Media convergence policy issues

Oxford Research Encyclopedia of Communication

Media Convergence Policy Issues

Robin Mansell

Subject: Media and Communication Policy Online Publication Date: Nov 2016
DOI: 10.1093/acrefore/9780190228613.013.62

Summary and Keywords

Digital technologies are frequently said to have converged. This claim may be made with respect to the technologies themselves or to restructuring of the media industry over time. Innovations that are associated with digitalization (representing analogue signals by binary digits) often emerge in ways that cross the boundaries of earlier industries. When this occurs, technologies may be configured in new ways and the knowledge that supports the development of services and applications becomes complex. In the media industries, the convergence phenomenon has been very rapid, and empirical evidence suggests that the (de)convergence of technologies and industries also needs to be taken into account to understand change in this area. There is a very large literature that seeks to explain why convergence and (de)convergence phenomena occur. Some of this literature looks for economic and market-based explanations on the supply side of the industry, whereas other approaches explore the cultural, social, and political demand side factors that are important in shaping innovation in the digital media sector and the often unexpected pathways that it takes.

Developments in digital media are crucially important because they are becoming a cornerstone of contemporary information societies. The benefits of digital media are often heralded in terms of improved productivity, opportunities to construct multiple identities through social media, new connections between close and distant others, and a new foundation for democracy and political mobilization. The risks associated with these technologies are equally of concern in part because the spread of digital media gives rise to major challenges. Policymakers are tasked with governing these technologies and issues of privacy protection, surveillance, and commercial security as well as ensuring that the skills base is appropriate to the digital media ecology need to be addressed. The complexity of the converged landscape makes it difficult to provide straightforward answers to policy problems. Policy responses also need to be compatible with the cultural, social, political, and economic environments in different countries and regions of the world. This means that these developments must be examined from a variety of disciplinary perspectives and need to be understood in their historical context so as take both continuities and discontinuities in the media industry landscape into account.

Keywords: convergence, digital media, governance, policy, regulation, competition, privacy, surveillance, skills, business models

Introduction

In spite of the richness of technological development over the past two centuries, relatively few technologies entered the 21st century with the bloom of youth so prominently displayed by digital information and communication technologies. No other technology, with the possible exception of nanotechnology and biotechnology, displays more prominently the promise of influence in the lives of citizens. These technologies, often referred to as digital media, are distinguished by the ubiquity of their application and the multiple aspirations for their use. Their development calls for reassessments of the institutions charged with their governance. These technologies are implicated in numerous developments that are shaping how we work, shop, learn, and play and how we build, organize, coordinate, and deliberate about the future. They play a vital part in empowering or disempowering individuals and communities. The widespread deployment of networking technologies is challenging assumptions about power, privilege, and influence within society.

Digital media are a cornerstone of contemporary information societies. They are expected to increase productivity and competitiveness, renovate education and cultural systems, stimulate imaginations and social interchange, and democratize political and social institutions. Assessing whether these aspirations are being fulfilled is a basis for accountability. This means it is essential to evaluate whether claims about digital media are empty promises or only crude approximations of more profound transformations that lie ahead. Research aimed at examining how digital media and the convergence or (de)convergence process is failing to meet aspirations is one means of preparing social actors to enhance their benefits, redirect the technologies from misguided paths, or mitigate negative consequences.

Defining Convergence and (De)convergence

A principal characteristic of digital technologies over the past 30 years is their convergence. There is no commonly accepted definition, but convergence can be conceived broadly as a phenomenon that “occurs when innovations emerge at the intersection of established and clearly defined industry boundaries, thereby sparking off

an evolutionary development with much broader impact" (Hacklin, Marxt, & Fahrni, 2009, p. 743). Technological convergence within the innovation process involves complex knowledge that supports the accumulation and spread of novel ways of configuring any technology. Using this definition, convergence might be present in any industry, but extraordinarily rapid change has been a feature of digital technologies throughout recent history, albeit with contradictory outcomes. Technological convergence may be associated with new market entrants and with market consolidation, or with industry (de)convergence. This ambiguity makes the implications for markets and society very challenging to interpret. The term "(de)convergence" calls attention to the fact that even when technologies and markets appear to be on a convergent pathway, this can change very quickly. For example, enterprise resource planning software began as a generic "one-stop shopping" product, later diversifying into specialized packages to support manufacturing cost accounting and logistics and scheduling requirements in the transport sector. Similarly, it was once assumed that bundling digital software and hardware in a single machine (as in the case of early IBM computers) was the result of "convergence," whereas today these are typically offered separately.

Historiography

Research in the social sciences demonstrates that digital media convergence and (de)convergence depend on multiple social, economic, political, cultural, and organizational factors. This simple message is difficult for developers of these technologies to reflect in their development practice. Digital convergence or (de)convergence may occur when "new combinations of existing knowledge and resources, open up possibilities for new business opportunities and future innovations, and in this way set the stage for continuing change" (Fagerberg, 2006, p. 28). Scholars who approach digital convergence in this way build on studies of technological innovation and acknowledge that "technological progress at any given time … has to be understood as an attempt to extend and further exploit certain trajectories of improvement that are made possible by the existing stock of technological knowledge" (Rosenberg, 1982, p. 16).

Others who theorize the innovation process in this area note that analytical frameworks must be "sensitive to the conscious efforts of designers, programmers, engineers and various other stakeholders in confronting and leveraging unintended consequences of previous iterations" of technology (Shtern, Pare, Ross, & Dick, 2013, p. 240). Innovation and digital media convergence may refer to hardware or software or to information and media content. Some authors insist that the processes underpinning change can only be understood by studying the history of developments and the micro-sociological factors

that shape trajectories of change (Dogruel, 2013; Tilson, Lyytinen, & Sørensen, 2010). This perspective contrasts with the broader and structural view that typifies the work of those who study longer-term trajectories often leading to convergence within the digital media system.

Long-term trajectories are often the focus of economists who examine “technical interrelatedness” and insist that the functioning of any component of an integrated system cannot be evaluated in isolation (David, 1987). Here the research focus is on digital system scale economies, network integration, and whether the supply of components is by independent or vertically or horizontally integrated economic agents. Economists consider whether a convergent network is likely to be pluralistic and whether there are market failures giving rise to the need for policy and regulatory measures to foster network interoperability, interconnection, integration, and openness to many information or content suppliers (Steinmueller, 2000).

While some consider progressive convergence in digital media a welcome development, in the critical social science tradition, researchers are more likely to examine whether asymmetries of power are being replicated or are emerging as a result of the digital convergence process. These asymmetries are seen as disadvantaging various groups. They may be associated with digital divides including cultural and social disadvantage or disempowering changes in the labor process for workers (James, 2008; Martin-Barbero, 2009; Webster, 2006). Critical scholarship tends to be ambivalent toward digital convergence. Enthusiasts emphasize how convergence will improve the quality of life and democracy, while the less optimistic are concerned with the negative consequences of converged media when they are used for gambling, criminality, and surveillance (Storsul & Stuedahl, 2007). Digital media convergence studies may also focus on the role of digital media in creating a novel public sphere or spheres, the implications for “cyberdemocracy,” transformations underpinning a more open culture, or whether convergence is giving rise to inclusive media practices (Couldry, 2012; Dahlgren, 2000; DuLond de Rosnay & De Martin, 2012; Poster, 1995).

Finally, “convergence culture,” the term used by Henry Jenkins, depicts the potential of digital technology convergence to enable multiple creative strategies for the production of media. For Jenkins convergence means “the flow of content across multiple media platforms, the cooperation between multiple media industries, and the migratory behavior of media audiences who will go almost anywhere in search of the kinds of entertainment experiences they want” (Jenkins, 2006, p. 2). He coined the term transmedia storytelling to signpost novel developments in the way media producers seek to develop complex fictional worlds across multiple media, with the aim of providing an expansive and immersive experience for users (Jenkins, 2003). These developments are examined

from a media economics perspective and by considering their cultural significance from the perspectives of the semiotics and narratology traditions (Scolari, 2009).

A Convergent/(De)convergent Landscape

Digital media, including computer and communication technologies, provide the foundation for the spread of networks supporting the nearly instantaneous exchange of data that would otherwise wend its way through complex hierarchies. They provide the means for establishing social interactions and methods of organizing and coordinating collective action that otherwise would be either impossible or cumbersome. At one extreme, they can reinforce or construct new systems of hierarchical control and divisions of labor that enrich the choices and material welfare of the few at the expense of others. At the other extreme, their use can yield anarchic wastelands interspersed with walled online spaces, admitting only those who submit to the authority and taxation of their masters. The forms of these developments are shaped by governance—policy and regulation—including the framework of legal rules and systems of norms and custom as well as approaches to social control.

Many attempts to map the cluster of digital technologies and services focus on major advances in information-processing capacity. Different media exist for the distribution of digitized information by combining networking elements. These support the input, storage, processing, distribution, and presentation of information, which is both a social and a technological process. In debates about the dynamics and consequences of convergence, several categories of digital technologies and services are implicated.

Digital Media Technologies

Networking services produce information content and services that can be addressed to customers and citizens. The services incorporate addressing capabilities and include e-mail, electronic funds transfer, electronic data interchange, and video conferencing provided by Internet Service Providers and other intermediaries. *Broadcasting services* deliver content and include radio and television as well as satellite services. They use networks for voice and data services, including the public switched network using wired or wireless technologies and private networks and the Internet Protocol.

Digital content is produced by audiovisual and publishing companies that may be responsible for the production and distribution of audio, video, and/or print information. The creation of online newspapers brings newspaper companies into this area along with

music and book publishers, along with self-publication of content. *Software* is one of the largest segments and includes packaged software products and internally produced software. C*omputer equipment* includes general purpose and specialized hardware used to build links between the communication infrastructure and digital services. It includes peripheral equipment such as printers, scanners, and storage devices. B*roadcast and network equipment* uses many technologies for delivering information ranging from fiber-optic networks to wireless transmitters and receivers. It includes equipment such as telephones and data networking equipment as well as a variety of handsets and tablets.

Consumer electronics include audiovisual equipment, digital watches, and digital games and toys. *Digital components* include resistors, capacitors, integrated circuits, liquid crystal displays, light-emitting diodes, fiber-optic cable, wiring and cabling for applications, and optoelectronic devices, as well as various kinds of *electronic measuring equipment and scientific instruments* and *professional and technical services* which support the production of digitally convergent (or (de)convergent) services used in every area of society.

These components comprise the digital system or ecology. In any historical moment some technical components will be converging and others will be diverging, as will the companies that supply them. The “systems” feature gives rise to unpredictability especially when user preferences and resistances are taken into account. User capacities to smooth or disrupt the pathway, encouraging shifts in developments in unexpected directions or in governance arrangements, need to be understood to assess how the system is developing. Social, cultural, and policy systems are as important as the technological system in influencing outcomes. It cannot therefore be safely asserted that there is something about digitalization per se that gives rise to technological or industrial convergence.

A major feature of digital information products and services creates strong, though not inevitable, pressures toward convergence. Digitalization ensures that the costs of reproduction of digital information including media content are very low. These low costs of information reproduction stimulate investment in the design and promotion of services producing “winner-take-all” races. In turn, these races stimulate innovation and creativity, but they may also suppress novelty and variety.

Developments in Digital Media Convergence

Successive developments in digital media have been accompanied by policy problems. Voice telephony “to the public” was limited historically, and the postal service was limited to literate and wealthier classes of society. Convergence, however defined, has

made exclusive provision increasingly indefensible. Signs of convergence across the digital ecology have been present since the 1950s, but it is only since the 1970s that there has been substantial market restructuring as a result of disruptive innovations. In the 1950s “integrated communications” was the term coined to suggest that digital switching and transmission would work together to provide flexibility for the delivery of new services (Arnold & Guy, 1986; Flichy, 1995; Marvin, 1988; Vaughan, 1959). During the 1980s, there was a wave of enthusiasm about the idea of convergence, but this was spurred by a predominantly technology-driven vision. At the same time, critical scholars regarded these developments as symptomatic of a hegemonic neo-liberal order which was yielding “a materially abundant but culturally impoverished and socially unequal ‘information society’” (Preston, 2001, p. 246).

User access to digital media was being shaped by the evolution of the underlying technologies. Convergence typically referred to the technological potential of interconnected digital “bitstreams” and to the market implications. In the mid-1980s, computing and communication networks were understood to be on an intersecting path that was expected to result in a convergent network infrastructure around the standards for the integrated services digital network (ISDN) (Mansell, 1993), but this expectation was not fulfilled. Instead, networks and services evolved using different standards and architectures with major implications for digital media. As the MIT Media Lab’s Stuart Brand put it, “with digitalization all of the media become translatable into each other—computer bits migrate merrily—and they escape from their traditional means of transmission … If that’s not revolution enough, with digitization the content becomes totally plastic—any message, sound, or image may be edited from anything into anything else” (Stuart Brand cited in OTA, 1990, p. 4).

When the Internet and multimedia applications started to dominate in the 1990s, the network scenarios of the early 1980s were disrupted. The computerization of the public communication network meant that it could be managed and controlled using sophisticated software-supported computer-based algorithms supporting a host of applications for internetworking. By the end of the 1990s, data communication services (including electronic commerce) and digital media content services had become the principal “drivers” of innovations in digital technologies. Data traffic became an increasingly large part of the public communication network operator’s business, and the suppliers of internetworking products challenged traditional suppliers of telecommunication equipment. The Internet—or Transmission Control Protocol/Internet Protocol (TCP/IP)—resulted from efforts to define a standard for intercomputer communication. It was designed to be robust to the disruption of any particular links in the network. This was achieved by developing a standard whereby individual data packets are routed flexibly so that they detour around damaged links.

As the Internet is used to deliver video and audio services, enhanced protocols and architectures emerged to support better performance and new services. Networks of intercomputer connections and software-based applications are fundamental features of the Internet. The software that is responsible for the Internet's explosive growth in the 1990s was the development of the World Wide Web based upon a proposal by Tim Berners-Lee in 1989. The Web is based on standards for the creation of linked information files and the development of a "browser" to read this information. After the Mosaic browser was developed in 1993, a global information network began to spread, and browsers available from commercial suppliers—for example, Netscape and Microsoft's Internet Explorer—were also important for the rapid expansion of the Internet (Bohlin, Brodin, Lundgren, & Thorngren, 2000; Elton, 1991).

The Internet has allowed users to be information collectors and providers. The distribution of software for Internet access through the network itself, relatively simple tools for content creation, and the novelty of the Internet contributed to its growth. Ever-higher-speed broadband networks became available to users (even in rural and less affluent areas), and new technologies were introduced into the "local loop"—the part of the network that connects users into the global network. Mobile voice and data services created a basis for additional services.

As a result, technological convergence made it possible to package digital content for delivery to citizens and consumers using a growing array of distribution paths. In the United States and Europe, research focused on broadband networks and the speed at which they were developing, depending on market incentives and government policy. By 2000, Eli Noam, a leading analyst of these developments, observed that there are four distinct types of convergence—delivery technologies, business, regulation, and vertical convergence of telecommunications and the Internet (Noam, 2000; see also Burgelman, 2000; Marsden & Verhulst, 1999; McQuail & Siune, 1999). Understanding the potential for further transformation requires consideration of developments in digital platforms, networks, and content. Incumbent firms face threats to their capacity to maintain exclusive access to their customers as other companies—e.g., Facebook, LinkedIn, Google—move into the marketplace.

Prominence of Information Society Debates

Alongside these technological and market developments, from the mid- to late 1990s, policymakers started to champion information or knowledge-driven societies or economies. It was claimed, especially in the United States, that ultimately convergence would lead to uniform digital platforms and equipment for producing and accessing all kinds of digital information and content:

> The composite vision for the NII [National Information Infrastructure] is to provide a nationwide assembly of systems that integrates five essential components: communications networks, computers and information appliances, information, applications, and people. These systems will use a wide variety of technologies to provide new ways for people to learn, work, be entertained, and interact with one another.
>
> (Branscomb & Keller, 1996, p. 25)

In the European Union targets were set for becoming the most competitive and dynamic knowledge-driven region in the world. The rush to develop information society visions building on the convergent technologies was not limited to the wealthy countries. The World Bank made a strong case for investment in digital technologies and information as a means of tackling poverty and other persistent development problems. The United Nations Economic Commission for Africa released its Africa Information Society Initiative, Singapore developed an Intelligent Island vision, and many others launched strategies. Some experts claimed that digital technology convergence would provide opportunities for lower- and middle-income countries to "leapfrog" generations of technology so that they could catch up with, and even surpass, the wealthy countries. The rapid spread of mobile phones and the growing use of Facebook helped to reinforce a strong emphasis on investment in technology.

Although some acknowledged that there might not be a clear relationship between investment in digital technologies and the gains for economies or social welfare, the mobilization of stakeholders around the digital technology agenda continued to emphasize the technical and economic over the social and cultural. The Declaration of Principles agreed at the World Summit on the Information Society in 2003 emphasized a "common desire and commitment to build a people-centred, inclusive and development-oriented Information Society" in line with the Charter of the United Nations and the Universal Declaration of Human Rights. Despite this emphasis on people and inclusion, the main drivers of convergence arguably remained reliance on digital technology innovation and investment in digital networks and services, rather than on people.

The technology-centered approach that predominates in the literature on convergence is especially problematic when people—as citizens or consumers—and institutions are taken into account. The implicit assumption is that convergence and (de)convergence processes occur in the same way and for the same reasons throughout the world. The literature in the development field addressing the cultural, social, political, and economic issues brought to the fore by transformations in the digital era insists that difference matters. There is no "one size fits all" set of theories about technological, institutional, or individual innovation that explains the convergence experience in different regions and

countries around the world, much less within them (Mansell, 2006; Unwin, 2009).This is because global and local relationships of power are influenced by multiple factors which give rise to highly differentiated outcomes, notwithstanding the spread of digital technologies and services such as the mobile phone and Facebook.

Digital Media Policy and Regulatory Convergence

Governance is the process whereby public institutions, businesses, and citizen groups articulate their interests, exercise their rights and obligations, make choices, and mediate differences. The convergence of digital technologies and their use by governments, companies, and citizens is creating tensions throughout society (Mansell, 2012; Mansell, 2014; Mansell & Steinmueller, 2000). Some of the literature on the governance of convergent or (de)convergent technologies emphasizes the need to strengthen participation by civil society.

Pressure to embrace greater participation by civil society actors is related to the perceived “hollowing out” of nation state authority through the devolution of governance to the private sector. The global transcendence of private sector firms and international organizations often sits uncomfortably alongside the desire for equitable and effective participation in the construction of digitally mediated societies through arrangements that recognize citizen rights. Thus, a major issue is whether emerging governance will support the ambitions of the private sector and those of online communities that do not have interests in commercial gain. Policy tends to rely on a presumption that liberalized and competitive markets will deliver socially desirable outcomes, notwithstanding research indicating that digital technology and service markets need not, and often do not, operate according to the principles of competitive markets (Melody, 1997).

A process of policy and regulatory convergence has accompanied technological and industry convergence. From the 1980s, decisions to liberalize communication markets encouraged new companies to challenge incumbent network operators and service providers. Market liberalization policies were based on the view that a failure to liberalize markets would lead to a weakening of national supplier competitive positions in global markets and to a slowing of the pace of technological innovation. The emphasis on market-led policies and liberalized markets was expected to put downward pressure on digital media prices, but this occurred very unevenly within countries and across countries and regions around the world.

Market liberalization led to changes in the governance framework for digital media. Key issues were arrangements for interconnecting networks and reconciling market-led outcomes with social goals. Those advocating a market-led approach assumed that competition would reduce the price of access to digital services for *all* customers and that any sign of a digital divide could be addressed by public action targeted at excluded groups. Others suggested that substantial gaps in the accessibility of new services already existed and would persist. Policy and regulation would be needed to reduce these gaps. It was acknowledged that despite the fact that convergence is a complex issue making it difficult to discern where convergence is leading or what the social problems will be, market intervention may be needed to reduce inequality (Burgelman & Verhoest, 1996; Clements, 1998; Pogorel, 1996).

Convergence brought two previously separate areas of policy into contact and often conflict. Telecommunications policy and regulation were principally concerned with point-to-point communication between individuals, paid for on a per-unit basis. Policy and regulation in this area focused on economic issues and on freedom of communication. Broadcasting was principally concerned with point-to-multipoint communication for collective or mass use. It was financed by subscription or taxation, and there was an emphasis on cultural diversity and plurality and on content regulation.

The potential benefits of networking globally, however, are contingent upon policies and regulation that enable participation in dispersed social and economic communities. Participation is dependent upon the appropriate skills and on cultural conditions and practices. In addition, the economic growth potential of national economies and the distribution of the gains from growth are crucial factors conditioning whether large-scale benefits are experienced as a result of the use of digital media around the world. In the contemporary digital media environment, the economic, social, cultural, and even political significance of digital technologies was said to have converged.

Citizens, consumers, and companies can only benefit from the potential of new technologies and services if an appropriate skills base is in place. This means that digital divides are not simply technological. In addition, technological convergence and the growth of new services have meant that markets are subject to major upheavals. There are new opportunities for establishing direct and intermediated relationships between companies and between companies and their customers (and between governments and citizens). Price comparisons can now be done on a global basis. Competition may create variety and choice for some, and expansion of global networks may yield productivity gains and opportunities for job creation in many parts of the world. There is, nevertheless, a large risk that these developments will exclude the disadvantaged or encourage their inclusion on terms that are less than favorable. For example, citizens who cannot access and use digital services are unable to benefit from online training and

education. They cannot enter new types of employment or generate income in new ways, and they are excluded from online public services. Those who cannot use digital media in creative ways do not have opportunities to produce content, to bring locally produced goods to wider markets, or engage with non-commercial information content.

Market liberalization, competition, and policy and regulatory reform in the 1980s and 1990s created stresses and strains in the operations of incumbent public telecommunication operators and in the values of public service (communications and media). Although the operators maintain substantial market shares for the provision of communication services in most countries, their service markets are being penetrated by new entrants. When they face competition it becomes more difficult to justify the internal subsidies that are needed to bring services to disadvantaged regions and users. Some suggest that a mix of cable television, terrestrial and satellite broadcasting, and fixed and wireless technology networks will prevail and that the same content ultimately will be transmitted over different media, thereby diminishing the need for public support for public service media, and that growing access to mobile phones will mean that nearly everyone has access to the Internet. Nevertheless, bottlenecks in the relationships between the information producer, the network operator, and the service user can occur at any point in the production-consumption chain. This, in turn, creates opportunities for the exercise of market power and the need for regulation in order to limit concentrated control over the distribution of information or media content and to meet public service objectives (Benkler, 1998; McChesney, 1996). However, other analysts argue that any intervention in the market will suppress innovation (Mackie-Mason & Varian, 1996; McKnight & Bailey, 1997).

Technological convergence in digital media as a result of network expansion and multiple public and private networks has meant that convergence is associated with redistribution and instability such that the spread of digital media is so successful that it has turned access to networks and digital information into a necessity. Access is increasingly seen as a public good that must be available to all, but this is unlikely in a distorted competitive market environment (Noam & Nishuilleabhain, 1996).

Differences in approaches to policy and regulation to address the uneven development of digital media networks and services in the United States and Europe, and between those in the global North and South, are examined in a comparative literature focusing mainly on legal and economic evidence (Baldwin, McVoy, & Steinfield, 1995; Lips, Frissen, & Prins, 1998; Thatcher, 1999). One major conclusion arising from this work is that “all countries should not try to charge down a single path emulating the perceived leaders in technological development at any moment in time. Rather each society will want to use

the new technology and service opportunities to meet its particular priority needs and values, and thus to help shape its future" (Melody, 1997, p. 489).

Institutional Responses to Digital Media Convergence

Discussion in the 1990s focused on the appropriate institutions and structure for national (or regional) regulatory agencies in the light of the convergence of telecommunication and audiovisual markets. The debate developed somewhat differently in the United States as compared to Europe (Bar et al., 1999; Nihoul, 1999; Noam & Nishuilleabhain, 1996). Apart from the legal form and independence of regulatory agencies, the concern was whether digital convergence creates a need to embrace transport and digital content issues within a single regulatory agency. Debate also focused on whether generic competition policy or sector-specific regulation is appropriate in a convergent era.

In addition, many policy issues with respect to network interconnection (and interoperability) in the case of the Internet are not subject to the forms of regulation that formerly applied to telecommunications and broadcasting (Internet services are regulated in various ways with regard to commercial practices). New policies have emerged involving a mix of co-regulatory initiatives where the industry players work together with government and civil society actors. Self-regulatory approaches by industry that are voluntary often are introduced in the face of resistance from consumers and citizens when rights to privacy are abrogated and intrusive surveillance is publicized.

Governance frameworks are becoming more complex as the interests of companies are weighed alongside those of consumers and citizens. For instance, from a policy perspective, there is no simple solution to how to extend universal access to the Internet. Extending public access to the Internet through efforts to connect schools, libraries, hospitals, and other public institutions is happening gradually in the wealthy countries. Policymakers are concerned about the dominance of major digital platform operators and, in Europe, the fact that most of these—Google, Facebook, Twitter—are foreign owned. In order for a market-led policy approach to operate effectively, the regulatory framework must provide clear signals about the rules of the market. In the face of rapidly changing technologies and convergence or (de)convergence, this is difficult to accomplish. Mixed forms of co-regulation, self-regulation, and formal regulation are emerging, and conflicts among the interests of companies, customers, and citizens are not diminishing (Ibanez Colomo, 2012). This is because the "current regulatory regime is

best suited for stable markets, not markets that are facing a major transition in the underlying technologies" (Lemstra & Melody, 2014, p. 19).

Digitalization has enabled digital media networks to become general conveyers of information of all types: voice, data, image, and video. Technological convergence enables different infrastructures to compete in the provision of the same services. The public Internet has decoupled services from their underlying infrastructure. This is enabling greater consumer choice, but it is also changing the structure of markets and competition. Markets are being driven by companies that are supplying service bundles such as quadruple-play: the combination of fixed and mobile telephony, Internet access, and radio/television as well as "Over-the-Top" or software-defined services operating over the Internet. Patterns of market differentiation, the bundling of services, and alliances and mergers are different in the United States than in Europe, indicating that technological convergence does not itself determine a particular industrial pathway.

Policymakers continue to grapple with how to manage asymmetric regulation to favor new market entrants and how to reconcile the notion of general public reception of media with the protection of cultural and political values. Questions persist about whether there is sufficient demand for new services to support a reasonable return on company investment. Despite a long history, a comprehensive analysis over time of the institutional, socioeconomic, and regulatory factors that influence convergence and (de)convergence is still missing. Three areas stand out in debates about the social, cultural, economic, and political consequences of convergence and (de)convergence: fostering innovation in business models, fostering the skills base, and privacy and surveillance.

Fostering Innovation in Business Models

The digital economy is built on innovative business models. Amazon sells products at discounted prices by squeezing the margins of independent and hyper-bookstores. Companies are devising hybrid or completely online businesses, providing some digital content for free, while at the same time charging for information that is hard to find because of its timeliness, quality, or accuracy. Intermediary services are developing to assist in defining information needs and meet them by bundling services in creative ways. Digital content is sometimes simply the advertising for other paid-for services that aggregate, filter, and integrate information (Verhulst, 2002).

Convergence is not only changing the business models of the private sector. Public media, including public service broadcasting, is being challenged as it faces competition

and the new opportunities for delivering content over multiple platforms (Syversten, 2003). Convergence and component modularity mean that, as digital media convergence approaches, the spread of the Internet and broadband is leading to a restructuring of the ways digital media services are financed. This is making it increasingly difficult to sustain state financing and subsidies (Cowhey & Aronson, 2009).

Fostering the Skills Base

Changes accompanying digital media convergence include innovations in learning and challenges that cannot be solved simply by increasing the numbers of computer science or other graduates with specialized technical training. Citizens and employees with hybrid technical, organizational, and information-management skills are much in demand. Unfortunately, the vast majority of digital media specialists are not trained to manage information creatively. There is increasing demand for workers with the ability to select information, to disregard irrelevant information, to recognize patterns in information (big data analytics), to interpret information, and to learn new skills. Technological convergence seems, at least in some ways, to enable enriched online experiences, and these opportunities are being extended through Massive Open Online Courses (MOOCs) and other platforms.

In principle, anyone can set up a home page, but Internet use depends on a range of skills to engage in interactive communication, information dissemination, and information collection. Services for education and training are as important as access to the network infrastructure. Relatively weak responses from policymakers to the challenges of building digital literacy are a result of the high cost of developing these skills. Public funding as a part of basic formal education would reduce the training costs borne by companies, but informal training is also needed. Failure to make significant progress in this area means that people who find digitally mediated life difficult or impossible because they lack the appropriate skills are being progressively marginalized and excluded. They can be excluded by their inability to recognize the value or usefulness of digital services or realize how they can use services in socially or economically productive ways. The burden of responsibility and the costs of engaging in a technologically convergent and digitally mediated society are falling increasingly upon citizens, and this is inconsistent with building inclusive and equitable societies (Livingstone, Haddon, & Gorzig, 2012).

Privacy, Surveillance, and Commercial Security

Legal regimes for protecting personal privacy and commercial security are being adjusted to promote the development of digital media. There is a growing emphasis on

technological methods to support a boundary between the private and public lives of citizens and consumers, but technological means do not substitute for social and legal policy choices. In the wake of convergent digital media, what is deemed “private” for the individual or company is being negotiated for various purposes. The unprecedented potential of the use of aggregated data for the protection of national security and securing commercial competitive advantage is leading to increasing investment in “big data” analytics and the infrastructure to support it. The capabilities of governments and companies to govern these uses are falling behind advances in technological capability, and efforts are being made by companies to enlist user cooperation to obtain compliance with changing norms with respect to privacy and surveillance (Diebert, 2013; Trottier, 2012).

Global networks are facilitating new types of communities and forms of behavior that are outside consensual social norms. Stimulating commercial activity requires rules and institutions that enable those using networks like the Internet to forge trusting relationships. When public confidence in privacy and security is endangered, privacy guarantees may be perceived as shields for those who engage in activities for which there is social disapproval or condemnation. Delays in implementing digital media systems are often related to the time needed to work out how to avoid “designing in” procedures that would violate strongly held beliefs about privacy. Striking an acceptable balance between the conflicting interests of technology designers and implementers and citizens requires an informed public debate. Digital networks offer the potential for monitoring the confidential, secret, and secluded space of an individual, a company, or of national or international organizations. The contravention of civil liberties is at the forefront of public debate, and research shows that public opinion in this area is highly context dependent (Nissenbaum, 2011). Interests in limiting privacy and enhancing security to guard against activities that are illegal or disapproved of need to be balanced by the social interest in defining fundamental “rights” to be free from surveillance and the use of private information by others.

Conclusion

Changes in governance influence public and private investment in digital media and the outcomes of the tension between convergence and (de)convergence. They influence the generation of information and creative content and the development of capabilities needed to participate in society. Policy intervention is being used in many countries and regions to secure open access to networks, and policy debates are influenced as much by geopolitical tensions as by the outcomes of digital technology convergence (DeNardis,

2014). Debate within the social science and academic legal communities is often about the need for regulatory intervention with respect to the design and implementation of digital technologies, but neither technological nor economic mechanisms can be relied upon to produce the best possible, or even necessarily desirable, outcomes.

Technical and economic issues of interconnection, interoperability, and universal access are basic elements of digital media governance because favoring interconnection and interoperability provides more attractive outcomes than can be achieved solely through the operation of the market. Options for financing commercial and public service digital media depend on the extent and rate of “take-up” of Internet services in businesses and homes as well as on government policies. Uncertainty exists about the path toward increasing capabilities and skills in the use of digital media and initiatives are needed to upgrade and develop skills and digital literacy.

Social science studies of the convergence and (de)convergence process are in relatively short supply. The vision of a technologically driven society based on convergent digital media predominates in many regions of the world, despite the availability of critical assessments of this perspective. It is increasingly clear that digital technologies cannot themselves overcome power asymmetries in the distribution of economic and social resources. Manuel Castells writes about a large gap between our “technological overdevelopment” and our “social underdevelopment” (Castells, 1998). Technologies are always transformed in their journey from invention to widespread use, and digital technology systems often experience dramatic transformations as they are brought into use. The digital technologies with the potential to support inclusive societies are characterized by a classic problem of coordination failure as they progress along a convergent or (de)convergent pathway. This means that markets for digital products and services for the disabled or elderly, for instance, may be insufficiently developed to ensure that a stable set of services emerges through market-led competition. This problem is exacerbated by the expectation that further technological progress will increase the variety of products and services, and so little may be done to correct imbalances in the marketplace.

The quality of modern life in a digitally mediated world increasingly depends upon active involvement with, and a commitment to, interactions with digital media systems. Some system designs favor outcomes that perpetuate historical patterns of unequal economic growth and social development, while others are likely to favor departures. As a result, the processes of digital media convergence signal the need for research to analyze how the co-evolution of technological, social, cultural,and economic change can make a difference that is consistent with inclusive and equitable social values.

Primary Sources

There are several handbooks and encyclopaedias that address issues related to this topic. These handbooks are not exclusively concerned with digital media, but they are all informed by efforts to respond to digital media convergence issues in the Internet age.

Brown, I. (Ed.). (2013). *Research handbook on governance of the Internet*. Cheltenham, U.K.: Edward Elgar Publishers.

Donders, K., Pauwels, C., & Loisen, J. (Eds.). (2014). *The Palgrave handbook of European media policy*. Basingstoke, U.K.: Palgrave Macmillan.

Dutton, W. H. (Ed.). (2013). *The Oxford handbook of Internet studies*. Oxford: Oxford University Press.

Haggerty, K., & Lyon, D. (Eds.). (2012). *The Routledge handbook of surveillance studies*. London: Routledge.

Mansell, R., & Ang, P. H. (2015). *The international encyclopedia of digital communication and society*. Chichester, U.K.: Wiley-Blackwell.

Mansell, R., & Raboy, M. (Eds.). (2011). *Handbook on global media and communication policy*. New York: Blackwell-Wiley.

Price, M. E., & Verhulst, S. G. (Eds.). (2013). *Handbook of media law and policy: A socio-legal exploration*. New York: Routledge.

Further Reading

Bygrave, L. A. (2014). *Data privacy law: An international perspective*. Oxford: Oxford University Press.

DeNardis, L. (2014). *The global war for Internet governance*. New Haven, CT: Yale University Press.

Donders, K., & Pauwels, C. (2008). Does EU policy challenge the digital future of public broadcasting? An analysis of the commission’s state aid approach to digitization and the public service remit of public broadcasting organizations. *Convergence*, *14*(3), 295–311.

Gillespie, T., Boczkowski, P. J., & Foot, K. A. (Eds.). (2014). *Media technologies: Essays on communication, materiality and society*. Cambridge, MA: MIT Press.

Kitchen, R. (2014). *The data revolution: Big data, open data, data infrastructures & their consequences*. London: SAGE.

Lemstra, W., & Melody, W. H. (Eds.). (2014). *The dynamics of broadband markets in Europe: Realizing the 2020 digital agenda*. Cambridge, U.K.: Cambridge University Press.

Ludes, P. (Ed.). (2008). *Convergence and fragmentation: Media technology and the information society*. Bristol, U.K.: Intellect.

Moe, H. (2010). Governing public service broadcasting: “Public value tests” in different national contexts. *Communication, Culture & Critique*, *3*(2), 207–223.

Napoli, P. M. (2014). Automated media: An institutional theory perspective on algorithmic media production and consumption. *Communication Theory*, *24*(3), 340–360.

Pauwels, C., & Donders, K. (2011). From television without frontiers to the digital big bang: The EU’s continuous efforts to create a future proof internal media market. In R. Mansell & M. Raboy (Eds.), *Handbook on global media and communication policy* (pp. 525–542). New York: Blackwell-Wiley.

Steinmueller, W. E. (2000). Paths to convergence: The roles of popularisation, virtualisation and intermediation. In E. Bohlin, K. Brodin, A. Lundgren, & B. Thorngren (Eds.), *Convergence in communications and beyond* (pp. 383–396). Amsterdam: Elsevier Science Publishers.

van Deursen, A. J. A. M., & van Dijk, J. A. G. M. (2014). The digital divide shifts to differences in usage. *New Media & Society*, *16*(3), 507–526.

Webster, F. (2014). *Theories of the information society* (4th ed.). London: Routledge.

References

Arnold, E., & Guy, K. (1986). *Parallel convergence: National strategies in information technology*. London: Frances Pinter.

Baldwin, T. F., McVoy, D. S., & Steinfield, C. (1995). *Convergence: Integrating media, information and communication*. Thousand Oaks, CA: SAGE.

Bar, F., Cohen, S., Cowhey, P., DeLong, B., Kleeman, M., & Zysman, J. (1999) *Defending the Internet revolution in the broadband era: When doing nothing is doing harm*. Berkeley: University of California. Retrieved from **http://brie.berkeley.edu/econ/publications/wp/ewp12.pdf**, accessed August 13, 2016.

Benkler, Y. (1998) Communications infrastructure and the distribution of control over content. *Telecommunications Policy*, *22*(3), 183–196.

Bohlin, E., Brodin, K., Lundgren, A., & Thorngren, B. (Eds.). (2000). *Convergence in Communications and Beyond*. Amsterdam: North Holland.

Branscomb, L. M., & Keller, J. H. (Eds.). (1996). *Converging infrastructures: Intelligent transportation and the national information infrastructure*. Cambridge, MA: MIT Press.

Burgelman, J. C. (2000). Innovation of communication technologies: Some general lessons for the future from the past. In B. Cammaerts & J. C. Burgelman (Eds.), *Beyond competition: Broadening the scope of telecommunications policy* (pp. 229–237). Brussels: VUB University Press.

Burgelman, J.-C., & Verhoest, P. (1996). Convergence and trans-European networks: Some policy problems. In A. Bianchi & G. Richeri (Eds.), *Telecommunication: New dynamics and driving forces* (pp. 7–18). Amsterdam: IOS Press.

Castells, M. (1998). *The information age: Economy, society and culture. Vol. 3: End of millennium*. Oxford: Blackwell.

Clements, B. (1998). The impact of convergence on regulatory policy in Europe. *Telecommunications Policy*, *22*(3), 197–205.

Couldry, N. (2012). *Media, society, world: Social theory and digital media practice*. Cambridge, U.K.: Polity Press.

Cowhey, P. F., & Aronson, J. D. (2009). *Transforming global information and communication markets*. Cambridge, MA: MIT Press.

Dahlgren, P. (2000). The Internet and the democratization of civic culture. *Political Communication*, *17*(4), 335–340.

David, P. A. (1987). Some new standards for the economics of standardization in the information age. In P. Dasgupta & P. Stoneman (Eds.), *Economic policy and technological performance* (pp. 206–239). Cambridge, U.K.: Cambridge University Press.

DeNardis, L. (2014). *The global war for Internet governance*. New Haven, CT: Yale University Press.

Diebert, R. J. (2013). *Black code: Surveillance, privacy, and the dark side of the Internet*. Toronto: McClelland & Stewart.

Dogruel, L. (2013). Opening the black box: The conceptualising of media innovation. In T. Storsul & A. H. Krumsvik (Eds.), *Media innovations: A multidisciplinary study of change* (pp. 29–43). Göteborg, Sweden: NORDICOM.

DuLong de Rosnay, M., & Carlos De Martin, J. (Eds.). (2012). *The digital public domain: Foundations for an open culture*. Cambridge, U.K.: Open Book Publishers.

Elton, M. C. J. (Ed.). (1991). *Integrated broadband networks: The public policy issues*. Amsterdam: North Holland.

Fagerberg, J. (2006). Innovation: A guide to the literature. In J. Fagerberg, D. Mowery, & R. Nelson (Eds.), *The Oxford handbook of innovation* (pp. 11–28). New York: Oxford University Press.

Flichy, P. (1995). *Dynamics of modern communication: The shaping and impact of modern communication*. London: SAGE.

Hacklin, F., Marxt, C., & Fahrni, F. (2009). Coevolutionary cycles of convergence: An extrapolation from the ICT industry. *Technological Forecasting and Social Change*, *76*(6), 723–736.

Ibanez Colomo, P. (2012). *European communications law and technological convergence*. AH Alphen aan den Rijn, The Netherlands: Kluwer Law International.

James, J. (2008). Digital divide complacency: Misconceptions and dangers. *The Information Society: An International Journal*, *24*(1), 54–61.

Jenkins, H. (2006). *Convergence culture: Where old and new media collide*. New York: New York University Press.

Jenkins, H. (2003). Transmedia storytelling: Moving characters from books to films to video games can make them stronger and more compelling. *Technology Review*. Retrieved from **https://www.technologyreview.com/s/401760/transmedia-storytelling/**, accessed August 13th, 2016.

Lemstra, W., & Melody, W. H. (Eds.). (2014). *The dynamics of broadband markets in Europe: Realizing the 2020 digital agenda*. Cambridge, U.K.: Cambridge University Press.

Lips, A. M. B., Frissen, P. H. A., & Prins, J. E. J. (1998). Regulatory review through new media in Sweden, the UK and the USA: Convergence or divergence of regulation? *The EDI Law Review*, *5*, 123–257.

Livingstone, S., Haddon, L., & Gorzig, A. (2012). *Children, risk and safety online: Research and policy challenges in comparative perspective*. Bristol, U.K.: Policy Press,

MacKie-Mason, J. K., & Varian, H. R. (1996). Some Economics of the Internet. In W. Sichel & D. L. Alexander (Eds), *Networks, Infrastructure and the New Task for Regulation* (pp. 107–136). Ann Arbor: University of Michigan Press.

Mansell, R. (1993). *The new telecommunications: A political economy of network evolution*. London: SAGE.

Mansell, R. (2006). Ambiguous connections: Entitlements and responsibilities of global networking. *Journal of International Development*, *18*(6), 1–13.

Mansell, R. (2012). *Imagining the Internet: Communication, innovation and governance*. Oxford: Oxford University Press.

Mansell, R. (2014). Empowerment and/or disempowerment: The politics of digital media. *Popular Communication: The International Journal of Media and Culture*, *12*(4), 223–236.

Mansell, R., & Steinmueller, W. E. (2000). *Mobilizing the European information society: Strategies for growth and opportunity*. Oxford: Oxford University Press.

Martin-Barbero, J. (2009). Digital convergence in cultural communication. *Popular Communication: The International Journal of Media and Culture*, *7*(3), 147–157.

Marvin, C. (1988). *When old technologies were new: Thinking about communications in the late nineteenth century*. Oxford: Oxford University Press.

Marsden, C., & Verhulst, S. (1999). *Convergence in European Digital TV Regulation*. London: Blackstone.

McChesney, R. W. (1996). The Internet and US communication policy-making in historical and critical perspective. *Journal of Communication*, *46*(1), 98–124.

McKnight, L. W., & Bailey, J. P. (Eds.). (1997). *Internet economics*. Cambridge, MA: MIT Press.

McQuail, D., & Siune, K. (Eds.). (1999). *Media policy: Convergence, concentration & commerce*. London: SAGE.

Melody, W. M. (Ed.). (1997). *Telecom reform: Principles, policies and regulatory practices*. Lyngby: Technical University of Denmark.

Mosco, V., & McKercher, C. (2006). Convergence bites back: Labour struggles in the Canadian communication industry. *Canadian Journal of Communication*, *31*(3), 733–751.

Nihoul, P. (1999). Convergence in European telecommunications: A case study on the relationship between regulation and competition (law). *International Journal of Communications Law and Policy*, *1*(2).

Nissenbaum, H. (2011). A contextual approach to privacy online. *Daedalus*, *140*(4), 32–48.

Noam, E. (2000). Four convergences and a trade funeral? In E. Bohlin, K. Brodin, A. Lundgre, & B. Thorngren (Eds.), *Convergence in communications and beyond* (pp. 406–410). Amsterdam: Elsevier Science.

Noam, E., & Nishuilleabhain, A. (Eds.). (1996). *Private networks—public objectives*. Amsterdam: Elsevier.

OTA. (1990). *Critical connections: Communications for the future*. Washington, DC: Office of Technology Assessment, U.S. Department of Commerce.

Pogorel, G. (Ed.). (1996). *Global telecommunications strategies and technological change*. Amsterdam: Elsevier.

Poster, M. (1995). *Cyberdemocracy: Internet and the public sphere*. Irvine: University of California. Retrieved from **http://faculty.humanities.uci.edu/poster/writings/democ.html**.

Preston, P. (2001). *Re-shaping communications: Technology, information and social change*. London: SAGE.

Rosenberg, N. (1982). *Inside the black box: Technology and economics*. Cambridge, U.K.: Cambridge University Press.

Scolari, C. A. (2009). Transmedia storytelling: Implicit consumers, narrative worlds, and branding in contemporary media production. *International Journal of Communication*, *3*, 586–606.

Shtern, J., Pare, D., Ross, P., & Dick, M. (2013). Historiographic innovation: How the past explains the future of social media services. In T. Storsul & A. H. Krumsvik (Eds.), *Media innovations: A multidisciplinary study of change* (pp. 239–253). Göteborg, Sweden: NORDICOM.

Steinmueller, W. E. (2000). Paths to convergence: The roles of popularisation, virtualisation and intermediation. In E. Bohlin, K. Brodin, A. Lundgren, & B. Thorngren

(Eds.), *Convergence in communications and beyond* (pp. 383–396). Amsterdam: Elsevier Science.

Storsul, T., & Stuedahl, D. (Eds.). (2007). *Ambivalence towards convergence: Digitalization and media change*. Göteborg, Sweden: Nordicom.

Syversten, T. (2003). Challenges to public television in the era of convergence and commercialization. *Television & New Media*, *4*(2), 155–175.

Thatcher, M. (1999). *The politics of telecommunications: National institutions, convergence and change in Britain and France*. Oxford: Oxford University Press.

Tilson, D., Lyytinen, K., & Sørensen, C. (2010). Desperately seeking the infrastructure in IS research: Conceptualization of "digital convergence" as co-evolution of social and technical infrastructures. In HICSS (Ed.), *HICSS 10 Proceedings of the 2010 43rd Hawaii International Conference on System Sciences* (pp. 1–10). Washington, DC: IEEE Computer Society.

Trottier, D. (2012). *Social media as surveillance*: Farnham, U.K.: Ashgate.

Unwin, T. (Ed.). (2009). *ICT4D: Information and communication technology for development*. Cambridge, U.K.: Cambridge University Press.

Vaughan, H. E. (1959). Research model for time-separation integrated communications. *Bell System Technical Journal*, *38*(4), 909–932.

Verhulst, S. (2002). About scarcities and intermediaries: The regulatory paradigm shift of digital content reviewed. In L. A. Lievrouw & S. Livingstone (Eds.), *Handbook of new media: Social shaping and consequences of ICTs* (pp. 432–447). London: SAGE.

Webster, F. (2006). The digital sublime: Myth, power, and cyberspace. *European Journal of Communication*, *21*(1), 110–112.

Robin Mansell
Department of Media and Communications, London School of Economics and Political Science