

In this respect, the book could have explored more thoroughly the paradoxes of modularity which affect not just the current historical inflection point, but more directly the proposed end result. If the growth and differentiation of ICT markets via modularity involves increasing layers of pluralism and heterogeneity of systems depending on deeper layers of underlying standardisation, this raises the spectre of new kinds of technocratic control of which national politicians are rightly fearful. Have we nothing to fear from new institutions of delegated ICT governance based on peer-reviewed technological democracy, beyond the reach of existing forms of democratic representation? The authors do not broach these questions upon which the whole point and purpose of 'the way forward' depends. Nonetheless, the description of the modularity trend itself and the empirical charting of the politics of current ICT governance are undoubted strengths of the book. The often subtle counter-pointing of the political and economic/technical aspects of ICT development is what makes this book a worthy contribution to our attempts to comprehend the central challenges facing the development of ICT markets. What is precisely indicated by this book is that the very nature of ICT markets requires more political/economic analysis of this type, working at the intersection between political institutional and corporate strategies.

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Wired shut: copyright and the shape of digital culture, by Tarleton Gillespie, Cambridge, MA, MIT Press, 2007, viii+395 pp., US\$14, ISBN-13: 978-0-262-07282-3

This book traces how the entertainment industry has attempted to collude with successive governments and the manufacturers of consumer electronics equipment to tilt the balance of copyright law away from the public benefit and towards private commercial interests. Clearly, such a big argument demands a big toolkit and Gillespie employs an eclectic scholarly approach involving sociology, communications, culture and media studies, economics, law and the history of technology. He is an accomplished writer and has a nose for a good story, especially when it comes in the form of a periodically swashbuckling tale of pirates and pornography. In this endeavour, he has ample assistance from poster villains such as Jack Valenti, president of the Motion Picture Association of America (MPAA) until 2004, who couched the case against peer-to-peer (p2p) file sharing in the following terms:

... downloading Kazaa, Gnutella, Morpheus, Grokster, etc ... can bring into your home and expose your children to pornography of the most vile and depraved character imaginable. Most insidious of all, the pornography finds its way to your children disguised as wholesome material: your son or daughter may 'search' for 'Harry Potter', or 'Britney Spears', and be confronted with files that contain bestiality or child pornography ... the business model that current p2p networks celebrate as the 'digital democracy' is built on the fetid foundation of pornography and pilfered copyrighted works. (p. 123)

Valenti variously conflates copyright infringement with cancer, fungus, witchcraft and damnation, all of which *inter alia*, help to finance international terrorism and organised crime (p. 124). Gillespie forensically analyses the language of his

protagonists and deftly loads the argument with linguistic nuances of his own. One man's 'intellectual property', for example, becomes Gillespie's 'cultural expression'. In *Wired Shut*, Gillespie exposes a wide-ranging, systematic and relentless effort by the entertainment industry to secure and extend private rights of ownership, undermining public interest copyright exemptions along the way. The book then goes on to extrapolate the potentially harrowing implications for society.

The book is organised as follows. Chapter 1 considers how societies use 'technology' to fix social problems: ranging from surveillance and security technologies to combat crime and terrorism, to the hydrogen bomb as a fix for the social problem of World War II. Similarly, says Gillespie, the Internet has been enlisted as a technological fix for various social ills by different groups, albeit with considerable interpretive flexibility about what it represents. The Internet is commonly portrayed both as a source of cultural flowering, a repository and medium of human knowledge and a trough of cultural decay, characterised by pornography, misinformation and mindless distraction. To separate these good and bad uses, argues Gillespie, society is again turning to technological solutions, but these technological fixes also control what users can do online, undermining traditional rights of cultural expression. These controls are part of what Gillespie views as 'an increasingly cohesive regulatory strategy' to build a 'trusted system' of digital rights management (DRM) that is progressively eroding social rights in favour of private property rights (p. 9).

Chapter 2 considers the constitutional underpinnings of copyright law in the USA (to promote 'the progress of science'), subsequent legislative developments and important legal cases, particularly the Napster case. Gillespie's central concern is that commercial interests led by the Hollywood movie studios have managed, through the use of technology, dubious moral argument and weak legislatures to subvert copyright law to their own ends and at the expense of the public interest. The chapter enlarges the concept of the 'trusted DRM system', a combination of technological, legislative and cultural measures that has evolved to enforce copyright protection.

In Chapter 3, Gillespie broadens the discussion by turning to the sociology of technology and cultural aspects of media and communications. He argues that technological systems are not inert or neutral, but a product of social choices that in turn choreograph human activity: technological systems and the way they are defined are political. He uses the concept of a 'speed bump' as an extended metaphor to explore the cultural legitimisation required for the development of a trusted DRM system of copy controls into a regime of alignment. This process of cultural legitimisation is illustrated with the story of the MPAA's construction of a doomsday vision in which copyright infringement undermines cultural expression, creativity, consumer choice and the American economy (Chapter 4). Here Gillespie invokes the hellfire and salvation rhetoric used by Jack Valenti to bolster the moral imperative against illicit file sharing. He also investigates the way the industry used the concept of 'piracy' to frame the debate and establish a semantic bridge between file sharing and theft.

Content owners also progressively turned to digital rights management (DRM) in order to control user access to their products (Chapter 5) and Gillespie recounts the early and abortive attempt to introduce DRM in the music industry, the secure digital music initiative (SDMI). This failure is contrasted with the somewhat greater success of the video industry in the development of the DVD format. Gillespie then explores the development of video copy protection through the adoption of the content scramble system (CSS) and its associated licensing arrangements (Chapter 6). The enactment of the DMCA in 1998 criminalised (among other things) the DeCSS hack that broke the

encryption system. Gillespie describes the CSS licensing scheme as ‘an egregious intervention into the distribution of cultural expression’ (p. 182) and the DMCA as the ‘most dramatic change in the history of US copyright law’ (p. 177): by removing people’s ability to access content in the first place, consumers are effectively unable to exercise their rights under fair use provisions of copyright legislation. Beyond this, the system provides copyright owners with far greater control over how people consume content and how, when, and to what extent people are required to pay.

Chapter 7 develops this argument further, looking at subsequent attempts to extend copyright controls to *all other* digital media, most controversially to digital television and radio broadcasts, through the implementation of the so-called broadcast flag. Originally proposed as a technical standard by Fox Broadcasting, the FCC went so far as to order all manufacturers to implement the broadcast flag in digital TVs before being overruled by the US Court of Appeals in 2005. Gillespie is sceptical that this legal setback will hold back the media barons for long. The commercial interests behind the scheme were not only attempting to build a trusted DRM system for digital television, he argues, but were also building ‘a coalition of industry partners so that regulatory strategies that depend on the interlocking of hardware and software could be pursued by similarly interlocking industries’ (p. 220). There is therefore a broader project afoot whose success depends on the ability of these commercial interests to fully capture government regulators.

Chapter 8 explores the implications of this coalition in greater detail, with special emphasis on the implications for innovation. Gillespie argues that DRM (and its associated trusted systems) inherently consign cultural expression to the status of a commodity that is passively consumed. This contrasts with the open source movement, which encourages interactive participation in design and consumption. Where legal and technical constraints preclude the possibility of user agency, cultural artefacts become ‘wired shut’ inside a DRM black box, locked by technical and legal measures.

The book concludes by tying these themes into a discussion of the cultural implications of encryption. Gillespie argues that DRM encryption is not meant just to exclude people without rights of access – even after the consumer pays the access fee, the system potentially restricts the way content is consumed. While copyright law leaves the discretion about forms of use in the hands of the purchaser, DRM forecloses such discretion, permitting only those actions that are deemed appropriate in advance by the information producer. Gillespie believes timid governments have traded away important public interest considerations under pressure from copyright owners and summarises his case in these terms:

Copyright as a legal doctrine attempts to strike a balance among the interests of authors, owners and the public they serve. In pursuit of this balance, the otherwise exclusive rights granted ... are delimited by a set of important exceptions. Some of these exceptions such as fair use, are ... legally sanctioned exceptions to the rule, rather than affirmative rights on their own ... By preempting copying, DRM intervenes before use is made, meaning no unauthorized use can ever be accommodated, permissible or otherwise. (p. 257)

Gillespie is not prescriptive in terms of what governments *should* do to protect copyright owners so much as to say that the current imposition of global enforcement is highly unsatisfactory. Consumers’ rights of access to cultural expression and information are viewed as a resource for democracy as well as a market commodity (p. 273).

DRM and other attempts to 're-privatize' copyright lead to a reduction in the utility of communications networks like the Internet, which is transformed from a two-way medium of cultural participation into 'a one way medium for content distribution to passive consumers' (p. 277). In other words, copyright law has been hijacked to the point that it is achieving exactly the opposite of the original intention of promoting 'the progress of science' or indeed stimulating 'content creation for the public's benefit' (Jackson, 2001).

Citing space constraints, Gillespie decided not to extend his discussion beyond US law, arguing that US doctrine was built on the European model and many of the mechanisms are similar. This self-imposed constraint is understandable, given the complexities of US copyright law. However, for a book that seeks to provide a broad perspective about copyright and digital culture, some small amount of space might have been given to the more important aspects of legal developments outside the US. These provide an important context and counterbalance to the public legitimacy argument and the viability of the US global enforcement regime of intellectual property rights (Joseph and Drahos, 1998, pp. 108–9).

For example, cultural attitudes and copyright practice in Asia are not irrelevant to the US argument. The economic significance of Asian markets as consumers of US content and the scale and industrialisation of copyright piracy in parts of Asia have provoked US copyright owners and their successive governments to take extraordinary measures that have in turn impacted on what US citizens can do. This has created, in the US, a complex web of legislative exemptions, interpretations and constitutional protections not available to consumers in other jurisdictions, but which have evolved as a way of managing the internal stresses and strains of creativity and appropriation of cultural products.

Second, Europe is more than just a template for US legislation. Leading industry figures in the US have long known that much of the concern over DRM systems originated in European countries, home to 'two-and-a-half' of the world's four biggest music companies. While the DMCA is only the US interpretation of Article 11 of the 1996 WIPO Copyright Treaty, its implementation in Europe following the European directive on copyright in 2001 generated significant and sustained controversy. This continues a decade later, as evidenced by the turbulent birth of Britain's Digital Economy legislation in 2010.

A key rationale for European recalcitrance can be deciphered from the arguments over the 2006 DADVSI Law in France: provisions to criminalise copyright infringement were challenged on constitutional grounds under the 1793 Declaration of the Rights of Man, with which the US Declaration of Independence of 1776 shares a philosophical debt. Gillespie's warnings about trusted DRM systems echo Enlightenment concerns about the monopolisation of human knowledge. The convergence of interests between the State and large quasi-monopolist publishers, manifest in ever-stricter copy controls and the rhetoric of anti-piracy, have not changed much over the centuries, even if the technologies have evolved. The absence of historical context renders understanding and interpretation more difficult. As Adrian Johns (2009) argues in his history of piracy, we cannot even ask the right questions of our own culture, let alone answer them, without understanding how they took shape in an earlier age. The neglect of this broader historical context means that for the general reader at least, Gillespie's argument rests on the rather narrow foundations laid out on page 22. The reader (in homage to Valenti) is left to drift through pirate infested waters, without anchor, compass or a chart that extends much beyond modern US territorial waters.

Aside from strengthening Gillespie's argument, a broader international and historical context might have obviated some basic factual matters that need attention in future editions of the book. For example, in a section on encryption (p. 251) enigma is described as a device that was 'used by the Allied forces in WWII' and subsequently 'became a particularly valuable trophy for the enemy'. This seems to imply that enigma was invented by the Allies. Whether this is an error or just careless writing, it is ironic in a book about digital culture, especially in view of the digital age's debt to Alan Turing, the Bletchley Park cryptanalyst, whose enigma hack during the war led to the foundation of modern computer science.

Gillespie's argument could also be strengthened by a less casual articulation of the public benefits enshrined in copyright law. For example, he says that fair use copyright exemptions serve valuable social purposes like 'quotation, classroom copies, criticism, journalism and parody' (p. 59). These valuable social purposes are later further exemplified by things like sampling in hip hop music and 'the possibility of unexpected technological innovation' such as the VCR, the web browser and Napster (p. 60). Some readers might feel short-changed by such an impoverished catalogue of public interest copyright exemptions.

A critical part of Gillespie's critique of the trusted DRM system concerns the role of governments in upholding copyright law. His contention is that legislation such as the DMCA upsets the balance between private commercial rights and public benefits by criminalising the circumvention of access controls, such as developing and publishing copyright decryption technology. In effect, governments have been co-opted into undermining exemptions to copyright that permit fair use. This begs the question, not resolved in the book: how *should* governments exercise their responsibility to protect copyright exemptions?

Gillespie argues that the current legislation not only protects copyright, but furthers the broader commercial interests of content owners. This legislation protects digital rights management mechanisms that (for example) prevent DVDs purchased in one region being played in another. Such legislation allows content owners to charge different prices in different regions and to manage release dates. This may not be an appropriate area for public law.

But what *are* governments to do? Apart from defending fair use exemptions, governments seem to presume they have a responsibility to see that there is some workable means by which copyright owners' rights can be enforced. In the digital domain, many governments are bolstering *ex ante* copy protection (with its attendant evils) because the traditional *ex post* prosecution of offenders has, they believe, become largely ineffective. Or has it? The music industry has mounted a number of multi-million dollar legal actions targeting individuals accused of egregious file-sharing. As another example of industry taking care of itself, Apple introduced regional pricing controls into its iTunes and AppStore content portals. Closer examination of the market failure claims of the entertainment industry might be merited in future editions of the book.

Gillespie acknowledges that the 'regime of alignment' behind current copyright enforcement initiatives in the last instance requires public consent and this is not easy to earn (p. 280). This is an important point and further investigation into the role of the consumer in maintaining the integrity of the trusted DRM system would be illuminating. The prevailing copyright regime has a degree of public legitimacy, but while most members of society oppose stealing, that does not stop them heading for the bootleg DVD markets of Bali, Beijing and Dubai. Although consumer participation in the

trusted DRM system is essential, its actions and influence on the ordering of that system are assumed rather than explored. Gillespie argues only that users sometimes matter (pp. 242–43). However, the empirical evidence shows that the technology blocks are invariably circumvented and in a socially constructed trusted system, users probably matter all of the time.

Few readers would disagree that the issues considered in this book are important and need to be articulated, particularly in the context of prevailing public apathy about copyright matters and amid the frenetic attempts in boardrooms, courts and parliaments to sort out the digital economy. This book is a thought-provoking read for the generalist and for policy makers seeking a broader perspective on copyright. It will be more relevant to US readers than those in other jurisdictions. The book was republished in 2009 in paperback with an updated preface. Interestingly, the paperback version is priced on Amazon at US\$10.85, which is unaccountably US\$1.14 cheaper than the digital version available through the Kindle e-book reader.

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Wired for innovation: how information technology is reshaping the economy, by Erik Brynjolfsson and Adam Saunders, Cambridge, MA, MIT Press, 2010, xvii+154 pp., US\$18.95, ISBN 978-0-262-01366-6

This slim volume, written by one of the foremost researchers on IT and productivity with one of his current PhD students, aims to 'provide a guide for policy makers and economists who want to understand how IT is transforming the economy and where it will create value in the coming decade' (pp. 11–13). IT is defined more narrowly than Information and Communication Technology (ICT), but in most of the book the two terms can be used interchangeably. The book contains an introduction and eight chapters of varying length. Each chapter ends with a list of between three and five further readings with a one- or two-sentence comment on each. There are no equations.

The core argument of the book is that IT has been responsible for the resurgence of productivity growth in the US since 1995, and that gains from IT can only be realized with time lags and substantial additional investments in 'organizational capital', a form of intangible capital neglected in national income accounts. Organizational