permanent copy', and temporary reproduction to mean a 'non-visible temporary copy'.

(35) - See point 101 et seq. of this Opinion.

(36) - The national court uses the term 'temporary act of reproduction'; as in point 71 of this Opinion I have already pointed out that it is not clear whether the storing of an extract consisting of 11 words is a temporary act of reproduction, in considering the questions referred I will use the expression 'act of reproduction'.

(37) - To this effect see also the study 'Study on the implementation and effect in Member States' laws of Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society', op. cit. (footnote 34), p. 0032, which states that the term 'transient' in Article 5(1) of Directive 2001/29 concerns a 'very short lifetime'.

(38) - This is also clear from the usual meanings of 'transient' and 'temporary' in various languages. In English the term 'temporary' means 'lasting for only a limited period of time' while the term 'transient' means 'quickly passing away'; see the Oxford Dictionary of English, 2nd edition, Oxford University Press, Oxford 2005. Similarly in German the term 'vorübergehend' (temporary) is defined as of a 'certain period of time; temporary', while 'flüchtig' (transient) is (at point 3 of the definition of 'transient') defined as 'quickly passing away, which does not last long'; see Duden - Deutsches Universalwörterbuch, 6th edition, Mannheim 2006. In French the term 'provisoire' (temporary) means 'only lasting for a limited time, while waiting for something definitive', while 'transitoire' (transient) means 'which does not last'; see Nouveau Larousse Encyclopédique, Vol. 2, Larousse, Paris 2003. In Italian the term 'temporaneo' (temporary) means 'which lasts for a limited period of time', while 'transitorio' (transient) means 'which lasts briefly'; see Dizionario Italiano Sabatini Coletti, Giunti, Florence 1997. It is however the case that there are nuances which must ultimately be drawn from the context to arrive at the meaning in individual cases.

(39) - See the study 'Study on the implementation and effect in Member States' laws of Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society', op. cit. (footnote 34), p. 0032.

(40) - Ibid.

(41) - Legal commentators point out that it is not absolutely clear what that means. See for example Hart, M., 'The Copyright in the Information Society Directive: An Overview', European Intellectual Property Review, No 2/2002, p. 0059. Mayer, H.-P., 'Richtlinie 2001/29/EG zur Harmonisierung bestimmter Aspekte des Urheberrechts und der verwandten Schutzrechte in der Informationsgesellschaft', Europäische Zeitschrift für Wirtschaftsrecht, No 11/2002, p. 0327, who describes that condition as 'problematic'.

(42) - This dilemma in the interpretation of the condition that the temporary act of reproduction must be an integral and essential part of a technological process is raised for example in the study 'Study on the implementation and effect in Member States' laws of Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society', op. cit. (footnote 34), p. 0033. See also Spindler, G., 'Europäisches Urheberrecht in der Informationsgesellschaft', Gewerblicher Rechtsschutz und Urheberrecht, No 2/2002, p. 0111.

(43) - Such as Spindler, G., op. cit. (footnote 42), p. 0111; and the study 'Study on the implementation and effect in Member States' laws of Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society', op. cit. (footnote 34), p. 0033.

(44) - The explanatory memorandum to the proposal mentions 'certain acts of reproduction which are dictated by technology'; Explanatory memorandum to the proposal for a European Parliament and Council Directive on the harmonisation of certain aspects of copyright and related rights in the information society, COM(97) 628 final, p. 0029.

(45) - This footnote only concerns the Slovenian version of this Opinion.

(46) - Communication of the work to the public, making available to the public or distribution of the work.

(47) - Concerning the fact that the condition of lawful use concerns lawful use on the basis of Article 5(2) and (3) of Directive 2001/29, see, for example, Waelde, C., MacQueen, H., 'The Scope of Copyright', Electronic Journal of Comparative Law, No 3/2006, p. 0063; see also the study 'Study on the implementation and effect in Member States' laws of Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society', op. cit. (footnote 34), p. 0034, which states that the condition of lawful use of Article 5(1) concerns legal norms outside Article 5(1).

(48) - See point 111 of this Opinion.

(49) - It is stated, for example, in the study 'Study on the implementation and effect in Member States' laws of Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society', op. cit. (footnote 34), p. 0034: the reproduction of a work in the RAM memory which occurs at the same time as the making of a private use copy in accordance with (a national implementation of) Article 5(2)(b) of Directive 2001/29 may be exempted from the reproduction right since the use it enables - the making of a private use copy - is lawful.

(50) - Article 5(2) of Directive 2001/29 provides for exceptions and limitations to the reproduction right provided for in Article 2 of the Directive, while Article 5(3) provides for exceptions and limitations to the reproduction right provided for in Article 2 and to the right of communication of works to the public and the right of making available to the public the subject-matter of related rights provided for in Article 3 of that Directive.

(51) - Recital 32 in the preamble to Directive 2001/29 provides that the 'Directive provides for an exhaustive enumeration of exceptions and limitations to the reproduction right'.

(52) - It should be added in connection with that article that it was included in Directive 2001/29 following the model of Article 10bis of the Berne Convention for the Protection of Literary and Artistic Works, op. cit. (footnote 21). More precisely, the first exception provided for in Article 5(3)(c) was included in Directive 2001/29 following the model of Article 10bis(1) of the Berne Convention, while the second exception provided for in Article 5(3)(c) was included in Directive 2001/29 following the model of Article 10bis(2) of the Berne Convention.

(53) - The other exceptions cannot be relevant in the present case. I note in particular, in connection with the exception provided for in Article 5(3)(d), which authorises 'quotations for purposes such as criticism or review, provided that they relate to a work or other subject-matter which has already been lawfully made available to the public, that, unless this turns out to be impossible, the source, including the author's name, is indicated, and that their use is in accordance with fair practice, and to the extent required by the specific purpose', that in the present case the extracts from newspaper articles could certainly have characteristics of quotations, but not quotations for purposes such as criticism or review. Those quotations are not in fact used for criticisms or reviews of the newspaper articles in question but are on the contrary used for the production of summaries of the newspaper articles.

(54) - See, for example, Berger, C., 'Elektronische Pressespiegel und Informationsrichtlinie. Zur Vereinbarkeit einer Anpassung des § 49 UrhG an die Pressespiegel-Entscheidung des BGH mit der Informationsrichtlinie', Computer und Recht, No 5/2004, p. 0363; Glas, V., Die urheberrechtliche Zulässigkeit elektronischer Pressespiegel. Zugleich ein Beitrag zur Harmonisierung der Schranken des Urheberrechts in den Mitgliedstaaten der EU, Mohr Siebeck, Tübingen 2008, p. 0131. It is also apparent from legal commentary on the interpretation of Article 10bis(1) of the Berne Convention on the model of which the first exception provided for in Article 5(3) was included in Directive 2001/29,

that newspapers and magazines generally fall within that exception: see for example Ricketson, S., op. cit. (footnote 21), p. 0501, section 9.30, and p. 503, section 9.32. Legal commentators also state that Article 10bis(1) of the Berne Convention does not in principle prevent extension to online editions of newspapers and magazines: see on that subject Ricketson, S., Ginsburg, J.C., op. cit. (footnote 21), p. 0801, paragraph 4.

(55) - The right of communication of works to the public and the right of making works available to the public are provided for in Article 3(1) of Directive 2001/29, which provides that 'Member States shall provide authors with the exclusive right to authorise or prohibit any communication to the public of their works, by wire or wireless means, including the making available to the public of their works in such a way that members of the public may access them from a place and at a time individually chosen by them'.

(56) - Directive 2001/29 describes communication to the public in recital 23 in the preamble, from which it is apparent that it covers 'allcommunication to the public not present at the place where the communication originates' and includes 'any such transmission or retransmission of a work to the public by wire or wireless means, including broadcastings'. This would include for example public performance, broadcasting, and transmission via cable or satellite of works.

(57) - Making available to the public is described in the recital 24 in the preamble to the Directive, from which it is apparent that this covers 'all acts of making available... to members of the public not present at the place where the act of making available originates'. It is apparent from legal commentary concerning the WIPO Treaties (WIPO Copyright Treaty and WIPO Performances and Phonograms Treaty), which are transposed into Community law by Directive 2001/29, that making available to the public means making available to the public via information systems thanks to which a given work may be obtained; see Ficsor, M., The Law of Copyright and the Internet. The 1996 WIPO Treaties, their Interpretation and Implementation, Oxford University Press, New York 2002, p. 0183, section 4.56. See also Reinbothe, J., von Lewinski, S., The WIPO Treaties 1996. The WIPO Copyright Treaty and The WIPO Performances and Phonograms Treaty. Commentary and Legal Analysis, Butterworths, London 2002, p. 0109, paragraph 20.

(58) - Sending by email is definitely not transmission or retransmission of a work to the public by wire or wireless means, including broadcasting.

(59) - Sending individual customers extracts from newspaper articles by email cannot in my opinion be considered as making available to the public. As is apparent from Article 3(2) of Directive 2001/29, the condition for the existence of making available to the public is that members of the public have access at a place and time chosen by them. That condition is however not fulfilled in the case of sending by email because this is specific correspondence with given clients in the context of which those clients do not themselves have access to the reproductions in part of newspaper articles, nor do they chose the time at which they have access to them. Legal commentators also state that transmission of a work by email does not fall under making available to the public. See, for example, von Lewinski, S., 'Die Multimedia-Richtlinie - Der EG-Richtlinienvorschlag zum Urheberrecht in der Informationsgesellschaft', MultiMedia und Recht, No 3/1998, p. 0116; Spindler, G., op. cit. (footnote 42), p. 0108.

(60) - Glas, V., op. cit. (footnote 54), p. 0144. Such an interpretation is also confirmed by Article 10bis(2) of the Berne Convention, on the model of which this exception was included in Directive 2001/29 and which provides: 'It shall also be a matter for legislation in the countries of the Union to determine the conditions under which, for the purpose of reporting current events by means of photography, cinematography, broadcasting or communication to the public by wire, literary or artistic works seen or heard in the course of the event may, to the extent justified by the informatory purpose, be reproduced and made available to the public' (emphasis added). See Ricketson, S., Ginsburg, J.C., op. cit. (footnote 21), p. 0802 (section 13.54), p. 0805 (section 13.55).

(61) - Legal commentators state that this condition is not found either in international treaties or in national copyright law. See, to that effect, Westkamp, G., op. cit. (footnote 31), p. 1101. See also the study 'Study on the implementation and effect in Member States' laws of Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society', op. cit. (footnote 34), p. 0035.

(62) - Explanatory memorandum to the proposal for a European Parliament and Council Directive on the harmonisation of certain aspects of copyright and related rights in the information society,

COM(97) 628 final, p. 0037.

(63) - What is essential here is whether the act of reproduction has independent economic significance for the person who carries out the act of reproduction or for the copyright holder.

(64) - See the study 'Study on the implementation and effect in Member States' laws of Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society', op. cit. (footnote 34), p. 0035, which also argues in this manner and states that - if Article 5(1) of Directive 2001/29 is to have real meaning - independent economic significance cannot be interpreted solely in terms of the interests of rightholders.

(65) - Prim. Corbet, J., 'De ontwerp-richtlijn van 10 december 1997 over het auteursrecht en de naburige rechten in de Informatiemaatscjhappij', Informatierecht/AMI, No 5/1998, p. 0096, who considers that caching has economic significance because it increases the speed of transmission of data, for which reason services which involve transmission of data are more attractive to customers. However, Corbet refers only to economic significance and not independent economic significance. See also Hugenholtz, P.B., Koelman, K., Digital Intellectual Property Practice Economic Report, Institute for Information Law (IViR), p. 0024, footnote 36, report available at: www.ivir.nl/publications/hugenholtz/PBH-DIPPER.doc.

(66) - Legal commentators also state that reproduction which constitutes an actual economic activity in its own right would have independent economic significance. See to that effect Hugenholtz, P.B., op. cit. (footnote 28), p. 0488; Westkamp, G., op. cit. (footnote 31), p. 1098; Hugenholtz, P.B., Koelman, K., op. cit. (footnote 65) p. 24.

(67) - This reasoning applies to the storing of newspaper articles if the national court finds that a temporary act of reproduction is involved; if not, the storing of extracts cannot be justified on the basis of Article 5(1) of Directive 2001/29.

(68) - See the reasoning of Westkamp, G., op. cit. (footnote 31), p. 1101, who states that it is always necessary to assess the economic significance of temporary acts of reproduction in relation to the most lasting final act of reproduction.

(69) - As regards storing of extracts from newspaper articles, this analysis applies if the national court finds that this is a temporary act of reproduction; if not, the storing of extracts cannot be justified on the basis of Article 5(1) of Directive 2001/29.

(70) - I would like to clarify in connection with Article 5(5) of Directive 2001/29 that that provision lays down additional conditions for the application of the exceptions and limitations to the reproduction right, to the right of communication to the public, to the right of making available to the public and to the right of distribution of the work or subject-matter of related rights. As is apparent from its wording, Article 5 of Directive 2001/29 concerns the 'exceptions and limitations provided for in paragraphs 1, 2, 3 and 4'; those paragraphs govern the exceptions and limitations to the reproduction right (paragraphs 2 and 3), to the right of communication to the public and of making available to the public (paragraph 3) and to the distribution right (paragraph 4).

(71) - See, for example, Hart, M., op. cit. (footnote 41), p. 0061; Kritharas, T., op. cit. (footnote 18), p. 0030; Lehmann, M., op. cit. (footnote 13), p. 0526.

(72) - Berne Convention for the Protection of Literary and Artistic Works, op. cit. (footnote 21). The Community is not a party to the Berne Convention, but it modelled certain provisions of Directive 2001/29 on that convention. See the list of parties to the Berne Convention at: www.wipo.int/treaties/en/ShowResults.jsp?country-id=ALL & start-year=ANY & end-year=ANY & search-what=C & treaty-id=15.

(73) - The European Community is a party to the World Intellectual Property Organization Copyright Treaty; see the list of parties at: www.wipo.int/treaties/en/ShowResults.jsp?country-id=ALL & start-year=ANY & end-year=ANY & search-what=C & treaty-id=16.

(74) - Agreement on Trade-Related Aspects of Intellectual Property Rights. The Community is a contracting party to the TRIPS Agreement; the power to conclude that treaty is shared between the Community and the Member States; see the Opinion of the Court of Justice of 15 November 1994 (Opinion 1/94 [1994] ECR I5267, point 3).

(75) - Recital 44 provides moreover that the exceptions and limitations 'may not be applied in a way

which prejudices the legitimate interests of the rightholder or which conflicts with the normal exploitation of his work or other subject-matter'. That recital therefore refers explicitly to two of the conditions laid down by Article 5(5) of Directive 2001/29.

(76) - Such a particular objective could, for example, be the reproduction of a work for educational purposes, for the benefit of invalids or for public security. See, concerning the particular exceptions in those areas, Article 5(3)(a), (b) and (e) of Directive 2001/29. See Ricketson, S., Ginsburg, J.C., op. cit. (footnote 21), p. 0764, section 13.12; Reinbothe, J., von Lewinski, S., op. cit. (footnote 57), p. 0124, paragraph 15.

(77) - I note in that respect that the exception provided for in Article 5(3)(c) of Directive 2001/29 does not explicitly state that informing the public about current events cannot have a commercial purpose; in that respect, the exception provided for in Article 5(3)(c) of Directive 2001/29 differs for example from the exceptions provided for in paragraph (2)(b) and (c) of that Article, which expressly prohibits reproductions for private use, or which are made by publicly accessible libraries or establishments, with a commercial purpose.

(78) - See to that effect Ficsor, M., op. cit. (footnote 57), p. 0516, section C10.03.

(79) - Reinbothe, J., von Lewinski, S., op. cit. (footnote 57), p. 0125, paragraph 18, state that in the context of this condition the relevant market for exploitation of the work which a given exception could affect must be defined. In that context he puts forward the example (paragraph 19) that the sale of photocopied textbooks would affect the market for school books and could not therefore be justified on the basis of the exception which authorises reproduction for educational purposes.

(80) - It is appropriate to undertake this analysis irrespective of the fact that - as stated by the national court and the two parties to the main proceedings - the drawing up of summaries is permissible under Danish law. I note as an example that reading photocopied books is not prohibited, but that does not justify photocopying of a book without restriction.

(81) - Ficsor, M., op. cit. (footnote 57), p. 0516, section C10.03.

(82) - Reinbothe, J., von Lewinski, S., op. cit. (footnote 57), pp. 126-127, paragraph 22.

(83) - This analysis applies to the storing of extracts from newspaper articles if the national court finds that this is a temporary act of reproduction; if not the storing of extracts cannot be justified on the basis of Article 5(1) of Directive 2001/29.

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Subject
Approximation of laws; Industrial and commercial property; Freedom of establishment and services; Right of establishment; Free movement of services

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Digital Copyright and Related Rights Law

Guido Westkamp

Study Guide

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General Outline

This course addresses the most important rights and related legal issues that arise in the context of digital uses of informational works under the law of copyright and related rights.

The course examines the protection afforded to computer programs, databases, as well as looking at the implication of digital copyright as regards exclusive rights, limitations and the protection of digital rights management systems. The course intends to provide participants with a sound knowledge of the structure of the relevant legal provisions and their purpose and function so as to enable them to independently assess opportunities for protection and their respective limits. The course will also include practical examples where participants are given the opportunity to apply their acquired knowledge of the law to factual examples or hypothetical disputes. However, participants should note that the main purpose is to provide an introduction to fundamental principles rather than specific problem areas, which is necessary so as to permit independent revision.

Consequentially, the course covers specific subject matter – computer programs and databases – first before turning towards the effects of copyright harmonisation following the 2001 EU Directive on Copyright and Related Rights in the Information Society. The main objective is to allow participants to acquire a solid understanding of the general framework and underlying rationale, as well as to introduce the reader to consequential problem areas as identified by commentators and the partially deviating approaches in national law. Specific emphasis is placed upon those provisions that shape the boundaries of copyright rather than assessing meticulously specific detailed issues under UK law. These include the scope of exclusive rights, the general concept of limitations and the practice and effects resulting from the protection of digital rights management measures, here particularly technological access and use control mechanisms. An overview of the development in competition law – often counteracting tendencies of expansion in IP law – and an introduction to the treatment of cross-border copyright disputes wrap up the course.

Each chapter is divided in sub paragraphs dealing with the core regulatory function and each contains relevant and recent jurisprudence on individual aspects that are intended as an illustration for how courts approach the legal issues at stake. Emphasis here is placed on the jurisprudence by the European Court of Justice and the jurisprudence of relevant Supreme Courts. Because of the importance of legal harmonisation and the international nature of the subject a comparative perspective is taken.

There is no prescribed allocation of time since each chapter may cover different aspects to varying degrees. This means that the content will be spread unevenly over a period of 20 hours of lectures.

You should note that there is much overlap between specific issues. Therefore, the individual chapters should not be treated as a comprehensive and close regulation – for example, many of the problems surrounding the scope of limitations must be addressed, under different aspects, again in the context of digital rights management.

1 A Primer on IP

OUTLINE

Before entering into more detailed discussion, it seems advisable to introduce the reader to the basics of intellectual property and to the overall current trends shaping the debate. The aim is to provide a bird's eye view of relevant sources of law, international and European influences and the structure and purpose of IP rights and adjacent rights.

LECTURE

What is deemed to belong to the remit of IP rights today – that is, predominantly copyright, patents, trademarks and designs – has different roots and was created out of rather divergent historical developments. We will approach the different types of IP rights by their function and underlying rationales as they are accepted in national law first, before continuing with the influences of European and international law. Despite the truly international character and the need to harmonise IP rights there is no such thing as a global copyright, trade mark or patent. All IP rights are, with very few exception in the EU, territorial, that is, the protection afforded is limited in theory to the country where the right was awarded. The reason is that the grant of a patent, for example, is an act by a sovereign state and such act does not have any implications on other states.

Sources of law

One may therefore distinguish the various sources of law in IP. These are:

- National law: in the UK, predominantly the

    o Copyright, Designs and Patents Act 1988
    o Patents Act 1977
    o Registered Designs Act 1949
    o Trade Marks Act 1994

- At the European level:

    o The *EC Treaty* (now the Treaty for the Establishment of the European Union = TFEU). This contains the primary law of the European Union, that is, particularly the fundamental freedoms guaranteed by EU law to EU citizens. The most relevant provisions pertain to the free movement of goods and services and the rules on competition law. The latter distinguish between the abuse of a dominant position and agreements and concerted practices (cartels) restricting competition. In relation to the latter, the IP remit is extended by certain regulations which permit,

initially, certain agreements relating to IP rights, such as in the field of franchising, technology transfer and research and developments contracts. The reason why IP rights fall in the ambit of competition law is the fact that they give a monopoly and thereby allow the exclusion of others from, for example, licensing agreements.

o *Regulations*: under EC law, a regulation is a piece of legislation that is immediately applicable, i.e. does not need to be transposed into national law. Regulations have, therefore, direct effect. Regulations exist in relation to Community Trade Mark and the Community Design.

o *Directives* are the most regular means of legal approximation. A directive must be transposed, or implemented, into national law, to become binding. A directive is binding only as far as the overall aim is concerned, that is, member states have a certain flexibility. Directives can be found in the field of all IP rights, most notably in copyright law, where the laws have been approximated by way of seven copyright directives of varying importance. For example, there exist directives harmonising the protection of certain subject matter under copyright, such as computer programs and databases, or directives concerning specific rights such as in the ambit of cross border satellite transmissions and public rental and lending of works. The most important Directive is the Directive on Certain Aspects of Copyright and Related Rights in the Information Society (2001/29/EC) which aims to approximate the laws of member states vertically, that is, it covers subject matter, ownership, limitations and further aspects of copyright concurrently. Directives also exist as regards patents, though here only in relation to inventions in the area of biotechnology. The harmonisation of trade mark and design law was – in addition to the establishment of community titles – also done by way of Directives aiming to approximate the substantive laws of member states.

o A final source of the law is the jurisprudence of the European Court of Justice. This may take two forms. In relation to Community titles, such as the Community Trade Mark and Design Rights, the ECJ (the Court of First Instance) hears disputes relating to, for example, the community trade mark as the last instances. In relation to law that is to be interpreted by the national courts of member states – that is, the law as approximated by European Directives - national courts are obliged to present cases that are to be decided on the basis of community law – including both regulations and directives – to the ECJ for a preliminary ruling (Article 234 EC). That practice means that the national court presents abstract legal questions to the ECJ which is then to respond to that court giving the "correct" interpretation of community law. The aim here is to facilitate a common interpretation of community law across member states.

At the international level, both the EC and the member states are bound by a number of international conventions described below. Typically, these conventions expressly confer a certain level of protection that must be granted. Other conventions apply in order to facilitate the cross border registration of rights. The most important international convention today is the TRIPs-Agreement, which is administered by the World Trade Organisation.

The Branches of IP

In general, the following IP rights are distinguished: copyright, trademarks, patents and designs. There are certain other IP rights not covered here, such as rights in semiconductor topographies, plant varieties and utility models.

Copyright exists to protect certain works of art and science and therefore gives to the author of a work a monopoly of up to seventy years after his death. The exclusive rights afforded contain both a commercial and a moral dimension. The author is given certain exclusive rights covering certain uses of the work, such as the reproduction, distribution or public communication, and in addition is given certain rights that attach to the moral value, that is, that protect his ideational relationship with his work. Further, copyright law contains a range of specific limitations that allow, in certain circumstances, to use the work freely, which responds to the need to persevere the public domains and certain social needs such as media privileges and educational purposes. There are significant differences in how copyright law is understood in different jurisdictions, however, and a distinction is typically made as between the common law copyright countries and the civil law authors rights countries. In short, the common law countries place emphasis on the protection of the work as a tradable object and therefore demand, in order to be protected under copyright law, merely a certain degree of investment, skill or labour; the civil law countries, for historical reasons, emphasise the role of copyright as a legal mechanisms protecting first and foremost the authors personality rights and his relationship with the work he created, and here the standard of originality is higher in that a personal intellectual creation or a work of the mind is required before protection is granted.

That approach has certain practical consequences, such as in the case of works created by employees in the UK and the degree to which moral rights are protected. A further aspect of copyright law concerns the protection afforded to those who – in theory – provide certain commercial services in the cultural sector or who performs works, and therefore copyright also protects – again to varying degrees – the efforts of both performing artists and of certain commercial producers such as the makers of sound recordings, broadcasters, database producers and film producers. These rights are – in most countries – more limited and necessarily producers cannot claim moral rights. Copyright is to some extent harmonised in the European Union. The harmonisation process actually commenced when the national differences in copyright protection – and the general territorial nature of IP right – began to negatively impact on the principle of free movement of goods and services in the EC. The European Court of Justice here imposed a general principle of exhaustion that precluded the owner of copyright from relying on the territorial nature of his copyright so as to prevent parallel imports, and

this European exhaustion principle can today be found in all IP related pieces of legislation. The history then continues with the adoption of a number of directives – legislation that becomes binding only once it is implemented in national law – on certain aspects of copyright, and today legislation is in place that aims to approximate the law in relation to computer programs and databases, the term of protection, certain exclusive rights such as lending and renting and some aspects of cross border satellite broadcasting.

An attempt to "vertically" harmonise copyright was the Directive on Copyright in the Information Society, adopted in 2001. This Directive is of significance and will be discussed here in much detail. The legislation covers exclusive rights and contains certain fundamental rules on copyright limitations, as well as requiring member states to protect digital means of copyright protection such as digital rights management systems and technological protection systems. The rationale for harmonisation is to overcome existing disparities that have an effect on the workings of the internal market.
At the international level, and prior to any EC activities, some harmonising effect may be attributed to international convention law. In particular, the Revised Berne Convention (1886) aimed to overcome the territorial nature of copyright law – especially because in the 19th century authors found it difficult to be afforded protection in foreign countries.

The Berne Convention was the blueprint for a range of other conventions, such as the Universal Copyright Conventions and the Rome Convention protecting certain neighbouring rights such as the rights of performers, film producers and broadcasters. These Conventions contain specific mechanisms under which union members must afford, to different degrees, protection to foreign authors and right holders. The way it works is as follows: first, there are certain minimum rights that must be granted, such as the reproduction right for certain classes of works including, for instance, literary, dramatic or artistic works, work of architecture and original collections. Where such minimum rights do not apply, union members must afford protection in accordance with their own law, i.e. they must not discriminate on the basis of nationality or because the place of first publication is in a foreign country. There are few exceptions to that rule where reciprocity may be demanded. The Berne Convention is administered by the World Intellectual Property Organisation in Geneva, as are many other international conventions. Despite these efforts, there is still no consensus on the rationale of copyright law.

The position in patent law is decisively different. A patent is granted for an invention, that is, a technical solution to a technical problem which is new, shows an inventive step and is industrially applicable. A patent can be applied for both nationally on a European basis under the European Patent Convention, and in the latter case the successful applicant acquires a bundle of national patent rights for the countries designated. International agreements such as the Patent Cooperation Treaty have further eased the way for registering inventions as patents in more than one country but the harmonising effect here is restricted to the procedural aspects of registration. The PCT, therefore, likewise results in a bundle of national rights but eases the application procedure. The only field of activity where there is community legislation concerning inventions is a

Directive dealing with biotechnological inventions, whereas an attempt to harmonise the standard of protection for computer implemented inventions at EU level failed.

In relation to trade mark law, the situation in the EU appears to be much more harmonised, thanks to the existence of legislation that harmonises the substantive rules on trade marks and established identical conditions for registration and infringement. In addition, there is a plethora of case law concerning trade marks. The purpose of the European advances in trade mark law was twofold, in both extending the notion of protectable signs across the Union and in implementing a dedicated property right in the mark that exists irrespective of any business or a goodwill associated with such. A trade mark therefore is a sign that has, as its primary function, to distinguish the goods or services of one trader from another. There is a comparatively huge amount of litigation concerning trade marks before the European Court of Justice. There are different routes of protecting signs as trade marks, and the easiest way is by registration. In Europe, both national trade mark laws and a unique community trade mark right co-exist, and for both protection is afforded on the basis of registration, in some countries such as Germany, trade mark rights may be acquired through the use of a non-registered sign where such sign has acquired a certain degree of recognisability in commerce, though in the UK unregistered trade marks continue to be protected under the law of passing off, which does not give a licensable property right but which allows a trader to prevent the use of a name or other insignias for which he has acquired goodwill if such use causes confusion. Registered trademarks are protected to different degrees, and a trade mark that has a reputation is afforded more protection than a merely registered trade mark. At the international level, a distinction is also made as regards well known and famous marks which may be protected above and beyond the uses they have been registered for. There is currently an ongoing debate in Europe as to the general rationale underlying trade mark law and the protected functions an owner of a trade mark may rely upon. Whereas it is certain that the core function of the mark lies in its capacity to distinguish, the Court of Justice has sometime referred to other functions that should be protected, such as the advertising, investment or goodwill function afforded to the mark.

The law relating to designs covers, in particular, three and two dimensional products that are in a certain way unique. Like trade mark, there exists a Directive harmonising national law on designs and a Regulation according to which a community design may be applied for. As with trade marks, the latter gives a pan-European right rather than a bundle of national rights and here specific rules apply exclusively. The reason for European harmonisation was the patchy landscape of design protection. Because industrial designs fall somewhere in between the realms of copyright and patents, rules on design protection were highly heterogeneous. In the UK, this led to a distinction between (community and national registered designs and a continued application of legal protection under a separate chapter in the Copyright, Designs and Patents Act affording protection to three dimensional designs where these are novel and have eye appeal. In addition , protection under artistic copyright, including complex limitations, continues to be available.

A further approach to harmonise the law in Europe was made in relation to geographical indications. Here, the legislative intention was to afford protection to certain products

that bear some qualities as a result of coming from or being produced in a certain locality. The regulation aims to produce a European registered of protected GIs. The question of protectability and registrability is to be assessed by national authorities.

Patents, trade marks, geographical indications and industrial designs are usually referred to as industrial property right. There is a basic distinction between copyright and industrial property rights. The latter are often subject to registration and, in contrast, to copyright, give a full right to use in commerce. Hence, industrial property rights do not affect the private user. Industrial property rights are also protected by virtue of the Paris Convention, which foresees an obligation to allow foreigners to apply for the registration of a patent to a trade mark and which also provides for a minimum level of protection against unfair competition, specifically against acts causing confusion. As with the Berne and Rome conventions, the Paris Conventions is administered by WIPO.

International IP Mechanisms

Certain instruments are in place covering more than one IP right. At the international level, as mentioned, the most important text is the Agreement on Trade Related Aspects of Intellectual property Rights (TRIPs). That agreement differs from the existing conventions in some respects. It entails a rather high level of protection that TRIPs members must grant. The scope of the agreement is wide and it provides for protection of copyright and related rights (by reference to the existing Berne and Rome Conventions, which thereby become part of TRIPs, patents, trade marks, computer programs and original compilations of data, trade secrets, semi conductor topographies and geographical indications. The agreement is based, as the Berne, Rome and Paris Conventions, on the principles of national treatment and minimum rights. One peculiar aspect of the TRIPs-Agreement is the so-called "most favoured nation" principle, according to which an advantage or privilege that one state affords to another automatically extends to all other TRIPs members. The most important feature of the agreement is, however, that is contains a mechanism for enforcing the required degree of protection. The Agreement both contains, as a requirement, rules on the effective enforcement of IP rights which include civil remedies and border controls, and additionally provides for a dispute resolution mechanism. The latter is important: the TRIPs-Agreement, in contrast to other conventions, has "teeth". The general effect is that a rather high protection level must be established. This presents a problem specifically for developing countries and these problems can partially be seen in counter-movements aiming to adopt IP rights specifically benefitting those countries, in particlaur as regards the protection of traditional knowledge (folklore and biological material) against misappropriation and the claim for extending rights in geographical indications.

Additional Sources of IP Law

A related aspect concerns the complementary protection that may be afforded under the law of unfair competition or the law relating to economic torts in the UK. At the international level, the Paris Convention requires union members to afford protection

against unfair competition (Article 10bis (3)), though the scope of that protection remains dubious.

In some countries, general provisions prohibiting unfair competition are in place. In Germany, for instance, the act of imitating or copying a product in commerce may constitute unfair competition where there are specific additional circumstances rendering the use of a product in such way unfair. In France, a general doctrine against parasitic conduct exists. The UK does not share these approaches but is limited to, particularly, the action for passing off. The reason for the rather distinct treatment lies in the different notions of market freedom that prevail in these countries and which are deeply rooted in legal thinking. This is one of the reasons why the EU has found itself unable to harmonise unfair competition law, though you should note that by now a Directive on Unfair Commercial Practices is in place the primary aim of which is to ensure a high level of consumer protection. That Directive has been implemented in all member states by now though it does not, in the UK, allow a competitor to instigate legal proceedings against another trader such as in cases of product imitation.

In the UK, the most important action protecting interests associated with IP is the action for passing off, which protects the goodwill in the marketplace against a misrepresentation by another trader that causes confusion. It is a general requirement that there is a common field of activity. However, UK courts have consistently rejected the notion that protection may be afforded unless there is actual confusion, and that UK law does not protecet against unfair conduct as such.

ACTIVITIES

1. Assess the potential IP rights that may subsist in a standard mobile phone, and explain how these arise.
2. Explain the basic mechanisms of how international convention law protects IP rights.

General Reading

The following lists the most important texts on IP and its individual branches:

Bently/Sherman, Intellectual Property, 4th ed., London 2008.

Colston/Middleton; Modern Intellectual Property Law, 2nd ed., London 2010.

Copinger & Skone James on Copyright, 2008.

Cornish/Llewelyn, Intellectual Property, 6th ed. London 2007.

2 Copyright Protection of Computer Programs

This lecture considers the protection of computer programs under copyright law, as it currently stands in the European Union.

LECTURE

Introduction

Though not defined anywhere in a statutory text, a computer program can be understood as a series of instructs that causes a certain result in a machine. Hence, the program instructs a machine to perform certain functions. It is this general functionality that distinguishes computer programs from other works protected under copyright law – programs have, therefore, no communicative function. In designing a program., the programmer must first identify the task that is to be carried out and how the program should conceptually achieve this. At this stage, basic steps must be formulated (the algorithm) and this is done by creating flow-charts or logical flow diagrams. The second step consists of writing the individual steps that need to carried out in high level computer language, which is less a creative and more a laborious pursuit. At this stage, the source code is created. The final step is then undertaken by the computer in converting the instructions into operational terms of object code, for which a separate program is utilised.

As noted above, it was highly debated whether computer programs should be treated as a work protectable under copyright at all. However, especially in the early 1980s, voices emerged demanding copyright protection as a literary work, predominantly because copyright arises automatically. A protocol to the Berne Union was agreed according to which member states should treat computer programs a literary works. Whilst some commentators argued that computer programs should be governed by a specific sui generis regime – particularly because of the lengthy term of protection which does not reflect the limited commercial lifespan of software – this route was not followed, assumingly because such sui generis system would have required a new international instrument.

Protection as Literary Works

The adoption of a principle to treat computer programs as literary works meant that they were considered protected ab initio and that the general reciprocity and minimum

rights principles under the Berne Convention applied. The TRIPs-Agreement later expressly included computer programs in Article 10(2)[1].

In Europe, this led to the further adoption of the 1991 Directive on the Legal Protection of Computer Programs (Directive 250/91). That directive sought to approximate the laws of member states and respective passages were introduced into member states laws. In the UK, previously subsistence of copyright had been assumed by courts[2]. A specific problem concerns the level of originality. Whilst in the UK the traditional approach – according to which a work is protected under copyright provided there is sufficient skill and labour – arguably provided for generous protection, the approach by German courts was different. According to the *Debt Collection* decision in 1985, a computer program had to meet the general requirement that it reflected its authors personal intellectual creation. The German Federal Court of Justice asserted that this is only the case where a significant distance from routine and everyday solutions can be shown. This was taken to mean that German law in particular required an above-average level of originality. It was then particularly that difference between the UK and the German approach that caused the European Commission to act.

Rationale and Criteria

Under the Directive, a computer program – which is not defined – is protectable as long as it is the authors own intellectual creation. This follows the notion of an independent creation and any other criteria such as a specifically or highly original solution must not be applied. It follows, roughly, the French test as to whether the work is a work of the mind. The underlying rationale of the Directive was, principally, to afford computer programs protection given that these require investment and can easily be copied. It was by no means the intention to harmonise copyright law as such, though copyright then provided the most effortless regime.

In the UK, the criterion of an own intellectual creation was, however, not implemented, and there are no judicial assertions that the law was actually changed. Whether this divergence leads to actual differences is difficult to ascertain. Certainly, the introduction of an authors right principle clasher, for example, with the protection afforded to works created by a machine under UK law, that is, in the absence of a human author. Secondly, as will be discussed later, there are divergences in assessing the scope of protection – and, indeed, in the test to be employed – in cases of so called non literal copying.

Copyright protection is afforded to the program's expression and not to the underlying idea and entails any documents made in the process of program development. Protection is further afforded to both the source code and the object code. The source code is the underlying program and is not readable by humans. It is the commercially most valuable

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[1] "Debt Collection Program" [1986] EIPR 185.
[2] Sega Enterprises v Richards [1983] FSR 73.

aspect of a computer program. The manner in which a computer works can only be detected by way of reverse engineering, so that in general the source code is kept inaccessible. This creates a problem as far as general copyright principles are concerned – that is, that the idea underlying a work should be freely accessible to others so as to facilitate further development. At this stage, the general copyright principle – according to which the author has a right to maintain the work as a whole secret is waived by an authorised publication, in which case the ideas become part of the public domain – should be mentioned.   The Directive permits under certain circumstances reverse engineering – and therefore access to the source code – though if these conditions are not met there is a case for infringement, and this is discussed in the context of so-called non-literal copying where the defendant argues he had not taken anything that is protected by copyright.

Ownership of computer programs follows, initially, the general principle that it is the author who is to be considered as first owner. Where a computer program is created in the course of employment (that is, where "programming" is a duty under the employment contract), the Directive foresees that the employer should be treated as first owner. There is no provision made for software that is commissioned. Here, the general domestic rules apply – in the UK, the author of the programs thus remains its owner.

Exclusive Rights

The Directive gives a range of exclusive rights. These include the rights of reproduction, adaptation and distribution. In addition, there are rather specific limitations on these rights.

The reproduction right generally gives the right to reproduce the work in a material form. There are two problem areas associated with the reproduction right. The first concerns the duration of a copy, the second aspects of non-literal copying.

Temporary Copying

The Directive has extended the meaning of copying to so-called transient copies of a computer program. The background here is that where a computer program is loaded and/or running on a computer, actually a transient copy of that program is made (for technical reasons), and the status of such copies had been debated in member states. The Directive took the view that a wide meaning should be given to the term "reproduction" encompassing any copies, irrespective of their duration and functionality. The commercial reasoning behind that wide meaning is, predominantly, that it allows the owner of copyright control over individual uses. Otherwise, a purchased program could be used at an unlimited number of individual work stations. The true meaning therefore lies in securing the investment by permitting control (and, therefore, facilitating licensing fees on the basis of copyright) over each individual use. You should note, however, that the rather specific formulation as regards computer programs has successively been extended and that the notion of transient copying now applies to all

works and all forms of – even ephemeral – copying on the internet. This produces a range of problems as regards the scope of the control right of copyright (and database right) owners in general. These problems are discussed later.

Non-Literal Copying

The second aspect – non-literal copying – leads us straight into the central problem caused by the adoption of copyright principles to computer programs. They term "non-literal copying" is not specific to computer programs. Similar problems arise in relation to all other species of works, such as where the plot of a novel is appropriated. Applying copyright law to computer programs means therefore that certain fundamental principles will likewise have to be recognised. The most important principle is the so-called idea/expression doctrine. Copyright, accordingly, only protects the expression of thoughts in a material form and not the underlying idea and/or the information incorporated in a work, in order to prevent a monopolisation . Computer programs present, in this regard, a complicated task to courts. The defendant will usually argue that what he had taken is a certain functionality only, rather than the exact expression of the program as it can normally be identified by spread sheets etc. Thus, he would have appropriated the underlying idea. In other words: if only certain functionalities are taken – i.e. where a similar or identical technical result is achieved – courts must then conduct a test as to whether this amounts to an infringement of the reproduction right. This is a question of degree.

The legislative starting points of how that issue must be addressed are rather different. In the continental jurisdictions, infringement of copyright by way of taking non-literal (i.e. functional) elements requires an assessment of whether the portion taken is protectable in its own right, that is, whether that portion mirrors an own intellectual creation. This is certainly different and assumingly less generous than the position under UK law.

The starting point here is the definition of copyright infringement under the CDPA as meaning that a substantial part of the work must have been taken. Substantiality in general means that courts will have to assess the quality rather than the quantity of elements taken. As regards computer programs, courts had to devise a test as to how to conduct that assessment form a theoretical point of view. There was debate as to how such test should properly be conducted. The first approach was formulated in a US decision and later followed in the UK until it was given up.

In *Whelan* v *Jaslow*[3], the US court rejected the notion that all elements of a structure must count as a "mere idea" and must therefore be excluded from protection. However, this still meant that – given the utilitarian and functional character of a program – the distinction between idea and expression still had to be considered. How this should be

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[3] Whelan v Jaslow [1987] FSR 1.(US C. Apps. 3d Circ)

conducted was the next step in the evolution of protection. In a further US decision[4], the court adopted the so-called abstraction and filtration test. The objective of that test was to detect the core expression as protectable under copyright. In short, the objective of that test is to separate a computer program into purely functional and into literal elements. In doing so, the program as it is must be considered. The court must assess the overall function first. This general function is, necessarily, to solve a particular problem. This is considered to be the highest level of abstraction and is, as an idea, not protectable. Successively, the court will then assess each level of the program in order to find a protectable kernel of expression, which then must be compared to the allegedly infringing program. The background of that test is US-American copyright law. In the US, as a matter of principle, if there is only one way of expressing an idea, expression and idea merge and consequently there is no protection. The problem with that test is that it is, in itself, too abstract and leaves in general little that can be considered as protectable. This is because merely comparing different levels of a program with those found in the allegedly infringing software ignores the program as a work protected as a whole, so that by successively "slicing off" non-protectable elements the degree to which copyright protection attaches to the individual structures and routines is significantly limited.

The test was therefore rejected, although it had been applied initially in the UK[5]. In the *Ibcos* v *Barclays* decision[6], the court re-interpreted the substantial taking test and asserted that US law had no impact. The traditional test had to be applied and this was formulated so as to mean that infringement was a matter of finding an over-borrowing of the skill and labour that had ventured into the creation of the program. The court assessed whether there had been copying of specific lines of code. That test is rather similar to unfair competition law as it had been applied in, for example, Germany prior to the enactment of specific legislation. It focuses, inter alia, on the degree of investment, the question of whether there is actual competition between the parties and allows a much more flexible assessment that takes into account the basic protectionist rationale. This is particularly so where whole programs including multiple sub-routines (which as such may be designated a program) have allegedly been reproduced. Note also that collection of computer programs may constitute a database, as discussed *infra*.

Today, it may broadly be said that courts take an approach must focussing on the quality of what has been taken, so that routine programming is given less protection. The issue of the defendants own creativity and the question of similarities between the programs remains difficult[7].

Further, the author has the exclusive right to make an adaptation of the program. Therefore, translating the program into a higher programming language can be prohibited.

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[4] Computer Ass v Altai 982 F. 2d 693 (1992) (C. Apps. 2d. Cir.)
[5] John Richardson Computers v Flanders [1993] FSR 497.
[6] Ibcos Computers v Barclays [1994] FSR 275.
[7] Navitaire v Easyjet [2006] RPC 151; Cantor Fitzgerald v Tradition (UK) [2000] RPC 95.

Distribution and Exhaustion

The right of distribution – known in the UK as the right to issue copies to the public – is generally considered as a right that complements the reproduction right. It basically gives the author the right to consent to or prohibit any putting into circulation of the protected program. Once a specific copy has been put into circulation, the distribution right is said to be exhausted. This means that the owner cannot further control the re-distribution of the work. Exhaustion occurs with effect for the entire European Union once the work is put on the market by or with consent of the owner. This secures, from the perspective of EU law, the ability to maintain the principle of free movement of goods as safeguarded under the Treaty, and thus allows parallel and re-importing of works protected by intellectual property rights (that is, the concrete and individual copies) by and large. The question of exhaustion has become an issue of debate recently with respect to software. The fundamental reason for that debate is, of course, technological development and changed attitudes to how software is commercially distributed, which today is done predominantly by way of online access and downloading rather that purchasing a copy of a program on a disk - a far cry from the commercial realities present in the late 1980s. There are two major problems to consider. First, the directive itself is not clear whether exhaustion may occur online, that is, whether the owner has the right to control the further distribution where the original copy was made after downloading the work in the absence of a purchased physical carrier. The general rule is that exhaustion only affects the physical copy: a purchaser acquires, then, property in that copy and the exhaustion rule safeguards the right to resell.

The purchaser does, however, not acquire any rights associated with copyright in general. Exhaustion does not permit to make copies or to engage in other activities that are restricted by copyright. The restriction of the exhaustion rule to physical copies is further expressly asserted in later copyright legislation though, strictly speaking, this does not apply to computer programs as these are governed by specific legislation. What speaks against the application of the exhaustion rule to programs that have been downloaded, therefore, immediately follows from the statutory text and is difficult to rebut: the acquirer of the software does not become owner of a physical copy but must produce that copy himself. Further, the acquirer may, without control, create multiple further copies and those copies are not , in terms of quality, inferior to the original – they represent exactly the same set of data.

However, some commentator present a different view. Because today the download of software factually substitutes the acquisition of a physical copy, the payment of money – irrespective of whether this is trend a purchase or a licensing fee – by the user is held to be sufficient for exhaustion to occur. Hence, the work may be stored on a disk and resold as long as the intangible copy stored on the users disk is deleted. It is clear that the question of exhaustion requires more argumentative effort. There is a general uncertainty as to why the principle existed in the first place. Indeed, it was first formulated in

German literature as a rather general principle according to which all IP rights are subject to consumption. It was explained by reference to the fact that the owner of the right had acquired remuneration. Later, it was explained by reference to the fact that it permitted the creation of second hand markets and that therefore it maintained a balance between copyright protection and the acquisition of physical property. Yet another explanation holds that the exhaustion rule allows legal certainty, which was a prerequisite for the free circulation of protected works – the purchaser of, for instance, a book did not have to worry about a continued threat of copyright infringement.

Necessarily, all these explanations overlap to a certain degree. What signifies the principle of exhaustion today is, predominantly, the fact the it was employed by the European Court of Justice as a convenient principle to support its view that placing a protected article on the market anywhere in the European Union had the effect to exhaust the distribution right in the entire internal market. This principle – i.e. a "European" notion of the exhaustion rule was then inserted into all IP-related secondary legislation. However, the argument can be made that the interpretation of the exhaustion rule exclusively as a matter of safeguarding the free movement of goods – from which it would follow that it can only apply to physical articles – is too narrow. The question of online exhaustion therefore requires a much more advanced examination including a proper analysis of its economic effects in an online market.

Secondly, and closely related to the first problem area, the exhaustion principle may be restricted according to the scope of the consent. As mentioned, exhaustion occurs where the article has been placed on the market by or with consent of the owner. If there is no consent, the distribution right and, consequently, the right to control the further distribution of protected articles continues to exist. The owner may restrict any further distribution by relying on the proprietary copyright. Consent is, generally, understood objectively: if consent is present, so is exhaustion. However, where the owner of copyright restricts his consent to certain markets, the question arises whether he can still exercise his copyright to prevent the distribution of works on markets that are not covered by that consent, that is, typically under the terms and conditions of a licensing contract. Such restriction can affect certain geographical areas as well as certain product markets. In the case of geographical restrictions, a license permitting the licensee to distribute only in one country of the European Union in general only has the effect to bind the licensee under the contract. Where the licensee, contrary to the stipulations in the licensing agreement, resells into a different territory the owner of copyright cannot prevent any resale or parallel import because here the principle of exhaustion – with absolute effect – applies. In addition, the contractual restriction may fall foul of competition law and therefore may be void. In relation to constraints affecting different product markets, the situation is not as clear. In general, a licensor may define a product market himself, and such restriction would, at first glance, immediately limit the scope of consent. If this was applied generally, it would be in the hands of the rights owner to arbitrarily restrict markets which would impact on legal certainty and the overall capacity to freely trade in protected works. The question therefore is precisely when a restriction to certain product markets has "proprietary" effect, i.e. when the right to distribute the work can be exercised against those further distributing the program

without being bound contractually. Initially, two aspects must be separated. First, the owner can exercise his contractual rights against a licensee who, contrary to what had been agreed, sells or otherwise distributes into a different market. Where such clause is invalid, predominantly because competition law interferes, there is no further problem because in that case consent must be understood so as to have been expressed without limitation; in other words, the control right is consumed.

Where the contractual term is valid, the licensee is in breach of contract.

However, that does not mean that third parties – that is, those who have purchased the program from the initial licensee – can be prevented from selling in such different product markets. This constellation lay at the root of a dispute concerning the distribution of computer programs (here: standard user applications) decided by the German Federal Court of Justice, and that decision is the sole existing judicial examination in Europe at present. The case concerned so-called OEM software to be loaded onto individual personal computers. The owner of the copyright permitted, in various countries, so-called authorised replicators to make copies of their software packs, but the licensees where only permitted to sell that software to manufacturer of personal computers who would install it. The reason was that the copyright owner wished to reserve to himself the – lucrative – market for individual software outside the hardware market, i.e. the right to sell the programs on physical carriers etc. The licensee contravened that clause and sold the software individually. The right owner demanded estoppels from the wholesalers and retailers who had acquired, somewhere along the distribution chain, the programs. The question therefore was whether the restriction to one product market meant that exhaustion did not occur with respect to the market for individual copies. The court took the view that the owner could not restrain the agreement with such proprietary effect. The reason, in general, was to maintain market transparency; a license may be separated only – with proprietary effect where the markets are considerably distinct.. The court thereby asserted that the two markets were not.

Limitations

The Directive contains – in contrast to general copyright law – rather specific limitations. These limitations are mandatory and other limitations (such as the exception to make works for private and domestic purposes that exists in many countries in the EU) must not be applied.

The limitations once again highlight the rather homogenous nature of computer programs. Their overall objective is, in short, to prevent a monopolisation of underlying ideas and information in order to secure the establishment of secondary or related. Hence, the most important limitations reflect, in reality, competition rather than copyright rules. This, in turn, reflects the reality that source code access initially falls within the domain of the reproduction right.

The first important constraint on the copyright owners rights is the decompilation limitations. The Directive permits the decompilation of a computer program in order to

detect the functionalities predominantly because otherwise the production of, for example, peripheral products such as printers would be impossible. Therefore, a manufacturer wishing to produce such dependent products needs information embedded in the source code so as to make the two programs technically compatible. In order to allow the proper functioning at the interface level, the directive permits reverse engineering though this is subject to further conditions. First, the directive limits that capacity to lawful users. This term is not defined but is generally understood as a person who has a license to use or has acquired the program by way of purchase. The position of the latter is not entirely clear. In the UK, however, sec. 56 CDPA similarly allows the purchaser of a work in a physical form to make necessary copies, so that here exhaustion and a permission to copying go hand in hand. Further, reverse engineering is permitted only insofar as it is necessary to acquire the relevant information by way of studying or testing the program.

The Directive further permits the making of copies (that is, temporary copies) for purposes of examining the program in order to correct errors and allows the lawful user to make a back up copy. Note that Sc. 50B CDPA deviates partially from the text of the Directive.

ACTIVITIES

- Explain the different approaches to and problems encountered in finding infringement in cases of so-called "non-literary" copying.

- Explain the scope and rationale of the decompilation provision.

- In how far can the maker of a computer program separate product markets?

- Would the creation of a sui-generis-right protecting the investment in a computer program pose a preferable solution?

SUMMARY AND REVIEW

The chapter dealt primarily with the central problems still encountered in software copyright law. These include non-literal copying, decompilation and market segregation. It remains important to understand the different positions that may be taken under the statutory text. It should also be understood that many of the problems encountered have their roots in more traditional notions of copyright rather than on specific needs for protecting programs as such. As will be seen in the next chapters, the solution adopted in relation to databases was precisely to overcome some of the conflicts that arise where

functional creations are, for reasons of harmonisation, governed by traditional copyright law.

FURTHER READING

Czarnota/Hart, The Legal Protection of Computer Programs in Europe, London 1991.
Cornish/Llewelyn, Ch. 20
Laddie/Prescott/Vitoria, Ch. 34.
Lai, Copyright Protection of Computer Software in the UK, 2000.
Karjala (1994) University of Dayton Law Review 975
Vinje [1994] EIPR 364
Westkamp [2008] Marquette IP Law Review.

3 Computer-Implemented Inventions

OUTLINE

An assessment of copyright projection for computer would be incomplete without examining the scope of protection offered, alternatively or cumulatively, under patent law. The lecture will consider in particular the way in which courts and other relevant bodies have assessed the patentability of programs in accordance with the basic requirement that the program must be a technical invention, and here particular emphasis is placed upon the general exclusion of "programs as such" under European patent law. As will be seen, the most intricate problems arise where a patent is claimed for a program not attached to a machine. The divergent approaches as between the European Patent Office and UK law in this area are an important indication of the multiple possible approaches.

Lecture

Patent law protects technical inventions provided these are new, involve an inventive step and are industrially applicable.

Despite the existence of dedicated copyright protection for computer programs, patent law never ceased to play an important role in securing rights in software. The European Patent Office, for example, permits numerous software-related patents every year. Patents in the field of computer programs and computer technology have been granted ever since the inception of that technology. Hence, patents may be acquired for both hardware and software relate inventions. This lecture focuses on the latter. The advantages for rights owners thus appear to outweigh the disadvantages that come with the relatively higher requirements and formalities that patent protection demands. Certainly, the copyright limitations allowing access to the source code can effortlessly be circumvented since a patent grants a more complete right to use the invention.

The central problem – at least under European patent law – concerns the exclusion of computer programs "as such" from the scope of patentability. This principle is enshrined in Art. 52 of the European Patent Convention and similarly in all patent laws of EU member states. Thereby, a computer program is considered to fall in line with other types of excluded subject matter and a program "as such" must therefore be considered alongside pure formulae, concepts and procedures. More precisely, the debate centres around the notion of *technical character*.

Clearly, a program as such is not technical in nature – it consists of written instructions that makes a computer program comparable to a formula or concept – and without an further technical effect the attempt to register must fail. Conversely, where such technical effect exists, Article 52 does not bar registrability.

Technical Character

The problem is how far the notion of "technicity" is stretched and, further, whether the exclusion denotes some general preclusion from patentability or whether it may be said that computer programs – given that, by definition, they must achieve some result – normally are technical in nature and excluded only where the claim extends to non-technical features. In other words: does the term "as such" mean anything more than a general statement repeated fundamental principles of patentability or does it have a more independent and limiting meaning? In the latter case, Article 52 would not present a stand-alone obstacle and the issue of patentability can be assessed under the test for whether there was an inventive step (Article 56 EPC). Hence, Article 52 allows a range of different interpretations and before turning to a more detailed assessment these should be briefly summarised.

First, one may argue that Article 52 (2) is meaningless because each program inherently has technical character, inasmuch as a chemical formula or a mechanical device has. If so, the provision should be removed. Second, the view may be taken that a program is generally technical unless the it is perceived in its purest form as a set of binary instructions. Hence, Article 52 (2) would be rather limited, and in fact may be understood to merely reflect that basic principles of patentability likewise apply in the realms of software. Thirdly, the view may be taken that computer programs may do something on a technical filed, such as causing a result that is not necessarily technical. Thus, the program itself may be technical in nature and would not be excluded - though protection is a matter of the actual contribution and therefore to be assessed under the general criteria of obviousness and inventive step only – this is roughly the position taken by the EPO. Fourthly, one may take a more restricted view and demand that the software causes a result that is technical in nature, such as operating a machine. Fifthly, one may go further and require that the subject matter exclusion is to be understood broadly – a program "as such" is just that and in order to participate from protection it must be applied to a technical apparatus. These positions overlap. This overlap depends on how courts assess what is technical or not. In short, protection under the fifth rule is more easily attainable than under the first, with many deviations in between. The basic problem emanates from the fact that the question of "technical" means as a matter of patent law is necessarily difficult to establish – the law therefore must be adjusted to technological development.

International Approaches

The debate on how Article 52 should be understood certainly is informed by robust global commercial interests. At the international level, there is no consensus as to the patentability of software apart from a general obligation to maintain a patent system under the TRIPs-Agreement, which in relation to patent law incorporates the minimum rights and reciprocity obligation of the Paris Convention on the protection of industrial property rights. This means that, for a long time, the United States afforded generous

protection to computer programs given that an express exclusion of subject matter is absent under the US Patent Act. The US have long followed – and particularly still do – the theory that "anything under the sun made by men" can be patented provided only that the statutory requirements are present. This means that US patent law allowed patents for a range of subject matter that caused significantly more concern in Europe. This entails patents in the field of biotechnological inventions as well as patents for certain business methods. Since specifically business methods are, conceptually, identical to the way in which computer programs work – in that some concept is put into practical operation - protection was afforded to the method rather than to the result that method achieved. Likewise, developing a method for doing something may of course be "translated" into a computer program. Although – at least with regard to computer programs – the generous protectability under patent law has now been rejected, the generally more extensive scope of US patent law has not. Overall, this meant a certain advantage in global commerce.

However, notwithstanding US approaches, there are vital reasons to exercise caution. In copyright, as noted, some freedom to take non-literal elements is provided for, and additionally specific limitations that have been adjusted to the more precise requirements of the software market have been established. Where the same set of instructions – irrespective of whether this forms part of a device or not – was patentable, the scope of patent rights would circumvent the freedom to use pre-existing elements. This would, on the whole, not only stifle innovation but would also affect the proper functioning of related markets, such as in the case of printers and replacement printer cartridges. In addition, permitting a generous scope for software patents would certainly have chilling effects on open source software. It is by no means certain whether the initial prohibition to prospective open source licensees not to patent open source elements (as a form of commercial commodification) as part of software developed is strictly enforceable.

"Programs as Such": Judicial Approaches

There is a vast judicature on the subject in Europe and, in addition, some divergence as between the approaches of the UK Intellectual Property Office, the European Patent Office and other national Patent Offices that complicates the matter has been identified.

In Germany, it was specifically academic opinion that attempted to define the meaning of the exclusion "as such". Some commentators held the view that the subject matter exclusion related only to the program as an intellectual concept (i.e. the content of the program) that was to be executed by a machine but that it had no further effect on the general criteria for patentability. Others thought that "as such" related to the expression of the program as protected under copyright whereas the content of the program – thus exceeding copyright protection – was a matter of patent law. Hence, it was only the program code that was considered as non-patentable.

The German Federal Court of Justice clarified the issue, partially, in a 2002 decision[8]. The court considered a teaching clad in a computer specific form alone was insufficient even where such teaching related to hardware. The instructions must, accordingly, relate to the precise solution of a concrete technical problem. Such solution must be executed in a machine. The practice was criticised because the German courts had not fully engaged with the meaning of forces of nature – indeed, it may be argued that information as such is a force of nature.

The criterion of "technicity" or "technical character" remains the central element of the assessment and a similar position is taken by the European Patent Office. It follows from the meaning of "invention" as something that must be technical in nature. An invention thus exists where there is an instruction (a teaching or concept) that allows premeditated actions by using forces of nature ensuing in a causally foreseeable result without human interference. Hence, it is the result that is technical, which means that product patents incorporating a computer program are more easily patentable than the program as a process. In other words: the program must change the state of such device, and that device in turn must reflect a technical character[9]. Similarly, the programming of a technical device was held not excluded by the EPO in a number of decisions[10]. However, that case law merely suggests that a program is not excluded "as such" insofar as it affects the operation of a technical device. They do not suggest that a process patent can be obtained, nor do they suggest anything that ultimately clarifies the proper construction of the terminology under Article 52 EPC.

In the UK attempts to go beyond the technical character in apparatus claims often failed. Some decisions reflect the general overlap between computer implemented inventions and other subject more generally excluded. Predominantly, patentability was rejected because the program embedding the invention was considered to consists of a mathematical operation[11] or that consisted of instructions to the human mind[12].

Both these areas are distinguishable. In the first, there appears to exist a rather evident technical character; in the second, the grounds for exclusion go beyond the express assertion for programs "as such" in that in reality what was claimed – irrespective of whether this was to be executed in a device – were certain concepts. In such cases, the exclusion "as such" may be understood in the same sense as any other excluded subject matter, and indeed as simply a clarification that transferring concepts and other forms of excluded subject matter into an executable program is insufficient – unless the position is taken that Article 52 (2) is incommensurate with the TRIPs-Agreement and that it should be abolished, a position much informed by the understanding that any type of

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[8] [2002] CR 88
[9] See BGH [2002] IIC 343Speech Analysis Apparatus.
[10] Koch and Sterzel's Application [1988] OJ EPO 19; Vicom's Application [1987] OJ EPO 14; IBM's Application [2000] EPOR 301.
[11] Gale's Application [1991] RPC 305 CA.
[12] Fujitsu's Application [1997] RPC 608 CA.

computer program is technical simply because a meaningful distinction as between, for instance, biotechnology and information technology cannot be made.

The EPO went a step further in cases concerning claims for programs that effectively processed information in order to achieve a result that was arguably not technical in nature, including business methods. In 2001, the Enlarged Board of the EPO allowed a claim for software that calculated automatically certain parameters relating to pension benefits[13]. In 2004, EPO jurisprudence held that a computer as programmed *and* a program as a method for doing so were patentable[14]. This is considered to be in contrast to the accepted view in the UK, according to which the effect must be technical in nature[15]; where the result was an automated legal transaction, the claim was rejected. The most important factor in these decisions then concerns the question of inventive step, that is, whether Article 52 is given a narrow meaning. If the program forms part of an apparatus, the exclusion pertains only – according to the EPO – to the question whether a programmed apparatus is technical. The EPO thus takes the position that it is irrelevant whether or not there is a technical contribution in the program itself. This was an issue of identifying the inventive step. In other words: there may be some technical character in both the program and the apparatus. But the effect of the program - as being technical or not - is not a matter of general exclusion, but more precisely solely a matter of assessing whether the relevant art was known. Similarly, in the "auction method" decision, it was held that a program was patentable as long as it had, in itself and distinct from the apparatus to which it was to be attached, technical character. This was because here the program included a method that operated the functioning of a device, and that method was considered patentable. This constricts the subject matter exclusion to pure data sets and abstract instructions. The additional presence of either a technical character in the device or in the function of the programs then moves the assessment to the general patentability criteria, specifically obviousness and inventive step. There, however, the claims failed in each case. However, allocating the question of protectability broadly to questions of obviousness and inventive causes further uncertainties[16]. This is because the EPO is not clear on how, specifically, the test for inventive step should be conducted as regards computer programs.

The problem with the approach taken by the EPO lies in its initial breadth. It is hardly conceivable that a computer program does not reflect, to some degree, something that may be construed as being technical in character, rendering all forms of computer software initially patentable subject matter. Where one computer program determines the functioning of another, the former is protectable once that function is considered as technical in character. Consequentially, this allows broad process patent claims. It is, inter alia, perhaps for that reason that an attempt by the European Commission to introduce community legislation aiming to harmonise the law on computer implemented

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[13] Pension Benefit System [2000] OJ EPO 441 (Technical Board of Appeals)
[14] Hitachi [2004] OJ EPO 575.
[15] Merryll Lynch's Application [1989] RPC 561 CA.
[16] See Cornish/Llewelyn, Intellectual Property, No. 20-32, p. 828.

inventions failed, ultimately so for political reasons. The concerns are reflected in UK jurisprudence on the issue and a 2006 decision accordingly refuses to accept the approach taken by the EPO. Here, the court employs a rather different test consisting of four successive steps. The overall effect of conducting that test is to exclude claims for pure business methods and concepts even where these are guised in the form of a program. Accordingly, Article 52 (2) EPC must be construed as follows: first, what is it that is actually claimed, which requires a proper construction of the claim; second, the court must identify the actual contribution to the state of the art which must thirdly be assessed as falling into excluded subject matter or not. Fourthly, it must be ascertained whether the alleged contribution is technical in nature[17]. Arguably, this reduces the scope of protection: the contribution must be one that inherently has technical character, i.e. must cause a specific technical result. There is a clearer distinction between the legal treatment of subject matter and the standard criteria for patentability. Whether the EPO will follow is a different matter.

The overall problem is that the debate almost exclusively orbits around the relatively limited and obscure connotation of a "computer program as such". Nowhere is it mentioned what the historical legislator sought to achieve. As the construction of that term is informed primarily by attempting to deduce its scope from rationales or principles of patent law, many important factors that would enable a future legislator to more precisely indentify what the law should be vanish from view. There is not only an overlap and tension with copyright, but certainly a problem with the freedom that the legislator should afford to software developers, whether this is done for commercial gain or under the more altruistic open source system. The reasons why copyright law entails, for example, specific limitations securing competition never come into view in a debate that centres around the proper location of assessing computer implemented inventions in the context of the traditional patentability test. Whether patent law can sufficiently develop a convincing and differentiated system for protection does, further, not merely require a debate on technical character. The term "technical" is too opaque and allows too many subjective interpretations to be seriously treated as the sole principle on which entrance requirements rest.

The Posistion in the United States

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[17] Aerotel v Telco, Macrossan's Application [2006] EWCA 1007. See further Laakonen/Whaite [2001] EIPR 244.

SUMMARY AND REVIEW

The chapter considered in particular the divergent approaches to the issue of technical character as the major element in distinguishing patentable from non-patentable subject matter. Specific emphasis must be placed upon the patentability of programs where no further technical result is achieved. The divergent approaches between UK courts and, specifically, the EPO Board of Appeals decisions should be noted.

FURTHER READING

Cornish/Llewelyn, Intellectual Property, Chapter 20.
Singer/Stauder, European Patent Convention.
Drexl/Hilty/Kur (2005) IIC 448.

4 Database Protection: Copyright

OUTLINE

The following two lectures will consider how databases and collections of information are protected. The two regimes currently governing database protection are copyright and the so-called "sui generis" (database maker) right, as implemented following the 1996 Directive on the Legal Protection of Databases. The latter is by far the more important regime. However, copyright might still play a certain role.

LECTURE

Copyright protection for databases – similarly to the protection afforded to computer programs – was different across EU countries prior to the adoption of the 1996 Directive. The European Commission had begun early – in a 1988 Green Paper – considering harmonisation of database protection given these differences. It was specifically the low standard or originality required in the UK and the general high level demanded by German courts that, according to the Commission, required an approximation of these regimes in the face of a developing information society.

The Directive introduces a two tier system for database protection. Copyright protection is available where the structure – that is, the selection and/or arrangement of data – show the authors own personal creation. A database maker right is further introduced that protects the investment of the person taking the commercial risk.

The Directive contains a definition of databases. That definition applies to both rights. A database is defined as a collection of independent information, data and other elements that is arranged in a systematic manner. The elements must be individually accessible.

Definition of Protectable Databases

The definition is rather broad. It applies to both electronic and paper databases. The term "collection" stems from the TRIPs-Agreement, according to which original collections of data are to be protected by copyright law, which in turn refers to Article 2 (5) of the Berne Convention. The latter provision obliges union members to similarly protect collections, though here the protection is arguably limited to collections of literary works such as anthologies.

The term "independent" is supposed to mean that each element must enable a communication – that is to say, a film is not to be treated as collection of still frames, and

a book is not a collection of words. In each case, the elements are necessarily dependent on each other – if one element is removed, the content of what is to be communicated is changed. The same principle might apply in relation to software, since removing a step in the set of instructions would render the program useless. However, it should be noted that the type of information held in a database is roughly irrelevant, and includes all data and information whether these are works protected as such under copyright or "pure" information such as stock exchange data. Hence, a collection of software may indeed be sufficient.

The meaning of a systematic arrangement is likewise not entirely certain. It should clearly not be confused with the terminology used to define the necessary degree of originality, and therefore the meaning of a systematic arrangement is a minimum requirement permitting some reduction in the scope of protection for unorganised sets of data. However, it is – insofar as the definition of subject matter is concerned – not necessary that the arrangement is compiled by human activity. Hence, a computer generated organised arrangement would suffice.

A database is, further, individually accessible if means are present that permit finding particular data or information, such as an index or a particular manner of arranging data. Therefore, a telephone directory is protectable subject matter because here the elements are individually accessible due to an alphabetical arrangement. Some residual problem areas should be mentioned. First, whereas it is certain that the Directive applies to non-electronic collections; it is not entirely clear whether it would cover arrangements of physical items. Such protection would mean, factually, that database protection would come into conflict with areas such as artistic copyright and design law, though it may be argued that this is an effect not intended by the directive.. Second, there is doubt as to whether a sound recording is protectable. The problem here is that – as will be discussed later – the directive introduces a right of making available that previously was not afforded to makers of sound recordings, and the recitals make it clear that compiling individual music tracks on a CD is not to be considered a substantial investment.
Whether so-called multimedia works are to be considered as databases is a matter of debate.

Examples of protectable database therefore include directories, recipe books, travel guides, concert listings, library catalogues, and (very) arguably any collection of physical items such as a library or a picture gallery, but also a list of hyperlinks. Indeed, the enumeration of potential candidates for protection seems limitless.

The breadth of the definition today allows an application of the directive to almost all conceivable form of information presentation, in particular websites (as a collection of individual web pages). Therefore, the directive has an extremely important function because at this stage it provides for a catch-all right governing uses on the internet. This is particularly important when considering the protection for technological protection measures under copyright, discussed later (Chapter 10), that is equally applicable to database under both copyright and the sui generis right.

Originality

The required level of originality follows – as with computer programs – the continental standard, that is, a human creator must be present. The originality must be reflected in the structure, that is, either in the original selection or arrangement of data. In general, therefore, protection is not afforded where the required level is not met. Most commentators agree that this is the case where the database is structured in accordance with routine and well known methods. Hence, whilst an alphabetically arranged telephone directory constitutes a database, the level of originality is usually not met. First, the selection of necessarily all subscribers in a given geographical area is typically not an original creation because the person compiling necessarily has no choice as to which data to select. Therefore, as a general rule, the greater the choices are that have been made, the more it is likely that an original selection will ensue.

The underlying rationale is to not monopolise methods of compilation and selection of information. the same principle applies with respect to the arrangement. Here, pre-existing methods – such as by way of an alphabetical, numerical or chronological arrangement will not suffice. In both cases, one may argue that where there is only one meaningful way of structuring a database, the level of originality is not met.

In the UK, the standard or originality has been literally implemented into Sec. 3A(2) CDPA 1988, though according to the text this only applies to databases as defined. In contrast to computer programs, in which case English law has not followed the European definition and debatably continues to apply the traditional skill and labour test, a database as defined must now meet these requirements. However, the Act makes it clear that a database is a sub-species of a table or compilation – classes of works that are expressly protected as literary works under Sec. 3 CDPA 1988. Here, the traditional skill and labour test – according to which only a modicum of investment must be shown – continues to be applicable. Necessarily, this may lead to unintended overlaps given that the definition of a database as subject matter and the definition of a compilation does not significantly differ, and indeed it may be argued that there are few compilations that do not simultaneously constitute a database as defined. the potential effect is that English law affords a higher degree of protection to compilations. A compilation may then be defined as a database where certain elements – such as individual accessibility or a systematic arrangement – are absent. Necessarily, that conclusion would be absurd.

The protection of multimedia works as databases then causes further problems. UK law requires, as mentioned, each work to be definable as one of the classes of works enumerated in the CDPA 1988. A multimedia work, however, generally combines aspects of different aesthetic categories – there will be artistic, literary and/or musical elements, as well as incorporating a film or a sound recording. Whilst under the Directive a multimedia work would constitute a collection of "works and other elements", that position is not entirely clear under UK law given that a database is defined as a literary work exclusively.

The owner of the database structure is the author. Here, the general copyright principles apply. For the UK, a database created in the course of employment belongs to the employer as first owner. Whether a database structure that was created by a computer continues to be protected is, however, a different matter. Sec. 9 CDPA stipulates that computer generated works belong to the person who made the necessary arrangement for the work to be produced. However, that rule is now incommensurate with the principle of a personal creation.

Exclusive Rights

The database author enjoys the exclusive rights of reproduction, adaptation, distribution and the right to publicly communicate the database structure.
The right of reproduction is affected only in cases where the structure as such has been appropriated. The taking of data is insufficient since protection is not afforded to those. However, as long as an original selection is taken, the contents of the database are subject to the reproduction right. In the UK, an infringement of the reproduction right is subject to the traditional substantial taking test. The reproduction right further entails the right to make temporary reproductions, in a similar way as was regulated with respect to computer programs. The rights of adaptation and distribution likewise follow conventional principles. Distribution also includes the renting of databases for profit. The exhaustion principle applies.

The database directive further introduced – for the first time in Europe – the so-called right of making available. This right emanates from the 1996 WIPO Treaties. It applies where a work is made available to the public by wire or wireless means in such a way that members of the public may access it at a time and place individually chosen by them – in other words, the right affects the use of a database structure in public networks such as the internet. The implications of this right are considered in Chapter 9.

The directive left some scope for limitations. First, where a member state permits the making of copies for private purposes, such exception must be abolished insofar as electronic databases are concerned. The Commission thought the danger of private copying of electronic databases would be too significant. Further, copies may be made for purposes of research and study. A specific limitation was introduced in order to protect the lawful user. The owner of copyright may not prohibit, by way of a licensing agreement, the normal use of the database.

ACTIVITIES

- Explain why there was a need to protect electronic databases.
- Assess the potential divergences between the Directive and UK copyright law with respect to the required level of originality.

SUMMARY AND REVIEW

The impact of copyright as such tends to be rather limited today, though it might of course affect the relationship between the database maker and the author of the database structure. The important thing to keep in mind is that, by adopting copyright protection, European legislation for the first time introduced the continental level of originality into the UK copyright system.

5 The Database Maker Right and Misappropriation

This lecture considers the so-called database sui generis right. It is not an overstatement to say that this right represents perhaps the most complex form of IP protection. The basic problem concerns, as will be seen, the question of what actually constitutes the protected object.

LECTURE

The database maker right was introduced under Chapter II of the 1996 Database Directive. In short, it aims to protect any database where there has been a substantial investment in the obtaining, verification or presentation of data. That right is afforded to the maker of the database, that is, the person or entity that takes the commercial risk. The right entails rather novel – at least in terminology – rights. These are the right of extraction and/or re-utilisation of the whole of a substantial part of the *contents* of the database. This architecture of the right reflects elements that stem from various statutory and doctrinal principles. In particular, it relies partially on UK copyright law in terms of the "substantial taking" doctrine, and partially was informed by certain unfair competition doctrines that existed specifically under French and German law. It was – although this is nowhere expressly claimed – also influenced by the doctrine of misappropriation that was applied in the US. Further, the sui generis right was based on protection models found previously under Dutch law (where a special provision was in place protecting non-original writings against copying only) and Scandinavian laws, which protected catalogues against certain uses. The express objective was to further the market for informational p[products in Europe as a counterweight to the striving database market the Commission saw developing in the US, which was considered to be predominantly an effect caused by the existence of copyright protection under the – then – applicable "sweat of the brow" doctrine.

Background

The debate surrounding this right cannot be comprehended without a clear exploration of its legislative history. As noted, the idea to protect non-original information came to the European Commission as early as 1988. The Commission first presented a proposal according to which databases should be subject to a harmonised copyright regime. However, given that fundamental and divergent principles of copyright law would certainly still apply under such regime, a later proposal suggested a two tier system, whereby original databases were still subject to approximated copyright rules; the Commission, at this time, apparently thought that the UK approach should be transferred to the continental systems, presumably because it was believed that UK compilation copyright law would extend to the contents of a compilation. Additionally a right against "unfair extraction" was to be introduced. The latter failed specifically because of the grave differences between member states as regards notions of unfair competition, and the terminology was considered to be too closely linked to principles

followed in continental Europe whilst the law in the UK never developed an unfair competition regime. A further influence then informed the final version of the directive: in 1991, the US Supreme Court decided that a telephone directory, ordered alphabetically, was not protectable under US copyright law[18]. The Supreme Court demanded a "creative spark" mirrored in the organisation of such data on grounds of constitutional law. Thereby, it became clear that copyright was inapt to achieve the desired aim of protection. It became clear that the aim to protect the investment was not achievable by the protection system as foreseen.

The *Feist* decision is important. It reflects, by and large, the typical scenario the Commission wished to remedy. Here, the claimant spent an enormous amount of time, money and energy in compiling a comprehensive and voluminous telephone directory. The defendant copied these entries and produced a competing product which, of course, he then could offer at a fraction of the price the claimant had to demand. Without legal protection, therefore, the overall incentive to produce informational products disappeared more or less entirely. The rationale in remedying that situation therefore was to maintain that incentive. Hence, it may be said that – at least in the early stages – there was a clear factual case scenario around which the protection regime was modelled. The important factor in the equation thus is the grave discrepancy between high investments costs and usually negligible costs in copying, especially where done electronically. Therefore, the Commission continuously suggested that electronic or digital copying presented a danger to that incentive. Typically, that danger is realised where a competing product is offered on the same market. However, the Directive stripped the regime, as it was finally formulated, of all market-related considerations. Instead, the uninitiated reader would presume that protection is afforded to the contents as such, provided that a substantial investment is present, and in this sense the sui generis right may be understood as a regime simply complementing and extending copyright protection. In contrast to this, some countries have clearer regimes. The Swiss Unfair Competition Act, for example, provides for a liability rule in cases where – in general – endeavours in competition are copied by using technical means, which of course entails electronic copying, The rationale here is similar to the concept of misappropriation that was developed in early US Supreme Court decisions. Here, the question of taking information that was not itself protectable by copyright was remedied by allowing a claim based on unfair competition. Accordingly, where "time sensitive" information such as "hot news was appropriated, the claimant was able to prevent such appropriation of his investment. In the US, later proposals for specific database protection followed this model. It was made clear that protection was afforded only as regards specific time sensitive markets – in other words, there must be both direct copying by technical means and direct competition, which would have required courts to establish the market on which these interests in protecting the respective investment should be safeguarded.   However, the US never enacted specific database protection, and likewise the idea for a treaty on the protection of non-original databases – that was

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[18] Feist v Rural US SCt (19910

to be negotiated under the auspices of the World Intellectual Property Organisation – failed.

These developments are indicative of the basic complexities surrounding the current status of the law: the less a clearly formulated fundamental protection rational is reflected in statute, the more it is likely that information as part of a database will be protected. The more scope of protection is afforded to an investment in information, the higher the danger of over protection is, and in addition such loose concept will call into doubt the overall power of the IP system: all IP rights are, very fundamentally, concerned with some form of "investment" that has ventured into the creation of some ideas and information. Therefore, it was felt that the Directive purported to institute intellectual property rights in data as such, which necessarily would have negative consequences in diminishing the public domain and in deterring the development of informational products by and large.

On the other hand, the Commission itself foreclosed an escape route, that is, a formulation more akin to the Swiss and US unfair competition models; the reasons for rejecting, finally, a notion of "unfairness" was arguably threefold, though these motives have little to do with the objective to formulate a stringent legal regime: first, as mentioned, a harmonisation of unfair competition law as such appeared too burdensome. Secondly, and closely related to this sentiment, the Commission certainly was aware of the dangers of nonspecific requirements, especially as regards the general notion of what would constitute an unfair appropriation. The effect would have been less harmonisation. Thirdly, there were objections against any formulation too resonant of unfair competition law. One of the objectives was to persuade the US to introduce IP protection for database contents. Previously, the US had enacted a sui generis right for semi conductor chip topographies, which importantly was denied to EU citizens given that such right was – precisely it did not fall into any of the internationally recognised categories of IP – regulated as a standalone right For this reason, many commentators assumed that the final version was much informed by the political desire to retaliate, and it is therefore that neither typical copyright elements are present nor an unfair competition approach was followed, particularly because unfair competition must be protected against under Article 10bis (3) of the Paris Convention. Hence, the database maker right is not afforded to non-EU citizens. The Commission may extend reciprocal protection on the basis of bilateral treaties – as of today, one is in force, with the Isle of Man.

Therefore, a closer examination needs to take into account these multifaceted influences. The directive had to respond to sometimes conflicting objectives, and arguably it is the concoction of pre-existing doctrinal principles and divergent protectionist role models. Necessarily, this causes uncertainties in the construction of the statutory elements. It is not an overestimation to say that courts struggle. As mentioned, the perhaps most fundamental problem concerns the question of what, precisely, the object of protection should be.

That problem is closely interwoven with the issue of what the underlying rationale should be.

Scope of the Database Maker Right

The central element is to be found in Article 7. Accordingly, the sui generis right is afforded to the maker of the database – the natural person or legal entity – where there has been a substantial investment in the obtaining, verification and/or presentation of data. That enumeration is not closed – for example, a substantial investment in developing a specific search program may be sufficient. The issue of *obtaining* data must be differentiated from the issue of acquiring a complete set of data. Obtaining means an independent compilation from different sources. Hence, the purchase of a finished database product is not a substantial investment. What would amount to a substantial investment has been subject to debate.

Some commentators have argued for a rather high level, others have taken the view that merely a modicum of investment must be present. Courts have taken, in general, the view that some minimum investment is sufficient, a view apparently following the lines of the UK approach to copyright. A specific problem as regards the investment threshold concerns so-called spin off databases. Such databases are developed using a pre-existing database. For example, a telephone directory in paper form may be transformed into an electronic version. The investment necessary for that transformation does not necessarily reach the required threshold. In this regard, the European Court of Justice held in a number of decisions – following requests for a preliminary ruling under Article 234 EC – that the investment must have ventured into the obtaining rather than the creation of data.

Violation: Extraction and RE-Utilisation

Article 7(2) then stipulates the two central exclusive rights that define acts of infringement, extraction and/or re-utilisation of a substantial part of the contents of the database. Before turning to the core problem of what amounts to a substantial part, the terminology underlying the rather novel rights should be explained. The term extraction is, though a different wording was used, more or less synonymous with the term reproduction. Accordingly, the right extends, as under copyright law, to the making of temporary copies of the contents of the database. The right of re-utilisation then entails all successive forms of using database contents, irrespective whether in a physical form or online. Hence, it covers the rights of distribution of physical copies (exhaustion applies) and a right of making available to the public.

In the *Directmedia* decision, the European Court of Justice was asked to explain the meaning of extraction further, in particular whether extraction meant direct copying using technical means. The Court thought it did not. Therefore, a substantial part continues to be protected if it is taken from a second database. Whether the same applies

now where the owner of the database actually creates – rather than obtains – the information that form part of such second database is open. Hence, if a newspaper maintains an automated systems that allows for the automatic transformation of data – such as small ads – into an online version, taking a substantial part of that version would amount to an infringement of the first database. It appears there is an inconsistency between the *British Horseracing* and *Directmedia* decisions, since – as noted – the second database in itself does not necessarily require a substantial investment. it is, according to the British Horseracing decision, a database for which data have been created rather than obtained.

Substantial Part

The rights are infringed once at least a substantial part of the contents of the database have been extracted and/or re-utilised. In general, the Directive stipulates that the test should have regard to both the quality or the quantity of contents taken. Such test can, if quantity is applied as the sole factor, lead to absurd results, since the amount of data does not necessarily reflect the degree of investment. Hence, a database that may contains 1 Mio entries may require a rather insubstantial investment indeed, whilst another database with the same amount of entries requires a huge degree of money and time to compile. The Court of Justice has taken the view that the test is based on both quantity and quality but the question whether – as some commentators have suggested – an absolute percentage can be established at which point the threshold to a substantial taking is crossed remains open. The quality of the data likewise poses interpretational problems. It was suggested that the quality depended on whether there is demand for such data – i.e. whether these data could have been "sold" or licensed to a third party.

This is not convincing. As mentioned, the directive achieves to give protection against certain forms of misappropriation, and the correct question to ask is whether such taking at least jeopardises the return of the investment made. Hence, alternatively the view can be taken that both the quantity and quality factors are to be assessed in accordance with whether the head start in competition is endangered. That test may – more along the lines of a less inflexible misappropriation test – include specific considerations as to the proximity of the markets affected and whether the parties share a common filed of activity. This would allow the contents to be used on markets not strictly related to the makers core business and would not significantly impact upon his legitimate interests. On the other hand, the question of substantial taking and market proximity is not expressly regulated under Article 7(2).

This shows that courts perceive the rights afforded more along the lines of copyright: as soon as the existence of a database and a substantial investment therein is established, the test solely turns towards asking whether the data taken are quantitatively and qualitatively substantial, which ultimately gives an IP right in the data as such whilst excluding both the specific impact of the investment and any consideration based upon market proximity and competition aspects. This leads to further implications given that these data may be useful for the creation of new informational products which now the

maker of the database may prevent, and cases such as these as will be seen in Chapter 12 – have already been subjected to scrutiny under the prohibition of abuses of dominant positions provisions under Article 82 EC (now Article 102 TEU). It has been suggested that the test for substantiality therefore should take into account both the relative degree of the investment and, consequentially, the purpose for which the data have been extracted. Hence, the higher the investment had been, the less data may be taken subject to an additional test scrutinising the proximity of markets. Overall, one may summarise the divergent approaches as protecting either the investment of the contents of the database. The former test is preferable because it clearly demarcates the legitimate interests of the maker, leaves sufficient distance to copyright protection in informational products and generally reduces the impact of an extensive legal doctrine according to which any investment gives rise to rights in information. the latter approach, simply affording protection on the basis whether a certain compilation of information had been part of a database requires a clear understanding of the required level of investment, and this cannot be done without clear economic proof evidencing a necessity to protect databases; such evidence is totally absent. Further, a less rigid approach would significantly ease the assessment in individual cases by allowing a balancing of different parameters and would therefore enhance legal certainty.

Protection of Insubstantial Parts

The problem as to what constitutes the protected subject matter is most visible when considering the most complex provision of the Directive under Art. 7(5). Art. 7(5) gives the maker a right to prevent the taking of insubstantial parts where this is done repeatedly and systematically and where such taking conflicts with the maker's legitimate interests. The objective of this provision was to prevent situations where the defendant takes, over time, an insignificant amount of data and thus compiles a database that finally constitutes a substantial part of the claimant's compilation. Therefore, the provision constitutes a mere re-exception to the rule that the right extends only to a substantial part. In any case, the elements of article 7(2) must be present, that is, overall a substantial part must have been appropriated. The legislator sought to preclude reliance on Article 7(2) – i.e. to assert that the taking had occurred over a period of time and therefore had not affected a substantial part – in order to prevent the creation of a competing product – clearly, for the objective to prevent a danger to the investment by creating competing products it is irrelevant whether the defendant had obtained the collection of data over time or in one act of extraction. Nevertheless, Article 7(5) has been applied extensively to a number of situations. Therefore, the scope of that provision needs to be explored in detail.

First, the terms "repeated and systematic" show that both elements must be present for Article 7(5) to apply. It is open, however, whether "repeated" means simply "more than once", and whether "systematic" denotes more than using a computer program that automatically compiles data. The alternative view holds that "systematic" and "repeated" denotes that the defendant must have had a subjective intention to perform acts of extraction of insubstantial parts in order to avail himself of the data, thus to ultimately

come into possession of a substantial part. In this case, the meaning of a "conflict" with the maker's legitimate interest makes sense – these interests are legitimate because he may prevent the creation of a competing product. Article 7(5) further complicates the situation where the taking of insubstantial data concerns so-called dynamic databases. Here, much depends on what constitutes the database that is affected. In *British Horseracing*, for example, the defendant took each day the most recent and new information on horse racing. The claimant operated a website concerning horseracing information that was updated daily. The defendant – who had a license to use the data on television screens in his betting shops - employed a special computer program that would automatically transfer these data onto their internet website. That use was not covered by the licensing contract. Hence, each day a small number of information was taken. The court rejected the argument that the taking was insubstantial because it would only affect a new database created each day – in that case, arguably no protected database existed. However, according to *Laddie* J. the taking of the most recent data amounted to a substantial taking since it concerned the most valuable information, for which in turn the claimant could have demanded licensing fees. The Court of Justice, following a request for a preliminary ruling, did not elucidate what the proper test under Article 7(5) should be, but introduced, as noted, a test on whether the database in question had been obtained rather than created.

Limitations for Lawful Users

The Directive further entails a specific limitation concerning uses by a lawful user. The maker cannot prohibit the extraction and/or re-utilisation of insubstantial parts of the database by a contractual agreement. This complements the lawful user provision under Article 6.

ACTIVITIES

- Assess the main differences between the copyright and the sui generis regime as applied to databases
- Explain the objective of the Database Directive
- Explain the various approaches that may be adopted in conducting a "proper" test of infringement
- Why does Article 7(5) pose specific difficulties in the case of dynamic databases?
- In your opinion, is the database maker right truly an intellectual property right?

SUMMARY AND REVIEW

The most important aspect of database protection concerns its scope and the potential anti-competitive effects a broad database maker right might effect. Therefore, an understanding of the different ways of interpreting the terminology used and its underlying protectionist rationales is important.

FURTHER READING

6 Copyright in the Information Society: The Background and Structure of Digital Copyright Law

This chapter considers the scope of protection for copyright in digital networks. It explains, first, the overall architecture of the 2001 Directive on Certain Aspects of Copyright and Related Rights in the Information Society. .the succeeding chapters build upon the exploration of the Directive here and will examine, in detail, specific aspects such as exclusive rights, limitations and he protection afforded to technological protection measures.

LECTURE

The 2001 Directive sought, for the first time, to harmonise copyright law vertically, that is, it affects nearly all aspects of copyright protection the Commission thought was necessary.

Structure and Background

The Directive is structured as follows. First, it clarifies the beneficiaries of protection., thereby, the Directive goes beyond the protection of authors rights and includes the rights afforded to performers, makers of sound recordings phonograms), broadcasting organisations and film makers. This was done so as to bring the laws of member states in line with the respective international agreements concerning neighbouring rights, and here in particular the Rome Convention and the World Intellectual Property Performances and Phonograms Treaty (WPPT), both of which also form part of the TRIPs-Agreement. The Directive uses the term "work" to refer to works of authorship and "subject matter" to indicate that neighbouring rights are meant. The Directive leaves the provisions for computer programs and databases intact and here the respective directives as explained above apply. The Directive then affords certain exclusive rights. These are restricted to the reproduction right, the distribution right and the right of making of available.

It should be noted that the rights of public lending and renting already formed part of the acquis. The right of making available stems from the 1996 WIPO Treaties and now is afforded to each beneficiary. This right forms part of an umbrella right of communication to the public. In general, such rights may be found in the Berne Convention and cover all uses by way of communication – that is, uses where a physical carrier is absent – and include, for example, broadcasting, satellite and cable-casting.

The general distinction between these rights and the right of making available lies in interactive the nature of the making available right. In cases of broadcasting and similar rights, the public is present at the same time (simultaneous) transmission but at

different places, and this extended, historically, the public performance right where the public was present simultaneously both in terms of place and time. The making available right applies where the public is present at different times and places but where access to a work or other subject matter depends on individual choices, i.e. is interactive. There is much debate on the scope of this right as explained later in Chapter 9.

The right of reproduction rests upon the definition given in the computer program and later the database directive. It entails transient as well as temporary copies. However, a specific exception was put in place that limits the reproduction right as far as certain transient copies are concerned. Article 5 contains an enumeration of different limitations and exceptions – the terminology is not clear – and thereby permits member states to "pick and choose" – in other words, member states may maintain or implement any of these limitations, but may not go beyond. There is a clear demarcation between limitations applying in the digital and in the analogue field. In general, there is a clear indication that the Directive is apprehensive in permitting limitations to be introduced for digital copying. The directive further distinguishes between limitations applying to the reproduction right only and limitations that may be introduced or extended to both reproductions and acts of making available. Insofar as digital uses are concerned, overall the Directive does not permit such uses to be commercial in nature.

You should note that this issue – whether a third party may rely upon a limitation afforded to, for example, a specific institution or for a specific purpose – is perhaps one of the most debated and is explained in Chapter 10. The types of limitations that may be introduced then differ according to the purpose. First, the Directive allows the making of private digital copies, i.e. member states may continue to permit such personal and/or domestic use. Second, the use of works in certain institutions is permitted under certain conditions, including for purposes of teaching and research as well as media uses. All limitations are, further, subject to the so-called three step test. That test has its roots in the Berne Convention and provides for certain parameters that must be recognised by the legislator before enacting limitations. In general, a limitation must concern a special case and must not conflict with the right holders legitimate market and prejudice the normal exploitation of the work or subject matter. Both the meaning of that test under the Directive and its construction have become a matter for debate, as will be explored in Chapter 10. It should also be noted that the way in which domestic legislation organises copyright limitations is quite distinct. In general, one may distinguish limitations that permit certain sues without any further qualification.

For example, it is permitted to make a citation for the purpose of illustration. Such limitations reflect certain needs that arise under human rights considerations and maintain freedom of communication, speech and/or opinion. In contrast, other limitations render certain uses free but in certain cases the author receives – under national law – an equitable remuneration. Typically, such remuneration is paid through collecting societies that collect payments from manufacturers of copying devices such as copying machines or blank tapes, or that collect payments from certain institutions for specific uses therein. The most prominent example is the right to make private copies

that is permitted in most member states (though not in the UK, pending reform). This is further explored in Chapter 10.

A specific feature of the terminology used in the directive is that, while for many limitations it makes clear that some payment should be made, the term "equitable remuneration" has been avoided; instead, the Directive requires that authors and/or right holders should receive fair compensation, which many commentators interpreted as meaning less than an equitable remuneration.

The reason for that deviance is perhaps the general objective of that Directive, and that objective is particularly found in Article 6. Accordingly, technological protection measures must be protected – an obligation that, to a certain degree, also arises as a consequence of the 1996 WIPO Treaties. The function of TPM's is twofold. First, such means may prevent certain uses and/or access to digital works technically. Second, on the basis of such technical control, the right holder is placed in a position to negotiate individual agreements with users – therefore, the fact that TPM control is possible means that end users are subject to a direct legal relationship with the right holder, for the first time in the history of copyright. It is this that the directive predominantly aims to achieve. The recitals make it clear that the facilitation of online services lies at the heart of this legislation. Therefore, the question as to whether limitations may continue to exist is raised. In certain cases, member states may declare certain limitations enforceable vis-à-vis applied TPMs, though this is subject first to voluntary actions taken by right holders and is, secondly restricted to a few exceptions concerning predominantly institutional uses; finally, there is no right of "self help" and beneficiaries of limitations need to undergo certain procedures.

Because the income of right holders can now be realised by way of direct agreements, the necessity to maintain a system of collective licensing is beginning to vanish, and that development calls into question the need to maintain limitations at least in those cases where the limitation, under domestic law, requires payment of fees. It should be noted that in the case of most such limitations – for instance, as regards private copying – the monies are usually paid to authors directly, and that the question of whether exploiters may claim this equitable remuneration on the basis of contractual agreements with authors is highly debatable.

This is why the Directive is perceived as protecting, foremost, exploiters rather than authors. It is usually exploiters that can arrange licensing agreements with providers of online services for which technical control means are being used – such as agreements between sound recording manufacturers and providers of music download services. This means that authors face a reduction in their income – the interplay between the protection of technical protection measures and limitations, as well as the fact that the directive grants a high level of protection to right holders and authors simultaneously effectively has the consequence to permit right holders to apply TPM's without the authors consent and to collect licensing fees, in many cases for payment of a lump sum licensing fee payable to authors.

The situation is even further complicated because the Directive is not clear on whether the term "right holder" applies to any licensee or to those exploiters that hold existing neighbouring rights – for example, publishers are not right holders in the latter sense. Likewise, it is uncertain whether database makers, as protected under the Database Directive, may be able to rely on that principled approach. In general, this permits "buy out" contracts; it follows that copyright today moves away from fundamental perceptions of personality protection that moulded the protection afforded under the Berne Convention, towards a right that predominantly facilities business models for the benefit of exploiters. Accordingly, the Directive affects a web of complex and closely interwoven interests. The interests of authors, exploiters and users are as much affected as those of potential competitors and the general public interest in preserving the public domain in order to facilitate creation and to sustain culture.

Hence, the Directive is indeed best understood if the levels of protection as organised in the text are reversed. Right holders have almost absolute freedom where technological measures are applied. They may then arguably circumvent limitations – subject to limited national rules that preserve limitations where TPM's are in place.

This makes it difficult at the national level to achieve harmonised solutions, and indeed both the specific implementation of the individual provisions and the broad freedom to interpret the Directive as a matter of its underlying principles and objectives in national courts shows significant deviations. It is perhaps for this reason that one may doubt whether the European Commission, in accordance with basic principles of European harmonisation, had the capacity to harmonise copyright law in such broad manner. Overall, where the target to achieve harmonisation is not met, national differences continue to exist and therefore a directive that leaves a broad scope of judicial and legislative freedom of movement does not reduce obstacles for the creation of the internal market – indeed, it creates further obstacles.

FURTHER READING

      Hugenholtz [2001] EIPR
      Westkamp [208] J. Cop. Soc'y. USA.

7 Exclusive Rights in Modern Copyright Law

OUTLINE

This chapter addresses predominantly the scope of and interaction between the two most important rights, the right of reproduction (including the limitation applicable to transient copies) and the right of communication to the public including the making available right.

LECTURE

Before a closer inspection of the rights of reproduction and communication to the public a brief assessment of the historical development and status of rights afforded under copyright should be made. Without a clear perception of that historical background the current problems and debates cannot properly be understood. At the outset, it should be noted that – in contrast to patent and trade mark law – copyright law does not entail a general use rights, though likewise in contrast to these industrial property rights copyright law is not restricted to commercial uses and accordingly covers a range of private uses. In general, copyright affords a bundle of pre-defined rights to authors and right holders. These rights differ, at the international level, between the respective applicable conventions. The Berne Convention affords certain exclusive rights to authors whilst the Rome Convention applies to owners of neighbouring rights. These rights are proprietary: they may be licensed with absolute effect and form part of the property right afforded to authors and owners of neighbouring rights.

Structure of Exclusive Rights

The reason why copyright does not entail a general right to use the work is that copyright must, precisely because it applies to both commercial and non-commercial rights, strike a balance. It must clarify what may be prevented in individual cases on the basis of such proprietary right since otherwise there is a danger of over-monopolisation: it is often said, therefore, that the balance that needs to be struck must permit the "right" level of protection that leaves sufficient scope for the freedom to re-use pre-existing works, and in that sense copyright law protects works only to the degree necessary.

Historically, the right to make reproductions was, of course, the right first recognised, though it had a different impact in the UK than in continental Europe. The purpose of establishing a reproduction right was to permit authors (in the UK: publishers) to enter into licensing agreements, for example with publishers. At that time, a reproduction was definable as meaning a copy that would substitute the original – in that contained the same communication on a physical carrier – and hence the reproduction right applies to durable and permanent copies. However, the reproduction right has further connotations going beyond the making of direct copies. It covers the making of indirect copies – that is, where the reproduction is made from another copy rather than from the

original – and is therefore not restricted to technical copying. Hence, the taking of the expression of a work would constitute a reproduction, and here a distinction needs to be drawn between the right of reproduction and the right of adaptation. Clearly, at a certain point the taking of expression will be insufficient for an infringement of the reproduction right – this is regulated in UK copyright law under the doctrine of substantial taking, hence allowing the taking of ideas, information or insubstantial portions of the expression. In Germany, for example, a similar doctrine can be found which allows the free use of a work in order to create a new work. The requirement here is that the original work is used as an inspiration and that the individual elements of the original, though recognisable in the alleged copy, are insignificant and dim when comparing both creations.

Expansion of Rights

Over time, certain different uses of works came into being, and the law was accordingly extended to cover these. First, in some jurisdictions a separate right of distribution was introduced that covered mainly the putting into circulation of physical copies through intermediaries. Second, the law afforded protection against certain uses that communicated the content of a work rather than being concerned with uses in a physical form. The first such right is the right to perform the work in public, and with technological development that branch of exclusive rights in communication was extended to cover other aspects such as broadcasting, satellite uses and cable-casting.

The final extension of rights came in 1996 when a right of making available was introduced. What distinguishes the "physical" rights from rights in the communication of works is that all rights pertaining to certain forms of communication must concern a use *in public*. This is why the question of a simultaneous communication is so important. Public performances pertain to uses where there the audience is present at the same time and place; broadcasts and similar uses reach the public merely as far as the time is concerned, and therefore cover communication via a distance. The making available right gives up both. Without a simultaneously present public, however, what is left is often simply a one-to-one communication, and it is accepted that copyright should not interfere with private communications. Similarly, it is usually clear that a certain technology such as broadcasting – defined as a transmission by Hertzian waves – does, from a commercial point of view, necessarily always reach the public such as in television or radio, and there is usually little debate as to what the term "public" would actually signify. In general, in these cases the law confers protection for a certain use that is commercial in nature and for such commercial use the author has a right to participate financially. Indeed, as will be seen, much of the debate today concerns the question of a sensible definition of the public when it comes to the novel right of communication that was predominantly introduced to cover the internet and other digital networks. In short, there is reason to believe that an all encompassing right was introduced affecting adversely fundamental freedoms of communication. .

The following will first address the scope of the communication rights under the Directive before turning to the reproduction right. The reproduction right today is formulated as broadly as possible – it covers any copy of the work, irrespective of whether direct or indirect and, more critically, irrespective of whether the copy is transient or durable. In relation to transient copies, as mentioned, Article 5(1) formulates an exception to the right to control certain transient copies, albeit under strict conditions.

Making Available and Communication to the Public

Article 3 of Directive 2001/29/EC requires member states to implement the so-called right of making available to the public, defined as the right to authorise or prohibit the making available of works at such a time or place that members of the public may choose to access it individually. The objective here was to extend copyright protection to, specifically, typical internet uses such as placing works on a publicly accessible website. However, the provision creates numerous problems.

Interactivity: the Web-"Broadcasting" Example

The first problem concerns the distinction between interactive uses and may be illustrated by using the example of internet broadcasting – that is, a pre-scheduled radio or television broadcast streamed over the internet. Such broadcasts can be accessed on the internet, that is, in a digitised format inasmuch as these broadcasts can be made by Hertzian waves. The question of whether – in this case – the broadcaster enjoys the making available right raises some concerns. Clearly, where the broadcast is streamed simultaneously and in accordance with a pre-scheduled programme, the making available right does not apply. However, there are many cases where a broadcast program may be accessed, i.e. remains stored over time in a digital format. It is not entirely lucid, however, whether the requirement of an interactive access encompasses uses that are not strictly interactive, given that listeners cannot access individual works to be broadcast but must follow a pre-existing program format. Hence, arguably an element of "individual" accessibility is lacking. The user does not access the program at a time individually chosen, but the program is streamed to a simultaneously present public. At closer inspection, this is not true as far as the broadcast as such is concerned, and the rights in such broadcast are enjoyed by the broadcasting organisation. That broadcasting right is generally afforded on the basis of protecting the organisational efforts of broadcasters and is independent of the copyright in the broadcast content .The consequential issue then concerns the issue of whether the broadcaster enjoys both rights – making available and broadcasting. Arguably, then, the user accesses the broadcast individually, though he does not access the individual works broadcast in such way - he must accept the sequence as arranged by the broadcaster. Therefore, the right in controlling the act of broadcasting is not affected as far as the organisation of the broadcast (that is, the program) is concerned.

The problem is that usually the subject matter under broadcasting copyright is defined as the broadcast *signal*, not any broadcast program or its contents, and that it is therefore – irrespective of the hypothetical applicability of the making right – doubtful whether digital broadcasting forms part of the rights afforded to broadcasting organisation at all. This is precisely because the signal cannot be appropriated by, for example, "framing" such program into a third parties' website. Therefore, it remains dubious whether broadcasters enjoy any rights at all. In relation to the individual works broadcast such as music tracks, the position is equally complex: here, the user does not access these individually. They are broadcast at a pre-set time, and here irrespective of whether the streaming takes place simultaneously or whether the program is accessible after the original streaming date. As these rights are not owned by the broadcaster as part of their neighbouring right, only the bright to consent to the broadcasting of individual works remains. At this juncture, the question of subject matter is raised again, and where that subject matter is the signal rather than the content the right must fail. The latter problem was discussed in international negotiations with a view to establishing a harmonised set of rights for broadcasting organisations that would extend to the content of their broadcasts, but these failed. In the UK, however, the right in the broadcast extends to the broadcast items under Sec. 20 (1) CDPA 1988, and arguably this allows the conclusion that the content is covered. However, this is an entirely unresolved issue and is pending judicial clarification, which would in turn have to take into account international law. To sum up: a broadcasting organisation is afforded the right under Article 3. The scope of that right depends on whether (1) it extends to contents rather than the signal and (2) whether the program appropriated is made available in an interactive manner as prescribed. Where the content is protected by copyright (this may be the case where the content constitutes, for example, a film), the right to object against the making available is attributed to the author of that film. It is infringed where it has been made available inasmuch as any other work.

The Public

A second area of grave complexity concerns the question as to what precisely constitutes the public. The meaning of the term had intentionally been left open and it is therefore a matter of national law. It must first be remembered that in relation to acts of making available the communication takes place at different times and places. Therefore, the status of the recipient as a member of the public, rather than the type of commercial endeavour, is crucial. In short, the term may be interpreted restrictively or extensively. A restrictive interpretation is usually conducted insofar as traditional communication rights were concerned. The "public", then means a group of persons not sharing personal ties with each other, or alternatively a group of persons not having a personal relationship with the person or entity initiating the communication. Hence, the re-cabling of satellite broadcasts in a hotel amounts to a public communication because hotel guests do not share such ties. Likewise, German decisions purported that prison inmates or hospital patients did not constitute a public. An alternative view is that the term "public", basically, stands for a particular commercial use of the work. The issue is currently unresolved.

The latter approach would reduce the danger of over-protection of communications on the internet though admittedly it would force courts to clarify the demarcation lines between commercial and private forms of internet uses.

Communication to the Public

Finally, there is a different debate concerning the existence of a broader right of "communication to the public". Article 3 indeed uses that terminology as far as author's rights are concerned. Such right would have a significant impact and would lead to a critical overlap with the reproduction right. The problem is best explained by using an example. File sharing technology permits users to download unauthorised files containing protected content such as film or music. The act of placing such file on a web site for download constitutes both a reproduction (by way of an upload) and an act of making available to the public. The act of downloading results, then, usually in the making of a reproduction on that user's hard disk. The issue here concerns the legal characterisation of the electronic transmission of the file from the site where it is stored to the user's personal computer. That transmission does not constitute an act of making available – though some commentators have attempted to categorise that transmission, instigated by the user as a type of contributory infringement. Apart from that position, however, the owner of the rights in the file downloaded has no further legal remedy in many countries. This is because the ultimate copy made on the hard disk may be covered by national private copying exceptions. For example, in Austria the user may rely on the limitation permitting the making of copies for private and domestic purposes irrespective of whether the source copy was a legal or not, and there it is also irrelevant whether the author actually received remuneration for such use. The position in many other jurisdictions in Europe is similar though there exist some differences. In the UK, however, the question is practically not as significant given that no private copying limitation is in place, though this is likely to change (see Chapter 10). This means that file sharing activities can only be prevented if an exclusive right exists that would cover the act of transmission. The debate then surrounds the issue whether the 1996 WIPO Copyright Treaty (Article 8) introduced a general umbrella right covering all forms of communication, including any transmission irrespective of the technology used, or whether the term "communication" must be understood more restrictively. The more restrictive view hold that the umbrella formulation pertains only to the pre-existing communication rights as found in the Berne Convention – that is, rights where the communication occurs simultaneously – whereas the making available right must be perceived as the only right governing non-simultaneous uses. Accordingly, no rights exist that cover the process of transmission solely.

The Reproduction Right

The second important feature of the Directive concerns the reproduction right. That right, as mentioned, covers all forms of copying irrespective of whether this is done directly or indirectly. The more important problem concerns the formulation of reproduction as including any copy, permanent or temporary. The debate centres around

the scope of the reproduction insofar as it attached to temporary copies. The reason is that, necessarily, digital networks always, as a matter of technical necessity, require the making of copies of information transmitted therein. These copies usually last for milliseconds and their purpose is to speed up the process of downloading information. Such copies may typically be "stored" on proxy servers, that is, servers geographically situated between the originating server on which the information downloaded is stored and the user's personal computer. These copies are not functional, i.e. they are automatically deleted once the process of download or transmission is terminated. Other temporary copies occur where, for example, a protected work or subject matter is loaded onto a computer from a physical carrier such as a CD. Even playing a CD or DVD requires the making of copies. The broad scope of a right to control temporary copies therefore would give right owners an extremely broad right to control internet uses, and such right control right was heavily lobbied for. However, in order to delimit that control right the Directive now foresees, under Article 5(1), an escape route: here, certain transient (not: temporary)(copies are exempt. The purpose was to allow typical acts such as browsing. However, the impact of Article 5(1) is far from clear.

Article 5(1) is the only mandatory limitation to copyright infringement and therefore member states must implement it. It is formulated in a complex manner, building upon a technique of exceptions and re-exceptions pertaining to different situations. First, it only pertain to transient copies that have a particular technical function, that is, whose sole function is to speed up processes. Arguably, this excludes more durable copies (i.e. temporary there than transient copies) that occur in a computer once a work is loaded thereon.

To some extent, this was the position taken in the *Infopaq* decision rendered by the European Court of Justice in 2009. Here, a temporary copy made in a scanner was held to be sufficiently non-transient to not to be caught under Article 5(1). This misses an important commercial consideration: the right to control such temporary copies was, as mentioned, introduced in the directive concerning computer programs, and in there the extension had the purpose to safeguard the control over multiple uses of one piece of software in large entities (see Chapter 4).

The position as regards general copyright is decidedly different because, simply, computer programs can only be used in such a way, whereas the making of temporary copies of music or literary works does not normally cover the mere use. In addition, the inclusion of temporary copies has another detrimental effect, because it conflicts with national limitations that permit uses of works in a digital format. Hence, the European Court of Justice held that even where the defendant would have been able to rely on a general limitation – in this case, a limitations permitting the use of press articles in a digitised archive, the scope of which was disputed – the existence of a temporary copy was subject to Article 5(1) only. In other words, the permanent copy that is arguably permissible under national law in such cases is factually irrelevant as long as the technical procedure to make that reproduction entails the making of a temporary copy not exempt under Article 5(1). This causes great legal uncertainty and ultimately renders

limitations permitting certain digital uses subject to an additional test that has no basis in traditional copyright doctrine and theory.

Insofar as a transient copy is present, the provision distinguishes as to the person or entity who made it. The first limb concerns intermediaries, that is, service providers, whose responsibility for these copies is accordingly restricted. The second limb concerns situations in which the transient copy is part of a lawful use. This is not further elucidated. Clearly, a lawful use is one to which the owner of the right had consented; thus, right owners cannot, once a general consent had been given, resurrect the existence of transient copies to prevent or restrain such permitted use. Whether a lawful use includes reproductions made for purposes permitted under a limitation is – following *Infopaq* - now, unfortunately, to be disputed. This conclusion is almost absurd because it gives more weight to the existence of copies that are neither functional nor durable than to an express permission in national law that allows the making of permanent and useful copies.

Finally, the provision contains a further safeguard: it shall be inapplicable where the use in question has independent economic significance. This appears to partially rely on the conditions of the three-step test as set out (in relation to all limitations) in Article 5(5). In other words, the exemption of transient copies is subject to a further test of whether the use in its entirety conflicts with the right holders legitimate interests. The meaning of that re-exception is not known. The Directive does not provide further guidance. In *Infopaq*, the European Court of Justice suggested, however, that the three-step test would be applicable to Article 5(1) as a general restriction, i.e. notwithstanding the fact that Article 5(1) already contains a safeguard benefitting right holders. This allows, in general, wide ranging conclusions and complicates the matter further.

ACTIVITIES

- Explain the problems associated with the meaning of "making available" and explain the consequences with respect to internet streaming technologies.
- What is the effect of the "transient copying" exception under Article 5(1)?
- Assess the degree of overlap between the right of reproduction and the right of making available and/or communication to the public.

SUMMARY AND REVIEW

You should have acquired a thorough understanding of how the two rights impact on digital uses and how their construction, respectively, informs the degree of freedom enjoyed on the internet today. You should bear in mind that the divergent approaches have an impact in different contexts discussed herein later, in particular in relation to the protection of technological protection measures.

FURTHER READING

Westkamp,

Westkamp,
Okoedji

8 Copyright Limitations and Digital Uses

Copyright limitations form an integral and essential part of all copyright legislations worldwide. However, in recent years much debate has surrounded the question of whether limitations may have purposes that go beyond broader principles such as securing freedom of speech. A particular here concerns the issue whether limitations may be employed so as to allow certain new markets to be created, and whether they may be extended beyond a literary interpretation. A particular concern especially as regards copyright limitations is the so-called three-step test apparently constraining such extension and openness.

LECTURE

The impact of copyright limitations on the current debate cannot be overestimated. Many perceive copyright limitations or exceptions as a prudent vehicle by which to maintain the balance between copyright protection and certain elements of the public interest.

Limitations and Economic Freedom

However, the function of copyright limitations is not necessarily to sustain broad fundamental freedoms only. They may effortlessly be used to secure competition – for example, a limitation may, under national law, be extended to allow a specific value added service that the right holder does not provide. Here, there is a clear overlap between restraining control rights internally (within the judicial freedom of movement permitted under national copyright law) and externally – such as by European competition law as discussed in Chapter 14). Additionally, many commentators today envisage a more liberal approach based on implications of fundamental human rights. Both these approaches stem from the insight that the advantages of digital technology must be allocated by the legislator in an equitable manner. These very fundamental issues, that affect, ultimately, the question what copyright law should be achieving in the face of digital technology, cannot be exhaustively addressed here. The following restricts the discussion to the question of how far the Directive permits flexibilities that allow a meaningful response to the ever changing realities – and the constant evolution of niche markets for certain specific uses.

Striking the Balance: Basic Approaches

As noted, the Directive appears – notwithstanding the assertion that it wishes to strike a proper balance between the interests involved – to be principally based on the notion that digital uses pose a danger to copyright. That assertion is coupled with the further predicament that the Commission saw a high level of protection as the fundamental premise on which European copyright law should be based. From that – limited – perspective the apprehension towards digital limitations is indeed sensible: where the overall objective, as noted, is to facilitate direct online services and thereby contractual arrangements between right holders and end users, the existence of specific limitations presents an obstacle to such freedom to contract. Indeed, the question whether existing copyright limitations may be contracted out of has been subject to debate, and there is no certainty on this important issue amongst member states. For example, under UK law a court would presumably permit a prohibition to use a work under a licensing agreement even if that use is made for a purpose safeguarded by, for example, the defence for private research and study; here, the overall generous approach to freedom of contract accepted under UK law would assumingly permit such conclusion.

Conversely, in some countries (such as Belgium and Portugal) the law expressly disallows such contractual prohibition , albeit under different preconditions. In any case, however, the existence of broader limitations covering digital uses places burdens upon right holders' freedom to contract. For example, the Directive does not permit a member state to render limitations enforceable where works are made available online and where such use is safeguarded by the use of access control technologies, to which we return later in Chapter 11. It appears to follow that the permission to include digital uses in the realm of limitations at all is a concession to lobbying rather than an assertion of the importance of limitations as a means to balance interests. This explains the overall restrictive approach to digital limitations – in general, these are limited to non-commercial and strictly personal uses. In this regard, it must be made clear that limitations do not solely express public interests, but that they may be used to secure personal commercial interests, albeit in turn to objective overall public welfare objectives. Thus, there is no such thing as a monolithic antagonism between copyright as property and some obscure public domain notion. Each limitation has different functions, is underscored by divergent individual and collective interests and must be adapted to the emergence of new technologies.

The Three-Step Test

Before assessing the scope of digital uses – and respective national responses – the impact of the three-step test under Article 5(5) should be explored. That test emanates from the 1971 Revision Conference of the Berne Convention. It has subsequently been incorporated in all international copyright and neighbouring rights conventions and also applies, under the TRIPs-Agreement, to all other species of IP. It requires Berne Union and TRIPs members to recognise certain parameters when adopting limitations.

These are: the limitation must be applied only in certain specific cases; it must not conflict with the normal exploitation of the work and must not prejudice the right holders (under the Berne Convention, the authors) legitimate interests. Clearly, this formulation is extremely wide ranging and abstract. The initial purpose was to permit limitations to the reproduction right for certain uses but to constrain the capacity of union members in accordance with certain parameters.

One example where the three-step test would not permit a limitation for, for example, the making of private copies or copies for educational purposes therefore is sheet music – the reason is that such limitation would totally undermine the market for sheet music because of the high investment costs involved and the relative small demand for such works, which would eradicate any incentive to produce such works. Under the Directive, however, the legal nature of that broad exception to the freedom to enact limitations appears to have changed. First, some member states such as France have included the test in the statutory text of national copyright law, where the effect now is to provide an additional test that immediately impacts upon the interpretation of a limitation. Whether this was the purpose of including the test is, albeit, unresolved.

Secondly, the test requires the legislator (and, where applicable, courts) to assess what a normal exploitation is. Further, the European Court of Justice generally – following the *Infopaq* ruling – demands that because of the existence of the test copyright limitations must be interpreted narrowly. Such understanding instigates a tendency that overall benefits right holders – in short, the test allows a construction of a limitation as static and thereby reduced the flexibility of courts to adapt limitations to changing technical circumstances. In addition, a further problem concerns the extension of the test to any right holder, rather than benefitting, first and foremost, authors. Thereby, the test operates so as to inherently allocate right holders any future market for their works and to shift the problem of specifically secondary markets to competition law, as discussed in Chapter 10. That underlying tendency presents the most critical complexity, and here the Directive is partially out of step with national laws.

Judicial Approaches to Extending Limitations

This may be illustrated by two decisions that took a different approach. In the first, the German Federal Court of Justice in 2003 had to assess whether the pre-existing limitation covering the freedom to make (paper) copies of press clippings for an internal archive (such as in an undertaking) could be extended to digital uses. The statutory text did not permit so. Despite that statutory constriction, the Court went beyond the written text of the limitation, which clearly only applied to copies on paper. It held that in general limitations must be interpreted so as to reflect technological development and that, therefore, a static interpretation was inapt. Moreover, the court held that such interpretation must be nonjudgmental in having to consider all relevant interests; hence, there was no tendency to read the limitation as predominantly benefitting, where its construction was uncertain, right holders. The court thus permitted an extension by way

of analogy to digital uses. Importantly, however, the court required that authors (not: right holders!) must receive equitable remuneration for such increased use.

A further decision by the Swiss Supreme Court goes even further. Here, the issue was whether a Swiss limitation similar to the German wording could be extended to both digital archiving and to the provision of such archive for commercial purposes. The Swiss court explicitly rejected the argument posed by the claimants (publishers of newspapers) that such permission would fall foul of the three step test. It asserted that the test was not a catch-all provision securing the interests of exploiters. It was sufficient, therefore, that authors receive remuneration. Both decisions illustrate aptly the rather autocratic future impact of the test on national law. First, it is clearly that the interests of authors in receiving an additional remuneration for the use their works may come into conflict with the interests of exploiters to be allocated future markets, even where they do not provide such services. Secondly, it reflects the inherent need for copyright limitations to be kept accommodating in order to permit the general balance to be achieved on a case by case basis.

Digital Limitations under Article 5

These general considerations aside, the list of permissible limitations as applicable to digital uses is indeed rather short. However, it should be noted that many deviations exists as between jurisdictions. Sometimes, the text of the directive was not followed strictly.

Digital uses are permitted, generally, for the purpose of making private copies for personal and domestic uses, for quotations and citations, for the use of illustration of teaching, for certain research purposes and for media uses.

Private Digital Copying

The exception for private copying, first, does not exist in the UK though, as mentioned, there is some discussion with a view to implement it. In contrasts to copies made for private purposes in analogue form, the private copying exception in relation to digital copies is limited to copies made by a natural person and for strictly private and domestic purposes. The right holder should receive fair compensation. You should also note the problems concerning the applicability of the communication to the public rights as regards, particularly, file sharing, which was discussed *supra*.

One specific problem concerns the impact of the private copying exception in relation to the legal nature of the source copy. In some countries, that source copy must be a legal copy, i.e. it must not have been created without consent. In other countries, in particular Austria, this is irrelevant. In Germany, the compromise was to limit the exception to source copies that are not obviously illegal, a formulation that is difficult to comprehend and which places the burden of proof in many cases upon the user.

It should be mentioned that, as previously noted, most jurisdictions permit such copying irrespective of whether a system for the collection of levies placed on copying technology and devices is in place, in other words: the right holder or author cannot challenge the legitimacy of such use for non-payment, an aspect that is highly impacting on the freedom to use works in digital networks. In general, such levies are today placed upon traditional blank carriers as well as copying devices such as photocopiers, and in most countries a collecting society is charged with administering the system.

Institutional Digital Limitation

The Directive further permits certain uses in educational institutions. For example, the Directive permits the making of copies for the purpose of illustrating teaching, though this must be done for non-commercial purposes. Similarly, the making available on the premises of a public library is permitted. This allows the scanning of, for example, academic journals or extracts from textbooks so that library users may access these on machines located on the premises of the library. In order to safeguard the interests of academic publishers, it is a condition that each work so converted must exist in a physical form in that institution. Thus, the limitation only applies to a secondary use since a hard copy must have been purchased, and digital access is permitted only consecutively - one individual user at one point in time. That limitation has not been implemented in the UK where library uses are generally governed by specific collective licensing schemes the terms of which take precedence.

In Germany, the adoption of that limitation caused turmoil because academic publishers argued that it would adversely affect their business, in particular their ability to provide academic users with online access for payment of fees. The compromise finally struck foresees that the libraries may not engage in such use where the same service (digital access to, predominantly, online journal articles) is provided by publishers; however, it is a condition that the fees payable for such service are fair. It can effortlessly be imagined that the question of fairness is now becoming a thorny issue difficult to disentangle. Of course, publishers and users have rather different ideas of how much may be charged.

These problems are illustrative, yet again, of the emerging conflicts of interests as regards the advantages of digital technology. In this scenario, academics in particular may argue that (1) they would receive at least some (modest) remuneration for such use; (2) that in many cases the publication of academic article is traditionally not remunerated by academic publishers; (3) that it is the state that provides the framework for academic research to be published in journals sold for profit; (4) that, therefore, it is both for their monetary benefit as well as their ability to have cheaper access that is compromised by excessive pricing that limitations in realm of academic publishing should be rendered more liberal.

Quotation and Citation

Of particular note to uses on the internet are those limitations that are generally considered to be of utmost importance in securing freedom of speech and communication. To this belong the limitations for citations and quotations, and their importance is underscored by the fact that – as regards the ability to make citations – their legal recognition is mandatory under the Berne Convention. In addition, it is clear that the historical legislator afforded special importance here. There is no requirement for a remuneration or compensation to be paid, which places the citation and quotation right clearly in the proximate vicinity to fundamental human rights rather than mere exceptions.

ACTIVITIES

– Should copyright limitations be interpreted narrowly?

– What is the overall implication of the three-step test on digital uses under Article 5(5)?

– Briefly assess the problems encountered in regulating the legal relationship under copyright law between academic publishers, authors and users insofar as this concerns the freedom to enact or maintain copyright limitations under Article 5(2) and 5(3).

SUMMARY AND REVIEW

The chapter considered the overall implications of the way in which the directive aims to regulate copyright limitations with respect to digital uses. The pillars on which that architecture rest should be known, especially the impact and debate surrounding the three-step test and the general possibility to extend limitations to cover economic interests for the broader social benefit.

FURTHER READING

Coleman/Burrel, Copyright: The Impact of Digital Exceptions, Oxford 2003.
Westkamp [2008] J. Cop. Soc'y. USA.

9 Digital Rights Management

OUTLINE

The chapter will provide an introduction to the legal protection of digital rights management systems. The emphasis is strongly upon the protection granted to technological protection measures, though the protection of rights management information will be covered as well.

LECTURE

TPMs AND RMI

The Directive requires member states to provide legal protection to both rights management information (Article 7) and Technological Protection Measures (Article 6). That obligation partially stems from the 1996 WIPO treaties. Member States had little freedom of movement given the rather dense regulation of both, though there still exist numerous differences. As far as copyright law is concerned, the general notion of protecting a work by a TPM – and the subsequently adopted consensus to grant legal protection to such measures – raises immense doctrinal difficulties.

The Directive distinguishes between technological protection measures and digital rights management information. The protection afforded to TPMs will be discussed infra. Rights management information, as such, concerns digital information that is attached by the right holder to a file containing a work in a digital format. Such information may relate to details of a licensing agreement, such as the name of the "purchaser" and the date the agreement was made, as well as to conditions of use, or it may relate to details of right holders. It is, therefore, a general condition that protection applies only to information that is required so as to protect the right holders interests under copyright law, that is, to enable him to trace the origin of a digital file in order to allow him to assess whether a file is illegal or not. Therefore, the removal of such information as well as the putting into circulation of tools permitting so is prohibited. The provision does not raise significant concerns as regards copyright law in general, though it should be noted that concerns relating to the protection of personal data have been voiced.

THE CONCEPT OF TPM PROTECTION

Much more intricacies arise under Article 6. This provision legally protects applied technological protection measures. There are numerous initial problems concerning the use of computer code to regulate access to information in general and its legal protection in particular.

First, by recognising the status of a TPM much along the lines of recognising the right of property owners to fence in their property, the law moves from an open system in which

conflicting interests are balanced by an open discourse (the legal/illegal dichotomy, or the "legal code") towards a code-based system that decides on the right to access information on the basis of a technical code only – in other words, the binary code decided upon a legal issue and does so on the basis of an include/exclude dichotomy (the "binary code"). This is a general concern and not restricted to the protection of TPMs protecting, in turn, copyright.

The second problematic concern arising under TPM protection for copyright is that it evokes the impression that –again similar to an "electric fence" legitimation – copyright is to be perceived as a closed system in which the scope of property rights may be assessed on the simple presumption that certain material contains or is based upon information to which copyright may attach. As such, this proposition is clearly erroneous. Necessarily, copyright – regardless of national differences in detail – entails numerous mechanisms that allow courts to "strike the balance". This includes the assessment of whether the requisite level of originality had been achieved, doctrines such as the free use mechanism under German law or the open "substantial taking doctrine" under UK law, as well as an open "fair use" clause employed in US copyright law instead of an enumeration of limitations. Importantly, the legal protection of TPMs – in addition to their factual ability to include or exclude – then allows the far-reaching conclusion that copyright does protect the idea or the information that is fenced off. The danger in that proposition is that the simple legal ability to erect electronic fences can effortlessly be developed into a general argument that supports an expansion of copyright even where TPMs are not applied, quite simply because an unreflected recognition of "electronic fencing righs" can be interpreted as equivalent to real property protection, and any circumevtion thereof must mean trespassing upon copyright. Such assumption of absolute protection is an obstacle to a meaningful evolution and adaption of the law. The directive approaches that problem, overall, in an over-simplfying manner, by monolithically contrasting copyright protection with a set of limitations, and it is only in the case of (some) limitations that the absolute effect of TPM is weakened, albeit to a modest degree.

Article 6 is a complex provision entailing a system of rules, exceptions and re-exceptions. It was intended, overall, to strike a balance between copyright protection and the public interests which accounts for these difficulties. In general, Article 6 is structured into four sub-paragraphs. Article 6 (1) contains a general prohibition on circumventing TPMs whilst Article 6(2) prohibits the manufacture and a range of other commercial activities that seek to allow the circulation of circumvention devices, and both these types of torts related to copyright must be strictly distinguished because they raise different issues. Article 6(3) defines a TPM as either a technological tool protecting against access – which may, for example, be a measure applied to an online service for which a password is necessary – and use controls, such as measures disallowing the making of digital copies. These copies may be temporary or permanent and it is irrelevant whether these are made on a physical carrier such as a CD or on a computer. The most difficult element here is that the TPM in question must be "effective" so as to achieve the objective of protection. It is not explained what that objective should be and at this juncture one needs to consider the interface between the scope of copyright as laid down in statute

under national law and the potential scope of the control right afforded to the entity applying the measure. This is discussed later..

However, as a minimum requirement it is certain that not all measures can be effective. There are two approaches. First, it may be said that a measure is generally effective where it cannot be overcome by an average consumer who does not have the required technical skills to program his computer so as to circumvent, and it is that average consumer that the Directive had in mind. A measure that can effortlessly be circumvented is, therefore, hardly effective, especially where tools are used that already exist on standard equipment.

Further, it also seems that "effectiveness" relates to the making of digital copies in the case of copy control mechanisms. For example, it is hardly imaginable that using the "analogue gap" so as to make a copy of a music CD amounts to an infringement. Here, copying devices such as CD recorders usually permit the making of copies from CD's either as a complete digital copy (that is, by copying the entirety of digital information stored on the source copy, such as the music, the table of contents and all other information as is) or as a simple analogue copy (here, the device will allow the making of copies after the digital information had been transformed into analogue signals, which means that only the individual tracks are copied and subsequently transformed back to digital information). Otherwise, the Directive takes a broad approach to what measures amount to effective TPMs.

One particular problem area concerns the question whether a TPM may lose the quality of being effective. Thus, a Finnish court held that where over time circumvention tools become readily available from the Internet, the TPM in question will lose its capacity of being effective. Clearly, though such deduction seems acceptable given the dictionary meaning of "effectiveness", it is hardly compatible with the overall objective to protect copyright – necessarily, as will be seen, the competition between those who apply TPMs and those who supply circumvention devices may render devices practically inefficient, that approach questions the entire framework of protection. It would incentivise the production of circumvention devices and cause legal uncertainty.

The protection afforded under Article 6 applies to all works and subject matter that is governed by the Directive, and also applies to the database maker right. It does not apply to protected computer programs for which a specific provision is in place.

COMMERCIAL EXPLOITATION OF CIRCUMVENTION DEVICES

The prohibition on commercially exploiting circumvention devices is the oldest accepted prohibition in the realm of technology protecting information. Article 6(2) thereby refers to both the WIPO treaties, which require such protection as a minimum right of copyright owners. Article 6(2) may also be traced back to similar form of protection as found in other pieces of European legislation, and here most importantly as regards copyright protection of computer programs and so-called conditional access services. In both cases, relevant legislation disallows the manufacture of circumvention devices that permits consumers to circumvent and thus to avail themselves of services for free: for

example, the Directive on conditional access purports that putting into circulation, advertising for, importation or exporting a device that would, for example, disable a device used to block access to pay-TV is prohibited. To some extent, these historical role models for protection reflect that the "true" nature of such prohibition is informed by unfair competition law.

This is an important aspect – as will be seen, much of the debate generally concerns the question of in how far statutory copyright law impinges upon the ability to use works (and, accordingly, to manufacture devices that enable so) that are protected by TPMs. Indeed, in jurisdictions where broad notions of unfair competition are accepted, courts have found that the manufacture of devices allowing circumvention amounts to unfair competition. The underlying reasoning gives further insight. Typically, and especially in the case of business models such as Pay-TV and similar services, there is necessarily a high degree of investment that is required to set up and maintain such services, and it is for that investment that the person operating such service seeks payment. Notably, under that approach it is irrelevant whether the information conveyed through such service is protected by copyright or not; what counts is the objective to protect such investment.

Consequentially, the manufacture of circumvention devices would disincentives the risk associated with such service, and in this regard the rationale underlying TPM protection in general bears striking similarities with the rationale underlying the database maker right. In addition, the manufacturing of devices interfering with a third parties' protected service also entails an element of unfairness – it is a gross example of "reaping where one has not sown" because customers are being diverted to a different – and less costly – service that economically substitutes for the original business model. It is for that reason that commentators have proposed to locate TPM protection to unfair competition law, though – as with the database directive – the prospects of proper harmonisation here are bleak given the divergent approaches to unfair competition law in a business to business relationship. In other words: the legal approach was, historically, neutral as to the content and the technology used. It was based on traditional (and rather flexible) notions of investment protection and the underlying aim to facilitate innovation in fostering varieties of business models.

The transformation of rules fundamentally arising out of unfair competition law into rules subsumed into copyright legislation, therefore, raises consequential issues. Article 6(2) refers to the definition of TPMs that are, as noted, effective in achieving the protection object, and here it may be argued generally that this object must be the protection of copyright. Therefore, is it a requirement that the circumvention tool allows the user to access or use a work, or does "object" mean an infringement of copyright by enabling a user to commit a restricted act such as copying? Again, different approaches seem acceptable. The best example to illustrate the debate concerns devices that prevent the usability of a technical device, such as a DVD recorder or a device for playing games. Manufacturers often use software embedded in such devices that disallow the use of carriers such as a DVD or a computer game for reasons of preventing competition: many DVDs, for example, still entail regional encoding, and similarly manufacturers of

computer game devices ensure that only specific games are playable by applying software that recognises the game to be played as genuine or not (so-called "mod chips"). Economically, the idea is to prevent parallel imports so as to maintain price differences in different regions. From a copyright point of view, the playing of a game as such, or viewing a movie on a DVD does not amount to an infringement of copyright. Hence, if the view was taken that Article 6 has in mind acts constituting an infringement of copyright, the manufacture of circumvention tools allowing a "pure use" would not suffice to trigger the provision.

Much here depends on the question of whether copyright is infringed by the making of temporary copies such as a fixation of the work in the device's memory, and that question predominantly relates to very fundamental issues on the "copyright nexus" discussed later.

Depending on how one answers the foregoing question of the interaction between Article 6(2) and copyright law, the scope of the right further depends on how that provision must be understood. Does it provide a closed set of acts prohibited, or does the provision stipulate a specific and discreet type of commercial tort.?

Article 6(2) lists the manufacture, distribution, export and import of circumvention devices as well as advertising for such devices. It may therefore be argued that – given that all these activities in some way are preparatory to the final act prohibited that is committed by the end user - Article 6(2) must be interpreted narrowly as far as these acts are concerned, since the provision normatively establishes what amounts to an act of aiding and abetting a discreet tort (that, in turn, may either be an infringement of copyright or an infringement of the TPM "right", which is discussed later).

Understood this way, courts will be restricted to the interpretative construction of the acts described as preparatory acts in the sense of a contributory infringement. Hence, it may be argued that the party allegedly violating the TPM rules must have the intention to commercially profit, an element clearly underlying the acts as described. Again, the uncertain and multi-faceted nature of TPM protection is brought to light remarkably. A German court, for example, had taken the view that setting a hyperlink to a website from which circumvention software permitting the copying ("ripping") of DVDs could be downloaded amounted to a violation of the TPM rules, because it constituted an act of advertising and therefore an act contributing to otherwise contributory acts. This was despite the fact that the link was part of a report in an online news forum and that therefore the requisite intention to commercially exploit was not present. If an approach following unfair competition law had been taken, the relationship between the parties would have led the court to a different conclusion, since here a common field of activity must be established.

"PRIVATE" INFRINGEMENT BY CIRCUMVENTION

Article 6(1) prohibits acts of circumvention carried out by end consumers. It is the only provision that affects acts done in private. Therefore, justifications based on unfair competition notions fail. Indeed, the Directive is clear that such act is prohibited because

of the presence of some material protected by copyright or the database maker right. Therefore, the relationship between copyright law and the legal nature of that prohibition must be examined, both in relation to the scope of Article 6(1) and in relation to the more daunting question of the overall effect of access and use prohibition on general theoretical explanations of copyright law. The latter consideration is of extreme importance for the understanding and reception of copyright and its interface with the public domain in the ambit of digital technology because necessarily the existence – above and beyond the practical implications – of TPM protection as part of general copyright law allows further deductions affording, increasingly, more rights to right holders and thus limiting the remit of the public domain.

The reason for the rather grave implication of TPM protection against private removal of circumvention devices   simply lies in the fact that it grants right holders a complementary right that goes beyond what copyright law seeks to protect. First, copyright law does not protect the idea and expression underlying a work as long as that work is published. Second, copyright law only protects a work as long as limitations do not apply. This means that three levels must be distinguished. Article 6(1) does not apply where the material protected by a technical tool is not protected by copyright law. This is a direct consequence of the scope of the Directive, necessarily restricted to copyright, and therefore Article 6(1) as implemented cannot be used to complement the protection afforded under different provisions concerning the commercial use of circumvention devices, in particular in cases where the rules on conditional access apply with respect to content not protected by copyright. Therefore, it is also clear that Article 6(1) cannot protect content for which the term of copyright has lapsed. Whilst this appears a lucid proposition, the position becomes entirely unresolved as soon as the user seeks, for example, access to unprotected items but makes a temporary copy of the structure in which that item is embedded. For example, a compilation of out-of-term poems that is protected against access may be copied in the course of accessing one particular poem. Again, much here depends on whether one accepts that protection is afforded in more absolute terms or not.

It may be argued, therefore, that the sheer presence of any material protected – here: a database or compilation protected by copyright – is sufficient. clearly, that view causes frictions with notions of traditional copyright. However, if the view was taken that copyright infringement must occur for Article 6(1) to apply, the question of a temporary copy is raised, and here it is certain that the Directive covers such copies unless, in turn, Article 5(1) applies. However, Article 5(1) – which relates to certain transient copies – is characterised as a limitation. Limitations receive special consideration under Article 6(4) but that sub-paragraph does not mention the transient copying provision. Hence, where the transient copy of the structure was caught under Article 5(1), would that mean that accessing unprotected material after removing circumvention control measures is permitted? Apparently, this is a hypothetical outcome in Dutch law, where Article 5(1) was considered as an exemption to the reproduction right. It follows that, dogmatically, the act of making transient copies does not constitute an infringement. Conversely, one may consider the position as regards other provisions limiting copyright and their qualification as either rules limiting copyright or rules exempting certain acts – one

example is the treatment of parodies which is permitted under a limitation in France but perceived as an exemption to the exclusive rights under the free use provision in German law. This means that the outcome depends on two issues: first, is protection absolute, or is a nexus with copyright infringement required? Second, what exactly is the impact of Article 6(4) dealing with limitations? If the existence of a necessary nexus between copyright infringement and TPM violation is supported, is there freedom left for member states to re-characterise norms that fulfil a function restricting copyright broadly for ideational purposes or for purposes of allowing a certain degree of freedom to sue and access works, or is the treatment of limitations to be understood as conclusive? These issues cannot be resolved here – they require a clear understanding of the scope of copyright and how it should apply in a digital context. However, it is likewise certain that the interplay between activities that do not affect copyright on a first level and those that are "merely" permitted under the respective chapter on copyright limitations in national laws require much more clarification than the Directive actually provides.

TPMs and Limitations

Article 6(4) regulates the interplay between TPM protection and copyright limitations. It is, in this context, recommended to consult the chapter on limitations in general in order to understand the conceptual approach. In particular, a distinction must be made between online services by which protected works are delivered and situations affecting other means of control such as applied to individual digital copies. Second, a distinction must be made as to the nature of the limitation in question, that is, whether that limitations requires the collection of levies. Notably, what Article 6(4) seeks to maintain is the balance between the interests of right holders and consumers. Article 6(4((1) lists limitations that may under certain conditions be rendered enforceable vis-à-vis applied TPMs. This does not mean that, from a doctrinal point of view, reliance on limitations permits the beneficiaries of those to circumvent – in other words, a right to self help is not granted. The Directive relies on, initially, voluntary measures taken by right holders to permit beneficiaries the use of works to which TPMs had been applied in accordance with the purpose covered by the limitation. If such voluntary action fails, member states must foresee mechanisms that allow negotiations. This includes, as the case may, a decision by courts or the use of alternative dispute resolution mechanisms. In the UK, the Secretary of State may impose an obligation to remove TPMs following an application by certain beneficiaries (here most notably educational establishments), and such order is subject to exercising discretion only, i.e. the applicant cannot claim access unless the Secretary of State sees fit.

It seems prudent to distinguish, in line with the directive, between two scenarios for which the directive foresees divergent rules. The first concerns online services, and here protection is broader. Article 6(4)(4) stipulates that TPMs applied to such services – that is, in general, access control mechanism – cannot be subjected to limitations at all. The consumer must avail himself of the works forming part of such service under individual contractual agreements. That solution again supports the view that online services generally receive broader protection due to the high investment costs involved in establishing and maintaining online delivery platforms. The protection factually afforded therefore covers the service as such, which is in line with the requirements of the

conditional access rules. One problem then concerns the legal protection of the individual works that are part of such service.

It has been argued that Article 6(4)(4) equally applies to those individual works. However, given the distinction between services on the one hand (protected equally under the copyright and conditional access rules) and individual works the preferred view is that Article 6(4)(4) has no impact where TPMs applied to individual works are concerned. Here, the general rules apply. In this context, it should also be noted that according to the Directive Article 6(4)(4) yet again excludes the application of general exhaustion principles. In this regard, the provision is in line with the view of the European Court of Justice that the provision of services cannot be considered an act of distribution, and therefore exhaustion only applies where physical carriers are put into circulation.

However, Article 6(4)(4) is further subject to the condition that such service must be interactive, a formulation based upon the definition of the making available right under Article 3(1) and Article 8 WCT, and accordingly such service must make works and other subject matter available to the public at a time or place individually chosen by the user – and at this juncture the problems in distinguishing between interactive and non-interactive uses arise again, for example as regards the legal characterisation of services such as internet television. Clearly, the directive confuses the scope of the communication to the public right – which regulates the question of an infringement of copyright – and issues of, ultimately, the protection of services on that basis of providing incentives to engage in the invention of new business models.

In relation to works to which TPMs have been applied on an individual basis, Article 6(4)(1) applies, both as regards access control and copy (use) control mechanisms. A distinction is made, initially, between the limitation permitting the making of digital private copies and an enumeration of other limitations selected from the list in Articles 5(2) and 5(3). We shall begin with the latter. The rationale for the regulation of the interface between TPM protection and limitations in general was a certain apprehension, given that TPMs not only permit the erection of electronic fences covering he work in its entirety, but more so that they permit right holders to stipulate conditions of use and, in particular, the setting of fees that many public institutions would find prohibitive. This is perhaps why the limitations that are mentioned concern certain establishments that are typically funded by public money. The implementation of those provisions is highly divergent in member states. In the UK, as mentioned, beneficiaries may instigate proceedings with a view to removing TPMs before the Secretary of State, though it is entirely uncertain whether such procedure will achieve a reasonable balance.

Overall, the system foreseen is based on two pillars: first, right holders should make the necessary means voluntarily available to beneficiaries. One example of how this can be achieved is a "key escrow system" that provides beneficiaries with the necessary software to access and use the work. Secondly, beneficiaries are asked to undergo specific procedures, and here a particular problem concerns the outcome of such procedure and the general scope of the limitation upon which beneficiaries wish to rely. Certainly,

whilst judicial proceedings would presumably allow absolute reliance in accordance with the purpose of the limitations in question, the situation is not as clear where, for example, mediation resulting in a contractual agreement had been chosen as the preferred option. This means that the type of proceeding ultimately, by its very nature as a judicial or extra-judicial form of dispute resolution, will additionally impact upon the freedom that is left under existing limitations. A specific example of that uncertainty concerns the use of "arbitration" proceedings foreseen in some member states. Here, it remains open whether the use of the term "arbitration" must be understood in accordance with general principles of arbitration law as recognised, or whether is simply denotes a mixture of mediation and extra-judicial dispute resolution. In the first case, the decision rendered by a "proper" arbiter would then be enforceable, in the second case it would arguably not.

Member states have considerable freedom under Article 6(4). They may abstain entirely from regulating the interface between TPMs and limitations, may select the entire list or may pick a selection. Where the limitation requires – absent applied TPMs – the payment of reasonable compensation, national law is facing further difficulties concerning the triangular relationship between exploiters, authors and users. As mentioned, it may be in the interests of authors to continue to enjoy the payment of – under national law – an equitable remuneration for their works, such as in the case of library uses.

Because the application of TPMs predominantly allows right holders to stipulate such payment, users face a "double dipping" system that is not necessarily sound, but may conversely result in prohibitive payments. Hence, public libraries will indirectly pay for the collection of levies (which is hidden in the price payable for copying devices), pay directly for public lending of works and will additionally pay right holders directly for the use of works protected by TPMs.

At present, there is no solution to that problem. The Directive mentions that levies paid should be considered ("taken into account") in the context of the private copying limitation, and certainly the existence of a levy system must have implications on decisions to be made under Article 6(4)(4). In general, the problem stems from the underlying intention to gradually phase out levy schemes and replace the dissemination of works by a system based on direct contracts that require TPMs. In most cases it is authors that will have a statutory claim for such remuneration under levy schemes, whereas right holders have an interest in maintaining contractual agreements. The current system operating in most member states thus requires a re-consideration of the relationship between authors and exploiters. For example, it remains unresolved whether the author has a right to consent to the use of his work where TPMs are to be applied, simply because the TPM rules do not form part of his licensable exclusive right but are considered as an alternative means of enforcing copyright. This is further complicated by the fact that the Directive does not establish a clear hierarchy of protected legitimate interests, but indeed allows the wide ranging conclusion that all exploiters (as exclusive licensees) are to be treated as right holders with no clear distinction between the degree of author's right protection and the protection afforded

to the latter. In addition, it appears fair to say that the overall legal nature of compensation paid to authors under existing limitations is hardly lucid. Although most statutory texts denote that payment is to be made to authors rather than right holders, it may be doubted whether the statutory claims to such fees are licensable by contractual agreement (in which case it would be right holders and other exploiters who would be able to collect "twice"), or whether such remuneration right is inalienable. A further difficulty in this context may arise under moral rights, and here particularly the right of integrity – depending on whether it extends to modifications of the work, it may always be argued that consent is required to modify a work by applying TPMs, though yet again that issue is not settled. Unless that position is not resolved, the impact of how the interface between levy schemes and TPMs must be resolved remains unanswered.

Private copying is, as noted, regulated in a slightly different manner, allowing member states to stipulate the number of copies that may be made where a TPM is applied. Nearly all member states with the exception of Spain have made use of the freedom to render the private copying defence enforceable.

Article 6(4) further requires that in implementing the provision the three-step test must be recognised. One particular aspect here concerns the scope of that test vis-à-vis TPMs. As mentioned, the second and third step of Article 5(5) may be interpreted rather broadly, giving right holders a general claim to be allocated future markets. An argument may indeed be made according to which, generally, the application of TPMs as a discreet business model to the traditional way of dissemination of works constitutes such discreet market, and must be interpreted in the light of these interests. For example, the view has been taken that permitting the private copying defence to be enforced so as to permit the removal of a TPM would contradict the three-step test in interfering with the right holders legitimate interests to operate a TPM ordered market, which was to be distinguished from traditional means of dissemination. What this means is that once TPMs have been applied by right holders, the enforceability of limitations is further constrained, and, ultimately, reliance on it – even where permitted to be enforced under national law – is effectively annulled. That proposition is certainly not in line with the Directive, since it contradicts the text under Article 6(4)(1) according to which – at least – some limitations must remain enforceable.

The central issue regarding the complex interaction between the three-step test as referred to in Article 6(4)(1) and in Article 5(5) denotes, arguably, that the interests of right holders are different and protected to a higher degree when the decision is taken to apply TPMs. Clearly, the overall disposition of the Directive with its tendency to allocate online markets generally would support such view, despite the fact that Article 6(4)(1) only declares the test applicable in the context of TPMs That proposition may, as noted, be robustly buttressed – as noted, the three-step test – even under the wording of the Directive - should not be considered an additional restriction on the way in which limitations must be interpreted in the light of digital technology and its perceived dangers, but simply encapsulates certain parameters that are met in accordance with Article 5 once the conditions of a limitations are present. In addition, the test does not imply that a distinction must be made on the basis of whether TPMs are used or not.

There are further problem areas that are not regulated by Article 6(4)(1). These should briefly be mentioned.

The first important oversight concerns the limitations as granted to lawful users under the database directive. Given that Article 6(1) protects the database maker right where TPMs are in place, the fact that the relevant limitations are not mentioned appears to denote that these are not applicable. This may have serious consequences. In particular, it would denote that the database maker may, on a contractual basis, limit the lawful users right to extract and re-utilise insubstantial parts of the database can be overridden by contract. This certainly appears to be the case where the database is offered in an interactively online, since here, as noted, limitations shall not be rendered enforceable.

The second problem concerns the complete silence of the Directive on the status of important limitations such as the citation and quotation right. These, as mentioned above, are mandatory under the Berne Convention. It therefore follows that member states may either have to follow the text of the Directive – where, notably, the prohibition of private circumvention is not a mandatory requirement under international law – or risk falling out of line with established principles arising under international convention law.   It must again be remembered that, in all such instances, reliance on the right to quote from a work after circumvention of a TPM may still require the making of temporary copies.

ACTIVITIES

– Explain the conceptual approach underlying the rules protecting TPMs.
– Assess the difficulties member states may encounter when regulating the interface between TPMs and copyright limitations.

SUMMARY AND REVIEW

The chapter provided a partially rather detailed overview of TPM protection. It is of utmost importance to understand the implications of TPM protection on copyright doctrine as well as gaining a sound understanding of the complexities surrounding the interaction between TPM protection and countervailing interests, and to acquire a clear understanding of how the rules on TPMs impact upon each of the interest involved.

FURTHER READING

Guibault/Westkamp/Hugenholtz, .

10 Abuse of a Dominant Position: The Impact of Article 102 TEU

Outline

You will, by now, have noted that many problems occurring in the field of digital technology affect the freedom to use protected information in order to create secondary or related markets. Examples of these problems have been explained both as regards computer programs, where the decompilation provisions safeguard market freedom to some extent, and also in relation to en extended function of general limitations in copyright law. However, at present the applicability of copyright limitations to achieve such objective – if, indeed, such objective can be ascertained under the Directive – is rather opaque. European competition law has, however, played an important role in securing such market freedom as regards instances of over-protection of copyright.

Lecture

In general, competition law under Article 102 TEU (previously Article 82 EC) allows a competitor to ask for a compulsory license in order to use works or subject matter on a different market. The details are highly controversial. However, it appears that – taking into account the development specifically of the jurisprudence of the European Court of Justice – more emphasis is now placed upon economic insight rather than dogmatic considerations on the "proper" relationship between intellectual property law and competition law.

We will first consider the basic elements of Article 102 TEU. That provision prohibits, in the internal market, any abuse of a dominant position. Such abuse may take different forms. One of these is a refusal to supply goods, and consequently a refusal to licenses falls in this category. Any application of Article 102 must first address whether the defendant enjoys a dominant position on the relevant market. The relevant market is assessed by looking at the relevant product and the relevant geographical market, as well as taking into account the relevant market in time. Of importance here is the relevant product market. This is assessed by establishing whether the defendant has, in general, the power to act independently of competition, i.e. whether it may operate in the absence of competition. This assessment requires first a definition of what the relevant market is: this is approached by taking a consumer perspective. Can the consumer switch to other products, or does he have to rely on those manufactures and supplied by the defendant? If the latter is the case, dominance is established. In general, the European Court of Justice has taken a narrow view, resulting in extremely narrow markets and consequentially dominance was established effortlessly. It should be noted, however, that the mere fact that an undertaking holds specific intellectual rights is insufficient, despite the intuitive feeling that one may perceive such protection as granting a monopoly.

The precise conditions for establishing an abuse in relation to IP rights have been laid down in the *Magill* decision of 1997. This decision was of utmost importance. The

claimant sought a license from UK and Irish broadcasting organisation that would enable him to publish a weekly comprehensive television guide. The broadcasting organisations objected and asserted that their TV listings were protected by UK copyright law. The Court of Justice held that in such circumstances reliance on national copyright law was irrelevant where certain conditions were met. Accordingly, the claimant was able to demand a compulsory license where the defendant prevents the emergence of a new product for which there is consumer demand without justification. It was clearly established that a refusal to license, therefore, fell in the category of abuse as a refusal to supply. This meant that the traditional view on the interface between intellectual property rights and competition control had been overcome. Previously, it was accepted that both were not merely independent, but that both aimed to achieve the same objective, that is, to secure innovation. Therefore, it was claimed that there was no conflict per se – the exercise of an IP right by withholding a license formed part of the specific subject matter of that right. Accordingly, there was criticism holding that aping competition law in order to allow for compulsory licensing rendered the IP right useless, a property right that was not freely exercisable ("nudum ius").

The decision sparked, however, further controversy. As noted, the Court of Justice continuously asserts that the mere fact that an undertaking owns IP rights is, as such, insufficient for establishing dominance. However, there is an exception to that rule, concerning so-called essential facilities. Such facilities are generally physical facilities entry to or use of which is essential in providing services on new markets. Typically, these facilities include ports, railway lines and telecommunication networks. In these cases, refusing access to such facilities can amount to an abuse irrespective of whether the owner enjoys a dominant position. Some commentators interpreted the Magill decision as establishing the applicability of the essential facilities doctrine to IP rights by and large. The effect would be that, in many cases, the sheer demand to acquire an IP right would be sufficient so as to establish dominance. The Court of Justice has, however, never asserted the existence of that doctrine – which is of US-American origin - in general and certainly has never expresses that it should apply to IP rights.

Competition law further complements the provisions on decompilation under Article 6 of the *Computer Program Directive*. According to the *Microsoft* decision, the owner of software copyright can be under an obligation to supply interface information. The condition for such obligation to arise is extra-ordinary market strength. The decision is, however, insightful in a further respect. Here, the defendant tried to rely on a range of intellectual property rights that allegedly protected the code that was necessary for competitor to be accessed in order to provide new products. It was further argued that these rights – unless a right to reverse engineer was established under Article 6 of the Computer Program Directive – meant that competition law should not apply, and that the creation of the programs in question by the defendant allowed him to extend the monopoly to secondary markets where the defendant was active himself. It was also argued that parts of the programmed code were protected by patents, which under existing patent law would have raised the issue of a dependent invention, which can be used by second comers following an application for a compulsory license. This aspect – that the defendant aimed to argue that control over dependent markets should be

allowed due to its own innovation and investment, and that it therefore had a legitimate interest in the allocation of such markets - distinguishes *Microsoft* from *Magill*.

However, the Court of First Instance, in upholding the findings of the Commission that preventing access constituted an abuse of its dominant position, did not engage in an examination of the interface between the alleged IP rights and the scope to which competition law may interfere. In general, the Court apparently found the existence of IP rights irrelevant. This is, certainly, a consequence of the previous finding of an extra ordinary market strength, but importantly the Court also took into account the effects of the IP right as regards the incentive to innovate. Had the defendant been allowed in preventing access to the interface information in question, the effect would not only be a lack of competition on related and dependent markets. More critically, the Court also seems to have taken into account the general function and rationale of the IP right as legal means to foster innovation. The fact that the information to which access was required was protected per se meant that – from a general policy point of view – there was not much incentive left to continue with innovative adaptations of the program. In other words the Court established, arguably, a principle according to which the function of an IP right can be questioned on a case by case basis. Thus, it was held that the defendant not only lacked a legitimate interest in precluding competition, it also lacked a legitimate interest to rely on the IP right at all. The implications of that view can be tremendous – competition law may clearly result in a general means allowing the individual correction of written IP laws, above and beyond the statutory limitations that apply in order to preserve competition. Although the decision certainly cannot be over-generalised, it appears that it may instigate a development towards a more competition-oriented assessment of whether an IP right fulfils, as the case may be, its assumed proper function, that is, to foster and incentives innovation. If so, the Microsoft decision, even where only marginally extended to less dominant positions, calls into question the entire framework of the Information Society Directive and its uncritical reliance upon copyright exploiters or right holders to develop business methods resulting in an "ideal" solution for digital uses.

Activities

- What are the general requirements in competition as regards the restriction of existing intellectual property rights?

- Explain the basic differences between the essential facilities doctrine and the conventional approach to assessing dominance.

- What are the main differences between the decisions in *Magill* and *Microsoft*?

Summary and Review

The chapter considered important case law in the ambit of European competition law and its relevance with respect to constraining intellectual property rights where the use of such rights amounts to an abuse of a dominant position. The most important aspect to remember is the interaction here between the development of statutory copyright law on the one hand and the more restrictive approach ex post taken by competition law. The ensuing issue is whether these rules, once firmly established, should be "internalised" into the copyright system by way of legislation rather than leaving such control to the procedures of complaints under competition law.

Further Reading

11 Enforcement, Jurisdictional Aspects and Applicable Law

OUTLINE

Where a case concerns two or more connections between different jurisdictions, the relevant area of law applicable is called private international law (or conflicts of laws). Necessarily, given the global nature of the internet in particular and the nature of information as ubiquitous, aspects of private international law are still important in the absence of globally harmonised norms.

LECTURE

The relevant rules concerning IP rights are mostly national. It should, from the outset, be noted that private international law is, indeed, national law, and that all countries apply their own rules – subject to applicable international agreements – on cases where there is a foreign element.

Introduction

From the perspective of IP rights, one should distinguish issues of infringement from issues of IP licensing contracts. The following will be concerned with infringement issues, but a brief introduction to the law governing P licensing will follow.

Two issues must be strictly distinguished. First, if a case shows there is a foreign element, which court has jurisdiction to hear it? Second, that court must then apply the national rules on conflict of laws in order to determine which law governs the substantive aspects of the dispute.

"International" Jurisdiction

Issues of jurisdiction are governed, in Europe, by Regulation 44/2001. That regulation contains specific rules on international jurisdiction that binds the courts of member states. It is by no means restricted to IP but covers all matters in civil and commercial proceedings. The aim of the regulation is to unify the rules for judicial cooperation between member states as foreseen under Article 62 et seq. EC.

In relation to international jurisdiction, a distinction is made between the general jurisdiction and special jurisdiction. General jurisdiction usually gives a court the capacity to hear a case if it has jurisdiction, under national civil procedure law, at the place where the defendant is domiciled (Article 2 Regulation 44/2001). This means, in the case of natural persons, the place where they live, and in the case of legal entities the headquarters or place of establishment. Special jurisdiction takes precedence over

general jurisdiction (i.e. jurisdiction is exclusive) or may coexist with the general jurisdiction of domicile.

Special and Exclusive Jurisdiction

In matters concerning IP rights, two important special jurisdictions exist. The first concerns the place where a tort had been committed, that is, a court in a member state has jurisdiction (and hence must adjudicate) where the action that infringes an IP right took place within its territory. Where the IP right in question was infringed, by one act (such as placing an infringing work on the internet), the jurisdiction is limited, according to the *Shevill* decision of the European Court of Justice, to each national territory, i.e. an Italian court may only adjudicate on the basis of Italian copyright law. That approach (also referred to as the mosaic approach) imputes conflicting decisions given that national IP rights are not fully harmonised but is a consequence of the territoriality of IP rights (Article 5(3) Reg. 44/2001). It must be noted that cases concerning so-called multi-state torts – that is, torts that cause damage in tow or more jurisdictions of torts committed in one jurisdiction and causing damages in one or more other jurisdictions – cause further problems which relate to general principles of civil procedure and which cannot be discussed here in detail. There is, however, a certain overlap in finding relevant points of attachment as regards both jurisdiction based on tort law and the related issue in relation to which substantive national law applies to the merits of the dispute, which is discussed below.

An exclusive jurisdiction exists under Article 22 (4) concerning actions pertaining to the registration or validity of patents, trademarks, registered designs, utility models and similar rights. Proceedings concerning the registration or validity of registered rights must be brought before a court in the country where the patent was registered. This is an important exception to the general rules under Articles 2 and 5(3). The European Court of Justice extended that rule to infringement proceedings - that is, to proceedings not expressly covered by the provision. The rationale was that usually a defendant in patent proceedings would assert the defence that the patent was invalid. Under most national laws, the court will then stay the proceedings so that the preliminary question of validity can be answered by the national patent courts or offices. According to the ECJ decision, once a defendant raises the defence of invalidity the national courts loses its capacity to hear the case, which means that proceedings will be referred back to each EU member state. There are current debates concerning the question on whether Article 22(4) may be applied to other IP rights such copyright, designs and trademarks. In a recent UK decision, jurisdiction was denied under Article 2 because the court interpreted the provision to apply to all IP rights, thus maintain the territorial character. In the same decision, the court further denied its capacity on the basis of the forum conveniens doctrine existing under English law (though not in other, notably civil law jurisdictions) to preclude a US-American IP owner from suing a defendant in the UK. Overall, an extensive application of Article 22(4) Regulation 44/2001 multiplies the jurisdictions and makes it considerably more difficult to enforce IP rights.

The Law Governing Cross Border Disputes

The law applying to substantive issues outside the realms of registered rights is governed, in part, under the Rome II Regulation (Regulation EC 864/2007) on the law applicable to non-contractual obligations, that is, to – inter alia – torts.

Infringement of an IP right constitutes a tort, and hence such cases with a foreign element are to be decided in accordance with Article 8 (1) of the Regulation. Hence, the law of the country for which protection is claimed is usually said to be the law applicable to the dispute. That national law shall, accordingly, govern all substantive issues such as existence, validity, scope, duration, limitations, ownership and transferability of an IP right. In the UK, courts have, for example, applied Dutch copyright law to a dispute over a literary work created by a Dutch author and infringed in the Netherlands, which marks a shift from the pre-existing position under which UK courts would usually reject jurisdiction.

The parties do not have the autonomy to choose an applicable law in such case. Hence, the same principle of territoriality as is applied to questions of jurisdiction equally applies to questions of the applicable law, which means that again different national laws apply. It should be noted that, at least for copyright, the applicability of the territoriality principle is doubted. Some commentators have taken the view that copyright law is, in contrast to registered IP rights, not subject to a territorial principle but that copyright protection should better be considered as a universal right – much in the way that a right to enter into a contract is universally recognised. The effect of that view is that it allows courts to repudiate the country of protection principle and to substitute this for a country of origin principle. There are indeed, numerous cases where courts have followed the country of origin principle, in particular as regards the question of first ownership which may considerably differ between national laws. It is widely accepted in many countries that, whilst the law of the country for which protection is sought governs the issue in general, specific aspects – in particular the issue of ownership – is governed by the law of the country of origin.

Rules specifically pertaining to uses of works protected by copyright or other IP rights do not exist. The general rules apply. Again, most commentators still agree that the law governing an infringement of copyright is the law of the country for which protection is sought, and this is not to be confused with the law of the country where the dispute is heard. That approach results in the application of multiple laws, and hypothetically all copyright laws that exist worldwide and for which the author qualifies under international convention law Therefore, proposals have been made – mostly in academic writing - that would limit such burden on courts, and today it is accepted that where a work is placed on the internet further factors need to be taken into account in order to find relevant points of attachment. Each of those has its own advantages and disadvantages and the purpose here is to provide an overview of potentially acceptable solutions, rather than discussing the implications of each in detail.

The rather different proposals for internet-specific types of copyright infringement are as follows: some commentators propose to restrict the applicable laws to the law of country where the relevant exploiter or author is domiciled or has its habitual residence or where the legal entity has its seat. That solution allows the restriction to one country and follows, broadly, notion of applying the country of origin principle, but the downside is that it fails to take into account the legitimate interests of the defendant specifically when copyright limitations are to be assessed. Similarly, the general rule that copyright is governed by the law of the country of origin may sound an acceptable proposition, given that such approach would likewise reduce the number of points of attachment to one – typically, the law of the country where the work was first published or the nationality of the author. Further suggestions aim to constrain the applicable law to the place where the server is situated, which had been buttressed given the transient character of such place and, increasingly, the impossibility to locate a server in cases of modern forms of distribution such as in cloud computing. More abstract proposals foresee the applicability of the law with which the dispute has the strongest connection or, along similar lines, the law of the country where the dispute is heard or the law of the country where it had effect or where the damage was caused.

Contractual Aspects

In relation to a contract by which an IP right is licensed or assigned, different rules apply partially as regards questions of contractual obligations, remedies available, issues of contract formation and so on. This is because, in general, cross broider contracts are regulated under the Rome I Regulation on the law applicable to contracts. Under that regulation, a contract is governed, first, by the law of the country the parties have expressly or implicitly chosen. Where such choice is not present, the principle of specific performance applies. Under that principle, a two stage test is required. First, the court must determine what the characteristic performance is. In general, the characteristic performance is always the part of the agreement that does not involve, exclusively, payment for goods or services. In the second step the court then needs to assess where the party rendering that performance is situated, i.e. domiciled or having an established head quarter ("habitual residence"). It is then the law of that country that would govern the contractual obligations.

Forms of Licenses

In the case of licenses, determination of the characteristic performance can be difficult. For example, where there is one licensor and a multiplicity of licensees in different countries, the place of the specific performance may be determined to be the domicile or established place of business of the licensee, which avoids the applicability of multiple national laws on contracts. In the case of a bilateral license, for example between the owner of a work protected by copyright and a licensee in France, the determination of the relevant party must take into account the respective obligations. For example, where the emphasis of the contract is simply to allow that licensee to use the work the law of

the country in which the licensor has his habitual residence would apply. Where the license – in particular in relation to technical inventions and designs – includes further obligations such as the development of the invention or the production of products, the focus of the contract may lead to the application of the law of the country where the licensee has its residence.

However, the law governing the contract is not the same as the law governing preliminary questions in relation to the existence of IP rights or their scope. These issues are still to be decided in accordance with the territoriality principle, that is, the law of the country for which protection is sought.

You should note that a distinction must be made between the law actually applying and an obligation to protect, for example, the foreign author of a work protected by copyright. The first question is a matter of national private international law. The second is a matter of international convention law as implemented into national rules on the law relating to foreigners, in copyright, for example, under the qualification rules. These rules do not, as such, answer the question which national law must be applied but say that protection must be afforded in accordance with certain minimum standards laid down by international convention law. For example, under the Revised Berne Convention an author of a literary work must be protected in accordance with the standards of national law and in accordance with the minimum rights foreseen under that Convention. However, the convention rules do not prescribe that the law that is to be applied must be the national law, i.e. there is no reference in the Berne Convention to one national law despite the expression "the law of the country where protection is sought". However, this is a disputed matter – some commentators read that wording so as to mean "the law of the country for which protection is sought". There is nothing, however, in the Berne Convention that obliges a national to only apply its domestic copyright law. Hence, a French court may freely apply the principle of the law of the country from which the work originated to the issue of first ownership and apply its domestic law to questions of a violation of moral rights.

ACTIVITIES

- A is the Dutch author of a novel that was first published in Dutch language in Belgium in 2007. In 2009, he enters into an agreement with P-Publishers Ltd. in London. Under that agreement, P shall have the right to translate the novel from Dutch to English, to reproduce and to distribute copies of the novel. A therefore assigns to P "the English copyright" in the novel. A later finds that the commercial activities of P are below his expectations, and that P in particular failed to properly advertise the novel. Therefore, sales figures were considerably lower than in continental Europe. A wishes to terminate the agreement and asks for damages. He therefore instigates litigation before the Court of Amsterdam, knowing well that failure to properly commercialise a work may allow him to revoke his rights under Dutch copyright contract law, a possibility not foreseen under UK copyright law. Does the Court of Amsterdam have jurisdiction? Which law applies to the dispute?

– M is a Danish musician who finds one of his compositions (music and lyrics) had been made available by unknown third parties using a file sharing service called "Prunella". The service can be accessed anywhere in the world but M find that 98% of downloads of his song (in total about 500 downloads) were requested by users in the Scandinavian countries, for the obvious reason being that the lyrics are in Danish. Because the operator of the service (who offers the file sharing software for download) is located in London, M wishes to bring proceedings before an English court. Assess the scope of the jurisdiction the court has as regards the international component of the action, and explain which national copyright law(s) would and/or should be applied.

SUMMARY AND REVIEW

This chapter should be read as an addendum to the preceding chapters covering substantive legal issues as they apply in the UK. However, to properly grasp the important implications of this area of the law on branding issues, it is necessary to have a clear understanding of the distinction between jurisdictions on the one hand – and here the distinction between exclusive and general jurisdiction – and the substantive law that applies to the substance of the dispute. You should also be aware of the different approaches as regards registered rights and copyright respectively.

FURTHER READING

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Dutson, 'Actions for the Infringement of a Foreign Intellectual Property Right in an English Court' (1997) International and Comparative Law Quarterly 918.

Kur, 'Exclusive Jurisdiction and Cross Border IP Infringement', 2007.

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