Society and the Internet

Moments in the Development of the Internet

1950s: Early development of computing for domestic purposes

1960: J. C. R. Licklider's call for a global network

1962: Doug Englebart began design of an "oN-Line System" (NLS), demonstrated in 1968

1963: Ted Nelson coins the term "hypertext"

1967: L. G. Roberts publishes his plan for the ARPANET at DARPA

1969: ARPANET Commissioned by US Department of Defense for research on networking; and the first message is sent over the network

1972: ARPANET's first public demonstration

1972: e-mail system begins on ARPANET

1973: TCP/IP is developed by Robert Kahn and Vint Cerf

1981: US National Science Foundation (NSF) develops the Computer Science Network (CSN), later NSFNET, expanding ARPANET

1982: Internet Protocol Suite (TCP/IP) is standardized

1986: NSFNet created

1989: Tim Berners-Lee and CERN colleagues invent the World Wide Web; Réseaux IP Européens (RIPE) is formed by European service providers

1990: ARPANET decommissioned, ceases to exist

1991: World Wide Web service becomes publicly available on the Internet

1992: Internet Society is chartered; World Wide Web is released by CERN

1993: Mosaic Web browser developed, soon commercialized as Netscape Navigator

1994: World Wide Web Consortium (W3C) founded; NSFNET decommissioned

1995: Internet commercialized, Netscape launched, Amazon.com and eBay are founded

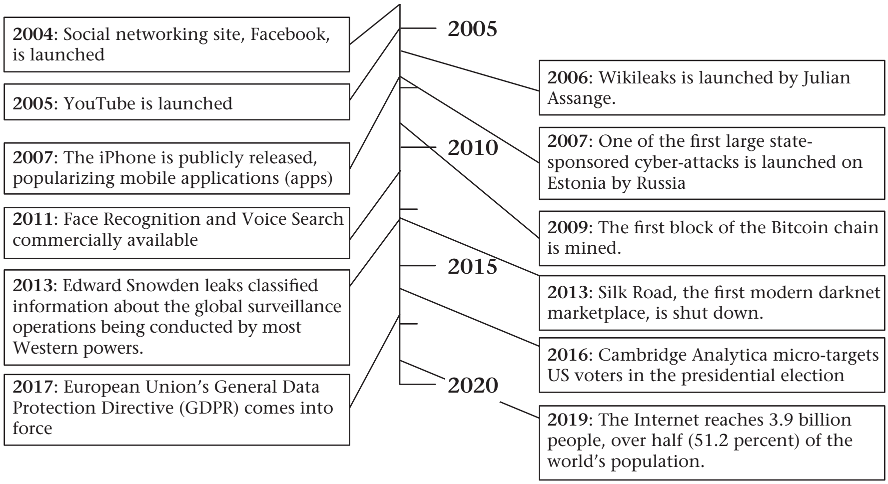
1998: Google starts as a research project at Stanford University

2001: Tim Berners-Lee and others call for a new semantic (data) web

2001: Wikipedia is founded by Jimmy Wales and Larry Sanger.

2001: Original peer-to-peer file-sharing music site, Napster, is shut down.

2003: Hacktivist group Anonymous is formed.



2004: Social networking site, Facebook, is launched
2005: YouTube is launched
2007: The iPhone is publicly released, popularizing mobile applications (apps)
2011: Face Recognition and Voice Search commercially available
2013: Edward Snowden leaks classified information about the global surveillance operations being conducted by most Western powers.
2017: European Union's General Data Protection Directive (GDPR) comes into force
2005
2010
2015
2020
2006: Wikileaks is launched by Julian Assange.
2007: One of the first large state-sponsored cyber-attacks is launched on Estonia by Russia
2009: The first block of the Bitcoin chain is mined.
2013: Silk Road, the first modern darknet marketplace, is shut down.
2016: Cambridge Analytica micro-targets US voters in the presidential election
2019: The Internet reaches 3.9 billion people, over half (51.2 percent) of the world's population.

Society and the Internet

How Networks of Information and Communication are Changing Our Lives

Second Edition

Edited by
Mark Graham and William H. Dutton

with a foreword by
Manuel Castells

OXFORD
UNIVERSITY PRESS

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UNIVERSITY PRESS

Great Clarendon Street, Oxford, OX2 6DP,
United Kingdom

Oxford University Press is a department of the University of Oxford.
It furthers the University's objective of excellence in research, scholarship,
and education by publishing worldwide. Oxford is a registered trade mark of
Oxford University Press in the UK and in certain other countries

First Edition published in 2014
Second Edition published in 2019

Impression: 1

Published in the United States of America by Oxford University Press
198 Madison Avenue, New York, NY 10016, United States of America

British Library Cataloguing in Publication Data
Data available

Library of Congress Control Number: 2019930267

ISBN 978–0–19–884349–8 (hbk.)
ISBN 978–0–19–884350–4 (pbk.)

Printed and bound by
CPI Group (UK) Ltd, Croydon, CR0 4YY

Foreword

Internet: Utopia, Dystopia, and Scholarly Research

The Internet has become the fabric into which our lives are woven. It is relentlessly changing our communication environment. And communication is the essence of being humans. It is not "I think, thus I exist," but "I communicate, thus I exist". If I do not communicate, no one knows what I thought and therefore I exist only in my inner self—which only becomes fully human when I leave my shell and I venture into the wonders and surprises of life.

Indeed, forms and technologies of communication have differentiated our societies throughout history. The advent of the Internet has represented a quantum leap in the transformation of communication. Yet, half a century after its first deployment (in 1969) the social meaning of this interactive, multidirectional, global, digital network of communication remains obscured in the media, in the institutions, and in people's minds, by the utopias and dystopias that emerged from the very moment of its inception.

Utopians hailed the Internet as the coming of the kingdom of freedom. Freedom from the state, and from big corporations.

Dystopians warned against a technology that would bring widespread isolation and alienation to society, as people would be transformed into nerds mired to their computers day and night, leaving reality and being submerged into virtuality. Furthermore, Big Brother would use the pervasiveness of the Internet to construct a digital panopticon and establish a surveillance system as never before possible.

Both positions were proven right and wrong at the same time.

On the one hand, it is true that unfettered, multimodal, ubiquitous communication has extraordinarily enhanced the capacity of individuals to construct the networks of their lives. In so doing, they have largely bypassed the mass-media control exerted by either governments or media corporations, creating a space of autonomy that has impacted everything, from business to social movements, from cultural creativity to the rise of the sharing economy. However, states have rushed to limit the newly developed free communication by setting up sophisticated systems of censorship, by blocking access to websites, by approving and enforcing restrictive legislation, by engaging in cyberwarfare, and by inducing massive disinformation, amplified by armies of robots that populate digital networks. As for the corporations running these networks, they have become gigantic oligopolies, and have used their control of traffic to transform our lives into data, the sources of their profits: data capitalism is a fundamental industry of the twenty-first-century economy. Freedom of information is the subject of a decisive fight against the freedom of producing and propagating "fake news."

On the other hand, the myth of the alienated Internet user has been debunked repeatedly by a flurry of studies that have found the obvious: sociability is hybrid (as it always was), made of both face-to-face and technology-mediated interaction. Of course, there are people alienated and isolated among users. As they are in the whole of society. In fact, the Internet has alleviated these feelings, by providing an alternative for people who tend not to be very sociable. And, yes, a new pattern of sociability has emerged: it is what we conceptualize as networked individualism. Individualism is the predominant culture of our societies because of a number of factors that are not rooted in technology. What the Internet does is to provide an appropriate platform for the full development of this new form of sociability. The Internet and social media are as sociable as any other forms of mediated communication: in traditional sociological terms, we moved from community to association, and then from association to networking.

Yet, the dystopian view of the Internet finds strong support in the extraordinary rise of government surveillance apparatuses after 2001, exploiting the emotion and the fear caused by the terrorist attacks on 9/11. As Michael Hayden, the director of the US National Security Agency (NSA) said at the time, referring to the difficulty of finding terrorists in a world of ever-growing information: "In order to find a needle in a haystack, I need the entire haystack."

Thus, while most of the alarm about the power of digital Big Brother has been aimed at the attempt to control Internet communication by China, in fact the NSA has become the core of the most comprehensive surveillance system on the planet, particularly through its connection with the sophisticated British intelligence agency, GCHQ, and their counterparts in Germany and Israel among others. Together they constitute a global bureaucracy of surveillance, with occasional collaboration with the independent Russian and Chinese agencies.

However, while surveillance is the domain of the state, the total loss of privacy is mainly the result of the practice of Internet companies, such as Google, Yahoo!, Amazon, Facebook, and Twitter. These companies retrieve and store data about all of our communications, sometimes with our (forced) consent (we need their services because they are an oligopoly), and sometimes without it. In principle, they aggregate our data without personal identifying information, but the advertising we receive relentlessly in our electronic addresses is customized, and so someone enabled the advertisers to personalize content for our tastes, preferences, and behavior. However, not all of this is the fault of the Internet, because a key source of the data is the digitization of everything, starting with our bank cards, that tells the story of our life in minute detail. It is the formation of a "digital exhaust" by the linkage between all our digital traces that provides the basis of this panopticon resulting largely from the exchange of data between different corporations and, ultimately, the state itself.

Nonetheless, the digital panopticon is not an overwhelmingly dictatorial system, because people are still able to communicate in a horizontal manner, and even to rebel, and mount political challenges, as we have witnessed, particularly since 2010, in multiple countries around the world. We can say that a new form of social movement has been born: the networked social movement, with extraordinary impacts in political processes. But this says nothing about the ideological orientation of these movements, as extreme right movements have taken advantage of these autonomous networks, at least as much as progressive social movements have. Technology does not create the content of the behavior of the actors in the networks: it amplifies its effect.

Thus, the simplistic debate between utopians and dsytopians blocks our understanding of the key communication technology of our lives. Because, as in all technologies in history, in the first stage of their development there is a reaction of fear of the unknown, particularly among the older generations, overwhelmed by the proliferation of machines that they ignore. These fears are deepened by the mass media, because "only bad news is news." And because of the potential existential threat to traditional media, from the press to television, that is posed by social media, traditional media have a vested interest in delegitimizing social media as a form of reliable information and communication. And so, our world has entered the Internet Galaxy at full speed, without awareness of its implications.

Scholarly research, conducted in the usual conditions of intellectual independence and rigorous methodology, is the only way to clarify the issues at stake, as a precondition to designing appropriate polices and legislation that could eventually restore human control over new, powerful machines, and people's autonomy vis-à-vis the proprietary networks of communication.

This is why the field of Internet studies is essential for the construction of human consciousness in our contemporary context. And this is why this book that summarizes, updates, and theorizes critical research findings on Internet and society, is a necessary guide to address key dilemmas of our time.

Manuel Castells

Los Angeles and Barcelona,
March 2019

Preface

As we completed this second edition of *Society & The Internet*, the Internet had reached over half of the world's population. There was surprisingly little fanfare for such a major milestone. To the contrary, there was concern that the rate of the Internet's diffusion was slowing—an inevitable pattern in the diffusion of all innovations.[1] But more alarming was the rise of increasingly major concerns over the societal implications of the Internet and related media, information, and communication technologies. Pundits argued that social media was destroying democracy, big data was undermining our privacy; screens were affecting the health and sociability of children; artificial intelligence (AI) would kill jobs; states were engaged in "World War Web"; and the Internet and Web were fragmenting as the balkanization of the global information system speeded up.[2]

As Manuel Castells elucidates in the foreword to this book, this is part of an enduring utopian–dystopian dialogue about the societal implications of the Internet and related media and communication technologies. However, what is somewhat different about these debates from past hopes and concerns about technology is the degree to which they are current rather than future issues. That is, concerns at a level bordering on panic have emerged around actual developments, such as revelations about government surveillance, massive data breaches, and disinformation campaigns.

Has the dystopian narrative been proven right? Alternatively, are such concerns based on overly simplistic and often deterministic logics that do not withstand the scrutiny of empirical and theoretically sophisticated analyses? We hope this book's collection of research will help you answer such questions.

This book, as Manuel Castells points out, is an attempt to bring independent, disinterested, and empirically informed research to bear on key questions. We want to show the reader how research is being conducted in central

[1] This refers to the S-curve of any innovation that describes how the rate of diffusion slows after it reaches most adopters (Rogers, E. M. (2004). *Diffusion of Innovations*, fifth edn. London: Simon and Schuster.).

[2] "World War Web" was the cover title of the September/October 2018 issue of *Foreign Affairs*.

domains of Internet research: demonstrating a breadth of theoretical and methodological approaches to developing understanding about the societal implications of the Internet. Each author was tasked with not just laying out key disagreements or debates, but also explaining how they interrogate them. We hope this collection therefore conveys the significance of varying perspectives on the Internet and brings Internet studies alive for anyone who seeks to understand the many ways in which the Internet is impacting, co-constituting, and being impacted by society.

Central to understanding the role of the Internet in society, is to focus on not just its material, but also its discursive power. Visions of the Internet have always been a critical driving force behind its development. Ted Nelson, the person who coined the term "hypertext," has been a critic of the design of the Web and many other information technologies. He explained the failure of so many technical designs by famously saying: "Tekkies have created the world in their image; I believe today's computer world is a result of tekkie misunderstandings of human life and human thought." Despite spectacular advances, there remains much room for improvement.

But utopian visions of the Internet live on and continue to be a force driving individuals, companies, and governments to invest in its potential. As the first edition of this book was nearing completion, we learned of the death of Douglas C. Englebart (1925–2013), an engineer and one of the first scholars to envision a future in which computers and telecommunications would be networked worldwide in ways that could augment human intelligence. In 1962, over fifty years ago, he started work on the design of what he called an "oN-Line System" (NLS), which he demonstrated in 1968, one year after his team invented the "mouse"—a device that has since changed the ways in which people interact with computers.

He was one of many pioneers who helped shape what we have come to know as the Internet, the Web, and related digital technologies, ranging from telecommunications infrastructures to tablets, smartphones, and voice search. He was inspired by earlier pioneers, such as Vannevar Bush and J. C. R. Licklider, who called for a global system, and in turn inspired others, such as Ted Nelson, who conceived and developed the concept of "hypertext," to describe the nonlinear pathways that can link digital text and images, and which move away from the model of a linear book.

As we were working on the second edition of this book in 2018, another Internet pioneer passed away, but one of a very different sort. Not an engineer, but a poet and essayist, and a lyricist for the Grateful Dead (as well as a cattle rancher). John Perry Barlow founded the Electronic Frontier Foundation, dedicated to protecting digital rights, and in 1996 penned one of the early Internet's most utopian visions: "A Declaration of the Independence of Cyberspace." The declaration boldly proclaimed: "Governments of the

Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone. You are not welcome among us. You have no sovereignty where we gather." The declaration, in other words, introduced the idea that the Internet could allow its users to transcend many of the world's preexisting material constraints.

Such early visions of what would become the Internet of the twenty-first century were formed when computing was out of the reach of all but a few organizations. Englebart's vision was developed when nearly all computing was conducted on large mainframe computers that were so expensive and complex that only large organizations and governments possessed them. In the sixties, the very idea that households, much less individuals in their pockets, would have access to a computer networked with billions of other computers around the world was viewed as folly—completely unrealistic "blue sky" futurology. Ironically, even Barlow's ideas of the 1990s were developed when mobile computing was still a far distant dream for the general public. And yet today a majority of humanity takes the Internet—often via a mobile device—for granted as a central feature of and tool in use for everyday life and work.

Of course, many pioneers followed in the steps of Englebart, Barlow, and other early visionaries and developed the technologies and visions that have shaped access to information, people, and services in the twenty-first century. They include Vint Cerf and Robert Kahn, inventors of the protocols that define the Internet, and Tim Berners-Lee and his team at CERN, who invented the World Wide Web. Of course, there are many more—too many to list.

But the most unsung pioneers of the Internet are its users—people like you who use, view, mediate, edit, make, and therefore profoundly change the ways that much contemporary knowledge is circulated and recirculated, and communication is enacted and used. This book provides many examples of how users have shaped—and continue to shape—the development of the Internet and its application across nearly every sector of society, always coming back to the key issue of what difference the Internet makes in all aspects of our lives.

Influential pioneers in the design and development of the Internet, like Doug Englebart, understood the importance of users. As computing moved from large mainframes to personal computers to the Internet becoming your computer, it became clear that users were playing a major role in shaping the Internet in ways many of its designers could not have imagined. For example, many did not foresee the Internet becoming so widely embedded in core activities of everyday life, from correspondence to banking and shopping. It was originally designed to share computing resources in the computer-science community. In a personal conversation about cybersecurity, one of the key engineers involved in developing the Internet argued that—to paraphrase him—if he had known how the Internet would develop, he "would not have designed it as he did."[3] Fortunately, the Internet *was* designed as it was, which led to its becoming one of the most transformative technologies of the twenty-first century.

Likewise, while the Internet was developed originally to support collaboration and sharing among computer scientists, few early developers would have anticipated the ways in which crowdsourcing—tapping the wisdom of Internet users distributed across the globe—has enabled users to play more important roles in science and society in what has been called "citizen science." Who would have envisioned, for instance, that people from all over the world would edit Wikipedia, averaging about 1.7 edits per second around the clock?[4] However, even with enormous numbers of people being creators and makers on the Internet, huge inequalities remain in terms of who gets to have a voice there and what is represented. As new uses evolve, there is a need for even greater ingenuity and creativity on the part of developers and users alike to address the problems and risks of the digital age.

In the half-century since Englebart envisioned an NLS, the promise of the Internet, Web, and related digital information and communication technologies to truly augment human intelligence has become evident, but so has the centrality of a global Internet to such valued outcomes as freedom of expression, privacy, equality, and democratic accountability. The visions and work of the John Perry Barlows, as well as the Douglas Englebarts, of this world continue to be needed as much as ever. In fact, most debates over such central values as freedom of expression in the twenty-first century are about the Internet.

It is important to recognize that present-day concerns, such as those over disinformation, are not new. Well before the twenty-first century, many people considered the potential societal implications of computing and telecommunications enabled by digital technologies. As early as 1973, computer scientists such as Kelly Gotlieb began to write about some of the key social issues of computing, such as the implications for freedom of expression, privacy, employment, education, and security. Most of these issues remain critical today. In the early 1970s, Gotlieb and others discussed the idea of an "information utility"—analogous to other utilities, such as those for electricity or water. They were well aware of J. C. R. Licklider's call for a global network, even though ARPANET—the early incarnation of what would become the Internet—was only at the demonstration stage at the time they wrote, and governments were the primary adopters of computing and electronic data-processing systems. Nevertheless, the issues defined as early as the 1970s

[3] David Clarke in a personal conversation with Bill Dutton.
[4] https://en.wikipedia.org/wiki/Wikipedia:Statistics/

remain remarkably key to discussions of the Internet, big data, social media, and mobile Internet, over forty years later.

As the second edition of this book was nearing completion, the world was only beginning to recover from a moral panic over the rise of fake news, the fear of filter bubbles and echo chambers, and a declining trust in the Internet to deliver on its promise. Major changes have occurred across the decades and even since this book's first edition. Two are absolutely fundamental in introducing this edition.

First, the Internet has increasingly been perceived as a serious threat. In the Internet's early years, it was an interesting innovation, but viewed as of no particular importance by many in government, business and industry, and society. With its continued and rapid diffusion into and out of the dotcom bubble of 2001, the Internet came to be viewed as a fountain of benign innovation in democratic governance and everyday life. The Internet, Web, and social media came to be viewed as the harbingers of worldwide transformation to more distributed, collaborative, governance—the end of hierarchy and the death of dictators. But within a decade after the millennium, dramatic events began to challenge positive visions of the Internet's role. To many, Wikileaks came to be viewed as a threat to governance, rather than a tool for accountability. The release of secrets by Edward Snowden fueled visions of worldwide surveillance rather than distributed intelligence. Social media came to be viewed as a Trojan Horse to democracies targeted by malevolent and possibly state-supported actors, a tool for propaganda and misinformation. Thus, to paraphrase Albert Teich's summary of perspectives on technology in general, the Internet has come full circle, from having no particular effect, to being an unalloyed blessing, to being an unmitigated disaster—all in the course of a few decades.

Secondly, in contrast to the early years, as we moved into the second decade of the twenty-first century, the Internet had become an infrastructure of everyday life and work for much of the world. It is no longer seen as simply a "virtual" or "cyber"-space beyond the realm of the material world. It is instead an embedded, augmented layer and infrastructure of contemporary societies. As such, instead of a Barlow-esque vision of a domain of life in which the old rules no longer apply, we see ways in which people, organizations, and states with economic, social, and political power use the Internet to amplify their reach.

The Internet has become so widely diffused and pervasive that we are no longer simply relegated to debating competing visions of the societal implications of this technological innovation. We are in a place in which the actual societal implications of one of the most significant technologies of our lifetimes can be seriously studied. In doing so, students of the Internet and society need not just to stop at understanding the dynamics of our contemporary digitally mediated world, but to build on those understandings to develop new, fairer, and more just digital utopias. As AI, even bigger data, new forms of human interaction with computers, and ever-increasing mobility, enabling access from anywhere to anywhere at any time, change how we interact with each other, we need to make sure that we always look to not just where we are heading, but also where we might want to be—on the basis of normative forecasts. Nascent movements around initiatives like data justice, platform cooperatives, digital unions, and a decolonized Internet are just some of the ways in which emerging visionaries are trying to forge a better digital future.

The central mission of this book is to offer a base from which the next generation of scholarship, policy, and visions can be constructed. It aims to show you how a multidisciplinary range of scholars seek to empirically and theoretically understand the social roles of the Internet. It is in this spirit that this book brings to bear a variety of methodological approaches to the empirical study of the social shaping of the Internet and its implications for society.

Are those developing and using the Internet creating a system that augments human intelligence, as Englebart envisioned? Will the Internet be designed and governed to support freedom of information, as Barlow envisioned? Are we using the Internet in ways that undermine social relationships and the quality and diversity of information resources required for economic, social, and political development? What difference is the Internet making to the quality of our lives and how can this role be further enhanced in the future? What people, places, groups, and institutions have been able to derive the most benefit from the Internet, and who, what, and where have been left out? Who gets to control, create, and challenge new flows of information in our networked lives? And how are those flows of information used to entrench, amplify, or challenge economic, social, and political power? In the years and decades to come, the answers to these questions will be driven in part by the quality of research on the social shaping of the Internet and its implications for society. We hope this book helps engage you in that enterprise.

For this collection is designed to show how these questions can be addressed. It presents a stimulating set of readings grounded in theoretical perspectives and empirical research. It brings together research that examines some of the most significant cultural, economic, political, and other social roles of the Internet in the twenty-first century in creative ways. Contributors and topics were selected to introduce some of the most engaging and groundbreaking scholarship in the burgeoning multidisciplinary field of Internet Studies. In this spirit, the chapters are rooted in a variety of disciplines, but all directly tackle the powerful ways in which the Internet is linked to transformations in contemporary society. We hope this book will be the starting point for some students, but valuable to anyone with a serious interest in the economic, social, and political factors shaping the Internet and its impact on society.

Acknowledgments

This book began as a collaboration across the Oxford Internet Institute (OII), one of the world's first multidisciplinary university-based departments of Internet Studies. Over the years, our collaboration has grown to encompass a wider range of scholars across the world who are focused on studies of the Internet and related information and communication technologies.

The founding mission of the OII was to inform and stimulate debate over the societal implications of the Internet in ways that would shape policy and practice. As this book engaged more universities and colleagues across the world, it became a joint endeavor to extend this mission beyond the OII and engage the growing field of Internet studies more broadly. This broadening of our contributions was greatly facilitated by Bill Dutton's directing the Quello Center at Michigan State University while we were developing this second edition. Bill has since returned to Oxford, but we wish to thank the Quello Center for becoming a partner in sharing this mission.

Society and the Internet arose through a lecture series that the editors organized for the OII as a means to engage undergraduate students at the University of Oxford.

It was launched with a lecture by Professor Manuel Castells, an OII Distinguished Visiting Professor at that time, on the cultures of the Internet. We are most grateful for his support and his foreword to both editions of this book.

As this series unfolded, we realized that our audience was far broader than we imagined as the lectures engaged a wide range of students, faculty, and the general public. From those who attended our lecture series or viewed our webcasts, it was apparent that there was serious interest in the societal implications of the Internet. We thank all those who came to these lectures—your participation led us to edit this collection.

We are particularly grateful to the authors contributing to this second edition. The success of the first edition led to this new edition, so we also remain indebted to all of our original contributors. Without the many authors contributing to these volumes, and their good spirit and enthusiasm in working with us as editors, this book would not have been possible.

Mark wishes to thank the Leverhulme Prize (PLP-2016-155), ESRC (ES/S00081X/1), and the European Research Council (ERC-2013-StG335716-GeoNet) for supporting his work. Bill acknowledges the Quello Center at MSU, Oxford's Global Centre for Cyber Security Capacity Building (GCSCC), and Google Inc. for supporting his research and work on this book.

We are also very grateful to several anonymous reviewers, to Barbara Ball for her brilliant copy-editing, and to Steve Russell for his evocative artwork for the cover of this and the previous edition. Our editors at Oxford University Press, including David Musson, Emma Booth, Clare Kennedy, Jenny King, Louise Larchbourne, project manager Lydia Shinoj, and their many colleagues, were professional and skilled at every stage of the process of producing this book. We could not have asked for better support.

Help to bring this book into being came from not just our colleagues and editors, but also our families. Mark and Bill wish to thank Kat and Diana for their invaluable support.

Finally, we thank those who read, work with, critique, and build on this work. Our imagined readers have been the major inspiration for this collection, and we appreciate your role in making this book a contribution to our field.

The Editors

Oxford
2019

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Introduction

William H. Dutton and Mark Graham

This chapter provides an introduction to this edited collection for all those interested in critical social aspects of the Internet and related digital media and technologies. The chapter explains the significance of multidisciplinary perspectives on the implications of the Internet in contexts ranging from everyday life to governance, and provides an overview of how the subsequent chapters address some of the big questions for study of society and the Internet.

How is society being shaped by the diffusion and increasing centrality of Internet use in government, politics, business and industry, and everyday life? This collection addresses this question through a stimulating set of readings grounded in theoretical perspectives and empirical research. It brings together research that examines significant cultural, economic, political, and other social roles of the Internet in the twenty-first century.

Contributors and topics were selected to introduce students to some of the most engaging and groundbreaking scholarship in the field. The chapters are rooted in a variety of disciplines, but all directly tackle the powerful ways in which the Internet is linked to transformations in contemporary society. This book will be the starting point for some students, but valuable to anyone with a serious interest in the economic, social, and political factors shaping the Internet and its impact on society.

Much has changed since the first edition of this book was published in 2014 (Graham and Dutton, 2014). Over a billion new Internet users have joined the global network in that time. Nevertheless, nearly half of the world's population continues to remain disconnected. Access to information and communication technologies is considered so important in some parts of the world (Costa Rica, Estonia, Finland, France, Greece, and Spain) that laws have been adopted limiting the power of the state to unreasonably restrict an individual's access. At the same time, numerous countries (such as China, Egypt, and Cameroon) have been doing the opposite: restricting access to citizens in recognition of the perceived damage that unfettered access to information and communication technologies could have on established social, economic, or political order.

These contrasting reactions are united by a recognition that the Internet matters more than ever to social, economic, and political life. For many people and organizations, day-to-day life and work without the Internet are unthinkable. Yet the Internet, the Web, and social media are relatively recent innovations, as illustrated by the frontispiece to this book. It was impossible to use Google, Baidu, or Wikipedia in order to look up information until the turn of the century. Most people couldn't use social media to connect with friends until later in the first decade of the 2000s. And it was only in the second decade of the millennium that a sense of ubiquitous connectivity became possible owing to the ready availability of smartphones. If the next two decades of Internet time are as transformative as the previous two, it is likely that many of us will be living in a very different technologically, informationally, and algorithmically mediated world.

In this future, there will be an increased need for critical and sustained inquiry into questions about the interrelationships of the Internet and society. To echo Kranzberg's (1986) First Law of Technology, the Internet is neither good nor bad; nor is it neutral. It makes some futures more viable than others, and provides affordances to help some groups more than others in struggles for resources and power. Thus, in recognition of the social, economic, and political transformations wrought on the Internet, through the Internet, and by the Internet, this second edition of *Society & the Internet* brings together leading scholars from a wide range of disciplines in order to think through how the Internet and society are co-developing and co-transforming.

As you introduce yourself to this book, you might find it useful to consider some significant questions related to access, communication, and control over the digital domain.

- How do you create, get, use, and distribute digital information? The Internet allows many people to access a world of knowledge (compared to, for instance, working at a library). However, even the wealth of content on the Internet has its own biases. Information is partial, and the algorithms that mediate our access to, and use of it necessarily mediate some choices over others. The Internet, and the data and media that it mediates, therefore shape how we move around cities, how we access news, how we interact with our friends, and how the economy is organized. Who controls what you see and don't see? How much do you know about the agendas of the people, organizations, algorithms, and machines that filter your informational diet?

- How does the Internet help introduce you to new people, as well as helping you keep in touch with old friends and associates? Are social media platforms bringing you together with friends or making it more challenging to connect with different friends in different spaces? Use of the Internet shapes who you know as well as how you communicate. How do the designs of the platforms that afford all of this communication shape what you do, where you go, and how you interact?
- How do you obtain services, from banking and shopping to entertainment, games, and public services? What is your money supporting, and how much do you know about the products and people enrolled in your digital economic transactions? Are concerns over security online changing what you do online and how you do it?
- What technologies link you to the Internet, from wired and wireless infrastructures to devices you carry with you or wear? This will not only shape what technologies you require, but also what knowhow you require to live and work in a world of digital media, and communication and information technologies?
- How is the Internet changing your workplace and your ability to get a job? Is the fact that many more jobs can be outsourced through the Internet impacting your profession? And what strategies can enhance the effectiveness of distributed collaboration, but also how are groups of workers able to collectively engage in them to prevent a race to the bottom in wages and working conditions?

Just as importantly, think of how people use the Internet to get information about you, to communicate with you, to provide you with services, and perhaps even to observe your Internet-mediated behavior. The Internet is shaping access to you, just as you employ the Internet to shape access to the world (Dutton, 1999: 4–17). Has the Internet made you feel more isolated, or more connected? More private, or more public? Empowered, or more dependent on and controlled by others?

Reconfiguring Access and the Societal Implications of the Internet

This book seeks to bring to life some of the basic ways in which digital media and technologies reconfigure your access to the world, and the world's access to you. Moreover, the chapters show how these shifting patterns of access translate into outcomes of significance to politics, governance, work, and the quality of your life and the lives of people and communities across the globe.

For nearly half a century, academics, pundits, and policymakers have speculated on the coming societal implications of the widespread diffusion of computing and telecommunications, which we have come to identify with the Internet and related digital communication and information technologies. Computer and social scientists alike have raised social issues of computing from the 1960s into the present day (Gotlieb and Borodin, 1973). Early experiments with computer-based communication and conferencing systems, such as by Starr Roxanne Hiltz (Hiltz and Turoff, 1978), and Sara Kiesler and her colleagues (Kiesler et al., 1984) began to raise key social psychological issues of computer-mediated communication in the 1970s. Broad theoretical perspectives on the societal implications of the information age were provided by Daniel Bell's (1973) concept of a post-industrial "information society," Fred Williams' (1982) "communications revolution," and later by Manuel Castells' (1996) trilogy focused on the "network society" and his later work on "communication power" (2009). These are only a few of many scholars who have speculated about the social implications of the convergence of computing and telecommunications that has since networked people through the Internet, World Wide Web, and a growing number of devices, from smartphones to wearable computing and the Internet of Things (Lanier 2013).

However, since the beginning of the twenty-first century, it has become increasingly possible to move beyond speculation and to study the actual implications of the Internet across a wide range of social, economic, and political contexts of use (Katz and Rice, 2002; Howard and Jones, 2004; Lievrouw, 2011; Nichols, 2017). Instead of anchoring research on early trials of emerging technologies, researchers can study the factors that are presently shaping the development and use of the wide range of technologies that form the Internet, how they are used, and with what effect in everyday life and work, in the creation and consumption of a wide range of cultural products, in politics and government, and in business and industries, as well as in science and the wider economy (Wellman and Haythornwaite, 2002; Hunsinger et al., 2010; and Rainie and Wellman, 2011). It is also possible to look back at the history of the technologies that define this new infrastructure of society, and the policies and regulations that have shaped its development and use (DeNardis, 2013; Hazlett, 2017).

Business and industry, governments, and academia will continue to speculate on the future of the Internet, since the range of innovations that define it will continue to fuel discussion of where the technology is headed. Topics such as artificial intelligence (AI), algorithms, machine learning, the gig economy, the Internet of Things (IoT), and big data, for example, are emerging developments that have spawned much speculation about their eventual uses and implications (Brynjolfsson and McAfee, 2014; Carr, 2015). Early trials and experiments will remain important. However, increasingly, researchers and students can draw from studies over years of actual use across many social contexts to make more empirically informed judgments about the societal implications of these technologies. The Internet has been shaping societies around the world, with over four billion people connected, and will continue to do so with billions likely to come online in the near future (Graham et al., 2018).

In short, the technology and the research communities concerned with the Internet are in a position never before possible to address how information and social networks are changing our lives. This book draws from theoretically informed analyses and empirical research to address this issue across many technologies, in many social and cultural contexts across the globe, within major arenas of use and application, and from issues of everyday life to those concerning public policy and regulation.

Don’t Take the Internet for Granted

If you are in a college or university then you are likely to take the Internet for granted as a normal part of life from the living room to the classroom and workplace. In fact, you may find it difficult to escape using the Internet in a wide variety of areas, particularly as a student, such as when preparing an assignment for a course. However, as illustrated by a selected chronological timeline of Internet innovation, the history of this technology has been one of continuing rapid innovation that is likely to continue well into the coming decades (frontispiece). Get used to this change. What you know as the Internet is likely to be transformed dramatically in the course of your lifetime.

As of 2018, more than four billion out of the world’s 7.6 billion people were using the Internet, leaving about half of the world without access. Are those without access disadvantaged? You might think for a moment that they will be free from the hassles of responding to messages and updating their profiles or being overloaded with advertising, and confused by disinformation. On further reflection, you are likely to conclude that those without access to the tools and skills required to access the Internet are truly disadvantaged in a variety of ways—often unable to effectively compete in many arenas of a digitally networked world, from completing homework to getting a job and accessing healthcare.

At the turn of the century—around the year 2000, the Internet was only emerging from what was called the dotcom bubble, named after the flop of the commercial (dotcom) rush to exploit the Web, which led to many new companies losing huge amounts of money in a very short time (Smith, 2012).

The Internet had emerged from the academic realm to enter the world stage, only to crash after the dotcom bubble burst. This led many commentators and even social scientists to view the Internet as a fad that would soon fade away (Wyatt et al., 2002). Clifford Stoll, an astronomer and author of *Silicon Snake Oil* (1995), is famously quoted in a 1995 interview as saying that the Internet was simply

> . . . not that important.[1]

But as the significance of the Internet became widely recognized, and people, businesses, governments, organizations, machines, computers, plants, animals, databases, and networks have become networked, others have wondered if we can any longer discern the difference it makes in our lives. It no longer makes sense to think of connectivity as simply affording access to some sort of "online world" or virtual community (Graham, 2013). But as the Internet is becoming more inseparably integrated into our lives, can we still unravel its implications? Could social scientists and other Internet researchers inform us about the actual implications of the Internet and also be more prescient about the future? We know that contemporary debates continue to surround the future of the Internet, but can multidisciplinary research that engages the social sciences inform our views of the future of this information and communication infrastructure and its role in societies across the globe?

In the next twenty years, many new and many enduring issues will arise around the future of the Internet. Will it fade away as new information and communication technologies (ICTs) are invented and put to use? Alternatively, will the Internet—defined broadly as a network of networks—become even more pervasive and more critical to everyday life and work? There are almost eight billion people on the planet in 2018, but the designs of digital industries for a network of sensors—an Internet of Things—anticipate networks with many billions if not nearly a trillion "things" like sensors and actuators. With the Internet of people and things generating mountains of data from searches, postings, messages, likes, and just moving through life, governments and corporations are hoping to harness these big data sources to learn more about our behavior, attitudes, and values—for better or worse?

Questions such as these about the present, past, and future illustrate the importance of understanding the role of the Internet in society, and how society is in turn shaping the Internet. That is why study of the Internet is increasing rapidly and has become a more central aspect of the curriculum of courses about communication, information, politics, and society (Dutton, 2013; Ess and Dutton, 2013; Peng et al., 2013).

[1] A transcript of the interview is available at http://blogs.mprnews.org/newscut/2012/02/the_Internet_futurist_who_thou/(accessed on August 16, 2013).

Lessons Learned for Study of the Internet

There are a number of important lessons that have been learned from decades of research on the societal implications of communication and information technologies—increasingly subsumed under broadening conceptions of an expanding Internet. The chapters in this book avoid the common faults identified by these issues, but they are valuable to keep in mind as you critically assess the contributions to research in this field.

Moving Beyond Conventional Perspectives on Technology and Society

Journalistic and much public debate about technology in general, and the Internet more specifically, revolve around three almost classic positions that remain true to this day: they are perspectives on technology as an "unalloyed blessing," or an "unmitigated curse," or "not worthy of special notice" (Mesthene, 1969). These utopian, dystopian, and dismissive views seldom, if ever, survive careful empirical scrutiny. Of course, they are basic cultural responses to the idea of technology that are real and infect everyday discussions and public policy, but they often fail to hold up to careful observation about the actual implications of technologies in real social settings—the implications are seldom so simple. It is necessary to move beyond such extreme generalizations and define exactly what expectations are tied to particular theoretical and critical perspectives on any given technology.

Challenging Taken-for-Granted Assumptions about Technology

Discussion of the Internet and related digital technologies, such as social media, is filled with taken-for-granted assumptions. Will the Internet lead to social isolation? Will it undermine higher-quality information, and replace experts with amateurs (Nichols, 2017)? Will it democratize nations or be a technology of control and surveillance (Wu, 2016)? Will it lead to new and rewarding jobs, or deskilling and an erosion in job quality coming from the pitting of workers from around the world against one another? Such conventional wisdom can often be a guide to answering important questions, but it should be challenged rather than taken for granted (Keen, 2015).

When you hear people that you know talking about the impact of digital technologies, you will find it of value to look closely at what these accounts claim and imply. What do they assume about the role of technologies in causing these impacts? What evidence do they provide, or what evidence might illuminate the actual implications of particular technologies in the specific social settings being discussed, ranging from households to boardrooms?

Throughout this book you will see excellent examples of how research can challenge expectations about the role of the Internet in society.

The Flaws of Deterministic Thinking about "Impacts": Social-Shaping Perspectives

Traditional perspectives on technology, whether utopian or dystopian, and conventional wisdom often embody technologically or socially deterministic logics. Technological determinism—at its extreme—maintains that a given technology is on a predetermined trajectory toward the one particular best way of doing something, and that this one best way will have a rationally predictable set of social consequences. For example, because the Internet can support more horizontally networked communication rather than only reinforce more traditional hierarchical systems of communication, it has been viewed as a "technology of freedom" (de Sola Pool, 1983). However, the very design of the Internet is a matter of national and international debate, for instance when governments want intermediaries like service providers to exercise greater control over certain "choke points" to resurrect more hierarchical controls over content, even as far as having a so-called "kill-switch." In addition, the ways in which technologies evolve are seldom well-described along a single path, but more often through multiple paths where selections are made based on non-technical criteria, such as the momentum behind previous choices. Furthermore, how we experience something like freedom is shaped not only by the technology, but also by such factors as where we access that technology, how we access it, and the sociocultural contexts and places from which we access the Internet (Kitchin and Dodge, 2011). As such, the impacts are never as straightforward as deterministic thinking would have us believe.

The idea that technologies, and their uses, are on an inevitable path of development and that their impacts are predictable—easily extrapolated from features designed into the technology—has been challenged so often that social scientists rarely use the term "impact," for fear of being branded technological determinists. At the opposite extreme are the social determinists who dismiss the technology as not having any impact at all since people design and respond to technologies in such open and flexible ways. As some of the leading sociologists challenging technological perspectives have argued, it is equally flawed to move into a position in which the roles of technology are not considered seriously (MacKenzie and Wajcman, 1985).

All technologies—the Internet included—are socio-technical systems in that they are designed by people and in turn shape social choices and behavior. As technologies are accepted, for example, they do contribute to defining the best way to do something, such as moving people away from pen and paper. Technological change will make some activities more difficult than before, or other activities easier to do. Think of how the speed bump in a street can regulate the speed of a car (Latour, 1999), or social media, and how it can make it easier to communicate with some people, and more difficult to communicate with others (for instance, if they have no access to the Internet, or simply refuse to use social media). Myriad examples of the biases of different communication and information technologies can be called up to illustrate that technologies do indeed matter.

Anchoring Research in Social and Institutional Contexts

In order to move beyond overly simplistic perspectives, and challenge taken-for-granted assumptions from multidisciplinary perspectives, it is critical that research is focused on particular aspects of the Internet, such as using search or social media in specific social and institutional settings. You can see that the role of the Internet in a household is altogether different from its role in a government. A household or government department in the US is likely to be significantly different than in China. As the Internet potentially affects everything, enabling so many different activities in so many contexts, the field requires ways to arrive at some cumulative set of overarching themes and conclusions. Some have approached this through metatheoretical perspectives, such as Manuel Castells' (1996) concept of the "network society" that could be extended to many social and institutional contexts. This book will not embrace any single theoretical approach, but bring a set of scholars together who are addressing key questions across a range of fields. By focusing on a number of big questions for Internet studies within and across many different contexts of use, we seek to convey the excitement and open-ended nature of this emerging field.

The Value of Multidisciplinary Perspectives

One lesson that the editors have sought to follow in compiling this volume is that study of the Internet requires a multidisciplinary perspective. Much disciplinary research seeks to develop and refine a particular theoretical perspective. In contrast, most research within Internet studies is focused on a problem, such as understanding the role of the Internet in a particular social context. Put simply, the most important issues tied to the Internet cannot be addressed from any single theoretical or disciplinary perspective. Take online voting as one example. Research on Internet voting would need to draw from political science, but would also need to understand the security issues that could undermine its credibility, so computer scientists and security researchers would have a critical input as well. Problem-driven research is inherently multidisciplinary, and this is the case for most issues facing the role of the Internet in society.

The Big Questions Driving Internet Studies

The questions driving study of the societal implications of the Internet are wide-ranging, but a few of the big questions can provide a sense of the issues at stake.

Power and Influence

A core issue of technical change since the advent of computing centers on shifts of power (Castells, 2009). Will the Internet and related digital media empower or disempower particular individuals and groups (Benkler, 2006; Stallman, 2015)? Whether as consumers or audiences in the household, as workers or bosses, as readers and producers of news, or as citizens and as activists, a promise surrounding the Internet has been to empower users to have more choice and influence vis-à-vis intermediaries, news organizations, governments, and business (Tufekci, 2017). Others maintain that the networked nature of contemporary economies means that large governments and corporations will have ever more ways of managing citizens, exploiting workers, and undermining their collective power. Workers can find themselves competing against people from around the world for jobs and beholden to "platform" companies that do not even recognize them as employees (Srnicek, 2016). This has led to some scholars not just questioning who profits and should profit from the labor produced by users and workers, but envisioning alternatives such as so-called "platform cooperatives" (Scholz, 2016). This issue of power and influence has local as well as global dimensions, instanced in issues such as whether readers can hold local news organizations and politicians more accountable, and also whether the Internet empowers Western sources of news and cultural productions—the old information order—or amplifies new sources of content production, for example in low-income countries, that find a more global audience in a new world information order.

Equality and Divides

Will the Internet contribute to an exacerbation or a reduction of socioeconomic inequalities? (Unwin, 2017; Heeks, 2018) The fact that just about half of the world has access to the Internet makes it even more apparent that the other half does not. How are non-users distributed across countries, cities, classes, races, and genders? Are digital divides possible to bridge, or will new technologies continue to exacerbate the inequalities between those who are connected and those who are disconnected? We need to understand what a lack of connectivity means for those who aren't connected. Does it mean absence from networks of knowledge, a lack of access to the right nodes in global production chains, an inability to connect with potential employers, and barriers to communication with friends and family? Related to these issues, does the Internet, as well as the associated technological infrastructures of use, impose particular norms, values, and ideals that are drawn from and are thus more conducive to usage in particular socioeconomic contexts and places (Kleine, 2013)? Will the Internet reduce or amplify any of the core issues about inequalities of access, participation, and voice that we are able to observe in almost every place and community on our planet?

Quality and Diversity

Is the Internet undermining the quality or diversity of information crucial to democratic societies? Before advances in search, for example, the Web was frequently referred to as a giant garbage dump of information. Bloggers have been castigated as rank, unknowledgeable amateurs, undermining the voices of experts (Keen, 2007; Nichols, 2017). Wikipedia articles and OpenStreetMap edits have been ridiculed for biases and inaccuracies, with untruths and misinformation potentially spreading with astonishing speed and scope through social media. However, others have viewed the Internet as a new source of information that can complement existing sources and help ensure greater accountability (Brin, 1998; Dutton, 2009; Schmidt and Cohen, 2013). It can do this both by questioning and critically discussing information sources, and by exposing potential untruths and inaccuracies to the gaze of hundreds or thousands of users through what has been dubbed "the wisdom of the crowd" (Surowiecki, 2004), even enabling new forms of scientific research (Dutton and Jeffreys, 2010; Nielsen, 2012). Beyond quality, critics have argued that the Internet and social media will cocoon users in echo chambers and filter bubbles that simply reinforce their beliefs and attitudes (Sunstein, 2017; Pariser, 2012; Graham and Zook, 2013), and become a tool for politicians and advertisers (Turow, 2011), while others see the Internet as a means of enabling people to find new and more diverse sources of information (Schmidt and Cohen, 2013; Halavais, 2018; Dutton et al., Chapter 13, this volume).

Hierarchies and Networks

Another theme tied to all social and institutional contexts is the potential for the Internet to undermine hierarchies that are supported by one-to-many networks of communication and information access (Barabási, 2003). The Internet can easily support more diverse one-to-one, many-to-one, and many-to-many networks of communication and information access. This is one idea behind the concept of a network society being ushered in by the digital age (Castells, 1996). However, others would counter that digital media is being used to shore up hierarchies and support the continuity of traditional political and economic power structures (Howard, 2010; Morozov, 2011; Fuchs and Dyer-Witheford, 2013). In the production of information and cultural artifacts, for example, the Internet is said to be undermining traditional distinctions between producers and users (former viewers and audiences) (Castells, 2009).

Are audiences being empowered, or are traditional centers of the production of information becoming even more powerful and global (Lanier, 2013)? How key is the role of users in becoming new sources of content, from posting comments to news stories to participating in collaborative citizen science projects (Nielsen, 2012)? In politics, are networks powerful structures that can move in more agile ways than hierarchies, or are they unable to take decisive action? Is the Internet advantaging networked groups and political movements, for instance in support of collective action (Castells, 2012; Tufekci, 2017)? Are businesses and economies able to benefit from the same transformative forces, such as by bypassing intermediaries and creating more direct value chains between producers and consumers, and reconfiguring the workplace to become a more distributed virtual organization (Huws, 2003)? And how do groups of workers identify and undertake appropriate networked strategies in order to improve their lives and livelihoods (Wood et al., 2018).

Identity and Community

When you can participate in local and global networks of communication, it is important to ask what exactly an identity is—how do you portray yourself across multiple digital and disconnected contexts (Castells, 2009, 2010)? Identity construction undoubtedly becomes more important as you codify various facets of yourself, such as your personal and work lives, and present them in different networks. Here it is important to ask questions not only about online versus offline identities, but rather about the ways in which identity is variably presented and enacted through a range of digital, networked, and disconnected forms and mediums. Similarly, it is important to focus ever more inquiry into the digitally augmented nature of our villages, towns, and cities (Graham et al., 2013), such as when a village, a monument, a shop, or an event is represented and defined digitally. As the Internet increasingly evolves from being a digital network that we log into, toward being an assemblage of data and infrastructures that permeates all aspects of everyday life, we need to ask what those changes mean for the ways that urban environments and communities are governed, planned, lived in, and challenged (Miller, 2007). Are we building smart cities or social deserts of our localities (S. Graham, 2004)?

Freedom of Expression and Connection

The media have long been subject to concerns over freedom of expression, most often expressed around freedom of the press, as enshrined in the First Amendment to the US Constitution, but also in many other national, regional, and global documents (Dutton et al., 2011). Increasingly, as more of our everyday life and work is conducted over the Internet, concerns over freedom of expression and other basic human rights are becoming issues around Internet policy and regulation. Examples include whether nations, Internet Service Providers (ISPs), organizations, or households should filter content on the Internet in order to protect children and various cultural, ethical, or religious sensibilities (Nash, 2013), and whether and how this is practiced (Deibert et al., 2010)? Should users be disconnected if they violate laws and regulations governing copyright or decency? What penalties are proportionate to the offense? How should we study, critique, and challenge opaque and proprietary filtering and ranking systems that increasingly shape what is visible (and invisible) on the Internet? Will the Internet be a technology of freedom, enabling more freedom of expression, or will it enable governments, corporations, and regulators to block content, and disconnect users, in ways that can have a chilling effect on freedom of expression and connection (Zheng, 2008; Dutton et al., 2011)?

Privacy and Security

Similar battles rage over privacy and security issues on the Internet. Most people support efforts to ensure their privacy—their right to be left alone and for personal information about them not to be disclosed without their permission (Dutta et al., 2011). Yet, people have long been willing to sacrifice their personal privacy in some circumstances, such as for public safety, health, or even convenience (Dutton and Meadow, 1987). Are people more trusting in providing personal information to companies in the digital age, or is the protection of privacy becoming more complicated and less manageable by individuals? Many worry about big data, social media, and the data traces left by users pursuing everyday practices, such as search, and how they might enable companies and governments to tap into the personal information of Internet users in ways that violate key privacy and data-protection principles (O'Hara and Shadbolt, 2008; Turow, 2011). Can privacy be protected in ways that enable Internet service providers to have sustainable business models, such as through advertising? Must privacy and anonymity be sacrificed to protect people from cyberbullies, trolls, or fraudsters? How will governments balance concerns over privacy against other key concerns, such as national security, and the enforcement of intellectual property rights and other law and policy?

The Social Shaping of Technology

The "social shaping of technology" has been a broad approach to science and technology studies since the 1980s (MacKenzie and Wajcman, 1985). The perspective takes the details of technology like the Internet as a focus of social inquiry. Technologies do not just spring into being, but are invented, designed, implemented, and used by people in particular social contexts. It is because these technologies matter that it is valuable to understand why they emerge and are designed and used in particular ways. Technologies are not on an inevitable path toward a one best design, as time and again less technically optimal designs often win out. Understanding the technical, economic, political, gendered, geographical, and other social factors shaping technologies can help foster better designs, more effective patterns of implementation and use, and more equitable and fair outcomes. While the focus of this volume is on the social implications of the Internet, it is taken as a given throughout this collection that technological innovation is a key focus of inquiry in all of the areas studied. The last section of the book moves this into a more central focus. What factors are shaping the futures of the Internet and its use across multiple contexts?

Internet Governance

Likewise, the development of technologies and its social implications are dramatically shaped by policy and regulations (DeNardis, 2013; Cowhey and Aronson, 2017; Hazlett, 2017). The very success of the Internet is in part due to many governments making an effort to encourage technological innovation through investment in computing and telecommunications, as well as by not regulating early innovations in computer-based telecommunications and computing. In the first decades of the twenty-first century, governments around the world are debating whether and how to best govern the Internet in the face of issues around child protection, disinformation, cybercrime, and national security, in addition to politically charged turf struggles over who governs the Internet.

While the outcome of these debates and policy initiatives around the world are uncertain, it is very clear that policy and governance issues will be increasingly important to the future of the Internet and its societal implications. To put it in the starkest terms, the continued vitality, if not very existence, of a global infrastructure for media, information, and communication services is at stake, making it critical to govern the Internet in ways that preserve its documented value to global communication while managing to grapple with many issues of safety, security, privacy, and freedom of expression that hang in the balance. Who governs the Internet? Who should govern the Internet?

Changes in policy and governance of the Internet are almost certain to follow from global controversies around who governs it. Therefore, it is important to study empirical relationships and anchor debate in what people actually do through, and on, the Internet, how the Internet and the sites that it contains are themselves designed, governed, and produced, and the social effects of technical designs that pervade our increasingly Internet-mediated world. But it is simultaneously crucial to keep a clear view of future developments in technology and policy that together can reshape the societal implications of the Internet, such as turning a potential technology of freedom into a tool of surveillance, or segmenting a global digital network into a set of national and regionally isolated domains.

Uncertain Futures

The future for each of these issues across all of the contexts we have discussed seems uncertain in light of the unpredictability of technology, policy, and users in the coming years and decades. The fact that we are in a position to study the actual role of the Internet in multiple contexts does not mean that the Internet and its use and impacts will stand still. Quite to the contrary: there are major developments around the Internet, such as big data, the gig economy, and artificial intelligence, and more, that could reconfigure many of the ways we get information, communicate with people, navigate through our cities, organize activities, and obtain services in the future (Carr, 2015; Lanier, 2013; Wu, 2016). For these reasons, it is critical that multidisciplinary research study the social shaping of technologies of the Internet, the factors shaping Internet governance and policy, and the relationships between technical change, patterns of use, and Internet governance.

Outline of this Book

This book is divided into five parts: (I) *The Internet and Everyday Life*; (II) *Digital Rights, Human Rights*; (III) *Networked Ideas, Politics, and Governance*; (IV) *Networked Businesses, Industries, and Economies*; and (V) *Technological and Regulatory Histories* *and Futures*. Each one of these parts focuses on particular contexts of use and impacts, but also remains closely interrelated to the other parts.

While each chapter can be read on its own terms, we have sought to organize the book in a way that will help readers gain a broad understanding of the range of issues and the ways they have been approached in research.

The chapters of Part I provide a foundation for the remainder of the book by focusing on how the Internet is perceived and used across a wide variety of individual users, dealing with the Internet in everyday life. A key focus of this section centers on inequalities arising from differential access to the attitudes, skills, and related technologies of the Internet. Lee Rainie and Barry Wellman (Chapter 1) offer an introduction to how people use the Internet (and to what effect) by describing results of Internet surveys. They then offer a theoretical concept of "networked individualism" to help synthesize their findings—one that counters conventional wisdom about how the Internet isolates individuals.

Communication on the Internet is distinctly different from traditional forms of mass communication in being more malleable and capable of flowing via one-to-one, one-to-many, many-to-one, and many-to-many networks. It also has generated some unique communication practices. Limor Shifman (Chapter 2) introduces one of the more captivating aspects of digital communication in describing and explaining the role of Internet memes and how they convey values and meaning in efficient ways that are open to multiple uses and interpretations. In the next contribution, from Mark Graham, Sanna Ojanperä, and Martin Dittus (Chapter 3), the authors address one of the major myths about the Internet. Far from erasing geography by enabling anyone to communicate with anyone from anywhere, their research illuminates important material manifestations of the Internet. They argue that the geographical distribution of information resources shapes both what we know and the ways that we are able to enact, produce, and reproduce social, economic, and political processes and practices—a central theme of this book.

The next three chapters of Part I illuminate some of the major ways in which use of the Internet varies across cultures of the Internet, and by age groups, and users with different levels of skill in Internet use. Bianca Reisdorf, Grant Blank, and William Dutton (Chapter 4) show that an analysis of individual differences in beliefs and attitudes toward the Internet can be used to identify distinct cultures of Internet users, which helps explain patterns of use and impact, such as why some people choose not to use the Internet. Seniors are often identified as distinctly different from youth in their attitudes toward and use of the Internet. Anabel Quan-Haase, Renwen Zhang, Barry Wellman, and Hua Wang (Chapter 5) look at older adults in Canada to empirically challenge some of the stereotypes about this group of (non)users. Age and attitudes are often intertwined with individual differences in the skills that Internet users possess. Eszter Hargittai and Maria Micheli (Chapter 6) describe the many aspects of skills relevant to Internet use, and explain how skills matter in shaping the use of this technology. They show that in contrast to prevailing stereotypes, young people are far from universally knowledgeable about digital tools and media.

Part II builds on those discussions of inequalities in access to, and use of, the Internet to focus on Internet rights and human rights. Freedom of expression is widely accepted across the world as a fundamental human right. Lisa Nakamura (Chapter 7) argues that instead of allowing a "post-racial" society to be brought into being, online games raise serious questions about the exercise of free expression owing to offensive racist and sexist comments. Nakamura notes efforts to moderate such expression, and leaves us with questions about what can be done and what can be tolerated.

Privacy, the right to protect your personal information, such as health records, from being disclosed without your permission, is another well-recognized human right that individuals, business and industry, and governments try to protect on the Internet. As data moves from a personal computer to the cloud to reside in server farms around the world, can law and policy protect it from unauthorized use? A legal scholar, Christopher Millard (Chapter 8), looks at law and policy in the European Union to show how one set of governments and regulators is seeking to protect data in the clouds. His discussion is particularly important given the influence that the European Commission's directives are having across the world.

Security is closely related to privacy, as it concerns the ability of a person, household, or organization to prevent unauthorized access, whether into a home or a computer. The Internet was originally designed to make the sharing of computer resources easy, so that computer scientists at one university, for example, could use a computer at another university. Those who designed the Internet did not necessarily foresee how the Internet would be ubiquitous and central for everyday life, for example in shopping and banking, where preventing unauthorized access is extremely important. Major initiatives across the world are aimed at helping governments, business, and industry to have greater capacity to secure data and other computer resources. These efforts, called "cybersecurity capacity-building," are described by Sadie Creese, Ruth Shillair, Maria Bada, and William Dutton (Chapter 9), who provide evidence that these initiatives can help ensure that Internet users face fewer problems.

Basic human rights—freedom of expression, privacy, and security—are connected with the degree of autonomy and agency of connected individuals. Is the Internet empowering individuals or undermining control by individuals as governments and industry gain more information and knowledge to manage the individual consumer or citizen (Stallman, 2015)? One case in point concerns large organizations that are increasingly using "big data" in order to develop attitudinal or behavioral insights. This is done through data aggregated from search, social media, and mobile phone use. Ralph Schroeder (Chapter 10) looks at contrasting theoretical perspectives on the social implications of big data, comparing Marxists who argue that big data can be exploitative to advocates of a "free market" who believe that data-driven capitalism will lead to more growth. Schroeder instead introduces a Weberian point of view and argues that big data needs neither to be seen as unquestionably positive nor to be seen as inherently exploitative.

Part III moves to the study of ideas, politics, and governance in a digitally networked world. The idea that the Internet supports more horizontal and interactive networks rather than simply top-down hierarchies within organizations and governments has led to visions of the Internet democratizing government and politics, for instance through enhancing the responsiveness of politicians to their constituencies. Social and political researchers have sought to develop theoretical and empirical perspectives on the actual implications of Internet use in a multitude of areas, from political movements and elections to political accountability in government and everyday life. Helen Margetts, Scott Hale, and Peter John (Chapter 11) have focused on how the Internet is enabling small political acts, as simple as liking a candidate, to potentially mushroom into major social movements, and the political turbulence resulting from such impacts. Their work expands traditional conceptions of political participation and shows how significant small political acts can be to understanding politics in the digital age.

After the US presidential election of 2016, and the UK's referendum on membership of the European Union, optimistic views of the Internet as enhancing democracy shifted to near panic over the potential for social media and the Internet to sow disinformation. The next three chapters address complementary aspects of this concern over disinformation. Philip Howard and Samantha Bradshaw (Chapter 12) focus on the rise of what they call "computational propaganda" (software used to automatically generate messages on social media in an effort to support a political candidate or issue), and Internet bots. The authors then discuss the responsibilities of users and platforms to protect the digital public sphere. A related fear is that the personalization of search tools, and the tendency for people to read material that confirms their pre-existing biases, will make the general public particularly susceptible to being caught in Internet filter bubbles and echo chambers. William Dutton, Bianca Reisdorf, Grant Blank, Elizabeth Dubois, and Laleah Fernandez (Chapter 13) draw from a survey of Internet users in seven nations to argue that these fears are wildly exaggerated. This focus on filter bubbles and echo chambers is built on by Silvia Majó-Vázquez and Sandra González-Bailón (Chapter 14), who designed a novel approach to tracking news consumption to explore the degree of fragmentation evidenced in the patterns of access to the news they uncover.

In Part IV, the book shifts to the role of the Internet in business, industries, and economics, generally finding patterns that challenge some of the more transformative expectations that have been linked to the Internet. Mark Graham (Chapter 15) uses a case study of the Thai silk industry to provide a critical look at the potential of the Internet to empower producers at the margins of the global economy. Instead of disintermediating production networks in ways that might benefit village-level producers, he finds a new group of intermediaries becoming the primary beneficiaries of Internet-mediated value chains (Graham, 2018). The promises of the Internet to connect users and service providers are also a common theme in the context of healthcare. Gina Neff (Chapter 16) describes some of the key promises and expectations surrounding digital health, and raises some of the issues that arise from the inequities in access to these technologies and services. Equity concerns regarding personal data lead Neff to be wary of seeing digital health as a "silver bullet."

Internet platforms are increasingly mediating much of the world's digital economy. Antonio Casilli and Julian Posada (Chapter 17) offer a critical perspective on the platforms as digital intermediaries. They show how platforms standardize and fragment labor processes, and create value from the work of users. How individuals spend their time on the Internet is a focus for Greg Taylor (Chapter 18), who argues that the attention of individual users is one of the new, scarce resources of the digital age. He shows how economic theory can be applied to understanding the scarcity of attention for thinking about the business models underlying Internet-mediated information and services. Digital platforms have also disrupted traditional practices in the ways they encourage users to share digital content, such as music, even benefit those users. Matthew David (Chapter 19) makes a strong case for what he calls a sharing economy that is enabled by the Internet. Sharing, from David's perspective, presents a serious alternative to traditional market-based mechanisms for a number of areas, but it is clear that such a shift would be disruptive of traditional practices.

Part V concludes the volume by turning to the technologies and regulatory processes that are likely to shape the future of the Internet. Chapters in this section focus on different factors driving Internet use, governance, and regulation, from national policy initiatives, such as those common in China, to concerns over children's use, technical advances, and the rise of global Internet companies.

The first contribution, by Jack Linchuan Qiu (Chapter 20), provides a historical perspective on the regulation and governance of the Internet in China. Across three phases of Internet governance in the country, the Internet has become a major infrastructure of China's growing consumer-oriented society. The model of the Chinese Internet should be of interest to anybody seeking to understand how the Internet might further balkanize from the American-led global Internet of the past.

Some of the first regulations of digital content were driven by efforts to protect children, and this motive continues to drive policy and regulatory developments. Victoria Nash (Chapter 21) has been involved in ongoing debates over children and the Internet and provides insights concerning the role of children in the politics of Internet policy and practice. In so doing she demonstrates how children have presented one of the most politically charged topics of Internet debate, and she questions whether a risk-focused public debate best serves their interests.

And technology continues to advance in ways that raise new issues for users, regulators, and policy-makers. Eli Noam (Chapter 22) looks at the history and potential futures of media consumption and distribution as video consumption moves away from linear television to new patterns of viewing. Noam raises questions about whether changes in viewing patterns could be as dramatic in the coming years as were changes wrought by the rise of television over seventy years ago. He sees major implications, not only for entertainment, but for education, politics, and other consumer and public-oriented uses of video in the next generation of television.

This potential for technical change to have implications for policy and practice is a central theme of Laura DeNardis (Chapter 23), who develops the significance of technical designs in shaping the governance of the Internet. Most people focused on Internet governance are looking at policy processes, but technical decisions, such as those made in a standard setting, can also have profound implications for issues such as privacy and freedom of expression. Increasingly, private Internet platforms are being pressed to regulate the Internet and social media. DeNardis uses this chapter to identify some of the issues raised by this privatization of regulation.

The final chapter of this reader is authored by one of the pioneers of the Internet and his colleague at Google's People Centered Internet. Vint Cerf and David Bray (Chapter 24) are well aware of the degree to which the Internet has been developing over the decades, but know that much work remains to be done. It is fitting that they tackle in this last chapter some of the "unfinished work of the Internet."

We hope this book provides a starting point for those interested in understanding some of the key interactions, overlaps, and collisions of the Internet and society. It provides an overview of some of the key questions in Internet Studies, and introduces readers to a diversity of data, methods, and approaches employed to answer them. You will see that much of this work opens up many new questions as it seeks to address others. The Internet and the practices that it mediates are constantly evolving, and constantly being reproduced in novel, contingent, and unanticipated ways. As such, Internet research needs to learn from the past, ground itself in a diversity of disciplinary perspectives, and look to the future. In doing so, it can address core questions about equality, voice, knowledge, participation, and power. It can ask what the ever-changing configurations of technology and society mean for our everyday lives. Armed with such an understanding, it is possible to address the major issues of policy and practice facing societies around the world as we seek to harness the potential of the Internet, and avoid the risks that remain very real for our networked digital information age. Visions of a hopeful, fair, and just digital future require a diversity of sound theoretical and methodological approaches in Internet research to get us there.

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1

The Internet in Daily Life

The Turn to Networked Individualism

Lee Rainie and Barry Wellman

No other information and communication technology in history has spread at the pace of the Internet. Data from the Pew Research Center and NetLab, focused on the North America, shows how the spread of digital technology has reshaped the flow of daily life, vastly expanded the personal and information boundaries of users, and transformed the way people take care of their health, learn new things, and act as citizens. While change continues, Lee Rainie and Barry Wellman discern general social trends, including a large shift from small, tight-knit, locally rooted social groups to larger, more loosely knit, and geographically expanded personal networks, which they call "networked individualism." This chapter provides an introduction into how digital innovations over the past generation have been adopted by users and how the utility of these tools is reshaping the ways people spend their time, enlighten themselves, and carry on in their daily lives.

The expansion of super-connectivity and the unprecedented rise in the production and use of digital information have transformed a host of human and organizational arrangements. This chapter concentrates on how these technologies spread through the population and describes how all this connectivity has created new kinds of social interactions and social differences. These are sometimes called "digital divides" and they affect how people function in economic and social environments in modern knowledge economies (Tsetsi and Rains, 2017; Quan-Haase, Williams, Kicevski, Elueze, and Wellman, 2018).

Just as in the past, there have been arguments in the digital age about whether changes in human and informational connectivity are beneficial or harmful to "community." It is common for analysts to worry that new technologies threaten existing community structures. Those worries have been particularly pronounced in these digital times, perhaps because there is ample evidence that social relations have changed—fewer people belong to church groups, unions, sports leagues, or social clubs in North America (Putnam, 2000; Putnam and Bridgeland, 2017). Hence, the new concern is that the shift away from tight, tribal connections is destroying communities and trust.

Such exaggerated fears have welled up recurrently since at least the eighteenth century (Hampton and Wellman, 2018). Our evidence is that there is a mixed accounting about change for good and change for ill in the digital age. This more nuanced story is still evolving. The bigger and clearer story is that three technology revolutions have shifted many people's everyday lives away from traditional families, neighborhoods, villages, and work groups, and towards more far-flung, less bounded, and diverse social networks. The Triple Revolution that pushed along these changes involved the spread of 1) broadband Internet deployment; 2) mobile connectivity; and 3) social media such as Facebook, Twitter, and Pinterest. They have produced neither a relentlessly declining social world nor a world of unceasing progress, but rather, a new environment of *"networked individualism"* where people's fragmented personal networks—cultivated by digital interactions—provide many of the same things that those traditional, tight networks provided in the past, such as sociability and support (Rainie and Wellman, 2012).

Still, there is a different character to those interactions. This change from tight social units to loose social networks has affected how people interact and meet each other's needs. Some parts of the lives of networked individuals, compared with those of their forebears, are easier and more rewarding. Some are more challenging. The balance sheet of the impacts of super-connectivity has entries on both sides of the ledger. We summarize some of the most important of them here, rather than trying to keep score about which commentators' assertions are right or wrong. The evidence shows that networked individualism is the new normal for social arrangements and produces strikingly different interactions and social divisions from those of the pre-Internet world of more tightly connected and locally rooted social groupings.

One issue making this a complicated tale is that some big forces besides those driven by the Triple Revolution have provoked the turn to networked individualism. (Although our specific discussion in the rest of this chapter pertains to North America, we believe that the general statements pertain to much of Europe and also increasingly large segments of the rest of the world.

At the same time, they do not map neatly onto Global South countries, for a variety of reasons rooted in economics and culture.) The forces we have identified include the spread of automobile and airplane travel; the lower cost of telecommunications (first phone and then computer networks); less prejudice and discrimination against women, other ethnic and racial groups, and those with different sexual orientations; the transformation of many households into networks, as both spouses leave daytime homes to work and lead distinct, if overlapping, professional and personal lives; weakened institutional ties to organized religion; and weakened national borders.

Additionally, the timeline of the ascent of networked individualism is an extended one. Even before the rise of the technological revolution in social media, a social network revolution had been underway for decades. In generations past, people usually had networks where a few important family members, close friends, neighbors, and community groups (religious institutions, organized social clubs, and the like) constituted the safety net and support system for them. In those bygone days when the main means for being in contact were communal, people walked to each other's homes (or places of business), or they sent letters or made phone calls that the entire household or business could observe.

Those structures are fading as the number of networked individuals is expanding. Individuals are becoming the central actors in social circumstances. Individuals have their own jobs, their own work-related networks, their own social and work schedules, and their own affinity groups. Most importantly, they have their own technologies. They drive separate vehicles, or find other means (such as transit) to pursue their individual ways. They connect to the Internet by separate log-on accounts and devices (rather than household phones), consume different news, enjoy different cultural experiences, and have different enrichment practices and diversions. Mobile phones are particularly individualized, with phone to ear, text to tiny screen, and apps downloaded to taste. Personal networks are built and curated in particularized ways.

To be sure, not all people are full-on networked individuals—clannish ethnic, racial, gender, class, and local tribes still exist. Yet it is safe to assume that almost all of the people in tightly bounded groups are still connected beyond their bubbles to the outside world by the Internet and mobile apps (Hochschild, 2016; MacFarquhar, 2017; Wellman, Quan-Haase and Wellman, 2019).

The Rise of the Internet

The speed and spread of the Internet and mobile devices is one of the most dramatic stories in the history of technology (McGrath, 2013). In a generation, they have become embedded into everyday life. By early 2018, eighty-eight percent of Americans were Internet users, up from six percent in 1996 (Pew Research, 1994). Almost all US adults under the age of fifty, or those with university educations, or who live in cities or suburbs, or who have household incomes of $75,000 or more are Internet users (Pew Research Internet/Broadband Fact Sheet, 2017b). Not only are most people Internet users, but seventy-three percent of US adults also subscribe to high-speed broadband at home and more at work or via libraries (Pew Research Internet/Broadband Fact Sheet, 2018a). This proliferation has vastly increased *the volume of information* coursing through their lives.

On the mobile side, by early 2018, ninety-five percent of American adults owned a mobile phone, and seventy-seven percent owned smartphones (Pew Research Mobile Fact Sheet, 2018b). Almost half of them say they cannot imagine life without their phone (Gallup, 2015). The average iPhone user unlocks her phone eighty times a day (Bajarin, 2016) while twenty percent of adult Internet users say they are online "almost constantly" and seventy-five percent are online at least once a day (Pew Research, 2015a). The widespread use of smartphones has speeded up *the velocity of information* in people's lives.

The turn to social media such as Facebook—supplanting predominantly one-to-one email, Instant Messenger (Bowman, 2017), and formal group meetings (Putnam, 2000)—has fostered a special kind of many-to-many communication in which each person maintains a series of partial, fragmented social networks. More than two-thirds (sixty-nine percent) of American adults are social-media users (Pew Research Social Media Fact Sheet, 2018c). Almost all of them use Facebook, and more than half use at least one more social-media platform such as Instagram, LinkedIn, Pinterest, or Twitter (Pew Research, 2016d). For the first time in history, networked individuals have efficient, low-cost opportunities to broadcast around the world. That has expanded the *variety of information* people can access. See Figure 1.1, which shows this data in graph form. The difficult part is getting attention, rather than producing content (see Chapter 18, this volume).

Thanks to the Triple Revolution, a staggering amount of information is shared and re-shared in digital formats. In mid-2017, statistics compiled by Domo.com showed that every minute there is an average of:

- 3.6 million Google searches
- 15.2 million text messages sent
- 103 million emails sent by spammers
- 527,000 photos shared on Snapchat
- 456,000 tweets
- 74,000 posts published on the blog site Tumblr
- 154,000 Skype calls

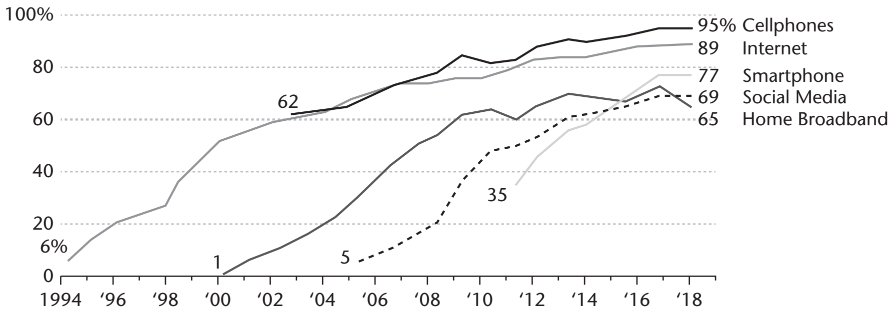

Figure 1.1. Technology adoption trends over time

- 46,000 photos posted on Instagram
- 600 new page edits on Wikipedia
- 4.1 million videos being watched on YouTube, with 300 hours of videos posted on YouTube's site every minute (Fast Company, 2015).

The breadth of activities that people pursue online regularly is so sprawling that few organizations bother to track them anymore. It is safe in most cases to assume that as people pursue connection with each other and seek information on any given topic, the Internet—and, in most cases, a search engine—is their starting point (Dutton and Blank, 2011). People use their smartphones as all-purpose information and personal enrichment devices. Fully sixty-two percent of US smartphone owners have used their devices to get health information; fifty-seven percent perform online banking tasks; forty-four percent seek material about places to live; forty-three percent look for jobs; forty percent seek government information; thirty percent use the devices to take classes or get educational content; and eighteen percent have filed job applications with them (Pew Research, 2015c). Young adults (aged eighteen to twenty-nine) are especially likely to do such things as use their smartphones for directions, recommendations, and other location-related information, listen to music, buy products, get sports information, participate in video calls, and watch videos. And mobile connectivity is rapidly becoming more available around the globe (International Telecommunications Union, 2017): China has far more mobile phone users than the United States, with its penetration rate increasing rapidly (Chen and Reese, 2015; Sun, 2017).

The Deepening of Networked Individualism

The spread of these technologies plus urbanization has created a new organizing structure for human relations. Social support often comes from wide-ranging and diversely affiliated people in fluid personal and professional networks. Such networks function in both offline and online realms, and they have become the dominant organizing social structure as the Triple Revolution has rolled out. There are several key traits of these new arrangements that are associated with networked individualism:

1. *People function more as connected individuals and less as embedded group members*. One major difference from the past is that digital media enables people to do more on their own than their ancestors could, especially when it comes to accessing information, learning about the world, finding their way around, discovering rarities, making connections with people and communities anywhere, solving problems, and expanding the information they use in their lives (Rainie and Wellman, 2012; Wang, Zhang, and Wellman, 2018). For better or worse, mobile phones make information and friends available wherever people are—and phones enable their friends to find them. Despite the intrusions of algorithms affecting what people read on newsfeeds and hear on playlists, networked individuals are more in charge of what they see and the relationships in their lives than they would be having those things handed down to them by a few newspapers, magazines, and broadcast stations.
2. *Household members act more like individuals in networks and less like members of a solidary (densely knit) family*. Each family member has his/her own mobile phone, contact list, calendar, social-media presence, and personal computer accounts. Additionally, family members use digital media to maintain relationships with non-family domains such as school and work. The formerly clear boundary between home and work in North America has become more fluid as technology enables people to perform "home" activities such as shopping and personal encounters when they are "at work" and to do work activities "at home," outside the traditional confines of the workplace (Kennedy and Wellman, 2007; Pew Research Center, Future of the Internet I, 2005).
3. *People never are self-sufficient rugged individuals*. Many meet their social, emotional, and economic needs by tapping into loosely knit networks of diverse associates rather than relying on tight connections to a relatively small number of core associates. When they have problems to solve, decisions to make, or questions that need answers, people usually turn to the relevant parts of their network for assistance (Rainie and Wellman, 2012). They do not have one sure-fire anchor community to help them with all the issues that arise in their lives. Instead, they rely on many specialized relationships to meet their needs. A typical social network might have some members who are good at meeting local logistical needs (pet-sitting, watering the plants) while others are especially

useful when medical needs arise or for providing emotional support. Still others are the folks whose political opinions carry more weight, while yet others are especially valued for giving financial advice, restaurant recommendations, or music downloads (Wang et al., 2018). And a separate group might be helpful for dealing with job-related issues.

4. *Most members of a networked individual's network do not know each other intimately or comprehensively*. In bygone days, everyone in the same village or neighborhood knew a great deal about each other's lives. In the twenty-first century, many have only casual encounters at school, or in the workplace or the supermarket, or through Facebook posts, short tweets, LinkedIn profiles, and Instagram pictures. Although such casual ties help embed people in their social milieus, their usefulness is tied more narrowly to the specific roles in the networks (that is, health guru, neighborhood helper, or tuned-in civic advisor) than as full-service, jack-of-all-aids, best friend forever (Hampton and Wellman, 2003; Small, 2017).
5. *Networked individuals have partial membership in multiple networks and rely less on permanent memberships in settled groups*. The most prominent individuals they deal with in person may have little or no visibility on Facebook or Twitter. With a social environment in flux, people must deal with frequent change in their networks. Even when contact with network members persists, their salience may ebb and flow with their prominence on Facebook posts or changes in work teams. The most successful networked individuals are jugglers of their social environment, who calculate where they can turn for different kinds of help—and what kind of help to offer others—as they occupy positions in others' networks (Wang et al., 2018). At the same time, social media makes it easier to keep in touch with—and reattach with—those from the past (Hampton, 2016, Pew Research Center, 2011).
6. *Social networks are large and diverse, thanks to the way people use digital media*. To some critics, this seems a problem. They express concern that technology creates social isolation as people rely on digital media rather than on more informative and nuanced face-to-face encounters (Hampton and Wellman, 2018). Thus newspaper columnist Douglas Cornish (2006) worried: "Will this glow [from the Internet] produce a closed generation of socially challenged individuals; humans who are more comfortable with machines than anything else?" Yet the evidence suggests that rather than social media luring people away from in-person contact, it helps users manage large, diverse, and fragmented networks (Boase and Wellman, 2006; Hampton, 2016; Wang et al., 2018). For example, one study showed that between 2002 and 2007, there was an

average increase of more than one third in the number of friends seen in person weekly (Wang and Wellman, 2010).

7. *The changing social environment is adding to people's willingness and capacity to exploit more remote relationships—both those that are physical and those that are emotional*. Social media especially helps people maintain contact where ties are weaker: with friends, relatives, workmates, far-flung acquaintances, and even neighbors with whom they are not close. While weaker, these ties often provide crucial elements of information, sociability, and support as people seek jobs, cope with health issues, make purchase decisions, and deal with bureaucracies. Most importantly, they fill out the larger social circles that give people their places in life by connecting them to the broader fabric of society. Networked individuals can function better in a complex environment because the Triple Revolution provides them with double diversity: more access to a greater variety of people, and more information from a greater variety of sources. People not only find help from close relatives and friends but also from acquaintances they hardly know (Blau, 2009; Small, 2017).
8. *Social media has become the new neighborhood*. People still value some neighbors because physical proximity remains important for everyday sociability and dealing with emergencies large and small. Yet, one Toronto study found that neighbors comprised only about ten percent of people's significant ties (Wellman and Hogan, 2006). As a result, people's social routines are different from those of their parents or grandparents. While people see their coworkers and neighbors often, most of their important contacts are with those who live elsewhere in the city, region, nation—and abroad. Social media is especially valuable for these kinds of persistent and pervasive exchanges, especially mobile phone calls and texts, Facebook, and now-traditional email. The mix of in-person contact, telephone calls, and social media allows a level of contact and information that is unprecedented in its breadth and efficiency (Hampton, 2016).
9. *Networked individuals have new powers to create media and project their voices to more extended audiences that become part of their social worlds*. Social media plays a special role for networked individuals because it is a participatory medium. Connections can ripen in important ways because social media offers so many options for interaction through emailing (unfashionable but still popular), blogging, as well as posting Facebook activities, Instagram photos, text messaging, and short tweets embellished with photos. Social media allows people to tell their stories, draw an audience, and gain assistance when they are in need (Pew

Research Center, 2011). Moreover, the act of creating is often a social, network-enhancing activity, where people work together or engage in short- and long-term dialogues—from mashed-up videos and pictures to repartee on Facebook and Twitter. To be sure, there is a digital division of labor, with a small number doing much of the creation, but many having an unprecedented voice, even if it is only commenting on a news story or a Facebook post (Graham, Straumann, and Hogan, 2015).

10. *People routinely have become broadcasters through their brief comments on review or news sites.* They can broadcast their opinions on any restaurant or news story. After people have bought a product or formed an opinion, many turn themselves into broadcasters on Yelp or Google News, commenting on the experience they have just had, rating the product they have just bought, and applying their own labeling tags. Their participation reaches those who come later and can read their material. The participatory environment provides innumerable opportunities for expanding their reach for new relationships, even among the most remote strangers. But it also expands the opportunities for mischief and worse: fourteen percent of US adults say they have passed along online information they know is fake (Pew Research Center, 2016b), and forty-one percent say they have been harassed online, including eighteen percent who have experienced physical threats, stalking, or sexual harassment (Pew Research Center, 2017c).

New Social Divisions

Not all individuals are equally networked. Some remain in small tightly bound communities of family, neighborhood, or work, while others do not have access to the social media that has amplified networked individualism (Hargittai and Dobransky, 2017). This has prompted concerns about digital inequalities (sometimes called “digital divides,” Evangelista, 1999). The earliest concerns were related to access: Those who did not use the Internet were perceived to be at a disadvantage compared to those who had access (McConnaughey and Lader, 1998). Those living in lower-income households, rural and central-city residents, Blacks and Latinos, older Americans, and some younger citizens were have-nots who could not as easily seek and apply for jobs, housing, and other services. While broadband Internet and smartphone adoption have soared since then, there are still gaps in the population that are related to income, educational attainment, rural- and inner-city residency, age, and disability status (see Table 1.1).

Table 1.1. Home broadband subscribers

% of US adults	
All online adults	73%
Men	74
Women	72
18–29	77
30–49	81
50–64	75
65+	54
Lower than high school	34
High school diploma	62
Some college	80
College+	91
Less than $30K/year	53
$30K–$49,999	71
$50K–$74,999	83
$75,000+	93
Urban	73
Suburban	76
Rural	63
White	78
Black	65
Hispanic	58

Source: Pew Research Center

Although the lack of resources is an important factor for some of those who do not use various technologies, not everyone is convinced that they want access to the Internet. The complexity of computers and smartphones can be a hindrance. The mechanics of using browsers, apps, and platforms can be confusing. The Internet's relevance and value is not apparent to those who grew up with other technologies. Many, though, changed their minds *after* they obtained access and experienced the Internet (Dutton et al., 2007). Others, though, gave combinations of reasons for not using the Internet: not seeing its usefulness, lacking digital literacy, or an inability or reluctance to afford the cost (Horrigan, 2009; Quan-Haase et al., 2018). However, such digital choices are shaped by a variety of social circumstances, such as age, income, and location. Those who advocate for narrowing digital divides therefore seek to shape these choices—changing attitudes and beliefs about the Internet (see Chapter 4, this volume).

Where the digital divide once pertained only to computers accessing the Internet, by 2016 more than a tenth of Americans relied on their smartphones for access (Pew Research, 2016c). These smartphone-dependent people are disproportionately poor, young, less educated, Black, and Latino. Although smartphones help those without home broadband to access the Internet, this group frequently encounters constraints with less reliable service, data caps, and applications with more limited abilities. Hence, those depending only on smartphones struggle to do such things as write and submit résumés to job sites, attach files to their communications, and efficiently access educational sites.

Even as digital-media use has become the norm, there are enormous variations among users in their search proficiency and search psychology; information literacy and credibility-assessing strategies; browser knowledge and Web acumen; self-presentation in social media; and insight into the processes that drive social-media platforms (Hargittai and Dobransky, 2017; Rheingold, 2012). Roughly half the US adult population shows relative unreadiness to exploit digital media (Pew Research Center, 2016a). A third of older adults in one 2017 study were reluctant or apprehensive about using digital technologies, even as they described themselves as Internet and mobile users (Quan-Haase et al., 2018).

The Future of Everyday Life with the Digital Media

In sum, the spread of digital technologies has helped shape the rise of networked individualism and all the changes that has brought to personal and group interactions. Further, these tools and the connectivity they afford have created differences in access and usage that affect social cleavages.

What does the future hold? The pace of technology change has accelerated with the spread of the Internet of Things—connected objects, appliances, and the environment. This means that the overall connectivity of people to one another and people to information will grow. A non-representative canvassing of a group of technology experts and scholars by the Pew Research Center about the trajectory of digital media showed that the vast majority of analysts canvassed think digital technology will become like electricity: mostly invisible, as it is deeply embedded in personal interactions and the physical environment (Pew Research, 2014b). This will bring more benefits and new ills. Their predictions, based on the Pew Delphi study, were of a future with:

- A global, immersive, invisible, ambient, networked computing environment built through the continued proliferation of smart sensors, cameras, software, databases, and massive data centers in a world-spanning information fabric known as the "Internet of Things."
- Augmented reality enhancements to the real-world input that people will perceive through the use of portable/wearable/implantable technologies.
- Tagging, data-basing, and intelligent analytical mapping of the physical and social realms.

- Information and interactions available anywhere.
- Surveillance of everyday activities, coupled with personalization of interactions and commerce as organizations know individuals—and what each one wants and fears.

This canvassing of experts found that they expect this will dramatically change most human interaction, and especially affect health, education, work, politics, economics, and entertainment (Pew Research, 2014b; Wellman et al., 2017). Most of these experts believe that many results of this connectivity will be positive and enable people to know more about themselves and their surroundings; take advantage of new knowledge; and lead healthier, safer, and more efficient lives.

At the same time, many foresee threats to interpersonal ethics, and increased surveillance, terror, cyberattacks, and crime. The experts worry, too, about additional societal divisions that will occur as complex digital tools spread through societies. They are also concerned about the impact of technology on jobs, many of which are threatened by continuing advances in artificial intelligence and robotics. Indeed, the entire relationship between humans and machines will be frequently renegotiated in the years to come (Pew Research Center, 2014a and 2017d).

In short, the world ahead in all likelihood brings more individualism as people gain tools to help them fend for themselves, and more networking as they connect in new ways. We noted before that the rise of networked individualism has spawned a mixed record of benefits and problems. That is what the future holds, as well. The more connections people have and the more information they can access, the more capacity they have to reach out and the more chances others have to reach them. On the positive side, more connection yields more:

- chances to learn
- possibilities for intimacy
- ways to share
- openings for social support and expressions of empathy
- chances to find others who share interests and, thus, more chances to build communities.

On the negative side, more connection yields more:

- possibilities for surveillance along with more insights about people to harvest
- hateful and angry encounters
- long-lasting arguments
- anxiety about whether users belong to a “home” community
- ways to customize sales pitches and information streams in ways that can result in filter bubbles

- pathways to attack and harass
- opportunities to exploit human credulity
- ways to form hell-bent mobs.

As technology evolves, well-meaning and destructive actors will find fresh ways to take advantage of these new realities. And they most surely will try to do so.

Acknowledgments

Beverly Wellman was a fount of useful ideas and editorial advice. The Digitech296 class of Rutgers University (led by Mary Chayko) contributed several good ideas about the transition from traditional groups to social networks. The editors helped sharpen our arguments. Thanks to Bree McEwan and Yvette Wohn for useful comments.

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2

Internet Memes and the Twofold Articulation of Values

Limor Shifman

Shifman illuminates the roles of a central cultural phenomenon in the digital age—the meme. She introduces the concept of the Internet meme, and traces the rise of memes over the past decade till they have become a prevalent mode of communication across the globe. The chapter provides insights on memes in digital communication cultures, explaining why they matter economically, socially, and politically. Shifman argues that memes are nothing less than new ways of expressing and constructing values. While there are many different kinds of memes, Shifman argues that the content of Internet memes tends to go well beyond the overt values expressly conveyed to incorporate a set of more latent, or covert, values, which are intrinsic to the significance of memes as communicative formats. Her chapter clarifies why the study of memes is an important new area for research on digital communication.

Over the past decade, Internet memes have become prevalent modes of communication around the globe. Broadly defined as groups of digital texts characterized by a shared core, Internet memes span a wide range of morphologies, functions, and domains. Memes may be verbal or visual, serious or humorous. Some memes are used for social and political purposes (e.g., #MeToo), others are associated with charity (e.g., the Ice Bucket Challenge) and some, at least at first glance, seem to be purely whimsical (e.g., LOLCats). Yet, what all Internet memes have in common is a structure of similarity with variation. For example, while the shared core of the LOLCat meme is a photo of a cat accompanied by a caption in a unique "cat-like" lingo, specific meme instances vary in the situations, emotions, and worldviews they incorporate (see Figure 2.1).

The propagation of Internet memes has yielded a growing body of scholarly work aimed at unpacking their social and cultural implications. Such works have looked into issues that relate to memes' history and definition (Burgess, 2008; Milner, 2016; Shifman, 2013; Wiggins and Bowers, 2014), their political functions in a wide range of regimes (Ekdale and Tully, 2013; Pearce, 2015), and their roles in interpersonal communication, community building, and social stratification (Miltner, 2014; Nissenbaum and Shifman, 2017). This rich body of literature helps us to address a fundamental question that has not yet been directly explored: Which types of values do Internet memes promote? The main premise guiding this chapter is that values—beliefs about the desirable that guide social actors in their assessments and behaviors—are shaped through everyday communication. Internet users reflect and construct notions concerning good and bad, desirable and condemnable, through the digital artifacts they create, share, and like. While some may reasonably argue that the values promoted by memes are as diverse as the populations creating and circulating them, I would explore the possibility that some values are intrinsic to Internet memes as forms of communication, regardless of their content.

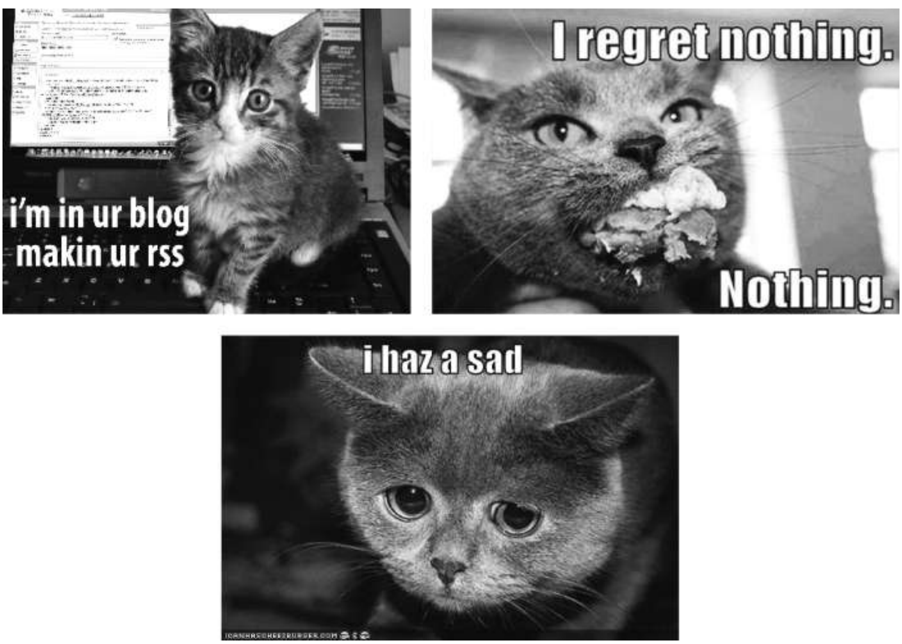

Figure 2.1. LOLCats

This chapter, first, looks backward into existing literature on memes and provides an overview of the history of the concept, explaining why memes matter economically, socially, and politically. In its second part, the chapter looks forward, offering a foray into the unexplored research trajectory of memes as vehicles for value construction. I argue that memes construct two types of values: overt values, which are expressed through memes' content, and covert values, which are intrinsic to Internet memes as communicative formats. Finally, I discuss briefly the possible implications of these meme-related values.

What are Internet Memes?

Internet memes are groups of user-generated digital units (such as texts, videos, or images) that share characteristics of content, form, and/or communicative stance. Meme instances are produced with awareness of other instances and circulated by many participants through digital networks (Shifman, 2013). Examples of memes include video-based phenomena such as Shit X Says, images such as the Situation Room, and image-texts such as First World Problems or Success Kid (see Figure 2.2 for illustrations). Milner (2016) depicted five fundamental logics governing memetic participation in contemporary social media: multimodality (expression through multiple modes of communication), reappropriation ("poaching" existing texts to create new meanings), resonance (emotional connections to groups and individuals), collectivism (social creation and transformation), and spread (network-facilitated circulation).

The meme concept was not invented in the digital age: it was coined as early as 1976 by Richard Dawkins in his book *The Selfish Gene*. Dawkins conceptualized memes as the cultural equivalents of the biological replicator, the gene. These small units of culture spread from person to person through copying and imitation, diffusing gradually (yet much faster than genes). As with their biological equivalents, the propagation of memes follows the principles of variation, competition, selection, and retention. Memetic diffusion amalgamates repetition and variation; while the repetition of the same element in various contexts is key to memes' survival, recreation needs to be flexible enough to adjust to changing circumstances. The notion of a "cultural unit" is defined very broadly in Dawkins' inaugural text to incorporate texts (e.g., "Twinkle, Twinkle, Little Star"), ideas (e.g., heaven), and practices (e.g., celebrating birthdays).

The Internet, more than any communication medium in history, has turned the propagation of memes into a ubiquitous process: memes spread more quickly, more accurately, and to a wider reach through digital networks (Marshall, 1998). Moreover, the logic of participatory culture—in which

Figure 2.2. Success Kid

content is generated from below by many participants (Jenkins et al., 2013)—resonates perfectly with Dawkins' initial conceptualization of memes as small units that scale from the micro to the macro societal level (Shifman, 2013). While user-generated pieces of content often spread just as they are in what has been depicted as processes of "virality" (Berger and Milkman, 2012), they often lure creative responses by other participants that result in the creation of memes. The prevalence of memes in digital spheres has led to the popularization of the term through its mundane vocalization by many users, subsequently followed by academic studies.

Why Do Memes Matter?

The ongoing scholarly interest in Internet memes reflects a prevalent perception that they actually matter. Rather than being simply the whimsical creations of bored teenagers, they are modes of expression that hold significant economic, social, and political power. Memes' economic power is linked to the "attention economy" (Davenport and Beck, 2001) characterizing many contemporary societies. Put simply, the concept denotes economic systems in which the most valuable resource is time or human attention. The formulation of memes is beneficial in these economies. An emulation of a famous "viral" video may get attention because it appears in YouTube's suggestions bar, which then attracts attention to the original video in a reciprocal process (Shifman, 2013). Moreover, the formulation of texts in memetic groups is important for agenda-setting, transforming random issues to phenomena covered by main media outlets. This is particularly evident in charity-oriented memes; some of these campaigns (e.g., #NoMakeupSelfie and The Ice Bucket Challenge) not only raise huge amounts of money but are also covered extensively by various news organizations (Deller and Tilton, 2015).

If the economic power of Internet memes relates to their articulation in textual groups, their social power is related to a different feature: the combination of a shared core and many distinct variations (Segev, Nissenbaum, Stolero, and Shifman, 2015). The social logic of meme creation relates to what Wellman et al. (2003) have described as "networked individualism" (Raine and Wellman, 2019). Memes enable participants to simultaneously construct their individuality and their affiliation with a larger community: circulating a self-made video or a Photoshopped image allows people to express their uniqueness, identifying them as digitally literate, sophisticated, and creative; at the same time, the text they upload relates to a common and widely shared memetic video, image, or formula.

The social function of memes is emphasized in nonsensical memes that seem to be devoid of clear "referential meaning" about the external world. Memes in which people put their heads in freezers, pose as owls, or Photoshop Nicholas Cage's face onto any given body do not make claims about reality. However, mere participation in their creation generates a sense of communal affect, described by Papacharissi (2015) as the "phatic nod" with which we signal that we are listening to someone even before we form our opinion. Digital memetic nonsense thus serves as a social glue that bonds members of phatic, image-oriented communities (Katz and Shifman, 2017).

While thus far I have discussed memes' social functions in terms of connectivity and communality, their corresponding roles include division and boundary work. Various researchers have depicted memes as expressions of a form of literacy that involves both direct knowledge of templates and a broader acquaintance with the appropriate norms of their use (Knobel and Lankshear, 2007; Milner, 2016). The "proper" use of memes marks communal belonging: one needs to follow unwritten and ever-changing conventions in order to avoid mockery and symbolic expulsion. Such boundary work can actually divide people using the same meme genres into distinct communities. For example, Miltner (2014) found three separate groups of LOLCat fans: cat lovers, Internet geeks (who admire the place of LOLCats in the grand history of Internet memes), and casual users. As with other genres, LOLCats are used to construct and maintain social boundaries.

Memes' political power stems, to a large extent, from the combination of their economic and social power. In the past few years, memes have been used extensively in a range of campaigns and rallies across the globe—from the 2011 Arab Spring to the 2016 US presidential elections—relating to politics in both its broad sense as the societal construction of power and its narrow sense as a system of governance. Such memes constitute new forms of political participation and grassroots activism. Building on Bennet and Segerberg's (2012) notion of digital "connective action," I have previously discussed the centrality of memes in linking the personal and the political in order to empower coordinated action by citizens (Shifman, 2013). As textual groups with a shared core, memes reflect both communal political opinions and the diverse voices of the individuals expressing them. Stories about the sick young woman who is unable to afford healthcare (#Wearethe99 percent) or the women sexually harassed on a bus (#MeToo or #INeverAskForIt) are framed through their communal invoking, not as personal problems, but as systemic problems at a societal level. Memes thus turn the personal into the political.

Political memes can also be analyzed as tools for collective expression and discussion. Since the creation of memes is an accessible and enjoyable route to voicing opinions, they have been used to convey a wide range of political sentiments (Milner, 2016), as will be further discussed. In nondemocratic regimes, such as China, political memes may carry an additional important meaning of anti-government protest (Rea, 2013). Extensive meme-based expressions of subversive standpoints in tightly controlled environments signal to fellow citizens that they are not alone in their opposition, possibly breaking "spirals of silence" (Noelle-Neumann, 1974) by expressing allegedly minority voices.

While memes have been thoroughly analyzed through the economic, social, and political perspectives already depicted, a fundamental prism for understanding their societal implications—the ways in which they construct values—has not yet been systematically considered.

The Articulation of Values through Internet Memes

Studying Values in Mediated Artifacts

Values have been defined as core enduring beliefs that guide the ways in which social actors behave, evaluate the world, and justify their deeds and assessments (Rokeach, 1979; Schwartz, 2012). These abstract entities function as "moral compasses" that help people to differentiate between good and bad, desirable and avoidable, admirable and condemnable. Since values function both as personal attributes held by individuals and as shared cultural and social properties, they have been studied in a variety of disciplines, including psychology, anthropology, sociology, philosophy, and political science (Hofstede, 2003).

The study of personal values has been conducted mainly within the field of psychology and investigates the ways in which values are connected to goals, motivations, and behaviors. Of the various theories developed within this tradition, the most influential is Schwartz's (1992) universal value model, which maps ten distinct values that can be found across the globe, and charts the relationships among them. Identification of the sets of values particular to collectives constitutes the core mission of the body of studies focusing on cultural values. A landmark in this tradition is Hofstede's (2003) series of cross-national studies, which yielded a system of differentiation among nations based on their combined scores on a six-axes model. A similarly ambitious mapping effort was carried out in the set of studies conducted by political scientist Inglehart (1990, 2015). Two major dimensions—traditional versus secular/rational and survival versus self-expressive—served this scholar and his colleagues as anchors for both contemporary cultural comparisons and a historical analysis of the transition from industrial to postindustrial societies.

Whereas the research on values in sociology, psychology, and political science is rich and profuse, there is much less emphasis on the concept in the field of communication. This is surprising as values spread and materialize through communication: they are formed through words, movies, and TV shows. The vast majority of studies looking at the ways values are constructed in media focus on TV advertisements. Almost all these studies use predetermined lists of values (based on the aforementioned models but sometimes with slight modification) as the basis for a code book used in quantitative content analysis. They do not aspire to construct a novel, communication-related theory of values, but build on existing theories mostly as a prism to explore culture and cultural differences. Such studies often revolve around a comparison between "Eastern" and "Western" ads, particularly the United States versus Japan, Korea, and China (Cho, Kwon, Gentry, Jun and Kropp, 1999; Mueller, 1987).

The relative marginality of the "value" concept in media studies may be partially explained by the prominence of its distant cousin, "ideology." While the relationship between the two is multifaceted and contested, a simple account would claim that ideology, at least as conceptualized in communication studies, is a *set* of values and beliefs. Ideologies are deeply entwined with social relations and power structures; dominant ideologies correspond with the interests and needs of dominant groups. For almost a decade (and definitely since the emergence of the Frankfurt School and subsequent critical schools), communication scholars have delved into questions that relate to the ideologies represented in mediated texts. Yet the emergence of social media, characterized by the fragmented flow of data from below, calls for a deeper look into the ways in which values—which are less organized and articulated social constructs than "ideologies"—are manifested in mundane acts of creative expression.

Studying values as they are expressed through user-generated content requires a new, communicative, perspective which analyzes the articulation of values in such texts as a twofold process, entailing two distinct layers. The first layer, which resembles both the study of values in other fields and previous studies of values in media artifacts, relates to content. It suggests that the values highlighted by a specific text can be inferred through an analysis of narrative, characters, and composition. The second dimension relates, not to content per se, but to the conditions and norms governing its communication, which I have previously referred to as "stance" (Shifman, 2013). Values, in this respect, pertain not to what is said but to how it is said, by whom, and to whom.

Content-Related Values: Memes as Polyvocal Expressions

The analysis of the content-related values embedded in Internet memes focuses on the direct messages that such memes convey about the principles that should govern individual and collective thought and behavior. As memes often amalgamate the personal and the political, so-called "personal values" are often entwined in these memes with what the literature has identified as cultural and political values. While not labeled explicitly as relating to values, Milner's (2016) analysis of memes as spaces of polyvocal expression may be of particular relevance to such an analysis. According to this author, memes enable the expression and negotiation of multiple opinions and identities. As demonstrated by Figure 2.3, the very same meme templates are used for opposing sides of public debates, allowing for a common ground and shared cultural language even in cases of dispute.

Milner highlighted the "We are the 99 Percent" meme and its successors as examples of such polyvocality. In 2011, the Occupy Wall Street movement attracted substantial attention to its digital and street activities. While the protests were backed by participants in prominent meme hubs (particularly Reddit and Tumblr), memes supporting the movement were followed by opposing counter-memes. One of the most prominent slogans of the campaign was "We are the 99 Percent," stressing the unbalanced

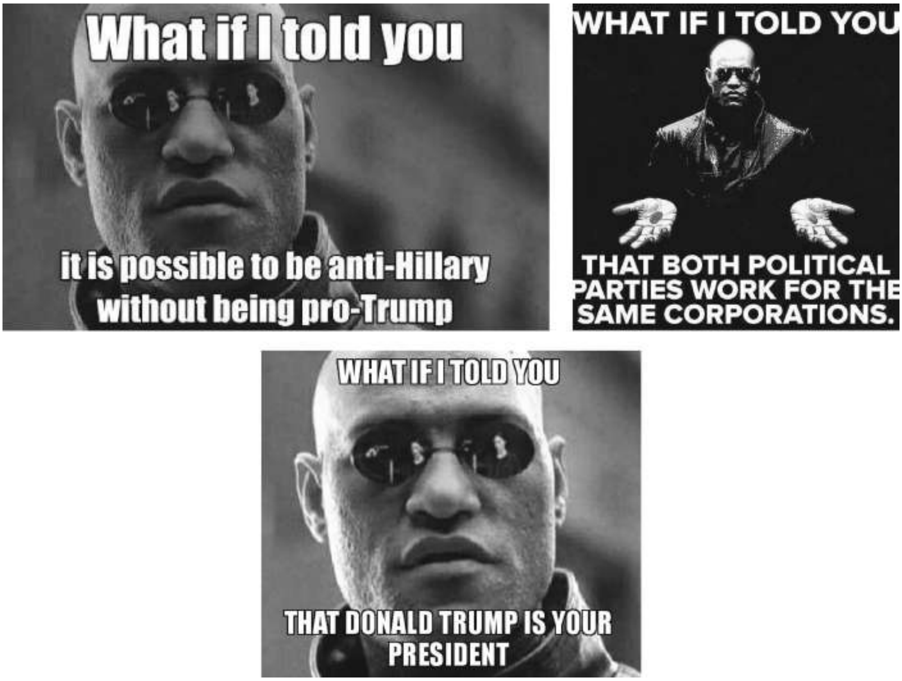

Figure 2.3. Using the same meme template to express divergent opinions

distribution of wealth in America (as the top one percent of the population controls most of the country's capital). The meme crafted around this slogan featured a person holding a handwritten text depicting a harsh personal story, culminating in the statement, "I am the 99 percent." The hardships of ordinary Americans unable to afford medication or education were vividly portrayed by meme creators as problems that are not personal in essence but generated by a flawed economic and political system. In response to the claims made in this meme, the counter-meme, "We are the 53 Percent," used the same aesthetics to make an opposing claim: if you work hard, you succeed in America. By referring to Mitt Romney's assertion from the presidential campaign that forty-seven percent of Americans do not pay taxes, this meme conveyed the message that the Occupy Wall Street protesters do not work hard enough and fail to take responsibility for their fate.

The 99 percent meme and its counter-meme reflect opposing values which can be depicted as equal opportunity versus self-reliance. In the literature about political values (e.g., Goren, Federico, and Kittilson, 2009), equal opportunity is described as "the belief that everyone should have the same chance to succeed and prosper in life," while self-reliance represents "the idea that each person should rely on individual initiative and self-discipline to get ahead" (ibid. p. 807). These values relate to political affiliation: the Democratic Party is identified with the former, while the Republican Party stresses the latter.

An examination of an array of memes from various contexts reveals a similar picture to that demonstrated in the 99 percent example, namely, that memes convey a range of values that are as diverse as the populations using them. In this specific case the articulation of values was direct, whereas in other cases the use of humor and irony complicates the task of extracting values from memes. Even in polysemic memes, however, a careful examination would result in the identification of some values (Shifman, 2016).

Memes' Communicative Values (or When Pepe the Frog and #Metoo Collide)

The assortment of content-related values reflected in memes is not unique to this form of communication. Values such as self-reliance, equality, benevolence, and power can be found in genres as far apart as soap operas and action movies. What makes memes unique is the values *they transmit about the process of communication itself*. Such values do not relate to the world per se but to the ways in which we should speak about it. In the context of mass media, for example, Kampf (2013) highlighted "informing" and "documenting" as key principles: providing information to the public and keeping tabs of politicians' deeds are valued as desirable communitive acts, almost regardless of specific conditions. Tracing such communicative values in the world of social media, which is based on constant multi-participant interaction, may be of particular significance. As detailed later in the chapter, revealing the core principles shared and constructed through the circulation of memes may provide a key for deciphering broad political, social, and cultural processes.

In order to conduct this exploratory foray into the communicative values embedded in memes, I use Jakobson's (1960) seminal model of communicative functions. Jakobson identified six fundamental functions of human communication: (a) referential communication, which is oriented toward the context or the "outside world"; (b) emotive communication, which is oriented toward the addresser and his/her emotions; (c) conative communication, which is oriented toward the addressee and available paths of actions (e.g., imperatives); (d) phatic communication, which serves to establish, prolong, or discontinue communication; (e) metalingual communication, which is used to establish mutual agreement on the code (for example, a definition); and (f) poetic communication, which focuses on the aesthetic or artistic beauty of the construction of the message itself.

Interestingly, the sharp, content-related differences between memes diminish once we examine memes in terms of their communicative values. An integrative evaluation of the body of knowledge about Internet memes (as well as a reflection of my own work in this field) yields a list of five core communicative values that are relevant to Internet memes: authenticity, creativity, communal loyalty, freedom of information, and expressive egalitarianism. These values characterize both alt-right memes such as "Pepe the Frog" and left-wing and feminist memes such as "#MeToo." As detailed later in the chapter, each of these values is associated with one of Jakobson's communicative functions and, maybe more importantly, seems to contradict other values prevalent in Western societies.

Authenticity is perhaps the most fundamental value expressed by Internet memes (and many other forms of user-generated content). Memes tend to combine "external" and "internal" modes of authenticity (Shifman, 2018). While external authenticity refers to scientific notions of "objective" truth and facts (and is reflected in evidence-based memes such as #MeToo which aggregate testimonies about reality), the notion of internal authenticity is murkier. It relates, not to the correspondence between a certain utterance and the external world, but to the connection between a statement and some kind of core inner essence (Handler, 1986). Memes are expected to reflect these intrinsic cores—to express the emotions, experiences, hopes, and fears of unique individuals. In Jakobson's terms, the value of authenticity is closely interwoven with the emotive function that focuses on the addresser. This intimate association between Internet memes and the sender's inner world distances memes from old values of truthfulness that valorize scientific objectivity.

Another fundamental value highlighted by memes is creativity. Broadly defined as "any act, idea, or product that changes an existing domain, or that transforms an existing domain into a new one" (Csikszentmihalyi, 1996: 27), creativity is a guiding principle of memetic participation. Every person who contributes to a meme-based discourse must transform an existing text in an original (and perhaps "authentic") way. Creativity in meme creation is connected to Jakobson's poetic function in the sense that it relates to the forms that memes take. Interestingly though, being creative does not mean creating "beautiful" or aesthetic content. Douglas (2014) illuminated how Internet culture in general and meme culture in particular valorize what he terms "Internet Ugly"—an aesthetic style that purposefully highlights the sloppy and amateurish. Using techniques such as "digital puppetry, scanned drawings, poor grammar and spelling, human-made glitches, and rough photo manipulation" (p. 315), participants counter prevailing norms of beauty, and thus position themselves in opposition to mass-mediated commercial culture. Moreover, this creative ugliness is related to memes' core value of freedom of information (see below); in other words, any idea or content that people find of value should be distributed, even if its packaging is far from perfect.

However, creativity, as expressed in Internet memes, is not unlimited. It is mitigated by another core value of Internet memes—loyalty. Each meme instance needs to be loyal to both its creator (as reflected in the value of authenticity) and the broader community within whose realms the meme is created. This type of loyalty differs from what the literature on values defines as conformity. While in the latter (e.g., Schwartz, 2012), conformity is associated with authority and tradition, in meme culture toeing the community line is constructed as an act of personal choice which is renegotiated with every performative discursive contribution. As such, loyalty has an important phatic function: it is used as a marker of connectivity to a particular group.

The fourth value which underscores meme culture can be defined broadly as freedom of information. According to this principle, information is defined by users as a public good that should be distributed without limitation (for a problematization of this notion, see Rafaeli and Raban, 2005). "Information," in this respect, includes what Jakobson would depict as referential knowledge about the world, as well as emotive accounts about oneself. The imperative to spread information is reflected in the rise of sharing as a constitutive act and keyword in digital environments (John, 2016)—users of social media are expected to constantly share their thoughts and experiences with others. In the world of memes, freedom of information is reflected not only in the limitless range of issues addressed by memes, but also in the many types of meme genres which translate individual acts into public information. For example, the meme Manspreading is a form of feminist-activist "digilantism" (i.e., Internet vigilantism) in which men who are seen sitting in public transport with their legs spread wide in a way which fills multiple seats are photographed and tagged as being involved in sexist microaggression (Jane, 2017). Since anything that someone does (particularly in public) is legitimate as meme material, this type of information freedom conflicts with the veteran value of privacy.

Finally, Internet memes celebrate expressive egalitarianism. The essence of this value relates to freedom of expression; participants in social-media-based discourse are expected to vocalize their thoughts and opinions regardless of their sociocultural status, political affiliation, or gender. This is not to be confused with equality in its broad meaning. While not all memes promote equality in the sense of equal distribution of resources (as depicted above in the "We are the 53 Percent" example), they are all based on the notion that the right to create memes is universal. As such, this value is again related intrinsically to the emotive, speaker-centered, communicative function.

The five core communicative meme-related values—authenticity, creativity, communal loyalty, freedom of information, and expressive egalitarianism—share two fundamental features. First, their evaluation in light of Jakobson's model reveals that these values focus on the speaker, the community to which s/he speaks, and the phatic connection between the two. Simply put, meme-related values are essentially about the construction and expression of individual–group relationships. Second, the values expressed by memes subvert prevalent values of beauty, conformity, privacy, and truthfulness. Taken together, this new set of aesthetic and performative values valorizes the right, and perhaps even the obligation, to communicate, even if what one has to say is crude, embarrassing, or unpolished.

The implications of this emergent world of values are yet to be studied. However, what seems to be clear, even at this early stage, is that the analysis of seemingly trivial forms of communication, such as Internet memes, may help to produce a deeper understanding of broad social, cultural, and political issues. The set of values depicted in this chapter—which is shared across "#MeToo" and "Papa Frog" distributors—may allow for a move away from veteran all-embracing ideological dichotomies (such as conservatives vs. liberals) to expose core principles shared by groups who are, at face value, completely disparate. Moreover, since what happens in the digital memetic sphere never stays only in this sphere, the implications of the prominence of this set of values may be far-reaching. Thus, for instance, signifying "authenticity" by using a crude, amateur-like style and blunt content, and communicating in a constant, almost compulsive, manner, are the trademarks of some of this era's most successful political leaders. While digital communication cannot fully explain the rise of these figures, the congruency between the values they represent and those constructed in memetic spheres merits further study and reflection.

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3

Internet Geographies

Data Shadows and Digital Divisions of Labor

Mark Graham, Sanna Ojanperä, and Martin Dittus

From the earliest stages of computer-mediated communication, technical change was predicted to undermine the significance of geography and lead to the "death of distance." This seemed a logical consequence of electronic media enabling people to communicate from anywhere, to anyone, and anytime. However, empirical research, such as that illustrated in this chapter, has challenged this view. The authors argue that the Internet augments everyday places. As such, much like material geographies, the Internet can be spatially mapped. In doing so, the authors uncover significant geographic inequalities that shape how we use, move through, and interact with the world.

> All my characters were white and blue-eyed, they played in the snow, they ate apples, and they talked a lot about the weather, how lovely it was that the sun had come out. Now, this was despite the fact that I lived in Nigeria. I had never been outside Nigeria. We didn't have snow, we ate mangoes, and we never talked about the weather, because there was no need to. My characters also drank a lot of ginger beer because the characters in the British books I read drank ginger beer.
>
> Adichie, 2009

Introduction

The Internet is not an amorphous, spaceless, and placeless cloud. It is characterized by distinct geographies. Internet users, servers, websites, scripts, and even bits of information all exist somewhere. This chapter focuses on those geographies. It begins by discussing why Internet and information geographies matter and how they influence our everyday lives. It focuses on two important facets of Internet geographies, which might be called:

- *Data shadows*: the layers of digital information about places (see Graham, 2010).
- *Digital divisions of labor*: the distinct and uneven geographies of the production of digital information (see Graham, 2013).

The data shadows of our material cities, towns, and villages, and the digital divisions of labor that produce them shape more than just the content of a few popular websites. These geographies of information shape both what we know and the ways that we are able to enact, produce, and reproduce social, economic, and political processes and practices.

The chapter then moves to a discussion of some of the most significant geographies of digital connectivity (i.e., the Internet) and how they are changing in the twenty-first century. By 2017 the Internet was used by over 3.6 billion people around the world (International Telecommunication Union, 2018). The fact that so few parts of the world are not connected and about half of the world's population are Internet users (International Telecommunication Union, 2017) means that there is both a figurative and a literal space for more locally relevant information to be produced about much of the world.

Finally, the chapter explores some of the mappable data shadows and digital divisions of labor that we can observe across much of our planet, asking what people and places are left out of the digital and material augmentations that we produce and reproduce. Even in an age of almost ubiquitous potential connectivity, online voice, representation, and participation remain highly uneven. The chapter then ends by asking why in this hyper-connected world, so many people are still left out of global networks, debates, and conversations. It is ultimately important to understand that the linguistic, cultural, political, and economic processes and barriers that shape many contemporary data shadows and digital divisions of labor cannot simply be transcended by the Internet alone.

Augmented Realities

> We shape our tools, and thereafter our tools shape us.
>
> McLuhan, 2001: xi

The authorial and geographic biases in information shape not just what we know and do, but also what we are able to know and do. We see this with representations of markets (MacKenzie, 2009), economic flows (Ouma, Boeckler, and Lindner, 2012), tourism, and many other facets of life. In short, geographic information is implicated in how we produce space (Graham, Zook, and Boulton, 2012; Pierce et al., 2010). It is therefore important to begin to understand both the geographies of information (or *data shadows*) and the geographies of the production of that information (or *digital divisions of labor*). However, before discussing contemporary information geographies, it is instructive to explore older patterns and their geographic inequalities.

First, on the topic of information geographies, it is useful to begin with a look at historical maps because they illustrate some of the geographic limitations to knowledge transmission. Traditionally, information and knowledge about the world have been highly geographically constrained. The transmission of information required either the movement of people or media capable of communicating that knowledge. We see this if we look at the world's oldest surviving navigational chart: a map from the thirteenth century called the *Carta Pisana* (you can see a detailed reproduction of the map at http://en.wikipedia.org/wiki/Carta_Pisana). The *Carta Pisana* was produced somewhere on the Italian peninsula, depicts relatively accurate information about the Mediterranean, less accurate information about the fringes of Europe, and no information about any other, more distant parts of the world.

This example starkly illustrates some of the constraints placed on knowledge by distance. Thirteenth-century transportation and communication technologies (in other words, ships and books) allowed some of the constraints of distance to be overcome by the map's Italian cartographers. But in the thirteenth century those technologies were not effective enough to allow detailed knowledge about the Americas, East Asia, and much of the rest of the world to be represented on the map. Until this day, the design and development of many technologies follow predominantly Western traditions, and forms of knowledge and practice rooted in other traditions are often marginalized, resulting in technological monocultures (Irani et al., 2010).

Second, on the topic of information production, it is important to note that not only have some parts of the world traditionally been left off the map, but some parts of the world produce far more codified and transmittable knowledge than others, bringing into being and reproducing powerful forms of "knowledge dependence" (Ya'u, 2005 in Carmody, 2012). If we look at present-day patterns of the geographies of information and knowledge, we see some very uneven trends. For instance, if you examine the geographies of academic publishing in the map in Figure 3.1 you can see that outside of North America and Western Europe, most of the world scarcely shows up in these rankings. One of the starkest contrasts is that there are more than twenty

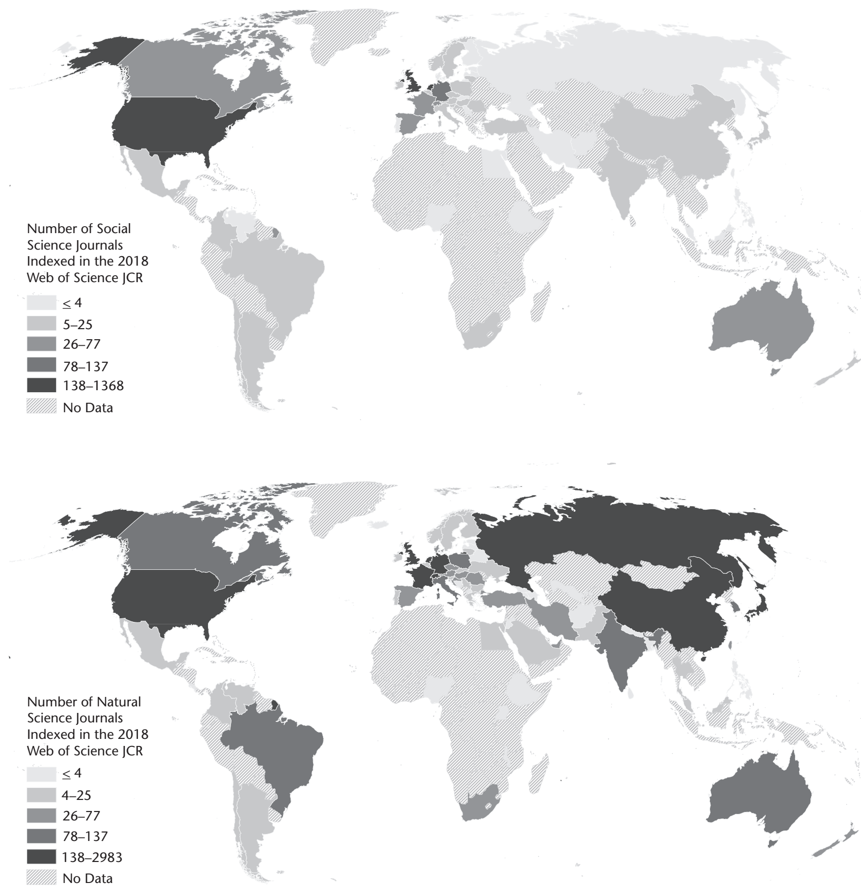

Figure 3.1. The location of academic knowledge

times as many natural science journals and ten times as many social science journals in the Netherlands (which admittedly is the home of many major global publishers) as there are in the entire continent of Africa. We therefore see a stark form of knowledge dependence.

The problem is that these two types of information inequality (information geographies and information production) can potentially start to reinforce each other as information and physical places become increasingly intertwined. This is because the networked, iterative, and relational ways in which we experience everyday life and produce space is increasingly experienced in conjunction with, produced by, and mediated by digital and coded information (Pierce et al., 2010). These intersections between the material and the digital are often so intertwined and so codependent that they are rendered invisible.

Following Wright's (1947) presidential address to the Association of American Geographers on "Terrae Incognitae" and the potentially uneven geographies of knowledge, it is important to examine the ways in which virtual representations of place are implicated in the ways that we produce and experience places as augmented realities. The term *augmented realities* here is used to describe "the indeterminate, unstable, context dependent and multiple realities brought into being through the subjective coming-togethers in time and space of material and virtual experience" (Graham et al., 2012; Graham and Zook, 2013).[1] In other words, think of *augmented realities* not as something you experience with a futuristic-looking headset over your face, but rather as the layers of digital code and content that infuse your everyday landscapes.

When talking about the coming-togethers of information and place, it is important to point out that geographical knowledge—whether by design or by the unintended consequences—has always been associated with power (Driver, 1992). Representations of space entail power-laden stabilizations of understanding (Pickles, 2004), and absences and silences in representations of place "are more than simply 'blank spaces' on maps, but are integral and deliberate parts of map construction" (Brunn and Wilson, 2013). In other words, representations of place are never neutral or objective and are always created in order to serve particular purposes (Harley, 1988; Crampton, 2001). Representations (and augmentations) of places therefore have, and can exert, power. As Harley argues: "Once embedded in the published text the lines on the map acquire an authority that may be hard to dislodge. Maps are authoritarian images. Without our being aware of it maps can reinforce and legitimate the status quo" (1989: p. 14).

It is also important to realize that while places can always be characterized by relatively fixed and sedimented social relations and structures, augmented places remain bundles of space–time trajectories that have no homogeneous identity or ontological security (i.e., objectivity fixity and stability) (Massey, 1994; Pierce et al., 2010; and Kitchin and Dodge, 2007). In other words, augmented realities are not immutable mobiles: they are always "of-the-moment, brought into being through practices (embodied, social, technical), *always* remade every time they are engaged with" (Kitchin and Dodge, 2007: 335). So, geospatial content enacted in augmented realities is necessarily spatially, temporally, and personally context-dependent.

Ultimately, the uneven geographies of information that we've seen can all shape what is known and what can be known, which in turn influences the myriad ways in which knowledge is produced, reproduced, enacted, and re-enacted. It is not just Italian navigational maps from the Middle Ages that display such uneven patterns. Almost all mediums of information (e.g., book

[1] This is in contrast to Castells' (1989) assertion that information technologies are causing many places to become increasingly meaningless.

publishing, newspaper publications, and patents) in the early twenty-first century are still characterized by huge geographic inequalities: with the Global North producing, consuming, and controlling much of the world's codified knowledge, and the Global South largely left out of these processes. This is a fact that only increases the importance of information created in the world's cores, and reinforces what Manuel Castells (1998) refers to as the black holes of informational capitalism that make it difficult for the South to be competitive in the markets for any advanced services.

But, as we increasingly engage with the practices of technology and information usage that we've just described, in which we're augmenting our material worlds with digital content, there is undoubtedly a literal and metaphorical space for more locally relevant information about all of the rest of the world. The remainder of this chapter, therefore, turns to a closer examination, both of where augmented digital content is produced, and of who is producing it. It does this with a particular focus on how ICTs might enable new geographies of knowledge in and about some of the world's most disadvantaged places.

Internet Geographies

Before talking about the geographies of online information, it is useful to first review some of the patterns of Internet use and Internet infrastructure. As recently as 2002, there were only 6 million Internet users in all of Sub-Saharan Africa, and only 16 million in India (compared to 481 million in 2017 (Internet and Mobile Association of India (IAMAI) and KANTAR-IMRB, 2018). A lot of this dramatic unevenness in Internet use came about because of the actual geographies of Internet infrastructure. Some parts of the world simply lacked the physical connections necessary to be well connected to the global grid. In 2009, for instance, not only were some parts of the world much better connected than others, but some parts simply weren't connected at all (East Africa, for instance, was one of the last parts of the world to acquire any fibre-optic cables connecting it to the wider world). This lack of fibre-optic connectivity meant that Internet access was significantly slower and much more expensive than access in much of the rest of the world.

However, only a few years later, many of these infrastructural constraints have been addressed, and there are only a few remaining parts of the planet absent from the global grid of connectivity. We have thus seen concomitant changes in the geographies of Internet use over time. Internet penetration and mobile growth rates in poor countries are impressive. For the first time in history, we are approaching a state in which a majority of human beings have an ability to communicate or access information non-proximately.

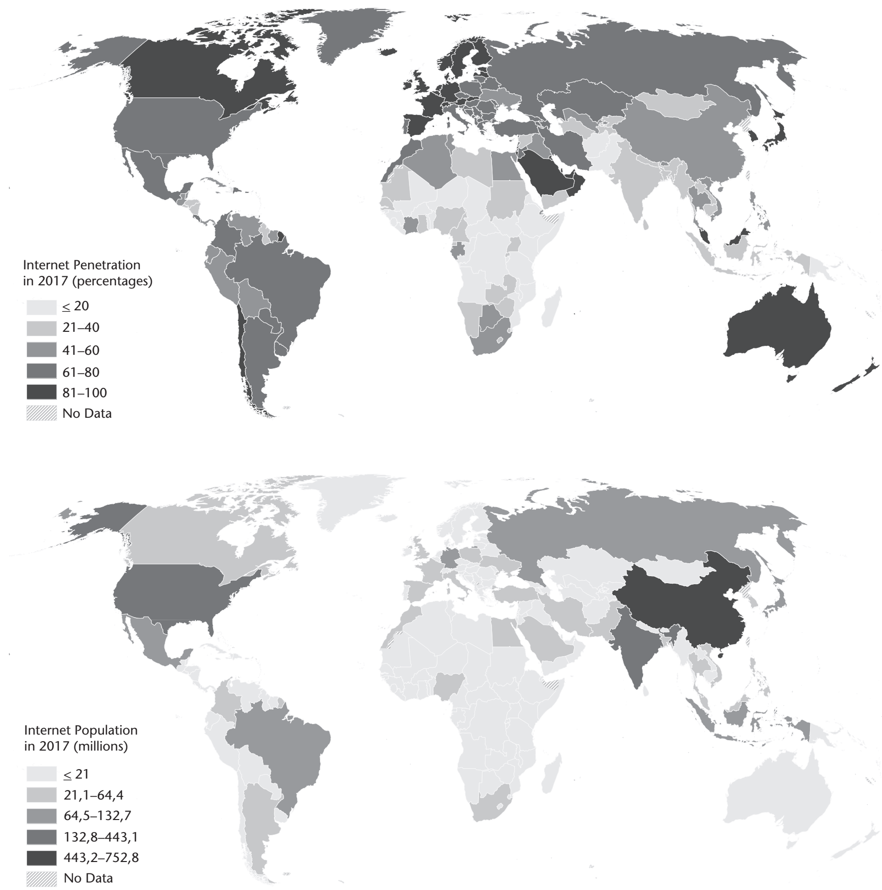

Figure 3.2. Internet penetration

At the end of 2017, there were 7.7 billion mobile connections globally (International Telecommunication Union, 2018), meaning that virtually all of humanity is connected in some way.[2] There are also over three and a half billion people who are Internet users (this is shown in more detail in Figure 3.2). While the geographies of Internet access are still very uneven, we nevertheless see that a majority of Internet users live in poor countries. China, for instance, despite its lower penetration rate, has the world's largest population of Internet users. In 2017, Africa had 213 million users (which is more Internet users than the online populations of the UK and France

[2] The actual figure is likely somewhat lower due to the fact that a significant number of people have more than one connection. However, there are also many cases of multiple people sharing the same connection.

combined) (International Telecommunication Union, 2018). However, as Figure 3.3 illustrates, whereas Internet penetration is high in places such as France and the UK (meaning that almost everyone is connected), many African countries continue to have extremely low penetration rates.

Being connected can potentially mean a lot of things to the world's poor (Marker et al., 2002). The free flow of information through the Internet is often seen as a "great equalizer" (Best and Maier, 2007), and many voices in policy and business circles attribute positive, widespread, and transformational impact to digital connectivity (Friederici, Ojanperä, and Graham, 2017). In other words, by allowing people to take advantage of economic, political, and social opportunities, improved connectivity can help empower these capabilities (Sen, 1999). The planet's changing connectivity is also seen as central to providing what the World Bank deems to be the missing link (i.e., knowledge) to the Global South (World Bank, 1999 in Kleine, 2013). These sentiments were echoed in a 2012 speech given by the secretary-general of the International Telecommunication Union, Hamadoun Touré.[3] He noted that once the world's disconnected are connected, then "all the world's citizens will have the potential to access unlimited knowledge, to express themselves freely, and to contribute to and enjoy the benefits of the knowledge society."

Touré's idea is a powerful one, and deserves further scrutiny. An important question to ask is whether the level of Internet use, 662 million in the Americas, 213 million in Africa, and 1.8 billion in Asia and the Pacific in 2018 means that people are using this new connectivity to address many of the informational inequalities that have characterized modern media (International Telecommunication Union, 2018).[4] Are all of these relatively new users represented by relevant information? Are they able to access the information they need? Are they contributing to global discussions that are taking place?

Because of the increasing amount of Internet access we're seeing around the world, with over two billion people online in 2018, and theoretically low barriers to entry, we need to then ask whether the Internet has enabled new, and maybe less uneven, geographies of knowledge. Has it given space for information produced about the Global South and for information produced by people in the Global South?

[3] Dr Hamadoun I. Touré, secretary-general of the International Telecommunication Union, November 2012.

[4] Because the geographies of traditional media have traditionally been characterized by such stark core-periphery patterns (Norris, 2001), the spread of new telecommunications technologies and ICT-mediated practices has thus far only increased inequalities by disproportionately benefiting the already privileged and powerful (Forestier et al., 2002 in Carmody, 2012).

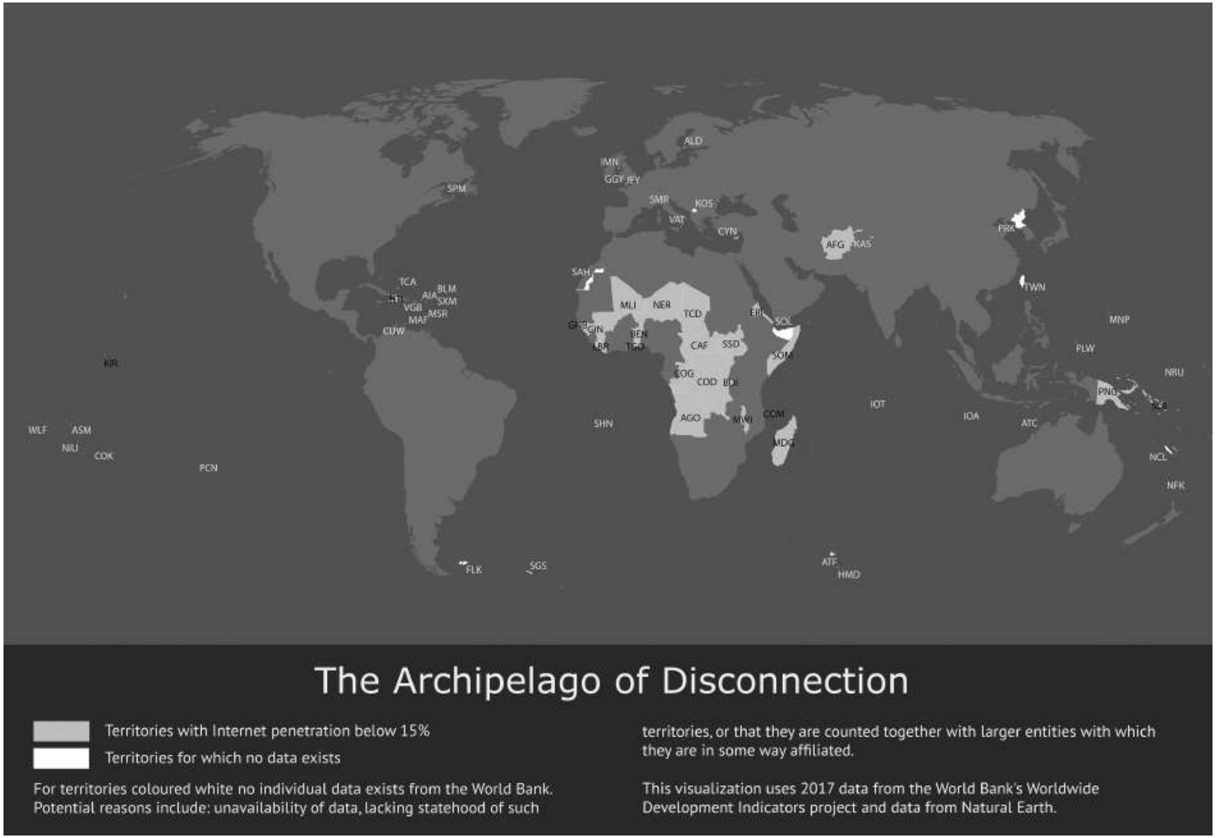

Figure 3.3. Archipelago of disconnection

Data Shadows and Digital Divisions of Labor

The obvious place to start is to begin by looking at where these new layers of information[5] are. Figure 3.4 displays a measure of the online content that people are creating about anywhere on Earth and that gets indexed by Google Maps. In other words, it is a measure of what Google knows about the world (and, in turn, what we are able to know about the world by using Google as an intermediary) (for more information about the methods employed to collect this data, see Graham and Zook, 2011). Looking at the map, we get an indication of the massive amount of unevenness in these layers of information that surround us. Dense clouds of information exist over some parts of the world and very little over other places.

Norway has the most content per person, with 434 indexed places per 1,000 people in the country. The rest of Scandinavia and most of Europe and North America also have high levels of content per person. If we move to the bottom of the list we see Afghanistan, which has only 1 indexed place for every 33,000 people in the country. Maybe even more surprising is the fact that there is more indexed content layered over the Tokyo metropolitan region than in the entire content of Africa.[6]

It is also important to note that Figure 3.4 only displays an aggregate count of content in all languages. In order to get a better sense of who is able to read and make use of this content, we can also explore the relative amount of content produced about the same places in different languages. Figure 3.5, for instance, compares Flemish and French content indexed by Google Maps about Belgium (a full description of methods can be found in Graham and Zook, 2013).

A dark dot on the map indicates that there is more French content than Flemish content about that particular place, while a lighter dot indicates that there is more Flemish content than French content. What we see is that the map very closely reflects "offline" geolinguistic practices—with its pattern almost perfectly mirroring the divisions between Flemish-speaking Flanders and French-speaking Wallonia. We can see similar patterns in much of the rest of the world (e.g., in Eastern Canada there is generally more French-language content about Quebec and more English-language content about Ontario.)

However, this geolinguistic mirroring that we see breaks down when we look at parts of the world in which there are more unbalanced power dynamics between different linguistic groups. If we perform a similar analysis of

[5] *Information* is generally used to refer to codified descriptions that can answer questions such as "who," "what," "where," and "why." *Knowledge*, in contrast, usually refers to the structuring, processing, organizing, or internalization of information (e.g., see Habermas, 1978).

[6] This is a fact reminiscent of statistics from the 1990s demonstrating that there were more landline telephones in Tokyo than in all of Sub-Saharan Africa combined (e.g., see Carmody, 2012).

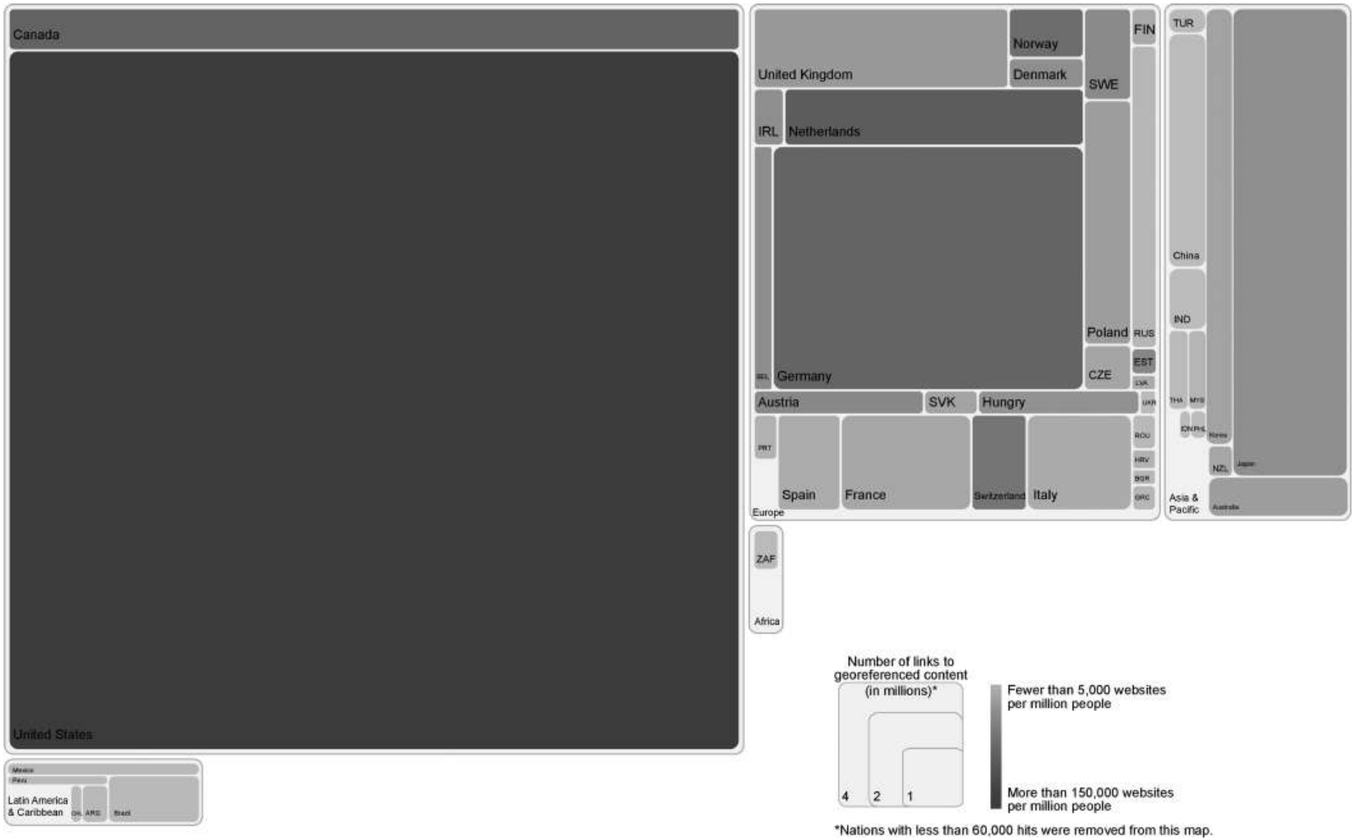

Figure 3.4. Content indexed in Google Maps

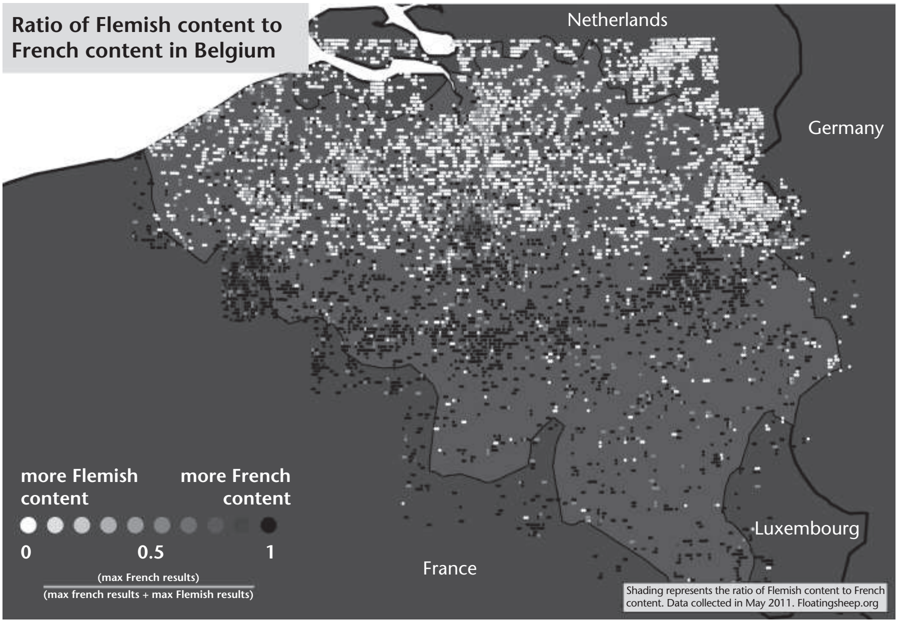

Figure 3.5. Ratio of Flemish to French content in Google Maps

Israel and the Palestinian territories (see Figure 3.6), then we see that while Arabic and Hebrew content tends to annotate the same physical places, there is a much denser cloud of Hebrew content over almost all of those places. The last three maps have shown us that not only is there a paucity of online information about many of the world's economic peripheries, but of the information that exists, much of it remains inaccessible to many people. This matters, because these digital representations can start to define and become part of the augmentations of place.

However, we haven't yet looked at the geographies of explicitly user-generated content on the Internet. Doing so can give us a better sense of what a broader segment of Internet users want to create content about (in contrast to what a large company creates content about). Arguably, the largest, most used, and most influential single Web platform on which people are creating layers of information about our planet is Wikipedia.

Wikipedia is by far the world's biggest and most used encyclopedia, and in August 2018, the text of the English Wikipedia was equivalent to 2,700 volumes of the *Encyclopedia Britannica* (Wikipedia Contributors, 2018b). On any given day, 15 percent of all Internet users access it (*The Economist*, 2014). It exists in over 300 languages; 60 of those language versions have over 100,000 articles, and the English one alone contains close to six million (Wikipedia Contributors, 2018c). In Figure 3.7 the shading of the countries indicates the

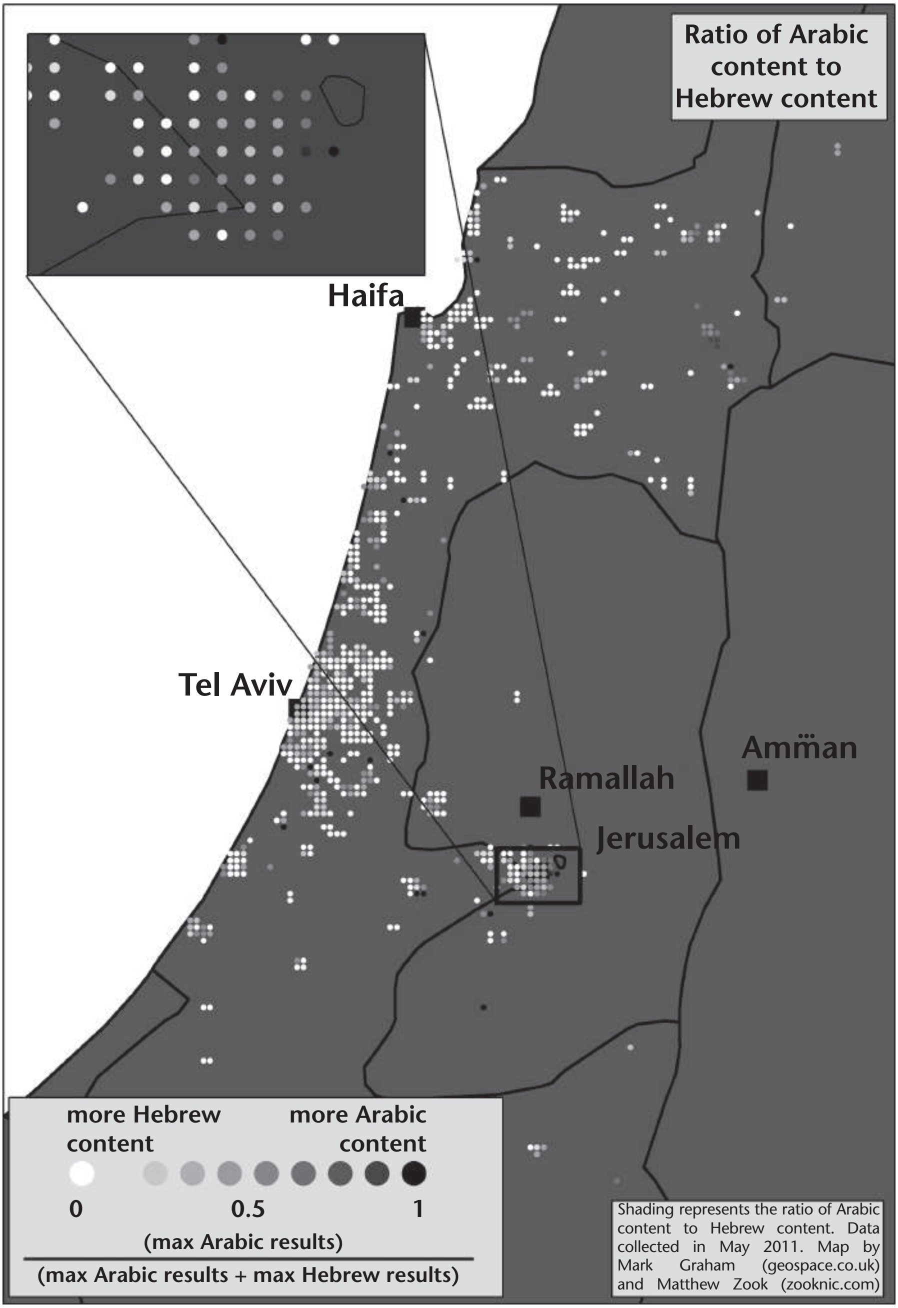

Figure 3.6. Ratio of Arabic to Hebrew content in Google Maps

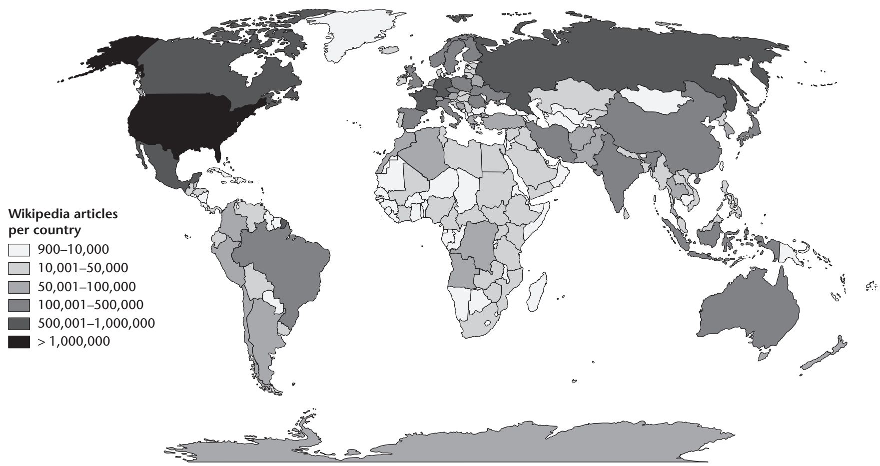

Figure 3.7. A map of Wikipedia

total number of Wikipedia articles written about each country (i.e., articles about cities, battles, parks, festivals, monuments, buildings, etc.).

We can see that representations within the platform are also highly uneven. Some parts of the world are characterized by highly dense virtual representations, while others are barely represented at all. The relative absence of Africa is again quite notable here. Africa has almost twice the population of Europe, and yet only fifteen percent the number of articles. Maybe even more shocking is the fact that there are more articles written about Antarctica than most countries in Africa, and many in Latin America and Asia.

Figure 3.8 displays the number of articles per person in each country (with dark shades representing more articles per person and lighter shades indicating fewer per person). We see that Europe, in particular, has a lot written about it on a per-capita basis. Most of Africa, Asia, and South America, in contrast, is characterized by only a small number of articles per person. Although one of Wikipedia's mottos is "to contain the sum of human knowledge," we see that we are far from that important goal. Uneven data shadows of places exist, not just in Wikipedia and Google, but also in all other important Internet platforms of information (e.g., OpenStreetMap, Twitter, Flickr, etc.).

Importantly, we are able to see clearly that not only are there uneven data shadows over much of the world, but that these data shadows are produced in uneven ways. Figure 3.9, for instance, displays the number of average monthly Wikipedia edits that emanated from each country in 2014. We see distinct digital divisions of labor. Africa, for instance, produces only a small amount of the content in Wikipedia (the entire continent combined has slightly fewer edits than the Netherlands, and only seven percent of the edits that emanate from the US). Unbalanced digital divisions of labor exist in other parts of the

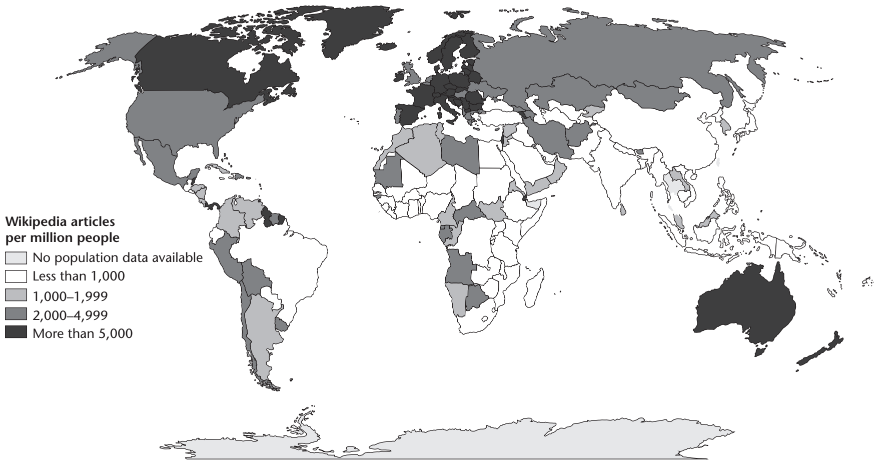

Figure 3.8. Articles per capita

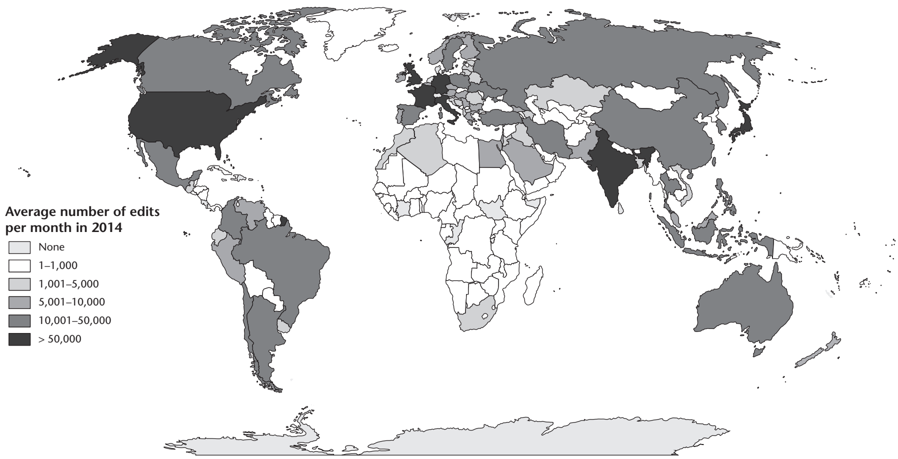

Figure 3.9. Edits to Wikipedia

world as well. Israel and Iran taken together, for instance, contribute more to Wikipedia than the remaining twenty countries in the Middle East and North Africa put together. Again, the focus here is on Wikipedia, but similar inequalities in online voice and participation can be seen in almost all other platforms. Comparisons between traditionally produced knowledge, for instance academic articles and digitally enabled content such as Wikipedia edits, or collaborative coding on the code-sharing platform GitHub, have recently shown that the latter are characterized with deeper inequalities, meaning that connectivity hasn't bridged the divides on knowledge-intensive content creation (Ojanperä, Graham, De Sabbata, Straumann, and Zook, 2017).

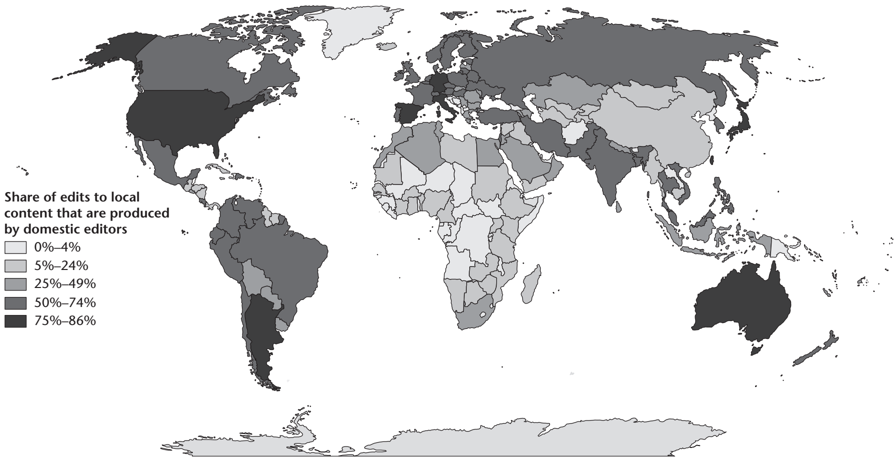

Figure 3.10. Share of edits to local content on Wikipedia

At the same time, there are interactions between these representation and participation imbalances which exacerbate outcomes even further. Figure 3.10 shows the share of contributions to each country's content that was provided by locals, rather than by people from outside the respective countries. Content for countries such as the US, Australia, and Germany is largely produced domestically, with more than seventy-five percent of contributions coming from editors within the country. On average, almost half the content about European countries is produced domestically, and it is feasible that many of the remaining contributions originate in other neighboring European countries. On the other hand, representations for a significant number of countries in the world are largely written by outsiders. This is particularly striking for African countries, where only a median of five percent of contributions come from domestic participants. In Asia, a median of thirty percent of contributions originate from within.

In other words, not only are African countries and other global regions underrepresented in terms of content (number of articles) and participants (contributions by local editors), the contributions that do exist are largely produced externally, by people from outside these countries. This raises the question whether such representations are significantly shaped by outside perspectives rather than based on local knowledge, and how this may lead to distortions (Graham et. al., 2015).

Informed by the recognition of these imbalances, the Wikipedia community has embarked on a significant shift in strategic thinking. Its strategy document for 2017 expresses a commitment to counteract structural inequalities by providing support for underrepresented groups, and by addressing barriers to participation (Wikipedia Contributors, 2017). It introduces the concept of "knowledge equity," expressing the idea that everybody should have the opportunity to participate in the creation of knowledge, and that communities around the world should have the capacity to make decisions about how they are being represented online. In doing so, Wikipedia has recognized that some local communities will require more support than others. Some of this support may come from diasporic communities, people who have emigrated to other parts of the world. India and China in particular benefit from a significant global diaspora that is actively contributing Wikipedia content about their home countries. Further important support is provided by concerted efforts such as Wiki Loves Africa and WikiProject China, which seek to improve representations of specific regions of the world, as well as the growing number of projects that seek to counteract Wikipedia's systemic bias (Wikipedia Contributors, 2018a). Although inequities remain, efforts such as these are helping to close the representation gap, and Wikipedia is starting to better reflect the world we live in.

Stark global information inequities have further inspired interest in critical theoretical approaches to understanding and addressing underlying structural causes. Among them, decolonial and postcolonial approaches seek to trace the powerful dominance of Western cultural narratives embedded in ICT, and to open up alternative pathways to technology conception and design (Ali, 2014, 2016; Irani et al., 2010). In the words of decolonial scholar Walter Mignolo, this may signal a shift away from the common assumption of a universal perspective toward a pluriversal one, a worldview that allows for multiple entangled articulations to coexist, and that particularly emphasizes those situated at the margins (Mignolo, 2011).

Beyond these efforts we see a continued need to understand the knowledge production on Wikipedia and other information platforms not merely as volunteering efforts, but also as a form of labor that is largely unpaid. While the volunteering aspects of these platforms are widely researched, the role of labor in their production is still not well understood. Many such knowledge production platforms are efforts to replace expert labor with passionate volunteers who contribute in their spare time, purely out of their own enjoyment (Nov, 2007; Budhathoki and Haythornthwaite, 2013). This has proven to be a powerful model: Wikipedia has become the largest collective knowledge production effort in human history. And yet, the underlying expectation of spare-time contributions probably exacerbates economic inequities, and may be a significant contributor to global information imbalances. It has been shown that socioeconomic factors significantly affect a region's capability to produce its own representations, and can cause differences in participation levels of several orders of magnitude (Sen et al., 2015). Consequently, if global knowledge production is to become more equitable, does this mean that some of the editors should get paid?

Conclusions

In sum, we see that the production and subjects of knowledge have very distinct and uneven geographies. There remain significant silences and uneven geographies of knowledge at a range of scales stretching from the local to the national levels. We also see that Internet penetration rates or numbers of connected persons in each country (Figures 3.2 and 3.3) explain only some of the unevenness that we see. The fact that over a half of the world's population uses the Internet does not yet seem to have lessened the centrality of the world's informational cores. It is, therefore, a social risk to imagine that we are even getting close to having platforms that contain the sum of all human knowledge. Rather, we need to keep a focus on some of the significant biases embedded in this knowledge that plays a key role in shaping our understandings of the world.

These uneven data shadows and digital divisions of labor matter because they shape more than just the contours of websites. They influence what we know and what we can know about the world. They shape how we augment and bring into being our everyday lives. While these broad, national-scale information geographies may seem unimportant to, say, a bus driver in Birmingham or a postman in Pittsburgh, they constitute but one scale at which informational imbalances and inequalities exist. Even at the most local level, the voices and representation of some people and places will be more visible and more dominant.

More broadly, what do the maps presented in this chapter tell us? Not only is there not a lot of content created from the Global South, but there also isn't a lot of content created *about* the South. A lot of people and places are both literally and figuratively left off the map. The work presented in this chapter inevitably only provides a limited, partial, and selective snapshot of geographies of knowledge. However, the incomplete nature of this inquiry does not lessen the need for deeper research into issues of power, representation, and voice. For instance, the near absence of Swahili, Hindi, Bengali, and many other large African and Asian languages on Wikipedia means that we need sustained new inquiry into old questions about power and representation.

So, the question then is why? Why when the world is getting wired, and when Internet penetration rates are rising rapidly, are there still these massive absences? The Internet undoubtedly reconfigures processes of creativity and generativity, and, for many, does democratize both the production and the consumption of knowledge. But this does not mean that a necessarily causal or determinist relationship exists in which the Internet will "do" any of those things (Friederici, Ojanperä, and Graham, 2017).

Connecting the previously disconnected in order to solve these digital divides is undoubtedly only part of the solution. Equally important[7] are interrelated issues of literacy and education, digital architecture, physical infrastructure, governance of online communities and platforms, cultural, religious, gendered, and other socially constructed barriers, politics and political interference, and language. The demands of persistent poverty are also most likely reflected in the geographies of information.[8] The role of these social barriers is nothing new, and previous rounds of ICT innovation and upgrading, such as the invention of the printing press or the telegraph, equally failed to democratize voice and power/knowledge.[9] It is, therefore, important to realize that digital media and technological solutions alone can never erase the sorts of spatial patterns highlighted in this chapter.

In other words, there is no simple and singular answer to the very uneven geographies of information and voice that we see. Improved Internet connections alone are unable to democratize participation and knowledge, and it can be easy to forget about a lot of underlying structural and social barriers in the context of the expectations, buzz, and hype surrounding the changing connectivities in the Global South. A lot of these unrealistic expectations see the arrival of the Internet and broadband Internet as panaceas for participation and knowledge sharing.

It is also important to remember that despite changing and deepening connectivities for much of the world, most people on our planet are still entirely disconnected. Even amongst the over three and a half billion people who are Internet users, a significant number are still left out of global networks, debates, and conversations. While the Internet enables selective connections between people and information, it remains characterized by highly uneven geographies, and in many ways has simply reinforced older global patterns of visibility, representation, and voice.

Acknowledgments

Work on this chapter was partially funded by the Leverhulme Prize (PLP-2016-155), and the European Research Council (ERC-2013-StG335716-GeoNet).

[7] These factors emerged from a two-day workshop that Mark Graham hosted (with his colleagues Heather Ford, Bernie Hogan, Ahmed Medhat, and Ilhem Allagui) in Cairo in late 2012. The workshop provided a forum for Wikipedians who write articles about the Middle East and North Africa to voice their concerns about barriers to participation and representation for local actors. See also Lessig (2006) for a similar discussion of the complex constraints on Internet-mediated behaviors.

[8] Such demands have been highlighted by Wyche et al. in their (2013) study of social media use in rural Kenya.

[9] Gurumurthy (2004: 7), for instance, notes "the fact that centuries after ICTs such as cheap printing appeared, a vast section of humanity lacks literacy, testifies to our failure to prioritize the social role of technology."

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4

Internet Cultures and Digital Inequalities

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The attitudes and values of Internet users and non-users have frequently been studied, but they have rarely been used to identify broader patterns that could define general cultural orientations to the Internet. This chapter describes these orientations and how they might shape digital divides, such as why some people choose not to use the Internet. Specifically, the authors describe cultural values concerning the Internet in seven nations, and how these patterns of beliefs and values about the Internet can explain digital inequalities in Internet access and patterns of use. Their analysis explains why they believe that "cultures of the Internet" are as important as individual-level factors, such as age, education, and Internet skills, if not more so, in predicting patterns of (non)use of the Internet across all seven countries.

Introduction

In the early 1980s, scholars and practitioners often spoke of a cyberculture that determined why some individuals became early users of computer-conferencing systems and other computer-mediated information and communication systems, like the Internet. Early work on digital divides focused mainly on computer adoption in households and how socioeconomic factors shape adoption (Dutton, Rogers, and Jun, 1987); later, the focus shifted to Internet access (Norris, 2001; Rogers, 2001), and then to differences in Internet use (Livingstone and Helsper, 2007) and digital inequalities more broadly defined (Hargittai and Hsieh, 2013; Van Deursen, Van Dijk, and Helsper, 2014; Zillien and Hargittai, 2009). For example, digital skills (Hargittai, 2002) became a central factor in digital inequality research as Internet use became more common across high-income regions, such as North America and Western Europe. The concept of a cyberculture declined as the Internet diffused more widely.

However, researchers continued to look at motivational and attitudinal factors to explain inequalities in access to and (non)use of the Internet (Reisdorf and Groselj, 2015; Van Deursen and Van Dijk, 2015). This work has been advanced by research that began to resurrect a more general focus on the values of Internet users and non-users to discover distinct "cultures of the Internet" in Britain (Dutton and Blank, 2013, 2015a, 2015b) as well as in the state of Michigan in the United States (Dutton and Reisdorf, 2017). This research suggested that overlooking the role of Internet cultures in shaping take-up and use of the Internet could well have undermined efforts to address digital divides around the world, as efforts to address inequalities might be more effective if they addressed attitudes and values.

Therefore, this chapter builds on these previous studies by using data from the Quello Search Project, a comprehensive seven-country study that examined how different types of media are used to find political information and shape public opinion (Dutton et al., 2017). Web-based surveys were conducted in Britain, France, Germany, Italy, Poland, Spain, and the US, and included the same set of questions on values and beliefs that was included in previous studies on Internet cultures in Britain and the US state of Michigan.

Digital Inequality and Internet Cultures

Digital Inequalities

By 2018, the Internet had reached over half of the world's population. The widespread use of the Internet has moved digital divide and digital inequality research away from focusing on binary divides of Internet access vs. no access to explaining gradations of Internet access, skills, and usage. These studies measure how socioeconomic factors affect digital skills (Hargittai and Hinnant, 2008; Van Dijk, 2012), participation in social media (Blank and Reisdorf, 2012), or differentiated uses and outcomes (Van Deursen and Helsper, 2017; Blank and Groselj, 2014; Zillien and Hargittai, 2009). As it has become more apparent that socioeconomic factors, such as age and income, do not sufficiently account for gradations in Internet use, other factors have been examined. Also, while some demographic factors, such as age, might lead to different patterns of adoption or use, it is not clear why this relationship exists. Therefore, studies on digital inequalities began to look more closely at beliefs and values that affect how much and how broadly Internet users engage online (Blank and Reisdorf, 2012; Dutta et al., 2011; Dutton et al., 2013; Lüders and Brandtzæg, 2017; Reisdorf and Groselj, 2015; Van Deursen and Van Dijk, 2015).

Cultures of the Internet

"[D]uring the early years of Internet adoption, scholars from various disciplines discussed 'cybercultures' and specific typologies of those who were pioneering in their use of the Internet, using a wide range of research methods" (Dutton and Reisdorf, 2017: 3). This resulted in a number of publications that investigated these so-called "cybercultures," which are manifest in patterns of beliefs and values about being online (Bell, Loader, Pleace, and Schuler, 2004; Castells, 2001; Morse, 1998; Silver, 2000, 2004). However, work in this area decreased as the proportion of Internet users grew, and studies on values focused more on areas such as differences between younger and older generations, often the so-called "digital natives" who grew up with digital technologies and are therefore presumed to be more immersed in the Internet than older, "digital immigrants" (Palfrey and Gasser, 2008; Prensky, 2001; Tapscott, 2008).

However, values have rarely been analyzed in ways that enable researchers to identify specific clusters of Internet users based on their responses. However, Dutton and Blank (2013, 2015a, 2015b) conducted such an analysis and found that cultural values are not just another factor affecting digital engagement. Instead, the dimensions they identified played a key role in distinguishing different groups of Internet users who clustered in a specific way around these sets of values and beliefs. They defined cultural values as collections of beliefs about the Internet. These beliefs formed four distinct dimensions focused on whether the Internet was viewed as an enjoyable escape, an efficient instrument, a problem generator, or a social facilitator (Dutton and Blank, 2015b: 11). Internet cultures are distinct combinations of these values shared by a group of respondents. For example, they found a group that shared the belief that the Internet is an enjoyable escape, a source of efficiency, and a social facilitator, but not a source of problems. They were named "e-Mersives" because they were very active on the Internet and strongly positive about its effects (Dutton and Blank, 2015b, Table 2). Dutton and Blank (2015b) found five Internet cultures which mapped onto these four dimensions. Similarly, in their study of Internet cultures in Michigan, Dutton and Reisdorf (2017) found that value dimensions played a strong role in explaining Internet use and non-use as well as social media use and non-use, even when controlling for socio-demographic factors.

Research Questions

Based on this previous research, we know that Internet cultures could play a crucial role in shaping Internet use. What we do not know, however, is whether there are significant differences in Internet cultures across nations. For example, the studies we have noted, in Britain (Dutton and Blank, 2013, 2015a, 2015b) and Michigan (Dutton and Reisdorf, 2017), found similar value dimensions and only slightly different Internet cultures. The question, then, is whether we can find significant differences across a broader range of countries. We ask the following two research questions:

- Can we identify distinct cross-national cultures of the Internet? And if so, what are they?
- How do Internet cultures affect digital inequalities within and across nations?

Methodology

We used data from the Quello Search Project (Dutton et al., 2017), a study of media use shaping public opinion across six EU countries (Britain, France, Germany, Italy, Poland, and Spain) and the United States. In each nation, responses were received from approximately 2,000 adult individuals, yielding a total sample of 14,028 respondents. The data was collected through a Web-based random probability sample in January 2017. In the analyses that follow, respondents were weighted to reflect the known population proportions in each country.[1]

Identifying Cultures of the Internet

Our survey allowed us to assess the meanings that the Internet has for respondents by asking them about the extent to which they agreed or disagreed with certain statements. We used fourteen variables to measure beliefs about the Internet (see Table 4.1). Each item was measured on an identical five-point Likert scale ranging from "strongly disagree" to "strongly agree." The items include both positive and negative items to avoid a response-set bias.

The fourteen variables were analyzed to determine whether a smaller number of dimensions could summarize the relationships among the variables.[2] This

[1] The detailed weighting scheme used for each country is described in Dutton et al. (2017: Appendix 1).

[2] A principal components analysis (PCA) with varimax rotation and Kaiser normalization was conducted. This analytical approach takes responses to the fourteen items to find more general underlying components that account for most of the variation in responses to the specific items.

Table 4.1. Likert Scale items used to identify cultures of the Internet

Survey item	*Main dimension*
Going online helps me escape from things I would rather not deal with.	Enjoyable escape
Going online helps me pass the time when I am bored or have nothing to do.	Enjoyable escape
When I am online I don't feel lonely.	Enjoyable escape
I just enjoy being online to see what comes up.	Enjoyable escape
Going online is an efficient means of finding information.	Instrumental efficiency
The Internet makes life easier.	Instrumental efficiency
The Internet helps me save time.	Instrumental efficiency
It is difficult to delete personal information once it is online.	Problem generator
The Internet is frustrating to work with.	Problem generator
There is too much immoral material online.	Problem generator
Dealing with email takes up too much time.	Problem generator
People can find personal information about me online.	Social facilitator
Going online allows me to keep in touch with people.	Social facilitator
It is easier for me to meet people online than in person.	Social facilitator

analysis yielded four general components.[3] We examined the factor loadings and named the components according to the variables where they have the highest loadings. These four dimensions represent the degree to which respondents draw particular meanings from the Internet:

1. Enjoyable escape: Activity on the Internet provides an enjoyable escape that is a good way to pass time and to escape from day-to-day activities, meet people, and not feel alone.
2. Instrumental efficiency: The Internet makes life easier in a number of ways, such as enabling users to save time, for example by finding information quickly.
3. Problem generator: The Internet is a source of problems, such as frustration when working with it, wasting time with email, difficulties in controlling personal information, and exposure of users to too much immoral material.
4. Social facilitator: The Internet facilitates social activity, helping you keep in touch with friends, helping people to find information about you, and making it easier to meet people.

Each of the four dimensions is independent, so that someone can view the Internet as a wonderful escape, but also feel that it is a source of problems

[3] The first four components had eigenvalues greater than 1.0, meaning that they explained sizeable proportions of the variance across the fourteen items. This solution is based on the set of 11,928 Internet users who had no missing values on any of the fourteen Internet variables.

(such as wasting time). These four dimensions gave us the broad cross-national patterns across all these large, developed, democratic countries. It is notable that these are exactly the same dimensions that emerged from analysis of British data in the 2013 Oxford Internet Survey (see Dutton and Blank, 2015b). This is an indication that these dimensions are robust and might well exist across other countries as well.

We then identified groups of people who tended to share common beliefs about the Internet, defined by the degree to which they tended to be similar in their positions across these four different dimensions.[4] The goal was to locate groups for which the Internet had a similar set of shared cultural meanings. This process identified five clusters of individuals, each corresponding to a particular constellation of meanings, which we describe in the next section.

Internet Cultures Shaping Digital Inequalities

In our final step, we examined how these cultural factors influence digital inequalities across the seven countries. We used two measures of digital inequalities. First was the amount of use of the Internet, using a scale constructed from twelve items asking about different uses of the Internet, ranging from buying a product, sending emails or a message, getting information about local events, to watching films or TV programs online. Each was coded as a six-category scale ranging from "Never" to "More than once a day." The amount of use was indicated by the sum of these variables, yielding a range of 0 to 72.[5] Secondly, we constructed a similar scale measuring the amount of social-media use from items asking whether the respondent had a profile on any of nine popular social-media sites, such as Facebook, that were generally accessible in these countries. Each is coded as a binary, yes/no variable. Amount of use is the sum of these variables, yielding a range of 0 to 9.

We included seven demographic variables as control variables: age, gender, marital status, education, disability, presence of children in the household, and the respondent's life stage. Income was omitted from the analyses because it has a high proportion of missing data in all countries, and it is occasionally collinear with education.

[4] This was done by generating factor scores for these dimensions and then using a hierarchical cluster analysis to find groups or clusters of respondents who answered questions in similar ways. Specifically, we examined results from several similarity measures and clustering rules. Ward's clustering with squared Euclidean distances produced the most interpretable clusters.

[5] This procedure sought to replicate that used by Blank and Groselj (2014).

Table 4.2. Percentage of cluster who agree with each dimension

	e-Mersive	Cyber-savvy	Conflicted socializers	Cyber moderates	Adigital
Instrumental efficiency	75.6	86.6	14.5	0.0	33.4
Enjoyable escape	65.8	99.6	59.9	16.7	22.0
Social facilitator	60.8	98.6	84.1	28.4	8.5
Problem generator	30.5	90.9	99.0	43.2	53.2

Note: The table shows the percent above average on each dimension. Agreement over 50 percent is shaded.

Results

Cultures of the Internet across Countries

Table 4.2 identifies the five different cultures: e-Mersives, the Cyber-savvy, Conflicted socializers, Cyber moderates, and Adigitals. Each cluster is defined by the dimensions on which fifty percent or more of the respondents in that cluster are above average. For example, 75.6 percent of the e-Mersives agreed that the Internet is high on “instrumental efficiency”: it saves them time and generally makes their lives easier. In contrast, over half of the Adigitals tended to see the Internet as a problem generator.

Each of the five cultures has distinctive characteristics:

- *E-Mersives* see the Internet as a source of efficiency, an enjoyable escape, and a social space. They do not see the Internet as a source of problems. They are comfortable in the online world and they are happy to be online. They are fully immersed in the Internet and they see it as almost entirely positive.
- The *Cyber-Savvy* are ambivalent about the Internet. We call them “cyber-savvy” because they see not just the positive aspects of the Internet, but also the problems that the Internet can create. Despite their concerns they fully exploit the Internet as a source of leisure enjoyment, a tool for increased efficiency, and a medium for social life.
- *Conflicted socializers* describes a group that sees the Internet as a source of social activity—an escape and a social place—but also sees it as a source of problems. They are notable because they tend not to see it as a tool for instrumental efficiency. This is the only group that is not replicated from the 2013 study of Britain (Dutton and Blank, 2015b).
- *Cyber moderates* tend to not be enthusiastic about any aspect of the Internet. They do not regard the Internet as a useful tool for instrumental efficiency, an enjoyable escape, or a social facilitator. They also do not regard it as a problem generator. Since they are neither bothered nor impressed by the Internet, we have called them “cyber moderates.”

- *Adigitals* are also unenthusiastic about the Internet as a source of efficiency, an enjoyable escape, or a place to socialize, but more than half agree that the Internet is a source of problems. They are the group that is not happy or comfortable to be online. These negative perceptions foster the belief that the Internet is out of their control, potentially controlled by others. Since they harbor major reservations about the Internet we call them "Adigitals."

Figure 4.1 shows that the largest group by far is the e-Mersives. Almost half of all respondents (45.8 percent) see the Internet in largely positive terms, underpinning the central role the Internet continues to play. However, the second largest group are the Adigitals, at 25 percent. They are a full quarter of Internet users and their most notable characteristic is that they see the Internet predominantly as a source of problems. The Cyber-savvy, Conflicted socializers, and Cyber moderates make up around 10 percent each. It is notable that for over one-third of all respondents the meaning of the Internet is primarily negative (25 percent Adigitals) or unenthusiastic (9.3 percent Cyber moderates). This has implications for how these individuals will use the Internet.

These are the broad patterns across all seven countries, but we also wanted to understand whether different countries have different distributions of cultural groups. In other words, are certain cultural groups more prominent in one country than another? Figure 4.2 shows that some differences stand out. Most strikingly, there are considerably fewer e-Mersives in our German sample (38 percent), and considerably more in the Polish sample (53 percent), whereas the other country samples fall somewhere in

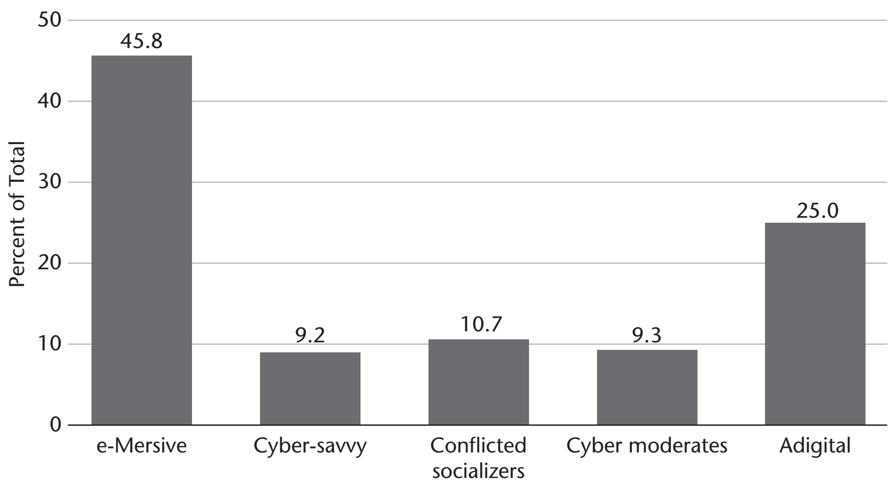

Figure 4.1. Cybercultures on the Internet

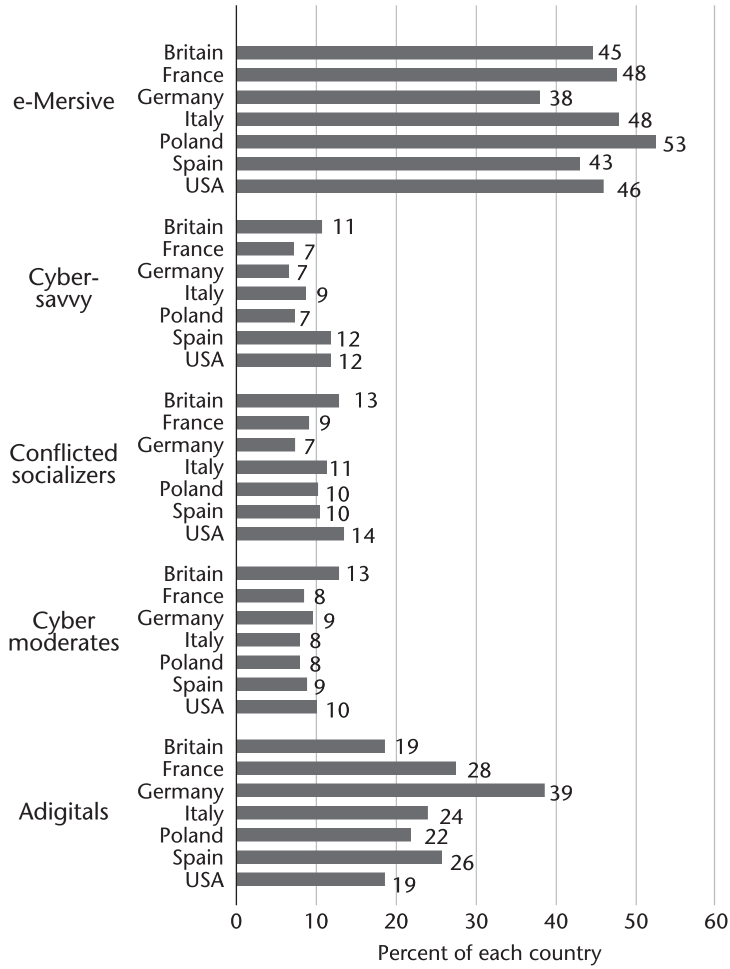

Figure 4.2. Internet cultures and countries

Source: Quello Search Project Ns for each country: Britain: 1, 658; France: 1,660; Germany: 1, 664; Italy: 1, 768; Poland: 1, 691; Spain: 1, 764; UK: 1, 658; USA: 1, 723

between. At the same time, the number of German respondents who are part of the Adigital cluster is considerably higher than for any other country (39 percent), and 14 percentage points higher than the average of all seven countries (see Figure 4.2).

The other three groups, Cyber-savvy, Conflicted socializers, and Cyber moderates, do not show large differences between countries. The differences are largest among the Conflicted socializers (seven percentage points) and least among the Cyber moderates (five percentage points). Although the sampling error in each country is less than three percentage points, the total survey error is certainly larger. As a result, we do not think these small differences are large enough to reflect meaningful differences between countries. In summary, while there are no striking differences between most of the country samples, Polish and German respondents stand out as more enthusiastic and more sceptical respectively.

Cultures and Digital Inequalities

In the final step, we ask whether Internet cultures shape digital inequalities. Table 4.3 contains the results of two hierarchical regressions that examine how amount of Internet use (dependent variable) is related to socio-demographic factors (control variables) and Internet cultures. Considering, first, the demographic control variable regression, we see that most variables are statistically significant, except for two life-stage variables, retired and unemployed. The strongest variable in the regression is age, followed by having a college degree. Age is negative, meaning older people use the Internet less. The marital status variables show that all other categories (married, living with partner, divorced or widowed) use the Internet more than singles—especially those who are married. Education is also positive, that is, higher educational qualifications are associated with more Internet use. Women are less likely to use the Internet than men, although the effect is small. These results are in line with previous research on Internet use.

Table 4.3. Hierarchical regressions on amount of Internet use

		Control variables	Control plus culture variables
Age		−0.33***	−0.25***
Female		−0.08***	−0.07***
Marital Status			
	Married	0.13***	0.11***
	Living with partner	0.03***	0.03***
	Divorced/separated	0.04***	0.03***
	Widowed	0.04***	0.03**
Life stage			
	Employed	0.11***	0.08***
	Retired	−0.01	−0.02
	Unemployed	−0.03	−0.05***
Education			
	High School grad	0.15**	0.14**
	Some college	0.18***	0.17***
	College degree	0.29***	0.27***
Instrumental efficiency			0.17***
Enjoyable escape			0.15***
Social facilitator			0.23***
Problem generator			−0.03**
N		13,705	11,708
Adjusted R^2		17.5%	36.0%

Notes: *p < 0.05, **p < 0.01, ***p < 0.001; standardized regression coefficients; omitted categories are male, single, student, and less than high school.

Overall, the variance explained by the control variables is nearly eighteen percent, but by adding the Internet culture variables, we are able to more than double the explained variance.[6] All four of the Internet culture variables are statistically significant, and three of the four are positive. As we would anticipate, if people see the Internet as a problem generator, they tend to use the Internet less, producing a negative coefficient, although the effect is weak. Age is weaker than it was in the control-variable-only regression. Having a college degree becomes the most influential control variable in the regression. The social facilitator variable is almost as strong as age and the third strongest explanatory variable in our extended model. The other two culture variables are among the strongest coefficients in the model, rivaling the influence of the education coefficients. This shows that the culture variables have a stronger relationship to Internet use—and a greater explanatory value—than many of the socio-demographic control variables that are traditionally presumed to explain a lot of the variability in Internet use and non-use.

Table 4.4 contains the results of the hierarchical regressions on social-media use. In the control-variable-only regression, age is by far the strongest coefficient, with older users being less involved with social media. The other strong

Table 4.4. Hierarchical regressions on amount of social-media use

		Control variables	Control
Age		−0.42***	−0.35***
Female		−0.03***	−0.02*
Marital Status			
	Married	0.04***	0.03**
	Living with partner	0.01	0.01
	Divorced/separated	0.01	0.01
	Widowed	0.03**	0.02*
Life stage			
	Employed	−0.02	−0.04*
	Retired	−0.04	−0.06**
	Unemployed	−0.05**	−0.07***
Education			
	High School grad	0.08*	0.09**
	Some college	0.16***	0.16***
	College degree	0.18***	0.18***
Instrumental efficiency			0.07***
Enjoyable escape			0.08***
Social facilitator			0.24***
Problem generator			−0.03**
N		13,734	11,712
Adjusted R^2		20.6%	30.1%

Notes: $^*p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$; standardized regression coefficients; omitted categories are male, single, student, and less than high school.

[6] The R^2 for the control variable regression is 17.5 percent; adding the Internet culture variables more than doubles it to 36 percent.

coefficients are two education coefficients involving college. Being female and being unemployed have small negative coefficients; being married or being widowed have small positive coefficients. Nothing else is statistically significant. Compared to the Internet use regression in Table 4.3, the lack of significance of the marital status variables is notable.

In the analysis of social-media use, the variance explained by adding the culture variables is again greater, although not doubled.[7] All the culture variables are statistically significant with the same signs that we saw in the previous table. Age remains the strongest variable in the model, as older people are less likely to use social media. Social facilitation is the second strongest, followed by the education variables. All the life-stage variables are significant here, and the other significant coefficients have comparatively minor influence. This shows that Internet cultures have a strong effect on who is using the Internet in general and social media specifically, when compared with demographic characteristics on their own.

Discussion and Conclusion

Our results reinforce and extend previous work on Internet cultures. When we add cultural dimensions to the regression models, we get more robust results, and the culture variables are strongly and significantly related to differences in both Internet and social-media use. They are important to explaining relationships between demographic factors and digital inequalities and social-media use. Previous work has not had the cross-national data to compare countries. The unique dataset used in this chapter allowed us to do just that. With respect to our first question, the cluster analyses showed that, with the exception of Germany (Adigitals) and Poland (e-Mersives), where some differences emerge, there appear to be major similarities in Internet cultures across the seven countries.

Users in Germany are more skeptical of the Internet than users in the other countries. German users seem to have a particularly strong value attached to privacy, possibly due to past abuse of personal information during the Nazi regime and by the Stasi in East Germany. The data breaches, and the widespread use of personal information by Internet companies and advertisers may lead them to be more sensitive to the problems of the Internet, leading to a higher proportion of Adigitals and a lower proportion of e-Mersives than in other countries. Furthermore, Germany has a strong tradition of public service broadcasting that is the responsibility of

[7] Specifically, the R^2 is about 21 percent and rises to about 30 percent when we add the culture variables.

provincial (Bundesländer) governments and therefore more insulated and independent of the central government. Consequently, online media might be viewed as less important than they are in countries with greater reliance on traditional mass media (see also Dutton et al., 2017).

Internet users in Poland are more enthusiastic about the Internet than users in the other countries that we surveyed. This may be due to the recent actions by the ruling Law and Justice party that have made state-run television and radio more one-sided and pro-government. Poland does not have a recent history of stable and independent mass media. The result may be reduced reliance on offline media and more reliance on the Internet and social media. With these exceptions, the overall patterns of the seven countries were similar within the margins of likely error.

Looking at our second research question, we found that all four cultural dimensions were strong predictors of both Internet use and social-media use. The social facilitator variable is particularly strong in both models, possibly indicating that much Internet use stems from the ways it facilitates many kinds of social interaction.

The similarities in Internet cultures across most of the seven countries are an important finding in light of the different media landscapes as well as the different levels of Internet penetration. For example, whereas about seventy-two percent of the Polish population were using the Internet in 2016, nearly eighty-eight percent of the German population were online (Internet Live Stats, 2017a, 2017b). And yet, Internet users in Poland were more enthusiastic about the Internet, whereas German respondents were more skeptical. While we find overall similarities among the seven countries with respect to Internet and social-media use, we do not claim that this will be the case for all cross-country Internet comparisons in Europe or worldwide. The Quello Search Project report (Dutton et al., 2017) shows that there are stark differences in trust in different media platforms across these seven country samples. For example, whereas respondents in Poland reported higher trust in online media than in print and broadcast media, Internet users in Germany reported higher trust in traditional mass media than in the Internet and social media.

There are some important limitations of our findings. First, we cannot generalize from our seven countries to the rest of Europe, much less the wider world. While we did not find national Internet cultures in this study, it is possible that some national Internet cultures are economically and culturally different. Although we compared a number of European countries and the US, all of these countries have comparatively high Internet penetration, and are highly advanced economies with mostly uncensored content and open access to all types of media. Internet cultures could look vastly different in countries with low Internet penetration or less open media landscapes. That said, our findings are reflective of the results of related global research that found remarkable cross-national similarities in the attitudes and beliefs of Internet users (Dutta et al., 2011; Dutton et al., 2013).

In addition, there are limitations to our findings due to the types of analyses that we conducted. By putting all the cases across all seven countries into one single analysis, we may miss some national differences.[8] However, we analyzed the nations separately, and in combination, and found the similarities too great to justify a country-by-country analysis.

Let us conclude by pointing out the nature of cultures of the Internet. Cultural values tend to be stable attributes. Once analysis, we tend not to shift easily with each news story or personal experience. Therefore, the value of examining cultures of the Internet is that, like other cultural values, they should be relatively enduring and stable. The fact that large proportions of Internet users regard the Internet as a source of problems is itself a cause for concern. It suggests that many people who are online are not altogether happy about it. This creates a policy dilemma. Governments everywhere are trying to encourage people to develop Internet skills, because this is a potential source of productivity for the economy and it also allows the government to deliver more services electronically, such as via the Internet, which is more efficient than any offline alternative. If people are not happy to use the Internet, then this whole policy may fall short of optimal levels. Some proportion of the population may balk at developing Internet skills. This underscores the possibility that the growth of Internet use may stall if major problems are not better resolved. Governments may need to develop much more creative and innovative approaches aimed at reshaping cultures of the Internet to encourage reluctant citizens, such as the Adigitals, to take fuller advantage of the Internet.

Acknowledgments

We wish to acknowledge Google, Inc., for supporting this research. As agreed with Google, representatives of the company had not seen or approved this paper prior to publication

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[8] This may mean that national differences that are present are being treated as noise in the PCA and are not included in the factor loadings or factor scores.

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5

Older Adults on Digital Media in a Networked Society

Enhancing and Updating Social Connections

Anabel Quan-Haase, Renwen Zhang, Barry Wellman, and Hua Wang

Conventional wisdom holds that the Internet is a technology for the young. However, as this chapter shows, older adults are increasingly adopting digital media, and it is therefore critical to know more about how networks of digital communication are changing their lives in such respects as their interaction with family and friends. The authors draw upon a study using in-depth interviews of older adult residents in East York, a locality in Toronto, Canada. These interviews illuminate the roles that digital media play in managing and strengthening the personal networks of elders. Their findings challenge stereotypes about older adults and their use of the Internet. The chapter makes an evidence-based case that the Internet and related digital media help older adults develop a sense of connectedness versus isolation.

Although the rate of older adults' adoption of digital media is climbing, little is known about how networks of communication through digital media are changing their lives. Digital media can help them form and maintain social relationships and also facilitate the exchange of social support. This chapter examines two research questions: (1) To what extent do older adults use digital media? (2) How do they use digital media to connect with family and friends? We draw upon a study of older adult residents in East York, a locality in Toronto, Canada. In-depth interviews illuminate the roles of digital media in managing and strengthening their personal networks. Our findings contradict stereotypes about older adults' laggard technology adoption. Instead, a majority of them reported using different types of digital media to maintain their social connectivity in a digital networked society. Digital media helps these older adults to develop a sense of connectedness and intimacy; they appreciate "talking" with their family and friends when they cannot be physically together. For some, video communication applications such as Skype occupy a special niche by affording a greater sense of co-presence.

Introduction

Older adults are not born old: they grow into it. The age of 65+ conventionally used to identify the phase of becoming old is as much a number in a birthday card as an actual signifier of a change of life. Yet, age is closely related to technology adoption (Blank and Groselj, 2014; Haight, Quan-Haase, and Corbett, 2014) and often serves as an indicator for digital media use (Schreurs, Quan-Haase, and Martin, 2017). Unlike the younger generations, many older adults nowadays did not grow up with pervasive digital resources and real-time connectivity through their communication devices (Robinson et al., 2015). Many learned to use email and Internet search engines only later in life. The present chapter draws upon interviews with East York senior residents to investigate how older adults use digital media, and their role in connecting these older adults to family and friends. We also address stereotypes of older adults as being less adept than younger generations and assess to what extent they are networked individuals.

Background

Stereotypes of digital natives vs. digital immigrants. Older adults are often seen as laggards in comparison to younger users because they did not grow up with the Internet and had to learn how to use digital technologies later in life. They are often described as "digital immigrants" when their digital skills and savviness are contrasted with that of "digital natives" (Palfrey and Gasser, 2008; Prensky, 2001). The stereotypes see young people as adept users who can tackle any new device and easily navigate the digital world. While much evidence suggests that older adults are slower in adopting digital media (Blank and Groselj, 2014; Haight et al., 2014), many older adults have become digital and use the Internet for a wide range of activities (Anderson and Perrin, 2017).

In this chapter, we investigate to what extent older adults are using a range of digital media and how they benefit from their adoption. We do not focus on comparisons with younger generations; rather, we move away from the notion that there is only one acceptable way of adopting digital media. Pew data (Anderson and Perrin, 2017) show that older adults' use of digital technologies (including social media) is increasing and they use it on their own terms with their particular needs in mind (Quan-Haase, Martin, and Schreurs, 2016). This suggests that older adults are integrating into the networked society, and we examine its actual use by this generation to gain deeper insights into what role technology plays in their everyday communication and how it fulfills social and information needs.

Social networks. The study of how processes of modernization shape the structure and composition of social networks has been a topic of much concern. Wellman (2001) coined the concept "networked individualism" to describe changes since World War II in how people socialize and communicate. Prior to the Industrial Revolution, people's social networks were largely constrained by geography and limited to a set of social ties with people who tended to share similar backgrounds and beliefs (Hampton and Wellman, 2018). For Wellman (2001), networked individualism represents a shift in communication, as individuals are available for interaction independent of place. With mobile technologies facilitating the reaching of a specific person rather than a place, communication moves from place-to-place to person-to-person. Building on the concept, Rainie and Wellman (2012; Chapter One) describe how three key developments have transformed communities and neighborhoods since the 1990s, making location-based belonging less central. First, individuals are no longer embedded in bounded, village-like settings—or urban neighborhoods—but rather they are members of multiple, diverse social networks, often based on shared interests. Secondly, connectivity via networked computers has become widespread, providing flexible communication and information exchange over great (and small) geographic distances. Thirdly, mobile devices have diffused widely in societies around the globe, leading toward personalized and ubiquitous communication and information. We examine to what extent older adults are also part of these transformations and use media to support multiple, fragmented networks.

Time and space constraints. The advent of the Internet promised to reduce the constraints of time and distance (Castells, 1996; Wellman, 2001). For some, this would bring about "the death of distance," as many activities that took place locally would move to a global sphere (Cairncross, 1997). Email is a good example of how communication can occur irrespective of place by facilitating contact with multiple social networks through such features as group communication, replying, and forwarding (Wellman, 2001). Although there is no evidence supporting the proclaimed death of distance, studies have shown that digital media can maintain and strengthen long-distance ties in conjunction with in-person ties (Mok, Wellman, and Carrasco, 2010). Considering that older adults often report feelings of loneliness (Dickens, Richards, Greaves, and Campbell, 2011), strengthening ties at long distance may be particularly relevant for them.

The literature on older adults' adoption of digital media suggests that this leads to positive social outcomes and increased well-being. For example, in a study of seniors living in assisted and independent-living communities (AICs), Cotten, Anderson, and McCullough (2013) found those who used the Internet experienced lower levels of loneliness and greater social connectivity, suggesting that "the maintenance of personal relationships through the Internet could be critical to well-being for this segment of the population" (p. 9). The research to date tends to focus on older adults who live in AICs. Yet, it is also important to look at active older adults who continue to live in their homes. In the present chapter we investigate whether older adults maneuver in multiple networks as younger adults do, or if they use digital media to connect to a more limited set of social ties (Wang, Zhang, and Wellman, 2018). We examine to what extent the adoption and use of digital media by older adults helps to maintain social ties near and far, overcoming the constraints of distance and time.

Approach

Drawing on a study of how older adults use digital media to connect with diverse networks, we base our analysis on forty-one in-depth interviews with a representative sample of non-frail English-speaking older adults living in the East York locality of Toronto, Canada (Quan-Haase, Mo, and Wellman, 2017; Quan-Haase, Wang, et al., 2018). This study represents a continuation of previous East York investigations starting from 1968, when the first East York project surveyed more than 800 adult residents (Wellman, 1979), with the second study taking place in 1979 (Wellman and Wortley, 1990), and the third in 2004 (Wellman et al., 2006). The fourth wave collected data from 101 residents, and here we focus on a subset of those residents aged sixty-five and older.

We conducted semi-structured interviews to get a more in-depth and nuanced understanding of older adults' digital media use. All interviews were conducted in person and each lasted about 1.5 hours, which allowed the research team to clarify any concerns participants had and to ask follow-up questions about their use of digital media. Thus, understanding both the opportunities in and barriers to digital media adoption in the everyday lives of older adults from their own perspectives fills an important gap in the literature. We use descriptions and participants' original comments to ensure authenticity of the data, and pseudonyms to protect their confidentiality (see Houghton, Casey, Shaw, and Murphy, 2013).

To What Extent Do East York Older Adults Use Digital Media?

Most of the East York older adults were online in 2014 when the interviews took place. Almost all (ninety percent) owned personal computers, with nearly one third (thirty-two percent) having multiple computers, for instance, two desktop computers or one desktop and one laptop. Almost all (eighty-five percent) owned mobile phones, although almost everyone (ninety-eight percent) continued to also have a landline telephone at home. Among those who had mobile phones, three-quarters (seventy-three percent) had ordinary phones and one-quarter (twenty-seven percent) had smartphones. The participants especially valued the ability of mobile phones to help them—or their friends and relatives—in emergency situations. Tablets remained a novelty and were owned only by a minority (seventeen percent).

Although older adults are becoming more accustomed to smartphones, large-scale survey data have shown that smartphone use among American older adults still lags significantly behind that of younger adults (Tsetsi and Rains, 2017). A 2017 Pew survey showed that forty-two percent of American older adults owned smartphones. Although the percentage was up from just eighteen percent in 2013, it was still much lower than the percentage of those aged 18 to 64 (Anderson and Perrin, 2017). Our own East York study found that those who had a smartphone used it primarily for calling and occasionally for texting, but that they rarely used their phones for going on the Internet. Many regarded mobile phones as an emergency tool. As Beverley told us:

> I use my cellphone to call neighbors. Or, if I had an emergency, I could contact a hospital or doctor.

How Do East York Older Adults Use Digital Media to Connect?

Canadians have good reasons to use digital media extensively (Haight et al., 2014). Canada is one of the largest countries in the world, and friends and relatives often live hundreds—and even thousands—of kilometers away, while others may have retired to the warmer southern United States or re-migrated back to their ancestral homelands abroad. Like the rest of Toronto, our participants—and their network members—included a high percentage of immigrants who wanted to keep in contact with their friends and relatives across the Atlantic and Pacific Oceans. Moreover, Toronto's cold climate for many months a year encourages using telecommunication—rather than walking or driving to visit others or to conduct financial transactions.

Although smartphones are less widely used by older adults than by younger adults, computers have increasingly become incorporated into their routine activities. We found that older adults in East York actively engaged in computer-mediated communication via email, video chat, and social media. Four-fifths (eighty percent) of the participants said they regularly used email to connect with family and friends, more than one-third (thirty-seven percent) were social media users (mostly Facebook), and nearly one-third (twenty-nine percent) used Skype. We note that as our interviews were conducted in 2014, the use of smartphones has probably proliferated since then.

Research has consistently found that digital media use has supplemented offline interaction, and not replaced it, as some tech-doomsters have feared it would (Hampton and Wellman, 2018; Rainie and Wellman, 2012). Similarly, we found that East Yorkers used digital media to complement—rather than replace—face-to-face and telephonic interactions. Email was especially popular and was most frequently used for maintaining long-distance ties because of its convenience, low cost, and ease of use. Email's asynchronous communication was perceived as a benefit—rather than a drawback—for sustaining meaningful social contacts and coordinating get-togethers.

These older adults used email somewhat differently from younger adults. For most, email served as a tool more for affective communication than for instrumental communication: It was used to convey warmth more than to get things done. They shared life events and jokes with their family members and friends, usually sending their messages to multiple recipients. Such email chat helped older adults to maintain and strengthen social connections that were especially relevant for those who had limited mobility and declining health. As Duncan commented:

> Some of my friends have funny stories so they just forward them to me. I get these things and read them and pass them on. It's a way of keeping in touch . . . So people who I wouldn't normally communicate with—the contact is enhanced by forwarding these pictures or these jokes or stories. It helps a lot. That's email!

Video chat and social media were important for some. one-third of the East Yorkers used Skype to contact family and friends, especially those living far away. Although most were novice Skype users, they loved the increased companionship enabled by its visual cues and sense of co-presence, especially being able to see their grandchildren and to connect with those at a distance. Facebook also provided older adults with opportunities for intergenerational communication. Among the more than one-third who were Facebook users, about half used it for intergenerational networking. Most of them did not post pictures themselves, but valued viewing updates and pictures of their children and grandchildren. Indeed, many felt compelled to use Facebook to keep up with the youngsters in their social networks. As Devon pointed out:

> The only reason I set up the Facebook account was our daughter posts pictures on there so I can see them.

Tech-savviness tended to vary by age, with those between sixty-five and eighty more adept than those over eighty: the sixty-five to eighty age-group reported a higher level of perceived Internet skills; were more apt to use Skype and social media and not just email; and were more likely to have used digital media earlier in their life, especially at work; with some still working (also see Hargittai and Dobransky, 2017). This higher level of use among younger older adults is consistent with US national surveys showing that an increasing number of older adults are using digital media (Anderson and Perrin, 2017), suggesting that age differences until now have been more of a generational effect than a cohort effect (Wang et al., 2018).

Digital skills are important for social connectivity among older adults. We have learned that the older adults we have studied are not a homogenous group in terms of their digital skill levels. Based on self-reported skills, few of our participants are illiterate, some are well skilled, others have basic skills, while still others are digitally eager to expand their basic digital literacy by learning how to use various platforms and apps. To better describe the range of abilities, we developed a user typology that moves past the dichotomy of seeing older adults as either non-users or users, to include tech mid-rangers, middle-of-the-road users, intermediate go-getters, and cultivated users. At the extremes, only a few did not use any digital media while only a few others felt they were tech-savvy. However, most used digital media, with more or less confidence or trepidation. Some stuck to the one or two procedures they knew, such as email and Internet search, while the go-getters plunged into multiple activities and often called on others for technical help. Many felt good about their abilities in comparison to similarly aged friends and relatives, but felt (accurately or not) that their ability was inferior to the ability of their adult children, grandchildren, or younger friends (Quan-Haase, Williams, Kicevski, Elueze, and Wellman, 2018).

How Do East York Older Adults Use Digital Media to Communicate?

Previous research has found that the use of digital media can help older adults develop a sense of connectedness and intimacy rather than social isolation

(Cotten et al., 2013). In our interviews, we discussed with the older adults how they interacted in different types of social relationships. On average, they reported seven friends, seven neighbors, four close kin (siblings, adult children, in-laws), five extended kin, a few coworkers (if they were still working), and one or more social groups such as churches (Table 5.1). The size and composition of socially close network members is consistent with the first and second East York studies (Wellman, 1979; Wellman and Wortley, 1990), suggesting that digital media has helped maintain these older adults' existing ties more than creating new ones (Quan-Haase, Wang et al., 2018). The one anomaly was that these older adults had appreciably higher numbers of ties with neighbors, perhaps a result of more limited mobility and a turning of attention away from ties with present and former coworkers.

We examined the communication channels these older adults used with their social contacts, ranging from face-to-face interactions and landline phone calls to digital channels such as mobile phone calls, text messages, emails, video chats, and participating in social media such as Facebook. The ratio of digital channels to the total number of communication channels that our participants used ranged from 0 percent to 71 percent, with a mean of 51 percent and a median of 60 percent—indicating that at least half of the channels that East York older adults used to maintain social contact were some form of digital media.

Digital media has the potential to transcend distance and time and thereby enrich the social networks of older adults. However, much social interaction is place-based and the "death of distance" continues to be a topic of debate (Mok et al., 2010; Pieber and Quan-Haase, forthcoming). Our participants appreciated the ability to chat to their family and friends when they could not be physically together, using asynchronous media such as email or synchronous media such as Skype. Such digital media allowed them to overcome the challenges of geographic distance and time difference while enjoying special events and special moments in life. As An Dung said,

> My group of friends celebrates Lunar New Year in Washington, DC. They take pictures and send an email with all the pictures to us.

Like other East Yorkers, these older adults especially valued companionship, integrating existing in-person contact with various means of Internet and

Table 5.1. Size of East York older adults' social networks

	Close Kin	Extended Kin	Friends	Neighbors	Coworkers	Social Groups
MIN	0	0	0	0	0	0
MAX	10	40	16	30	15	10
Mean	4.1	5.2	7.1	7.3	0.8	2.3
Median	4	4	5	5	0	2

phone contact. Ties with friends were important, especially for those who had lived nearby but had dispersed over the course of life. Many made a habit of contacting friends both near and far, often to see how they were doing (Quan-Haase et al., 2017; Quan-Haase, Williams et al., 2018). As Aaron told us:

> We use Skype a lot. We talk to a bunch of friends overseas, and one in particular we Skype with every couple weeks . . . [With] Skype you can have the audio as well as the visual, whereas on a phone you've just got one. So I think it's just the fact that it does a more complete job.

Digital media opens up new opportunities and challenges for family communication. By contrast to ongoing friendships, companionship with kin mainly transpired over holidays, birthdays, and other celebrations. Although many only posted birthday wishes on social media, they loved seeing updates and pictures from their children, grandchildren, and other relatives who were active online (Quan-Haase, Wang et al., 2018).

These older adults were often motivated to use digital media because they got to learn and interact with the younger members in their social networks. And by keeping up with them, they vicariously lived a fuller and more interesting life. Dorothy told us:

> I have a nephew in Halifax and I always find it interesting to look on his wife's Facebook because she posts things quite often. Yesterday, she had pictures of the boys in the backyard. So nothing major, but it's just nice that I find those small, informal things are good for keeping in touch.

Digital media can also help older adults reconnect with old friends and grow their networks with new relationships. Thomas recounted how he found his friend in Malaysia:

> I knew he was off as a lawyer and it popped up [online] as a lawyer, so I just emailed the address that came up, and I'd say within 5 hours I had an answer, 'How the hell did you find me?'

Online communication was not all chat. Some older East Yorkers used digital media to organize professional and social groups in which they were involved. Most of the participants were involved in at least one type of social group such as church, music, or sports. A few were involved in more than five groups. Our participants actively used digital media such as email and social media to interact with their groups. For example, Tom participated in a wide range of social groups and frequently used email to communicate with members of the educational organization he headed:

> We have face-to-face meetings every six weeks. I send out the agenda by email and get the minutes for the meetings by email and we send these things to each other. Sometimes we do conference calls.

Digital media also augmented the reality of the world for older adults at times of need. Living alone after adult children have moved away or spouses have passed away can jeopardize health and well-being. But having digital devices by their side 24/7 and being able to reach out for help whenever they need it can offer older adults more mental freedom and feelings of belonging. The power to seek and receive social support was often at their fingertips (Neves, Franz, Judges, Beermann, and Baecker, 2019; Quan-Haase et al., 2017).

Conclusions: East York Older Adults in a Networked Society

Many observers think of aging as a "grey tsunami": a time of decline and fall (Enright, 2017). Yet, older adults' active engagement with digital media is increasing worldwide, suggesting that the grey divide is narrowing and possibly vanishing (e.g., Neves, Fonseca, Amaro, and Pasqualotti, 2018).

Our study of East York found that a majority of older adults own personal computers, with some having multiple desktop computers and laptops, and many using mobile phones, especially valuing them for emergency situations. Most participants were socially connected in the networked society, using the Internet and mobile phones to cope with whatever limitations they and their friends and relatives had (e.g., low mobility, poor health). Our evidence counters the stereotype that older adults are digital immigrants with limited use of technology. Rather, we find that East York older adults used digital media in conjunction with in-person meetings to connect with multiple networks, learn new things, and engage in a wide range of activities. Policy needs to counter stereotypical portrayals of older adults and push toward more inclusive narratives about older adults and digital media.

These older adults have largely joined the digital world, transforming how they connect and search for information. Most used one form of digital media for at least half of their social contacts. Digital media has supported their offline lives to a great extent, allowing them to be involved with family and friendship networks, interact with various social groups, and coordinate events and meetings. They valued it for the ability to keep in touch with other adults as well as to increase intergenerational connectivity with their adult children, nieces, nephews, and grandchildren. Rather than withdrawing into themselves, digital media afforded these older adults opportunities for connecting with large and more diverse social networks.

Yet, the digital lives of these older adults were different from those of younger generations. Only a minority were truly networked individuals in the strictest sense of that term, actively managing and navigating a sizeable number of diverse and non-redundant social networks (Wang et al., 2018). But the great majority were socially connected, with a combination of in-person encounters and digital media allowing them to overcome constraints of distance, time, and physical limitations to function in a networked society. Many of the participants stressed the benefits of being able to "talk" to and "be together" with their family and friends when they could not be physically together. They relied on digital communication for keeping both geographically distant and nearby networks active. Email was a routine practice for many. Social media was less common, with about one-third using Facebook and slightly fewer using Skype.

Digital media provided them with a greater sense of mental freedom and belonging, as social connectivity was readily available when needed. Those who were actively networked individuals dealt with multiple, partial, and somewhat autonomous sets of relationships. They actively leveraged digital media to maintain and manage their social networks, possibly using various types of digital media, depending on which part of their social networks they were contacting and about what they were communicating. For example, they tended to use Facebook to communicate with younger generations of their kinfolk, especially valuing the posting of photographs of children and grandchildren (Quan-Haase, Wang et al., 2018).

The diverse social connectivity of older adults needs to be analyzed more thoroughly. We have found that self-reported skills are not directly associated with how engaged people are online. In fact, some older adults with few skills engaged in many online activities: they were insecure but curious and saw the benefits of digital media for information and social connectivity (Quan-Haase, Williams, et al., 2018). When older adults, like other segments of the population, are presented with technologies that are beneficial to their way of life, they tend to adopt them more readily than might have been expected. Clearly, there is a policy need to go beyond promoting digital inclusion to strengthening digital skills and increasing confidence. It is time for the old myth of grey older adults languishing at home to fade away.

From this study of older adults living in one locality, it is impossible to generalize to older Canadians or networked older people. However, by focusing on one locality, this study was able to offer a more detailed examination of the perspectives and practices of older adults that can complement large-scale surveys that face major limitations in lacking richness in qualitative data. While more studies on specific populations are needed to build on this work, we have shown the degree to which such research enables us to reflect critically on the findings of past research, generating questions for further research and policy responses.

Acknowledgments

We are grateful to Christian Beermann, Brent Berry, Isioma Elueze, Maria Kicevski, Rhonda McEwen, Darryl Pieber, Lilia Smale, and Carly Williams for their collaboration, as well as to the East Yorkers who invited us into their homes, and the Social Sciences and Humanities Research Council of Canada (SSHRC) for their financial support. All participants' names are pseudonyms.

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6

Internet Skills and Why They Matter

Eszter Hargittai and Marina Micheli

Given that the Internet is now ubiquitous in high-income nations, do Internet skills still matter? The authors of this chapter synthesize a body of research that shows how Internet skills, defined across ten dimensions, remain critical, especially as the technology becomes ever more significant and embedded into everyday life. Having the requisite skills to use the Internet and related social media is essential to avoid being excluded from key facets of society. This chapter demonstrates the need to build the study of skills into digital inequality scholarship that seeks to address concerns over online experiences tending to follow and reinforce socioeconomic inequalities. Complementing research by Quan-Haase, Zhang, Wellman, and Wang (Chapter 5, this volume), this chapter challenges stereotypes of young people being tech-savvy, showing that youth are not universally knowledgeable about digital tools and media.

Introduction

Scholarship on digital inequality is concerned with how differences in people's Internet use relate to their social position in society. Since the early days of the Internet's mass diffusion, such work has emphasized that research in this area should consider variations in people's skills, that is, their ability to use the Internet effectively and efficiently (Selwyn, 2004; Warschauer, 2003; Hargittai, 2002). As the Internet has evolved, a focus on skills has only become more important, given the increasing number of types of know-how that are required to make the best use of digital media. Internet skills require more than just technical savvy, often they also have a social component, as we will discuss.

This chapter develops the case that Internet skills matter today as much as they did in the Internet's early days and cannot be taken for granted. Notwithstanding widespread assumptions about young people being automatically skilled with technologies, considerable research has shown that the youth of today are not universally knowledgeable about digital media (Bennett, Maton, and Kervin, 2008; Hargittai, 2010; Livingstone and Helsper, 2007). If anything, growing up in an age when understanding the behind-the-scenes mechanisms of how technologies work is not necessary for their use may actually hinder the development of more sophisticated usage. And given the development of digital media, new dimensions of skills emerge that may not have been as important earlier. To appreciate the ongoing relevance of Internet skills, we must take into account the ever-changing configuration of digital media. While there is a conventional wisdom that the widespread adoption of user-friendly social media platforms, as well as smartphones, is negating the importance of Internet skills, this chapter draws on a large body of research to show how users vary considerably in their ability to use emerging digital media effectively and efficiently. The chapter discusses these issues by focusing on ten dimensions of Internet skills, and then draws conclusions from this review of skills in shaping Internet use.

Dimensions of Internet Skills

Awareness of What is Possible

Awareness of what it is possible to do with communication technologies is a vital prerequisite for being able to engage in any type of digitally mediated behavior (Hargittai, 2007a). Lots of sites and services offer the opportunity to change default settings, for example concerning privacy functions, but the majority of people tend to stick to what is offered (Sunstein, 2013). It is wrong to assume, however, that staying with the defaults is a conscious decision on the part of the user when picking the particular settings available from the start. Rather, users may often not know that there are easily accessible alternatives. If users do not know that changes are possible then they will not take advantage of the option.

Examples of such services include customization features that facilitate accessing information such as filters to organize email messages and feed readers to streamline content. Such features could be particularly helpful in navigating the Web's non-linear structure more efficiently, an ability that Eshet-Alkalai (2004) defined as "branching literacy." Yet, the mere existence of such services does not mean that everybody benefits from them, since many may not know about them or know how to use them (Hargittai, 2007a). Similarly, research has shown that almost a third (thirty-two percent) of American Internet users do not know that Wikipedia can be edited (Shaw and Hargittai, 2018). When seeking to understand why people do not edit Wikipedia, it is important to recognize that lack of awareness of its being editable is part of the answer.

Effective Ways of Communicating with Others

While the Internet has been a social medium since its early days, the proliferation of social media platforms has truly propelled mediated interpersonal communication to the fore. Even with something as basic as email, there are skills that help with being efficient (Hurst, 2007) and maximizing a response from the recipient (Hargittai, 2006). Similarly, engaging in effective communication on discussion forums and in chat rooms requires a certain know-how, such as being able to share emotions appropriately (Eshet-Alkalai and Amichai-Hamburger, 2004).

When it comes to interpersonal communication, Internet skills are as much about social skills as technical ones (Bradner, 2001; Hsieh, 2012). To communicate effectively in a mediated environment, users need to be able to choose the communication functions and capabilities most appropriate for their purposes, that is, the ones that best match the social context in which their communication occurs. For example, in many contexts it will be more appropriate and effective for a student to send an email to a professor rather than a message through Facebook.

Each social media platform has its own affordances and over time develops its particular norms and expectations (van Dijck, 2013). Users act as part of networked publics, an audience composed of their diverse contacts in mediated environments, and thus, they have to learn to behave accordingly (Langlois, Elmer, McKelvey, and Devereaux, 2009; Papacharissi, 2010). Most notably, they have to negotiate their "public performance of intimacy" (Lambert, 2015: 2566) on social network sites in order to engage in fruitful social interactions and not be stigmatized. Teenagers, as a way to carve out a private space for their interactions in a less-than-private setting, often use social steganography—messages that only their peers know how to interpret—to communicate with one another (Marwick and boyd, 2014; Oolo and Siibak, 2013). On the whole, whether communicating through email or on social media, through text or visual content, users need skills, both for knowing how to utilize various features as well as for appreciating what social norms surround the various contexts of use.

Participation through Content Creation and Sharing

Optimistic accounts of digital media in the popular press claim that "lay" citizens can make their voices heard and produce positive changes in society through active participation. Yet, empirical research has shown that such participation is unequally distributed across social groups and geography (Schradie, 2011; Lutz, Hoffman, and Meckel, 2014; Micheli, 2015; Hargittai and Shaw, 2015; Johnson et al., 2016; Graham, Hogan, Straumann, and Medhat, 2014), with Internet skills functioning as a crucial correlate of who participates (Correa, 2010; Shaw and Hargittai, 2018). Complicating the picture is the fact that there are very different types of participation on the Internet, from pressing the Like button on Facebook to writing longer-form content or creating videos.

Much content-sharing requires skills in navigating specific platforms, from editing Wikipedia entries to uploading YouTube videos and posting photo albums on Facebook. Platform-specific skills are thus significant, yet not often investigated (for an exception, see Litt et al., 2014). Additionally, a general understanding of licenses and intellectual property rights is also important, given that many forms of creative participation may depend on existing cultural artifacts (Ferrari, 2013).

Even conscious abstention from participation in social media platforms such as the removal of content (Lutz and Hoffmann, 2017) can be contingent on skills. For example, Internet skills may play a role in users' choices to participate in boycotts of platform providers or to push back against the collection of their data (Casemajor, Couture, Delfin, Goerzen, and Delfanti, 2015; Lutz and Hoffmann, 2017). Understanding inequalities in digital content production requires an appreciation of how people's skills differ in the many domains required to produce and share material through Web-based platforms.

Knowledge about Seeking Assistance

Knowledge about how to seek assistance is a crucial, but often overlooked, dimension of Internet uses (DiMaggio, Hargittai, Celeste, and Schafer, 2004). Being able to find help on the Web can have a positive impact on people in a wide range of domains, both professionally and personally (Morris, Teevan, and Panovich, 2010). From search engines (Jansen and Spink, 2006) to social network sites (De Choudhury, Morris, and White, 2014), from question-asking sites (Mendes Rodrigues and Milic-Frayling, 2009) to domain-specific forums (Wicks et al., 2010), lots of opportunities exist to get assistance as long as users recognize this and know how to approach the various resources to get the information and support they seek.

Social network sites may offer a valuable venue for support-seeking, an area so far underexplored in the scholarship on Internet skills (for an exception, see Micheli, Redmiles, and Hargittai, 2019). Morris, Teevan, and Panovich (2010) found that people turn to social media because posing questions to their contacts is perceived as easier than formulating a query and evaluating search results, and it allows users to get answers from people they trust. To seek support efficiently on social network sites, however, users need to be able to communicate with others effectively (see earlier discussion). Of course, seeking answers through search engines demands its own set of skills, which we discuss next.

The Ability to Find and Evaluate Information

There is a long tradition of research into the skills necessary to find and evaluate information on the Internet, from efficient use of search engines (Hargittai, 2002) to credibility assessment (Metzger, Flanagin, Eyal, Lemus, and McCann, 2003; Eshet-Alkalai and Amichai-Hamburger, 2004). While search engines have become ever more sophisticated, users still require skills to keep up with their changes and to benefit from them maximally (Russell, 2015). After finding content that is relevant, users need skills to evaluate the content's credibility, validity, completeness, accuracy, and overall quality. Research has shown that many users skip these evaluation steps, putting undue trust in search engines' first results (Hargittai, Fullerton, Menchen-Trevino, and Thomas, 2010; Pan et al., 2007).

Scholarship has examined whether certain types of people are better than others at searching efficiently and evaluating content credibility. Education is an important positive correlate of such skills (Eshet-Alkalai, 2004; van Deursen and van Dijk, 2011; Hargittai, 2002). Regarding age, contrary to claims about so-called digital natives, many youth lack information-evaluation abilities (Gui and Argentin, 2011; Metzger, Flanagin, Markov, Grossman, and Bulger, 2015; Robinson, 2014) and perform worse than adults (Eshet-Alkalai and Amichai-Hamburger, 2004; van Deursen and van Dijk, 2011).

Awareness of How Algorithms Influence What People See

Writing in 2000 about the role of portal sites and search engines in navigating users' attention on the Web, both Hargittai (2000) and Introna and Nissenbaum (2000) called attention to how the systems that people use to find content function in ways that many users do not understand. In subsequent years, research on people's use of search engines (Hargittai, 2007b) delved more deeply into this area, finding that users put undue trust in Google's rankings (Pan et al., 2007). Although such focus has clearly been of interest to some research for quite some time, particular emphasis on algorithms' role in users' experiences has gone beyond work on search engines to include social media, retail sites, news aggregators, and other services (Gillespie, 2010; van Dijck, 2013). Those who understand that algorithms play a role in what content they see can both adjust their expectations and use strategies to find content in a way that sidesteps constraints imposed by platforms (Hargittai, 2000). Those who lack such awareness and understanding are more at the mercy of what sites are made available to them most prominently.

Empirical research in this area has focused mainly on Facebook's News Feed, which is the content Facebook users see when they log onto the site (T. Bucher, 2017; Eslami et al., 2015; Micheli, 2017; Powers, 2017; Rader and Gray, 2015). It presents an "algorithmically curated or filtered list" of updates from a selection of one's network (contacts, pages, and groups) as well as sponsored posts (Eslami et al., 2015: 153). Eslami and colleagues (2017) found that a considerable portion of their study participants were not aware of the fact that Facebook curates the content they see. Based on a survey of high-school students, Micheli (2017) also found that more than a third of respondents did not know that Facebook personalizes content according to what a user does on the site, such as through likes and interactions. A study of creative entrepreneurs' algorithmic skills found that even people whose livelihood depends on understanding these systems often do not know how they work (Klawitter and Hargittai, 2017).

Owing to the proprietary nature of algorithms and companies' claims that making them transparent would open them up for manipulation, it is impossible to know the specifics of any particular system (Introna and Nissenbaum, 2000). However, users who are aware of their existence can implement strategies to address some of the constraints they pose (T. Bucher, 2017). Awareness of social media algorithms is also important for being able to attain the desired visibility for one's own content, something we discuss in more detail in the section below on managing one's digital identity.

Understanding and Managing Privacy

Understanding why personal information should not necessarily be available to others, and knowing what to do about protecting such content, is a type of skill that varies considerably across the population (Büchi, Just, and Latzer, 2016; Park, 2013). Social network sites make the task of managing privacy especially challenging, given that their defaults often favor public sharing. Both technical and social skills can help in managing one's privacy. One example of a technical approach is use of the "limited profile" function on Facebook (Hargittai and Litt, 2013; Sonck, Livingstone, Kuiper, and De Haan, 2011). Social strategies include selective self-disclosure, use of pseudonyms, and social steganography (Marwick and boyd, 2014; Oolo and Siibak, 2013). Privacy-related skills also concern an awareness of one's audience (Litt, 2012). Users have an "imagined audience" in their mind when they post on social media, which often does not correspond to the people who may see their content (Acquisti and Gross, 2006). Additionally, networked privacy means that not only one's own, but others' actions may have repercussions for who sees one's content (Marwick and boyd, 2014). Given all of the complexities of managing one's privacy, it is perhaps not surprising that users feel "a sense of apathy or cynicism" regarding their ability to prevent privacy violations (Hargittai and Marwick, 2016: 3752). Nonetheless, those who are more skilled are likely to have more say over it than others.

Understanding Safety and Security Issues

Related to privacy, but worth special discussion, are safety and security. From viruses to spyware, from phishing messages trying to trick a user out of personal information to geolocation services publicizing one's whereabouts, Internet use can cause countless security threats with potentially undesirable outcomes. While many protections are needed at an institutional level, users can also be proactive by installing security programs and updating their software regularly (Martínez-Cantos, 2017; Redmiles, Kross, and Mazurek, 2016). Analyses of European Union residents' security-related skills have found significant gender differences, with women being less engaged in protective behaviors (Martínez-Cantos, 2017). Data on Americans' Internet use has found that users of lower socioeconomic status are less likely to use security strategies, such as software updates and difficult passwords, and are also less likely to understand the causes of threats and thus to learn from their negative experiences (Redmiles et al., 2016).

Not only is there a serious risk from malicious threats of a technical nature, but safety can also be compromised through unwanted and harmful mediated social interactions (Lenhart, Ybarra, Zickuhr, and Price-Feendey, 2016). Young people, who are more likely to experience harassment, do not necessarily have the skills to protect themselves from it. For example, one project highlighted that almost half of children aged between eleven and thirteen were not able to block messages from people they "don't want to hear from" (Sonck et al., 2011: 2). Being informed about how to protect oneself from threats is essential, both to help reduce their rate of occurrence and to know what to do when they occur.

Managing Information and Communication Overload

While the idea of information overload is not new (Edmunds and Morris, 2000) and the evidence about it as a problem is mixed (Neuman, 2019), the exponential increase of electronic information (Shenk, 1997) raises the question of how people may benefit from higher-level skills in managing content around them. Many critical accounts of digital technologies are based on the idea that users are overwhelmed by information and communication (Shenk, 1997; Andrejevic, 2013). Yet, research shows that not everyone is equally affected by information overload and Web-use skills may be a factor in explaining whether or not people feel overwhelmed (Hargittai, Neuman, and Curry, 2012).

Social media and the increasing diffusion of smartphones that enable regular contact have resulted in the potential problem of an overabundance of communication (Gui, Fasoli, and Carradore, 2017; Stephens et al., 2017). Young people have reported feeling as if they are spending too much time using digital media (Mascheroni and Vincent, 2016; Lutz, Ranzini, and Meckel, 2014). Problems may arise from users' inability to cope with communication overabundance (E. Bucher, Fieseler, and Suphan, 2013; Gui et al., 2017).

Multitasking is an area in which information overload may be particularly prominent. Work on academic performance has examined the effect of multitasking on immediate recall of information (Rosen, Lim, Carrier, and Cheever, 2011; Wood et al., 2012) and grades, finding that those who multitask in the classroom do worse academically (Junco and Cotten, 2012). Although Junco and Cotten (2012) also collected Internet skills data, they did not report on how this related to multitasking, but did show that higher skills were associated with higher grades. In sum, there is a need for more research on the role of skills in dealing with information overload, as there is good reason to believe they may be connected.

Managing One's Digital Identity

Social network sites can be powerful tools for impression management because they let users present a desired image of themselves (Papacharissi, 2010). While building a successful digital identity can lead to positive outcomes, such as increased social capital and employment opportunities, undesirable portrayals of one's identity could have negative implications such as loss of a job (Marwick, 2015; Solove, 2007).

The creation and management of a profile on a social network site, according to one's own goals and based on the affordances of the platform, constitute one part of such expertise (Iordache, Mariën, and Baelden, 2017). Many professionals, for example, may benefit from strategic self-promotion on LinkedIn, whose focus is professional networking. Creative workers may adopt a more subtle strategy: self-branding through social media (Marwick, 2015; Khamis, Ang, and Welling, 2016). Web micro-celebrities, who are "ordinary" users who have acquired fame thanks to their presence on social media, enact a complex set of tactics to build and maintain their reputation (Khamis et al., 2016). Their practices include not only strategic self-presentation across several social media platforms, but also a constant effort to reach out to followers and increase visibility to gain attention and status (Marwick, 2015).

Self-presentation and self-branding may be further enhanced by advanced knowledge of social media platforms (Duffy, Pruchniewska, and Scolere, 2017). Some users carefully tailor their messages to the textual/visual affordances of each social network site and adapt their posts to maximize reaching their preferred audience (Litt and Hargittai, 2016). Such expert users try to understand how social media's algorithms determine what content gets exposure and use this knowledge to maximize their posts' visibility (T. Bucher, 2017). Digital identity management thus requires sophisticated skills, and like with other skills, it has both technical and social aspects.

Conclusion: Skills Continue to be Important Shapers of Internet Use

Internet users are a diverse population, not only in terms of geographic and demographic characteristics, but also regarding their Web-use skills. Emerging technologies, such as mobile Internet and voice search, are often seen as enabling those without skills to use the Internet as effectively as others. Likewise, those growing up with the Internet are often assumed to appropriate the skills that evaded earlier generations of users. We critically examined these arguments about the diminishing importance of skills across ten dimensions that identify a range of skills signficant for the Internet age.

While much of the evidence cited in this piece comes from the Global North, the consistency of findings across several national contexts suggests that similar dimensions of Internet skills are likely to matter for those in the Global South as well (e.g., Correa et al., 2018). There are numerous dimensions to being an effective and efficient Internet user and being good in one does not automatically mean being good in another. For example, a user may have excellent skills for sharing content, but may not know how to go about privacy protection or managing information overload. Rather than assuming that users are all universally savvy with the numerous dimensions of digital media, it is important to recognize that most people need support in one realm or another.

Reflecting on how youth acquire technical skills, Barron (2004) notes that skills can be cultivated through multiple sources, from community resources like libraries to one's peers and home environment. This is encouraging, given the diverse types of people who need support and whose needs will most likely be met through different approaches. Most importantly, it is crucial to recognize that people of all ages differ widely in their Internet skills, so offering support is essential to making sure that not only certain segments of the population get to benefit from all that digital media has to offer.

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7

Gender and Race in the Gaming World

Lisa Nakamura

Age is not alone in shaping real and imagined differences in Internet use. Racial and gender-based stereotypes abound and need to be empirically challenged. This chapter explores the relationships between race, gender, sexuality, and digital cultures in one increasingly significant digital domain—gaming. With a review of previous scholarship on race, gender, and gaming, the author shows that we see few signs of a "post-racial" society being brought into being. In fact, gaming is a digital activity where racism and sexism are commonplace. The chapter thus leaves us with questions about why, when the Internet is a potentially powerful leveling tool in the quest for democracy and fairness, does it continue to be defined by egregious sexism and racism?

Race, gender, and sexuality have a paradoxical relationship with video game culture. Like the Internet itself, gaming culture is both mainstream, with a majority of young people and adults under fifty playing video games,[1] yet it is also subcultural. Despite larger numbers of women playing games, including "hard core" online and multiplayer competitive games, this medium is still perceived as a "boys' club," and the cultural domain of young white men.[2] As video-game scholars such as Anna Everett, Craig Watkins, and David Leonard have noted, games contain some of the most egregiously narrow, racist, and

[1] Anna Brown, "Younger men play video games, but so do a diverse group of other Americans," Pew Research Center: FactTank Facts in the Numbers, 2017, www.pewresearch.org/fact-tank/2017/09/11/younger-men-play-video-games-but-so-do-a-diverse-group-of-other-americans/

[2] Cote (2015).

sexist storylines and depictions imaginable.[3] Yet in recent years some of its most highly regarded, best-selling, and award-winning games from both indie and mainstream studios, such as Naughty Dog's 2013 *The Last of Us*, That Game Company's 2012 *Journey*, Telltale Studio's 2012 *The Walking Dead*, and Blizzard's 2016 *Overwatch* multiplayer game have centered female, nonwhite, and queer protagonists.

In short, digital gaming is a controversial and fast-changing medium that is in the midst of an equally controversial and far-reaching cultural transition toward both diversity and inclusion. Many within the gaming community have reacted negatively toward these changes, part of a racist and misogynistic backlash connected with the new conservative right wing in the US.[4] As game developer and activist Zoe Quinn writes, the mistreatment of women, people of color, and queer players in gaming spaces is symptomatic of the Internet's larger issues around harassment, trolling, and online hatred. And Gamergate, the 2014 campaign that resulted in death threats against her and two other feminist game activists and developers, Anita Sarkeesian and Brianna Wu, demonstrated this culture's extreme hostility to critique about race and gender. As Quinn writes in her 2017 memoir, "Gamergate was a full-blown culture war over the heart and soul of the Internet itself."[5]

In a way, this is nothing new; digital games have always been controversial, both mainstream and synonymous with culture wars around specific types of social harm. Games are still typecast as addictive media that encourage school shootings and other forms of violence. Scholarly research about games' negative depictions of race, gender, and difference first emerged from critical and quantitative media scholars working in the 2000s. This groundbreaking wave of research on race, gender, and video games by Anna Everett, David Leonard, Craig Watkins, Hilde Cornelissen, Tanner Higgin, David Golumbia, and Alexander Galloway focused on anti-black and other types of US racism in video-game imagery, aesthetics, narratives, and game mechanics.

Representations of black people as evil zombies, drug dealers, and criminals perpetuate some of the worst images found in other media, while the exclusion of images of blackness and black avatar characters from fantasy games such as *World of Warcraft* creates an artificially "blackless fantasy," as Higgin puts it.[6] Racist representation within games can be found in every genre: simulation games like the immensely popular *Civilization* series depict non-Western culture as shot through with superstition, cruelty, and irrationality.[7] *World of Warcraft's* Tauren, Troll, and Blood and Night Elf Player reprise classic

[3] Leonard (2006); Everett and Watkins (2008a). [4] Nagle (2017). [5] Quinn (2017).
[6] Higgin (2009). [7] Galloway (2006).

racist imagery of Native Americans, Caribbeans, and Orientals from previous media.[8] Black women in particular were very rarely represented in video games, and as Everett found, when they were, they were much more often depicted as the victims of violence than characters of any other identity.

Games from this period represented black and brown avatars predominantly as criminals, gangsters, and athletes.[9] Women and people of color were usually depicted using broad stereotypes, resulting in one-dimensional depictions embedded within simplistic and exploitative "negative fictions," environments, and storylines. Everett and Watkins argue that black and brown bodies are represented and treated as expendable targets and violent actors, particularly within "urban/street" games. In "The Power of Play: The Portrayal and Performance of Race in Video Games," their close readings of games such as *Grand Theft Auto* demonstrate how digital visual environments produce "racialized pedagogical zones" that teach young players the proper place for raced and criminalized bodies.[10]

They also found that many gamers were resistant to critiquing racism, sexism, and homophobia within their favorite games, displaying a range of responses "from blatant racism to racial tolerance or inclusion."[11] Though many of the players studied were resistant to the idea that video games are morally consequential media, they are indeed powerful vehicles for specific racial discourses, ideologies, and structures of feeling.

Sociologist Ashley Doane defines "racial discourse" as the "collective text and talk of society with respect to issues of race."[12] And "racial ideology" as a "generalized belief system[s] that explains social relationships and social practices in racialized language."[13] Video games, particularly networked games, create social practices and belief systems that license and permit uses of racialized and racist speech that may be intended to stay within the "magic circle" of the game, but do carry over into the "real world," particularly for the players who are negatively represented within them.

Networked gaming presents a different and equally harmful form of racism and sexism: live interactions between players often result in the harassment and victimization of women and people of color. Douglas Thomas and Constance Steinkuhler's groundbreaking essays on anti-Korean and anti-Chinese racism in multiplayer games *Diablo 2* and *Lineage 2* demonstrate the remarkable prevalence of discriminatory behavior in process-based video games, and the insights and methods employed in their work enrich studies of television-based console gamers.[14] Nick Yee's *The Proteus Paradox* contains a remarkable

[8] Jessica Langer (2008). "The Familiar and the Foreign: Playing (Post) Colonialism in World of Warcraft," in *Digital Culture, Play, and Identity: A World of Warcraft Reader,* edited by Hilde Corneliussen and Jill Walker Rettberg. New York: Routledge.
[9] Everett and Watkins (2008). [10] Ibid. [11] Ibid. [12] Doane, "What Is Racism".
[13] Ibid., p. 256. [14] Thomas (2008); Steinkuehler (2006).

analysis of anti-Chinese player behavior in *World of Warcraft*, comparing US players' harassment of Chinese in-game currency sellers to earlier popular movements against Chinese workers in the laundry industry during the Gold Rush.[15] Indeed, as Zoe Quinn asserts, games are not only "the heart and soul of the Internet," they are sites where cultural struggles around racism, sexism, and xenophobia occur in real time in every national context. As Holin Lin has shown in her 2011 study of Asian *World of Warcraft* players, clashes between Taiwanese and Chinese players sharing Taiwanese servers has often resulted in "open nationalist confrontations," with "indigenous" Taiwanese players stigmatizing Chinese "immigrants" to the gamespace by calling them "locusts."[16]

Game research has radically challenged earlier scholarship, claiming that online anonymity would result in democracy and equality. Scholars of race and ethnicity note that racial stereotyping does not go away in games simply because players cannot see one another. As Kishonna Grey observed during extensive ethnographic work with female Xbox players of color, collaborative competitive games often require players to use microphones, and the sound of a female voice often led to expressions of the most horrible racism and misogyny.[17]

Williams et al.'s 2009 quantitative "census" of protagonists, racial content, and themes within selected popular games found that people of color and women are both under-represented and depicted negatively.[18] Other data gathered by Williams and Watkins brought to light another paradox that characterized video games, race, and gender: they found that Latino, African-American, and Asian and Asian-American male players are better-represented in the gaming world than white males, despite their being represented so negatively in game texts. Rideout, Lauricella, and Wartella's study of media use among youth in the United States found that nonwhite youth spend significantly more time playing video games at home. This is especially concerning: because youth of color spend more time playing games than white youth do, they may be more vulnerable to the racial discourses within games and game-enabled communications.[19]

Ivory et al. (2009) cautioned that networked play added a new and as yet understudied dimension to the study of profanity, and merited additional studies. The study analyzed several popular video games representing a variety of age ratings and found that one out of five games contained one of the "seven dirty words" which are regulated in network television, as

15 Yee (2014); Burnett (2004). 16 Lin and Sun (2011). 17 Grey (2014).
18 Williams, Martins, Consalvo, and Ivory (2009).
19 Rideout, Lauricella, and Wartella (2011).

well as "words that evoke strong emotion and offense (e.g., bitch)."[20] No mention is made of racist language, but the study cautioned that player-produced profanity may be a greater cause for concern in the age of networked gaming than pre-scripted profanity programmed into games: "The increasing popularity of multiplayer games and optional multiplayer game modes featuring voice interaction between players suggests that future studies should also examine the prevalence of profanity in online voice chat sessions."[21]

While the rest of the Internet became more gender-balanced years ago,[22] the world of video games self-identifies, and is seen by many of its players of both genders, as fundamentally masculine, despite evidence to the contrary. Despite the enduring popularity of games such as *The Sims* among female players,[23] as Adrienne Shaw's groundbreaking work on gender and gaming found, "there is a definite correlation between gender and gamer identity. Male interviewees were much more likely to identify as gamers than female, transgender, or genderqueer interviewees were."[24] As Shaw notes, her findings are far from unusual: many other game scholars have "found that women tend to underestimate the amount of time they play and do not generally identify as gamers."[25] Interestingly, nonwhite males reported feeling less disidentified with gaming, despite their poor treatment both as players and as represented in game narratives, and while women were far less likely to claim membership or standing within gamer culture or to claim the identity of "gamer," this was not true for nonwhite players.[26] Men who play less often than women may identify with gaming and as gamers more strongly than women do in order to solidify claims to masculinity. The identification between gaming and masculinity has become so strong that a new type of male identity, that of "geek masculinity," has acquired popular currency. John Scalzi's essay on white privilege, "Straight White Male: The Lowest Difficulty Setting?" attests to the ways that the vocabulary of gaming addresses men, particularly white men, in ways that other discourses cannot. As Scalzi writes, "[m]en think in the language of gaming . . . or at least wish to appear to do so in front of other men and women."[27]

Feminist scholars such as Christopher Paul, Carly Kocurek, and Megan Condis have shifted the research focus from female and nonwhite misrepresentation to a welcome interrogation of masculinity and its identification with gaming. Paul's 2018 book *The Toxic Meritocracy of Video Games: Why Gaming Culture Is the Worst* and Megan Condis's 2018 *Gaming Masculinity:*

[20] Ivory, Williams, Martins, and Consalvo (2009). [21] Ibid. [22] Wakeford (2000).
[23] Gee and Hayes (2010). [24] Shaw (2011, 2015). [25] See Cote (2015); Condis (2018).
[26] Shaw (2011), 28–44. See also Shaw (2015).
[27] Scalzi (2012). Retrieved from http://whatever.scalzi.com/2012/05/15/straight-white-male-the-lowest-difficulty-setting-there-is/. (Accessed August 6, 2018).

Trolls, Fake Geeks, and the Gendered Battle for Online Culture employ careful readings of game, producing nuanced and thoughtful accounts of the rise of the racist and misogynist right-wing movements centering around Donald Trump's election, and their roots in gaming culture.[28] Kocurek's work on early arcade gaming culture sheds light on how gaming came to be identified with maleness.[29] This work embodies one of the great strengths of gaming scholarship: it provides a perspective on race, gender, and gaming's struggles over digital media and communication, while grounding analysis in specific texts, practices, and embodied behaviors and discourse.

Women and minorities are underrepresented in the games industry, and this plays a role in perpetuating racist and sexist game content. Feminist game scholar Nina Huntemann's work documents how the practice of requiring workers to perform compulsory unpaid overtime at game studios, or "crunch time," produces female- and family-unfriendly workplaces. These institutional environments ensure that game-production culture remains male.[30]

As Mia Consalvo, a leading scholar in the field of gender and video games, wrote in her 2012 essay, "Confronting Toxic Gamer Culture: A Challenge for Feminist Game Studies Scholars": "Of course harassment of female players has been occurring for quite some time—perhaps the entire history of gaming—but it seems to have become more virulent and concentrated in the past couple of years."[31] Consalvo discovered that gaming culture was far less toxic, paradoxically, when there were *fewer* women playing:

> Slowly but surely and building upon one another in frequency and intensity, all of these events have been responding to the growing presence of women and girls in gaming, not as a novelty but as a regular and increasingly important demographic . . . The "encroachment" of women and girls into what was previously a male-gendered space has not happened without incident, and will probably only become worse before it (hopefully) improves.

Consalvo's 2012 thinking about gaming's backlash against women players was prescient. This essay overlapped with the rise of mobile and so-called casual video games (defined by Jesper Juul as games which are "easy to learn, hard to excel at"),[32] which brought women to gaming in much larger numbers. The 2009 Game of the Year, *Plants Versus Zombies*, *The Sims*, the classic *Tetris*, *Angry Birds*, *Bejeweled*, and *Candy Crush* lack overt racial and gender stereotyping. They also appeal to women and others with less time and money to devote to other types of games. Two years later, GamerGate proved Consalvo's prediction that things would get worse for women in gaming before they got better completely correct.

[28] Paul (2018); Condis (2018). [29] Kocurek (2015). [30] Huntemann (2010).
[31] Consalvo (2012). [32] Juul (2009).

Gamergate embodies many of gaming's paradoxes and moments of struggle over race, gender, and identity. In 2014, game developer Zoe Quinn, a game maker who is still viciously harassed to this day on Twitter under the #gamergate hashtag, found herself under continual attack after an angry ex-boyfriend claimed that she had had sex with a game journalist in exchange for a positive review. The campaign of sexist hate against her and her boyfriend at the time made them unable to find jobs and in fear of their lives. Quinn's memoir *Crash Override* describes Gamergate in great detail from her own point of view.

Gamergate made public what many gamers already knew: that gaming can be a uniquely uncivil medium for women, queer people, and people of color. Gamergate was a punishing and traumatic experience for those targeted, but because it brought the culture's egregious mediated racism and sexism to light, it may have resulted in the corrective moves that characterize gaming in the post-2014 era. Gamergate was a watershed moment that exposed the pervasive sexism and racism in gaming culture and motivated many developers for major studios, such as Bioware's Manveer Heir, to address it directly.[33]

So where do we stand today? Games have become more diverse, and so has research on games. As mentioned earlier, some of the most highly regarded games produced since 2012 engage directly with race, gender, sexuality, and emotion. Published and forthcoming books and articles by Bonnie Ruberg, Audrey Anable, Edmond Chang, Alenda Chang, Soraya Murray, and others focus on race, sexuality, and gender in gaming as topics for analytical study and as unique opportunities to understand speculative digital media.[34] These scholars employ scholarly approaches and methodologies that center affect, identity, and queer narratives and playing styles. Their work demonstrates both the potential and the harm of video games: at their best, games can bring new and impossible worlds and stories into being that create unique conditions of possibility for players to experience new identities, ideas, and environments.

Gaming is growing up, but it has much further to go. Gaming hardware has turned toward immersive technologies such as virtual and augmented reality platforms. The PS4 VR, the Oculus Rift, HTC Vive, and the Samsung Gear are expensive and powerful devices that raise the ante for digital embodiment and representation. These immersive game experiences offer new pleasures and risks along with new forms of digital harassment in game spaces. They present an even greater risk of harassment and mistreatment precisely because they are so intense: female players who use their real voices during multiuser play

[33] Grayson (2018). Available at www.rockpapershotgun.com/2014/03/27/manveer-heir-interview/. (Accessed July 6, 2018).
[34] Ruberg and Shaw (2017); Anable (2018); Malkowski and Russworm (2017).

have found their virtual breasts grabbed, and stalking and harassment have already become a major issue for developers.[35]

Gaming is in the midst of a cultural turn; it is still, in Mia Consalvo's words, often extremely toxic to women and minorities. Pervasive sexism and racism characterize the industry, a characteristic it has in common with Silicon Valley's "bro" culture generally. The remainder of this essay will discuss why racism is such a stubborn aspect of gaming culture and will conclude on a hopeful note by analyzing how contributions by users and industry work to combat and correct these problems. Activist programmers such as Sassafras Collective and the Hollaback team have produced social movements and software to alter this climate of harassment and, in reaction to Gamergate, companies such as Intel have committed significant amounts of money to programs that support women professional gamers.

"Shall We Play a Game?" How Calling Someone a Racist Is like Starting a Thermonuclear War

There is no doubt that the "n-word" is "a racial insult with a special status and unique strength. In Randall Kennedy's definitive book on this topic, entitled *N*****: The Strange Career of a Troublesome Word*, he asserts "it has long been the most socially consequential racial insult."[36] He cites writer Farai Chideya, who concurs, calling it "the All-American trump card, the nuclear bomb of racial epithets." Though it is cause for banning on every game platform that has a Terms of Service agreement, the word is frequently found in gaming culture.

What can be worse than sending someone an in-game message calling them a "nigger bitch," or calling someone a "nigger" over a voice-enabled headset? Calling someone a racist has almost an equivalent charge. (Sadly, calling someone a sexist lacks this ability to shock or anger.) Doane writes: "Today, charges of 'racism'—or the use of the label 'racist'—carry an extremely negative connotation and serve as perhaps the ultimate rhetorical weapon in public discourse on racial issues." The discursive act of calling someone a racist is viewed as almost equally transgressive to the act of actually using racist language: it is deemed so devastating that presumably no thing or body can survive it.

Race is a famously contentious topic, particularly in the United States. Because overt acts of racism have become less common in recent years, there is always a troubling tendency to view racism as disappearing, if not in fact completely eradicated. This view of racism as an unfortunate artifact of the

[35] Belamire (2016). [36] Kennedy (2002).

past, always as something that is dying out, characterizes the "post-racial ideology." Subscribers to this ideology believe that racism manifests itself most commonly as isolated incidents of hateful speech directed from one person to another, that racism is the result of "ignorance" rather than harmful intent, and that it is ultimately personal rather than culturally systemic.

However, those who doubt that racism (and its frequent companion, sexism) is still a serious problem or who believe that it is "personal" rather than pervasive throughout societal institutions need only look to the Internet for proof that this is *not* so. Racism and sexism have continued to flourish on the Internet, and indeed to some extent have even come to *define* it, despite Obama-era hopes for a "post-racial" society. The title of legal scholar Danielle Citron's book, *Hate Crimes in Cyberspace*, attests to the often outrageous amounts of outright misogyny, racism, and other discriminatory types of communication to be found in the digitally mediated world.[37] This book is a welcome corrective to earlier work that glosses over the unpleasant realities of unbridled digital communication and its victims, who are predominantly women and minorities.

Doane identifies two dominant ways of understanding and talking about race in the United States. The first defines racism as the product of individual attitudes or behaviors motivated by personal hatred, stereotyping, and prejudice against people of color. The second defines racism as a set of *systemic* and institutional practices such as de facto segregation, persistent inequality, and unequal access to resources such as education and safe housing. Doane claims that the first definition is by far the most common. Individual examples of player-to-player prejudice and harassment are ubiquitous within networked video games, but it must also be remembered that systemic practices such as the exclusion of non-stereotyped characters of color and women from the game texts and storylines themselves are part of a harmful racial discourse as well.

As Gray and Cote have documented, "hard-core" competitive shooter FPS games like *Halo* and *Call of Duty* are rough places for women. Profane and abusive language is often described as "trash talk" rather than harassment by many players, a rhetorical ploy which minimizes the harm to recipient. There is, however, a bright line that separates inconsequential speech from abuse. Gamers themselves make a distinction between "trash talk" and discourse that crosses the line, such as use of the word "nigger."

In 2011 A professional black female gamer known as "BurnYourBra," a nationally ranked *Mortal Kombat* player, explained in an interview on Eventhubs.com, a popular gaming website, that

[37] Citron (2014).

> At tournaments players talk [crap] to each other. That's just the way tournaments are. People get hyped. Players get salty when they lose, which is fine. But there is a difference between trash talking and calling other players disrespectful names. For me, I've been called a dyke, a butch, a slut, a bitch . . . I was even called a black bitch to my face along with being called a lesbian, a gorilla, and a monkey.[38]

BurnYourBra's interview produced a lengthy comment stream on the site; many of the contributors debated where the "line" between trash talking and racism lay. Some agreed that "trash talk" was inevitable, indeed an intrinsic part of the competitive culture of video game tournaments, but that it was "not the same" as racism. Others maintained that racism is best ignored and is of little consequence in a "post-racial" world, leaving it to the receiver to "shake it off." A key paradox of race, gender, and game studies rose to the top: while profanity and abuse are "trash talk," a form of discursive waste, lacking meaningful content that contributes to the game, many defended it as a distinctive and inevitable aspect of video game multiplayer culture. If it is indeed trash, the consensus opinion among gamers on this discussion board is that it is the responsibility of the receiver, not the culprit, to "take it out."

As digital media theorists Galloway and Thacker write, "trash, in the most general sense, implies remnants of something used but later discarded . . . trash is the set of all things that has been cast out of previous sets."[39] Once trash talk has been used to intimidate or bully another player, it is supposed to disappear, absolving its user of responsibility or even memory of the event.

If "trash" doesn't deserve notice or interpretation, as some players maintain, it is because it lacks meaning. Yet like the omnipresent trash icon on the computer desktop, a fixture of personal computer use, trash talk is part of the media ecology of digital culture. Just like videogame cheating, in-game economies, and online gender identities, all of which have been the subject of important book-length monographs in game studies,[40] the discursive environment of sexism, racism, and homophobia deserves critical attention because it is central to games culture.

BurnYourBra is not a particularly famous figure in video game culture, nor would she most likely define herself as a video-game activist or a feminist. However, by sharing her experience of racism and sexism within the culture of gaming she is contributing to a small but growing media campaign against video-game racism and sexism, a form of speech that is often *defended a*s just "trash talking." Likewise, user-generated blogs that are devoted to the task of

[38] www.eventhubs.com, April 15, 2011. Available at www.eventhubs.com/news/2011/apr/15/dmgburnyourbra-discusses-difficulties-being-female-gamer/ (Accessed August 6, 2018).

[39] Galloway and Thacker (2007).

[40] Castronova (2005); Consalvo (2007); Nardi (2010). "My Life as a Night Elf Priest," University of Michigan Press.

confronting racism, sexism, and homophobia work to prevent us from forgetting or ignoring online "trash talk" by preserving and archiving it, using old and new media.

"Fat, Ugly, or Slutty?" Game Activists and Crowd-Sourced Campaigns against Racism and Sexism in the Networked Gaming Era

As Dyer-Witheford and DePeuter write, "Games not only cultivate the imagination of alternative social possibilities; they also present practical tools that may be useful for its actualization."[41] Gamers who love the culture but hate its racism and sexism create websites that aim to expose some of its worst excesses. Well before Gamergate brought gaming's problems to light for the general public to see, sites such as *Fat, Ugly or Slutty Racialicious*, *The Border House: Breaking Down Borders in Gaming*, *Not in the Kitchen Anymore*, and *The Hathor Legacy* critiqued and publicized game culture's problems with race, gender, and sexuality while asserting the pleasure, aesthetic value, and social importance of games. These sites, all produced by passionate volunteers, provided "safe spaces" where these often-unpopular minority critiques can be expressed.

For example, *The Border House: Breaking Down Borders in Gaming* describes itself as "a blog for gamers. It's a blog for those who are feminist, queer, disabled, people of color, transgender, poor, gay, lesbian, and others who belong to marginalized groups, as well as allies." In its policies about posting, it asks users to include "trigger warnings" about content that "involves sexual assault or violence towards women and other marginalized groups, which may distress or cause readers to be triggered."

Though anti-sexist and anti-racist gaming blogs often encourage users to report abuse to game moderators before posting, the sites work to address what the game industry can't or won't by publicizing sexist interactions on popular game platforms and exposing abusive gamers to public ridicule. Most screenshots of abusive discourse in-game include the gamer-tag or in-game identity of the abuser, thus linking the behavior to a semi- (but not fully) anonymous individual. In this, their strategy resembles *Hollaback*!, a "movement dedicated to ending street harassment using mobile technology." *Hollaback!* encourages women to take pictures of sexual harassers and catcallers on the street or in public places with their cellphones and to share them on their website, thus creating an archive for other users to access, as

[41] Dyer-Witheford and de Peuter (2009).

well as a form of accountability: "By collecting women and LGBTQ folks' stories and pictures in a safe and share-able way with our very own mobile phone applications, *Hollaback*! is creating a crowd-sourced initiative to end street harassment."

Hollaback! broke the silence that has perpetuated sexual violence internationally, asserting that "any and all gender-based violence is unacceptable, and creates a world where we have an option—and, more importantly—a response." Similarly, the "Fatuglyorslutty site" relies exclusively on crowdsourcing to produce a rich sampling of sexist and racist "trash talk" sent from one gamer to another in the course of gameplay on game consoles, mobile devices, within PC games like *World of Warcraft,* and on every imaginable gaming device that permits strangers to contact other strangers.

The site's successful use of humor has helped it to garner positive attention in the gaming community, quite a feat given how unpopular and divisive the topic of sexism has been in recent years. *Kotaku*, a popular and widely read gaming blog, wrote the following in 2011:

The casual racism, snarling sexism, and random belligerence one encounters in online play, particularly in a first-person shooter over Xbox Live, are not at all a new phenomenon. It's sadly accepted as par for the course, in fact. But the three curators of *Fat, Ugly or Slutty*, have chosen to archive it, not so much for a high-minded ideal, but to hold a mirror up to idiots worthy of ridicule.

Indeed, *Fat, Ugly or Slutty* embodies Henry Jenkins' "critically optimistic" theories about the power of participatory media to increase tolerance and respect for diversity.[42]

As the *Kotaku* post noted, racism, sexism, and homophobia are commonplace in networked console video gameplay. Though the Xbox One, Playstation, and multiplayer games such as *League of Legends* and *Overwatch* all require users to sign off on Terms of Service agreements regarding the use of profanity and hate speech in live gameplay, these regulations are enforced through a system of victim-reported "tickets" or, at one time, player tribunals that are acted upon well after the fact, if at all.[43] Users who engage in hate speech can be banned from the service, but are able to log back on after the ban period has passed. The ineffectiveness of industry regulation of hate speech has created a need for victims of gamer abuse to create their own participatory outlets to engage a wider public and increase awareness of this serious issue.

[42] Jenkins (2006).

[43] Computer-based online games have come up with some novel solutions to the problem of moderation. For example, *League of Legends*, a popular PC-based real-time strategy game, has a system that invites users to act as moderators of player disputes around inappropriate speech and behavior.

In 2012 the front page of *Fat, Ugly or Slutty* featured a banner headline decorated with an image of a white woman wearing a dress, pearls, a conservative hairstyle, and a wink (see Figure 7.1). The header reads "So you play video games? Are you . . . Fat, Ugly, or Slutty?" There are radio buttons that invite users to submit their own material, read archives, learn about the site's staff, and read "press" or media coverage that further explains the site's mission to expose in-game harassment. The side bar on the right categorizes posts under labels that express the most common expletives that users have reported hearing or seeing, including of course the old standbys, "Fat," "Ugly," or "Slutty," as well as additional ones such as "Crudely Creative," "Lewd Proposals," "Unprovoked Rage," "Sandwich Making 101," and "Pen15 club." Perhaps the most disturbing category, "Death Threats," is well populated by posts threatening female players with specific forms of violence.

Though online gamers almost never use their real names when creating avatars or identities for themselves, many of them have invested significant amounts of time, energy, and real capital in these gaming identities. "Fat, Ugly, or Slutty" publishes gamers' online identities along with the racist and sexist messages that they have sent to its readers, thereby helping these readers to avoid grouping or playing with these abusive players while simultaneously exposing them to semi-public ridicule and shame. Though the site

Figure 7.1. "Fat, Ugly or Slutty" front page

collects samples of abuse that users found noteworthy enough to send in and is thus not a representative sample of what users commonly hear while playing, the examples users share are shocking.

For example, "xXSTONERXx1690," the author of a message posted to the site that reads "u will always b a spastic cunt cause ur black ya dirty slave" is unlikely to find that readers of *Fat, Ugly or Slutty* will accept his requests to play with him, and he or she may suffer other repercussions. *Fat, Ugly or Slutty*'s front page features radio buttons that allow readers to re-post its content to Facebook and Twitter, and an RSS link for those who wish to add it to their newsfeeds.

The naked racism and sexist aggression displayed by xXSTONERXx1690 is far from rare on the site or in gaming culture, but neither is it the norm. While it has been argued that fighting games like *Mortal Kombat* and *Street Fighter* and FPS games like the immensely popular *Modern Warfare: Call of Duty* and *Halo* series promote violent and abusive behavior or even real-world violence, the range of game platforms that *Fat, Ugly or Slutty* displays shows the reader that racism and sexism are global behaviors that can be found on *all* platforms within *all* genres of networked play. For example, after winning a game of *Words With Friends* on the iPhone app, "Dabby Dot" sent a *Fat, Ugly or Slutty* contributor a message that reads "hi wanna suck my dick?" followed four minutes later by another reading "come ooon" (see Figure 7.2). *Words With Friends* is a casual game based on Scrabble with no gamic texts, images, or negative fictions that might refer to gender, race, or violence in any way.

Another post, filed under "Unprovoked Rage," simply lists a spate of racist and sexist words, demanding that the reader "go back 2 halo" (see Figure 7.3). Similarly, other posted messages threaten to rape, kill, or otherwise violate or harm their recipients. A particularly disturbing example sent by "MrWinnipeg" to another player in *Draw Something*, a very popular casual game based on *Pictionary*, depicts a female figure labeled "slut" performing fellatio on a smiling male figure labeled "me."

Doane also writes that there is "significant disagreement about what racism is." This is no less true within the gaming community. Gamers greatly resent charges of racism despite its prevalence within the community. Many gamers often define racism and sexism very differently from how non-gamers do, distinguishing between "trash talk" and "real racism." Many gamers who use sexist or racist language do not see themselves or their peers as racist or "bad" people. *Fat, Ugly or Slutty*'s goal is to collect overwhelming evidence that this speech is pervasive, harmful, and indeed both sexist and racist.

On February 28, 2012, *Kotaku* reported that a "firestorm of drama" had been set off in the already drama-laden world of video-game reality television. Another popular gaming blog, *Penny Arcade*, followed suit, reporting in a

Figure 7.2. Sexism in casual games: user-contributed capture from FatUglyorSlutty documenting harassment in Words With Friends

story entitled "Sexual Harassment as ethical imperative: How Capcom's Fighting Game reality show turned ugly" (PennyArcade.com, February 28, 2012) that during a recent Capcom sponsored event "contestants took part in sexual harassment and in fact argued that sexual harassment is an important part of the fighting game community that needs to continue." In a video podcast entitled Capcom's *Cross Assault*, aired on Twitch.tv, professional Tekken player Aris Bakhtanians repeatedly asked female player Miranda Pakodzi about her bra size, talked about her breasts, and otherwise made inappropriate and abusive remarks while watching her play. When she protested that he was making her uncomfortable and acting "creepy," he responded that she needed to "toughen up." Pakodzi withdrew from the tournament, Bakhtanians apologized on Twitter, but the story continued to draw attention.

This incident went viral, and Baktanians was later interviewed about it by Twitch.tv community manager, Jared Rae. When Rae asked him, "Can I get my *Street Fighter* without sexual harassment?" Bakhtanians replied bluntly, "You can't. You can't because they're one and the same thing. This is a

Figure 7.3. "Go back 2 halo pussy, u r a loser pussy faggot nigger spic jew"

community that's, you know, 15 or 20 years old, and the sexual harassment is part of a culture, and if you remove that from the fighting game community, it's not the fighting game community."

In this interview Baktanians retreats from his earlier position that women need to "toughen up," thus minimizing the effects of sexism, a common postfeminist claim that represents the orthodox opinion on harassment in the gaming world. Rather, this time, Bakhtanians took an entirely different tack, asserting that video-game sexism may be harmful, but that it is an intrinsic part of a long-standing culture and needs to be preserved and protected as such. His argument is that the "fighting game community" has the right to engage in sexual harassment because it is "part of the culture," regardless of the harm suffered by women. There are some obvious weaknesses in this argument—and in the wake of the controversy, hundreds of gamers stepped forward to disavow their membership in this "culture," or claimed that Bakhtanians was misrepresenting it. However, few challenged the notion that gaming constitutes its own sphere of convention and condoned behaviors: that it was, in short, a "culture" with different norms, forms of speech, and customs from those of culture at large.

Conclusion

Despite Bakhtanians' claims that the culture of gaming must retain its customary sexist and racist discourse to remain authentic, traditions change. Post-Gamergate critiques of these practices, industry attempts to address the issue, and the producers of new games that center diverse protagonists are working to produce new gaming traditions and cultures. Today, avatars are much more customizable than they were, and it is far more likely that women and people of color can "see themselves" in the games that they play.

Gaming is still a media form where egregious sexism and racism are commonplace. Indeed, digital networked games are where both the worst *and* the best behavior on the Internet are to be found. How can we avoid demonizing straight white male gamers and honor players' legitimate claims to belonging to a playful, generative, and distinctive "gamer" culture while working to address its historic hostility to women and minorities? As gamer culture continues to struggle with racial and sexual difference, those of us who love to play but who do not fit the traditional gamer identity envision an expanded community based on skill, pleasure, engagement, and collaboration.

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8

Data Protection in the Clouds

Christopher Millard

This chapter brings a legal perspective to bear on the topic of data protection on the contemporary Internet in which personal information is increasingly stored and processed in, and accessed from, "the cloud." The reliance of ever more apps, websites, and services on cloud providers contrasts with earlier days of the Internet in which much more data was stored locally on personal computers. At a time when there is ever more use of cloud computing, this chapter illuminates the complexities over what information in cloud computing environments is protected as personal data, and who is responsible. Will data protection laws, such as those in the EU, protect us, or are there alternative approaches to providing effective protection for personal data in clouds? This chapter airs the question of whether a greater focus should be placed on localizing personal data, as advocated by the Internet pioneer, Tim Berners-Lee.

Introduction

"Cloud computing" (also known as "the cloud") is essentially a means of providing computing resources as a utility service via the Internet.[1] Cloud services range in scope from the provision of basic processing and storage capacity through to fully featured online services such as webmail and social networks. The cloud market is evolving very rapidly, with substantial investments being made in infrastructure, platforms, and applications, all delivered "as a service." The appetite for cloud resources is enormous, driven

[1] For a more detailed introduction to cloud computing technologies and services, see Millard (2013), chapters 1 and 2.

by such developments as the very large-scale deployment of mobile apps and the rapid emergence of the Internet of Things. Estimates of the size of the market for core cloud services vary but in 2016 it was estimated to be US$210 billion, with forecast growth to over US$380 billion by 2020 (Gartner, 2017). The wider economic and social impact of cloud-enabled services is far greater than those numbers indicate. Facebook alone, a cloud-enabled service, had a market capitalization of more than US$550 billion at the time of writing. Whether they are aware of it or not, members of the public are increasingly dependent on cloud infrastructure and services as a technological underpinning of their lives as private individuals, as consumers, as students, as employees, and as citizens. As cloud computing has moved into the mainstream, questions have increasingly been asked about protection of, and responsibility for, "personal data" (broadly meaning information about identifiable individuals) that is processed in cloud environments. For example, ongoing investigations and litigation relating to the use by Cambridge Analytica of Facebook-derived personal data have been reported widely, and in many countries have triggered a public debate regarding data protection rights and responsibilities.

After a brief introduction to both data protection and cloud computing, this chapter will focus on four key issues in this field. First, what information in cloud computing environments is, and what should be, protected as personal data? Second, who is, and who should be, responsible for such data? Third, what is the international impact of data protection laws? In particular, which laws apply to personal data in clouds, and how do restrictions on cross-border transfers of personal data affect cloud computing activities? Finally, we will look at the likely future development of data protection law and policy and consider some alternative approaches to providing effective protection for personal data in clouds.

The global legal and regulatory environment for protection of personal data in clouds is complex, with many relevant laws at the national and, in some cases also state or provincial, levels. There have been various attempts to harmonize data protection rules at the transnational level and such initiatives continue. In addition to legislation and regulatory frameworks that focus specifically on protection of personal data, cloud activities involving personal information may be subject to numerous other legal rules, such as duties of confidentiality, contractual obligations, and remedies for defamation. Regulation of the Internet has evolved rapidly over the past couple of decades on many different fronts. Indeed, notwithstanding various popular/populist claims that it is somehow beyond the reach of the law (e.g. Barlow, 1996), the Internet has always been a highly regulated environment (Millard, 1995). It is true that conventional laws don't always translate easily from the localized, physical contexts for which they were designed to remote, digital environments, and also that remote activities may be less susceptible to local law enforcement. Nevertheless, it has become widely accepted that activities carried out via the Internet are regulated, and that numerous laws apply to online activities (Goldsmith and Wu, 2006). Moreover, we should tread with caution before introducing additional, technology-specific laws and regulations: most such initiatives have ended in failure, often with unintended and unhelpful consequences along the way (Reed, 2012).

Cloud computing is just one element of online activities, and data protection is a specific aspect of the legal and regulatory framework applying to the cloud. Certain activities that are facilitated by the cloud, such as machine learning and big data analytics, will be mentioned. The main emphasis, however, will be on cloud computing as such, and on the implications, for cloud providers and users, of legal and regulatory frameworks that apply specifically to the processing of personal data in clouds.

As regards terminology, the body of law that regulates personally identifiable information is referred to in most parts of the world as "data protection." In the US, however, it is sometimes called "data privacy." Although important distinctions can be drawn between these concepts, in practice they are often used interchangeably. The main geographical focus of this chapter will be Europe, which has the longest tradition of data protection regulation. Moreover, as we will see, the European model is increasingly becoming a template for data protection laws in many other parts of the world.

What is Data Protection?

Data protection is perhaps most easily understood as an instance of privacy law, with a specific focus on personal information. Privacy, as a distinct legal concept, can be traced back to an article published in the *Harvard Law Review* in the late nineteenth century (Warren and Brandeis, 1890). In that paper the authors reviewed the long history of protection under English law for various individual liberties and private property. They extrapolated a general "right to privacy," at the heart of which was a "right to be let alone." Eight decades later, popular concerns about the use of computers in both public and private sectors led to the gradual adoption of a swathe of data protection laws, starting with a regional law in Germany in 1970, followed by the first national law in Sweden in 1977 (Millard, 1985). Around the world, 120 countries have enacted laws (and thirty more have pending legislation) intended to protect individuals' rights to privacy by restricting the way in which information about them may be processed in the private sector (Greenleaf, 2017). Most of the laws are based on one or more transnational harmonization measures, notably the OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data (OECD, 1980), the Council of Europe Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data (Council of Europe, 1981), and a Directive on data protection adopted by the European Union (EU DPD, 1995). The EU DPD was replaced in May 2018 by the EU General Data Protection Regulation (EU GDPR, 2016) which developed the European model further with a much greater emphasis on accountability and substantially stronger enforcement powers. In recent years, countries outside Europe have been implementing European-style data protection legislation at an accelerating pace (Greenleaf, 2012).

The US remains an outlier. Although it has had a federal law regulating privacy in the public sector since 1974, private-sector processing of personal data are subject to a complex, but not comprehensive, patchwork of sector-specific laws and regulations both federally and in the states (Solove and Schwartz, 2018). There have been, however, calls for a more coherent, and less parochial, approach to privacy legislation. Proposals from the Obama Administration (The White House, 2012) and the Federal Trade Commission (FTC Report, 2012) recognized the potential benefits for both consumers and businesses of "interoperability" in relation to privacy laws, a theme that resonated with the European Commission's approach to increased harmonization in *Safeguarding Privacy in a Connected World* (European Commission, 2012). Moves to enhance privacy rights have not, however, attracted the same level of support from the current US administration which, among other things, has taken controversial steps to roll back Internet privacy rules that were adopted at the end of the Obama administration (Kindy, 2017).

Meanwhile, outside the US, at the heart of most existing data protection laws worldwide is a set of principles intended to ensure that personal data are:

- Processed only with consent or some other legal justification;
- Processed fairly and lawfully;
- Adequate, relevant, and not excessive for specific, identified, purposes;
- Accurate and, where necessary, kept up to date;
- Kept in an identifiable form only for so long as is necessary;
- Protected against unauthorized or unlawful processing and against accidental loss or destruction.

In addition, most data protection laws restrict the transfer of personal data to jurisdictions that are deemed to lack an adequate level of protection. Almost all laws provide for a range of rights and remedies for individuals in relation to their personal data, including access to data and a right to insist that inaccurate information be corrected or erased, and most laws establish a regulator with enforcement powers.

Much could be said about the core data protection principles and the specific rights of individuals, all of which can be both complex and controversial when applied to online activities. In the limited space available here the focus will be on the key issues arising from cloud computing arrangements and, in particular, the scope of the data protection obligations placed on cloud providers, and the corresponding rights and remedies available to individual users of cloud services.

What is Cloud Computing?

At its simplest, cloud computing is a way of delivering computing resources as a utility service via the Internet. As such, the cloud may prove to be as disruptive an innovation as was the emergence of cheap energy delivered via electricity grids a century or so ago (Carr, 2008). In slightly more technical terms, cloud computing is an arrangement whereby computing resources are provided on a flexible, location-independent basis that allows for rapid and seamless allocation of resources on demand. Typically, cloud resources are provided to specific users from a pool shared with other customers with charging, if any, proportional to the resources used. The delivery of cloud services often depends on complex, multilayered arrangements between various providers. Many permutations are possible, but cloud computing activities are often described as falling into one or more of these three service categories:

- Infrastructure as a Service (“IaaS”)—computing resources such as basic processing and storage (e.g., Amazon Elastic Compute Cloud—EC2);
- Platform as a Service (“PaaS”)—tools for developing and deploying applications (e.g., Microsoft Azure);
- Software as a Service (“SaaS”)—end-user applications (e.g., Salesforce, Dropbox, Gmail, Facebook).

In addition to these basic service categories, there are many highly specific “as a Service” offerings, such as Machine Learning as a Service (“MLaaS”), Robot as a Service (“RaaS”), and Blockchain as a Service (BaaS).

Cloud deployment models can also be viewed in various ways, but a widely used classification is:

- Private cloud—where the relevant infrastructure is owned by, or operated for the benefit of, a single large customer or group of related entities;

- Community cloud—where infrastructure is owned by or operated for, and shared amongst, a specific group of users with common interests;
- Public cloud—where infrastructure is shared amongst different, varying users using the same hardware and/or software;
- Hybrid cloud—involving a mixture of the above, for example an organization with a private cloud may "cloud burst" processing activities to a public cloud for "load balancing" purposes during times of high demand (Mell and Grance, 2011).

The cloud sector is expanding rapidly, with cloud service providers ranging from extremely large technology companies to tiny start-ups. While some providers specialize in a specific type of cloud service and/or market, others offer cloud products covering the spectrum of cloud activities. In addition, there is an emerging group of integrators, who provide various types of cloud consultancy and systems integration services. The importance of such intermediaries in the enterprise cloud sector (i.e., for businesses and governments) looks set to grow (Hon et al., 2012a).

Most cloud service arrangements, especially for consumers and SMEs, are set up via nonnegotiable, standard-form, "click-through" contracts. Such terms of service tend to favor cloud providers, and often contain specific provisions, even in privacy policies, which are disadvantageous to customers and may be unenforceable, or even illegal. Terms and conditions may be complex and obscure, and it is not uncommon for cloud providers to claim the right to change them unilaterally and without notice (Bradshaw et al., 2011). Transparency is generally regarded as a fundamental prerequisite to effective privacy protection, and it is also important that affected individuals have an appropriate degree of control over the way that information about them is used. Cloud providers, and the contractual terms on which they operate, vary significantly in the way they address (or fail to address) these and other privacy issues, such as data security (Kamarinou et al., 2016).

A relatively small, but growing, number of cloud contracts are negotiated, typically where a cloud customer insists on specific arrangements and a cloud provider considers that the financial or strategic value of a particular deal merits special treatment. Although such deals mainly involve corporate or government customers, privacy and security provisions are amongst the most commonly negotiated terms and can be deal-breakers (Hon et al., 2012a). Sectoral compliance obligations, for example in financial services, are a further driver for the negotiation of customized contractual arrangements (Hon and Millard, 2016).

What Information in Clouds Is Regulated as Personal Data?

Regulatory obligations imposed by data protection laws tend to apply on an "all or nothing" basis. In the member states of the European Economic Area (EEA),[2] and many other jurisdictions with data privacy laws, the key test is whether information constitutes "personal data." This is typically defined along these lines: "any information relating to an identified, or identifiable, natural person" (EU GDPR, 2016). If information is personal data, then "data controllers" (see the section called "Who is Responsible for Personal Data in Clouds?") are subject to a raft of compliance obligations, some of which may prove highly onerous, or even impossible, in specific online environments. Even stricter rules apply to a subset of personal data defined in the EU GDPR as "special category" data, also known as "sensitive data," or "sensitive personal data" (which includes data relating to health, religion, genetics, biometrics, etc). Conversely, if information is not personal data, or if it ceases to be personal data (for example, as a result of irreversible anonymization), it may instead be subject to no restrictions at all under data-protection laws. This binary approach can be problematic, especially when applied to complex processing scenarios such as those that arise frequently in cloud computing arrangements. To complicate matters further, regulators and courts that are supposed to use the same concepts may disagree fundamentally as to what is and is not "personal data" (Millard and Hon, 2012).

It is the incorporation of "identifiable," and not just "identified," in the definition of personal data that tends to be most problematic, in the context of cloud computing and related ecosystems such as the Internet of Things as well as other standard arenas. If "identifiable" individuals are included by default, even if their identities are disguised securely, and regardless of whether they are ever actually identified, then a vast category of information that is only *potentially* personal data will be regulated. This has been described as the "European Union's expansionist view" and can be contrasted with the "United States' reductionist view," whereby only information that has been specifically associated with a particular person constitutes "Personally Identifiable Information (PII)." An alternative approach might be to protect and regulate the processing of information about both identified and identifiable individuals, but with different legal requirements for each category (Schwartz and Solove, 2011). The EU GDPR has moved toward this model in relation to

[2] The EU DPD has been implemented throughout the EEA, which comprises the 28 EU member states plus Iceland, Liechtenstein, and Norway. On 29th March 2017, the United Kingdom gave notice of its intention to leave the EU by 29th March 2019. At the time of writing that deadline had been extended to 31st October 2019. However, the timetable and terms on which 'Brexit' would take place (if at all) remained very uncertain.

data that have been pseudonymized so that they can no longer be linked to an identifiable individual without the use of additional information (which is kept separately and securely). Such information is still treated as personal data, but pseudonymization may help to justify the use of such data for purposes such as research and archiving.

The answer to the question of whether or not personal data are being processed may vary depending on the type of cloud service and precise deployment model used. In some cases, for example a social networking service, it may be clear that the service provider is processing personal data, partly provided by users and partly generated through operation of the service (the latter type of data being described usually as "metadata"). The question then is, who should be responsible for the relevant processing activities (see the section called, "Who is Responsible for Personal Data in Clouds?"). In other cases, it may be more difficult to establish whether information that is being processed in a cloud environment should be regarded as personal data. For example, should encrypted or pseudonymized data be regulated as personal data in the hands of a cloud service provider that does not have the decryption key or the means to re-identify the individuals concerned? Such scenarios are common. A customer may use strong encryption to make personal data indecipherable prior to uploading the encrypted data to a SaaS cloud backup or archive service. Similarly, a customer of an IaaS service may use the cloud service provider's computing resources to process personal data on virtual machines in a way that prevents the service provider from having access to any identifiable information. Why should the personal data controlled directly in this way by the customer be treated as also being personal data in the hands of the cloud service provider in either of these examples? To take the argument a step further, why should the responsibilities of a cloud provider depend on the steps that their customers take to anonymize or encrypt their data (Hon et al., 2011)? This leads us beyond the definitional question about personal data to the key question of responsibility for personal data in clouds.

Who Is Responsible for Personal Data in Clouds?

Under data protection laws in EEA member states and many other jurisdictions, it is assumed that anyone who processes personal data will be either a "data controller" or a "data processor," or possibly both. A "controller" determines the "purposes and means" for processing personal data. The EU GDPR and existing laws based on the EU DPD impose various obligations on controllers vis-à-vis the "data subjects" whose information they process, including compliance with the principles summarized in the section of this chapter called “What is Data Protection?” Controllers also have obligations to regulators that may include providing information about certain types of processing activities and reporting data breaches in certain situations. A failure by a controller to comply with their obligations may expose the controller to regulatory intervention (including administrative fines), civil liability, and in some cases, prosecution for criminal offences.

A “processor” processes personal data on behalf of a controller. This may seem a straightforward concept, but drawing clear distinctions between controllers and processors is often difficult, especially where a service provider has a degree of autonomy in determining the “means” used to process a controller’s data. This categorization issue can arise in conventional outsourcing deals, but it tends to be both more common and more complex in cloud computing arrangements.

In some cases, such as social networking and webmail, service providers may both provide a processing service for users and also have significant control over what they do with the information that is provided by users. As such, they are likely to be viewed as data controllers, at least to the extent that they use the data for their own purposes, such as data analytics and targeted marketing. Each user may also be a controller, although use of a social network or webmail service by an individual for private purposes may be exempt from regulation as “processing . . . by a natural person in the course of a purely personal or household activity” (EU GDPR, 2016, Article 2(2)(c); Article 29 WP 163, 2009; Article 29 WP 169, 2010). In other cases, a cloud provider may play a fairly traditional role as a data processor, for example by providing backup and disaster recovery services for non-encrypted data. Still further down the cloud service delivery chain, a customer may simply be leasing general-purpose computing infrastructure, and the cloud provider may have neither knowledge of, nor control over, any activities that involve the processing of personal data. In such a case, the cloud service provider will not be regarded as a controller of such data, but arguably it also makes little sense to treat the provider as even a processor.

By analogy, if I sell or lease to you a conventional computer system for you to use on your premises to process personal data in your business, you will be the controller of the personal data and the mere supply of equipment will not make me a processor. In a cloud infrastructure arrangement, instead of supplying you with a physical computer for you to use at your premises, I may provide you with one or more virtual machines that are hosted on hardware at my data center. I may, however, still have no more knowledge of, or control over, your data than if you were doing the processing yourself on equipment under your direct control at your premises. So, what is the difference? Under EEA rules, even simple storage of personal data are a type of processing that is likely to be regulated. This means that if you store personal data on equipment located in my data center, I will be a data processor as defined by the EU GDPR, and possibly even a joint data controller because I determine aspects of the "means" of storage.[3]

Why does any of this matter? The reason is that the characterization of participants in cloud arrangements as controllers and/or processors has significant legal consequences. For example, Article 28 of the EU GDPR states that controllers must only use processors that provide "sufficient guarantees to implement appropriate technical and organisational measures in such a manner that processing will meet the requirements of this Regulation and ensure the protection of the rights of the data subject." If a controller delegates any processing activity to a processor, then the controller must put a detailed contract in place to regulate the processing, and similar contractual arrangements must be established in relation to any sub-processors. Many aspects of compliance with the detailed rules in the EU GDPR will be a joint responsibility of controllers and processors, and the penalties for breaches may be substantial. For a range of offences, the upper limit for fines will be Euro ten million, or two percent of global turnover/revenues (whichever is higher). For other offences, fines may go up to Euro twenty million, or four percent of global turnover/revenues, again whichever is higher. For one of the major global cloud service providers, the potential upper limits may amount to several billion dollars. While fines on that scale will almost certainly be extremely rare, the mere possibility of a very substantial fine is likely to be sufficient to motivate large data controllers to take compliance seriously. Isn't that an obviously good thing for data subjects? Maybe. However, given the complexity and uncertainty that surround data protection compliance, there is a risk that such penalties may have a chilling effect on innovation and they might deter companies from offering certain types of (potentially useful and popular) services in markets where heavy enforcement is considered likely.

As a consequence of concerns about enforcement risks, providers and users of enterprise cloud services are likely to pay greater attention to their contractual positions. In a conventional outsourcing transaction, it has long been common for the respective roles and responsibilities of a customer and its service provider(s) to be the matter of extensive negotiations. A detailed contract, or set of contracts, will usually be prepared that, in the EEA at least, will include specific provisions to address the parties' respective data protection compliance obligations. Although similar negotiations do occur in relation to some cloud arrangements, the vast majority of cloud contracts are offered on a

[3] For a more detailed discussion of the issues with additional examples, see Hon, Millard, and Walden (2012b).

“take it or leave it” basis (Hon and Millard, 2012). Nevertheless, in an opinion on cloud computing, the Working Party of national regulators established under Article 29 of the EU DPD[4] asserted:

> the processor can subcontract its activities only on the basis of the consent of the controller . . . with a clear duty for the processor to inform the controller of any intended changes concerning the addition or replacement of subcontractors with the controller retaining at all times the possibility to object to such changes or terminate the contract. There should be a clear obligation of the cloud provider to name all the subcontractors commissioned. (Article 29 WP 196, 2012)

Compliance with this requirement may be difficult, or impracticable, in many cases where a specific cloud computing arrangement depends on multiple providers, each of which may play a different and changing role in delivering a complex package of services to a particular customer. Moreover, it is not clear how a customer with modest technical and legal resources, such as a typical SME (Small or Medium-sized Enterprise), will be in a position to evaluate, and deal appropriately with, all the information that a SaaS provider might need to provide regarding its subcontracting arrangements with providers of IaaS, PaaS, and perhaps also other SaaS services.

Another fundamental problem with the established controller/processor model is that it may be inappropriate, or impossible, for a particular cloud customer to impose terms regarding security and other key processing criteria on a large cloud provider with perhaps millions of customers. This point has been acknowledged, though not resolved, by the UK Information Commissioner’s Office, which has observed:

> a cloud customer may find it difficult to dictate the specifics of data processing to a large (and perhaps global) cloud provider. However, this cannot be an excuse for a data controller not fulfilling their responsibilities required by the DPA.
> (ICO, 2012, para 44)

Furthermore, it may be impracticable, and indeed inappropriate, for a particular customer to insist on conducting an on-premises audit to assess a public cloud provider’s security arrangements, not least because an audit by one customer may compromise security for others.[5]

[4] Under the EU GDPR, this Working Party has been replaced by the European Data Protection Board, which has a broader remit and many specific powers.

[5] This much is accepted by EEA data protection regulators who concede that an independent third-party audit commissioned by the cloud provider may suffice. Nevertheless, they insist that “businesses and administrations wishing to use cloud computing should conduct, as a first step, a comprehensive and thorough risk analysis.” Reference is made to reliance on “independent verification or certification” but it is not clear whether this can be a complete substitute for a risk analysis (Article 29 Working Party, WP 196, 2012).

What Is the International Impact of Data Protection Laws?

Remote processing of data are an essential feature of many cloud computing arrangements. Many major cloud providers that provide services in Europe make use of data centers and other infrastructure outside the EEA, and such processing may occur even where the provider also has infrastructure within the EEA. The specific cross-border arrangements may not be obvious, or even predictable, because transfers of data may occur automatically within distributed cloud architectures. What impact might data protection laws have on such arrangements?

The EU GDPR has a very long arm reach in two key respects, both of which are controversial. First, it applies to “processing of personal data in the context of the activities of an establishment of a controller or a processor in the Union, regardless of whether the processing takes place in the Union or not” (EU GDPR, 2016, Article 3(1)). A similar provision in the EU DPD was interpreted expansively by the EU’s highest appeal court, the European Court of Justice (ECJ) in several cases. Most notably, the ECJ ruled that Google Inc (a Delaware corporation) was “deemed” to be established in Spain because it had a subsidiary there selling AdWords to appear alongside search results (Google Spain, 2014).

Secondly, the EU GDPR applies to processing of personal data relating to individuals in the EU by a controller or processor established outside the EU, where the processing activities relate to either (a) offering goods or services (whether or not payment is required) or (b) monitoring behavior that takes place in the EU. Both of these tests are potentially broad. While mere accessibility of a website in a particular country will not be sufficient to constitute “offering goods or services,” factors such as use of a language or currency that is prevalent in one or more EU Member States (e.g., German/Euros) may be significant. As for what will constitute monitoring, key factors will be whether an individual is “tracked on the Internet . . . particularly in order to take decisions or for analysing or predicting his or her personal preferences, behaviours and attitudes” (EU GDPR, Recital 24). Such “tracking” is extremely common and may result in a large number of non-EU based organizations becoming subject to EU data protection law. Many will have no idea about their obligations, or may choose to ignore them but, as already noted, the existence of potentially harsh penalties is likely to lead at least larger non-EU organizations that have assets or people based in Europe to take seriously their compliance responsibilities. This may in turn, lead to the EU GDPR’s increasingly being treated as a global standard or benchmark for processing of personal data by companies that operate internationally.[6]

In addition to their broad jurisdictional reach, EEA data protection laws also contain tough restrictions on the export of personal data to non-EEA countries that lack an "adequate" level of protection. There are various possible justifications for transferring personal data to such "inadequate" countries, including use of standard contract clauses that have been approved by the European Commission and reliance on participation by a data importer in the so-called US Privacy Shield. However, the data transfer rules are complicated and compliance can be very cumbersome. Taken together, the long-arm jurisdiction rules, combined with the restrictions on exports of personal data from the EEA, may reduce the attractiveness of Europe as a location for cloud businesses and infrastructure.

Although cloud computing has highlighted fundamental problems with the location-based approach to regulating organizations that process personal data, the EU's preoccupation with the physical location and movement of data has long been anachronistic (Millard, 1997). European data protection concepts largely crystallized at a time when computers were few in number, large and expensive, and when data input and output options were limited and typically involved the physical movement of media such as punched cards and magnetic tapes. All of this made it relatively straightforward for regulators to identify and monitor the automated processing of personal data. Keeping track of data processing became steadily more difficult as online transfer technologies evolved in the 1970s and 1980s. Commercialization of the Internet from the mid-1990s made it increasingly easy and inexpensive for governments, businesses, and consumers to transfer information worldwide, at low cost, and on a very large scale. Billions of network-enabled devices are in use, with vast amounts of personal data being transferred globally every second. Export control regimes for personal data that deem most countries of the world to be "inadequate," and that impose cumbersome restrictions on international transfers are, for all practical purposes, obsolete.

What Is the Future of Data Protection in the Clouds?

Might there be a better way to provide effective data protection safeguards for personal data in the clouds? More specifically, how might we move beyond

[6] See, for example, Microsoft's decision to extend GDPR rights to all of its consumer customers worldwide: https://blogs.microsoft.com/on-the-issues/2018/05/21/microsofts-commitment-to-gdpr-privacy-and-putting-customers-in-control-of-their-own-data/. (Accessed October 6, 2018).

the current formalistic, complex, and uncertain rules that determine what is regulated as “personal data” and who is responsible for processing such data? Is there a more effective way to ensure that national privacy safeguards are not undermined as a result of offshore processing or remote control of data? How can legislators and regulators manage the daunting challenges involved in achieving a balance between reliance on broad, but inevitably vague, principles of general application, and the imposition of much more specific, but potentially unworkable, compliance obligations? To even begin to answer these questions, we must revisit some of the core issues discussed earlier in this chapter.

In relation to the questions of what should be protected as personal data in clouds and who should be responsible, in both cases it might be helpful to adopt a purposive, or functional, approach in place of the current procedural, or formalistic, model. Under a purposive/functional paradigm, instead of trying to squeeze cloud computing and other online services into the current “all or nothing” binary models of what is personal data and who has responsibility, the focus could be on who has effective control over personal data and who is best placed to ensure appropriate safeguards for individuals. Under such a purposive/functional approach, considerations of risk and accountability would assume much greater importance, while issues of precise categorization and regulatory formalities would have much less importance.

The EU GDPR includes several provisions that represent a positive attempt to shift the focus toward a more proactive, and indeed preventative, approach to protecting personal data based on assessments of the risk of harm to individuals. In particular, the EU GDPR contains various provisions that are intended to promote data protection by design and by default techniques that have been tried and tested and found to be beneficial in other jurisdictions, especially in Canada. Similarly, the revised version of the OECD Guidelines (OECD, 2013), the updated Asia Pacific Economic Cooperation Privacy Framework (APEC, 2015), and the Modernised Council of Europe Convention (Council of Europe, 2018), all have a strong focus on accountability mechanisms and on promoting privacy by design.

Such a paradigm shift would also make sense in relation to cross-border aspects of data protection law. As noted earlier, continuing attempts to regulate the physical location and cross-border movement of personal data may miss the point in terms of protecting individuals, and also have a chilling effect on the development and deployment of international cloud services. The geographic location of data are no longer, indeed perhaps never was, the key factor in determining whether personal data will in practice be protected from unauthorized access or use. For example, strongly encrypted data hosted on a secure server outside the EEA may be much “safer” than unencrypted data stored within the EEA on infrastructure or devices that are often far from secure (Millard, 2015).

If instead of looking at the physical location of data, the primary focus was on logical control of data, might this lead to a radically different approach to cross-border protection of personal data? Interestingly, one country has taken this challenge beyond the level of a thought experiment. In response to "[g]eopolitical events in 2014" [code for Russia's annexation of Crimea], the government of Estonia undertook a pilot project to assess the viability of a "Virtual Data Embassy Solution." The ultimate objective was to establish a digital continuity plan for Estonia's essential public services via a combination of a "physical embassy for data in a friendly foreign country" and a "virtual embassy for data in a privately owned public cloud." This is not as odd as it will probably seem to many privacy regulators. Amongst the fundamental objectives of data protection laws are to protect the security of personal data, including the confidentiality, integrity, and availability of the data. If that can best be achieved by using cloud servers abroad, so be it. Personal data stored on servers located in Estonian embassies would remain subject to Estonian law. Meanwhile, replication of critical data in a secure manner in a public cloud service could provide a high level of data integrity and availability. The report of the pilot project concluded that, while some further work would need to be done before it could be deployed on a large scale, there were no fundamental legal or technical obstacles to the adoption of the proposed model. The "data embassy" solution became part of the Digital Agenda 2020 for Estonia (Estonia, Ministry of Economic Affairs and Communications, 2016).

Meanwhile, the social and economic significance of both personal data and cloud computing will continue to grow as more and more relationships and transactions are mediated via online services involving storage and processing of data. In particular, the use of cloud computing to facilitate the rapid expansion of the Internet of Things will entail the processing of vast amounts of personal data via increasingly complex supply chains for products and services. Indeed, the vast, and rapidly expanding, scale and complexity of systems that are used to process personal data may stretch the established data protection model beyond breaking point. For example, how can appropriate contractual arrangements for processing data be implemented in IoT environments containing numerous connected sensors and a very large number of different manufacturers, distributors, and service providers (Millard et al., 2017)? How should individuals be provided with "meaningful information about the logic involved," and an effective right to human review, in relation to automated decisions made using intricate, and increasingly obscure, machine learning techniques (EU GDPR, Arts. 13(2)(f), 14(2)(g), 22(3); Kamarinou et al., 2017)?

As already noted, the EU GDPR's focus on risk assessments, privacy by design, and ongoing accountability points the way to a more purposive, functional approach to data protection rights and responsibilities. In the end, however, this may not be enough to provide appropriate and enforceable rights for individuals in scenarios involving extremely complex technologies and processes, with long supply chains, and large numbers of controllers and processors of personal data. A possible alternative approach, at least in such cases, would be to think about data protection more in terms of consumer protection, rather than as a rather abstract individual human right that is buttressed by labyrinthine and bureaucratic regulations (as is the case in many countries). This would be controversial, but it might make sense, for example, in cases where it is infeasible to provide transparency regarding processing activities, or it is impossible to ascertain precisely how a particular harm involving a misuse of personal data has occurred. Whether such an approach would be appropriate and acceptable would probably depend in large part on the nature of the harm involved. For example, a quantifiable financial loss resulting from a data breach may lend itself to a remedial model based on strict liability, perhaps backed by compulsory insurance. Moreover, it might in some cases be possible to standardize this for a whole class of affected people. Individualized remedies would still, however, be needed, for example in a case in which a reputational or other intangible harm is suffered as a result of unfair, or otherwise unlawful, processing of data. Although yet to be developed in practice, the EU GDPR does envisage a move toward a more collective model, including the promotion of industry codes of conduct and the possibility of representative or class actions. Work is also underway on the development of industry codes and standards for cloud computing, and this is a trend that is likely to accelerate (Gleeson and Walden, 2014). So, while data protection in the clouds seems impossibly complex, there are early signs that a more systematic and manageable regulatory model might evolve.

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Building the Cybersecurity Capacity of Nations

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Threats to and attacks on the security of the Internet—unauthorized access to digital resources, such as computer hardware, software, data, and data centers—have become a major global issue in the twenty-first century. One consequence is that policy-makers are focusing more attention on global strategies, given that nations without the capacity to maintain security can be exploited by malevolent actors in ways that undermine other states. And this strategy presents policy-makers with an opportunity to become more proactive in building national capacity to withstand threats to the security of the Internet, rather than addressing security breaches only after they occur. Bringing together data from multiple sources in 138 countries, this chapter provides an overview of global cybersecurity capacity building and examines whether these efforts actually enhance security for end users of the Internet.

Introduction

There is an increasing awareness of society's vulnerability because of computer systems' susceptibility to hacking, phishing, viruses, spying, malware, and other related threats. Governments, international organizations, and companies alike are developing initiatives to better protect security of these systems through what has been called cybersecurity.

The term "cybersecurity" has been defined to include the "technologies, processes, and policies that help to prevent and/or reduce the negative impact of events in cyberspace that can happen as the result of deliberate actions against information technology by a hostile or malevolent actor" (Clark, Berson, and Lin, 2014: 2). The term references the related conception of "cyberspace," which has been used to refer metaphorically to the network of systems and devices that are linked via the Internet (Graham, 2013).

One set of initiatives is to build an individual's or organization's resilience to malicious users—that is, building their cybersecurity capacity. This is not simply a technical approach as it includes policy and strategy, sociocultural behavior and attitudes, knowledge and skills, regulations, law enforcement, technical standards, and capabilities (Creese, Bada, Ignatuschstschenko, and Roberts, 2017). Such capacity-building efforts are designed to confront the growth of Internet-related security breaches, crime, and terrorist activities (Europol, 2016).

This chapter asks whether the resources devoted to cybersecurity capacity building can indeed have the intended impact of reducing problems for users. It begins by describing capacity building in more detail, and then moves to an empirical approach to determine whether capacity matters, which provides a means for operationalizing whether or not cybersecurity capacity has an independent influence on end-user security, meaning whether it makes a difference that cannot be explained by other factors, such as the wealth of the nation. While the analysis is a preliminary examination of a critical question, it is the first effort that empirically tests the taken-for-granted assumption that capacity matters.

The Assumptions Underpinning Cybersecurity Capacity Building

In past decades, security was largely viewed as a technical challenge in building walls to protect computer equipment and data. Over time, the Internet has distributed computing resources into more open and global networks that put far more responsibility in the hands of users at many levels. One consequence is the rise of centers focused on this new realm of cybersecurity, which encompasses a wide range of actors involved in all aspects of the Internet. A major innovation in this area has been a greater focus on proactive steps to build an individual's, organization's, or nation's resilience to security threats, that is, their cybersecurity capacity. There have been many discussions of the building blocks of cybersecurity capacity, but relatively little empirical research. This section identifies many of the assumptions underlying capacity building, while the following section moves to an effort to empirically assess if building the cybersecurity capacity of nations does make a difference in reducing security problems for users.

In this research we address three domains that shape cybersecurity. Although these domains interact with each other, they tend to be discussed separately in different circles: (1) the vulnerabilities of devices and services (the responsibility of security practitioners), (2) the security practices that should be followed by end users, such as individual Internet users, and (3) what can be done about these two things and who should be doing them (the role of governance). Traditionally, computer security was largely left to technical experts within organizations. Since the Internet, by design, allows access to multiple levels of computing and communication networks, security has increasingly become a concern across these three major domains, and the multiple stakeholders in each of them, including users. Actors at each layer of design, production, implementation, and use of the Internet and the systems it pervades, all have a role in cybersecurity capacity building.

The Role of Governance in Increasing Cybersecurity Capacity

Governments, organizations, and individuals accept that they will continue to face cyber-attacks. Therefore, there is a need to focus on enhancing their resilience to these attacks by building policies based on expert judgments of best practices. However, internationally, there is a lack of consensus on the appropriate norms for online behavior—best practice—that are critical to cybersecurity capacity, except for international standards for how to manage risks, called cyber-risk management (NIST, 2014). The role of the state is critical in both implementing and enforcing norms that support security, but more research is needed to identify those norms that are critical to supporting security.

Part of cybersecurity capacity is defining standards of protective norms and clarifying what types of actions would be viewed as an attack on a nation's security (Sommer and Brown, 2011). This suggests that a foundational step in developing capacity is establishing acceptable norms of risk, protection, and defense.[1] These would include the need for states to prevent malicious activity emanating from their territory, and agree that critical infrastructure should not be targeted by cyberattacks in times of peace.

A lack of trust can be another problem for capacity building as it can inhibit effective communication between different stakeholders, resulting in such behavior as failing to share security incident information. The Information

[1] A UN Group of Governmental Experts report (GGE, 2015) listed four norms that nations agree upon: a) the need to protect critical national infrastructure; b) the prevention of cyberweapon proliferation; c) the management of critical information and communication technology; and d) assistance to victim states when attacked.

Sharing Framework (Homeland Security, 2016) posits that trust depends on an AAA Model: Authentication (Are you who you claim you are?), Authorization (Do you have permission to undertake the activities?), and Accountability (Can you evidence compliance in any court of law?). Following these types of confidence-building measures should help build trust between entities. An example of this type of trust is the international cooperation demonstrated by many nations collaborating to form Computer Emergency Readiness Teams, as well as more localized Computer Security Incident Response Teams to address cybersecurity problems.

Also, confidence-building measures are valuable in creating an environment in which more ambitious cybersecurity norms can develop. Since confidence-building measures can build trust between entities; it allows public–private partnerships, which in turn can make policy, improve practice, and make a normative framework more coherent and durable. So all three are essential: confidence-building measures, capacity building, and norms of appropriate best practice.

In the context of this research, once national policies are in place that support capacity-building measures, integrate information-sharing networks, and promote training to develop appropriate norms, then a nation has a higher cybersecurity capacity.

The Role of Security Practitioners in Increasing Cybersecurity Capacity

Security practitioners produce the technical and procedural solutions that help protect against threats, mitigate damage when there is a breakdown in security, and recover systems post-attack. This often entails substantial investments in hardware, software, processes, policy, and training of personnel. This can only be done if governments help build an environment that will protect the investments of the organizations that are producing the relevant technology and accompanying practice. At the same time, the interests of other organizations and end users need to be protected from substandard products that don't follow basic security protocols.

Security practitioners can also promote a more widespread understanding of industry standard protocols for security by increasing training for staff. Some companies have supported their staff to become more aware of cybersecurity risks in general, with the intention that this will positively impact behavior while at work. However, many businesses do not share their protection protocols, leaving a void in sharing prescribed cybersecurity practices that can become norms. Although there is an understandable need to keep some company-specific protections proprietary, agreeing on basic security protocols is assumed to help overall protective capacity. This is especially true since systems are interdependent: each vendor needs assurance that other vendors are consistently contributing to an ecosystem that follows industry standards for security. Indicators that industry and public–private alliances are engaged in cybersecurity capacity would include such actions as the purchase of latest advances in technology, the use of secure servers, the provision of extensive staff training, and the adoption of cybersecurity standards.

The Role of Individuals in Increasing Cybersecurity Capacity

It would be inappropriate to consider technology as being separate from its end users, such as the general public. When technology is discussed, and the security of any technical system addressed, it must be understood that humans are inherently part of the system. The behavior of humans—how they design, procure, and use technology, including its security features—has a direct consequence for the overall security of a system. This creates a challenge when considering the development of norms and confidence-building measures, since they must take account of the heterogeneous array of people involved.

This heterogeneity often entails people who make poor security choices, for instance, using pirated software and imitations of branded products (Cheng, Sims, and Teegen, 1997). Pirated software and hardware are easily a prey for malware, and compromised machines become a vector for further attacks (Symantec Corporation, 2016). Although nations with the most distressed economic conditions can be expected to use more pirated software, this is not simply determined by economic conditions. Often inefficient judicial systems and particular cultural norms, such as privileging individualism over the common good, can contribute to an environment where piracy is more prominent. Increasing capacity could therefore include initiatives to encourage safer alternatives for users than resorting to piracy.

Furthermore, end users are often the last to know about cybersecurity breaches, weaknesses in systems that they trust, or the theft of their personal information. They have few protective resources compared to industry or government; thus, they are often primary targets for attacks over the Internet. Efforts to improve the practices of users in ways that improve security—sometimes called "digital hygiene"—have had mixed results (Bada, Sasse, and Nurse, 2015). Yet, helping to increase the understanding of safe practices, encouraging end users to take personal responsibility (Shillair et al., 2015), and developing a cybersecurity mindset (Dutton, 2017), could increase the engagement of end users and thus enhance cyber-security capacity.

Empirical Study of the Impact of Capacity Building

All of these dimensions of increasing cybersecurity capacity require a significant investment from a wide variety of stakeholders. Even though it might seem logically true that increasing capacity will benefit the population of a nation, there is surprisingly little empirical research to demonstrate that investment in capacity will benefit the ultimate end users—the general public. In the ongoing discussion of various and dynamic aspects of cybersecurity capacity building, there is a need to have empirical research as a basis for implementation, and for understanding outcomes. Thus, the primary aim of the analysis reported in this chapter is to advance research on the implications of capacity building for end users of the Internet, using a cross-national, comparative approach. The next section reviews some of the key problems in measuring cybersecurity capacity, before describing the operationalization of key variables, and giving a preliminary analysis of how capacity can shape outcomes critical to end users of the Internet.

Limits on Efforts to Evaluate Cybersecurity Capacity

There are a number of constraints on the process of finding empirical data to test the impact of building cybersecurity capacity. First, as discussed earlier, the collection of data on cybersecurity is hindered by a lack of trust and transparency. Institutions of all types have reasons to not let others know about data breaches or security failures. For example, cybersecurity capacity is often closely tied to national strategies that address external threats, and internal strengths and weaknesses (Kshetri, 2016). Therefore, many treat capacity as proprietary information to be guarded, rather than a resource to be shared with other stakeholders.

Secondly, many investments in cybersecurity capacity are long-term, and hard to assess because they do not show immediate results. Also, some capacity investments are structural, such as those involving institutional change, and therefore invisible to end users. It may take years to implement improved legal protections, such as those that punish cybercriminal attacks, and even longer to track down the offenders and achieve convictions or the deterrence of further criminal attacks. Better cybersecurity training and educational initiatives also take time to show any effect, as trainees need time to learn new skills and incorporate them in the workplace.

Development of a Model to Explain Capacity and Its Outcomes

The present research sought to develop indicators of cybersecurity capacity (ICSC) in each domain—government, practitioners, industry, and end users—as factors that would explain end-user cybersecurity problems, as our major dependent variable. This approach allows a basic quantitative test to show whether the elements of cybersecurity capacity building are reflected in a major set of outcomes—the problems faced by end users.

To keep the analysis simple and replicable, the study focused on three independent variables that might account for different levels of cybersecurity outcomes, irrespective of the capacity of nations. These are indicators of scale, diffusion, and resources. "Scale" refers to the size of a nation and is measured by the total population. Size is measured using the number of Internet users in the nation, which would put different pressures on the allocation of resources from those exerted by the total population of a nation. "Diffusion" refers to the degree to which the Internet has spread to the general public and is measured by the *proportion* of the population that is online. Some nations, such as Indonesia or India, have many end users, but smaller proportions of their population are online. "Resources" refers to the wealth of a nation and is measured by national gross domestic product per capita (GDP). We expect that larger nations, with more Internet users, and wealthier nations with larger proportions of Internet users, will have higher cybersecurity capacity and also fewer end-user problems. The ICSC would act as a metaphorical wall to protect end users. The theoretical model is shown in Figure 9.1.

For indicators of end-user security problems, we relied on data published by Microsoft (2016: Report Vol. 21), which is based on data collected in the first

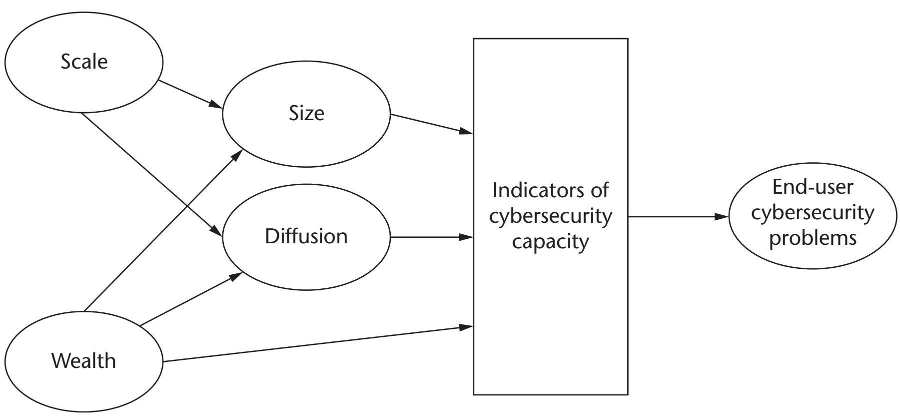

Figure 9.1. Model of factors shaping end-user cybersecurity problems

two quarters of 2016. The quarterly items were averaged together to minimize seasonal fluctuations.

This big-data source is collected from many Microsoft products whose users have opted to share their data. Because of the widespread usage of Microsoft products, this data is considered one of the most comprehensive available (Microsoft, 2016). Two of our indicators of end-user security problems come from this data: "encounter rates" (ER) and a "computers-cleaned metric" (CCM).

Encounter rates (ER) report "the percentage of computers running Microsoft real-time security products that report a malware encounter" (Microsoft, 2016: 52). Encounter rates include exploit kits that target plug-ins, such as Adobe Flash Player and JAVA. The ER ranged from a low of 6.8 percent in Japan to a high of 48 percent in Mongolia.

The computers cleaned metric (CCM) is the measure of the number of computers cleaned from infections per 1,000 runs of the Microsoft security software (Microsoft, 2016). The CCM registers infections that got past initial protections built into browsers. This ranged from a low of 2.35 percent in Japan to a high of 80.5 percent in Liberia.

These indicators are similar, but reflect different dimensions of threats that end users face. The ER reflect protection from infection in the general environment, while the CCM reflects removal of malicious software found on computers.

There are well-known weaknesses in each of these indicators, which is one reason why we use multiple indicators. For example, the computers included in these metrics are machines that are running verified copies of Windows software. The users are using Windows protection products. Thus, the reports reflect only a fraction of actual infection rates. It is likely that actual infection rates are much higher, especially on computers using pirated operating systems, or those not using security products.

Therefore, we utilized a third measure of end-user security problems, the percentage of software installed that is pirated.[2] The primary security concern of pirated software is that it often contains malware, and since it is not registered, it will not receive updates to fix known weaknesses. The piracy rates for countries that report the data range from lows of eighteen percent in the United States, nineteen percent in Japan, and twenty-four percent in the United Kingdom to a high of ninety to ninety-one percent in Zimbabwe, Moldova, and Georgia.

[2] This indicator is drawn from data from the World Economic Forum's publication, *The Global Information Technology Report 2016*. www.weforum.org/reports/the-global-information-technology-report-2016 (accessed June 28, 2018).

Indicators of the Elements of Cybersecurity Capacity

One of the most comprehensive projects in accessing national cybersecurity capacity, the Oxford Global Cybersecurity Capacity Centre, has developed direct indicators of maturity on many dimensions of capacity. At the time of writing, these items have been collected by the Centre for fifty-four nations. In this empirical study, we sought to match aspects of that model with available data to develop surrogate indicators of key dimensions of cybersecurity capacity.

A number of indicators were used from the World Economic Forum's (WEF) Networked Readiness Index. The data shared by the WEF is gathered from many sources, including: the International Telecommunications Union, World Bank, UNESCO, and other United Nations agencies (Baller et al., 2016). Many of the points that are used in this report are collected through the annual World Economic Forum's Executive Opinion Survey. This is administered to over 14,000 business executives and security experts in all economies covered in the WEF Global Information Technology Report (Baller et al., 2016).

Items we selected from this report are elements that would be needed to support cybersecurity capacity. The items include dimensions from law, technology, education, and how essential technology is to accessing government services. The items selected come from those that are referenced in the cybersecurity literature as important for capacity building:

- a supportive political and regulatory environment;
- a healthy business environment that supports innovation;
- secure infrastructure;
- an educational system that is building workers with needed skills;
- businesses that offer specific training to their employees; and finally,
- ICT use as part of the core interactions that citizens have with their government.

Most of the items, with the exception of secure servers, were on a scale of 1–7, with 7 being the most developed.

Items analyzed in the political and regulatory domain were:

- laws relating to ICTs and their regulation, and
- intellectual property regulation (IPR)

These items indicate an environment that reflects efforts to balance the interests of the people as well as the interests of those developing and supplying software and hardware needed for technology use.

In the business and innovation domain, we included:

- the availability of the latest technology and
- government purchase of up-to-date technology

Secure infrastructure was measured using:

- the number of Internet servers per million of population. Secure servers are a basic item in helping to reduce attacks and infection (Baller, Dutta, and Lanvin, 2016; Verizon Enterprise Solutions, 2015).

The quality of the educational system was constructed by including:

- international ratings of the quality of national educational systems, since education could help build an overall understanding of the affordances of computers as well as a basic understanding of cybersecurity.

Training in business and industry was inferred from:

- the fact that businesses that train their staff in ICT use often include specialized cybersecurity and digital safety training.

"ICT use by government" was included with the consideration that:

- a nation that utilizes ICT for access to key government services, is more likely to have also committed to protecting access to those services and protecting the data gathered through those services.

Given the challenge of finding trustworthy data from a large sample of nations, we sought data that was gathered by entities that are widely respected and have robust data-collection methods. Thus, we used total population data and GDP per capita from the World Bank (2016), and the number of Internet users from Internet World Stats (2017). Moreover, all of these institutions have global connections and periodically issue reports concerning ICT use, items that contribute to structural support of cybersecurity capacity, and the data points that contribute to this research. If their data can be turned to an examination of cybersecurity capacity, the analysis can therefore be replicated, studied over time, and open to public scrutiny. The sources for each variable, its domain, the range of each variable, mean and standard deviation are in Table 9.1. In cases where multiple items were used to measure the same concept, the items were found to be highly correlated, indicating that these different indicators seemed to be measuring the same underlying factor, and had achieved an acceptable level of reliability and validity.[3]

[3] Further details of this analysis are provided in Dutton, Creese, Shillair, Bada, and Roberts (2017).

Table 9.1. Variable information

Variable name	Operational definition	Range	Mean(s.d.)	Source
Scale	Total population	137,122,000-9,290 (in thousands)	4,830,166 (16,425,640)	World Bank
Wealth	GDP per capita	\$727–\$277,680	23,070 (31.034)	World Bank
Size	Number of Internet users	56,158–721,434,547	25,644,625 (78,342,325)	Internet World Stats
Diffusion	Percentage of population using the Internet	1.38%–98.16%	48.87% (28.81%)	World Economic Forum
Indicators of cybersecurity capacity	Laws relating to ICTs and their regulation	1.98–5.95	3.92 (0.91)	World Economic Forum
(Cronbach's alpha .969)	Intellectual property regulations	1.68–6.31	4.07 (1.03)	
	The availability of the latest technology	2.75–6.60	4.82 (0.91)	
	Government purchase of up-to-date-technology	1.63–5.65	3.38 (0.64)	
	Number of secure Internet servers per millions of population	0.15–3214.39	349.72 (658.54)	
	Quality of educational system	2.05–6.13	3.76 (0.90)	
	Businesses train their staff in ICT use	2.58–5.74	4.03(0.67)	
	National utilization of ICTs for access to key government services	2.46–6.18	4.33 (0.95)	
End-user cybersecurity problems	Encounter Rate (ER)	.07–.48	.26 (.09)	Microsoft
Cronbach's alpha (.899)	Computers cleaned metric (CCM)	2.35–80.55	19.47 (13.38)	
	Piracy rate	18.00–91.00	56.99 (21.49)	World Economic Forum

This research has important limitations, primarily tied to measurement issues. The measures do not include operating systems other than Microsoft, such as open source systems, Apple, or Linux, but Microsoft is the most prevalent. A fuller analysis might seek to utilize more indicators for concepts such as "end-user problems," and in particular, to see whether these results can be replicated when using alternative indicators. Every concept of our theoretical model is measured through relatively indirect, surrogate indicators. However, the use of these proximate indicators allowed us to incorporate more nations in this study. Moreover, it is encouraging that even relatively weak indicators of basic variables, which incorporate much noise into the analysis, are still able to show clear relationships in conformity with the expected model.

Multivariate Analysis

A model was developed controlling for contextual factors that might explain levels of cybersecurity capacity and its outcomes, such as the wealth of the nation (Figure 9.1). The central question guiding the analysis was whether the ICSC positively impacts the end user by reducing cybersecurity problems (where the problems being considered are infection rates on machines), while controlling for key contextual factors, such as the wealth of nations, that could offer alternative explanations of the results.

We tested our model using structural equation modeling methods using Smart PLS (Ringle, Wende, and Becker, 2015). It is an analytical approach to multivariate analysis that enables us to test the independent influence and interdependencies of each factor in a causal model. It helps us answer the question of whether cybersecurity capacity has a direct influence on end-user security that cannot be explained by other factors, such as the size or wealth of nations. This method allows testing of theories that embed latent variables, such as cybersecurity capacity, reflected in empirical data. Figure 9.2 shows the beta values and significance levels of the tested paths. Higher beta values generally indicate a stronger relationship.

GDP per capita indicates the economic resources of a nation—its wealth. These economic resources would factor in the type of equipment that could be purchased, and the ability to maintain other capacity indicators, such as secure servers. Therefore, GDP is seen as an independent variable. The number of Internet users per nation would tend to put pressure on that nation to prioritize the infrastructure needed to support these users, but also make the provision of Internet services more challenging, so this is another independent variable. These both independently contribute to the percentage of the population online.

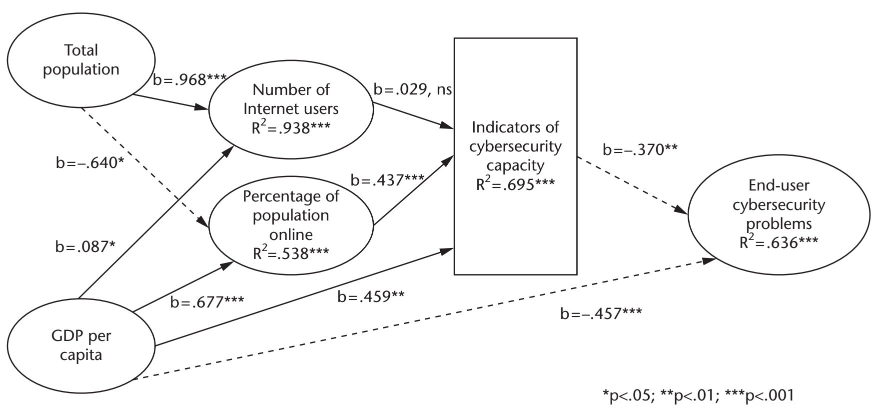

Figure 9.2. Model showing loadings and path values of significant relationships

The ICSC are conceptualized as intervening or moderating variables, in that they shape the relationship between the independent variables, such as the wealth of a nation, and end-user security. In some respects, cybersecurity capacity is conceptualized as a metaphorical wall, protecting end users. These indicators include improving science and technology education, improving infrastructure security, and supporting specialized training of workers. These are choices that nations make to reflect societal values that reflect a priority of long-term commitment to improved cybersecurity capacity. Even though greater economic resources might make these priorities easier to achieve, they are not directly tied to economic prosperity. These national-level priorities, the choice to invest in cybersecurity capacity, impact the threats that citizens face. The end users' cybersecurity problems are the direct dependent outcome variable, the area of concern.

The model showed a strong inverse relationship between ICSC and end users' cybersecurity problems. The nations with higher GDP per capita had better outcomes for end users, but when the ICSC, the environment that supports and fosters cybersecurity capacity, is parsed out, it becomes apparent that a large part of that benefit extends from the ability of wealthier nations to invest in the many dimensions of cybersecurity capacity.

Points of Summary and Conclusion

The results of this analysis are promising. They tend to confirm the value of conventional wisdom that building cybersecurity capacity will be of value to end users, and therefore benefit the larger economy and society. Even when controlling for the wealth of a nation, and the scale and centrality of Internet use in the nations, elements of cybersecurity capacity have a strong role in reducing end-user exposure to security problems.

However, the analysis also shows the degree to which cybersecurity is unevenly distributed across nations, with the least well-to-do nations the most negatively affected. Enhancing cybersecurity benefits nations at all levels of development, but these initiatives to boost cybersecurity capacity cannot erase the security gap between the rich and poor nations, leaving major global challenges for all nations in a connected world.

Capacity building assumes that the exchange of information could limit the number, diversity, duration, and impact of attacks. Many nations have Computer Emergency Readiness Teams that routinely disseminate information about known weaknesses and software fixes. These groups engage in coordinated efforts to eradicate specific strains of malware by combining legal and technical measures. However, as beneficial as disclosure is in increasing overall cybercapacity, news reports periodically uncover the fact that stakeholders (both public and private) do not share crucial information unless the law requires it. Therefore, to improve capacity on a national level there need to be social, cultural, and legal standards that guide disclosures (Sommer and Brown, 2011).

A crucial step in developing effective cybersecurity capacity building will be a deep, rigorous, and unambiguous understanding of the harms that nations can suffer in the face of cyberattack. If this can be developed, then it will be possible to closely couple specific capacity-building measures to a harm avoidance or reduction activity which might also be shared across a community.[4] This will further a key aim of capacity building, which is to enable governing bodies, industry, practitioners, researchers, and educators to work together to keep major systems functioning, particularly in light of the increasing frequency and severity of attacks.

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10

Big Data

Marx, Hayek, and Weber in a Data-Driven World

Ralph Schroeder

Business and industry, governments, and academia are increasingly using "big data," such as data derived from social media that is unprecedented in its scale and scope in yielding insights into people's attitudes or behavior. Increasingly, big data has been promoted as a new tool for evidence-based decisions and policy-making. In this chapter, Ralph Schroeder outlines contrasting theoretical perspectives on big data. He compares Marxists, who demonstrate the ways that big data can be deployed to exploit users of digital media, and free-market thinkers (following Hayek), who believe that in an age of more data, capitalism will continue to lead to more growth. He then contrasts those perspectives with those of the sociologist Max Weber. By contrasting these theoretical perspectives, the author argues that there is a middle ground between Marx and Hayek. From a Weberian point of view, big data need neither be endorsed as an unquestionably positive development, nor necessarily critiqued as inherently exploitative.

The term "big data" has generated much public debate over the ways that companies like Facebook, Google, and Amazon use data about their billions of users. This is arguably one of the most significant changes in society over the last decade. This chapter compares three theoretical perspectives on big data: first, there are Marxist scholars who think that big data exploits users of digital media, that users should be paid for their data, and that capitalist media companies should be more regulated. Second, there are free-market thinkers who follow the economist Friedrich Hayek and who believe

Ralph Schroeder, *Big Data: Marx, Hayek, and Weber in a Data-Driven World*. In: *Society and the Internet: How Networks of Information and Communication are Changing Our Lives*. Edited by Mark Graham, William H. Dutton and Manuel Castells, Oxford University Press (2019).
 DOI: 10.1093/oso/9780198843498.003.0011

that with more big data and information flowing freely through the economy, capitalism will become more effective and lead to more growth. Clearly, the first of these perspectives implies criticism of big data and of capitalism and the second perspective the opposite. A third perspective is that of the sociologist Max Weber, who argued that increasing knowledge and more powerful technology typically have both positive and negative sides. As applied to big data, the implication is that there are benefits with greater control over the world, but also dangers with increased surveillance and threats to privacy.

The work of all three thinkers predates the very idea of big data, but each provides a distinctive vantage point on the economic, political, and cultural implications of big data. For example, the Marxist and free-market Hayekian positions have been used to support proposals for how the use of big data by companies and governments should be curbed or improved. But this chapter argues that such proposals fail to grapple with the changing role of knowledge and of new technology in the media landscape, which makes these proposals unrealistic. Weber's ideas are more insightful in this regard and also lead to more realistic proposals. The chapter will conclude with an outlook on the implications of big data which is informed by these thinkers and their theoretical perspectives. Before we get to that point, the chapter will first review how knowledge generated from big data has become established in the social sciences and in the private and public sectors. This will also entail defining big data (and data), the resulting definition one that will help us to distinguish between the implications of scientific and those of practical knowledge. This distinction will, in turn, make it possible to say that there are quite different implications of big data for researchers from those for consumers and citizens. Once we have established this groundwork, we will be able to draw out the lessons of these theoretical perspectives.

Defining Big Data

Although there is a growing literature about big data, there are few attempts to tackle its implications as part of a broader perspective on social change. This is partly to do with disciplinary specialization. Many social science and related disciplines have contributed to our understanding of specific aspects of big data. For example, the social implications are discussed within philosophy, where there are debates about privacy and transparency and accountability (see Mittelstadt et al., 2016). Economists are concerned with the regulatory aspects of big data to ensure competition (for example, Ezrachi and Stucke, 2016), and security experts have dealt, among other aspects, with surveillance and cyberwarfare (Schneier, 2015).

Computational social scientists are developing new techniques for data analytics (Salganik, 2017). Media and journalism scholars have examined the impact of analytics on the production of news, such as the rise of data journalism (Cherubini and Nielsen, 2016). There have also been many computational social science analyses of digital media, including social media, search engine behavior, and the Web (Schroeder, 2016). Others see big data as part of a larger process of the increasing quantification of society (e.g., Mau, 2017). This still leaves a question: Is there a theory that best captures the manifold ways in which the knowledge generated by big data impacts society?

One way to delimit this vast topic is to notice that the main place where social science knowledge and digital technologies intersect lies in the sources of big data. These sources consist to a large extent of data that is born digital, such as that collected from digital media, a term that can be used here to encompass social media, search engines, and the Web, and mobile phones. There are other sources of big data, such as traffic sensors or credit cards or images captured on digital surveillance cameras. But the vast bulk of big data used in the analysis of society comes from digital-media devices, and the vast bulk of this data collection and analysis is carried out by digital-media companies. These companies also carry out social scientific analysis, but there is a fundamental divide between the private sector and scientific knowledge. There are also many sources of big data outside of the private sector—such as Wikipedia or national statistical offices or open scientific data sets.

The discussion of big data can benefit from conceptual clarification, since a commonly expressed view has been to say that there is nothing new about big data (see, for example, several chapters in Gitelman, 2013). It would follow from this view that it is not necessary to think about new or distinctive social implications. This chapter departs from that view: Data can be defined, insofar as it is part of scientific knowledge, in terms of three characteristics: it is a property of the objects being examined and separate from the observer; obtaining data comes before interpreting it; and data consists of the most divisible or atomized useful units of analysis. These characteristics fit with a realist, objectivist, and pragmatist account of science (and of technology). "Big" data can consequently be defined as data with a scale and scope that marks a step change in relation to a given object or phenomenon. This definition and the conception of science and technology on which it rests have been detailed elsewhere (Schroeder, 2007, 2016, 2018; Meyer and Schroeder, 2015). The key point here is that this definition regards data as one of the bases of scientific knowledge. And both how big data is responsible for advances in social scientific knowledge, and the limits of big data—most uses of big data are not scientific, as we shall see—can be traced back to these definitions.

More Data, Freer Markets

Against this background, we can examine several perspectives on the social implications of big data. Viktor Mayer-Schoenberger has written two major books about big data, both addressed to academics but also to wider audiences. The first (with Cukier, 2013) focused on the ethical and legal implications and the second (with Ramge, 2018) concentrates on economic and broader social implications. In both books, Mayer-Schoenberger's central idea is that capitalism will be increasingly driven by data. He argues that the abundance of data creates data-rich markets that increasingly displace non-data-driven markets, by bringing about greater levels of efficiency. He describes many examples, from job websites to online dating to the music service Spotify, that devolve information flow into decentralized teams with few hierarchies. A specific example here is that of the fishermen in the Indian state of Kerala who have started to use mobile phones to communicate prices with distant buyers. Introducing a freer and greater flow of data into these markets does not only allow the fishermen to communicate in a more efficient way, but also reduces obstacles (delays) and waste (fish unsold because the right buyer is not found), and ultimately benefits customers (with lower prices). In the more recent book, he adds that automation, machine learning, and artificial intelligence, all of which rely on big data, further boost these efficiencies.

The underlying idea is that markets work better if they are less centralized and based on the competition between individual choosers, which could include machines that make decisions in automated ways using abundant and rich data (hence the discussion of machine learning and AI). Mayer-Schoenberger envisions a world in which data in itself becomes a source of value and can be bought and sold (or exchanged) in a market for other goods or services. And since data is more abundant than money, again, an economy in which data is much more widely used will bring more prosperity for all. Note the assumptions here, based on the ideas of the economist Friedrich Hayek, a leading figure in championing free-market capitalism who became particularly influential during the period of a right-wing backlash against Keynesian economics in the 1980s, and influenced the policies of US President Ronald Reagan and UK Prime Minister Margaret Thatcher (see Cockett, 1995): the idea was that markets work best when they are based on optimal choices that rely on unobstructed information flows. On this view, according to Mayer-Schoenberger, even government could benefit from introducing internal markets, such as markets whereby citizens are better able to choose services as more data is made available.

But there is also a shift in Mayer-Schoenberger's ideas. In his earlier book, he argued that big data threatens the idea of free will. In his later book he argues that in the final instance, autonomous individual human decision-making ought to take precedence over decision-making by artificial intelligence and the big data analyses that are used by companies. Indeed, data-rich markets should enable this autonomy, since more effective organizations will allow people to concentrate on creativity—or decisions about decision-making. This is different from one of the implications that he discussed in his earlier (2013, with Cukier) book, where he argued that big data, with its predictions, challenges the idea of free will. He described these implications in terms of law and ethics, but the larger issues are not just ethical and legal: if big data can predict behavior, this potentially opens the way for manipulating people (a view, as we shall see, that comes closer to Weber's).

More Data, More Exploitation

While Mayer-Schoenberger is mainly positive about the economic implications of big data, Marxists are critical. We can take two examples here: Christian Fuchs, who has published extensively about social media and big data mainly for an academic audience, and Evgeny Morozov, who has written for a more popular audience (2013). For these thinkers, even if big data is a source of innovation, this has mainly negative implications. Thus, they focus on examples like Google, Facebook, and Amazon, and how these companies are able to exploit their dominant market positions to derive inordinate profits from these positions. Fuchs and Morozov also describe the worldview of the leaders of these digital behemoths as an ideology of California's Silicon Valley which worships freedom and entrepreneurship, but which is in reality based on monopolies and exploitation. Morozov (2013) labels this "Californian ideology" (Barbrook and Cameron, 1996), which posits an optimistic technologically based assumption that innovation can solve all manner of social problems, "solutionism."

Fuchs (2017a) argues that big data research is positivist and uncritically serves the administrative needs of capitalism and states. He thinks that only a critical Marxist perspective—he draws especially on Frankfurt School thinkers about the media—makes it possible to recognize how Facebook, Google, and other digital companies exploit the labor of their users to extract ever more profit from their increasingly monopolistic positions. Along similar lines, Morozov (2016) points out that the big five American companies (Amazon, Google, Microsoft, Facebook, IBM—plus Baidu in China as the only non-American contender) control most of the world's data for AI and will ultimately use it to extract profits from citizens when this data can be used to shape health and other services. He says that breaking up these data monopolists and forming data cooperatives could be alternatives.

Yet Morozov (again, like Mayer-Schoenberger) also recognizes that such breakups in favor of smaller companies are unlikely because, unlike other goods, data brings benefits when lots of it is controlled in one organization. Hence, he argues, like Fuchs, that data-controlling organizations like social media companies should be public infrastructures: companies should be obliged to pay citizens for their data and only then be allowed to provide services based on this data. He argues that the anti-monopoly position of left-wing populists, trying to break them up or reign in their power, is futile; those on the left should instead seize the day with an agenda whereby companies pay citizens for data rather than exploiting them with it. (Another recent book that takes a broadly Marxian perspective is Zuboff (2019), but this was published too late to be considered here.)

More Data, More Rationalization

Unlike Marx and Hayek and their followers, who concentrate on the economic logic of capitalism, the master concept in Weber's thought is rationalization, a process whereby the state, the economy, and culture become increasingly "disenchanted" because of the growing dominance of instrumental rationality. Weber's notion of rationalization can be summarized as follows: the advance of instrumental rationality and of science increasingly imposes impersonal, "cold" knowledge on the human and natural environments. Rationalization is an intensification and extension of "calculability." It can be added immediately that this process depends on data. Weber did not talk about "data" as such, but he saw "information" as essential to bureaucracies: bureaucracies depend on files or record-keeping. But information can simply be seen as organized data, just as knowledge can be seen as systematized information. And information-based bureaucracies are not just part of the state, but all large-scale organizations, including companies, are based on extensive bureaucratic record-keeping, including record-keeping for logistics, human resources, and customer relations (Dandeker, 1990). Databases are thus the building blocks for the information or knowledge systems on which the rationalization of organizations is based.

Rationalization entails the bureaucratization of markets and states: the creation, among other things, of large technological systems (Hughes, 1987) of information and communication—infrastructures—that are centrally and hierarchically controlled. Large technological systems follow a logic whereby they extend their scale and scope, becoming increasingly embedded in social structures and congealing into impersonal and irreversible "iron cages." Weber's term for how systems become ossified is "routinization," and this logic whereby change turns into locked-in structures also chimes with

Schumpeter's account of innovation whereby the "creative destruction" of entrepreneurship—the introduction of new technologies for harnessing information—develops ineluctably into sluggish and highly bureaucratic and often monopolistic firms that dominate markets (or create new forms of state administration) until they are destroyed by new waves of destruction.

Weber Beyond Marx and Hayek

These brief summaries allow us to compare the implications of the Marxian, Hayekian, and Weberian perspectives (see also Table 10.1), including the main effect of big data on the role of states and markets, and the resultant implications. Marxists think that data infrastructures should be public. "Socialize the data centres," proclaims Morozov (2015), because otherwise they can be used for capitalist exploitation. Along similar lines, Fuchs argues (2017b) that users should be paid for their data because otherwise, the commodified labor that creates data can be used to make profits without paying for the labor that produces this value.

These proposals would require extensive state apparatuses for regulation. Hayekians, in contrast, think that markets are too complex to be controlled or steered centrally and should be as free as possible. With markets ideally providing as much frictionless information as possible, they can self-organize in the most effective way. Hayek, like Karl Popper, relied on the idea of evolution, in his case the idea that complex systems have evolved to become large and unwieldy (Hayek was thinking of the authoritarian states of the mid-twentieth century, but also of the dangers of Keynesianism), and would operate better in competition via selection than in being steered. This idea could appeal to computer scientists who also emphasize complexity when there is an evolution toward more extensive and intensive uses of systems using information. Hence, they argue, as does Mayer-Schoenberger, that more decentralized systems make for greater robustness and efficiency.

But instead of more complex structures, in the sense that they continuously evolve toward greater efficiency, it could equally be argued that they become

Table 10.1. Three perspectives on big data

	Main perspective	Effects	Implications
Marxists	Exploitation	More control by capitalist firms	Nationalize infrastructures, pay users for data
Hayekians	Greater information flow	Increased role of markets, especially markets in data	Reduce friction more, enable more innovation
Weberians	Rationalization	Enhanced control, with gains and losses	Counteract impersonal forces

more routine and constraining. With Weber (and Schumpeter), one could emphasize that the large technological systems of today—the Internet, Web, and the behemoth companies and government information systems that are its dominant components—are not so different from previous large technological systems. Rationalization and domination by means of knowledge create impersonal and more powerful structures: technological systems can be seen as structures that both enable and constrain, "cages" (in Weber's view), but also exoskeletons, if we want to take a more positive view. Schumpeter would argue that this domination, including the domination via market position due to an advantage in controlling data, is inevitably fleeting, subject to new waves of creative destruction. This is an appealing and intuitively reasonable idea, but the evidence for it is scant: after all, many of the large technological systems or infrastructures that were created in the late nineteenth and early twentieth centuries, such as telephony, electricity, or the motorway system, are still with us and constantly being added to rather than replaced. Some of these were public, others in the private sector, and yet others a mixture, or they changed from one to the other. But even those infrastructures that have been and remain mostly in the private sector, such as electricity in the US, have lasted well over a century. The same may—or may not—apply to Google, Facebook, and Amazon: all we know is that they have become larger and more rationalized and embedded in society. That these behemoths will inevitably be replaced by smaller companies with newer technologies cannot be predicted.

Mayer-Schoenberger recognizes that big data can be problematic. Although he argues that data enhances the efficiency of markets, he notes that this will advantage larger data-rich firms at the expense of others. This is one reason for his proposal for a data tax: so that smaller firms can also benefit from data, and in this way compete through innovations. He thinks that the progressivity of his data "tax" should be linked to market share, which would also prevent market concentration of data on the one hand, and on the other enable smaller and innovative players to have a more level playing field to compete with larger data-rich and dominant companies. This is a praiseworthy idea, but it is unrealistic: market share based on data obtained from people's social relationships (Facebook) cannot be compared, for example, with data gained from individuals' search behaviors (Google). There are advantages and disadvantages in how markets (or capitalism) work on the basis of individual decisions, such as clicking on particular advertisements and making purchases. Clicks cannot be taxed, whereas purchases can—with a sales tax, for example. Along the same lines, market shares in attention (or data) cannot readily be taxed, while profits, comparable across companies, can be.

Similar limitations apply to the solutions proposed by Fuchs and Morozov to pay users for their data. Their proposals come up against the problem that if Facebook or Google became a fee-for-service company, then unless restrictions were placed on other services, it would create a two-tier system; a service free from advertising and marketing for those able to afford it, and for the rest a free service for those who could not, or do not want to pay. It can be added that these stratified systems are, of course, already in place, if we think of the difference between commercial fee-paying streaming services and free-to-air advertising-based TV, versus public broadcasting supported by the state (in countries such as Germany and Sweden), and other models such as a subscription-based system, like the BBC in the UK (which one can opt out of).

Morozov and Fuchs argue that big data is responsible for the increasing commodification (or for Morozov also the "financialization") of everyday life. But it is important to point to the limits of this process as they relate to the sources and uses of (big) data: for now, the vast bulk of how big data is used commercially relates to advertising and marketing. It may be that in the future, big data will pervade cars and homes and health, but these, too, are infrastructures that have been dominated by large technological systems for some time. It is true, as Fuchs points out (2017a), that research using big data is used for commercial purposes and atheoretical. But as noted earlier, big data advances knowledge because it provides more powerful scientific knowledge about certain phenomena, and this knowledge will eventually become integrated with social science theories. Even if this knowledge is not scientific, as with commercial or administrative research that is not open or cannot be replicated, it may nevertheless make states and markets more efficient (even if it also causes problems) insofar as it encompasses or captures populations more powerfully, targeting them more extensively and intensively, and tailoring information more accurately.

One question that those who focus on capitalism—and this includes Marxists and Hayekians—overlook is that there are varieties of capitalism, and also different types of states and how they use data. Some states, like Sweden, capture data about their populations extensively and intensively by means of centralized databases, but also use that data effectively and transparently with strict privacy laws in place, so they also keep the trust of their citizens (Axelsson and Schroeder, 2009). Another clear example is China, where the data-driven economy is arguably more advanced (Meissner, 2017; Pan, 2017) but also more crucial to the future, not just of the economy but also of political development (Qin et al., 2017).

Fuchs (2016) correctly points to the fact that Chinese digital-media companies make use of big data in a capitalist—I would prefer the term "market-oriented" (Schroeder, 2013)—way. But he also minimizes the difference between American and Chinese societies by saying that in both, there is an industrial-surveillance, capitalist-state complex which exercises control.

This view overlooks the differences between the two countries, and the fact that large technological systems are limited by borders: some US digital media have been globally dominant, but they have been unable to penetrate Chinese markets. Some argue that this is more because Chinese firms had a first-mover advantage than because the Chinese political system excluded them (Pan, 2017). These firms also have a large market for Chinese-language content, and language strongly shapes the online content that is of interest in different parts of the world (Wu and Taneja, 2016). Companies dominant in China, on the other hand, have been unable to conquer markets outside of China, partly because of different Chinese data protection laws and regulation of ownership, and also because state-shaped media content is not of interest outside of China.

Weber's ideas are directly relevant to these contrasting ways of thinking about digital technologies: Mayer-Schoenberger thinks that markets can ideally enhance the workings of states and of capitalism (he does not deal with China), and Fuchs and Morozov think that states operate alongside capitalist monopolies. For Weber, in contrast, the reach of large technological systems extends only as far as their congealed tentacles allow. Hence, too, there are not only competing economies (or varieties of capitalism) but also tensions between states and markets: different types of states will protect the privacy of their citizens' data in ways related to their political systems, and while this vast and topical issue cannot be discussed here (but see Rule, 2007; Pasquale, 2015; O'Neil, 2016), many current conflicts over data privacy and transparency between the United States, Europe (and European countries such as Sweden), and China are tied to the varieties of states and of markets.

Another mistake is to see public or state infrastructures as the only solution to capitalist excesses, without taking into account that they exist side by side in different ways and that both have limits. Fuchs points to the different conditions that obtain in Europe, with its public-service media tradition, and wants digital media to shift to become part of public-service infrastructures. But digital media have thus far been dominated by the private sector. Morozov likewise thinks that there should be a shift toward new models of the public ownership of data. These, like Mayer-Schoenberger's ideas about using data for the public good, are worthy. But they overlook the fact that big data is currently primarily used for advertising and marketing. As long as data uses do not deliberately (or secretly) manipulate people's market choices or invade their private lives, it is not clear how, given a society in which markets operate in a disembedded way within a culture dominated by consumerism, there could be curbs.

To be sure, there is no reason why public infrastructures (such as state-controlled, or public-service) should not coexist with private-sector commercial offerings (or there could be a mix). This is already the case in Europe, for example, where public-service providers such as the BBC and commercial television have coexisted for many years, albeit with commercial broadcasters adhering to a number of public-service norms. And big data should be seen as part of a wider account of social change, as Mayer-Schoenberger and Fuchs and Morozov suggest. But with Weber, I see the societal problems arising from big data as both larger and smaller than they do: larger, because big data contributes to the ongoing rationalization and disenchantment of the world through the growth of scientific knowledge. The implication is that this knowledge becomes more intensive and extensive—more pervasive—in everyday life (as these authors also note). Yet the effect of rationalization is also smaller than they envisage since production—including cultural production—has become separate from cultural consumption, just as the bureaucratic apparatus for governing is separate from the citizenry.

Big data penetrates our lives as citizens and consumers ever more deeply. But consumers also have options to consume differently (or less), and citizens similarly can inform themselves via different means and have their private lives sufficiently protected even as they yield up certain types of information that secure services. Data and big data have become the new frontiers where the powers of states, markets, and people's social lives intersect and cause tensions. Meanwhile, again, the most widespread effect of big data is that digital-media companies use technology to harness data about people's behavior in order to reach consumers more efficiently. Critics are right to warn about the excesses of the surveillance of consumers (Turow, 2017) and discrimination against citizens (Pasquale, 2015; O'Neil, 2016), but these can be curbed by states when they turn into manipulation or unfair practices.

Mau (2017) has argued along Weberian lines that quantification extends competition because measurement entails scales that rank performance. This also applies to government, where measuring service efficiency and the impact of policies are the main effects of data-driven changes. Certain parts of government, as Fuchs and Morozov argue, are thus creating a top-down surveillance state. But this is to do mainly with security; data-driven policy-making in government is mostly to do with efficiency, as Mau argues. Similarly with the rationalization of audiences (or consumers): to be sure, it may be worrisome that Google or Facebook might know our tastes better than we do ourselves on the basis of analyzing patterns of behavior. But as long as tastes remain private and choices are not manipulated (and social relationships are not exploited for commercial gain), and as long as information and communication infrastructures continue to be (or are increasingly) open and diverse and reliable, quantification need not entail adverse consequences.

Ultimately, the reason why Weber's ideas are more useful is because the concept of rationalization applies equally to markets, states, and culture. Unlike Marx and Hayek, there is no pre-judgment for Weber as to which type of economic system or state–market relationship works best. As we have seen, in different countries, the relations between markets, the state, and culture vary, as do the trajectories of rationalization within each of these domains. Thus, there are bound to be continuing tensions between them. And rationalization will have different, and contradictory, effects. To take some obvious examples: if, via online systems, it is possible to predict cultural tastes, this may lead to a homogenization of cultural offerings with, say, music or video download services, insofar as they increasingly cater to the most common or lowest-common-denominator preferences. But it is equally possible that alongside these "mass" offerings there will also be a greater diversity of niche offerings and that the two will proliferate side by side. Further, public-service providers such as the BBC also use audience measurement and targeting, just as commercial companies do. Big data may thus lead to targeting and tailoring offerings to consumers, but it can also enable consumers to find offerings that they might otherwise not have been aware of.

The same could be said for data-driven government services, which do not have to discriminate against minorities or otherwise neglected populations when they use big data, but which could also use big data to target different parts of the population in a more effective way. There is also an inherent tension within rationalization itself, between domination—in this case, by impersonal knowledge—and the ability of human beings to shape their lives autonomously outside of domination. An instance of this tension was alluded to earlier, that between how Mayer-Schoenberger's earlier book foresaw a problem with determinism and how his later book stressed the ultimate autonomy and creativity of human beings. This tension could equally be seen as one whereby different effects of big data—shaping our tastes, but also enabling new tastes to form, or shaping how government services penetrate our lives, but also enabling us to use them to improve our lives—are subject to the tensions of how rationalization and more powerful knowledge affect our lives in increasingly differentiated and plural ways.

Mayer-Schoenberger's (2018) book (with Ramge) is aimed at entrepreneurs, and the idea that firms (or technologically led change in government departments) could gain competitive advantage by introducing more decentralized and automated decision-making could be useful. But as a guide to society, Mayer-Schoenberger is less discerning than Weber, whose theory grapples with the double-edged nature of knowledge and power, which includes the depersonalizing consequences of data-driven decision-making. Fuchs and Morozov steer us away from taking the "solutionism" or the asocial or atheoretical ideas about big data at face value. But their single-minded focus on criticizing capitalist economies, again, overlooks the double-edged nature of knowledge, whereby there are also gains for citizens and consumers.

Outlook

The limits of knowledge generated by big data are evident in the tensions of rationalization. Knowledge from the private sector has not transferred on a large scale into the social sciences, as might be expected given the proprietary nature of the data and computational techniques involved. But nor is it the case, as Savage and Burrows feared in an influential early article (2007), that social science would become outpaced or outdone by the private sector. The two have simply largely gone their separate ways; put differently, the intersection in the Venn diagram between them remains small. The same applies to the public sector, though public-sector data is widely used by big data companies and combined with proprietary data (Schroeder, 2018). Again, the reason for going along mainly separate paths lies in the sources—mostly digital media—of the data. Savage and Burrows (2007) believed that private-sector data would stay mostly inaccessible to social scientists. Yet social scientists have been able to obtain digital-media data in a variety of ways, even if the proprietary and sensitive nature of data still often poses problems (Salganik, 2017).

This chapter has presented the perspectives of three thinkers on big data. Weber's position does not positively endorse big data, as Mayer-Schoenberger does, but nor does it engage in wholesale criticism, as Marxists do. Weber points beyond hypostatizing free and data-rich capitalist markets as well as beyond criticizing capitalism in a blanket manner as being driven by data-profiteering. Mayer-Schoenberger and Fuchs and Morozov justifiably push against the excessive power of dominant digital-media firms that avoid paying their taxes. But Mayer-Schoenberger also thinks that American right-wing populists support the concentration of power in digital-media companies. Yet it is not clear that they do: US President Trump's policies favor some digital-media giants and threaten others, for example, and what right-wing populists in Europe do is to propagate the view that public-service media are biased toward the left and should therefore be abolished. This view should be exposed as myth. Or again, the Chinese government uses digital media to infringe liberties via the social-credit system, a system which allocates points to citizens based on their economic behavior (as with credit-ratings systems) and also on their behavior as citizens. This Chinese system may improve the country's economy and responsiveness to citizens, but it also extends surveillance. Weber's position points us to what is unique about big data and at the same time provides a more balanced and accurate account of its effects. He goes beyond Marx and Hayek and allows us to identify options, such as curbing the excesses of power while recognizing that advancing rationalization is a double-edged sword, a constraining cage, but also an enabling exoskeleton, whereby the social environment is transformed.

Acknowledgments

I am grateful for very helpful comments on an earlier draft by Viktor Mayer-Schoenberger, Mark Graham, and Bill Dutton.

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11

Political Turbulence

How Social Media Shapes Political Participation and the Democratic Landscape

Helen Margetts, Scott Hale, and Peter John

This chapter argues that social media drives change by allowing new "tiny acts" of political participation in support of a social or political cause, such as sharing, liking, viewing, or following. While most of these "microdonations" of time and effort rapidly decay, they occasionally and unpredictably scale up to massive support for a political or social movement campaigning for policy change. Drawing on their computational social science research, the authors see that such mobilizations bring turbulence to contemporary politics. The findings reveal social media platforms as important actors in contemporary politics, shaping political behavior and the practice of politics, challenging political institutions and requiring new political science concepts and research methods.

In November 2017, protests against corruption swept across Romania, when a newly elected government attempted to introduce legislation to pardon itself for past crimes. They reached their peak in February with over half a million protesters—the largest demonstration in Romanian history. The movement took the form that we are familiar with from similar mobilizations in every country in the world, from the Umbrella movement in Hong Kong to the national walkout from schools of US children in the aftermath of yet another school shooting in 2018. As the *Financial Times* of February 10 put it: "There were no formal structures or leaders. And no speeches." The protests grew out of a discussion group on the online messaging site Slack, where supporters co-ordinated work and shared information.

Almost every country in the world has been touched by this kind of political mobilization, with social media as its roots, trunk, and branches. Such movements have become a key feature of twenty-first-century politics, driving policy changes, bringing new policy forces to the fore, acting as a focal point for dissatisfaction and discontent or for change, campaigning for social rights, and challenging both democratic and authoritarian regimes. Social media seems to have brought political mobilization to demographic groups labeled by political commentators as politically disengaged for decades, such as the young and African Americans (take, for example, US school children campaigning for gun control in the National School Walkout under the hashtag #Enough in March 2018, in the wake of school shootings in Florida in 2018, and the #BlackLivesMatter movement, highlighting racist policing across the US and spreading to other countries).

This chapter examines the changing relationship between social media and political participation over the last decade and considers the implications for the democratic landscape. Although the Internet has been touted as a potentially transformative technology for participatory politics for many years, until at least 2005 it was large political organizations—parties, interest groups, and social enterprises—that gained most from Internet-mediated communication. It was really only after the mid-2000s, when widespread adoption of social media offered new ways that individuals could participate politically without going through organizations, that there seemed to be a move away from organized interest groups as the key drivers of mobilization toward individual action and participation. Citizens have become more independent from organizations, as they can easily obtain political information, communicate with their peers, and disseminate views and issues, images and information without belonging to any formal organizations or groups.

Tiny Acts of Participation

People participate in social media for a whole range of reasons, most often to socialize, shop, find things out, or entertain themselves. But during the last decade, social media platforms have become a key venue for political participation as well. The range of activities that are open to people wishing to participate politically has extended, so that even those without a strong interest in politics may find themselves offered the opportunity to contribute micro-donations of time and effort to political causes on digital platforms as they go about their daily lives. That is, social media introduces new "tiny acts" of participation, such as a status update on Facebook, a tweet or retweet, signing of an electronic petition, sharing of a political news item, posting of a comment on a blog or discussion thread, a micro-donation of funds to a political cause or campaign, uploading or sharing of a political video on YouTube, and so on (Margetts et al., 2015). All these are very small acts of participation that for most people were not available until the advent of social media. Furthermore, social media changes the information environments in which people decide whether or not to undertake such acts. By choosing which social media to use and which users to follow or friend, individuals can expand and shape their own social networks and personalize the information environment in which they operate, in terms of the information they will be exposed to on a daily basis, thereby shaping the possible acts of political participation to which they are exposed.

Most importantly, the decision about whether to undertake one of these tiny low-cost acts of participation is much less lumpy than the decision whether to join an interest group or political party. Traditionally, most academic commentators have perceived a “ladder” of participation (Arnstein, 1969; Verba and Nie, 1972; Parry et al., 1992), the rungs of which are aspects of collective action, with small acts such as signing a petition and voting at the lower end, going through attending a political meeting or demonstration and right up to political violence and armed struggle (although with much debate over the definitions of what is a political act at either end of the ladder). Social media extends the ladder of political participation at the lower end, introducing new low-cost acts that were not possible in an earlier era, because the transaction costs would have been too great relative to the participation costs. In the social media era, if an individual wishes to raise an issue or participate in a campaign or debate, they can easily do so without belonging to anything, or even coming into contact with a political organization. Even if they do, they are far more likely to be visiting, following, or liking the organization, rather than belonging to it. In this way, social media bring politics outside its traditional domain of an activist elite, where only those with high levels of time, education, and other resources are involved in party politics. Newer civic activism groupings, such as Avaaz, offer far weaker patterns of allegiance than does traditional membership. Avaaz calls itself a “campaigning community” and shows the real-time number of “members” (forty-eight million in June 2018, www.avaaz.org)—people who have made any kind of contribution to one of its petitioning, emailing, donations, petition-signing, or lobbying campaigns, however small (basically, anyone who has interacted with their website). But with the rise of spontaneous campaigns coalescing around a hashtag, which people may join at any point—such as the hashtag #MeToo against sexual harassment and assault—or a large-scale petition, even Avaaz looks relatively formal and old-fashioned, particularly given their use of email as a key form of communication.

Scaling Up with Social Influence

Taken individually, tiny acts of participation seem insignificant, and indeed for many years of the Internet were dismissed as mere "slacktivism" or "click-tivism," and denigrated as low-cost political acts that have minimal effect (Christensen, 2011; Gladwell, 2010; Morozov, 2011). The US political commentator Malcolm Gladwell (2010) published a widely cited article in *The New Yorker* arguing that small-scale actions and weak ties facilitated by social networking platforms could never give rise to political mobilization on the scale of the civil rights movement, which provoked some controversy given the demonstrations, protests, and even revolutions of the so-called Arab Spring, which followed so soon afterwards. But as the introduction suggested, tiny acts can and do scale up to large-scale mobilizations and campaigns for policy change that have brought major shocks and surprises to political regimes all over the world. They also play a part within conventional political events—such as election campaigns—by building up into waves of support for unconventional candidates such as Donald Trump (elected as US president in 2016), or Jeremy Corbyn (elected as leader of the UK Labour party in 2015 and again in 2017). The mechanism by which tiny acts scale up relies on two key characteristics of social media that exert social influence on individual decision-making: social information and visibility.

First, by participating in social media the individual will be exposed to "social information," a term borrowed from social psychology (Salancik and Pfeffer, 1978) to indicate information about the participatory behavior of others, because social media abounds in real-time information for each user about whether and when other people are participating, in terms of having liked, shared, viewed, followed, or signed. We know from decades of social science research that potential participants take this information (or, lacking this information, their perception of what it might be) into account when they are deciding whether to participate. Social information provides a crucial signal of viability for a mobilization, that is, evidence of whether or not it has reached or will reach "critical mass" (Marwell and Oliver, 1993). Economists, political scientists, sociologists, and psychologists have studied the impact of social information on charitable giving and on willingness to participate in public goods provision (see Andreoni, 2006; Cialdini and Goldstein, 2004), showing that people are more likely to contribute to a campaign, or contribute to public goods by undertaking activities such as recycling (Schultz, 1999), and voting (Gerber, Green, and Larimer, 2008) if they are provided with information that other people are also doing so (Frey and Meier, 2004). All these studies highlight a phenomenon that is constantly at work in social media environments, where potential participants receive a continual stream of real-time feedback information about how many other people have participated; something that someone who signed a petition in the street or threw money into a charity collector's bucket would be unlikely to receive. On social media, when you decide whether or not to sign a petition, donate money to a political cause, or participate in an email campaign, the chances are that you will know how many other people have already done so, how many people are likely to do so, and whether a target is likely to be met.

Second, just as any one individual is reacting to the information environment they are also changing it, by giving a signal of viability to whichever campaign or individual they support because of the second characteristic of social media—visibility. Just as social media makes individuals aware of what other people are doing, it also has the potential to make other people aware of what they themselves are doing. If a user tweets on Twitter, posts a status, or comments on someone else's status on Facebook, signs an electronic petition that shows the names of signatories, or posts a video on YouTube and disseminates it on other social media, then that user is making herself visible to a wider audience (and a very much bigger one than in the pre-Internet era). In the context of collective action, if a user undertakes some participatory act, it is more likely to be visible to others and therefore to influence them in their own participatory decision-making. Various experiments have been used to test the effect of visibility on political participation in liberal democracies, showing that visibility itself also has an independent effect on whether people contribute to public goods; for example, people are more likely to vote when other people know whether they vote or not (Gerber et al., 2008). However, this independent effect is context-specific—in some regimes anonymity may be crucial to whether people feel safe to participate in political action, and visibility could be a deterrent.[1]

Social media platforms vary in the extent to which they exert these two forms of social influence—social information and visibility. On most platforms, visibility is vital to operation: people post things on Facebook because they want their friends to see them, tweet because they want their followers to know about something, upload a video to YouTube because they want it to be viewed, and edit an article on Wikipedia (in part, at least) because they want in some way their view of a subject to be widely accepted. However, the majority of people on Facebook want only their friends to see most things, meaning that people must befriend someone and have that person

[1] In the revolutions against authoritarian regimes that comprised the Arab Spring of 2011, for example, early protesters who aligned themselves with online protest groups (such as the Facebook page, "We are all Khalid Said" in Egypt) early on are likely to have sought the ability to do so anonymously. Those joining later could hide in the swelling numbers of people who clicked "like" on the page—over 500,000 by the time the Egyptian regime opted to turn off the Internet at the height of the protest—sending a crucial signal of viability to those who came later. But for the earliest joiners, the potential costs of showing themselves to be supportive of the protest could have been tragically high.

approve the friendship if they want to be notified of status changes, whereas on Twitter following a user requires no approval and is a looser and more public arrangement where users do not control who their followers are. While Facebook and Twitter are plastered with social information about how many people have done something, LINE and Snapchat give out far less of such information numerically, allowing people to think that they are in some sense in a special and secret group of “friends of [the Labour Party leader] Jeremy Corbyn” for example. Facebook and Twitter offer “trending” information about topics, which research has shown concentrates interest in the most popular items at the expense of those topics which are not in the top trends (Hale et al., 2018). Each of these features of an individual’s personalized experience of social media has the capacity to influence their decisions whether and when to participate in a mobilization or collective action. These influences will vary across social-media platforms, so once an individual has made the decision to use one, the platforms themselves will further shape that individual’s information environment and their likelihood of participating in politics.

Scaling up—or Digital Dust?

Using these chains of social information and visibility, some campaigns or waves of support can scale up very quickly indeed. For example, in 2016, in reaction to the presidential candidate Donald Trump’s policy pronouncement that as president he would ban Muslims from entry to the US, a petition to block Donald Trump’s entry to the UK quickly rose to over 100,000 signatures in a matter of days, while another to “not ban” him also rose by 10,000 signatures in a day (though did not make the 100k bar for a parliamentary debate), as shown in Figure 11.1. These petitions must have played some part (along with an equally rapidly rising and much bigger petition at the time) to discourage the by then President Trump from taking up Teresa May’s invitation for a state visit to the UK in 2017, by contributing to the White House’s (and the President’s) impression that there would be demonstrations at such a visit.

Likewise, in the aftermath of the UK referendum in 2017 on whether to leave the European Union, for example, a petition to rerun the referendum, given the closeness of the result, achieved four million signatures (making it one of the largest petitions of all time) in a very short space of time. As Figure 11.2 shows, this petition had been effectively dead for many weeks, having been set up prior to the referendum by an anti-Brexit organization, the English Democrats who, being pessimistic that Leave would win the vote, wanted the petition to be ready immediately afterwards. It languished at fewer than ten votes until the referendum, when anguished Remain supporters

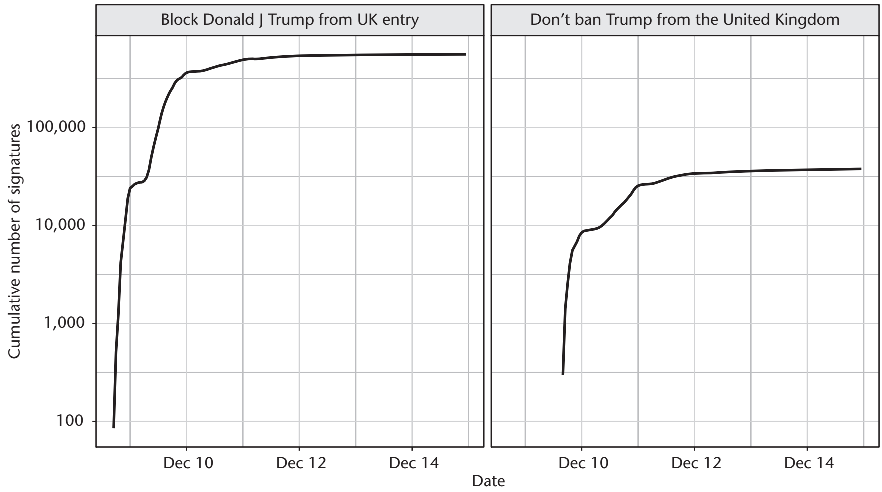

Figure 11.1. Signatures to petitions to "block" and "don't ban" Donald Trump from UK entry; December 2016
Source: Analysis of petition data from petition.parliament.uk (note the logarithmic scale).

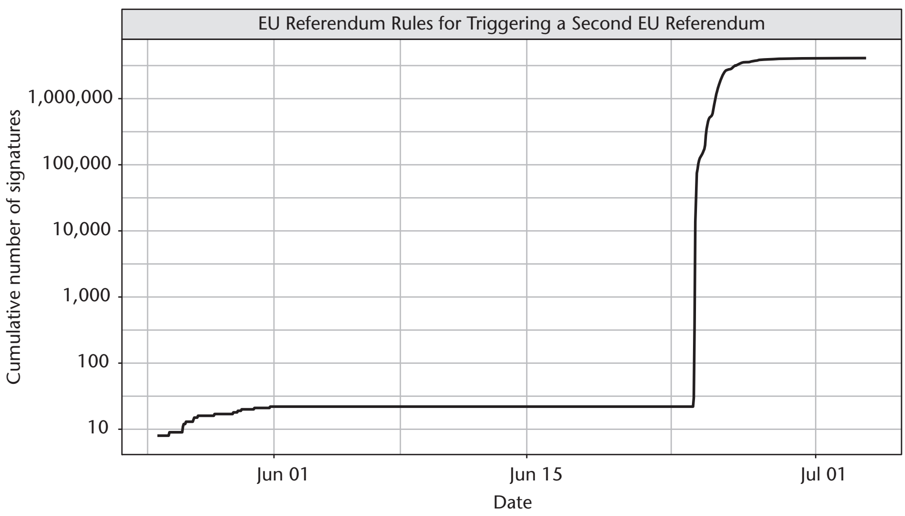

Figure 11.2. Signatures to the petition to rerun the UK's EU referendum
Source: Analysis of petition signatures from petition.parliament.uk (note the logarithmic scale).

seized upon it to avoid any of the set-up costs, and started signing in huge numbers. It went from having 22 signatures at 5 a.m. to having over 100,000 signatures by 12:00 noon. Ultimately, it led to a debate in Parliament; this had not, at the time of writing, caused the referendum to be rerun, but it did add to the ferment of emotion that still surrounds the Brexit decision, and could be considered to have contributed to any eventual decision to have another referendum or abandon the Brexit plans.

This pattern of scaling up rapidly and dramatically has been shown consistently across contexts. While our earlier research on petitioning showed the importance of the first day to the ultimate success of a petition (Hale et al., 2014), our subsequent analysis of hourly resolution in the data shows that those petitions that are successful in collecting a large number of signatures collect the bulk of them very shortly after launching (Yasseri et al., 2017). After a few days, the rate at which petitions gathered new signatures generally slowed significantly for all petitions. Alternatively, this could be viewed as the "outreach" (or capacity to reach more potential participants) of a petition decaying very fast, reducing to 0.1 percent after ten hours in the UK and thirty hours in the US (Yasseri et al., 2017). This pattern is replicated across the UK and US government petition sites consistently over time.

This pattern is also replicated across social media platforms, as shown in Margetts et al., 2015. For example, Figure 11.3 shows support for the hashtags related to campaigns on both Facebook and Twitter against perceived racist policing in the US during 2014/2015, when a spate of such incidents occurred.

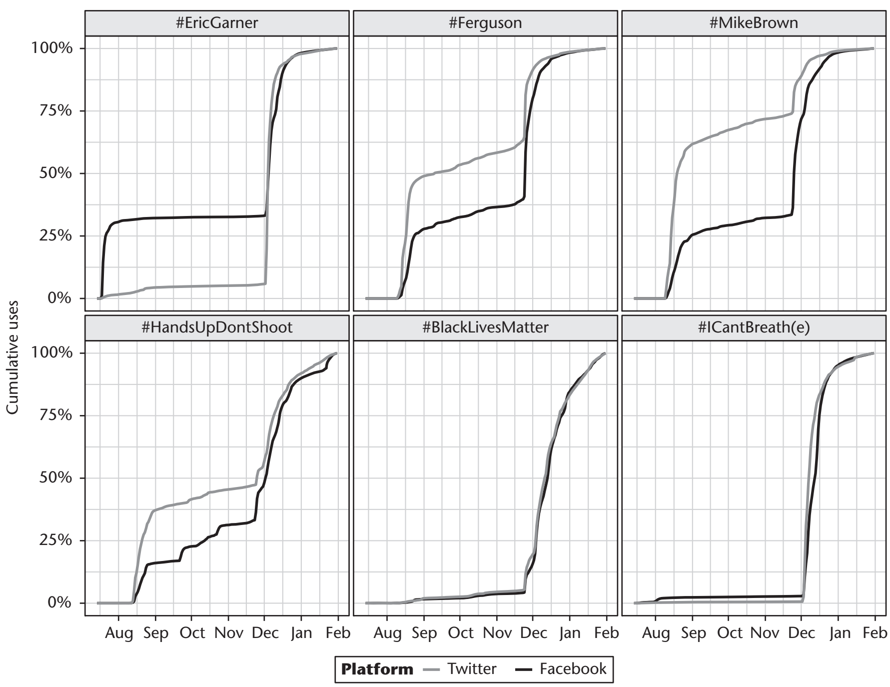

Figure 11.3. Mobilizations against policing in the US, on Facebook and Twitter
Source: Margetts et al., 2015.

For each event (such as the death of Mike Brown or that of Eric Garner in police custody), there tended to be a rapid rise in activity relating to the initial violence toward a black citizen, followed by another rapid rise relating to the failure to indict the police officers involved. For hashtags relating to umbrella campaigns where a number of hashtags are consolidated, such as #Blacklives-matter, the rapid rise relates to the creation of the hashtag. All the mobilizations illustrate the same phenomenon: for successful (in terms of gaining significant attention) mobilizations, the bulk of the attention is concentrated in the initial hours and days.

However, mobilizations seldom succeed. It may seem from the news media that it is relatively easy to get hundreds of thousands of people out in the streets or into a square, given the frequency with which such events appear to occur. But there is an obvious bias in favor of the successful mobilizations, which are reported on TV screens and circulate on social media, compared with all the failed mobilizations that we never see. The digital data that contemporary political mobilization generates allow us to measure, for the first time, the percentage of initiatives that succeed or fail. For example, there is virtually no data on failed petitions of the past, but the real-time transactional data generated by digital activism platforms allows us to scrutinize the failures along with the successes in an "N=all" data set. We have one such data set, reported in the book *Political Turbulence* (Margetts et al., 2015) and in various articles cited here (Hale et al., 2018; Yasseri et al., 2017), which contains every signature to every petition created on the government petitioning platforms in the US and the UK from 2011 to 2016. Recent analysis of this data shows that in the UK, over 99 percent of petitions fail to get the 10,000 signatures required for an official response, and only 0.1 percent attain the 100,000 required for a parliamentary debate (the same figure is 0.7 percent in the US) (Yasseri et al., 2017). Again, this picture is replicated over and again, showing a fat-tailed distribution of the kind that Internet researchers frequently encounter, where the vast majority of initiatives fail and a few achieve radical, rapid success (Figure 11.4).

When we model the daily growth of petition signatures, we see a leptokurtic, non-normal distribution, in that there are a small number of extreme changes and a long tail of minor changes. In this way, it seems that social media-based mobilizations of this kind contributed to the "punctuated equilibria" identified by the US political scientists Baumgartner and Jones (1993, 2005) in their Policy Agendas Project. In their model, developed prior to the social media era, the traditional media plays a role in policy attention "lurching" between issues. Our findings suggest that mobilization of individual acts on social media platforms might perform a similar role, although the mechanism is somewhat different. Another interesting characteristic of this distribution, shown in Figure 11.3, is that it is extremely difficult to predict which

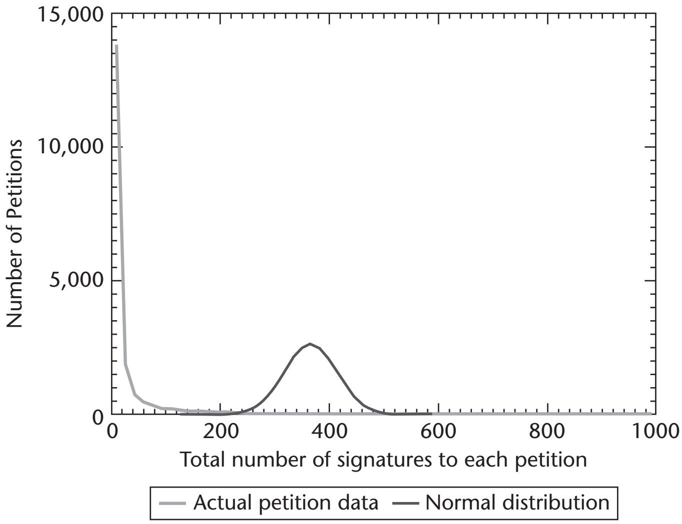

Figure 11.4. Distribution of petition data compared with normal distribution
Source: Margetts et al., 2015

petition will succeed, and which will fail. Having analyzed these data using topic modeling and a variety of other methods, we have shown that neither issue, nor time of day, nor day of the week, can predict which petitions will emerge as successful. Indeed, petitions with similar wording on the same issue and launched at around the same time can be shown to both fail completely and succeed dramatically in seemingly random ways. This uncertainty could well be a contributing factor in the seeming unpredictability of political life over the last few years.

Political Turbulence

The dynamics we have described suggest that social media platforms inject uncertainty and instability into politics. They allow tiny acts of participation, which scale up through a series of chain reactions of social influence, where people's decisions whether to act are influenced by social information about the participation of others, and in turn influence other people through their visibility, adding a signal of viability to whatever initiative they support. In this way, these chains of information and influence sometimes scale up to a large mobilization or huge wave of support, but mostly fade away into nothing. The unpredictability about whether something succeeds means that politics itself becomes less predictable and more uncertain. There is a further sense in which such dynamics also lead to instability, because on the rare occasions where mobilizations succeed it has been possible for a large-scale movement to develop without any of the organizational trappings of a political movement, such as leaders, or the involvement of an interest group, or an affiliation with a political party. That means that even when a mobilization appears to have succeeded in gaining substantive support, that support may wither away and disappear. This phenomenon is one factor in determining why so many of the dramatic protests and rebellions of the Arab Spring brought such disappointment; in Egypt, for example, one reason for the eventual failure of what was described as a revolution by many (even as "the Facebook Revolution") must have been the lack of leaders, or embryonic parties waiting in the wings, or civil society organizations, that accompanied the rapid accumulation of support in the squares and streets across the country.

These dynamics are encapsulated in the title of our book "Political Turbulence" (Margetts et al., 2015). They represent the undercurrents of political opinion and behavior on the social media platforms that have become completely intertwined with political life. They are part of the explanation for why there have been so many political shocks and surprises in recent years. Conventional methods of political prediction, using survey-based opinion polls carried out sporadically and at great expense, cannot hope to capture these rapid buildups of support that shoot up or die down within a few hours. And the digital data that they generate highlights the implications for political science research, discussed elsewhere in this volume. On the one hand, contemporary politics generates a deluge of transactional digital data in real time that holds great potential for computational social science methodologies, such as machine learning and agent-based models. On the other hand, it can be very difficult to obtain such data in the kind of quantities required for these models to work. The petitions data presented here was public and relatively easy to generate, as is data from Twitter which has an open application programming interface. But most social media data from the more popular platforms, such as Facebook and Instagram (which is owned by Facebook), is proprietary and closely guarded, especially in the wake of the Cambridge Analytica affair of 2018, where Facebook data generated by an application purportedly for academic research purposes was sold by the developer to the political campaigning organization Cambridge Analytica and used in the campaign to elect Donald Trump and (allegedly) in the UK referendum on EU membership. Facebook have since announced some positive changes, including requiring political advertisers to confirm their identities and provide disclaimers for the funding sources of political ads, as well as the development of a data-sharing arrangement for reputable academic researchers.[2]

[2] https://newsroom.fb.com/news/2018/04/new-elections-initiative/ (accessed August 11, 2018).

Institutional Catch-Up

The forms of political mobilization described here challenge political regimes, both democratic and authoritarian. When political campaigns, movements, protests, demonstrations, and even riots are organized via social media platforms it is likely that less tech-savvy state organizations will be caught off-guard and will be slow to react. The largest political parties can struggle to develop digital campaigns, sometimes resorting to scurrilous means to secure support, which can backfire or work in unpredictable ways. For example, while Facebook advertising seems to have worked for the UK Conservative Party in 2015, in 2017 it seemed as if the party had no way to communicate with anyone under the age of forty, and they appeared to be outmaneuvered by the far less expensive, less organized, more organic movement of viral "homemade" videos and grime artist support engineered by Momentum, an organization strongly supporting Labour Leader Jeremy Corbyn in the UK, which seems to have found appeal to younger age groups in particular.

Furthermore, electoral processes have become increasingly difficult to regulate, with many arguing that the UK electoral commission is no longer fit for purpose in the age of many of the phenomena discussed in this volume, such as deeply targeted political advertising, fake news, computational propaganda, and hate speech. The scale of the problem is illustrated by Facebook's first transparency report for 2018, which showed that in the first quarter of the year the platform took down 583 fake accounts, moderated 2.5 m pieces of hate speech, 1.9 m pieces of terrorist propaganda, 3.4 m pieces of graphic violence, and 21 m pieces of content featuring adult nudity and sexual activity.[3] Dealing with any of these pathologies of politics in the social media age becomes a complex and technologically sophisticated task.

Many scholars put forward a deeply pessimistic prognosis for democracy in the social media age, for example the economist Dambisa Moyo in the 2018 book, *Edge of Chaos*, and the political scientist David Runciman in his 2018 book, *How Democracy Ends*. These works place much more emphasis on the problems and challenges for democracy, than on their potential solutions. However, we would suggest that there is more cause for optimism than such works would have us believe. After all, social media platforms have only been around for ten years and intertwined in political life for far less than that, so it is hardly surprising that our political institutions lag behind, in terms of how to deal with a technologically advanced polity. In the US, the political scientist Bruce Bimber "continually returns" to the idea that we will not see "an end of

[3] Facebook's 2018 first quarter transparency report https://newsroom.fb.com/news/2018/05/enforcement-numbers/ (accessed August 11, 2018); commentary at www.theguardian.com/technology/2018/may/15/facebook-closed-583m-fake-accounts-in-first-three-months-of-2018.

the organization in civic life, but rather its transformation"' (Bimber et al., 2012), "bringing the relevance of formal organization back into contemporary collective action," while David Karpf (2012), in his *The MoveOn Effect* argues that rather than "organizing without organizations," the new media environment has given rise to "organizing through different organizations," and that it is on organizational innovation that we should focus.

Institutional catch-up is not just desirable, it is critical to the future of the democratic state. Even Mark Zuckerberg, from the helm of the Internet giant Facebook, with its two billion users and two miles of office buildings, announced publicly to a live-streamed hearing of the European Parliament on May 23, 2018 that regulation was both "inevitable" and "important," finally accepting the mantle of public responsibility that many commentators have been trying to place upon him and the company for years. Facebook and whichever companies follow in its wake are huge players on the democratic landscape, whose decisions shape individual political decision-making (and indeed regulatory mechanisms across the public sector) across populations.

New forms of political mobilization based (initially at least) on tiny acts of participation, such as the Romanian demonstrations cited in the introduction to this chapter, have proved themselves as viable political actors in an age where social media platforms are used widely. They have held corrupt regimes to account (as in the Romanian case); mobilized groups that have been viewed for years as politically inactive (particularly young people); toppled authoritarian regimes (as in Tunisia and Egypt); pushed for and achieved policy change across liberal democracies; and achieved social justice for a diverse range of victims, from women who have been sexually harassed or abused (as in the #Metoo movement which started with recognition of widespread such abuse in the US film industry and radiated out to other sectors and other countries) to the maligned football fans in the Hillsborough football disaster in Sheffield, UK. But these mobilizations usually fail, and when they do achieve success, they do so without the traditional organizational trappings of a movement, in unpredictable ways, leading to political change that is uncertain, unstable, and often unsustainable. For these reasons, there is need for institutional catch-up in terms of rebuilding political institutions and reshaping regulatory systems—particularly the regulation of elections—to adjust to the new democratic landscape. Otherwise the potential for democratic renewal and political enthusiasm that the availability of tiny acts of participation appears to have brought will dissipate amidst a morass of fake news, hate speech, and computational propaganda.

Finally, a crucial element of institutionalizing social media platforms in the democratic landscape will be building our understanding of the relationship between social media and political behavior. Every change on a social-media platform—such as the introduction of trending information, or a tightening up of controls on anonymous accounts, or changes in the way that a platform collects, stores, or deletes data—will affect political behavior and the relationships on that platform. Political science research needs to understand these social-media effects, because they will be a vital clue to the underlying patterns and trends in democratic life and, crucially, will underpin attempts to hold these important new actors to account. While all political actions and interactions increasingly generate digital data and we have theoretically more data at our disposal to undertake this task than ever before, in reality most data is carefully guarded by the social-media platforms themselves. Developing transparent and accountable data-sharing relationships will be a crucial part of the process of these platforms assuming their public role in democratic life.

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12

Social Media and Democracy in Crisis

Samantha Bradshaw and Philip N. Howard

The Internet and social media were originally viewed as democratizing technologies that would lead to a more vibrant digital public sphere. Following the outcomes of the 2016 US Presidential Election and the UK Brexit referendum, however, social media platforms have faced increasing criticism for allowing fake news, disinformation campaigns, and hate speech to spread. But how much bad information was spread? What can be done to address the problem? This chapter examines how social media algorithms and computational propaganda are reshaping public life. The authors explore how modern citizens are especially susceptible to computational propaganda, due not only to the prevalence of disinformation, but also to a political psychology that is often called "elective affinity" or "selective exposure." The authors use their findings to discuss the responsibilities of both users and platforms for protecting the digital public sphere.

Introduction

Like many new communications technologies, the Internet was initially viewed as a democratizing technology. With the click of a button, anyone from anywhere could access an immeasurable amount of knowledge and information. Many optimists hoped this revolution would lead to more informed citizens, alongside new avenues for civic participation and public debate. Indeed, it is hard to tell the story of the Arab Spring without acknowledging that social media platforms allowed democracy advocates to coordinate themselves in new and surprising ways (Howard and Hussain, 2013). But following the highly contentious political victories of the Brexit campaign in the United Kingdom and the election of Donald Trump in the United States, there are growing worries that social media platforms exacerbated the spread of disinformation and junk news online.

There is little scholarly doubt that social media has become an increasingly important platform for democracy by opening up new avenues for participation and playing a more central role in the circulation of news and information about politics. However, the definition of social media is often vague and constantly changing with innovations in technology and social networking. Some definitions focus on platforms that allow users to generate their own content, or focus on the ability of users to bypass traditional gatekeepers. Other definitions highlight the interactivity involved in the exchange of ideas. When discussing social media, we focus upon Howard and Parks' (2012) broad definition of social media, which consists of:

(a) the information infrastructure and tools used to produce and distribute content that has individual value but reflects shared values;
(b) content that takes the digital form of personal messages, news, ideas, that become cultural products; and
(c) the people, organizations, and industries that produce and consume both the tools and the content. (Howard and Parks, 2012)

Social-media platforms are among the most used applications on the Internet. In the United States, eighty-five percent of the adult population uses the Internet regularly, and eighty percent of those people are on Facebook (Greenwood, Perrin, and Duggan, 2016). In 2016, the Pew Journalism and Media Report found that in the United States seventy percent of Reddit users, sixty-six percent of Facebook users, and fifty-nine percent of Twitter users were getting their news from their respective platforms (Gottfried and Shearer, 2016). Although by 2018 the use of platforms such as Facebook, Twitter, and Google for news consumption was starting to decrease for the first time, chat applications such as WhatsApp were growing in popularity for sharing and disseminating news and other political content (Newman et al., 2018). Of course, the formation of ideas around politics is an ongoing social process that is not limited to social media (Dutton et al., 2017). Individuals who search for political information and news use a combination of traditional and digital sources, and establish their political opinions over an extended time period (Chadwick, 2013). Although traditional sources of mainstream media, such as cable television and newspapers, remain the most significant form of news, social media continues to be a valuable source that users consult in the process of opinion-formation.

Social media has transformed the ways in which users can create and share news and political content. Communication scholarship has always emphasized the role of powerful gatekeepers in the production of content

(White, 1950; Lewin, 1951; Shoemaker, 1991; Metoyer-Duran, 1993; Barzilai-Nahon, 2008; Neuman, 2016). But the Internet and social media have transformed the flow of information. Rather than relying on traditional media elites to push content, users can pull relevant information into their newsfeeds (Neuman, 2016). Microblogging and citizen journalism, made possible by the free flow of information, have had an important and positive impact on free speech and democracy, as traditional media and broadcasting organizations no longer hold a monopoly over news and information about politics.

Social media has also changed the way that information can be found. Machine learning and "black box" algorithms are playing an increasingly important role in selecting information that is relevant to users (Pasquale, 2015). Scholars have highlighted how social media algorithms determine relevant or popular content (Gillespie, 2012), help users create personal and professional networks (Hamilton et al., 2014), and profile behavior to deliver advertisements to users (Bermejo, 2007). Increasingly, algorithms "provide a means to know what there is to know and how to know it" (Gillespie, 2012). This has important consequences for how individuals find news and other important political information necessary for a healthy democracy. Instead of human editors selecting important sources of news and information for public consumption, complex algorithmic code will deliver (or exclude) certain kinds of information over others. Information might go viral—spreading exponentially—regardless of whether or not it is true (Nahon and Hemsley, 2013).

Finally, social media is important not only for obtaining news and political content, but also as an indicator of public sentiment in elections and other political crises (Gayo-Avello, 2013). No matter what the platform, social media users are producing a vast amount of data that is collected and analyzed to generate detailed psychological profiles of them that can provide insight into attitudes, preferences, and behaviors. The information users produce about themselves can affect sentiment (Kramer, Guillory, and Hancock, 2014), influence offline voting behavior (Bond et al., 2012), and improve voter turnout (Brand, 2016). The study shows that the news consumption habits of social media users can also produce fine-grained analysis of the causes and consequences of political polarization (Bakshy, Messing, and Adamic, 2015).

The growing significance of social media, the free flow of information, the rise of data analytics, and personalized algorithms, are claimed to be impacting politics in ways that we are only beginning to understand. Therefore, this chapter sets out to answer the following questions: (1) What has been the impact of algorithms on public life? (2) How do algorithms exacerbate problems of selective exposure and elective affinity in modern civic engagement? And (3) what is the responsibility of social media platforms for protecting and encouraging a healthy digital public sphere?

Social Media and Junk News

Social media platforms allow individuals to share news stories and political content readily with their social networks. As individuals integrate social media into their quest for political information, there have been several concerns around bias in the opinion-formation process (Dutton et al., 2017). The main question scholars ask is: Does social media expose users to a diverse array of information from various high-quality sources, or is it putting us into "echo chambers" and "filter bubbles" that reinforces singular viewpoints?

The argument that social media has negative consequences for public life begins with evidence that very little of the content shared over social media is about politics, and when it is, online conversations are short and emotionally driven, as opposed to substantive and engaging (Howard, Savage et al., 2017). Although this could also be said for conversations that take place in the real world, citizens rarely use social media for substantive political conversations, and behind the veil of online anonymity, such conversations are often anemic, uncivil, or polarizing. Ultimately, public debates over social media may do little more than promote ephemeral engagement without translating to offline political impact (Christensen, 2011).

Online political conversations are also relatively rare occurrences in comparison to the other kinds of things people do on the Internet (Massanari and Howard, 2011). When they do occur—during major political events such as candidate debates, for example—social media users often use digital platforms to learn about and interact with politics, but they tend to acquire new knowledge that is favorable to their preferred candidate (Boulianne, 2015). Recent work has found that while many US-based activist organizations believe they are creating stronger communities and dialogues with their public through social media content, this rarely translates to significant mobilization with regard to public events, consumer activism, or grassroots lobbying (Guo and Saxton, 2014; Lovejoy and Saxton, 2012). When social media actions do have offline impacts, they are usually the same kinds of low-quality, high-volume actions that advocacy and political groups have long used to gain notoriety and news headlines for their organizations (Rotman et al., 2011).

Social media can also lower the quality and the diversity of political news and information that voters have access to. Social media platforms are increasingly personalizing content through algorithms and machine learning models that tailor results to reflect an individual's interests, past behaviors, or geographical location (Gillespie, 2012). From more of a technological determinist perspective, some have argued that the automated curation of content could lead to "filter bubbles," where content that reflects an individual's point of view becomes inadvertently amplified, while the chance of exposure to new or challenging ideas is diminished (Pariser, 2011). In other words, social media allows users to create "homophilous networks" (Pariser, 2011). For example, Twitter data has been used to classify users by party affiliation and measure homophily in the United States, with results indicating that Democrats tend to have more homophilous associations than Republicans, unless the users classified as Republicans follow major Republican leaders (Colleoni, Rozza, and Arvidsson, 2014).

From a social-shaping perspective, others have recognized that users create their own "echo chambers" by "friending" like-minded individuals (Sunstein, 2009). Here, the social filtering of their friends and networks (rather than algorithmic filtering alone), diminishes the diversity of information that users are exposed to (Nikolov et al., 2015; Dutton et al., 2017). Additionally, numerous studies have demonstrated that people are more likely to share information with their social networks that conforms to their pre-existing beliefs (Quattrociocchi, Scala, and Sunstein, 2016), increasing ideological differences between individuals (Flaxman, Goel, and Rao, 2016).

On the other hand, many scholars have argued that social media leads to greater exposure to a diversity of information and viewpoints (Benkler, 2007). Goel, Mason, and Watts (2010) demonstrated that social media users are generally connected to several friends who hold different political opinions. And in a survey of Internet users from seven different countries—Britain, France, Germany, Italy, Poland, Spain, and the United States—Dutton et al. (2017) also found that concerns over filter bubbles or echo chambers are overstated: the majority of Internet users report that they consult diverse sources of information, expose themselves to diverse viewpoints, and read news they disagree with.

There are compelling arguments to be made on both sides as to whether or not social media has had a positive or negative effect on political life. However, during the 2016 Brexit referendum, and the presidential elections in the United States, commentators became increasingly concerned with the information ecosystem. Several critics became concerned about the dual realities of what social-media users were viewing. Online tools that allowed researchers to view the live streams of "very conservative" and "very liberal" users demonstrated two very different narratives: one filled with stories about Hillary Clinton, "the liar," the other riddled with stories about Donald Trump, "the delusional" or "the narcissist" (Keegan, 2016). Placed side by side, these liberal and conservative newsfeeds strongly demonstrate the dual realities of what is presented to users, illustrating the power of algorithms to perpetuate filter bubbles and limit the marketplace of ideas. However, the effect of echo chambers during the 2016 US presidential election tended to be more pronounced for Trump supporters, where research conducted by the Computational Propaganda Project found that those who supported Trump were more isolated in their media ecosystems, sharing sources mostly among themselves (Narayanan et al., 2017).

The fact that algorithms prioritize certain content over other types is not a new revelation. For quite some time, individuals and businesses have tried to "game" these systems for marketing purposes. For example, search engine optimizers have established entire business models for boosting a company's rank in search results. This multi-billion-dollar industry is built upon understanding how algorithms rank content in order to manipulate a client's rank in search results and create viral stories or images to spread messages or advertisements to users. What is novel is that these tools are no longer used to just sell products or drive advertising revenue from click-bait headlines. Instead, optimization tools have been repurposed to shape political outcomes.

Political actors and governments worldwide are employing both people and algorithms to shape public life (Howard and Kollanyi, 2016; Woolley, 2016; Bradshaw and Howard, 2017, 2018). Bots are pieces of software written to perform simple, repetitive, and robotic tasks. They can perform legitimate tasks on social media such as delivering news and information—real news as well as junk—or undertake malicious activities like spamming, harassment, and hate speech. Whatever their uses, bots on social media platforms are able to rapidly deploy messages, replicate themselves, and pass as human users. They are also a pernicious means of spreading junk news over social networks of family and friends. During the 2016 elections in the United States, bots played a large role in amplifying conspiracy theories around "pizzagate"—the rumor that Hilary Clinton and her campaign manager John Podesta were involved in a child sex ring operating out of the basement of a pizzeria. Bots drew an incredible amount of public attention toward the pizzagate rumors, and away from other important issues that needed to be discussed at the time.

Computational propaganda flourished during the 2016 US Presidential election. There were numerous examples of misinformation distributed online with the intention of misleading voters or simply earning a profit. Multiple media reports have investigated whether "fake news" propelled Donald J. Trump to victory (Dewey, 2016; Parkinson, 2016; Read, 2016).

While it is difficult—if not impossible—to demonstrate a connection between the consumption of political news and information over social media and a voter's choice, we can evaluate the amount of true and false information available to voters leading up to election day. In our research on Brexit we found that the leave campaign generated at least twice as much content as the remain campaign over Twitter (Howard and Kollanyi, 2016). In Michigan, conversation about politics over Twitter mirrored the national trends, in that Trump-related hashtags were used more than twice as often as Clinton-related hashtags (Howard, Bolsover, et al., 2017). We also evaluated the quality of information being shared by users. Based on a grounded typology of junk news,[1] we found that social media users in Michigan shared a lot of political content, but the amount of professionally researched political news and information was consistently smaller than the amount of junk news. And in evaluating the quality of sources shared in the days leading up to the election, we found that the amount of junk news steadily increased over time, while the amount of professional news shared decreased (Howard, Bolsover, et al. 2017).

Social media platforms have served significant volumes of fake, sensational, and other forms of junk news at sensitive moments in public life, though most platforms reveal little about how much of this content there is or what its impact on users may be. Junk news, widely distributed over social media platforms, can in many cases be considered a form of computational propaganda. When junk news is backed by automation, political actors can have a powerful set of tools to manipulate public opinion and degrade the quality of democracy.

Computational Propaganda and Selective Exposure

Voters do not get all the political news and information they need during an election, nor is important information randomly distributed across a voting population. Instead, research has found that people select what media and what sources they wish to be exposed to (i.e., "selective exposure"), and that they choose to associate with groups of voters, community associations, political parties, and particular candidates based on affinities unrelated to policy ideas (i.e., "elective affinity"). Technology has certainly made it easier for individuals to access news that conforms to their pre-existing beliefs (Gentzkow and Shapiro, 2011), and being exposed to partisan media makes audience partisan identities more salient (Knobloch-Westerwick and Kleinman, 2012; Horwitz and Nir, 2015).

The selective exposure theory argues that most voters prefer supportive to discrepant messages, because messages of this kind increase a voter's confidence that they are thinking, feeling, and acting in a correct or acceptable manner, that they have made good decisions about information quality in the past, and that they need not consider radical shifts in political affiliation. Effectively, selective exposure results in very few mass defections from political parties or experienced political candidates. When Lazarsfeld, Berelson, and Gaudet (1948) studied how voters in Erie County got political news and

[1] The grounded typology of junk news considers junk news to have three of these five characteristics: (1) lack of professional journalistic standards; (2) "click-bait" content presentation; (3) lack of credibility and limited sourcing; (4) clear biases; (5) counterfeiting of real news websites.

information, they found that people tended to selectively expose themselves to the media message of their preferred candidate. Almost every study of selective exposure since has affirmed some selective exposure effects. We still debate the explanations for selective exposure, however, and it is not clear that selective exposure works in quite the same way over the Internet. Studies of selective exposure on social media have not reached the same level of consensus that researchers working on broadcast media have reached (Chaffee and Miyo, 1983; Bennett and Iyengar, 2008).

Why do people selectively expose themselves to political news and information? The partisanship explanation suggests that people pay attention to political content that fits into their pre-existing beliefs. If they've already expressed a preference for a particular candidate they will select messages that strengthen, not weaken, that preference (Chaffee and Miyo, 1983). Effectively, this means that voters tend not to change political parties or favored candidates because they are unlikely to voluntarily or proactively acquire radically new information that challenges their perspectives and undermines their preferences. Obviously, the more interested a voter is in a subject, the more likely is such selective attention (Berelson and Steiner, 1964).

A second explanation for selective exposure focuses on one's "schemata" or cognitive representations of generic concepts with consistent attributes that can be applied to new relationships and new kinds of information (Fiske, Kinder, and Larter, 1983). Whereas the partisanship explanation emphasizes that we act with cognitive economy by applying to ideological frames or deferring to political figureheads, the schemata explanation emphasizes that we take cognitive shortcuts and depend on ready-made prior knowledge (Fiske, Lau, and Smith, 1990; Ossoff and Dalto, 1996). Information itself has a kind of gatekeeping role, such that we rely on the things we already know and believe rather than relearn the science and facts relevant to each new policy issue.

The third possibility is that we rely on selective exposure because we don't want to face the cognitive dissonance of exposure to radically new and challenging candidates and information (Chaffee and Miyo, 1983). Research on the cognitive dissonance explanation for online selective exposure is minimal. It is plausible, however, because investigations of context collapse where multiple audiences are collapsed into single contexts, making it difficult for people to adjust their tone and behavior the way they would in face-to-face interactions (Marwick and Boyd, 2011). Thus, social media can lead to very real, jarring experiences for users who are presented with unexpected information and social anecdotes over digital media (Davis and Jurgenson, 2014).

One important piece of the early scholarship on selective exposure may help us understand how young people explore political content on social media. When Chaffee and Miyo (1983) interviewed 501 pairs of adolescents and their parents during the 1980 US presidential campaign, they confirmed that partisan predispositions motivated selective exposure that strengthened those predispositions. They were surprised to find, however, that this tendency was strongest among adolescents. Chaffee and Miyo explained this by concluding, "Being comparatively new to politics, the adolescents respond more to the campaign, and they are considerably less likely than their parents to pay attention to the campaign communication of the candidate who is running in opposition to the one they favor" (1983: 32). It remains to be seen whether or not this conclusion holds for social media—are young social-media users *more* likely to exhibit selective exposure?

The primary difference between the roles played by (online) broadcast media and social media in democracy lies in the active role of the user in choosing to interact with particular kinds of political news and information. Digital-media users either deliberately select articles to read, or choose the settings and set up the social media networks that supply them with content.

Social media almost certainly facilitates selective exposure, and another explanation of this could be through *social* endorsements rather than simply partisan frames. Although not everyone trusts their friends and family relative to mainstream media (Dutton et al., 2017), on Facebook, friends share substantially less crosscutting news from sources aligned with an opposing ideology. In a study by Bakshy et al. (2015), Facebook users encountered roughly fifteen percent less crosscutting content in their news feeds, because of algorithmic ranking, and clicked through to seventy percent less of this crosscutting content. Within the domain of political news encountered in social media, selective exposure appears to drive attention. However, the underlying driver of attention is the social endorsement that is communicated through the act of sharing: social-media users will not pay attention simply because a piece of political news is from a credible source or generated by a political party, they pay attention because someone in their social network has signaled the importance of the content (Bakshy, Messing, and Adamic, 2015; Messing and Westwood, 2014).

A Democratic Deficit?

We live in a world where decisions that affect our lives are increasingly being made by algorithms and mathematical models (Pasquale, 2015; O'Neil, 2016). Internet platforms have been reluctant to identify as news or media organizations, preferring instead to view themselves as technology companies. As Napoli (2014) notes, citizen journalism and the dissemination of news were not "functionalities [that] motivated the development of these platforms";

instead, Facebook was originally designed to "help college students identify attractive classmates," and Twitter was intended "to facilitate the dissemination of a short burst of *inconsequential* information." Nevertheless, these companies provide vast platforms and are among the more important conduits of political news and information in all types of regimes. Just as traditional news organizations must have responsibilities to their readers, Internet platforms must face questions about how they serve the public interest (Gillespie, 2010). While these firms insist on being treated as technology firms, and are not newspapers or broadcasters, they effectively have the impact of traditional media organizations.

People get their political news and information from many sources. But social media is an important one because we often trust our friends and family to pass on good information. However, the science of network analysis can also show us how the problems of selective exposure and computational propaganda may be compounded. First, if the followers of candidates who lost an election begin "unfriending" the followers of candidates who won, then our social networks will become even more bounded than they already are. Diversity in sources of political news and information will drop further as our friends and family continue to circulate content sourced within our immediate community. By default, we tend to trust the news and information that comes from people who are in our social networks (Callahan, 2017), and experimental psychologists have demonstrated that we like to find information that confirms our biases (Metzger, Flanagin, and Medders, 2010). Networks are made up of sub-networks, so any sub-networks that are poisoned by someone actively generating false news reports may have more success in a bounded sub-network than in one where people are likely to find many sources of news.

Even worse, some politicians may keep pushing junk news to the parts of a country that voted their way, while other parts get high-quality political news and information. That may even produce an even deeper level of inequality across states, with some politicians and government officials making good decisions based on evidence, and others making poor choices based on bad information. The outcomes of the Brexit referendum and the 2016 US presidential election can, in part, be explained by the paucity of quality information available to voters on social media. Moreover, these outcomes have been so polarizing that social-media platforms may allow us to cut even more connections to people with different political opinions, and policy-makers in regions with misinformed publics and weak traditions of evidence-based policy-making may suffer further.

It is hard to know what a comprehensive solution might entail. To help identify ways to combat the problem of fake news, perhaps it would be productive to think about the attributes of a healthy democracy we should aspire to—one we would want to live in. Ideally, political news and information served up over social media would come with some quality control. Facebook is already offering to work with a range of civil-society groups to incorporate public judgments about news quality into the algorithms that serve up content to users. A number of tweaks have been made to the algorithms to help limit the spread of junk news. For example, one recent change made by Facebook is that less content that is shared without users clicking through will appear in the users' newsfeeds than links that have been clicked on by users. Both Twitter and Facebook have built out their systems for responding to complaints from users about abuse from other accounts. And both platforms have taken steps to remove fake accounts from users' networks. Whether or not these programs have a positive effect will be tested during upcoming elections.

There are, simultaneously, a series of public policy interventions being debated by governments around the world. First, governments could fine social-media companies for serving fake news to users. Second, social-media firms could continue to regulate themselves. Third, governments could help shape the content available over social media—some combination of user-control and user profiling, publicly minded service advertisements, and algorithmic distribution of some high-quality news might improve public knowledge. There is a fine balance that must be struck between regulation and free speech. Although social media can spread harmful and destructive content, it is also an essential platform for the expression of rights and freedom. Overregulation that leads to government censorship would destroy the value of these platforms.

The models for incorporating social media into public life will not be the same as those for television and radio. The trick will be to figure out which features of the regulatory environment should be applied and which should be adapted for social media. It took decades for policy-makers and the public to understand broadcast technologies and figure how to use them culturally, economically, and politically. Social-media regulation will also take time.

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13

The Internet and Access to Information about Politics

Searching through Filter Bubbles, Echo Chambers, and Disinformation

William H. Dutton, Bianca C. Reisdorf, Grant Blank, Elizabeth Dubois, and Laleah Fernandez

Concern over filter bubbles, echo chambers, and misinformation on the Internet are not new. However, as noted by Howard and Bradshaw (Chapter 12), events around the 2016 US presidential election and the UK's Brexit referendum brought these concerns up again to near-panic levels, raising questions about the political implications of the algorithms that drive search engines and social media. To address these issues, the authors conducted an extensive survey of Internet users in Britain, France, Germany, Italy, Poland, Spain, and the US, asking respondents how they use search, social media, and other media for getting information about politics, and what difference these media have made for them. Their findings demonstrate that search is one among many media gateways and outlets deployed by those interested in politics, and that Internet users with an interest in politics and search skills are unlikely to be trapped in a filter bubble, or cocooned in a political echo chamber.

Introduction: Search in a Web of Media and Information

Since the 1940s, when concerns over propaganda rose dramatically, the role of the mass media in shaping public opinion has been a major focus of research on political communication (e.g., Katz and Lazarsfeld, 1955; Lazarsfeld, Berelson, and Gaudet, 1968; McCombs and Shaw, 1972; McLuhan, 1964). Such studies viewed threats to news and public information as dangers to democratic processes, such as campaigns and elections. In the twenty-first century, as the Internet has moved from being an interesting innovation to being an essential source of information, global debate has arisen over the impact that algorithms, search, and online news—as well as fake news—can have on public opinion.

Powerful notions of the Internet as enabling access to a global treasure trove of information began to shift toward worries over the degree to which those who use social media and online tools such as search engines are passively fed inaccurate or politically targeted information that could distort public opinion and democratic choice. In the aftermath of the 2016 US presidential election of Donald Trump, and the UK's referendum on Brexit, these concerns went viral, leading pundits to argue that "your filter bubble" is "destroying democracy" (El-Bermawy, 2016). Likewise, days after Brexit, the headline in a major UK newspaper claimed that "The truth about Brexit didn't stand a chance in the online bubble" (Bell, 2016). These and related developments around the world led to a resurgence of near-panicked concerns over the role of new media in shaping public opinion. Explanations for rising levels of polarization, tribalism, and anger in politics relied increasingly on the role of disinformation, echo chambers, and filter bubbles.

The Role and Function of Algorithms in Shaping Search and Social Media

When Internet users look for information about politics, search engines are expected to play a positive gatekeeping role by recommending the sources most relevant to user search queries, whether they be websites, news articles, video clips, social media, or relevant conversations. As Herbert Gans (2003: 1) put it with respect to the news media: "[D]emocracy may belong directly or indirectly to its citizens, but the democratic process can only be meaningful if these citizens are informed." The Internet and social media should enable voters and citizens to get access to more information about more candidates and more issues than could possibly be available on traditional mass media, and thereby enable a more informed choice—a more rational voter (Docter et al., 1999). Thus, democratic systems are anchored in notions of the media supporting rational or responsible voters who seek information about candidates and issues to help make informed choices at the polls (Downs, 1957; Key, 1966; Caplan, 2007).

However, fears have increased over whether the Internet and social media are actually undermining democratic choice by locking users into filter bubbles or echo chambers or exposing them to misinformation in ways that undermine their ability to make rational political choices. Some fears have focused on the potential for the personalization of search and the curation of newsfeeds that limit the information to that which aligns with the user's preexisting beliefs rather than exposing the user to countervailing perspectives (Pariser, 2011). For instance, those who hold conservative views may only be exposed to conservative news sources, whereas those who hold liberal views may only be exposed to liberal news sources. Others have focused on the potential for social media to reinforce the propensity of individuals to seek out like-minded people and cocoon themselves in politically homogenous echo chambers (Sunstein, 2017). Still others are concerned that by enabling users to communicate directly with candidates, causes, and information, the Internet undermines the valuable mediation and gatekeeping role of traditional institutions, such as mainstream media, political parties, and interest groups (Noam, 2017). These concerns raise serious questions over whether the Internet and social media undermine access to information about politics that remains central to democratic processes.

Multiple Expectations

There are competing theoretical perspectives on the role that search and social media algorithms might play in reshaping access to information about politics. A number are technically or socially deterministic, and others are based on a more open, socio-technical shaping of democratic processes. As explained in the following sections, the technologically deterministic perspective posits that the outcomes of search can be extrapolated from specific features of a technology. Specifically, the systems and machines that personalize information through search-engine algorithms will predictably trap users in a filter bubble. The socially deterministic perspective suggests that information exposure is in part predetermined by personalization and in part by the propensity of individuals to seek information that conforms with their preconceived views—a confirmatory bias. In contrast, a socio-technical shaping perspective views the outcome of search to be far less predictable as it is shaped by technical, economic, cultural, and other social factors in different contexts of use. From this socio-technical perspective, it is critical to see what users actually do, rather than extrapolate their behavior from features of a technology, such as personalization, or people, such as their confirmatory bias.

Filter Bubbles

The concern over filter bubbles illustrates a technologically deterministic view based on search results which are customized to personalize information in ways that limit a user's exposure to information that could challenge their beliefs. One of the most popular perspectives on the role of search engines is captured by Eli Pariser's (2011) notion of a filter bubble. This is the idea that the algorithms designed to personalize search—by ensuring that Internet users get what they are looking for—tend to feed results that reflect the interests, location, and topics that Internet users have searched for previously. While personalization has become a valued service, the fear is that past search behavior results in users seeing a less diverse array of information. A rational extension of this feature is that it will lead to the reinforcement of a user's existing views on an issue, candidate, or political movement, rather than exposing users to countervailing information. In such ways, personalized search could determine what people see and believe about politicians or policies without users being fully aware of the intentionally limited range of information they have seen.

Echo Chambers

A more socially deterministic perspective is the view of an echo chamber. An echo chamber is similar to the filter bubble but with greater emphasis on the role of user choice (Sunstein, 2017). The idea behind echo chambers is that people use social media and other sources of information in ways that confirm their preexisting biases, such as to connect with like-minded people. They prefer to read information that confirms, rather than challenges, their preexisting views (Nickerson, 1998; Sunstein, 2017). This social process, often referred to as "confirmation bias," applies in contexts beyond Internet users, for example in the case of scientists who might ignore findings that run counter to their hypotheses. In a high-choice environment, people tend to choose only media that agree with them. This bias could affect how people select or read a newspaper or search the Internet, leading to the creation of echo chambers of relatively homogeneous groups of like-minded individuals. Echo chambers contain limited viewpoints and one-sided political information while facilitating communication and information sharing among the like-minded (Sunstein, 2007, 2017). From this perspective, social filtering of media choices by individuals adds fuel to algorithmic filtering to diminish the diversity of viewpoints, creating a homogeneity bias among media users (Nikolov et al., 2015).

Disinformation: Fake News

In recent years, the debate over the prominence and impact of deliberately falsified online news has continued to grow (Tufekci, 2017: 261–77). Inaccurate stories and misinformation have long been problems. In the early stages of the Internet, users invented lists of URLs to help other users find relevant information amongst mountains of useless dreck. Some of these lists evolved into the earliest search engines. However, this problem persisted. A survey of over a dozen nations in 2010 found most Internet users to be concerned about the trustworthiness of people and information online (Dutta et al., 2011). More recently, the term "fake news" has become politicized and increasingly ill-defined as politicians and journalists have used the term loosely to characterize misleading, partisan, or otherwise politically motivated stories. At times, creating and distributing fake news is an attempt to sway public opinion, for example with stories about the Pope supporting a political candidate. However, the concept of "fake news" came to be used to capture a perceived rise in the practice of deliberate sharing of disinformation, mainly to trick users into clicking on links to stories that generated advertising revenue for the hoaxers.

These concerns over filter bubbles, echo chambers, and disinformation are inherently attractive and compelling in part because they are technologically or socially deterministic (MacKenzie, 1999). They are rational extrapolations of the features of technology, such as algorithms for personalization, or features of human nature, such as a confirmatory bias. So they make sense. But there are serious reasons to question such perspectives. Decades of research on information and communication technologies, like the Internet, have found that the effects of new technologies are mitigated and reconfigured by a wide variety of economic, psychological, cultural, legal, policy, and other social factors, often leading to unanticipated and unintended consequences (MacKenzie and Wajcman, 1985; Dutton, 1999). From this perspective, any forecasts of the impact of a technology are highly problematic in the absence of empirical research on its actual uses and implications. Arguably, each of these major concerns over how search engines and social media are distorting access to information about politics assumes a technological or social determinism. They need to be empirically assessed.

This chapter empirically investigates whether any of these perspectives are true. What part do search engines play in shaping access to political information? Is their role comparable to the roles of other media, such as television and newspapers? Are users cocooning themselves in echo chambers with like-minded people?

Approach: A Cross-National Comparative Study

To address these questions, we asked Internet users how they use search, social media, and other sources of information about politics in order to understand whether patterns of use conformed to or undermined these prominent perspectives on the role of the Internet and social media. Our data is a cross-national sample of Internet users, which allows us to compare differences across geopolitical contexts and normative beliefs concerning media sources. Our data was gathered using Web-based random samples of Internet users in seven nations: six large European countries (Britain, France, Germany, Italy, Poland, and Spain), and the United States (US). In addition, the survey data was complemented by trace data captured by search engines—data on the most popular search terms over time—to evaluate the actual search behavior of Internet users.[1]

The survey was designed during the fall of 2016 and fielded online in January 2017. In each nation, responses were received from approximately 2,000 adults, yielding a total sample size of about 14,000 respondents. The survey was based on random probability samples and uses post-stratification weights to weight the results to known population proportions in each country (Dutton et al., 2017: Appendix 1). The post-stratification weights make the survey of Internet users more representative of the online population of each country aged eighteen and older.[2]

The questions guiding this study required that we gather information on demographic characteristics as well as political interests and Internet activity. The survey asked questions about offline activities and social networks as well as online activities including search and social media use. This is important considering that most research on filter bubbles and echo chambers is based on the study of a single platform, such as Facebook or Twitter. The online questionnaire was designed to specifically address questions about how Internet users obtain information about politics,[3] and in ways that built on previous survey research.[4]

The comparative data set enables this study to address how perceptions of media sources vary cross-nationally and over time. In addition, political

[1] A more detailed overview of the methodology of this study is provided in the study report by Dutton et al. (2017) available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2960697. (Accessed October 1, 2018).

[2] The weights are based on gender, age, and region within each nation. The exact classification will differ from country to country, for example, the US region weighting is by state, the UK's uses regions, and Germany's uses Bundesländer.

[3] The full questionnaire is available online at http://quello.msu.edu/research/the-part-played-by-search-in-shaping-political-opinion-the-quello-search-project/. (Accessed October 1, 2018).

[4] Major sources included the Oxford Internet Survey (OxIS) (http://oxis.oii.ox.ac.uk. Accessed October 2018), Pew Internet and American Life Project (www.pewinternet.org. Accessed October 1, 2018), YouGov surveys for the Reuters Institute (2016) (https://reutersinstitute.politics.ox.ac.uk/ Accessed October 1, 2018), and Canada's Young Voters Survey (Dubois and Clarke, 2015).

information gathering practices are sporadic, often peaking near elections, and change depending on the political context and personal factors (Dutton, 1999). Such variations may take shape in the perceptions of how much value is placed on different media, tolerance for bias within media, trust in media, and which media people choose when they want to access information. Furthermore, geopolitical factors related to the regulation of technology companies, including mass media, Internet platforms, and social media, vary across countries. For example, media regulation in the US is currently more light-touch than mandates and regulation in the EU.[5] These very issues surrounding variations in contexts led us to field a cross-national, comparative study. The resulting variations in political and cultural contexts allow better determination of whether the findings are general or specific to individual countries.

During the field research, there were unique political contexts in each region and state that might have influenced the survey results, but interest in politics was arguably high across Europe and the US. The US was in the midst of the inauguration of a new President, Donald Trump. Given the drama of the US election campaign, we expected relatively high levels of political engagement both online and offline. We expected more people than usual to use digital media and discuss political topics with their social circles online and offline. However, the EU member states also had major political events occurring, such as the aftermath of Brexit. Likewise, Italy had a constitutional referendum in December 2016 and a change of prime minister during this period.

While our study brings systematic, cross-national evidence to bear on the role that search and online media play in shaping public opinion about politics, it has limitations. This study is anchored in an online survey that samples Internet users—not the general public—in seven nations. But Internet users are the focus of concerns over fake news, filter bubbles, and echo chambers. By virtue of focusing on users, the sample overrepresents some demographic segments, such as individuals with more schooling, compared to a random survey of the general population. That said, at the time of writing, this study was the only major survey of how users actually use the Internet in the context of multiple media on- and offline.

Findings

Casting Doubt on Deterministic Perspectives

A key theme of the study is that technologies like the Internet matter, but technical artifacts and techniques such as those that drive the development of

[5] For instance, the EU's General Data Protection Regulation (GDPR) establishes a framework for introducing privacy and data-protection regulation of big data and computational analytics.

algorithms, do not play a deterministic role in shaping the content Internet users are exposed to. While we find that search and social media play unique and major roles in shaping access to information about politics, there are countervailing dynamics at play. For example, Internet users report using multiple platforms and information sources, which means that the design of any single platform becomes less meaningful. Search engines provide access to a huge array of content providers, but they are only one among an array of gateways and media sources consulted by people interested in politics. Likewise, those who search for political information expose themselves to a variety of viewpoints. The following sections describe key findings of this study, with examples of the kinds of observations that support each particular theme.[6]

The Centrality of Search for Information and Politics Online

First, search engines are indeed a significant source of information for most Internet users. In the early stages of the Web, there was so much irrelevant or bad information online that Internet users would use email to share the addresses of useful websites with their friends, for instance a website with information about political candidates. In fact, lists of useful websites provided the basis for the earliest search engines. They were the secret to finding good information—the proverbial needle in a haystack.

Over time, search has become so useful that it is one of the first places people go to find what they are looking for (Dutton and Blank, 2013; Dutton et al., 2017: 33–6). After email, search is the most common use of the Internet across the seven nations (Dutton et al., 2017). Nearly two-thirds of all users in six nations have a rate of search use "greater than once a day" (Germany is the one exception, see Table 13.1).

Table 13.1. Frequency of using a search engine (percents)

	Britain	France	Germany	Italy	Poland	Spain	US	Totals
Never	0.5	1.4	0.14	0.2	0.2	0.2	1.1	0.54
Less than monthly	2.5	1.4	2.02	0.8	0.1	0.6	3.0	1.5
Monthly	2.4	1.8	2.4	0.8	0.2	1.4	2.4	1.62
Weekly	14.2	12.1	17.5	6.9	2.7	6.5	11.3	10.1
Daily	24.3	22.5	28.9	19.3	21.8	19.8	20.0	22.4
Greater than once per day	56.2	60.9	49.0	72.1	75.0	71.4	62.3	63.85
Total N	1,961	1,972	1,972	1,979	1,992	1,989	1,995	13,860

[6] For more details see the project's report (Dutton et al., 2017).

Politics is a Limited, Specialized Topic of Search

Most members of the public are not focused on politics until an election is imminent. The purposes of search are very general, encompassing nearly every topic of interest to people. We asked respondents how often they used search for a variety of purposes and found that politics and current events ranked below most topics, but were roughly equivalent with some other specific topics, such as questions about health and medicine, and finding entertainment (Figure 13.1).

It is important to keep in mind that the use of search for information on politics and current events is not central to most people's use of the Internet, nor to most search engines. The fact that other uses, such as socializing, are more central to Internet users counters the notion that personalization will be driven by political orientations. There is still the possibility that personalization and other algorithms could have unanticipated impacts on access to information about politics, but topics other than politics will be more likely to dominate Internet use, leading algorithms to personalize on matters well beyond political orientations.

Search is Trusted as a Relatively Reliable Source of Information

Most Internet users do not express blind faith in any single source of information—they are concerned about the trustworthiness of information.

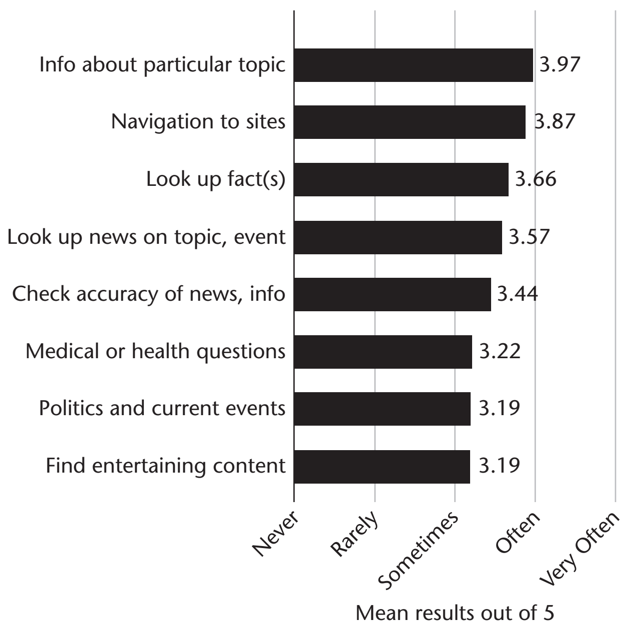

Figure 13.1. The purposes of search

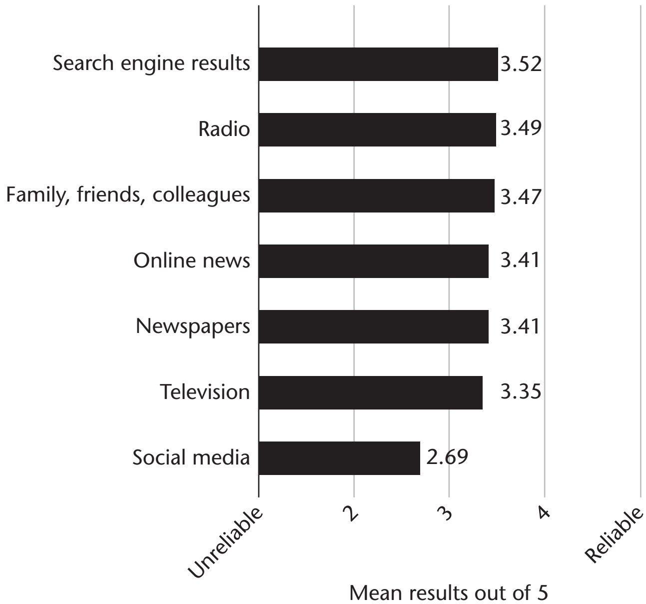

Figure 13.2. The reliability of different sources of information

However, respondents believe that search provides a relatively reliable means to find trusted sources of information. We asked respondents how they viewed the reliability of seven sources of information. Reliability was rated on a scale from totally unreliable (1) to totally reliable (5). The average ranking of the reliability of search engine results is on par with, if not higher than, mass media sources (radio, newspapers, and television) and personal sources, such as friends and colleagues. Social media are notably ranked as significantly less reliable than all other media (Figure 13.2). The trust shown in search is understandable, given that the content across nearly all media can be accessed via the Internet and search, and search has a correspondingly greater degree of control by the user than, for example, a newspaper's choice of content.

A majority of Internet users in the seven nations rated search engine results as reliable or totally reliable (4 or 5), but there are cross-national differences (Table 13.2). There is somewhat less reliability attributed to search engine results by respondents in Germany, France, and Britain, than in Italy, Spain, Poland, and the US. This is a consistent pattern in Germany, France, and Britain, where respondents have greater trust in and reliance on the mass media, possibly because of their strong public broadcasting traditions.

Table 13.2. The reliability of search engine results (percents)

	Britain	France	Germany	Italy	Poland	Spain	US	Totals
1 Totally unreliable	1.5	2.6	2.6	1.7	0.7	0.7	1.1	1.5
2	6.9	7.9	8.3	5.6	6.1	7.5	5.7	6.8
3	40.7	39.9	44.8	37	36.6	36.9	39	39.2
4	42.6	40.7	38.1	46.9	46.8	44.8	42.8	43.3
5 Totally reliable	8.3	9.0	6.3	8.9	9.8	10.1	11.4	9.1
Total N	1,895	1,910	1,920	1,938	1,958	1,966	1,950	13,537

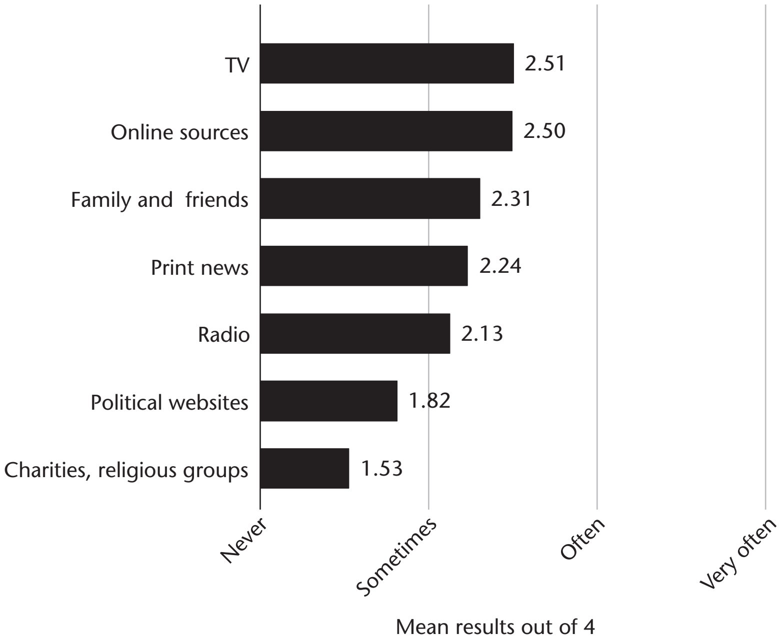

Figure 13.3. The multiple sources of information about politics

Search is One among a Diversity of Information Sources

Across the seven countries, the use of search takes place in a pluralistic media context in which those seeking information consult multiple sources. Some media complement and correct other media, and search engines are used frequently to check information, such as that seen on social media. We asked respondents how often they consulted different sources for information about politics. TV and online sources, including search engines, were the most frequently used sources (Figure 13.3). Moreover, respondents who say they are interested in politics tend to consult more sources. Specifically, those

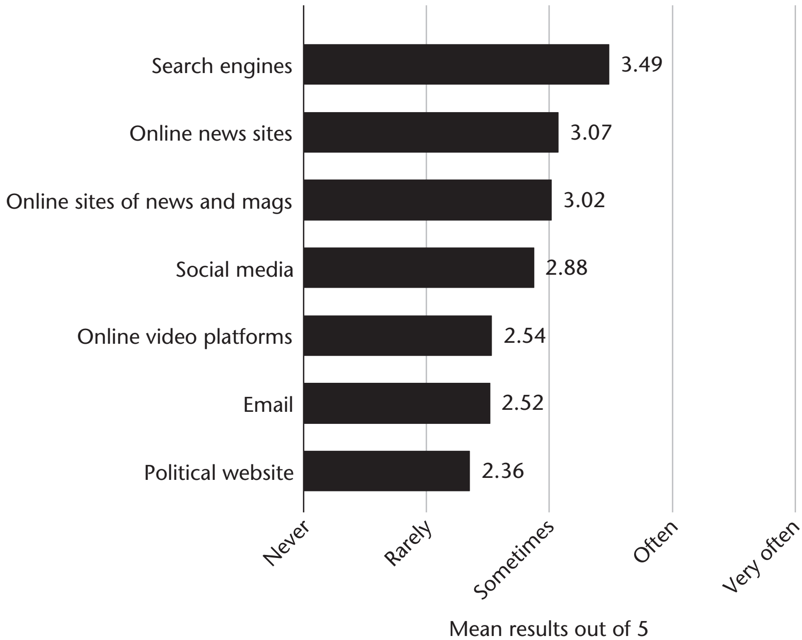

Figure 13.4. Online sources of information about politics

interested in politics tended to look at more than four (4.5) different sources for information about politics, each of which are gateways to multiple content providers. These included more than two (2.5) offline, and more than two (2.1) online (Dutton et al., 2017).

Even within the online domain, there is a diversity of sources. Those who go online for information about politics were asked how often they go to different online sources. Search engines were the most frequently visited location, but they were followed by online news sites, the online sites of offline newspapers and magazines, social media, online video platforms, email, and political websites, such as websites of a candidate or political party (Figure 13.4). In short, very few Internet users rely on one single platform for political information, and those interested in politics are likely to source information from a more diverse array of sources.

The Diversity of Views Encountered Online

Internet users not only rely on multiple sources of information, but they also encounter diverse views online. For example, thirty-six percent of our seven-nation sample read news they disagree with "often" or "very often" (Dutton et al., 2017: table 4.27). Only twenty percent of Internet users say they primarily communicate with people online with the same views as themselves (Dutton et al., 2017: table 4.25). Moreover, users generally do not unfriend or block people from their networks on the basis of their political views—only twenty percent say they do this.

Search and Other Approaches to Checking and Confirming Information

Internet users are skeptical of information about politics they encounter across all media. So it is understandable that they take a number of steps to verify information that they see, hear, or read. Internet users have multiple approaches to confirm or double-check the accuracy and reliability of information. While all approaches tend to be used "sometimes," in order of frequency, these approaches include confirming by searching online, checking major offline news sources, asking a friend or member of their family, or looking for the opinion of a trusted source (Figure 13.5). More generally, eighty percent of users say they use search to check facts online, and nearly three-quarters (seventy-four percent) use search to check information they encounter on social media. In short, critical evaluation, fact checking, and confirming the accuracy of political information across various sources proved to be commonplace among our respondents.

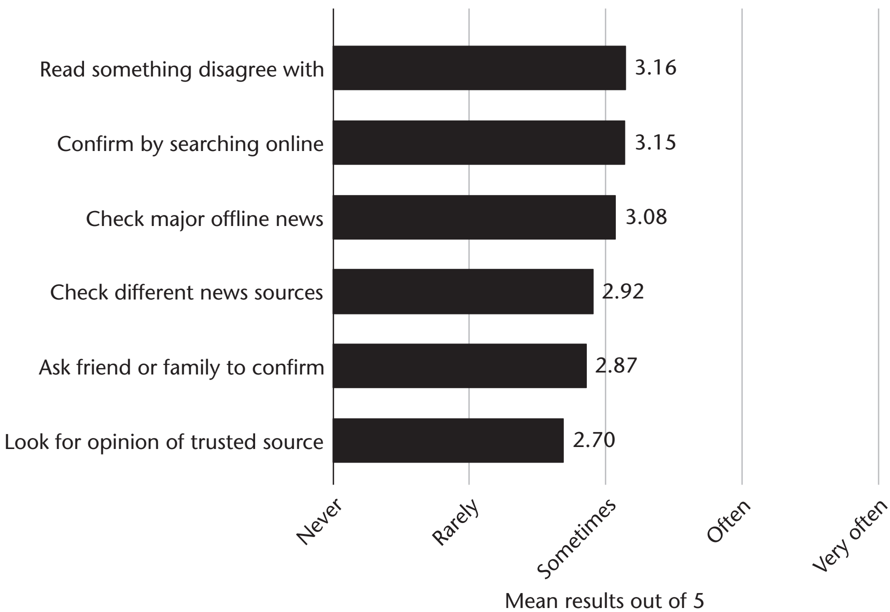

Figure 13.5. Practices tied to confirming a story

Patterns that Could Burst Filter Bubbles and Dismantle Echo Chambers

User behaviors that increase the number of information sources can reduce the likelihood of users being trapped in either a filter bubble or an echo chamber. Respondents reported such patterns of behavior, ranging from the use of multiple platforms to using other sources to check information found online. In addition, we see other patterns in our data that could help burst filter bubbles or echo chambers, such as identifying wrong information and finding new or surprising information through search.

First, many users say they find wrong information online. In the early days of the Internet, it was difficult to find any useful information online at all because the Internet lacked the infrastructure that would organize information and suggest the most relevant or credible sources. Search engines have since made it easy to find relevant information, thereby shifting concerns from the complexity of search to the relative simplicity of finding relevant information. Now, the concern over search has to do with users being exposed to disinformation online. Therefore, it is important to note that many users do recognize online information that they consider "wrong." Such recognition of "wrong" information signifies a deeper, more critical evaluation of information, thereby diminishing the likelihood of users being influenced by fake news or an algorithmically instituted filter bubble.

Secondly, our data suggests that users do not simply find what they are looking for to confirm their preexisting views. Reports of new and surprising information found through search tell us that people are learning as they search, rather than reading regurgitated versions of political information based on past searches. For example, over three-quarters (seventy-six percent) of our respondents say they occasionally or often find information that they were not looking for when searching online. This is analogous to discovering interesting books in a library while searching for a particular book. Similarly, while only about half (forty-eight percent) of our respondents said they "often" learn something new when using search, it is a common experience, even more than discovering important or wrong information online (Figure 13.6). Moreover, the degree to which users said they found new information and found material online that changed their opinion on a political issue supports the idea that surprising findings do not simply confirm preexisting views (Figure 13.6). People are generally exposed to a greater diversity of information about politics than is assumed by more deterministic perspectives. Even if filter bubbles did exist for some users within specific platforms, people's choices help them encounter countervailing information.

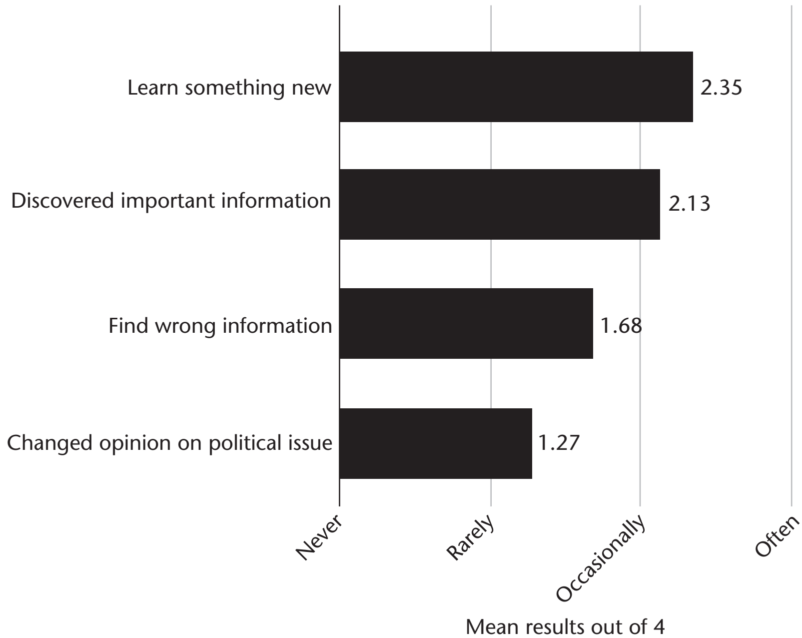

Figure 13.6. Relative prevalence of information practices

Individual and National Differences

The uses and impacts of search are clearly shaped by social and cultural factors beyond the technology of search and its associated algorithms. Cross-nationally, there are some relatively consistent patterns of media use, such as a greater reliance on television and the mass media in Germany, France, and Britain. In contrast, there was a somewhat greater reliance on the Internet for individuals in Poland, Italy, and Spain.

While such national differences exist, search behavior and general orientations to information are more often shaped by the attributes of individuals, especially their personal orientations to politics and the Internet. In fact, the cross-national consistency of patterns was one of the major patterns underlying our findings. Therefore, we conducted multivariate analyses of the factors that shape the effective use of search by individual users (Dutton et al., 2017). Several clear findings emerged.

Surprisingly, demographic factors (e.g., age, gender, education, and income) were relatively unimportant as explanations of search behavior. In contrast, a user's orientation to the Internet explained different levels of search behavior. Not surprisingly, while we only surveyed Internet users, those users with higher levels of skills in search and those who were more active Internet users were also more active in using search engines. Likewise, those most engaged with the Internet generally were more likely to be using the Internet for getting information about politics as well as in other areas of their lives.

In addition, interest in politics—how interested a person said they were in politics—proved to be among the most important factors driving patterns of search practices around access to political information, such as checking facts to verify information. Those interested in politics, and those who were more involved in political participation online, were the most frequent users of search for political information, as well as all other sources of political information. Those that were politically interested and engaged were also the most likely to use search to check the accuracy of information. This finding is not surprising, but this pattern tends to mitigate concerns that those who are politically opinionated and involved are passive receivers of information and caught in filter bubbles and echo chambers that simply confirm their existing views. To the contrary, it is those not interested in politics, or not skilled in using the Internet, who were the least likely to use search to burst filter bubbles or escape echo chambers. This was true even if the user was involved in offline political participation.

Lack of search skills proved to be an especially powerful predictor of vulnerability to filter bubbles and echo chambers. Taken together, search skill and interest in politics are the most important factors in understanding why some individuals use search more for information about politics, and are more likely to check facts and consult a larger number of sources. In politics, as in other content areas, from sports to travel, people interested in the activity realize that they sometimes find questionable information. Search practices, such as revising search terms, is one way in which users try to confirm or verify the veracity of the information. This is what helps make search attractive for those interested in politics, and it makes search a complement to the mass media. Instead of relying only on one-to-many, mass communication, Internet users are able to find alternative voices and sources of information, which may provide a new or more detailed angle on a news story.

Points of Summary and Conclusion: Questioning Deterministic Perspectives

Broadly, the findings from our seven-nation survey cast doubt on deterministic perspectives behind concerns over filter bubbles, echo chambers, and fake news. We find that search plays a major role in shaping access to information about politics—but it is not deterministic. That is, the fact that an algorithm is designed to personalize search does not mean that users are likely to be trapped in a political filter bubble. Specifically, the survey results indicate that the filter bubble argument is overstated, as Internet users expose themselves to a variety of opinions and viewpoints online and through a diversity of media. Search is one of multiple media that people use to find and verify information on politics and current events. Likewise, concerns over echo chambers are also overstated, as Internet users are exposed to diverse viewpoints both online and offline (Dubois and Blank, 2018). Most users are not silenced by contrasting views, nor do they silence those who disagree with them. Finally, fake news has attracted disproportionate levels of concern. Internet users are generally skeptical of information across all media and most know how to check the accuracy and validity of information they find. This is not to say that all users are ideal rational voters, but most users who are interested in politics and with some ability to use search will tend to use search and other media to find relevant information and to check its validity.

Reinforcing the Importance of Traditional Perspectives

The findings point to patterns of search and online information seeking that should be given more attention. We found that those interested in politics report using multiple sources of interpersonal and mediated information. In fact, Internet users are likely to expand the range of information they are exposed to, since the Internet and search also put the less well-known candidates, issues, and events at the fingertips of users. Again, forty-eight percent of all Internet users across the seven nations say they "often" learn something new when using search, indicating that search does not simply confirm their existing opinions. Instead, search engine results frequently bring up new information that may contribute to opinion formation. Moreover, the Internet is not a one-to-many mass medium like broadcasting, but can be many-to-many, one-to-many, and many-to-one. Internet users can be producers of content, and not simply consumers of mass media and news.

Internet users are not as gullible and passive as somewhat panicked headlines, such as "Your Filter Bubble is Destroying Democracy" (El Bermawy, 2016) may lead us to believe. Based on our surveys, Internet users consult multiple media for information about politics and are more skeptical about the content of social media than any other medium included in our survey. Filter bubbles, echo chambers, and fake news are real problems, but our findings suggest that they are the subject of disproportionate concern when they are cited as the cause of polarization, tribalism, or anger in politics. Internet users are exposed to such a diversity of viewpoints and sources of information about politics that any confirmation bias is more likely to be the result of individuals choosing to ignore information, and not the result of failing to be exposed to a diversity of information that might counter their viewpoints.

Most often, studies examining the role of search and social media in information-seeking and -sharing processes have focused on the kinds of interactions individuals engage in within the context of specific platforms (Nikolov et al., 2015), often Twitter. However, the formation of public opinion is an ongoing social process that is not limited to a single platform or type of interaction at one point in time. This study was one of the first to look at search in this larger context of multiple media by virtue of surveying users. Our findings suggest that most of the theoretical critiques of the dysfunctional role of search and social media might apply to some users, but not to most, and their negative views are exaggerated because they are not taking into consideration the multiple media that individuals employ to gain political information. Individuals seek and share information from and with a variety of sources and via a range of communication channels both online and offline (Chadwick, 2013), and over an extended period of time. This does not negate the role of a confirmatory bias, but it does counter claims that the reinforcement of political viewpoints should be blamed on the news media, and the Internet and social media in particular.

To the contrary, our study tends to reinforce and complement work that shows the limits of overly simplistic theoretical perspectives—perspectives that underestimate the agency, ingenuity, and unpredictability of Internet users. The new and old media across all seven nations offer a wide range of information about politics to those interested in politics with some skill in using the Internet.

The findings of this study should caution governments, business and industry, and the public against overreacting to alarmist panics tied to potential distortions in access to information about politics. Filter bubbles, echo chambers, and fake news are intuitively appealing, and might seem to apply to other people, if not you. However, these fears are anecdote-driven, exaggerated, and not supported by systematic empirical evidence such as that marshaled by this study of Internet users in seven countries.

Acknowledgments

This chapter is part of the Quello Center Search Project at Michigan State University, entitled "The Part Played by Search in Shaping Political Opinion," which was supported by Google Inc. More information about this project is available online at http://quello.msu.edu/research/the-part-played-by-search-in-shaping-political-opinion-the-quello-search-project/. (Accessed October 1, 2018), and a project report at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2960697. (Accessed October 1, 2018).

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14

Digital News and the Consumption of Political Information

Silvia Majó-Vázquez and Sandra González-Bailón

The Internet has fundamentally changed how people access and use news. As Dutton and others (Chapter 13, this volume) note, there are concerns that the Internet leads us to get stuck in "echo chambers" or "filter bubbles"—limiting our access to points of view that might challenge our preexisting beliefs. This chapter introduces a network approach to analyzing news consumption in the digital age. The authors explain how we can compare patterns of news consumption across demographic groups, countries, and digital platforms, and determine if there are differences across groups of users and media systems. Measuring news consumption has long been difficult owing to the limitations of self-reported data, so this chapter is notable in offering a novel approach that leverages the digital traces that people leave behind when navigating the Web.

Digital technologies have caused a tectonic shift in how we obtain news. Mass media have given way to multiple forms of networked communication that offer access to personalized information, tailored to our individual preferences. The nature of the current media landscape is often encapsulated in analogies used recurrently: the image of a "balkanized" public space divided by "echo chambers," for example, has been revived with newer metaphors, including "filter bubbles" and "algorithmic gatekeeping." In this chapter, we present a strategy to move beyond metaphors and obtain metrics that can help us analyze patterns of news consumption as they change across national contexts, demographic groups, and digital platforms. Our focus is on audience behavior and, in particular, on how much overlap news sources have in the audiences they share. We use that overlap to build audience networks that allow us to determine the strength of fragmentation in news consumption.

The analysis of how people consume news, or whether certain groups differ in their news consumption habits, is important in understanding a core mechanism of democratic engagement. However, to offer such an analysis we need first to answer the following questions: How can we analyze patterns of news consumption in a way that can be compared across demographic groups, countries, and digital platforms? How can we measure the extent of fragmentation in those patterns? This chapter introduces an analytical approach that allows us to answer these questions. The approach involves analyzing the similarity of news sources in terms of the audiences they share: if two news sources share a lot of readers, our approach assigns them a strong connection in a network of audience overlap. In this digital age, "readership" or "audiences" can mean very different things—from individual subscriptions requiring a fee to the more improvised browsing, following, or sharing of news that the Web and social media allow in myriad ways. Depending on how we define "readership," the interpretation of the connection between individuals and news sources will necessarily change but, in essence, it always taps into the same process: selective exposure to news and political information.

Digital technologies have multiplied the number of news sources available for consumption, but, crucially, they have also made it easier to analyze how that consumption takes place using observational data. In the past, most research on exposure to news relied on self-reported measures collected through surveys. Although many interesting trends have been uncovered using survey data, it is also well known that the approach has many limitations, mostly derived from measurement issues associated to imperfect recall (Prior, 2007). The approach we describe here relies on digital traces that tell us the number of people that accessed a given news website or that retweeted a given news link. Our approach, in other words, relies on actual traffic to news sources (or volume of engagement) and then asks how many unique users who access a given source also access a second source. This measure of overlap allows us to build the audience networks that we then analyze to compare patterns of news consumption across groups, countries, or platforms. These networks also help us map the different possible configurations that characterize media landscapes and, in particular, how well positioned digital-born media (i.e., media with no offline edition) are compared to more traditional legacy brands (i.e., those that originated in print or broadcasting).

The media ecology has been drastically reconfigured by the irruption of new actors, like digital-born outlets, news aggregators, or blogs (Carlson, 2007, 2017; Lewis, 2012; Singer, 2003). In countries as diverse as France, Mexico, Spain, or the US, for instance, some of these new actors (i.e., BuzzFeed, the

Huffington Post) have been able to build comparable audiences to those of legacy news providers (i.e., traditional newspapers, see Barthel, 2018). However, overall legacy organizations are still very prominent providers of news and political information. Determining the role that digital-born media play vis-à-vis more traditional news organizations requires empirical investigation—for instance, to test the hypothesis that new actors are attracting traffic away from legacy brands, or that they are becoming more prominent amongst the younger cohorts. The analytical approach we discuss in this chapter can be used to test such hypotheses: it provides quantifiable evidence of the position that different news outlets have in the media landscape, and whether that position changes across demographic groups or digital platforms. As we explain later in the chapter, the construction of networks of audience overlap can determine if specific types of outlets (say, digital-born) are more central, overall, than legacy brands.

The rest of the chapter proceeds as follows: first, we offer a brief overview of the forces that have prompted a change in the media landscape—a change that, according to many accounts, has increased the levels of fragmentation in the consumption of news. Then, we introduce the main building block of our methodology: a measure of audience overlap between news sources. This measure can be operationalized in different ways, depending on the data source or platform under analysis. In the section entitled "How to Build Audience Networks," we explain how this measure allows us to build audience networks that provide the raw material for the rest of the analysis. The section following this discusses how these networks can be analyzed, and how those analyses provide measures that can be compared across political contexts, demographic groups, or platforms. We conclude with a discussion in which we assess the role of methods and measurement for theory building.

The Changing Media Landscape

Internet technologies have dramatically changed patterns of news consumption and reshaped how people keep up with current events. In a way, these changes are not entirely new: the television also brought a major shift in how people consume news, and before that, the radio radically changed access to news compared with the newspaper era (Katz, 1996). What characterizes the current era, however, is the sheer number of new sources that are available at the touch of a finger. This explosion of news sources derives, mostly, from the lowered costs of distributing information over the Web (Bimber, 2003).

The Web and social media have increased the number of actors providing news on the supply side; crucially, digital technologies have also reallocated the levels of reach and influence amongst those actors. Publishers that traditionally controlled the means of production and distribution of information have seen their position challenged by the irruption of digital-born outlets that have been very successful in building audiences—in some cases building an audience as large as that of legacy media, especially in countries where traditional publishers are weak or do not generate much trust (Barthel, 2018; Majó-Vázquez, Zhao, and Nielsen, 2017; Nicholls, Shabbir, and Nielsen, 2016; Willsher, 2018). Digital-born outlets, in other words, have become increasingly influential in reaching (and potentially influencing) readers.

Social-media platforms have also secured much of the power that in the past was exclusively in the hands of legacy publishers. By controlling a large portion of the news distribution process, social-media platforms have drastically reconfigured the online news domain. Today, more people get news via Facebook than via any single news organization (Newman, Fletcher, Kalogeropoulos, Levy, and Nielsen, 2017). Social-media platforms increasingly mediate the relationship between readers and publishers (Bialik and Matsa, 2017) and, therefore, have the power to largely change the dynamics of news consumption (Nielsen and Ganter, 2017; Moore and Tambini, 2018). In 2018, Facebook downgraded news to favor posts from friends and family by changing the algorithm that ranks content (Mosseri, 2018). This strategy is intended to reduce the impact of "fake" news but might, in fact, be amplifying the biases embedded in social networks, for example, the tendency that people have to be connected to those who think similarly, enclosing them in ideological "echo chambers."

In parallel, all these changes have also had an impact on the demand side of the news domain. Much of what we know about news consumption and audience attention under the mass media paradigm needs to be revisited (Ognyanova, 2018; Prior, 2007). Digital technologies have prompted a transition from the days when entire nations gathered around the same televised broadcast to a more fragmented public that has access to a high number of alternative sources for news. Metaphors like "echo chambers" and "filter bubbles" have flourished to describe this new scenario in which like-minded individuals consume news only from the set of outlets that matches their interests and beliefs (Pariser, 2011; Sunstein, 2009; Turow, 1998). These dynamics are reinforced by the algorithms that social-media platforms employ to magnify social signals received from friends—who are likely to share similar attitudes and viewpoints (Bakshy, Messing, and Adamic, 2015).

It remains an empirical question, however, whether news consumption can be characterized by fragmentation. Likewise, empirical evidence is necessary to illuminate whether the extent of fragmentation differs across political contexts, demographic groups, and platforms. These two questions lie at the heart of an open debate in the literature (Anderson, 2006; Dubois and Blank, 2018; Fletcher and Nielsen, 2017; Majo-Vazquez, Nielsen, and Gonzalez-Bailon, 2018; Majó-Vázquez, Cardenal, and González-Bailón, 2017; Mukerjee, Majó-Vázquez, and González-Bailón, 2018a; Webster, 2008; Webster and Ksiazek, 2012). Our goal in this chapter is to show how computational tools can contribute to this debate. The main advantage is that they can shed new, comparative light on empirical trends using digital trace data, which produces more accurate results than the self-reported data employed in the past and collected with survey measurement instruments. Our approach borrows tools from network science and harnesses the potential of digital trails. In particular, it employs a measure of audience overlap across news sources to build networks that reveal the hidden structure of news consumption at the population level.

Audience Overlap and Why it Matters

Audience overlap measures how many people two media outlets share. The use of audience overlap metrics has a relatively long history in media research, going back to the sixties, when researchers started measuring shared public among media entities—mostly TV channels or programs—for the advertising industry (Goodhardt and Ehrenberg, 1969; Goodhardt, Ehrenberg, and Collins, 1987). The use of audience overlap data to map networks connecting media outlets has already generated a long stream of research (e.g., Ksiazek, 2011; Webster and Ksiazek, 2012; Taneja and Wu, 2014; Taneja, 2016; Taneja and Webster, 2016; Majó-Vázquez, Cardenal, and González-Bailón, 2017; Majó-Vázquez, Nielsen, and González-Bailón, 2018a; Mukerjee, Majó-Vázquez, and González-Bailón, 2018a; Mukerjee, Majó-Vázquez, and González-Bailón, 2018b). In this chapter, we follow those methodological developments and discuss the theoretical implications.

Audience overlap data offers important insights on how audiences navigate the many news sources that are available in online environments. First, audience overlap can be interpreted as a measure of similarity: the more consumers any two news sources share, the closer those sources are in terms of their audience base. Second, audience overlap can also be used to approximate the diversity of people consuming a given news outlet. For example, in Figure 14.1, nodes represent news outlets (e.g., the *New York Times*, the *Washington Post*, BuzzFeed) and the ties measure overlap. If outlet X has strong overlap with eight other outlets (panel A), and outlet Y has strong overlap with only two others (panel B), we can infer that outlet X attracts people with a wider range of interests that outlet Y. When this assessment is made for all news outlets, we can build a network, as the rest of the chapter explains, where the ties tell us how much overlap any two news sources have but also,

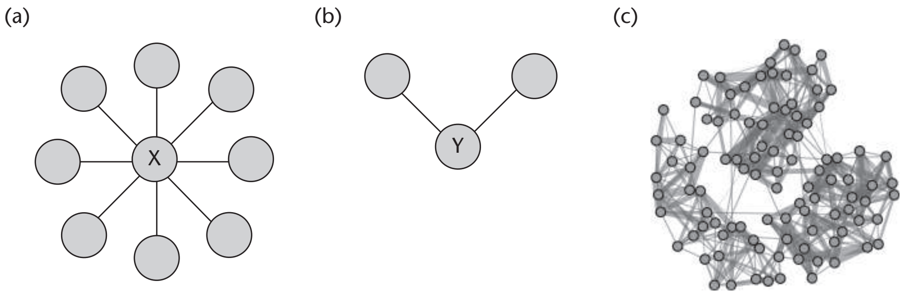

Figure 14.1. Illustrative examples of networks of audience overlap

and crucially, whether audiences self-select (or cluster) around specific outlets. In the schematic figure given in Figure 14.1C, for instance, there are three clusters in which news sources have denser internal overlap. This aggregated pattern suggests evidence of selective exposure at the individual level: some individuals are more likely to consume a set of outlets than others, resulting in fragmentation (as depicted by the clusters). Crucially, fragmentation in the context of this analytical framework goes beyond the number of news sources available for consumption (which is, trivially, much higher today than in the broadcast era); our approach measures, instead, the ways in which audiences converge or diverge around information sources.

An additional consideration of this approach is that the strength of the overlap is an important element in the analyses. The overlapping ties in Figure 14.1C, for example, differ in thickness; the reason is that the amount of audience any two news sources share can vary drastically. As mentioned, some news sources are more similar than others in the readers or consumers they attract (and they are thus connected by stronger ties). Of course, the strength of these ties will also depend on the total reach of news sources: those with higher audience reach will have more overlapping ties with other outlets just because they have a larger audience base. And yet, again, two outlets with the same total reach might have very different positions in the overall network—for instance, they might belong to different clusters. The only way to find out how news outlets compare with one another, and determine the strength of the fragmentation in the overall news consumption network, is by reconstructing these networks with empirical data, a goal that we illustrate in the following section.

How to Build Audience Networks

The first step in building audience networks is defining the boundaries of the network, or in other words, identifying the list of news outlets that should be included as nodes. The second step is defining audience overlap—which, in this digital age, can be operationalized in different ways. For example, in the context of web browsing, "audience overlap" refers to the number of users who access two news sites within a given time period. If, instead, we are analyzing news consumption in social media, such as Twitter or Facebook, we can define overlap as the number of users who share links published by two news outlets: in this case, the measure taps into active engagement with specific news; with web browsing, on the other hand, we are only measuring the consumption of news content in general. It is important to note that in both cases we are measuring the number of people who get exposed to content produced by news sources, but the measures tap into different levels of engagement or responsiveness to the news. One additional possibility with social-media data is to use the number of followers that a pair of news outlets shares: when users choose which outlets they follow, they express their preferences for some outlets over others.

However we measure audience overlap, the underlying data structure is very similar: a matrix that converts those measures into a network. Figure 14.2 illustrates this data structure using a measure of audience overlap drawn from Web browsing behavior in the UK. For the sake of clarity, this example focuses on a small subset of all news sources that are available to Web users. The data provider, a media analytics company, uses representative panels of Internet users to draw estimates of audience reach and audience overlap (for a lengthier discussion of the data, see Mukerjee, Majo-Vazquez, et al., 2018). Every cell in the matrix reproduced in panel A contains the estimated number of Internet users who accessed a given pair of websites during the months surrounding the 2016 Brexit referendum (the numbers are expressed as thousands). Note that the matrix is symmetrical: the upper and lower triangles contain the same information, which translates into the undirected network reproduced in panel B. The size of the labels in this network is proportional to the total audience reach of the corresponding websites. The thickness of the ties is proportional to the overlap connecting pairs of websites (i.e., the cell values in the matrix).

If we wanted to map news consumption in social media, the contents of the matrix would derive from alternative measurements like those just mentioned, that is, number of links published by two news outlets that are shared by the same people, or overlap in the number of followers. Likewise, the same data structure can capture audience overlap through nondigital channels, for example, audience shared between television news programs. These alternative forms of measuring news consumption (or exposure to news content) will lead to slightly different interpretations of the networks; but the analysis of those networks always follows the same logic, as the following section explains.

(a)

	bbc	breitbart	buzzfeed	huffingtonpost	independent	mirror	newstatesman	newsweek	spectator	telegraph	dailybeast	economist	guardian	sun
bbc		184	1526	868	3872	3829	282	171	469	6099	175	514	6401	1713
breitbart	184		45	50	122	103	16	10	43	149	17	32	145	85
buzzfeed	1526	45		164	723	711	81	37	86	926	48	128	978	380
huffingtonpost	868	50	164		426	415	72	38	117	387	35	76	505	204
independent	3872	122	723	426		1809	186	93	279	2579	109	310	2545	679
mirror	3829	103	711	415	1809		159	114	154	2396	99	235	2087	1093
newstatesman	282	16	81	72	186	159		15	44	199	14	38	227	71
newsweek	171	10	37	38	93	114	15		25	157	7	19	117	30
spectator	469	43	86	117	279	154	44	25		389	20	65	348	124
telegraph	6099	149	926	387	2579	2396	199	157	389		132	348	3847	1003
dailybeast	175	17	48	35	109	99	14	7	20	132		11	140	56
economist	514	32	128	76	310	235	38	19	69	384	11		397	54
guardian	6401	145	978	505	2545	2087	227	117	348	3487	140	397		950
sun	1713	85	380	204	679	1093	71	30	124	1003	56	54	950	

(b)

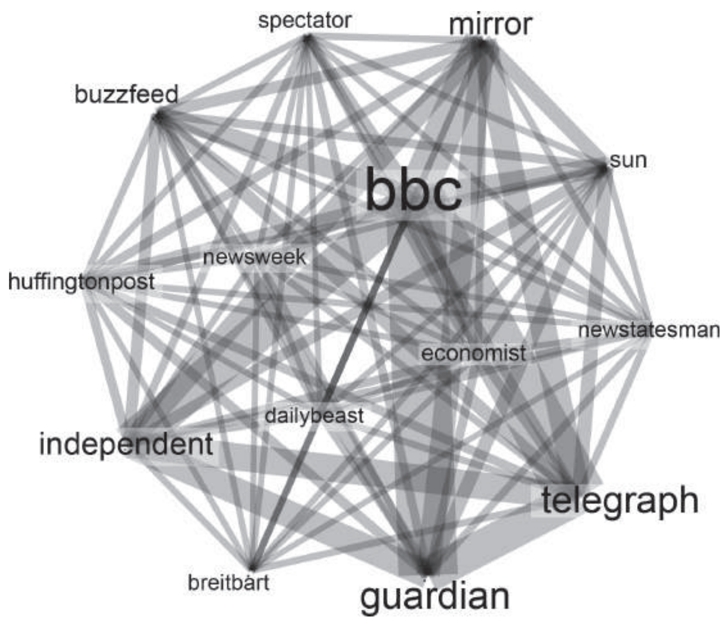

Figure 14.2. Matrix and graph representation of audience overlap (May–July 2016)

How to Analyze Audience Networks

Once we have encoded audience behavior in the form of a network, the next step is to analyze that network to summarize what it reveals about news consumption. One conclusion we can draw from Figure 14.1B, for example, is that the network is very dense, that is, most news sources share audience with most other news sources. Of course, the strength of the overlap also changes drastically across pairs, partly because the total audience reach of these sources is heavily skewed, that is, sites like bbc.com attract many more users than smaller sites like thedailybeast.com. One way to determine where most of the news consumption takes place is by eliminating the weakest overlapping ties. This procedure is known in the networks literature as thresholding (Borge-Holthoefer and Gonzalez-Bailon, 2015). Figure 14.3 shows the network at two levels of thresholding, one more stringent (panel C) than the other (panel B).

By eliminating the weakest ties, the core of the network is more clearly exposed. In our example, this core is formed mostly by legacy media brands. It is also clear, however, that digital-born outlets such as the *Huffington Post* or BuzzFeed have a comparable position to the long-standing tabloid the *Sun*—their audience reach is, in fact, more or less equivalent. All three of them lag behind the more established brands like the *Guardian* or the *Independent*. Because of the disparities in audience reach, it is important to have a baseline to determine what counts as significant overlap, that is, as a significant departure from randomness—taking into account that these sources are very different in audience reach to begin with. There are two approaches that have been used in the literature with this purpose: one determines statistical significance on the dyadic or pair level using the *phi* correlation (Fletcher and Nielsen, 2017; Majó-Vázquez et al., 2017; Mukerjee et al., 2018a), and the second uses a node-level filter that is known as backbone extraction (Majó-Vázquez et al., 2018).

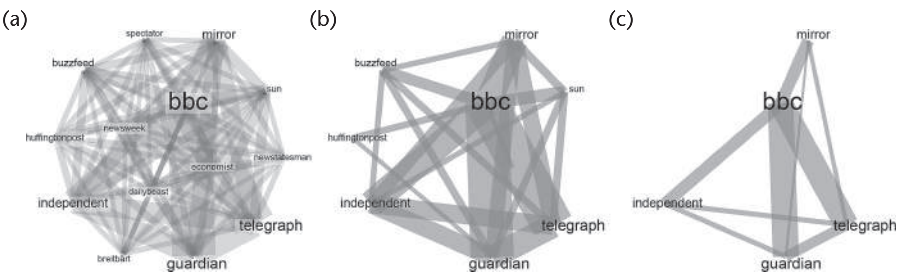

Figure 14.3. Audience overlap network before and after thresholding

In addition to the use of tie weights (or the strength of the overlap) to get a better sense of the network, there are other statistics that can help us summarize its structure—and provide metrics to engage in comparative research. In general, networks can be analyzed from three different levels (Borgatti, Everett, and Johnson, 2013; Newman, 2010). At the micro-level we look at the individual properties of nodes; for instance, their centrality scores. The sites at the core of our example network are more central than the sites at the periphery because they share audience with a wider range of news outlets. At the macro level, we shift focus to the distribution of those node-level features; for instance, we might be interested in the shape of the distribution of centrality, or how skewed that distribution is. Finally, between these two levels we have the meso scale, from where we identify clusters or groups of nodes. In the example we are considering here, the observed network looks very different from the hypothetical scenario depicted in Figure 14.1C; the empirical data we consider here does not offer much evidence of fragmentation.

Of course, the relevant question is whether this absence of fragmentation remains across platforms (i.e., maybe there is stronger evidence of self-selection in social media) or across political contexts (i.e., the UK has stronger public service media than the US, which leads to less fragmentation). Research in this direction is still incipient, but the first findings suggest that there are identifiable differences in how audiences consume news depending on the political context and the regulatory frameworks that shape that consumption (Majó-Vázquez et al., 2018a). The ability to measure those differences is important because they offer quantifiable evidence that relativizes the disruptive role of digital technologies when it comes to granting access to news: technologies are the same everywhere, but the level of centrality or fragmentation, or the popularity of digital-born outlets vis-à-vis legacy brands varies depending on the regulatory frameworks, journalistic practices, and levels of media trust in which news outlets operate.

Discussion: Measurement and Theory

In this chapter we have introduced an analytical approach that allows us to analyze news consumption in the form of networks of audience overlap. In these networks, nodes are news sources connected though shared audiences. The analysis of these networks offers a standardized language and metrics with which to compare news consumption patterns across platforms, countries, or demographic groups. The way in which we operationalize audience overlap differs across technologies (i.e., Web users access news domains, social-media users share news links), but since the network composition is the same across them all (i.e., news sources that have a website tend also to have social media profiles), we can compare how similar the networks are depending on the platform through which news is being accessed. The same applies to different demographic groups.

Empirical research benefits greatly from the development of new methods and metrics with which to uncover patterns. Most of past scholarship on the impact that digital technologies have on news consumption makes bold empirical claims about increasing fragmentation. The type of analyses we have introduced in this chapter can help us contextualize those claims in a frame of comparative research. The prevalence and reach of digital-born outlets, for instance, can vary drastically from country to country—and so can the strength of the evidence consistent with audience self-selection. In the simplified example we have used in this chapter (simplified because we have focused attention on a small subset of news outlets to enhance clarity), we do not find evidence that audiences are segregated around different sets of outlets. However, as research has started to show, the evidence might be stronger in other political contexts. Accumulating evidence on these patterns and, more generally, on how digital technologies shape access to news is important in understanding a core mechanism of democratic engagement. The quality of democracies, in the end, depends on the ability of citizens to stay informed.

Being able to access the appropriate data is, of course, a necessary condition for the approach introduced here to work. The great research advantage associated with digital technologies is that they generate observational trails; the great disadvantage is that those trails are often proprietary. Some of that data can be accessed through commercial agreements with media measurement companies (like the data analyzed in this chapter), but some other trails are impossible to obtain for a mixture of privacy and corporate reasons: only researchers working for those corporations can analyze the data, and they have a difficult-to-elude conflict of interest.

All in all, however, the approach we have discussed in this chapter is a step forward in our understanding of news consumption, if only because it demands greater conceptual clarity about what we mean by fragmentation. It is obvious that we now have many more news sources that were available in the past; it is less obvious that such an enlarged supply inevitably results in higher audience self-selection, or that the effects are the same across media environments or political contexts. This line of research capitalizes on past work to formulate new questions about how to best measure audience behavior and exposure to news—and how to best use those measures to offer a more comprehensive understanding of how people stay informed of political affairs. This chapter offers just an entry point to what is an exciting and ongoing line of research.

Acknowledgments

Work on this chapter has been partially funded by NSF grant #1729412.

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15

The Internet at the Global Economic Margins

Mark Graham

As access to the Internet spreads to corners of the world previously defined by their lack of connectivity, there has been much talk about the potential for digital media to have transformative and revolutionary effects of access to information, services, and markets. The chapter begins by focusing on some key hopes about what the Internet can effect at the world's economic margins. Anchored in an extensive case study of how new connectivity was, and was not, used in the remote nodes of the Thai silk industry, the chapter argues that many of our expectations about digital change may never be realized. One reason is that hope about what the Internet can do in some of the world's economic margins often rests on unrealistic assumptions about what the Internet is. By reframing the Internet itself, Graham sees an opportunity to build more effective strategies for shaping desirable and achievable outcomes.

Information and communication technologies have inspired hopes, fears, and expectations of social, political, and economic change.[1] Specifically, it is the technologically mediated reconfigurations, and speeding-up of movements of information that have led many to talk about the transformative and even revolutionary effects that ICTs can have (Kleine, 2013, Unwin, 2017, Heeks, 2018).

[1] This chapter is a revised version of the chapter that appeared in the first edition of this book: M. Graham (2014). "A Critical Perspective on the Potential of the Internet at the Margins of the Global Economy," in M. Graham and W. H. Dutton (eds), *Society and the Internet: How Networks of Information and Communication are Changing our Lives*. Oxford: Oxford University Press, 301–18.

This chapter focuses on the overlaps between the Internet and economic networks in traditionally marginal parts of the world. A pervasive idea exists that the Internet can liberate economic information from many of its traditional geographic constraints, and so ultimately benefit the world's poor by removing frictions, barriers, and intermediaries that stand between producers of goods and services in the Global South and consumers of those things in the Global North (cf. Nambisan, 2017, Graham, 2015).

Such ideas are examined through a case study of Internet use in the Thai silk industry. Thai silk is a high-cost product typified by long commodity chains connecting producers and consumers, in which the actual producers of silk receive very little of the value of the fabric that they produce. The case study demonstrates that while the Internet is allowing sellers of silk to expand their markets and reach out to new customers, few of these benefits are being accrued by the actual producers of silk. The benefits provided by Internet-enabled mediations and reconfigurations of commodity chains are therefore not being captured by those most in need.

The chapter concludes by arguing that many of our often unrealistic expectations of the power of ICTs in the contexts of marginal economies are based on particular spatial ontologies of, or ways of imagining, the Internet. The Internet is undoubtedly an important transformative tool for many at the margins of the world's economy, yet there are ultimately many entrenched social, economic, and political relationships and obstacles to change that cannot be easily dispelled by removing barriers to the flows of information.

Hopes for ICTs in the World's Economic Margins

Hopes for the transformative power of ICTs have been especially pronounced in the poorest parts of the world for a few interconnected reasons. First, the South has traditionally faced the biggest barriers to the transmission and communication of information non-proximately. ICTs can alter the relationships between people and information in key ways: they can change the speed at which information is transmitted over space (thus altering geographic frictions), they can change the cost of transmitting information (altering economic frictions), and they can change the accessibility of information and communication networks by altering barriers to entry.

In the poorest parts of the world, the time–space paths of most people have traditionally been highly constrained by distance. Simultaneously, they have also been lacking in the technological mediations that have the potential to alter either geographic or economic frictions. Because of this, the potential of the Internet to reconfigure time–space paths of people and information in global cores will be different than at global peripheries. It has followed that many governments and development agencies have seen broadening access to ICTs in the Global South as a way to "leapfrog" stages of economic development. This has led some prominent voices such as Jeffrey Sachs to claim that "mobile phones are the single most transformative technology for development" (quoted in Etzo and Collender, 2010: 661).

Second, and relatedly, is the idea that ICTs in the Global South will be able to radically reconfigure flows of cash and commodities. For many policymakers, the reduction of geographic frictions that techno-mediated changes in connectivity are thought to bring about can allow for both better functioning markets and better access to markets: the idea being that both changes will ultimately result in economic development and tangible benefits for people currently excluded from selling their goods and services.

The UK's Department for International Development (DFID), for instance, claims that "weak, inefficient or non-transparent markets and societal institutions, including governments, hinder economic growth, deter private sector innovation and investment, and weaken the ability of society to respond to the needs of the poor." In markets characterized by opaque economic information and significant barriers to non-proximate information flow, sellers often only know local prices and can thus be locked into selling to middlemen and intermediaries who have local footprints. This could mean village weavers selling their goods cheaply to a local intermediary rather than to a buyer in the nearest city, owing to lack of knowledge about the urban market value of their cloth, or fisherpeople similarly selling their catch for a low price in one port, not knowing that the price for their fish is significantly higher just a few miles away (Coyle, 2005 in Carmody, 2012). Further exacerbating the poor position of producers is the issue of clientelization (Eggleston et al., 2002). In an environment of high information search costs, producers of goods (such as farmers) are not just pushed into dealing with intermediaries, but are also often locked into long-term relationships with those dealers. This can be problematic because sellers are thus unable to "independently assess the integrity of the dealer, or the reasonableness of the prices he offers, by comparing purchase prices across many markets and many dealers" (Eggleston et al., 2002: 67).

Many of these examples of what economists refer to as weak, inefficient, or non-transparent markets are enacted because of a paucity of information. Because of their geographic positionalities (i.e., their non-proximate position to relevant information sources), many sellers are unaware of demand, and many buyers are unaware of supply, allowing the lion's share of value to be captured by intermediaries rather than producers and farmers (who are often the poorest in society). But in markets with efficient and transparent flows of information, it becomes difficult for intermediaries to capture excessive amounts of value in the chains of commodities that exist between producers and consumers (UNCTAD, 2003: 163).

Poon and Jevons (1997: 34) state that "because the Internet creates a 'borderless' virtual business platform on which suppliers, customers, competitors, and network partners can freely interact without going through the predefined channels on the value chain, members of the same business network or of different networks can bypass the traditional interaction patterns and form virtual value chains." As such, "the Internet has diminished many of the information asymmetries (and hence power asymmetries) between sellers and buyers" (Gereffi, 2001: 1628). Firms in "developing nations" can use transparency brought about by the Internet to find new customers in order to "escape local de facto monopolies" (UNCTAD, 2005). In a borderless world, it is argued that historical competitive advantages such as firm size become irrelevant because the Internet can "level the competitive playing field by allowing small companies to extend their geographical reach and secure new customers in ways formerly restricted to much larger firms" (OECD, 1999: 153), such as by allowing villagers to better understand the market price for their crops in nearby towns (Anderson, 2005).

There are important counterarguments to some of these positions. Some of the most sustained criticism is leveled by those who see the spreading of ICTs as ways of enabling and giving shape to processes of neocolonialism and exploitation (Gurumurthy and Singh, 2009). Early dependency theorists observed that the integration of "Third World" economies into first world markets created a state of dependence. Dos Santos (1970: 231) describes such dependence as "a situation in which the economy of certain countries is conditioned by the development and expansion of another economy to which the former is subjected." Drawing on the work of dependency theorists and postcolonial theorists, commentators such as Sardar (1996) see the Internet "as a new phase in a long history of the West's attempt to colonize not only the territory and the body but also the mind of the Third World 'other'" (Schech, 2002: 18).

From this perspective, by taking places out of their isolation and placing them in a global village, such places are thrust into the hegemony of Western knowledge and capitalism (Pieterse, 2001). Producers then grow dependent on unstable market conditions and distant consumer preferences (Dahles and Zwart, 2003). Profitable elements of local cultures (such as silk making) are packaged and integrated into the network, while others are potentially ignored, both by distant consumers and by local people. This dynamic can also have harmful effects on the crafts being produced: "the decline of craftsmanship, their simplification, the denigration of aesthetic and material culture and the loss of their symbolic and functional value, [...and] the subjection of indigenous groups to the external exigencies of the commercialization process" (Dahles and Zwart, 2003: 146).

Nonetheless, this chapter mostly concerns itself with the hopes rather than the fears of ICTs in the world's economic margins. The arguments that have been presented (for both the hopes and the fears), interestingly move beyond viewing the Internet as a tool for disintermediating commodity chains, to seeing it as a technology with the power to accomplish an unfettered geographic expansion of markets. Purcell and Toland (2004: 241) claim: "ICT[s] offer the opportunity to reduce the barriers of distance, and give . . . countries better access to the global economy." According to the International Telecommunication Union, the Internet "provides developing countries with a unique opportunity to compete in market places that were beyond their reach" (Ntoko, 2007: 1).

The ideas that the Internet will allow for geographic expansion and that it will allow for disintermediation are deeply intertwined, and rest on a particular spatial ontology. For both geographic expansion and disintermediation to occur, the Internet needs to bring consumers and producers into the same online marketplace. To do this, the Internet needs to take on an ontic (i.e., a physical or material) role. The assumption here is that the Internet can bring into being both an ethereal alternate dimension that is infinitely accessible (from any connected portal on the planet), and fixed in a distinct (cyber-) location (the virtual marketplace in which all producers and consumers transact with one another). Using the Internet to transport producers and consumers into co-presence in a virtual marketplace thus means that both physical barriers and the intermediaries who throughout history have served as a bridge over physical distance are rendered largely irrelevant (to the transactions that are supposed to happen between producers and consumers).

With the assistance of ICTs, many governments and development organizations therefore see the potential for significant change and an ability to bring development to the poor by bypassing entrenched economic power relations. For such reasons, there are substantial hopes vested in the potential for information and communication technologies in the Global South. ICTs are able to reconfigure time–space paths of people and information, and fundamentally alter economic flows and the functioning of markets; in doing so, they potentially provide benefits to the most marginal and disconnected in society.

Digital Divides in the Thai Silk Industry

It is useful to ground some of these important expectations in a concrete example of the intersections between ICTs and marginal economies. As such, this section reviews some of the results of my research into the role of the Internet in the Thai silk industry (Graham, 2010; 2011a; 2011b; 2013a).

The Thai silk industry has existed for thousands of years and remains an important part of the Thai economy and Thai social practices. Many unique

Figure 15.1. Digital divides in the Thai silk industry
Source: Author

weaving patterns have been handed down from mothers to daughters for generations. For instance, when interviewing a weaver in Khon Kaen province, I was told, "I have been weaving some of these designs since I was born." The weavers sitting next to her laughed at the statement, but then agreed that they too have been producing certain distinct styles since they were taught to weave. Almost any weaver in the northeast can point to unique designs and patterns that they have seen and woven all of their lives and that originate in their village, town, or province.

The Thai silk industry is distinct in Southeast Asia in its predominant use of handlooms (see Figure 15.1). Reeling and weaving are most often performed by hand by rural women and elderly household members. But Thai silk producers are currently in a worrying economic position. Thailand's National Economic and Social Development Board and the World Bank (2005) warned that Thai silk is highly uncompetitive in comparison to Chinese and other imported fabrics. They estimate that large reductions in labor costs or increases in productivity are needed.

Although Thai silk tends to be expensive, labor costs in the silk industry are paradoxically already extremely low (silk weavers are some of the lowest-paid workers in the country). In the northeast, stories abound about mothers being unable to persuade their daughters to take up weaving because of the relative allure of factory work in Bangkok and Central Thailand. It is the many intermediaries and merchants that instead tend to capture much of the value of any particular piece of cloth.

Policy-makers are then faced with a dilemma: saving an industry that is economically important for thousands of people without undermining the unique cultural practices and traditions associated with silk that are important for many Thais. It is this moment of crisis and worry that has given rise to many in government, in civil society, and in the private sector seeing the Internet as a partial solution to these issues.

The Internet could, in theory, reinvigorate the Thai silk industry in two ways. First, it could allow sellers to use new types of visibility afforded by the Internet to move beyond traditional time–space paths and networks of Thai silk to reach out to new and distant consumers. Second, it could increase economic transparency in the market for Thai silk, ultimately allowing producers to sell to consumers without the need for long chains of intermediaries.

Much effort has been spent trying to use the Internet to save the Thai silk industry. The former Prime Minister of Thailand, Thaksin Shinawatra, recognizing that Thailand could not compete with China on mass-produced products, often argued that Thailand needed to blend its unique heritage with ICTs in order to thrive in a global economy. These ideas were put into practice in Thailand's ten-year ICT policy framework which included the setting up of a large government economic stimulus program to market and sell Thai handicrafts in trade fairs and through the Internet.

My research, therefore, was designed to study this coming together of the Internet and a dying craft industry. I spoke to 126 silk producers and merchants and analyzed the websites of 139 Thai silk sellers and explored key research questions. These questions were designed to help me to understand the intersections of the Internet and the Thai silk industry, and identify some of the real potentials and barriers of the Internet for people in the world's economic margins.

The study asked: (1) how people in the silk industry imagine and envision the effects of the Internet, and how they use new types of visibility afforded by the Internet to represent their businesses and their work on the Internet; (2) whether sellers are actually using the Internet to sell to new and distant customers; (3) whether the Internet is being employed to disintermediate commodity chains and allow more direct links between producers and consumers; and (4) whether the Internet and integration into new commodity chains are altering the types of silk produced by weavers and ultimately reshaping the ways in which cultural practices are reproduced.

The work found that many sellers choose to portray the Internet as a tool that has brought about significant benefits to actors in the Thai silk industry. Many of these portrayals centered on the notion of "directness" or distintermediation that could be enabled by the Internet. Some sellers focused on the benefits of this directness to consumers:

Most [pieces of silk] are acquired directly from the artists or workshops that produce them. This allows us to offer lower pricing and provides greater control over the quality and designs of the products. [<www.asianartmall.com>]

The crafts that you see on our site are supplied direct from source which helps us to keep our prices very competitive, against other Thai and non-Thai suppliers. [<www.chiangmaicraft.com>]

Others chose instead to highlight the benefits to the producers of silk:

> World of Thai Silk online fabric shop connects you directly to Thailand's rural village weavers as well as the wholesale fabric of the largest weaving mills. No matter how distant you are from these villages, now you have access to them online. [<www.bangkok-thailand.com>]
>
> We also aim to provide a platform for the skilful Thai craft people. Many of those live in remote villages and do not have access to the world market. [www.thailandfashion.net]
>
> It is hoped that an expanded market for their silk craft can be developed. We are encouraging the female weavers to produce more of their "folk art" silk for a market previously beyond their reach. [<www.thaivillagesilk.com>]

In both cases, there is an idea that the Internet can bring into being direct connections and a form of proximity between producers and consumers that didn't exist before. These claims about altered commodity-chain topologies and imagined proximities are then used as a basis for powerful arguments that they then result in an accrual of economic and cultural benefits for producers and/or consumers (i.e., lower prices and the sustainability of the industry).

However, most of these statements about directness, new positionalities, and disintermediation actually come from intermediaries, rather than producers of silk who are disintermediating commodity chains. Northeastern producers have, for the most part, been unable to establish online presence, and it is merchants located primarily in Bangkok or outside of Thailand who have instead positioned themselves as virtual bridges in the buying and selling of silk. It is conceivable that proximity to markets (in terms of positions on a commodity chain) plays a factor in encouraging Bangkok merchants to create websites, as they adapt to the needs or desires of their customers.

Not only are intermediaries more likely to use the Internet to sell silk than producers, but both producers and merchants who use the Internet often see no noticeable change in the topological length of their commodity chains. Firms that use the Internet are actually more likely than those that do not to sell silk to intermediaries and are more likely to buy silk from intermediaries. In the Thai silk industry, instances in which the Internet is being used to shorten commodity chains are exceptions and aren't representative of common experiences with the Internet.

This isn't to say that the Internet has no geographical effects: Internet users are actually more likely to sell both non-locally and non-proximately. Specifically, amongst producers and merchants who do not have websites, there is a distance–decay pattern that can be seen: Thai customers are by far the most important, followed by customers elsewhere in Asia. No such statement can be made about producers or merchants that use websites, as their important customers are far more geographically dispersed. In some ways, then, the Internet seems to be altering the manner in which distance is experienced by firms in the Thai silk industry. Absolute distance is made less relevant and less of a barrier for firms with an online presence.

Pak Thong Chai

Why then is the Internet being used so well in expanding markets geographically and yet at the same time being so ineffective at breaking down existing commodity chain structures? One reason is most likely a lack of economic transparency throughout the commodity chain. Intermediaries limit knowledge about weavers to customers, and limit knowledge about customers to weavers.

An example of this can be seen in the town of Pak Thong Chai in northeastern Thailand. Pak Thong Chai is one of the hubs of the production of plain silk in the region (see Figure 15.2). Location A on the map is the center of town

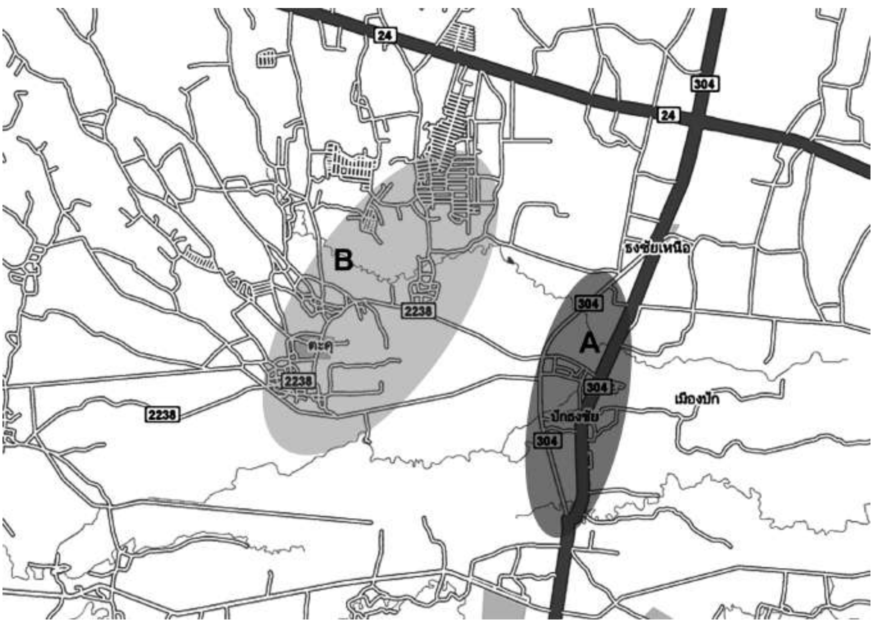

Figure 15.2. Pak Thong Chai, Nakhon Ratchasima, Thailand
Source: Google Maps (base map) and author

Figure 15.3. Silk shop
Source: Author

and contains a cluster of fifteen to twenty shops like the one shown in Figure 15.3. Most of these shops are designed for a comfortable shopping experience: they are sometimes air-conditioned, have polished wood interiors, and bilingual staff who offer visitors water and coffee.

Location B is where much of the actual weaving of silk occurs. It is an altogether different place. For outsiders, many of the weaving groups in this area are extremely challenging to find. They are sited on small side streets devoid of signs to indicate that people could buy silk from there. The purchasing experience is also an entirely different one: there is no polished furniture, no air conditioning, and no pretty displays of products (Figure 15.4). The weavers here rarely interact with end customers; something evident from my conversation with the group leader in location B. He told me:

> I don't know much about the shop that buys from me; they show up here at my house when they need more. I just know that they want the silk in long pieces. The price always varies, but sometimes if I really need money I have to sell it for 100bt a yard and lose money on the sale.

This conversation is reprentative of many other stories recounted to me in the area. In very few cases, in the northeast of Thailand, do the actual weavers

Figure 15.4. Spinning platform
Source: Author

of silk ever communicate directly with the consumer, and because of this there is very little transparency within, and a lack of knowledge about, distant nodes on the commodity chains of Thai silk.[2]

For instance, I asked all silk sellers that I spoke with to tell me about what their customers do with their silk. A large number of people told me that not only did they not know, but they also didn't care as long as they kept buying from them. The head of another weaving group in Pak Thong Chai that sells large amounts of silk to local merchants told me:

> There is such a long chain of people, and I really just don't know where it goes. I don't know if the retailers that buy from us export our silk.

[2] As an example, there is a pervasive myth among Thai consumers outside of the northeast that most Thai silk comes from Chiang Mai and the northern region of Thailand (hundreds of miles away from the northeast). On numerous occasions when I told Thais about my project, they insisted that I should be spending more time in Chiang Mai. What actually happens is that many merchants from Chiang Mai travel to cities in the northeast, buy silk, and rebrand it in their shops.

Others did have a vague idea of what happens to their silk, but were still lacking any specific details. The head of another weaving group recounted:

> I know that some of the people who buy from me export my silk, but I have no idea to where.

The example of Pak Thong Chai succinctly illustrates that the problem people in the silk industry face is not remoteness or distance from markets. Both places in Figure 15.3 are equally far removed from important and distant markets. In other words, the issue faced by many is not distance from markets, but rather a lack of transparency and an absence of functional information about markets.

More broadly, in the Thai silk industry, the Internet is undoubtedly allowing a few people and firms (most of whom are merchants in Bangkok) to sell in new markets, and is enabling some reconfigurations of economic positions. It is helping some people to reach out to customers all over the world (e.g., the merchants with websites described earlier in this chapter). But, while the Internet can theoretically allow people like the weavers in Pak Thong Chai to bypass existing nodes in commodity chains, it is difficult to see how that would work in practice. The actual producers of silk have little experience of marketing to distant consumers. Furthermore, this unfamiliarity with selling to other nodes on the commodity chain seems to have made many people skeptical about ever using the Internet for business purposes.

Some had never used the Internet, but nonetheless had an understanding of its potentials. One seller noted, "The reason I don't have a website now is because of copying. I will probably do it in the future, but I will decide which silk to show online." Others also had no direct experience with the Internet, but instead were pessimistic about its benefits. The head of a weaving group told me, "I prefer selling face to face so that people can touch. If I had a website, people might not buy anything. We had some people come around and tell us that they were putting our silk on a website. I don't know the name of it though ... They never call though so it doesn't matter." Finally, others still were hostile to the idea of using the Internet. One shook her head in disgust when I asked what she thought about the Internet and told me: "Other people have told me that colors are different on the Internet. It is not sure for selling and people might not pay money. What would I do then?"

In sum, there are three important points to take away from the case of the Thai silk industry. First, many sellers with websites choose to highlight the idea that the Internet brings about transparency and directness in the commodity chains of Thai silk. Ironically, it is primarily intermediaries (as opposed to producers) that use the Internet to sell silk. Sellers with websites are more likely to sell their silk internationally, but also more likely to sell to other intermediaries. The second key point is therefore that the Internet does not appear to be facilitating a process of disintermediation in this industry. Finally, relationships in the silk industry tend to be opaque, not because of an inability to communicate information and economic signals non-proximately, but because of a range of other microlevel barriers. Producers who are functionally illiterate, monolingual, and inexperienced in basic mathematics necessarily rely on intermediaries to do the work of brokering transactions.

We need to then ask why there are such powerful assertions about the disruptive and disintermediating potentials of the Internet and yet the benefits have been mostly captured by people and firms that the Internet was supposed to make irrelevant. Why do we expect the Internet to bring about transparency in the commodity chains of silk, when economic transparency is clearly reliant on so much more than the technologically mediated ability to transmit information? I assert that many of the hopes that we have for benefits that can be accrued to the underprivileged and disempowered through disintermediations, directness, transparency, and the bringing into being of virtual marketplaces all rest on a very particular ontology of space.

Reimagining the Internet

Development discourse is replete with suggestions that the Internet can *connect you directly*, *make the work smaller*, and *expand markets*. More broadly, much of the power embedded in discourses about the "digital divide" lies in the fact that they are able to postulate movement across space.

In some cases, much of the spatiality embedded into rhetoric about the "digital divide" refers to the geography of the divide itself. That is, a divide can be thought to exist between the North and South, East and West, urban and rural, etc. But to many people who talk about "digital divides," the Internet takes on an ontic role. The Internet is conceived to be enabling an ethereal, alternate dimension. This "online" space is simultaneously infinite and everywhere (because everyone with an Internet connection can enter) and fixed in a distinct location, albeit a non-physical one (because despite being infinitely accessible, all participants are thought to arrive in the same marketspace, civic forum, and social space) (Graham, 2013b). The Internet then turns into Marshall McLuhan's (1962) idea of a global village.

When we ermploy this "global village" conceptualization of the Internet, this ontology that sees the Internet as bringing into being a space that is simultaneously infinite and fixed, then the "digital divide" becomes, not a statistical divide between people or places, but rather an existential divide between those who can access a shared cyberspace, and those who remain rooted to the material world and constrained by traditional barriers of time and space (Graham, 2015; Graham et al., 2015).

It is then easy to see how expectations and claims about the Internet rarely seem to have matched up to its effects in the Thai silk industry. Ideas of transparency, directness, and proximity all appear to be grounded in the type of ontology that has been described. By rendering material time/space paths and barriers less relevant, and by providing a new virtual space in which goods and information can be exchanged, the Internet was thought to offer an effective solution to the silk industries' woes that are based on persistent barriers of long commodity chains and distances between producers and consumers. However, use of the Internet in the Thai silk industry has not had the expected effects.

First, the Internet appears to be partially fulfilling its geographical potentials. Absolute distance is made less relevant and less of a barrier for firms that have an online presence, with Internet users more likely than others to sell internationally. But at the same time, despite facilitating trade with new markets, the Internet doesn't appear to be facilitating the transparency and directness that so many hoped that it would.

It is important to note that the Internet is actually not being used by most producers of silk. Many of the people interviewed saw either too many difficulties or no economic value in attempting to use the Internet to sell silk. Instead, it is more often employed in this way by merchants in Bangkok and abroad. Furthermore, merchants found most success selling to other companies rather than to end customers. This means that many people are effectively using the Internet to add commodity-chain positions, rather than disintermediating those chains: a point which runs counter to much that is written about the potentials of the Internet.

In the places where it is being used by producers, it is rarely an effective tool. The producers of silk who had used the Internet were quite unfamiliar with the requirements or tastes of any distant markets. This is because intermediaries often occupy a crucial (and useful) organizational position on the commodity chains of silk. Put another way, the Internet changes the relative spatial positionalities of intermediaries, yet does little to alter their economic, cultural, and educational positionalities.

This chapter has argued that because of very specific ontologies that we tend to use when thinking about the Internet and its social and economic effects, we can often have unrealistic expectations about the transformative potentials of the Internet in the world's economic margins. Reducing a digital divide does not automatically bring a virtual, transparent, and direct marketplace into being that can transcend the distance between producers and consumers. The ability to engage in non-proximate trade in most cases requires an

Internet connection, but is also clearly contingent on a range of other economic, cultural, political, and technological positionalities, barriers, and costs. Not everyone has the education, experience, linguistic knowledge, willingness, or desire to innovate, and the interpersonal networks necessary to reconfigure commodity chains; and Internet access alone is rarely sufficient to fundamentally reconfigure entrenched, and often unfair, economic networks and relationships in the world's economic margins.

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16

The Political Economy of Digital Health

Gina Neff

The Internet and digital media are increasingly seen as having enormous potential for solving problems facing healthcare systems. This chapter traces emerging "digital health" uses and applications, focusing on the political economy of data. For many people, the ability to access their own data through social media and connect with people with similar conditions holds enormous potential to empower them and improve healthcare decisions. For researchers, digital health tools present new forms of always-on data that may lead to major discoveries. Technology and telecommunications companies hope their customers' data can answer key health questions or encourage healthier behavior. At the same time, Gina Neff argues that digital health raises policy and social equity concerns regarding sensitive personal data, and runs a risk of being seen as a sort of silver bullet instead of mere technological solutionism.

The broad label of "digital health" combines several distinct emerging social and technological innovations and trends for tracking and managing symptoms and health conditions and for using digital tools for encouraging healthy behaviors and discouraging unhealthy ones. Increasingly, people look to digital health to solve the problems facing healthcare systems in both developed and developing economies, to improve the health and wellness of individuals and populations, and to lower healthcare costs. This chapter traces emerging uses and applications of digital health, with a particular focus on the political economy of the data that such programs generate. For many people, digital health can mean the ability to use social media to connect with people with similar conditions and the power to access, analyze, and query their own data. These activities hold enormous potential to improve decisions about healthcare, expand access to health information, increase social support, and empower patients in their conversations with their healthcare providers. For researchers, digital-health tools present new forms of always-on mobile and Web-use data that may enable new discoveries about how daily behaviors are connected to particular health conditions—and one day may even help in their diagnosis. For technology and telecommunications companies, digital health provides another access point for customers' potentially valuable data, and the opportunity to create goods and services to address a market demand.

The challenge of digital health for both patients and citizens is that the development of digital-health technologies outpaces the creation of ethical and legal frameworks for mitigating social equity concerns and for protecting people's privacy. Without such frameworks, digital-health innovations may inadvertently lead to new modes of discrimination. For these reasons, the emergence of digital health is a useful case study for Internet scholars of how social institutions, legal frameworks, and professional norms shape the production, circulation, uses, and meanings of digital data.

What follows is an overview of how individuals and healthcare systems alike are marshaling digital technologies to improve health and wellness. I then outline five key ways that digital data changes the terms by which people participate in decisions and choices about their own health and wellness. I conclude by addressing four challenges to confront in the political economy of the data for digital health. For practitioners, I argue the lack of strong legal and regulatory norms around such data prevents it from being utilized to its full potential. For researchers of Internet studies, I argue that digital health provides a rich arena for furthering our understanding of the everyday practices and emerging norms of digital technologies.

Personal Data as a Resource for Health

Smartphones and wearable devices can help people to self-track: hours slept, steps taken, calories consumed, and medications administered. Technology producers shipped well over 125 million wearable sensors globally in 2018. The implications for how this data is used are urgent and important. In *Self-Tracking*, my co-author Dawn Nafus and I look at the emergence of digital health as a social and technological assemblage of the tools, practices, and communities of self-tracking data. Digital health relies on all three. We look at how to bring the tools of social theory and methods to understanding how self-tracking data is recorded, analyzed, reflected upon, and acted on. Communities form around digital self-tracking data, advocates argue how the data should and could be used, and industries create new ways to buy, sell, and share it.[1]

It is yet to be seen how this process of turning everyday experience into digital data might affect healthcare delivery and healthcare systems. Advocates see enormous possibility for using data from wearable devices, Internet searches, smartphones, and other so-called personal data for health purposes. While there is a growing consumer-oriented market in digital wellness, exemplified by fitness trackers, smart watches, Internet-connected devices such as scales and heart monitors, and other devices, the applications of this data in medicine are not yet clear. Such emerging trends have been called "digital medicine." According to one definition, digital medicine means

> using digital tools to upgrade the practice of medicine to one that is high-definition and far more individualized. It encompasses our ability to digitize human beings using biosensors that track our complex physiologic systems, but also the means to process the vast data generated via algorithms, cloud computing, and artificial intelligence. It has the potential to democratize medicine, with smartphones as the hub, enabling each individual to generate their own real world data and being far more engaged with their health. Add to this new imaging tools, mobile device laboratory capabilities, end-to-end digital clinical trials, telemedicine, and one can see there is a remarkable array of transformative technology which lays the groundwork for a new form of healthcare.[2]

Currently, protocols of healthcare rely on data that is instead collected or confirmed by healthcare providers, and few physicians can imagine how they would ethically or professionally deal with an onslaught of daily individualized tracking data about each of their patients within their current workloads. In one of our first interviews, a researcher who was studying sensing technologies used for elder care said that he was surprised at doctors' resistance to accepting the enormous amount of data generated from "smart homes" for their aging-in-place patients. One of the doctors expressed her problem as "I don't need more data; I need more resources."[3]

As such, different stakeholders in digital health and wellness contest the meanings and uses of the phrase "data." Researchers, clinicians, patients, and citizens all voice distinct meanings for what they consider data. For example, from the point of view of the doctor quoted above, digital self-tracking data *requires* extra interpretive, clerical, and managerial labor, and provides little benefit to clinicians making decisions. Presumably such data costs more in time and money per patient and brings an increased liability of risk exposure to the clinician.

[1] Neff and Nafus (2016). [2] Steinhubl andTopol (2017). on Its Way to Being Just Plain.
[3] Fiore-Gartland and Neff (2015).

Still, the narratives about the power of personal data to utterly transform healthcare holds captive the popular imagination about such tools. Three broad categories of the use of digital data for health and wellness are commonly discussed. First is the discovery of new insights, either for awareness of the self or for understanding the health of populations. A key example is how wide-scale direct-to-consumer genomics testing as in 23andMe might lead to novel discoveries. The second is that the persistence and prevalence of our smartphones and other digital devices, coupled with a seemingly magical power of data, can help "nudge" people toward healthier behaviors. Fitness trackers, sleep trackers, and food-tracking apps make such promises, at least in their marketing materials if not through research trials. Third is that digital tools can be supplements in the diagnosis and treatment of disease, perhaps even through using digital habits, smartphone sensors, and Web search information as digital indicators, either of the onset or early indication of symptoms of individuals or digital disease detection, or "infodemology" for public health. Google Flu Trends was one of the most visible of these endeavors, but researchers have worked toward using digital trace data to indicate the onset of an episode of disordered eating, movement disorders such as Parkinson's disease, or mood disorders like depression and bipolar disorders.[4]

In the US, the National Institutes of Health have increased research funding for the health applications of "mobile, imaging, pervasive sensing, social media and location tracking," or MISST technologies, almost fourfold over the last decade and doubly over the last five years.[5] In the UK, the embrace of digital technologies has led the National Health Service to create NHS Digital to "transform" healthcare within the country, including through managing a trusted library of apps and creating best practices for online personal health records.

Such digital health efforts are often lacking attention to the ethical and social implications of such amassing of personal data. One review found that digital health needs "technologists, ethicists, regulators, researchers, privacy experts and research participants [to be] included in shaping & iterating the ethical frameworks intended to inform participants and protect [their] privacy."[6] Without such concerted efforts to think about privacy and discrimination, digital health programs may risk reproducing social inequality and inadvertently supporting discrimination.[7] For example, qualitative research with digital app users found that people expressed surprisingly little concern when their health-related data was shared with corporations, and that a "widespread rhetoric of personalization and social sharing in 'user-generated culture' appears to facilitate an understanding of user-generated health data

[4] See Yom-Tov (2016). for an overview. [5] Dunseath et al. (2017). [6] Ibid.
[7] Ferryman and Pitcan (2018).

that deemphasizes the risk of exploitation in favor of loosely defined benefits to individual and social well-being."[8]

The lines between medical devices and consumer goods and between health and wellness are blurring in ways that have enormous potential for both benefit and harm to people. In terms of benefits, digital data has the capacity to link and connect people in unprecedented ways, and trace data from smartphones and Web searches is being researched for its potential as a health indicator. However, the aggregation and collection of widespread personal data that may reveal health information carries potential for social and cultural harms. Large, population-wide data sets highlight the impossibility of anonymity. Popular mobile phone apps for health and wellness that are less effective at what they claim to do may present more risks to privacy than benefits they offer. Lack of transparency and clarity about who has access to data and what purposes it will be used for may present real harm to people. Without clear lines to separate consumer goods from medical devices, the potential for harmful unintended consequences is real.

With this context for the political economy of personal data in mind, I look below at four key factors that shape how people can use their own digital data for improving their health and wellness. Each factor is accompanied by a real-world case study.

Data Plays Multiple Roles

Research that I undertook with Brittany Fiore-Gartland showed the radically different expectations different people had for data across digital health. We called these expectations "valences" and mapped different valences to different actions that stakeholders in digital health take.[9]

An example of the value of digital health data having different meanings in different communities is the Nightscout project. Started by parents of children with type 1 diabetes, Nightscout is an open-source, do-it-yourself modification of a medical device (a particular brand of continuous blood-glucose monitor) to display the data onto a smartwatch or smartphone. When the Nightscout project began, none of the major medical device makers offered the feature of displaying data on anything other than their own hardware. Nightscout shows what kinds of innovation are possible when users, patients, and their loved ones are involved in design. It also shows some of the complications that arise from the distinction between clinical and nonclinical data. For example, Nightscout changes which

[8] Ostherr et al. (2017). [9] Fiore-Gartland and Neff (2015).

screen the data is displayed on—from a single-purpose monitor display, to a display that the user is more likely to see. It does not recalculate that data, or make a medical recommendation, but the US Food and Drug Administration (FDA) asserts the rights over medical device data displayed in different formats. Regulators want to be sure that readings are not lost in translation and that they are safe and reliable. At the project's beginning, the designers behind it wrote on Twitter #WeAreNotWaiting "for others to decide if, when, and how we access and use data from our own bodies." In this case, the data has real usefulness to communities because of its timeliness and its ability to be shared. Before a commercial solution was available, parents took it in their own hands to make sure that they could have multiple displays of data from their children's CGMs. These kinds of innovative, DIY projects might go against the speed of the medical process. But they show what patients and their loved ones can do with their own data—and why they might want to have it.

Data as a Starting Point for Connection

The word "data," Daniel Rosenberg wrote, is rhetorically used to mean "that which is given prior to an argument."[10] Change the givens, and you change the conversation. Data, then, can be seen as the input for people to craft their own stories, the opportunity to start new conversations, and the reason for connections with others. In other words, many people looked to data for what Taylor and van Every have called a "site for conversation,"[11] and people may not prize accuracy as scientists and clinicians do, instead valuing data's ability to help them connect with others. For example, the effectiveness of fitness trackers may be due less to their ability to accurately measure calories burned than to their ability to offer people the occasion for social support for their goals.

Healthcare Providers No Longer Have a Monopoly on Health Data

New kinds of digital data about health will fundamentally change the roles of doctor and healthcare providers in patient care. Data in the hands of more

[10] Daniel Rosenburg (2013). "Data before the Fact," in Lisa Gitelman (ed.), *Raw Data Is an Oxymoron* Cambridge, MA: MIT Press, 15–40.

[11] James R. Taylor and Elizabeth J. Van Every (2000). *The Emergent Organization: Communication as Its Site and Surface*. Mahwah, N.J: Lawrence Erlbaum Associates.

people could maintain the cultural script that already plays out in doctors' offices (i.e., "Have you been measuring your glucose like I asked?") or it could change them, by making different "givens" the start of the conversation. The move toward more people having detailed data about their everyday lives mean, as my colleague Dr Anthony Back has said, that the physician and care team are but single points in an ever-widening stream of information.[12] This change in the health data ecology may lead to new roles for physicians and healthcare providers: those of adviser and coach. While clinicians and researchers may have expertise in the results from random controlled trials, individuals will come to be seen as the experts in their own conditions and experience. Coupled with data, there may be in the future new sets of what is considered normal. Front-line healthcare providers will need to grapple with these and make sense of these new inputs together with patients.

Data Grants the Power to Ask New Questions

Sensors on every smartphone open up the possibility for people who are not professional medical researchers to collect data about themselves and ask questions about it. The possibility of having control and access to data about themselves changes how people can be involved not only in their own healthcare decisions but also in the co-creation of new insights at the boundaries of knowledge. With data, one has the ability to ask the next question.

For example, Aisling Ann O'Kane and her co-authors found that the information practices about shared data in online patient communities show how people "look at their own personal health information, information about the condition in general, and what their peers have experienced. This information seeking contributes to a more grounded understanding of what is normal for them, what is normal for the condition, and what is normal for peers who are similar to them."[13] These kinds of critical engagement with data happen in Quantified Self meetings, support groups for people with chronic conditions, in rare disease communities, and in communities for people trying to "hack" or understand their symptoms and triggers in conditions that Western medicine does not fully understand yet, such as autoimmune disorders, migraines, and food allergies and sensitivities. These shifts toward individualized relationships to data may show a future where individuals are either recast to take responsibility for the self-management of their own health in an

[12] Anthony Back and Gina Neff (September 2014). "New Roles for Physicians in the Era of Connected E-Patients," Medicine X, Stanford University.

[13] O'Kane et al. (2016).

empowered way[14] or are an excuse for shifting the burden of care away from healthcare systems and onto patients and their families. Critical engagements with digital health data have been seen as "soft resistance" to the power of big data, as "participants assume multiple roles as project designers, data collectors, and critical sense-makers who rapidly shift priorities," pushing back on idealized notions of unified, authoritative data sets capable of being understood in the absence of personal insight and deep contextual knowledge.[15] In this sense, working with data, interrogating data, and raising critical questions afterwards is part of "doing" the self in the modern digital era, and not uncovering the self as some sort of preexisting entity, but rather making and remaking the self with digital technologies and the practices of working with the data they generate.[16]

Thus, the values of digital data have enormous potential to help people engage in wellness activities and healthcare and improve their lives. However, self-tracking practices and tools are not quick fixes for the problems of healthcare. The data collected about people's lives touches on their future in the workplace, in the marketplace, and as citizens. Whether digital data will empower or harm people ultimately depends who can access and control data. The future of data-driven health and wellness depends on decisions made during design about privacy, data flows, and business models. The future of digital data about health is fundamentally about what say people have in how knowledge about them is created and disseminated.

Challenges

Unfortunately, there are several challenges that corporations, regulators, policy-makers and citizens must resolve before people can use their digital data to improve their health. These include individuals' improved access and control over digital data about themselves and their health, better privacy and security at the device level, better legal protections for this data, including protection from harms that might arise, and clearly demonstrated and researched benefits and efficacy.

Access to Use of and Control over Data

When digital data can mediate so many different relationships, control over the meanings of data is a type of power. For too long, data about people's health has been seen as a stable entity only interpretable by experts. When

[14] Swan (2012). [15] Nafus and Sherman (2014). [16] Dudhwala (2017).

people have access to use of their own data and control over decisions regarding who else may use data about them, they have enormous power to shape the narratives about themselves. If society does not address the questions of digital health data for whom, when, and why, then it will be a failure of social justice and abuse of the trust that people have placed in the institutions of healthcare. The power to access this data led to the power to query it and to pose the next questions, and that is power that should be in people's hands as part of their decision-making process about their own lives.

Contextual Privacy, Security, and Transparency

As more varied types of digital data emerge as potential indicators of health, challenges of contextual privacy become more urgent. Philosopher Helen Nissenbaum uses contextual integrity as the model for how our expectations for privacy are closely coupled to the contexts in which our data is shared and generated.[17] What might feel like an appropriate thing to share among my Facebook friends may seem like a violation to me when shared in my doctor's office (or insurance company) and vice versa. For the moment, digital apps encourage their users to feel like there are no privacy violations when sharing information with corporations, especially in a market that sees personal information as the inevitable "cost" of otherwise free digital services.[18] The challenge is that digital data from our Web searches and smartphones that has not typically been seen as so-called health data may soon be able to be used to predict health-related information about us. When this happens, the contextual integrity of that information is challenged, and people may *experience* the shift of the context of their data as a violation, regardless of the legal or technical definitions that apply to the situation. When information that has not been widely seen as health data is being used to make decisions about our health—without our involvement—that will be seen as a violation of privacy and autonomy.

Freedom from Harms

Data from wearable self-tracking devices has enormous possibility in helping to inform people about their day-to-day habits. Quantified Self communities have found creative ways to repurpose, revamp, and reimagine how people might use this data. Health data privacy policies, though, have been based

[17] Nissenbaum (2009). [18] Ostherr et al. (2017).

upon protecting certain classes of information about individuals that have been collected about them in a healthcare setting. How might using data from our smartphones leave us open to potential harms? Data from wearable devices is emerging as a category of data that can be used in courts in the US. What happens when the risks in gathering and aggregating this data in the first place outweigh the benefits? Might digital data implicate family members? Without legal and cultural assurance that we have protection from the potential harms of digital data, the benefits for our health of using such devices in the first place can never be clear.

Demonstrated Benefits and Efficacy

There is still much work that needs to be done to qualitatively, quantitatively, and experimentally demonstrate the benefits and efficacy of digital data used for improving health. As we argued in *Self-Tracking*, making this data work often means some form of hacking or modification, so that the devices and their data work for you. But it means more than hacking software and hardware—it also means creating communities where you can make sense of the data and modifying your practices with and around the data. Most commercially available technologies are not helping people ask the right questions, and these devices and their interfaces come pre-loaded with a whole host of assumptions about their users and what those users might want out of their data. Some of the demonstrated success of using digital data for health wearables will come from the randomized controlled trials favored by researchers. Other demonstrations of the benefits of using digital data for health will come from people's own stories and experience in examining and testing their own conditions and their own "normals." Regardless, much more work needs to be done by activists, citizens, researchers, and regulators alike to show what works and what doesn't in digital health. Otherwise, the data offers little more than false hope and promises in exchange for the risk of wide-scale surveillance. So much more is possible.

Conclusion

The science of digital health is emerging. There is an urgent need for Internet studies scholars to contribute. First, always-on mobile and Web data require different ethical and legal frameworks when they are used as health indicators. The work of figuring these out needs social scientists to help design and deploy systems that can empower people to have better control and access over their digital health data. Second, digital health is social health, as people make sense of data together and use their data as a starting point for connection and further conversation. For researchers this means that digital health tools present opportunities and challenges for studying the social nature of networked data and for applying insights on distributed privacy, networks and behavior change, and sense-making. Third, new forms of always-on mobile and Web use data may enable new discoveries about how daily behaviors are connected to particular health conditions—and one day may even help in their diagnosis or management. For researchers of Internet studies, this means that digital health is a domain of everyday life where the theories and insights on the emerging practices and norms of digital data can have significant impact.

Pragmatically, this means working with policy-makers, healthcare providers, and technology and telecommunications companies to ensure that digital health develops in a manner that protects customers' potentially valuable data and takes seriously the healthcare maxim of *first do no harm* when it comes to the potential impact on people of their digital data. Without legal and regulatory norms and policies that prevent bias, discrimination, and harm, and without accountability, transparency, and fairness designed into the collection, analysis, and use of such data by technology companies, digital health will never be utilized to its full potential.

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17

The Platformization of Labor and Society

Antonio A. Casilli and Julian Posada

This chapter focuses on the role of digital intermediaries in shaping technology, society, and economy under what Casilli and Posada call "the paradigm of the platform." They trace the historical relationship between platforms, markets, and enterprises to demonstrate the role of algorithms in matching users, pieces of software, goods, and services, and how platforms can create value from the content and data generated by users. Their primary argument is that platforms play a fundamental role in establishing a digital labor relationship with their users by allocating underpaid or unpaid tasks to them. In order to enable and coordinate users' contributions, platforms need to standardize and fragment ("taskify") labor processes. The authors conclude by highlighting the link between platformization and automation, with the tech giants employing their users' data to produce artificial intelligence and machine-learning solutions to an expanding range of problems.

Introduction

The notion of the "platform" established itself in the tech industry in the early 2000s to designate digital intermediaries that match persons, information, and goods (Evans et al., 2006). The term, mainly borrowed from construction work, was initially synonymous with computer "architecture" (Hennessy and Patterson, 1990, Baldwin and Woodard, 2009). Thus, a platform can be mainly characterized as a software or hardware infrastructure on which users, companies, and even governments build applications, services, and communities.

In his book *Platform Capitalism*, Nick Srnicek (2017) distinguishes several types of platforms. Some run popular consumer services: *advertising platforms* like Google extract and analyze information from users and sell ad space; *product platforms,* like Spotify, transform goods into services accessible to subscribers; and *lean platforms,* like Airbnb, do not own the material assets from which they make profit. Other platforms cater exclusively to businesses: *industrial platforms,* like GE or Siemens, transform traditional manufacturing into Internet-based processes, while *cloud platforms,* like Amazon Web Services (AWS), rent data storage and computing power.

In light of the success of these services, platforms have established themselves as an organizational and technological paradigm both for tech industry companies and for companies, state and privately owned, that are not inherently technological, but whose business models transition toward platform-based strategies. For instance, insurance companies (such as Admiral), retail (such as Tesco), and transportation (such as French state-owned SNCF), are increasingly relying on platforms to coordinate and acquire data on their clients.

In this chapter we will focus on five aspects of the platformization phenomenon. First, the emergence of platforms as a replacement for preexisting modes of economic coordination. Second, the way platforms rely on data to create value. Third, how data is extracted from multitudes of users in the form of "digital labor." Fourth, how users' behavior is fragmented and reduced to standard tasks. And fifth, how trends toward "datafication" and "taskification" are the sinews of contemporary developments in automation and artificial intelligence.

Platforms Emerge as a Response to Deficiencies of Markets and Enterprises

Although platforms are grounded in digital technology, they primarily emerge as a response to long-term social and economic developments, particularly the diminishing relevance and efficiency of enterprises and markets, two traditional methods for organizing human productive activities.

Markets act as coordinating mechanisms, designed to enable several groups of buyers and sellers to interact. Conventionally, they achieve their goal using prices, thus matching individuals and organizations willing to provide a particular good or service in exchange for a certain amount of money (supply), with others who are willing to spend said amount (demand). Recent devastating crises that have hit both financial and goods markets have undermined collective confidence in their reliability as coordination mechanisms. Moreover, they have shown the limitations of prices in respect of adequately representing the values of the goods and services negotiated on the markets.

Some commentators describe this situation as a "crisis in the representation of value" (Muniesa 2011: 33).

Anthropologist Jane I. Guyer (2016) argues that, by losing its relevance as a mechanism for coordinating human actions, the market has increasingly become "abstract" and disconnected from individual experiences. Previously depicted as a physical space where localized relationships occurred ("the marketplace"), the market has been increasingly reduced to an impersonal force governed by opaque rules that transcend individual comprehension ("the economy") (Graeber, 2009). By contrast, platform components and applications present themselves as technological solutions with an actual impact on users' lives. Especially when they take the shape of mobile applications, they are perceived as capable of offering concrete solutions to real-life problems: for instance by connecting individuals to friends and loved ones via Facebook or Tinder, by helping them beat traffic on Waze, or by providing them with tips on the best deals as in ShopSavvy or Trivago.

As markets detach themselves from individual experience, another perceived failure looms: that of traditional enterprises to create wealth and innovation. Between 1980 and 2000, in the wake of financial capitalism, established firms faced harsh global competition and progressively gave up their usual "retain and invest" models, based on the internalization of assets to develop innovative value-added services and products. Instead, they have opted for narrower "downsize and distribute" business strategies, where principles of lean management coexist with the massive outsourcing of labor and production processes to generate short-term profitability for their shareholders (Segrestin and Hatchuel, 2012). During the 2000s, for instance, US top businesses have sacrificed R&D programs by expending up to ninety-four percent of their revenue in stock-market manipulation, mainly buying back their shares to artificially increase their sales per share (Lazonick, 2010).

These tendencies have eroded the role of traditional enterprises as drivers of economic growth and have accelerated their replacement by the new platform-based social and technological paradigm. Instead of focusing on core competencies, business identity, and flagship products, digital platforms adopt a more dynamic (even opportunistic) approach. They act as meta-organizations that try to discard products in a pragmatic and sometimes volatile way (Ciborra, 1996). For example, Yahoo! has pivoted over time from being a directory of websites, to an email service, to a news portal. Before becoming a top microblogging platform, Twitter was a podcast delivery service. Also, Google has launched and then dispensed with several services, from the messaging software Google Wave to the wearable device Google Glass.

Another characteristic of enterprises is their reliance on hierarchies to curb transaction costs (Williamson, 1967). This strategy implies a sharp distinction between the inside and the outside of a firm: the former is regulated by hierarchies and subordination, while the latter is directed by the freedom to cooperate. Instead of complying with traditional companies' "hierarchical control," new platformed organizations blur the boundaries between the interior and exterior of a firm and are predicated on promises of horizontal coordination and independent access to material and informational resources. When they sign up on Etsy or eBay, for example, all users are assumed to participate on equal footing in the functioning of the platforms, none of them acting as a supervisor or a line manager. Furthermore, the terms they sign do not include exclusivity clauses that restrict their usages inside a single platform.

Despite that, a digital platform is less of a sharp departure from previous paradigms and more like a hybrid organization, halfway between a market and an enterprise. For instance, Amazon presents itself as a traditional enterprise, with a highly hierarchical structure that often manifests itself in a "bruising" work culture (Kantor and Streitfeldaug, 2015), and the reinvestment of financial gains into shareholders' dividends. However, at the same time, it runs a thriving marketplace, where it connects sellers and buyers.

Like enterprises, platforms rely on intricate, multilayered, and ultimately hierarchical features (Gillespie, 2010). Like markets, they select goods, manage information, or even establish the prices of services. Uber's surge pricing algorithm is emblematic of this: the overall number of users launching its app on their smartphones allows Uber to estimate the number of people who are "on the market" at a given time in a specific area. The platform operates on a just-in-time basis and, unlike taxi companies, it does not manage a stable fleet of vehicles or have access to reserved parking spaces. In order for that potential demand to turn into actual rides, enough cars must converge in the same neighborhood. To coordinate supply and demand, the price of a trip is not calculated from distance and other criteria, such as the time or the type of vehicle, but it is multiplied by a coefficient that can range from 1 to 50. Thus, Uber does not wait for passengers and drivers to come up with a price autonomously or to set a fixed price for its rides, but instead uses dynamic pricing (Hall, Kendrick, and Nosko, 2015). This example highlights another essential feature of digital platforms: they coordinate their components through algorithmic matching, rather than through simple price adjustment. Prices are not the results of free transactions between sides of a given market, since a real-time algorithmic arrangement sets them on the platform.

In the next section of this chapter, we will argue that algorithmic matching rests on the use of data to create value-added services. Data is, in turn, created by the ambiguously consented participation of its users.

Platforms Capture Users' Content and Data to Generate Value

The network structure of platforms enables them to appropriate the fruit of the activity of the multiple parties in each transaction, instead of extracting it from relations of productive subordination, as in the case of firms (Ryall, 2013). On the one side, platforms monetize their users' interactions. Several, like Facebook or Google, make users' information available to paying partners. Some, like Netflix, make their customers purchase a subscription to their services. Others take a percentage of the revenue that the users generate, as is the case with Amazon, whose fees can reach twenty percent of the price of a product sold in its catalog.

Most importantly, platforms capture value by collecting the output of their users' participation. As tech investor and author Tim O'Reilly puts it: "The secret to the success of bellwethers like Google, Amazon, eBay, Craigslist, Wikipedia, Facebook, and Twitter is that each of these sites, in its own way, has learned to harness the power of its users to add value to . . . its offerings' (O'Reilly, 2011: 13). One of the first mainstream search engines, Yahoo!, classified and referenced millions of websites according to categories established by multitudes of early service adopters. YouTube users produce, upload, rate videos, and even review them for inappropriate content so that the recommendation algorithm can make automated suggestions.

Value capture is a strategy the platforms have adopted since the dawn of the World Wide Web (Teece and Linden, 2017). User-generated content (or UGC) is one of the most visible forms of appropriation of user participation for commercial use. The major social media platforms of the 2000s (Friendster, Myspace, YouTube, and Facebook in Western countries and Orkut, QQ, Sina Weibo, and VKontakte in emerging ones) owe their success to billions of "volunteer" users that over the years have produced their text, images, sounds, and videos.

However, user-generated content is not the only source of value for digital platforms. Value capture means that any information provided by the users represents a commercial advantage. Such information can also be attached to the products and services that circulate on a platform: ratings, engagement statistics, and commentaries help discriminate among sellers on e-commerce websites or service providers on ride-hailing apps.

Moreover, the harvesting of data and metadata has been a primary source of user-related value for tech companies. Data can be described as any information about the users requested by the platforms or volunteered by the individuals: a name, a telephone number, a password, but also the likes' on a specific content and the messages in someone's inbox. Metadata is information about other data: for instance, a tag on an Instagram picture, the IP address attached to a Wikipedia edit, or the description under a YouTube video.

This information is continuously monetized: sold or made accessible for a fee to brands and advertising networks, to other businesses, and even to governments for the surveillance of their population. Despite their marketing and communications strategies, platforms insist on the technical aspects of their success (their algorithms, their servers, or their drones), and their ability to extract contents, data, and metadata from their users is paramount. Their growth does not depend on a single product or service, but on the overall value that they can extract from the personal data they possess, the dynamism of their communities, and the relevance of the services they offer. In the following section we analyze how, by stimulating user participation, platforms end up creating a new form of inconspicuous digital labor.

Platforms' Prosperity is Predicated on Their Capacity to Put Their Users to Work

The capture of material and immaterial resources generated by communities of users can be considered either as a form of participation and "co-creation" or as a way of putting users to work to turn their participation into "digital labor" (Scholz, 2012). In a landmark publication, Tiziana Terranova describes digital labor as the "free labor on the net" and lists activities falling under this description as "building Web sites, modifying software packages, reading and participating in mailing lists, and building virtual spaces" (2000: 33). Beyond this initial characterization, as we have discussed, digital labor cannot be limited to a pro bono production of content, since activities performed by users, from filling in their profiles to drawing up a friend list, represent lucrative opportunities for tech giants.

In a practical sense, what digital labor encompasses is not confined to free Internet labor, but embodies a range of nonstandard forms of production, from semi-professional amateurism to monetized leisure, and from unpaid click-work to "gigs" and freelancing. This type of labor relations, mediated by digital platforms, locates productive activities outside of regular employment and spawns a variety of invisible or informal working arrangements which do not guarantee fundamental rights such as paid leave, retirement, safety, and most importantly, the right to be paid for one's contribution.

On social media, the production of information conventionally manifests itself in unpaid activities performed by users, so that online services can profit from every social media post, every gaming session, every comment, every photo uploaded, in so far as "both social media and the factory are products of capitalism and are, ultimately, adapted to its purposes" (Rey, 2012: 401). This, of course, creates tensions with formal labor markets and exerts a pressure on professionals and specialized service providers.

One of the early experiments in digital labor on Facebook was Diaries, a 2007 TV series made up of montages of user-generated videos. Around it, Facebook developed a fruitful broadcast partnership with Comcast (Johnston, 2007). The series served as advertising as well as a revenue source from the broadcasting rights. In the context of the reduction of the workforce in the media industry, according to Nicole Cohen (2008), the recourse to amateur content amounts to the outsourcing of content production to online multitudes of producer-consumers. This informal labor is so entangled with actual labor that it is redefining labor markets and eroding workfare protections, thereby prompting the emergence of new occupational identities built upon precarity and risk-taking.

Thus, the exclusive focus on free labor gives way to new evidence showing that digital labor is a continuum of unpaid, micro-paid, and poorly paid human activities, thus encompassing the kind of actions performed by users of participatory media as well as platform-based piecework (Casilli, 2017).

The example of on-demand platforms such as Uber, TaskRabbit, Deliveroo, or Airbnb is emblematic: based on mobile apps allocating material and informational resources in real time, they connect customers with independent goods or service providers. These platforms act as algorithmic matchmakers between one group of users (riders, home-owners, customers, or guests) and those who secure transportation, maintenance, catering, or accommodation. On-demand apps are incredibly dependent on material human labor, whether direct (a category of users performing physical tasks such as driving, delivering, or cleaning) or indirect (a category of users affording an asset like an apartment, a car, or a piece of equipment). Yet, this material labor is deeply interconnected to the information economy platforms thrive upon. Users are pressured not only to provide services, but also to create content, data, and metadata. For instance, Airbnb encourages its members to participate beyond the hospitality service. It acts as a social media platform, where both hosts and guests have to upload volumes of photos, texts, messages, and evaluations. Users also have to provide geolocation data or socio-demographic information (such as their name, address, or age). To satisfy its data needs, Airbnb has partnered with other platforms, for instance with Foursquare to employ its geolocated images in its city guides (Garun, 2016).

To Generate Data, Platforms "Taskify" Labor Processes

In order to generate data and to allow algorithmic matching of different groups of individuals, platforms encourage the "taskification" of work, or the reduction of human activities to the smallest conceivable unit of execution (virtually, a click), to facilitate interconnection and value capture. Platforms operate in ecosystems where consumers (e.g., those buying flights and booking hotels on Expedia), interact with companies (like hotels or airlines), smaller platforms (such as those which run ads and sponsored links on websites and mobile), or public infrastructures (e.g., airline schedules databases). All these individuals and organizations are components of the platform, and they all have to perform interoperable actions. The reduction of human activity to normalized and simplified elements is necessary for platforms to coordinate and access an ecosystem composed of individuals, communities, apps, and databases.

The standardization and the fragmentation of previously complex and specialized processes are essential to run a platform ecosystem where the activities of users fit in and are synchronized with others (Gray, 2016). Twitter, for example, is a medium that employs short of 3,860 people worldwide, as of 2018, has no actual editorial staff, and entrusts its users with the responsibility of producing and circulating content. The extreme standardization of its service, the publication of messages of less than 280 characters, has allowed its growth from 0 to 335 million accounts over the span of twelve years since its inception in 2006. By outsourcing mostly fragmented and effortless tasks of content selection and enrichment to its users (likes, retweets, and hashtags), the platform can efficiently run existing accounts, and easily add new ones.

Despite apparent similarities, the platform-based "taskification" represents a departure from the twentieth-century Taylorism in which the ideal of industrial-era scientific management sought to normalize work in units of time in order to reduce the internal complexity of the factory. The diversity of individual contributions (like different crafting styles or quality standards) was better integrated into the collective effort to produce value internally. In contrast, platform-based tasks are mainly connected to outsourcing, which becomes their prevalent way of operating. As far as platforms tend not to produce internally the goods and services they provide, their added-value tasks are fragmented and performed by their ecosystem of users. Nevertheless, it is a new type of outsourcing that takes place on platforms: it is not an individual or an organization that becomes a subcontractor, but an entire network, multitudes of production units, all qualified as users.

Furthermore, the Taylorist strengthening of bureaucracies and the simplification of labor processes were designed to develop critical skills within a company's workforce. Platforms, by contrast, bring forth a new division of labor which ensures a high level of productivity by involving users, consumers, and freelance workers in the production. Those who perform tasks are not specialized professionals with an obligation to achieve results, but casual, disposable, and virtually low-skilled performers that may not even require a small amount of pay. Standardization and segmentation of labor processes are thus instrumental in facing the uncertainty that this new division of labor entails.

Platform-Based Labor is the Secret Ingredient of Automation

A final consequence of platformization is the use of taskified labor to shape up business automation processes. Since platforms reduce labor to tasks—and sometimes to micro-tasks—a vast amount of data and metadata increasingly fuels human-based computation. This technique allows machines to crowdsource simple operations like tagging, flagging, or adding content descriptions to human users.

Maybe the best-known platform specialized in micro-tasks is Mechanical Turk, a service created by Amazon in the mid-2000s to provide services such as data refinement and enrichment, image recognition, and speech-to-text. Its users are classified as "consumers-workers," and are usually paid as little as one or two cents to perform tasks that vary in complexity (Hara et al., 2018).

Half-jokingly, the service was launched by Jeff Bezos (2006) as a way to produce "artificial artificial intelligence." In other words, automation performed by crowds of human users. Indeed, artificial intelligence should ideally execute the HITs (Human Intelligence Tasks) performed by Mechanical Turk workers. Nevertheless, too often, machine-learning models lag beyond the commercial claims of their producers and their investors (Irani, 2015). Despite the promises of "full automation," human digital labor compensates for the technical limitations of new intelligent solutions supposed to automate business processes. More broadly, the execution of micro-tasks is necessary to "train" artificial intelligence (i.e., to calibrate machine-learning models by providing them with millions of examples of human judgments, choices, and behaviors). To make automation possible, digital platforms recruit hundreds of millions of human beings as users, customers, participants, and, in some cases, cheap micro-workers.

The relationship between platforms, taskified digital labor, and automation can be better appreciated if we consider that, despite exaggerated claims by platform owners about a foreseeable "strong AI" capable of simulating all human cognitive processes (Kurzweil, 2010), present-day artificial intelligence is generally "narrow AI" based on "shallow" statistical learning methods (Hayes, 2012). Apart from its application in manufacturing technologies (the "smart factory") where it is used to advance preexisting automated physical processes of production, the most visible manifestations of this "narrow" AI are represented by late-2010s "virtual assistants." Voice-activated systems such as Siri, Alexa, or Cortana can be found both in smartphones and in smart speakers. These mainstream devices popularize the use of applications, websites, and services that require machine-learning methods to execute complex actions: to suggest and play music, to make a dinner reservation, or to switch off the lights to save energy. They purportedly operate without human intervention. Nevertheless, the autonomy of these systems needs to be measured against the need for human labor to correct and sort through users' requests. Armies of silent listeners and transcribers are hired every day to double-check the responses provided by virtual assistants or to compare human transcripts and computer recordings of the sentences uttered by users.

Facebook even tried to turn the concealed humans executing tasks that should be performed by machines into a selling point. In 2015, the Palo Alto giant launched "M," a text-based virtual assistant which was described as a "supercharged AI powered by humans" (Metz, 2015). Although these humans were supposed to supervise the actual machine learning for a limited amount of time, three years later they still performed up to seventy percent of the tasks (Griffith and Simonite, 2018), a testament to the fact that full automation and human-level artificial intelligence are far from being the "manifest destiny" of contemporary digital technologies (Feigenbaum, 2003).

Evaluators, "data wranglers," and human assistants for the virtual ones are recruited by and for platforms (Lenke, 2016) and put to work in increasingly precarious working conditions. In some cases, they perform piecework on portals such as Mechanical Turk, UHRS, and RaterHub—which provide the tech giants Amazon, Microsoft, and Google with micro-tasks and data, respectively. In other cases, they are paid on an hourly basis by global subcontracting platforms like Appen, Lionbridge, and Pactera.

However, the vast majority of tasks are performed pro bono by unpaid platform users. This is attested by the success of systems such as ReCAPTCHA which, under the pretext of detecting bots, has been duping users into "training" optical character reader software deployed to transcribe Google Books (Von Ahn et al., 2008) and more recently to train autonomous cars and sometimes military AI. Harvesting users' clicks and enacting concealed micro-tasks to sustain machine-learning solutions is a common strategy that Alphabet has been profitably using to enhance everything, from Google Search to Google Translator.

Present-day incarnations of artificial intelligence are thus heavily dependent on "non-artificial" work to operate. Despite the common argument that "machines are stealing our jobs," AIs are not replacing human beings, considering that they need them to exist and to overcome their limitations. In domains as diverse as healthcare, management, and leisure, machines cannot effectively learn unless they interact with platform users who correct their mistakes, reduce their bias, interpret their information, and perform actions in their place.

In so far as present-day AI systems are conditioned by computing power, big data, and financial resources provided by digital platforms, they depend on the digital labor performed by their users, who complete the tasks that make machines "intelligent." They create new technological assemblages which externalize labor processes, thus turning previously paid services into "unpaid consumption work" (Huws, 2003). From this point of view, AI does not represent a continuation of early industrial labor-saving technologies like the spinning mules or the locomotives, but is a close relative to more recent technologies, like the self-checkout machines and ATMs (Palm, 2015). As in the cases of customer-activated and often semi-attended terminals, automation does not replace work but displaces it to an increasing number of unpaid workers or "non-workers," for example, operators misrepresented and misclassified as workers of a lesser kind (micro-workers, temps, contingent, precarious, non-specialized data workers, and content providers). Platforms are the technological and organizational mechanisms that allow this task allocation to take place—and this brand of shallow automation to pursue its course.

Conclusion: Another Platformization is Possible

In this chapter, we have presented five aspects of the adoption of the platform paradigm in society, and its consequences regarding business and market organization, labor and automation. The societal implications of platformization will continue to unfold in the near future. While the outcomes are uncertain, it seems clear that there is a need to address the grievances and distortions that digital platforms generate.

Despite being often described as "technologically neutral," platforms are political in nature. One of the senses of the word "platform" is precisely that of a set of principles constituting a blueprint for future policies (e.g., the "platform" of a party or of a candidate). Digital platforms should be reconciled with this original meaning, so that they assume the social responsibilities appropriate to their impact on society.

This implies that platforms cease to disguise the political decisions their owners and investors make every day (about what kind of information circulates, who gets the biggest share of the value they capture, whose rights and welfare are guaranteed) as the impartial workings of ever-accurate algorithms. In a sense, there is no algorithm—it's only somebody's decision. Thus, it comes as no surprise that one of the fiercest battles taking place today around platforms is to oblige them to be transparent, auditable, even "loyal" to their users. These principles are now debated, advocated, and (in some European countries) enshrined in law (Sandvig et al., 2014; Gillespie, 2018; French Official Journal, 2016).

Recognizing the political nature of platforms also means conceding that their privately owned, capital-driven model is far from being the only existing one. Public platforms exist and prosper, ranging from state-owned ones (see, for example, the controversial Indian biometric and demographic data platform, Aadhaar) to those operating at both local and regional levels (see the cities partnering in the European Commission's Urban Data Platform). More promisingly, community-based or cooperative platforms are emerging all over the world. Some are embedded in the larger movement for the "digital commons" and try to recreate a sense of belonging and participation, beyond the commercial logics that regulate capitalist platforms. Others converge toward a distinctive brand of "platform cooperativism" (Scholz, 2016), based on collective ownership and governance of digital infrastructures. Principles of mutualism and solidarity can thus be coupled with platformization, especially to establish fairer working conditions and to limit the competition among "digital laborers" on platform-mediated tasks (Graham and Woodcock, 2018).

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18

Scarcity of Attention for a Medium of Abundance

An Economic Perspective

Greg Taylor

There exists an almost unimaginable amount of content on the Internet: a volume of content that far outstrips the ability of any person to use or consume even a significant proportion of what is available. Because of this abundance of content, there is an inevitable scarcity of attention that users can spend on the Internet and Web. This chapter brings the expertise of an economist to bear on this issue. By deploying economic theory, the author outlines key forces shaping the emerging attention economy, including platform pricing, network effects, common pool resources, such as attention, and the allocation of attention by markets. Taylor makes these ideas accessible to non-economists and shows how these forces might fail to allocate our scarce attention in a fashion that best serves our interests as members of the Internet's audience.

A conservative estimate (Google, 2017) puts the total number of Web pages at more than one hundred billion so that, viewing one page every second, it would take at least 3,200 years to see the entire extant Web. YouTube receives over 100 hours of new video content every minute; one would need to watch 6,000 concurrent video streams merely to keep pace with this rate of upload. Wikipedia articles (of which there are 5.5 million in the English language), tweets (500 million posted daily), and emails (200 billion sent each day) similarly proliferate on a scale that far outstrips our capacity to consume them. In short, the new abundance of information is met with a scarcity of the attention needed to consume it (see Simon, 1971, for an early discussion).

Such is the shortage of attention that some advertisers pay in excess of $100 for access to a single consumer's "eyeballs." Indeed, whether a piece of content gets developed at all often depends upon whether it attracts sufficient attention to sustain a viable business model. The allocation of scarce attention, then, has real and deep economic and social ramifications. To help understand these far-reaching implications, this chapter draws upon traditional and recent economic analyses of scarcity and of important forces in the attention economy.

To begin to see the central role of attention in the online economy, it is useful to invoke one of the most fundamental and basic insights of economics: that prices in a competitive market are determined by the interaction of supply and demand. If the quantity of some commodity supplied in a market exceeds that demanded by consumers, then firms face an incentive to reduce their prices so as not to be left with unsold inventory. It is natural to expect that buyers will respond to these lower prices by demanding more of the good or service in question, closing the gap between the quantity demanded and that supplied. This process should be expected to continue until the price has fallen to the level at which supply and demand are equalized, so the market is in some sense self-correcting; the market is then said to be in equilibrium. Similarly, if the price is below its equilibrium level, so that there is an excess demand in the market, then sellers could increase their price and still sell their entire supply as buyers compete for the right to purchase. One should therefore expect the price to drift upward until the excess demand has been eliminated, again restoring equilibrium.

This idea is illustrated in Figure 18.1(a). The upward sloping line is a supply curve, which shows the relationship between the price and the quantity that sellers are willing to supply. Likewise, the downward sloping curve, known as a demand curve, shows the quantity that consumers are willing to buy at any price. Observe how, when the price is quite high, the quantity supplied exceeds that demanded, suggesting that the price must fall. The equilibrium price is labeled p^*, and is found where the quantities supplied and demanded are equal (i.e., where the two lines cross).

One can think of the dynamics depicted in Figure 18.1(a) as being a simple representation of the market for advertising in the pre-digital era.[1] The prevailing market price for advertising opportunities in such a market is determined by the interaction of publishers' willingness to supply such opportunities and advertisers' collective demand for them. For example, an increase in the supply of advertisement opportunities in a market causes an excess supply: one should then expect the price of an ad to fall in order to restore equilibrium in the market. In terms of our diagram, such an increase in the supply of advertising

[1] For a broad and thorough overview of the literature on the economics of advertising, see Bagwell (2007).

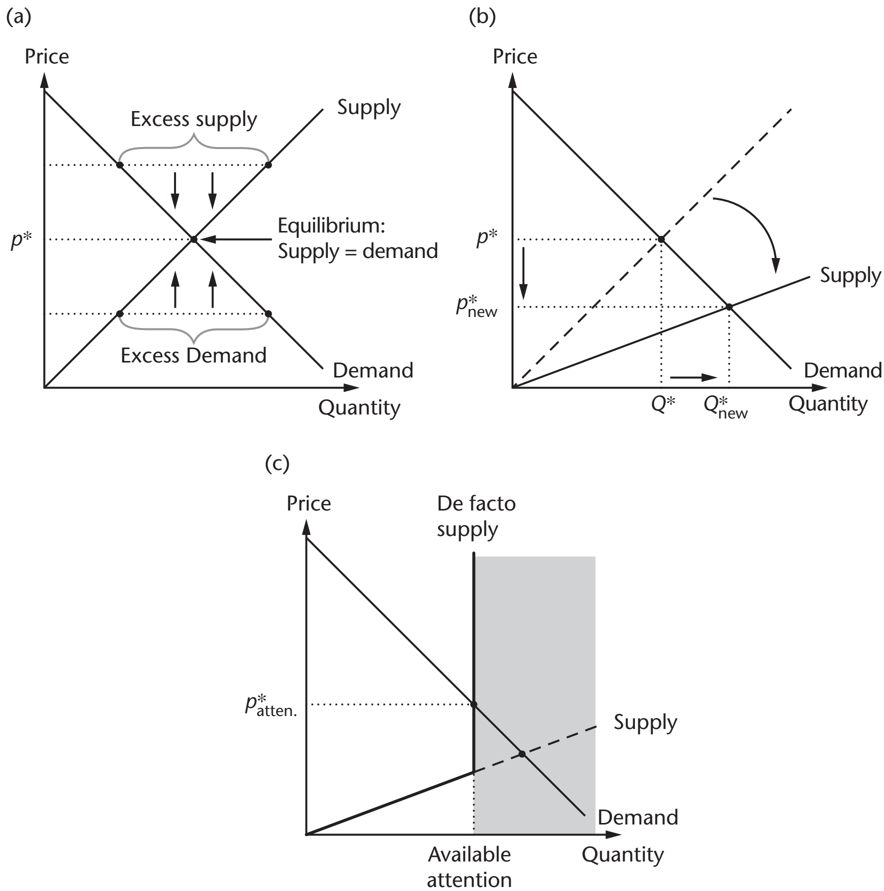

Figure 18.1. (a) Convergence to equilibrium price, p^* and quantity in a competitive market; (b) the effect on equilibrium price and quantity of a reduction in scarcity of a commodity; (c) equilibrium price when subject to a scarcity of attention

space can be depicted as a rightward rotation in the supply curve so that the quantity of ad space supplied increases at every price (Figure 18.1(b)). The arrows in the figure indicate that—in accordance with the intuition above—a reduction in the scarcity of advertising opportunities results in an increase in the quantity of advertisements sold but a fall in ad prices.

One effect of digital technology has been to dramatically reduce the cost of distributing content, with the consequence that the number of content publishers has exploded to include millions of individual bloggers and small outlets as well as large, established media organizations. Moreover, since every blog and niche website is capable of functioning as an advertising platform, the dramatic growth in content production has been coupled with the potential for an equally unprecedented reduction in the scarcity of advertising opportunities. We can easily incorporate such a change into our model of the industry. Take another look at Figure 18.1(b), but now think about what would happen if we made the supply increase much larger (so that the supply curve rotates even further to the right). The larger the increase in supply, the less scarce is advertising space, and the further must the price fall in order to restore equilibrium.

The simple market dynamics summarized in Figure 18.1(b) are illustrative of a broader theme of pessimism with regard to the future of the advertising-funded media, and prompt an interesting question: How can the continued availability of high-quality content, whose production is costly, be reconciled with a radical fall in the price of the advertisements whose sale funds that provision? An important part of the answer to this puzzle lies in acknowledging that the advertising business is not about selling ad space per se. Rather, publishers create value for advertisers by providing them with access to consumers' attention, and it is the supply of this attention that is ultimately relevant in determining the market value of an advertisement opportunity—indeed, an advertisement that no one will ever see has very little value! This distinction has broad-reaching implications for the future of the ad industry: while it is true that digital technology enables near limitless expansion of ad space, attention is fundamentally scarce. Thus, in Figure 18.1(c), we construct a de facto supply curve by recognizing that the quantity of valuable advertising opportunities provided will eventually be constrained by the amount of attention available. Beyond the level labeled as "Attention available," the de facto supply curve becomes vertical: publishers cannot increase their supply (of attention) any further because doing so would carry us into the shaded region within which the available attention of consumers is exhausted and they are unable or unwilling to process any additional advertising messages. Significantly, note that the equilibrium price (p^{*}_{atten} in Figure 18.1(c)) is higher once we account for the scarcity of attention.

Attention, then, plays a central role in the digital content ecosystem: it is the scarcity and consequent value of attention that underpin the viability of the online advertising industry which, in turn, finances commercially provided content and services en masse. Given this centrality, the remainder of this chapter is concerned with the economics of marshaling and managing attention, and the consequent implications for online media and advertising markets. The chapter proceeds by outlining four principles, each of which describes an important force that shapes the allocation of attention.[2] While the forces themselves are abstract phenomena that can be observed in stylized economic models, the

[2] This chapter is a revised version of Taylor (2014) but the topic coverage is not identical. In particular, see Taylor (2014) for a discussion of targeted advertising, which is mostly omitted from this chapter.

principles they reflect have proven to be robust features of a wide range of empirical markets and social contexts. Thus, taken together, these principles help us understand a variety of important empirical characteristics of the attention economy—from the preponderance of free content sources to the dominance of major tech firms and the growth of phenomena such as click bait.

Principle 1: The Pricing of Platforms Is a Multi-Sided Balancing Act

For a moment, leave the world of digital technology behind and consider the marketplace in a town. Townsfolk flock to the marketplace expecting to find a rich collection of wares for sale. Likewise, farmers and merchants travel from the surrounding area to the market in search of a buyer for their goods. This hypothetical marketplace exhibits two important and related features. First, it represents a *platform*, whose main purpose is to facilitate interaction between different groups (here there are two groups: buyers and sellers). Secondly, each group cares about whether the other shows up or not: the marketplace is more valuable to buyers the more sellers are there, and vice-versa.

The marketplace is an example of an *n*-sided platform (also known as an *n*-sided market or multi-sided platform), a place where *n* different groups come together to interact in some way. Foundational works in the theory of multi-sided platforms include Armstrong (2006), Caillaud and Jullien (2001, 2003), and Rochet and Tirole (2003); for an overview with applications to media markets, see Anderson and Gabszewicz (2006). Such platforms are pervasive in the attention economy. For example, online marketplaces (such as eBay or Amazon Marketplace) provide close analogs for their physical counterparts as places where buyers and sellers can trade. A newspaper (or news website) provides a platform through which advertisers can reach readers and readers can consume advertisements. The video-sharing website YouTube provides a platform where content creators, advertisers, and viewers can interact with one another. Likewise, mobile app stores such as Google Play Store or the iTunes store provide platforms where application developers can find users and users can find interesting applications.

Like the town's marketplace, these examples share the feature that the number of potential interaction partners on the platform matters. Just think how many advertisers would be willing to post an ad in a newspaper that has no readers! In the same way, viewers flock to YouTube precisely because it has so many active content creators; content creators go there because it has so many viewers. This gives rise to what has been called the "chicken and egg problem": if content producers won't show up without a substantial audience and an audience won't show up to a platform with no content, how is the platform ever to get off the ground?

An important way in which platform operators resolve this dilemma is by carefully choosing the prices that each group must pay to access the platform. Suppose that a platform serves two groups, "buyers" and "sellers," and that these groups each pay the platform operator for the right to use the platform. Now consider what would happen if the platform reduces the access price to buyers. The immediate and direct effect is that the platform earns less from each buyer, who pays a lower price. But because the platform is cheaper for buyers to access, more buyers will want to join the platform than before. Moreover, the fact that the platform has more buyers will also make it more attractive to sellers (because sellers care about the number of potential trading partners on the platform). Thus, by reducing the price on *one* side of the market, the platform operator can stimulate activity on *both* sides of the market. In other words, the platform resolves the chicken-and-egg dilemma by subsidizing one side to get them on board first. The cost of this subsidy can then be recouped from participants on the other side of the market—who are willing to pay more to join the larger platform. Thus, the fundamental balancing act faced by a platform operator is to decide who to subsidize, and to what extent.

It is now understood that the optimal pricing of multi-sided platforms will generally involve at least some subsidization of at least one group (see, e.g., Armstrong, 2006). Subsidization may mean that a group gets access to the platform free, or even that it is paid to join the platform. But often it will simply mean the group receives a discount relative to the price it would have been charged if there were no chicken-and-egg problem to resolve. Thus, newspapers are often sold below the cost of production (or even given away free) to attract more readers, which in turn makes the advertising side of the platform more lucrative. Users have free access to all kinds of online content for a similar reason. Likewise, buyers on platforms such as eBay or the Google Play Store pay no fee to the platform owner. This encourages more buyers to make more purchases, increasing the profit the platform can make through fees charged to sellers (for example, a fairly standard rate of commission in mobile phone application marketplaces such as iTunes or Google Play is thirty percent of the income from sales, paid by the application developer to the platform owner).

One pattern that these examples share is the asymmetry of pricing: one side of the market (e.g., readers, buyers) is subsidized heavily while the cost of that subsidy is recouped via a higher price paid by another group (e.g., advertisers, sellers). This begs the question: How can the platform determine which side of the market should be subsidized? A first principle is that subsidies are most profitably targeted at groups that create the most value by their presence on the platform. Indeed, one might be inclined to ask why it is that a newspaper subsidizes readers rather than advertisers.

The simple answer is that advertisers typically value an additional reader more highly than readers value an extra advertisement, so that attracting readers to the platform with a subsidy is a more powerful means of building value. By a similar logic, if readers are particularly price-sensitive, then a price cut will attract *many* additional readers so that subsidies are more effective when targeted at sides of the market where the recipients are more price-sensitive.

Principle 2: Markets with Network Effects often Tip

Some goods or services become more valuable or useful when more people use them. Any such good is said to exhibit *network effects*. Goods or services that exhibit network effects are often known simply as networks; see Farrell and Klemperer (2007) for a review of the literature on this topic.

We have already seen an important way in which network effects arise: the value of participating on a multi-sided platform depends on the size of other participating groups. But network effects can also arise because people care directly about the number of members of their own group. For example, a telephone network becomes more valuable when more people own a telephone (and hence can be called). Likewise, online social network services such as Facebook are valuable to users because there are other users who can be contacted through the site; the more users a site has, the more useful it becomes. Other examples include computer software that becomes more valuable as it is more widely used because there are more people who can share files or expertise, while many nonnative speakers choose English as their second language precisely because it is more widely spoken than any other.

The presence of network effects has far-reaching implications for the competitive dynamics of a market. It's easy to see why. Suppose a market initially consists of two networks: one large and one small. Because, by definition, the network with more users is more valuable, users of the small network have a strong incentive to switch to the larger one. Moreover, new customers in the market will disproportionately tend to choose the large network rather than the small one. Over time, this will cause the small network to shrink and the large one to grow bigger still until, eventually, only a single network survives. From that point forward, new firms contemplating entry into the market face the daunting task of displacing a rival that has already accumulated significant network size, with the result that the entry of new competitors will tend to be much more muted than in markets without network effects. This tendency for markets to converge to a single dominant network (and stay there for prolonged periods) is known as *market tipping*, and goes a long way to explaining why firms such as Facebook, YouTube, and eBay have become so dominant within their respective markets.

A number of factors are important in determining whether (and how quickly) a market will tip. First, and most obvious, is the strength of the network effects. The greater the benefit to being in the largest network, the larger the incentive for members of smaller networks to quickly switch, so markets with strong network effects usually tip fairly quickly. Acting in the opposite direction is the effect of product differentiation. Given a choice between two networks that look the same and function in the same way, a consumer is likely to choose the larger network. But substantial differences between the two products (e.g., differences in their design or in the function they serve) are more likely to result in consumers splitting and choosing whichever one best suits their needs or tastes. A third consideration is the ease with which people can be a member of two networks at the same time (so-called "multihoming"). If everyone is forced to choose a single platform, then it is likely that the largest platform will be chosen and the market will quickly tip. If, on the other hand, multihoming is easy, then many people will join both networks, meaning that neither network will necessarily collapse in size.

To illustrate, begin with format wars between competing standards for home video playback. In this market (i) multihoming is impractical (few people want to buy two expensive playback devices), (ii) there are relatively strong network effects (because a video format is only useful if, on the other side of the market, retailers supply content in the matching format), and (iii) there is relatively little product differentiation because all formats perform essentially the same function of storing video for home playback. These factors have combined to make the market tip decisively on a number of occasions.[3] On the other hand, the degree of differentiation between Facebook and LinkedIn is much larger (one is used mainly for private purposes, while the other is professional) and multihoming is relatively easy (it is possible to simultaneously participate in both networks). As a result, it has proven possible for both networks to coexist, despite the obvious presence of network effects in this market.

Because much of the attention economy is organized around platforms where network effects are important, and because network effects are of general importance in communication technologies, market tipping is a significant force within the attention economy. This presents an important challenge for policy-makers. Orthodox competition policy (also known as antitrust policy) is founded on the principle that competition is the most effective way to prevent firms from exploiting their customers, and that competitions will work well in most markets most of the time. For this reason, competition enforcement

[3] Such a format war played out in the 1980s between two types of video cassette—VHS and Betamax—with the market tipping in favor of the former. The same dynamics were repeated between 2006 and 2008 when two competing high-definition video disc formats (Blu-Ray and HD-DVD) contested the market. On that occasion, Blu-Ray emerged the decisive victor.

agencies such as the US Federal Trade Commission, the European Commission's Director General for Competition, the Competition Commission of India, or Brazil's Administrative Council for Economic Defense have a remit for *occasional* and *temporary* interventions in markets where competition does not appear to be functioning well. But markets that tip are likely to remain in a state of minimal or no effective competition for prolonged periods of time. This makes occasional and temporary interventions intended to fine-tune the functioning of competition look inadequate for use in such markets, and may go some way to explaining why policy-makers have struggled with the challenge of policing markets dominated by large tech companies.

These policy challenges are not without precedent. Another, much older class of industries also exhibits a tendency for big firms to grow bigger, namely those with significant economies of scale. Old industrial systems such as rail, electricity transmission, or telephone networks share the feature that almost all of the costs of operation are upfront infrastructure investments rather than ongoing costs of serving individual consumers. Once the phone lines are laid, serving phone calls over the network is not very costly at all. A firm that serves more customers can spread the large cost of infrastructure investment across all of them so that its average cost per consumer is much lower than would be the costs of smaller firms that each serve a few consumers. That gives an advantage to large firms, with the result that these infrastructure industries have historically tended to be dominated by monopolists (for this reason, markets with significant economies of scale are known as "natural monopolies"). There is a striking parallel between the old natural monopolies and modern network industries, where network effects also yield a tendency to monopolization. Historically, the natural monopolies were kept in check by taking the monopoly firms into state ownership, but the more modern solution in those industries is to allow firms to operate independently but to closely regulate the affected sectors.[4] Unless competition law can be adapted to deal better with the economics of network industries, it appears likely that there will be a growing tendency toward regulation of technology markets affected by network effects.

Principle 3: Attention Is a Common Pool Resource

Suppose there is a lake whose shores are home to many fishermen and whose waters hold a finite population of fish. If the fishermen behave sustainably—

[4] It is important to observe the distinction between competition/antitrust policy (which makes occasional ex post interventions where violations of the law are noticed) and regulation (which involves ongoing ex ante monitoring of an industry and specific prescriptions for the behavior of firms within that industry).

collectively taking no more fish than can naturally be replaced—then the lake will continue to provide a source of fish indefinitely. But each individual fisherman faces an incentive to take more fish out of the water and leave the burden of conservationism for others: more fish means more profit and, after all, a few extra fish won't make much difference to anyone. The problem, of course, is that when all fishermen think and behave in this way, the overall level of fishing ceases to be sustainable and the fish stocks will quickly be depleted. Such overfishing is an example of the *tragedy of the commons* (see Hardin, 1968 for an early reference): when people share access to a depletable resource they will often be compelled by self-interest to overexploit it. The tragedy is that, although overexploitation is optimal with respect to individuals' own self-interest, the collective failure to coordinate on sustainable behavior eventually harms every member of the community equally.

Attention, too, is a finite and depletable resource. As our attention is saturated, our ability to process further information is decreased. Moreover, there exist actors—such as advertisers—who gain privately from increasing their own share of our attention, even as this diminishes the residual attention available for others. Thus, the perfect conditions exist for a tragedy of the commons to arise. In practical terms, if there are more demands on a user's attention than he or she has the capacity to deal with then there is likely to be a crowding-out effect, as some useful messages go unseen while, at the same time, users' attention is exhausted by useless ones, a phenomenon known as information overload (see Anderson and de Palma, 2009; van Zandt, 2004 for an analysis). Perhaps the best example of this tragedy at work is the proliferation of junk email, advertising spam, and other kinds of unsolicited messages. Just as all fishermen suffer when the lake is overfished, so too do all advertisers suffer when users turn to technologies such as ad blockers to deal with the overexploitation of their attention.

Tragedy of the commons problems are often resolved by collective action among those affected. Recall that the fishermen were harmed by the eventual exhaustion of the lake's fish stocks; for this reason, they stand to gain if they can collectively coordinate around a more sustainable outcome. The principal question is how such cooperation can be sustained when each individual has a strong private incentive to behave against the group's interests. Ostrom (1990) argues that communities often develop ad hoc institutional arrangements to govern common resources. To this end, we observe industry bodies such as AdChoices and the Interactive Advertising Bureau emerging to propose best practices and coordinate industry self-regulation. But a key insight from the work of Ostrom and others is that such collective governance can effectively sustain cooperation only when participants are sufficiently forward-looking and concerned for the future. Indeed, both the reward for cooperation (long-run sustainability of the shared resource) and collective punishments (imposed by the group upon those who violate its norms) arise in the future, and are unpersuasive for those concerned only with the present. Thus, while large, established industry actors enthusiastically participate in such industry bodies (participants in the AdChoices programme include some of the world's largest advertising companies, such as Facebook, Google, and Yahoo!), those with no long-term reputation at stake have little incentive to do so. For this reason, the most egregious types of spam—such as mass unsolicited emails or so-called click bait—prove relatively immune to coordinated collective action solutions.[5]

Another means by which commons problems are often addressed is by privatizing the shared resource and allowing its owner to price access to it (e.g., by charging a fee to anyone who wishes to send a message to the user). The higher the price for access to a user's attention is, the lower will be the temptation to fill that attention with spam, and the less severe the problem of overexploitation. Indeed, given an appropriate price, the tragedy of the commons can be averted altogether. Moreover, a suitably flexible market can help to find that "right" price. Periods in which many senders seek access to a user's attention would correspond to times with high levels of demand for access (e.g., a rightward shift in the demand curve in Figure 18.1(c)), which causes the equilibrium price to rise. As the price of attention increases in this fashion, the advertisers whose messages are most likely to be of no interest to consumers find that it is no longer profitable to transmit messages at all. This ensures that only the most valuable messages are sent when attention is in most demand and the congestion problem is mitigated. Even the senders of spam messages can find themselves better off when access to attention is priced, because lower levels of congestion mean that those messages that are sent are more likely to be read (van Zandt, 2004). Indeed, many markets already exist to price access to users' attention. However, these markets are typically operated by platform owners rather than the users themselves, which can result in a misalignment of incentives as we will see in the next section.

A closely related alternative to privatizing attention is to let government set a "price" (in the form of a tax) for accessing attention. The insight that policy-makers can use taxes to deter socially destructive behaviors is far more general, and dates to Pigou (1920)—giving rise to the name for such a scheme: "Pigouvian tax." More recently, various technology experts and practitioners have suggested Pigouvian taxes as solutions to the problem of email spam (see, e.g., Hansell, 2004). Much like a market-based price, the tax will help to alleviate congestion by imposing a cost on the transmission of messages (but with the considerable added difficulty of having to determine what the correct level of the tax is, and precisely what kinds of demands on people's attention should be subject to the tax).

[5] The term "click bait" refers to strategies used to lure consumers to websites that contain minimal original content but a large number of advertisements.

Principle 4: Internal Markets Can (Mis-)Allocate Attention

We have seen that carefully chosen patterns of subsidization can be used to attract attention to a platform, and that prices can be used to regulate the demands placed on users' attention. But there often remains the challenge of allocating that attention *within* the platform. For example, a platform like Google has billions of users and millions of advertisers, but must decide which ads to show to which users. A hotelier might be more interested in advertising to a user searching for "hotel in Oxford" than to one searching simply for "visit Oxford." This suggests that, to balance supply and demand, the more valuable advertising opportunity ought to command a higher price (as do prime-time ads on television, inside cover ads in a magazine, or billboards in the best locations). But there are infinitely many possible search queries and, to make matters worse, each search query typically contains slots for several advertisements, with ads closer to the top of the page being more valuable. It would be impossible for a search engine such as Google to set a price for each ad opportunity individually. A similar challenge is faced by platforms like Facebook that target ads based on users' characteristics and behavior. Advertisers will pay more to reach a young professional with an interest in fashion than a teenager with a penchant for history. But if a different price is to be paid for reaching each combination of age, profession, interests, and a multitude of other characteristics, then the number of prices that must be determined quickly grows to be impracticable.

All this suggests that the job of choosing prices cannot be left entirely to the platform operator, but must be decentralized in some way. A centuries-old method for decentralizing the determination of prices is to run an auction and allow prices and allocations to be determined in accordance with bids proposed by the set of bidders. It is through this means that Google and others have successfully solved their advertisement allocation problem. A Google ad auction proceeds roughly as follows: for each search keyword, would-be advertisers enter a bid into Google's system. Each time a user searches, the auction system allocates the most prominent ad slot to the highest bidder, the second-best slot to the second-highest bidder and, more generally, the *n*th-best slot to the *n*th-highest bidder. Each successful bidder pays not their own bid, but rather the bid of the advertiser in the slot below.

This kind of auction is known as a generalized second price (GSP) auction, and was first studied by Edelman et al. (2007) and Varian (2007), who have shown it to have several interesting properties. Chief amongst these is that GSP auctions produce equilibrium allocations that are efficient—that is to say, they allocate the best advertising opportunities to those firms that value them the most. Recall that an important motivation for introducing such auctions is the difficulty in allocating large volumes of advertisements, and it is reassuring to know that the auctions perform well in this regard. A second important motivation for the introduction of ad auctions was the problem of price determination; here, too, GSP auctions have interesting properties. In particular, the natural outcome of competitive bidding in a GSP auction is a special set of prices (known as Vickrey-Clarke-Groves prices) that correspond to the prices that would ordinarily arise in a competitive market. Taken together, the efficiency and competitive prices induced by a GSP auction make such auctions look like an effective way to decentralize the problem of attention allocation.

These ad auctions are but one market-based means of allocating scarce attention. Other platforms eschew the auction but nevertheless use some price mechanism for the same purpose. Thus, sellers on eBay can pay to have their item promoted on the site, price comparison websites often have featured sellers who pay to be displayed in positions of prominence, and communication platforms such as Twitter allow for sponsored content. These examples share with ad auctions the feature that some members of a platform pay to be made more prominent than others. But one party cannot be made more prominent without pushing another further into obscurity. Thus, a kind of competition for prominence, mediated by the price, emerges—in other words, there is a market for attention. Typically, the natural result is that those willing to pay the most for attention will occupy the positions of greatest prominence; this is the same efficiency property observed of the GSP auction.

Economists often celebrate the ability of markets to efficiently allocate scarce resources (at least under ideal conditions). Indeed, regarded as a way of organizing bilateral trade between a buyer and a seller, a market that allocates goods where they are most valued might be seen as performing a valuable social function. This is also part of what made markets an attractive solution to the commons problems discussed in the previous section. But, in the context of a platform, there is typically a third party who also has a stake in the transaction. For example, we might be satisfied that the best advertising opportunities are going to the advertisers that most value them; but it is also important to ask whether those are the messages that audience members most want to see. More generally, when markets are used to promote some kinds of content or message prominently, do they promote the right kind from the audience's point of view?

Imagine a consumer is searching for a product and advertisers vary in their relevance to his or her search query. Athey and Ellison (2011) argue that it is the most relevant advertisers who will be willing to pay more to be made prominent because consumers are more likely to buy from a relevant advertiser than from an irrelevant one. By this reasoning, when the auction allocates attention to the advertisers willing to pay the most, it is also allocating attention in a manner that results in users seeing the most relevant content.

However, an advertiser's willingness to pay for prominence is likely to depend not only on the consumer's likelihood of buying, but also on how much profit the advertiser earns if the consumer does buy. The fact that sellers with high prices earn more from each sale implies these firms should bid the most and are made prominent (see, e.g., Armstrong and Zhou, 2011). But the sellers with the highest prices are exactly the ones that consumers are *least* interested in seeing! Thus, the relentless efficiency with which the market allocates attention to where it is most valued from the advertisers' perspective, can result in a perverse misallocation of attention from the point of view of audience members.

How can these conflicting perspectives be reconciled? When the main dimension in which advertisers compete is their relevance (or quality), the interests of the advertiser and consumer are congruent in the sense that consumers want to see the advertisers who most want to be seen. On the other hand, competition in prices implies that consumers and advertisers have conflicting interests, because the firms with most to gain from being seen are those in which consumers are least interested (i.e., the most expensive). This gives rise to the more general principle that markets for attention are best placed to serve consumers whose interests are aligned with those of advertisers (De Cornière and Taylor, 2016). This principle seems to have been borne out in relevant cases around attention markets. For example, analysis by the *Financial Times* suggests that sellers who pay to be prominent in Google's comparison shopping service are seldom those with the lowest prices (Waters, 2013), whereas a 2016 UK High Court ruling found that the prominent placement of Google maps within Google search results was justified. A key part of the argument in that case was the observation that online maps compete in quality rather than prices and therefore exhibit congruence between consumers' and advertisers' interests.

Situations of conflict give consumers a strong incentive to be vigilant (precisely because, absent such vigilance, the market allocation of attention is likely to be contrary to the consumers' interests). This has ramifications for policy because it implies that one of the best ways to protect consumers under conditions of conflict is to look for policy measures that help consumers to be more proactive and more attuned to the perverse incentives of advertisers. One example of such a measure is ensuring the effectiveness of competition at the platform level so that dissatisfied consumers can vote with their feet and abandon intermediaries that promote the wrong kinds of paid messages. As already discussed, though, competition is likely to be hard to sustain in markets with strong network effects. Another strategy to help consumers be more proactive is to mandate the disclosure of financial ties between intermediaries or publishers and advertisers. For example, US Federal Trade Commission guidelines urge social media users to disclose whether they are compensated for endorsing a product. The hope is that such disclosures help consumers to see when a situation of conflict might arise and calibrate their response to promoted messages accordingly.

Conclusion

The advent of digital distribution has brought an era of both abundance and scarcity. The potential for infinite duplication of content throws into sharp relief the extent to which the availability of attention is the defining constraint in online media and advertising markets. More than ever before, organizations are responding with new schemes to attract and distribute attention. This chapter has outlined four key forces that shape this emerging attention economy and their role in driving some of the attention economy's most striking phenomena. The principles were: (1) that platform pricing must be carefully balanced (which is a key reason for the proliferation of free content and services); (2) that network effects cause markets to tip (and have played a strong role in the emergence of large technology firms that have come to dominate many aspects of the online media sphere); (3) that common pool resources such as attention are often subject to overexploitation (which helps to identify both the causes and the consequences of phenomena like spam email and so-called click bait); and (4) that markets allocate attention, but need not do so in a fashion that best serves audience members' interests (simultaneously explaining the adoption of market mechanisms by major intermediary platforms and the attention given by policy-makers to some of those platforms' practices). These principles have proven to be robust features of the digital attention economy, but the rapid pace of change often brings new kinds of market arrangements. Whilst some appear to function well, others give rise to incentives that run contrary to what consumers and policy-makers might consider ideal.

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19

Incentives to Share in the Digital Economy

Matthew David

As noted by Greg Taylor in Chapter 18 of this volume, scarcity is a problematic concept in the digital age. The possibility of post-scarcity is not only a challenge to classical economics—the science of allocating scarce resources. The proliferation of what are called non-rivalrous informational goods is also a challenge to a capitalist economic system in which scarcity becomes a basis for price setting. This chapter by Matthew David provides an alternative perspective on the possibility of a post-scarcity, sharing-based economy in non-rivalrous informational goods, such as music. He explores the dimensions of incentive, efficiency, and efficacy by which property and market mechanisms have traditionally been justified in capitalist societies. David examines the distinction between two forms of sharing that he calls reciprocal peer co-production, and generalized peer-to-peer redistribution. The chapter conveys a valuable understanding of the rewards and incentives associated with sharing-based alternatives to more traditional market mechanisms.

Introduction

This chapter examines music, publishing, and computer software production. In each case, "sharing" creates an alternative and superior set of incentives, whilst also improving efficiency and efficacy. Classical economics is the science of allocating scarce resources. The possibility of post-scarcity is not only a challenge to classical economics. The proliferation of non-rivalrous informational goods is also a challenge to a capitalist economy, where scarcity warrants price. This chapter will examine the possibility of a post-scarcity, sharing-based economy in non-rivalrous informational goods. Drawing

Table 19.1. Reciprocal and generalized sharing: definitions and examples

Form of Sharing	Definition	Examples
Reciprocal peer co-production	Obligation created by gift-giving within a peer circle	Kula circle, hacker networks, and academic peer review
Generalized peer-to-peer redistribution	Free access to all	Potlatch, file-sharing, Wikipedia and academic referencing

upon the work of economic anthropologists, this chapter will pay particular attention to the distinction between two forms of "sharing": reciprocal peer coproduction, such as academic peer review and open source coding, and generalized peer-to-peer redistribution, such as free music downloading (see Table 19.1). Reciprocal peer coproduction in music, writing, and coding constitutes a mode of incentivizing innovation more effectively and efficiently than property-based market mechanisms. Generalized peer-to-peer redistribution, however, is often seen as a threat to any mode of incentive (whether that be property-based markets or reciprocal peer coproduction). However, generalized peer-to-peer redistribution is not simply a parasitic drain on reciprocal peer coproduction. In fact, peer-to-peer networks can, in certain situations, enable greater levels of efficient and effective distribution, and facilitate better rewards for direct producers, just as reciprocal peer coproduction facilitates better incentives to create.

Classical Economics

It is often observed that there is never enough to go around, and that desire will always exceed finite resources. Whilst all "societies" temper the absolute rule of markets, today's global capitalism still assumes that scarcity is the base human condition. Classical economics, naturalizing this assumption, also presumes scarcity in its self-definition as a discipline: "Economics is the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses" (Robbins, 1935: 15). Post-scarcity would challenge classical economics, just as post-scarcity challenges the capitalist economic organization classical economics presents as natural and inevitable.

If human desires have no necessary limits, whilst the means of realizing them are limited (scarcity), allocation mechanisms are required to distribute, or more to the point control distribution of, such resources. Beyond a fictive "state of nature" in which such allocation occurs simply by means of unregulated violence (Hobbes, 1991), all such allocation mechanisms are social contracts (Rousseau, 2008), and none is any more natural or necessary than any other. Community custom and tradition, bureaucratic administration, familial obligation, taxation, markets, and property rights are some of the most prominent allocation mechanisms societies have devised. The claim that private property and free markets are any more the extension of "natural rights" (Locke, 1988) than any other socially constructed allocation mechanisms is merely the reflection of where power lies in "our" capitalist order. The preeminence of markets and property rights in today's global world defines society as capitalist, and such preeminence is warranted by the claim that such allocation mechanisms (markets and property rights) are more efficient, effective, and incentivizing than the alternatives.

Efficiency, Efficacy, and Incentive

"Efficiency" refers to the generation of the maximum quantity of a particular good for the minimum input (Heyne, 2008). Efficiency can be said to have five dimensions: production efficiency in making a good, allocation efficiency in assigning resources to one form of production or another, informational efficiency in enabling optimal choices between goods to meet needs, transactional efficiency in minimizing the costs of accessing goods, and Pareto Optimization, which refers to the overall minimizing of opportunity costs across the whole economy—such that there is no better use of these scarce resources. "Efficacy" refers to the quality of a product rather than to its cost of production and access to it. However, the sum of total efficacy achieved is a combination of the quality of a product and the overall quantity of that product available to be used. Efficacy, therefore, must also take into consideration relative utility, as a system that allocates one hundred loaves of bread to one millionaire and one loaf of bread between one hundred less fortunate others, however "efficient" it might be, remains less efficacious in meeting the needs of each person than a system that allocates one loaf per person (Wilkinson and Pickett, 2010). Finally, "incentive" refers to the mechanisms that reward the creation of new goods, and the efficient and effective production and distribution of these innovations. In incentivizing creativity, such rewards increase overall utility in society.

In each case of efficiency, efficacy, and incentive, capitalism, through the allocation mechanisms of property and markets, created more overall utility than all previously existing forms of social organization (Marx and Engels, 2015 [1848]). Capitalism's defenders claim it remains the best way to manage/reduce scarcity (Saunders, 1995). However, in the conditions of post-scarcity for some types of goods, such as information, discussed in this chapter, intellectual property rights suspend markets to maintain prices. Whether property and markets remain optimal allocation mechanisms in post-scarcity conditions becomes questionable. In relation to information content in a global digital network society, sharing might well be the superior means of maximizing efficiency, efficacy, and incentive.

Information, Non-Rivalrous Goods, and Post-Scarcity

Physical goods have limited utility. If I have eaten my cake I cannot then still have it. This is the meaning of consumption. Physical goods are often used up (consumed) in the act of using them. Even when a durable good is not "used up" in the act of its use, it is limited in the sense that my use limits your simultaneous use, such that you will have to wait, and my use may diminish the good until such time as it wears out. Physical limits define "rivalrous goods." One person's use limits and may even totally prevent another's.

The rivalrous quality of physical things creates scarcity, and underpins the potential for overuse, whereby the repeated use of a good when held in common, or when rented out, may lead to its depletion. Common access may diminish incentives to prevent "overuse." Garrett Hardin's (1968) "Tragedy of the Commons," where each individual farmer's incentive to graze more sheep on common land will lead to its depletion, supposes the universal truth that rivalrous goods, when unregulated by private property controls, will be destroyed by overuse. Climate change today is an extreme case in point (Kahn, 2014). It should be noted that Hardin's generalization regarding the consequence of "common ownership" is contradicted by evidence of how community-based allocation mechanisms regulate overuse of "common pool resources" in non-property-based societies (Ostrom, 1990). Elinor Ostrom (with Hess, 2011) also highlights how "commons"-based principles in fact operate in the non-rivalrous knowledge economy.

Non-rivalrous goods are goods where one person's use does not limit other users from using the same good, even at the same time. If you read this chapter online, that in no way limits the potential of one hundred others to do so at the same time. Non-rivalrous goods are goods with little or no physical constraints, and are typically referred to as informational goods, or sometimes as "intangibles" (Phythian-Adams, 2015). As Jeremy Rifkin (2014) argues, today's global network society is becoming an increasingly zero-marginal-cost economy. As the cost of producing the next digital copy of an informational good (song, film, text of software file) falls to nothing, so the old mechanisms designed to manage scarcity cease to function in a positive fashion.

The abolition of scarcity through free digital sharing first impacted upon purely informational goods, those goods which are for the most part protected from such free copying by copyright. Copyright, as the form of intellectual property right designed to protect creative works, suspends free markets to profit property holders. This monopoly protectionism has been harmonized and extended worldwide in the creation of today's global network capitalism (David and Halbert, 2015). However, enforcement increasingly targets globally networked individual end users in the attempt to maintain the scarcity that affords price and hence profit. Whilst creative intangibles were the first domain where free sharing online challenged scarcity, the free circulation of information and the development of 3D printers mean that monopoly controls exercised through patent, trademark, and design rights are also coming under pressure from the possibility of post-scarcity. Free speech may become free content when today's ability to download a song becomes tomorrow's ability to download medicines, handbags, and champagne.

Is such free sharing then a viable form of what the preeminent sociologist of the digital network society, Manuel Castells, calls "economic counter power," an alternative economic "mode of development" (Castells et al., 2017, and David, Kirton, and Millward, 2017), or just a parasitic drain on market- and property-based mechanisms? In the next three sections of this chapter available evidence from the music, publishing, and software sectors will be examined to evaluate the efficiency, efficacy, and incentive created by free-sharing networks relative to market- and property-based systems. This is followed by an examination, again using the available evidence from the music, publishing, and software sectors, of the possibility that free sharing (circulation) within small/closed circles of creators is productive, whilst free sharing of products by all (redistribution) harms efficiency, efficacy, and incentive. Whilst it should not be assumed, even in relation to non-rivalrous "informational" goods, that all forms of unregulated (free) distribution are more productive (incentivizing, efficient, and effective) than markets and property-based systems, the evidence presented here shows that free distribution can facilitate rather than undermine productivity. The view that a free-for-all inevitably leads to "the tragedy of the commons" (Hardin, 1968) is disproved, even if the evidence presented here cannot be taken to prove that such a free-for-all is a universal panacea.

Efficiency

The digital compact disc increased production flexibility, reduced costs and breakages, and required customer reformatting, and hence created a profit storm in recorded music between 1982 and 1999 (David, 2010). The rise of the MP3 compression format, combined with Internet distribution and sharing software (starting with Napster) enabled digital content to be copied, mainly from CDs, uploaded, and shared. This raised the efficiency of digital music production and distribution to an effective zero marginal cost. Globally distributed instant and free sharing creates the ultimate efficiency. Attempts by record companies to offer standalone commercial platforms selling their limited range of encrypted content could not compete. This pressed record labels to licence content to iTunes, and eventually to streaming services like Spotify, where advertising funds seventy-five percent of users' free access even whilst a consistent quarter do pay subscriptions (David, 2016). Still, uninterrupted by adverts and/or other commercial/proprietary barriers (such as encryption), free sharing remains the most efficient means of copying and distributing recorded content.

Life magazine's purchase of Abraham Zapruder's film footage of John F. Kennedy's shooting saw the film withheld from public view for a decade. The early camcorder footage of Rodney King's beating by Los Angeles police officers reached the public in less than a week. Smartphone footage of the 2004 Asian tsunami was instantly circulated on the Internet. Citizen journalism provides coverage of events as they occur, exactly where the unexpected happens, and not just where professional journalists and broadcasters have been assigned to cover stage-managed events, press releases, and clean-up operations by dominant actors (Allen, 2013). Academic publishing has always relied on authors freely writing articles (for journals) in the hope of gaining recognition through citations, not payment. With journal prices rising on average thirteen percent a year for the last five decades (Thompson, 2005), even as authors, reviewers, and most academic editors receive no payment, free circulation of academic works through sites such as Academia.edu and ResearchGate complement the efficiency of freely shared production with that of free sharing as a means of distribution. As with music, the free circulation of digital copies of trade works of fiction and non-fiction is far more efficient than traditional commercial forms of production and distribution.

Hackers have broken every silo-based encryption system produced by corporate content providers. The codes that run the Internet, Web, and Wikipedia are all produced by teams of collaborative programmers, not market actors (David, 2017). Market failure theory (Weisbrod, 1977) and contract failure theory (Hansmann, 1980) demonstrate that free sharing of information is a necessary condition of production/allocation efficiency and informational/transactional efficiency, respectively. Access to information is the condition of efficient production and distribution. Making information a commodity requires monopoly control over its sale, and this significantly slows innovation (Boldrin and Levine, 2008).

Efficacy

The first MP3 compression files enabled music files to be distributed over low domestic Internet broadband speeds, and such compression did produce low-quality files (diminishing efficacy in overall utility). This has changed with much faster domestic Internet speeds, such that not only can high-quality music files be copied, but high-quality live visual content can be streamed, just as increased digital connectivity means that shared content can now be played on televisions and stereo systems rather than on small computer screens and even smaller speakers. Today, every Internet user has access to a greater repository of the world's music than was imaginable previously. The barriers of a work no longer being "commercially available," or never having been released commercially in the first place, are far less significant today than at any earlier time.

A commercial digital revolution in 1980s' journalism and broadcasting afforded a proliferation of new publications and channels. This saw advertising revenue spread more thinly, reducing investment in news production, increasing reliance on established press releases and packaged soundbites, allowing the rise of infotainment and the decline of investigative journalism (Allen, 2013). Citizen journalism can produce hate speech, echo chambers, and opinion bubbles just as well as old print and broadcast media bias can and do. However, in lacking an editorial nexus, citizen journalism challenges the scope for censorship by state and commercial actors, and thus challenges scarcity in information—such as when news becomes propaganda on behalf of states and/or advertisers. Free circulation of academic content, content that was itself made available for nothing in almost all cases, facilitates learning and future discovery. Libraries without walls turn capital into culture and increase the efficacy of academic life as a global-sharing enterprise (David, 1996). The online availability everywhere of all previously published works, in and out of print, at zero marginal cost, is a possibility far in excess of any level of efficacy ever achieved by the commercial publishing industry.

Common knowledge is the base foundation from which all software development arises and grows (Lee, 2015). Whether it be the "homebrew" software clubs in the 1960s' US out of which Microsoft and Apple emerged (or parasitized, depending on your point of view), the Free and Open Source Software movement, Creative Commons, Copy Left or the Free Software Foundation, like the World Wide Web (W3) Consortium, the Internet Engineering Taskforce, or the Wikimedia Foundation, nonprofit movements and foundations were and remain the bedrock that enabled and continue to facilitate innovation and development in the field of information technology. Without strong safeguards to keep the Internet, Web, and other foundations of the information society free from proprietary control, global network society would grind to a monopolistic halt.

Incentive

Most people play music because they enjoy it. Some learn to play instruments or sing. The availability of music to sing and play increases the opportunities to do this. Whether that is through oral traditions, or through the circulation of recorded content and sheet music, the greater the availability of music and the lower the cost of its access, the greater is the scope to engage and work with it. Making music requires access to music. Of course, it might be suggested that making music for fun is all very well, and access to the sum of all hitherto existing musical content free online is by far the best way to enable more people to experience, enjoy, share, and go on to perform music. However, that is not the same as saying free access increases the chances for the most dedicated musicians of making a life in music through making a living by it.

Actually, free sharing increases the capacity for most musicians to make a living. The free availability of recorded content has seen a collapse in opportunity costs between fans buying recordings and fans paying to visit live concerts and festivals. This has resulted in an increase in ticket prices and volumes sold, thereby increasing performers' incomes to (Krueger and Connolly, 2006). Musicians rarely made money from record contracts. In a "winner-takes-all" business model (Frank and Cook, 1995), where only a tiny number of recordings actually recoup anything for the artist after costs have been deducted from their royalties, Krueger and Connolly note that even amongst these lucky few mega-stars of "Rockonomics" almost all make more from the increase in live performance revenues than they lose from falling record sales. Royalties are and were retained by labels through contracts assigning these earnings to recoup production, promotion, and management costs (David, 2010). Additional revenues from live performance are a plus for performers, set against a loss of royalties they never see anyway.

What sociologist Robert Merton (1972 [1942]) called "academic communism" is not altruism. Academics desperately share their work, giving it away to academic journals for no direct payment with the intention of receiving citations that identify them as valued members of the community they work within. Recognition within that community is the key to career success. Academics are driven to share. Sharing is the best incentive mechanism for producing new knowledge (Sulston and Ferry, 2009). An idea becomes X's law or Y's theory only if X and Y manage to give it away first, and as long as others accept the gift that is given. Where the fourth estate (journalism) is bound through the "editorial nexus" to other powerful political and economic estates, "citizen witnesses" form a new "fifth estate" (Dutton, 2009), incentivized by various motives to give witness to the world from the ground up, rather than from the top down—as directed by editorial controls and the state, proprietor, and advertiser interests that appoint such editors. Charles Dickens made more money from speaking tours in the United States, where his books were circulated outside of copyright control, and hence created a larger fan base for his live shows, than he did from royalties back home in

England (Pearl, 2009). One-tenth of one percent of titles generate average wages for their authors. Most of these 1,200 "bestsellers" are "repeaters," so the number of authors making a living by royalties is far smaller than this (Anderson, 2009), and is concentrating over time (Thompson, 2012). Jessica Silbey (2015) found in interviews with over one hundred authors and other innovators that most make more from live work related to their creative activities—teaching, talks, journalist writing, interviews, and performances—than from royalties.

Free circulation of an author's published works increases these revenue streams. Beyond the very narrow confines of a tiny handful of corporate-sponsored "big books" each year, most authors only find a reading audience (some of whom pay) by sharing their work (Liebler, 2015). Just as most musicians get better paid for live work because their recordings circulate freely, so it is for most poets, novelists, and academics.

Peer recognition, as in academic life, is the core incentive, not just for hackers but for software code-writers in general. What Pekka Himanen (2001) calls "the hacker ethic" (a "net ethic" or "spirit of informationalism" that values creativity by celebrating those that innovate and that makes such innovations freely available to others to further develop), Johan Söderberg (2008) calls "play struggle." Such playful, peer-oriented incentive structures encourage hard work in return for recognition for overcoming obstacles and creating new things. Sharing achievements is central to gaining recognition, whether you are a pseudonymous hacker or someone seeking gainful employment. David Zeitlyn (2003) observes that "kinship amity," identity within quasi-familial networks, not instrumental exchange, incentivizes open-source software developers. Peer coproduction has proven a far more successful means of software innovation than closed corporate software silos, whether in hacker collectives, managing the Internet, building Wikipedia (at the levels of both its code and its content), or creating and maintaining the Web (Berners-Lee, 2000).

Gift Exchange as Reciprocal Coproduction

To say that sharing is a more efficient, effective, and incentivizing mechanism in the production and distribution of non-rivalrous goods is one thing. However, it should be noted that such a gift economy has two dimensions, mapping the distinction drawn up by economic anthropologists between peer-reciprocation-based forms of gift circulation and redistributive forms of generalized gift-giving. The paradigmatic case of reciprocal peer gift exchange is the Trobriand Islanders' Kula circle (Malinowski, 1922). The circle of gift-giving creates a community of cooperation through the obligation on all members to give necklaces (clockwise) and armbands (anticlockwise). Only those that give can receive. The value of what is given lies fundamentally in that it can subsequently be given away again and hence entitle the giver to remain in the circle to enjoy the more tangible benefits of community support. Nondirect exchange in the form of peer gift-giving is a useful way to view much of the everyday life of musicians, academics, and writers. Musicians learn their craft imitating, exchanging, jamming, and interacting with other musicians as performers and spectators. This learning is not just an apprenticeship. It is their career. The modern romantic conception of the artistic genius emerged out of this sense of creativity within a tradition, community, and culture toward a notion of the single lone creator—something that suited record companies looking to lock down content, but which has very little to do with the reality of how music is created (David, 2006). That today's musicians have at their disposal the creative works of every other artist is a great wellspring of potential interaction, and should not be seen as a threat.

Whilst media organizations are often funded by selling eyeballs to advertisers (Gitlin, 2003), peer recognition amongst journalists, in part at least, regulates professional practice. The survival of traditional journalism depends on the maintenance of peer-based self-regulation of standards (Curren and Seaton, 2010: 336), not just on maintaining payment mechanisms (important as these are). The peer orientation of citizen witnesses, whether at the level of Facebook friends, Twitter followers, or other "hits" operates through different peer networks but by similar mechanisms of motivation and recognition through gift-giving. Likewise, in academia, peer recognition is achieved by gift-giving, but not through direct exchange. A gift (article) freely given is "accepted" only when a peer cites, or a peer reviewer accepts, the work. Free access via services like Academia.edu and ResearchGate extend the community of peers into the tens of millions, but their restriction to users with academic email accounts does retain their position as sites of reciprocal peer exchange, rather than generalized redistribution (discussed in the following section). Today's trade publishing substantially rewards only a tiny number of "big book" authors—mostly authors of repeaters, "tie-ins," pot-boilers, and celebrity biographies. Infotainment cross-media marketing of such "big books" looks for comparability "comps" (repetition), a media "hook" (repetition), track-record (repetition), and an existing media profile (repetition) (Thompson, 2012). New and original authors have for the most part to find ways of sharing their work with each other.

In the domain of software production, it is unnecessary to repeat the examples of peer-to-peer coproduction already cited. It is simply worthwhile reiterating the significance of reciprocal but indirect gift exchange at the heart of software development.

Generalized Gift Redistribution

Marcel Mauss (1990 [1925]) criticized Bronislav Malinowski for not recognizing how gift exchange could be hierarchical as well as horizontal. Where the Kula circle was a reciprocal circle between peers, the Potlach was a vertical redistribution from the "big man" downward. Where the Kula circle created an obligation to give tokens back, the Potlach ceremonial feast creates status by giving away or even destroying stores of wealth. Today's so-called peer-to-peer sharing networks are routinely condemned as "stealing" from producers by passive consumers, not a genuine gift economy between equals. This asymmetry is real, yet it is unproblematic because generalized sharing by non-producers remains more efficient, effective, and incentivizing than property or markets for creators and consumers alike.

Music

As has been noted, file-sharing on peer-to-peer networks reduces opportunity costs for fans and has thereby increased earnings for live performers. The power of the "big man" [sic] (the romantic artist, male or female) is not reduced when they give away intangibles, even if the fans benefit. When Radiohead made their 2007 album *In Rainbows* available, via a digital honestly box, for whatever fans were willing to pay, most fans who downloaded the album only paid the minimum processing change, yet the band made more money from the release than they made from their previous album that had been just as successful but which was released under a royalties contract that saw the band receive only a small percentage of net sales, and where most of even that fraction went to pay for production, promotion, and management costs. When free sharing online affords larger live audiences paying more to performers, artists do better because of what might be perceived as "free riding" (taking without giving) in recordings. Mancur Olson's (1965) "problem of collective behaviour," where the individual free-rides on the contributions of groups, and so further undoes the incentive to contribute, might seem to be the case with free downloading. However, when free downloads increase concert ticket sales and ticket prices, the opposite is in fact the case.

Publishing

The concentration of trade publishing into an ever smaller number of conglomerates is hidden behind the retention of a multiplicity of nominal imprints (Thompson, 2012). Amazon's networked architecture opens up publishing's long tail beyond today's latest batch of "big books" (Anderson, 2009).

A bookshop earns most from the limited range of bestsellers it can fit on its shelves (a positive skew in graphical terms). Amazon makes more from the millions of titles that sell only a few copies each (the long tail on the sales graph), than it does from the latest bestsellers. However, only a tiny percentage of the world's literature is currently "in print" (Boldrin and Levine, 2008). The free circulation of works in and out of print offers the greatest scope for writers and readers to find each other. Whilst ResearchGate and Academia.edu allow researchers to peer-circulate their work, the scope to circulate academic content more widely also exists, even whilst the suicide of the hacktivist Aaron Swartz, after being threatened with twenty years in prison for de-encrypting hundreds of thousands of JSTOR files (Halbert, 2014), highlights the ongoing resistance to such redistribution by prosecutors. WikiLeaks is another manifestation of informational redistribution.

WikiLeak's challenge to, yet collaboration with, established print media outlets in the "authentication" and "safeguarding" of sensitive content (such as in relation to releasing but also editing potentially dangerous content from the Afghan and Iraq war papers) is an interesting illustration of the tensions that exist today between authority and openness in journalistic exposure (Beckett and Ball, 2012).

Software

Copyright creates monopoly protection for the life of the author plus a subsequent seventy years. This promotes an extreme form of ancestor worship (not to mention sacrifice). Innovation in software development, however, sees most products redundant within a year. Most games, and home and office computer packages, are updated repeatedly so as to make them virtually worthless to anyone but the person exercising first-mover advantage (Boldrin and Levine, 2008), usually the company employing the programmers. As such, free circulation of software, and thereby its redistribution—whether that be in developing countries or amongst those that cannot afford the latest versions in affluent countries—has not stopped games developers and other software companies rapidly overtaking the earnings of film, television, and music companies (Castells, 2009). Once again, redistribution of non-rivalrous goods increases utility without reducing incentive for its production. Redistribution in fact incentivizes innovation when it increases concert ticket sales and cinema attendance, and also compels games makers to constantly update and improve their content. Intensifying first-mover advantage rewards faster innovation whilst further disincentivizing commercial copying.

Conclusions

Free sharing takes two primary forms. The first is reciprocal peer circulation. Musicians, writers, and programmers (in the case studies used in this chapter) give and take from one another in a form of gift exchange and recognition, seeking to have their gifts accepted and valued. As this chapter has illustrated, this form of sharing creates higher forms of incentive than do markets and property. The second form of sharing is generalized redistribution. Creative works are distributed to and by non-creators without direct reciprocation or reward to the original creators. This form of sharing is far more efficient and effective as a means of reproducing and distributing content, just as peer reciprocation is the most powerful mechanism for incentivizing production in the first place. Adaptations do arise between these two gift economies in intangible goods, and this is where direct exchange (payment) most often takes place. These adaptations take place in the sale of more rivalrous goods, whether these are concert tickets, writers' time working for hire, or working as speakers/teachers, receiving grants, or taking up academic appointments. However, it is labor that is being sold here, not capital demanding monopoly rent—as in the standard business model of treating intangibles as intellectual property. In the domain of non-rivalrous goods, gift-sharing (both in the form of reciprocal peer circulation and generalized redistribution), not prices and property, is more efficient, effective, and incentivizing. Whilst capital adapts, it does not lead, nor fully control, what is strikingly alien and potentially threating to its logic (and future).

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Three Phases in the Development of China's Network Society

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While Raine and Wellman (Chapter 1, this volume) focus on contemporary uses and impacts of the Internet in the US, this chapter provides a more historical perspective on the evolution of China's network society since the 1990s. Jack Linchuan Qiu argues that during a time of rapid industrialization and globalization, China's network society went through three phases—which he characterizes as Asteroids, Bees, and Coliseums—with each phase having a unique pattern of institutional formation, class relationships, and sociopolitical dynamics. The chapter develops a typology of these three phases to capture and explain the formation of China's network society. The overall trajectory of China's network society, the author argues, has an important relationship with the growth of civil society in China from the 1990s into the twenty-first century. The turn of the millennium has seen consumerism and nationalism increase dramatically, thereby shaping life online.

Introduction

To grasp the relationship between society and the Internet, we must not ignore China, home to the world's largest national Internet population: 751 million as of June 2017 (China Internet Network Information Center (CNNIC)). The mid-1990s marked the beginning of the Chinese Internet, by which I understand, the technological systems of Internet communications that serve the Chinese people, including those living inside the People's Republic of China (PRC) and overseas members of the Chinese diaspora. Since the mid-1990s, Chinese society has gone through radical transformations in certain aspects, while in others it remains largely the same. Many have argued that this mixture of change and continuity has to do with China's fast-changing media industry, especially the rise of Internet industries (Qiu, 2004; Zhao, 2008; Yang, 2009; Hassid, 2012). The complex interactions between society and Internet in Chinese contexts have resulted in unique patterns of a network society formation. The next section will explain the theory of a network society developed by Manuel Castells (1996; 1997; 1998).

Many things have happened from the birth of the Chinese Internet in the mid-1990s to the widespread use of social media today. In this chapter, I divide this period of more than two decades into three phases, summarized as A (Asteroids), B (Bees), and C (Coliseums). I shall explain how this three-phase model makes sense of social and technological change; how each phase is distinct from, but also connected to, each other; and how and why the overall trajectory is moving away from global connectedness and the rise of autonomous social forces, despite significant trends of citizen journalism and some Internet-enabled social movements.

My task is therefore not to simply describe. Instead, my retrospective exercise is essentially about categorization, pattern-matching, and developing conceptual models to capture the complexity of changes on the ground. In popular media and in scholarly publications, China is often depicted as a single, monolithic entity—either a political monster or an economic miracle or both—which stays unchanged with its idiosyncrasies, albeit forever the antithesis of the West. This is a misleading simplification. As I shall demonstrate, not only has China repeatedly changed course, but those changes have clear patterns when we look back on past decades.

I take a political-economy perspective in modeling the ebb and flow for the dream of an Internet-based society that is plural, autonomous, globally connected, and capable of spurring social change. As Castells points out: "The key to the understanding of the Chinese model is the way in which the state . . . articulate[s] the institutions of statism to new class structure emerging from the global/local connection" (2008: 6). Along this line, I shall focus on patterns of state-centered institutional formation, sociopolitical processes, class relationships, and global connectedness, while taking inspiration from Hallin and Mancini's (2004) comparative modeling of media systems. More specifically, I have tracked major Internet events in China since the 1990s through online and offline observations, archival research, interviews, and the construction of an Internet-events database consisting of 180 Internet-based events.[1]

[1] The insights also originate from two month-long "new media events" workshops that I hosted in 2009 and 2016 at the Chinese University of Hong Kong, when I benefited from discussions with twenty scholars specializing in the study of Internet events in Chinese contexts.

Network Society: Global Theory, Chinese Reality

In this section, I will discuss the idea of a network society and its application to developments in China. For more than two decades, the theory of a network society has been developed to aid understanding of the fundamental relationship between information and communication technologies (ICTs) and society, both globally and in national contexts such as China (Castells, 1996; 1997; 1998). For Castells, a network society is, apart from statism and capitalism, a fundamental logic of social organization, which has become increasingly dominant worldwide since the end of the Cold War and with the arrival of the Internet. As Castells argued, in contrast to a hierarchical structure: "A network-based social structure is a highly dynamic, open system . . . Networks are appropriate instruments for a capitalist economy based on innovation, globalization, and decentralized concentration" (1996: 500).

The most basic logic of a networks is inclusion/exclusion, a binary process that according to Castells (ibid.) has penetrated other realms of society. On the one hand, systems of states such as the European Union have become "network states" when authorities share formerly exclusive sovereignty to coordinate actions, such as in facilitating trade. On the other hand, systems of market exchange also become globally networked, as in stock exchanges or as "network enterprises" when multinational corporations attain synergy across their subsidiaries. Among the networked, be they statist or capitalist, a second logic of programming and switching takes place, which decides the actual network structures and the dynamic relationships among them (Castells, 1996, 2009).

Rather than a simple system of harmony, the global network society is also full of tension and conflicts, especially "between the Net and the Self," that is, between state and/or market power on the one side and identities and traditions on the other (Castells, 1996; 1997; 1998). The conflictual aspects of a network society are most evident in what Castells calls "informational politics" (ibid: 367), which include elections and scandals, as well as political movements, such as key struggles like that of the Zapatistas in Mexico, when tensions from the top down emanating from the powers of dominant networks meet resistance from the bottom up. As such, networks of civil society and networks of domination penetrate each other. They co-evolve and are mutually transformative.

The general theory of the network society, however, is insufficient to capture variations across nations and over time, such as in China. Under conditions of persistent authoritarianism, China's network society occurred at a time when its Internet users aspired to develop a civil society, where social issues are discussed and resolved among informed citizens organized through spontaneous networks of communication, such as

NGOs (non-governmental organizations), rather than by force, hierarchical power, or buyoff (Yang, 2003; 2009; Svensson, 2012). In the mid-1990s, when China started its Internet, memories of the 1989 Tiananmen Square bloodshed remained vivid. Many thought communism would soon collapse in China. The Internet was, from this perspective, another tool to empower the citizenry vis-à-vis authoritarianism like the *samizdat* or Radio Liberty in Eastern Europe (Sukosd, 2012). Seen through this liberal framework, the birth of the network society in China was first about limiting the arbitrary powers of the state and its violence.

In hindsight, this was an overly simplistic view, not only because, after a quarter of a century, Chinese communism turns out to be highly resilient. There are also instances when ICTs failed to empower citizens, when they instead empowered the authorities. From the use of radio broadcasts during the Third Reich to that of cassette tapes during the Islamic Revolution, the effects of technological empowerment are often contradictory to the liberal dream, not to mention critiques about how new technologies have been commodified and used against democratic purposes, for instance, through corporate surveillance (Schiller, 2014; Zuboff, 2015). After all, civil society may also reproduce and perpetuate conservative norms of the status quo, as Spires (2012) argues in his critique of the role of foreign NGOs in China.

Compared to the dream of a civil society, the idea of the network society encompasses more internal diversity. Developed to address questions of economic restructuring and institutional reform, the theory of the network society focuses on social movements and dynamics of civil society that coevolve with technology and politics. Civil-society formations must of course be based on social networks, which rely increasingly on digital media. Much more than a collection of gadgets, Castells (1996) conceptualizes networks as the third fundamental form of social organization, after state structures/statism and the market/capitalism. Thus, if a social group is to be bound together through neither state coercion nor commercial exchange, broadly defined social networks are essential both for internal cohesion (how members share similarities) and external identification (how this group is different from others).

A specific pattern emerges from Guobin Yang's analysis that online activism has materialized in China through a multi-interactional model among the state, market, and civil society as "a generalized response to the consequence of Chinese modernity," "a countermovement rooted in material grievances and an identity movement born out of the identity crisis associated with dramatic change" (2009: 209). The state–society relationship is interactive, as Yongnian Zheng ascertains: "while the regime has cracked down on Internet-mediated collective actions that were regarded as threatening, it has also accepted social initiatives and made great efforts in adjusting existing policy practices" (2008, pp. 184–5). Meanwhile, scholars such as Min Jiang

(2010) and Rebecca MacKinnon (2011) have observed that the interactions among the Chinese state with the Internet, and commercial developments, have resulted in reinforcing authoritarianism.

Rather than trying to draw a one-size-fits-all answer for China's network society since the 1990s as a whole, I propose to use a three-pronged framework to examine this mutually transformative process in three stages: (a) the "asteroids" period or A-Phase, from 1996 to 2003, (b) the "bees" period of B-Phase, from 2004 to 2010, and (c) the "coliseums" period of C-Phase since 2010. I would submit that this periodized approach would allow for more comprehensive understanding without losing the complexities and internal contradictions of each period.

As explained at the end of the opening section, I came to the criteria for periodization through repetitive engagements with key Internet-based social events and through a political-economy approach to understanding the institutional formation of China's network society. I ask: Who owns the infrastructure, the major Internet companies, and social media platforms? How are they managed? Who reaps the economic and political benefits? I also examine the social-class relationships and the scope of a network inclusion/exclusion: Can we hear the voices of Chinese workers and farmers, those from lower classes, as well as non-users? Do Chinese citizens perceive themselves as being capable of becoming agentic actors before they attempt to build and program their networks, form solidarity, and influence state or corporate policy? In other words, efficacy at both the individual and collective levels is a basic yardstick to gauge the well-being of a network society.

Moreover, borrowing from Hallin and Mancini (2004), I inquire about (a) political parallelism or the degree to which online opinions reflect the spectrum of stances within the political system; and (b) opinion pluralism or the degree to which different social groups can voice their diverse opinions online. Another key dimension is the degree to which China separates its Internet from the global Internet through such devices as the Great Firewall.

I argue that the three periods have substantial differences in their network society formations with respect to institutional formation, social class relationship, efficacy, political parallelism, opinion pluralism, and global connectivity. These dimensions may not cover everything, but they provide a starting point for describing a more nuanced and dynamic view of China's network society.

The ABC of Periodization

This section overviews the three phases in the development of China's network society. Very briefly, the A-Phase ("asteroids") from 1996 to 2003 is fast-moving, elite-driven, and full of opportunities and conflicts. The B-Phase ("bees") lasts from 2004 to 2010, and is a period of tireless, intensive work, and the concomitant rise of Chinese informationalism building on the back of workers, bloggers, and activists. Beginning from around 2010, the C-Phase ("coliseums") has been the dominant mode of Chinese network society to this day, with its organizing logics being information management by the state, commercial co-optation, and a general sense of declining efficacy among Internet users who cannot hear other people's voice, let alone public deliberation, except the voice of the most resourceful.

The temporal division of the phases is not clear-cut to the month or the day because, rather than developing a neat historiography, my goal is to identify and compare patterns in the three phases. The asteroids, bees, and coliseums indeed co-occur within an enlarged media ecology embedded in China's evolving network society. Even to this day, asteroids still fly high, although few look at them anymore; bees still work diligently, churning out iPhones and user-generated content, although few still care—because attention is absorbed by the coliseums.

Asteroids (1996–2003)

China's Internet started as a scientific experiment toward the end of the Cold War. The spirit of this early period was reflected in the first email sent from China. Written by a research team at the Chinese Academy of Science in 1987, it reads: "Across the Great Wall we can reach every corner in the world" (see https://goo.gl/xSBfJi). I name this initial period an "asteroids" phase because almost all Internet users then belonged to the socially elevated classes. They were at least college-educated and most were either elite scientists or students pursuing graduate studies. Globally oriented and aspiring for seamless connection with the world, these were people with high socioeconomic status. Their online discussions were typically hosted in key university bulletin-board systems (BBS).

The aspiration for global connectedness—"across the Great Wall"—was temporarily interrupted by the 1989 Tiananmen crackdown. But by the time the A-Phase began in the mid-1990s and when it was in full swing in the late 1990s, liberal cosmopolitanism had joined forces with techno-utopian imaginations about digital media in defining Chinese cyberculture. Facing the challenge of dissident opinions, first by pro-democracy groups in and outside China throughout the 1990s, then by Falun Gong since 1999 (Chase and Mulvenon, 2002; Zhao, 2003), Chinese authorities attempted to intervene with legislative and technological measures which, however, were only loosely implemented. The A-Phase was thus a period of rapid ICT diffusion, first on university campuses but soon through Internet cafes in big cities and small towns (Qiu, 2013). The metaphor of asteroids captures this meteoric rise of China's online population from less than 40,000 in 1995 to 79.5 million in 2003.

The rapidity of technological diffusion coupled with half-hearted state regulation produced the unique dynamics of the A-Phase: China's first generation of Internet entrepreneurs emerged exclusively from the private sector, in this respect differing considerably from other key sectors of the Chinese economy such as automobile and real estate. Even in the software industry, nongovernmental businesses tended to rely on central or local governments to varying degrees (Segal, 2003). Yet Jasmin Zhang, founder and CEO of Beijing Info Highway Co., China's first nationwide ISP (Internet service provider) was a private entrepreneur who returned from overseas with few ties to the authorities, a common occurrence among China's leading Internet entrepreneurs at the time.

Admittedly, many private start-ups failed, burning out and leaving no trace behind, like asteroids flashing through the sky. We may see them on clear evenings. But if it's cloudy or in the daytime, few notice their falling. However, if they managed to hit the ground, they would make a huge splash. The impact would be felt long afterward, as in the case of Tencent, a start-up in Shenzhen that later grew into China's largest Internet company after its QQ instant messenger became immensely popular in the early 2000s. Tencent continues to be a dominant player in China's Internet industry today, with its WeChat (Weixin) occupying the bulk of China's social-media market. Despite censorship and clampdown, a few private companies emerged triumphantly from the A-Phase. Most of them, like Alibaba and Sina, were backed by highly globalized investments from the Silicon Valley or Japan.

In addition to commercial splashes, there were numerous sociopolitical events of great significance in the A-Phase. As the term "asteroids" suggests, this period was full of unpredicted movements. One telling event was the death of a Peking University student named Qiu Qingfeng due to problematic security measures, which caused campus-wide protests in May 2000. The pressure of Internet-facilitated activism forced the university's president to apologize publicly. He then adjusted policies according to the demands of the student protesters, marking an unprecedented success of civic action (Yang, 2003).

Intermittent cases like this demonstrated the power of the Internet and worried the authorities. The outcome of events varied depending on the specific mode of state response, sometimes with tolerance, sometimes with an iron fist. A turning point was the 1999 Falun Gong demonstration and the ensuing escalation of political violence in traditional media systems as well as online (Zhao, 2003). To ensure control, Chinese authorities stepped up

Internet control administratively and technologically. Until this point, Internet control was only loosely enforced. Since then, a full regime of control—of the Internet and through the Internet—has materialized.

Two other events in point were the 2002 Lanjisu cybercafe fire, which killed twenty-five college students in Beijing and the death of a migrant worker, Sun Zhigang, in 2003 in a Guangzhou detention center (Qiu, 2009). Both events were widely discussed, online and in the mass media, resulting in major public policy changes at the national level. The event outcomes were, however, quite contradictory. Justifying nationwide crackdown on cybercafés, the Lanjisu tragedy served as an excuse for heightened state intervention. On the contrary, the Sun Zhigang incident was celebrated as a rare case when civil society members could have their critical voices heard, thereby changing government behavior (Zhao, 2008; Yang, 2009). Scholars such as Min Dahong proclaimed the year 2003 the first "Internet public opinion year" when spontaneous online discussions could set the agenda for the mass media, thereby bringing about national policy change (Min, 2016).

Another prominent cluster of sociopolitical events during the A-Phase was nationalistic. It began with the BBS-mobilized anti-Japanese demonstration in Peking University on the evening of September 18, 1996 (Qiu, 2015). Since then, online nationalism has surged every year, leading to the violent anti-NATO protests of 1999 and the spy plane incident of 2001, when a US reconnaissance plane clashed with a Chinese fighter jet and had to land in Hainan Island. The US–China stand-off over the spy plane triggered what *New York Times* called "the First World Hacker War" (Smith, 2001). Neither Beijing nor Washington knew how to handle such crisis of mutual aggression at the time.

A last feature of the A-Phase was the long distance by which the civil society online was detached from serious issues on the ground, for example, facing China's emerging information have-less (Cartier, Castells, and Qiu, 2005). About thirty million workers were laid off from state-owned enterprises at the turn of the century, yet they were "switched off" and rarely appeared in online discussion. The elite online opinion leaders were as detached from the lower classes as they were from the authorities. During the A-Phase, Internet users cared little about social class. While laid-off workers had little access to digital media, young migrant workers had begun to use cybercafés and QQ instant messaging. Some also had their first mobile phones. However, they did so mostly for personal use rather than sociopolitical purposes. Although large-scale strikes took place with considerable worker militancy (Lee, 2007), the voices of China's working class were rarely heard online. Such elitist patterns of China's network society characterized most Internet events until 2003, although they began to change around 2004.

Bees (2004–2010)

The B-Phase, lasting roughly from 2004 to 2010, was China's closest encounter with digitally networked civil society—not just offline but online as well, through the mobilization of concerned citizens using blogs, online forums, and online videos with increasing efficacy. The period began with the authorities consolidating their monopoly over Internet and mobile communication infrastructure, using their regulatory power as well as investment from the global capital market, now that all state-owned national telecom corporations were listed on the Hong Kong or New York stock exchange. Besides passive censorship, Chinese authorities also took active measures to drown out alternative voices, for instance by hiring and training progovernment Internet commentators, known as *wumao* aka "fifty-cent-party" (*Phoenix Weekly*, 2012).

One result of the changing structure of China's network society has been increased separation between the Chinese Internet and the global Internet. This was something the party-state would favor: when it became more difficult for foreign content to spill over into China, the reverberation between domestic and transnational civil society could also be minimized, meaning the authorities would be under less pressure from public opinion. This was also to the advantage of Chinese Internet companies: Baidu could grow into a monopoly when Google first faced a series of constraints and then pulled out in 2010 from the China market. The closed beehive behind the Great Firewall benefits domestic social media, e-commerce, and online video companies.

Increasing closure of the Chinese Internet also resulted from the fact that hundreds of millions of workers, farmers, and retirees—that is, the "information have-less" groups—started to go online and have their own mobile devices (Cartier et al., 2005; Qiu, 2009). Soon surpassing elite users to constitute the bulk of China's network society, these were people from humble backgrounds, with low socioeconomic status, concerned with issues on the ground. As working-class and underclass users anywhere, this new generation of Internet users—toiling diligently online like worker bees—are less fluent in foreign languages, and their informational needs were usually local when they started to produce their user-created content (Sun, 2012).

The B-Phase contained several high-impact events, which exhibited characteristics quite different from those of the previous period and the one that followed. For example: the Ma Jiajue manhunt of 2004, the exposure of horrible Foxconn dormitory conditions in 2006, the Chongqing Nail House forced eviction of 2007, and the case of Deng Yujiao in 2009, when a pedicure worker at a massage parlor killed a local official who tried to sexually assault her. In all these cases, members of the information have-less took center-stage, often as both the victims and the heroes/heroines in online public opinion.

Although not all incidents led to the defeat of the powerful, it was not uncommon for them to cause systemic, progressive change at the national level. While others may see such macro policy reform as meaningless gestures from the top, I contend that many policy adjustments would have been impossible without bottom-up voices, which were amplified online to become an indispensable bedrock for collective action, and for policy change. As a result, collective efficacy through multi-modal participatory communication surged among Chinese Internet users. This made them work even harder as busy bees in the garden of Chinese network society.

This was a period of tireless work, immense labor, and collective empowerment, whose spirit is captured in the documentary *High Tech Low Life* (Maing, 2012). This film depicted two leading citizen journalists at the time: Zuola from rural Hunan and Tiger Temple from Beijing. Coming from very different backgrounds, they used different styles of reporting. While Zuola focused on issues faced by the urban underclass, Tiger Temple rode deep into the rural hinterland to investigate social and environmental ailments. After years of toiling, they finally met in the Annual Chinese-Language Bloggers' Conference.

That was a special moment for Chinese citizen journalists, who according to my observations in their online and offline gatherings became increasingly committed to a meaningful cause of social change toward democracy. Despite arguments among citizen reporters, they managed to gather physically every year from 2005 to 2009 at the annual bloggers' conference, until the authorities shut it down in 2010.

The power of citizen journalism was reflected in its ability to set the agenda for traditional media. A study by MacKinnon (2008) found that foreign correspondents in China had restructured their routine, to be organized especially around one bilingual blog in Hong Kong, EastSouthWestNorth. It was hosted by blogger–translator Roland Soong, who worked tirelessly around the clock. Every day, he selected dozens of newsworthy Chinese-language blog posts and translated them into English. He did this without charging, yet with high professional standards. More than eighty percent of foreign correspondents in China at the time started their day by reading Soong's blog (ibid.).

It was also in this B-Phase when Chinese worker-bloggers, for the first time, reported from the picket line of Uniden, a Walmart supplier factory, in 2004 (Qiu, 2016). When China became home to the world's largest Internet user population in 2008, the microblogging site Fanfou was on its way to becoming the most popular Twitter-like service in China. This was one year before the launch of Sina Weibo, and many leading Fanfou users, measured by their large number of followers, were among the most diligent worker bees of the Chinese blogosphere. They were ready to change China, for good. Then everything came to a sudden stop in 2009.

Coliseums (2010–now)

The coliseums of China's network society were constructed on several foundations: the global financial crisis emboldening the cash-rich Chinese government; the regime's new priority to silence collective action but not criticism in the aftermath of the Arab Spring; the atomization of social life among Chinese netizens; and the popularity of spectacles and consumerist infotainment.

Equally important have been the internal dynamics among the information have-less groups. By 2016, those without a college education had increased to 80.6 percent of the Chinese Internet population (CNNIC, 2016: 43). June 2009 foreshadowed the ominous beginning of the C-Phase, when ethnic tensions prevailed over the unity of civil society and working-class solidarity. At a toy factory in Guangdong, Uighur workers from Xinjiang, China's Muslim northwest, clashed with majority-nationality Han workers. Camera-phone videos and photos were circulated, from domestic sites to YouTube. Escalating tension bounced from overseas to Xinjiang, leading to fatal ethnic riots on July 9. To restore security, the authorities pulled the plug and the entire region, more than twice the size of Texas, was cut off from the Internet for ten months (Cao, 2014). Fanfou, the most successful microblogging service, was closed down.

Was Beijing really so afraid of the Internet? Not really, so long as the platforms were restructured to resemble coliseums where entertainment—often of bloody types—attracts a large amount of consumerist and cathartic attention, where events of informational politics compete with one another, only to reinforce structural inequalities.

While the Internet in Xinjiang was still switched off, Sina launched its Weibo microblogging service on August 14, 2009. By December 2012, the Twitter-like service had attracted more than 500 million subscribers. It had also become known for facilitating high-profile cases of contestation such as the Yihuang incident in Jiangxi, the Wenzhou high-speed train crash, the Guo Meimei "beautiful-girl" fiasco discrediting the Red Cross, and the Wukan Village protest (Lagerkvist, 2012; Sullivan, 2014). Meanwhile, since the tragic Foxconn worker suicides in 2010 (Pun and Chan, 2012), labor struggle has intensified, with Weibo along with heritage media used to express voices of dissent and advocacy. However, unlike what happened in the B-Phase, these struggles produced much less concrete change in governmental or corporate policy.

In fall 2013, Weibo experienced a major crisis as several key opinion leaders, known as "Big-Vs," were detained, subjected to public humiliation, and penalized for being outspoken online (Svensson, 2015). Some of these Big-Vs had been targeted because they excelled at maneuvering through dramatic events. Now they became human sacrifices on the altar, slaughtered in the coliseums before the eyes of countless social-media denizens. The chilling effect was considerable. As Weibo traffic decreased, users moved on to WeChat, a more Facebook-like platform launched by Tencent in 2011, which had more than 700 million active users by 2016. User-generated content continues to flood the WeChat platform. Billions of messages are circulated daily, competing for attention.

Weibo and WeChat have evolved quite differently from either Twitter or Fanfou, or the blogosphere of the B-Phase, the latter characterized by flat networks with little differentiation between elite and non-elite users, ease of connection, and possibility of interacting across group divisions. In contrast, Weibo and WeChat are hierarchical (e.g., "Big Vs" enjoy privileges unavailable to common users), opaque, censored, and flooded with marketing messages posted by hired hands and reposted by "zombie" followers, that is, accounts manipulated by algorithms.

The dream of some kind of solidarity, organic or mechanic, in China's cyberspace was shattered. Still, some tireless worker bees continue to use Twitter and Facebook so long as they can scale the Great Firewall. But few could hear what they say. Still, some work hard updating blogs and deliberating online, but their voices are seldom heard. They don't even hear each other's voice. Zuola, a famous blogger from the B-Phase, said in an interview: "Weibo is a black hole, it sucks everything in, but yields nothing."

The dissolution and cooptation of meaningful user-created content have deteriorated given Beijing's new censorship strategy of "Talk-But-Don't-Act." This was found in a study by King, Pan, and Roberts (2013), who collected and analyzed more than eleven million posts from 1,400 social-media services in China. They found that, although the regime actually allows criticism of the government, its focus is on preventing collective action. What is this, if people are allowed to criticize and ridicule, but not to act, not to assemble, on- or offline? The essence is captured in Hu Yong's book title: *the Rising Cacophony* (Hu, 2008).

The distracting effect of the coliseums is manifested in the cruel cases of farmers crushed in defense of their ancestral land which local officials wanted to grab and sell, in the context of China's massive urbanization drive deep into the countryside. In December 2010, a Wenzhou village leader named Qian Yunhui was crushed to death by a fully loaded truck. Fellow villagers—and Internet users—believed he was murdered by officials who had land disputes with him. Public outcry continued for a month in online forums, and in Weibo. Offline protests were organized that included not only local villagers but also netizens from elsewhere. The story went on to hit international headlines (Sullivan, 2014). What if a similar incident happened again? What if three such incidents happened at about the same time? From March 27 to April 3, 2013, three farmers, while trying to protect their land, were crushed to death by bulldozers and trucks, in Henan, Hubei, and Sichuan. Three deaths in eight days, yet the combined scale of online discussion and online–offline interaction was not even close to the 2010 Qian Yunhui dispute. Despite the phenomenal growth of both Internet and social media, apathy has prevailed. Bloody bulldozers keep rolling forward. Collective efficacy, however, rolls decisively backward.

China's Web 2.0 coliseums are shut off from the rest of the world. A study by Ogilvy (2015) revealed thirty-nine distinct services, all popular inside China but not outside. Having such a coliseum is not just good for censorship. It's great business, too, as many of these popular services perform handsomely in the stock market. Examining China's Internet today, one can see that it is common for a popular global service to have multiple copycats, and each still has a sizable market share. While Taneja and Wu (2014) maintain that the separation between domestic and global cyberspace has to do with cultural affinity and linguistic practice, not simply because of the Great Firewall, the degree of separation in China is indeed more severe than in other countries. Almost no popular global service can infiltrate the Chinese market.

In order to promote "Internet sovereignty," since 2014 China has held the Wuzhen World Internet Conference, the official event of C-Phase that could not differ more from the bloggers' conference of the B-Phase. A culture of self-censorship has emerged. In August 2013, a nationwide "Internet Celebrity Social Responsibility Forum" was held at which China's online public-opinion leaders agreed to abide by "seven bottom lines" covering (1) the law and regulation of the state, (2) the socialist system, (3) national interest, (4) citizens' legal rights and interests, (5) public order of society, (6) morality, and (7) information objectivity. It is ironic that morality and information objectivity came at the very bottom of this list, whereas most Big-Vs were punished owing to allegations of moral corruption or spreading rumors.

This happened at a time when government agencies actively promoted their "governance Weibo," when the authorities became more assertive, and more skillful, in exercising ideological leadership. Chinese informational politics have become highly predictable from the perspectives of the authorities. Thus, the recent trend in China has become characterized by institutional formations dominated by the powers that be, increasingly conflictual class relationships, and public opinion processes that have become fragmented and manipulated.

Concluding Remarks

Despite its peculiarities, the network society in China is probably not alone in its nonlinear trajectory of devolution, nor is today's social media technology, often carrying promises of civil society, but actually turning out to be populist and parochial, conservative and instrumentalized. The overall pattern revealed through our tripartite typology is not a rosy picture. It shows network society can still be dominated by statist logic in the Chinese context, although I must stress it is wrong to take this retrospective exercise as an advocacy of despair. Instead, this critical assessment should lead us to the ultimate question: could it be otherwise?

The answer is yes. Another future is possible. My goal in presenting the three phases is, after all, to motivate individual thinking and collective action, to prevent the further worsening of conditions, to renew and extend civic network ties, to imagine a better China, and to build a better world beyond the confinement of the coliseums.

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21

The Politics of Children's Internet Use

Victoria Nash

Children's use of the Internet raises fraught issues, frequently contributing to a media-supported moral panic. Whilst digital technologies offer young people unique opportunities for education, entertainment, and the development of key social, motor, and media-literacy skills, they also pose risks, such as those relating to bullying, adult content, unwanted contact, and a displacement of more meaningful activities, such as reading or physical play. How, or whether, these risks should be minimized is the subject of intense media and policy debate, and often technological solutions are favored over social policies that are messy and uncertain in their effectiveness. Nash sets out the evidence regarding the balance of digital opportunity and risk for young people, and uses this as the context to outline policy measures targeted at them. Her analysis raises questions over whether children's interests can be well served by policies developed in the context of a risk-focused public debate.

Reading daily news headlines, it could plausibly be assumed that the Internet's main impact on the lives of children has been the deplorable pollution and corruption of impressionable young minds.[1] This is a very one-sided view. Whilst each headline depicts a legitimate news story in which the well-being of youngsters is at risk, it tells us far more about the media's traditional dependence on bad rather than good news, and, perhaps more interestingly,

[1] For the purposes of this chapter, the term "child" will be taken to refer to any person under the age of 18, using the same definition as the United Nations for the purposes of the Convention on the Rights of the Child. Where the research described in the text refers only to a particular subset of this age group, this will be specified.

about the public appetite for scare stories concerning the Internet and its implied risks for children. In this chapter, we ask whether or not children's interests are well served by developments in Internet regulation, which seem to focus more on digital risks than opportunities. We also explore the factors that might explain this political approach, as well as its inadequacies, before concluding with some reflections on the ingredients of a more balanced approach.

The Dangerous Myth of the Digital Native

One factor which helps to explain some of the moral panic surrounding children's Internet use is the simple point that children are often presumed to be more expert users than either their parents or lawmakers. Characterized by Prensky (2001) as the difference between "digital natives" (those who have grown up with the technology) and "digital immigrants" (those who come to it later in life), this carries an assumption that all children born in the digital era are equally adept at using technology, even displaying the capacity to "think and process information fundamentally differently from their predecessors" (p. 1). Unfortunately, this bluntly essentialist dichotomy is damaging on two fronts. First, it encourages us to think that it's *impossible* for the older generation to understand or keep pace with children's Internet use, and second, it manages to obscure many policy-relevant variations in Internet use and access between children. With the rise of smartphones and tablets, children growing up in Western nations enjoy near-universal access to the Internet from an increasingly young age, but there remain considerable differences and inequalities in the extent and types of use, whilst many tech-savvy adults share many of the characteristics of supposed "digital natives" in their Internet use (Helsper and Eynon, 2010).

The range of influences shaping children's Internet access and use includes both internal and external factors. Most obviously, each child brings a different range of skills to their online activities, ranging from basic motor and technical skills, to more specific Internet-related abilities such as search techniques, as well as generic skills such as information literacy and emotional intelligence. Unsurprisingly, the wider the child's range of skills, the more variety in their use of their Internet and the more likely they are to benefit from it (Livingstone and Helsper, 2010).

Amongst the most important external factors that shape children's Internet use are the availability of home access and levels of support (Eynon and Malmberg, 2011). Although households with children are much more likely to have Internet access than those without (Eurostat, 2017), even the mass adoption of mobile phones has yet to drive universal access in Western countries (Mascheroni and Olafsson, 2016). In terms of support, it's not just a question of how much, but also from whom and what type. Support from those with positive Internet experience is more valuable in building children's online confidence (Eastin, 2005), whilst children whose parents lack confidence about Internet use may come to rely more heavily on peer support, with fewer opportunities for parents to pass on social norms (Palfrey and Gasser, 2008) or provide emotional backup (Ito et al., 2010; Turkle, 2011). Building on these findings about the importance of social support we can see that the "digital natives" myth is damaging in a third sense, in so far as its frequent repetition actually risks undermining parents' and educators' confidence in their own ability to provide positive support to the young Internet users in their charge.

Understanding the variability of children's Internet experiences is vital for policy purposes, both because such inequality in access and use may limit their development of digital skills, and also because the differences mean that not all children face the same combination of risks and opportunities. Laws, for example, that set a minimum age below which children cannot consent to their digital data being processed may do many children a disservice, either because they limit access to apps and services for those mature enough to understand the risks sooner, or enable use by those old enough but who still struggle to see the risks. Policy responses that treat all children as skilled and confident "digital natives" will be fundamentally inadequate, so policy, parenting, and educational strategies should be adjusted accordingly. The following two sections expand on this claim, analyzing how the "myth of the digital native" masks important disparities in the contexts and experiences of children's Internet use, first in education, and second in their uses of digital technologies outside school.

Hopes and Expectations: Internet Use and Education

Despite the media's focus on the Internet's dark side, technology policy does not always follow suit. Instead it has often been driven by optimistic (and potentially vote-winning) strategies to achieve beneficial social outcomes. Information and communication technologies have long been seen to offer many valuable opportunities for children, potentially delivering educational benefits such as greater engagement, improved learning outcomes, and skills important for workforce participation, and also more personal benefits, such as enhanced self-esteem or self-efficacy (Davies and Eynon, 2012). These expectations are often visible in the political rhetoric surrounding the launch of new investment programs, albeit frequently colored by a naive technological determinism that drives a fascination with investment in hardware rather than people (Livingstone, 2009).

Whatever the rhetoric, governments across most Western nations have invested significant resources in schools' digital infrastructure since 2000. Even though this is clearly a positive development, the evidence of educational benefits is mixed. Even for those children who do regularly use digital resources at school, the quality of experience may vary dramatically, depending on factors such as teachers' proficiency in integrating technology into class work or the level of support provided to help staff and children work effectively (Warschauer et al., 2014). The inequity of these conditions is further exacerbated by the fact that schools from richer and poorer areas often face very different educational challenges which technology implementation cannot be expected to overcome (Warschauer et al., 2004).

A further reason to be wary of the grand claims made for the role of the Internet in transforming children's education comes from the constrained nature of its use in schools. Most educational policies regarding technology investment in schools are driven by a determination that this will improve academic outcomes, but they are likely to be used only within preexisting curricular constraints (Livingstone, 2012). Schools are also, understandably, charged with ensuring safe and appropriate behavior, such that school Internet use is usually filtered and monitored. Social-media use is often forbidden or heavily restricted. Together, these constraints mean that pupils lacking easy access to the Internet at home are automatically at a disadvantage compared to those who have opportunities for more flexible and autonomous use at home (Wilkin et al., 2017).

Unfortunately, expectations of the Internet's improving effect on formal educational outcomes have yet to be fulfilled, and increasingly, research studies reveal the complex social, economic, and institutional factors that affect how children and young people experience technology (Wilkin et al., 2017). Nor does it seem to be the case that the Internet's collaborative and creative potential is exploited to the full for academic purposes. As Davies and Eynon note: "[T]he Internet serves most of all as a reassuring quick fix for teenage learners" (Davies and Eynon, 2012: 88), providing opportunities for consultation of a variety of information sources whilst working, whether the sources be Google, Wikipedia, or friends.

Perhaps such a focus on formal educational outcomes is misplaced. An influential early study for the MacArthur Foundation argued that teenage Internet users are increasingly engaged in a "participatory culture," namely, "a culture with relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations and some type of informal mentorship whereby what is known by the most experienced is passed along to novices" (Jenkins et al., 2006: 3). As the next section will make clear, many of the skills required to engage in such a culture may be better learnt through "informal learning" outside schools, meaning (rather ironically) that personal, private Internet use at home which gives rise to so many parenting fears may ultimately be best placed to build the soft skills required in digital cultures.

Personal Internet Use: Risks and Opportunities

Many aspects of children's personal lives are mediated by the Internet. It offers valued platforms for creating and playing with identities, making and talking to friends, even for living out some of the most mundane aspects of family life. It's not so much that these activities are new in themselves, but rather that children and teenagers "are doing this while the contexts for communication, friendship, play, and self-expression are being reconfigured through their engagement with new media" (Ito et al., 2010: 1). Such reconfiguration is itself helping to reshape existing *practice*, such as where traditional efforts by teenagers to change their appearance and image give way to the conscious creation and curation of online identities, as well as the revision of existing *norms* (for example, around the use and reuse of third-party-created content). As these altered practices and norms play out, the array of risks and opportunities facing children is also transformed, and it's no surprise that many media-driven outpourings of moral panic concern supposed horrors resulting from children's determination to connect with others online. For many parents and policy-makers, perhaps the greatest source of anxiety is the extent to which children and teenagers can conduct much of their personal life online in an environment which is perversely private in the sense that a responsible adult can easily be excluded, but public in so far as the content or communication is effortlessly opened up to unknown others.

Over the past decade, we have seen some notable changes in the patterns of children's Internet use. The first relates to the rise of mobile devices and tablets; the second to the ever younger ages at which children first use the Internet. The 2017 OfCom children and media use survey reports that sixty-five percent of UK children aged three to four are using tablet computers, for example, whilst ninety-three percent of twelve- to fifteen-year-olds use (but don't necessarily own) a mobile phone (OfCom, 2017). Despite the emphasis placed on digital technology uptake in schools, the most common point of access is still home rather than school, and increasingly in private by children using personal devices such as laptops or mobiles, in whichever space they choose (Mascheroni and Ólafsson, 2014). The most common uses of the Internet amongst nine- to sixteen-year-olds are for entertainment, such as playing online games, watching videos, or listening to music, or for communicating with friends using instant messaging apps or social networks (Mascheroni and Ólafsson, 2014).

Although many children are indeed engaged in what Jenkins describes as "participatory cultures" (Jenkins et al., 2006), perhaps playing online games with others or publishing music, videos, and photos for others to share, these activities are not as popular as simpler activities such as viewing content provided by others, supporting the concept of a "ladder of opportunities" which children may ascend at different rates and to different levels (Livingstone and Helsper, 2007; Hasebrink et al., 2011). Ito et al. (2010) note that for most teenagers, creativity is mainly expressed in "everyday personal media production" as they document their daily lives through social media, but that for some, this does become a "jumping-off point" for more elaborate forms of creativity (p. 290). And whilst these more creative activities (photography, music, or video production, etc.) may initially be interest-driven, they can develop into intensely social activities, generating their own communities of interest and becoming important forms of self-expression, the latter being a particularly important feature of Internet use for older children and teenagers.

Starting from the premise that identity is not fixed and objective, but fluid and mutable, the Internet enables the "performance" of identity across a range of sites and for different audiences, albeit with imperfectly permeable boundaries (boyd, 2007; boyd and Marwick, 2011). Although identity performance takes place across a range of platforms including messaging and texting, the rise of social media, with its central focus on a self-constructed personal profile, has provided a natural home for such activity. While social network sites such as Facebook are currently for use only by those over thirteen, sixty-eight percent of European children between nine and sixteen claim to have a social networking profile, with age-specific practices varying from twenty-seven percent for those aged nine to ten, to ninety-three percent for those at the top of the age range (Mascheroni and Ólafsson, 2014). In the United States, seventy-six percent of online teenagers between twelve and seventeen use social networks, with Facebook still proving the most popular service (Lenhart, 2015). Whilst the use of social media for social and expressive purposes is not necessarily problematic, these figures do raise legitimate policy concerns, implying that large numbers of children are using sites not designed for their age group, and potentially without parental consent or knowledge.

Whilst children and teenagers may be in thrall to the potential of social media to help them curate their online identities, they are also reliant on them for communication. This ability to master the affordances of particular platforms or technologies and make them work for a particular end, in this case establishing or maintaining friendships, is a skill which many, particularly older children and teens, manifest. Many studies note how young Internet users seamlessly manage a portfolio of different communication tools to sustain their social and family relationships, as well as mobile texting or messaging apps for quick and intimate conversations, social network status updates to check in with a broader group, or phone and video calls for private and urgent conversations (Ito et al., 2010; Davies and Eynon, 2012; Lenhart, 2015). Although some have raised concerns about the burden of managing so many different modes of communication (Turkle, 2011), and the strains of managing complex social hierarchies with relatively unsophisticated tools (Ito et al., 2010; boyd and Marwick, 2011), the majority of the evidence suggests that Internet technologies play a key role for children and young people in expressing their developing and mutable social selves.

Internet Regulation: Protecting or Politicizing Children?

In contrast to the panic-laden news headlines that have accompanied children's adoption of the Internet, the more positive aspects of Internet use rarely receive the same high degree of media coverage or policy recognition. This isn't to say that concern for the risks involved is illegitimate: clearly, governments, parents, and educators have a duty to protect. Rather, there are two problems with such a one-sided approach: first, there is a tendency to ignore messy details, such as the fact that some children are more vulnerable than others or that harm is hard to detect, and second, it ignores the possibility that risk and opportunity may go hand in hand.

Whilst there is a rich and expanding body of literature investigating how children's Internet use shapes their experience of risks and opportunities, there are still some real weaknesses. From a policy perspective, one of the biggest problems is that we know relatively little about the relationship between risk and actual harm, or the way in which different risk factors combine to increase or decrease risks for particular children. Most fundamentally, there are real methodological and ethical challenges involved in measuring harms to children resulting from Internet use; so many studies in this area measure not harm, or even risk, but the "risk of risk," for example, the likelihood that any one child will access pornography, rather than the likelihood that he/she will be harmed by this experience (Slavtcheva-Petkova et al., 2015). This poses a problem for responsible evidence-based policy-making, meaning that even with the best of intentions, policies are likely to be constructed on the basis of judgments about the *potential* risk of Internet use.

Despite this limitation, there are many excellent studies investigating the range of risks that children are exposed to in their digital activities. Probably the most commonly studied or discussed risks are exposure to grooming, sexual content, and bullying; however, there is often little consensus over their prevalence. Cyberbullying (understood as bullying behavior experienced online), has proved particularly hard to measure, with a recent meta-analysis noting prevalence figures of between ten and forty percent of adolescents reporting experiences of cyberbullying (Kowalski et al., 2014). Similar variation is found in studies of sexting (sending sexual messages or images via a mobile device); one systematic literature review suggests that anywhere between twelve percent and thirty-five percent of adolescents receive sexts, whether textual or photographic (Klettke et al., 2014). Although no single factor can explain these differences, they are likely to result from variations in how researchers define and measure key concepts, such as "cyberbullying," as well as the timescale that respondents are asked to reflect upon.

In addition to these long-acknowledged risks, the Internet's capacity to cater for more specialist audiences has seen the rise of networks and communities exchanging information and advice on issues such as anorexia, bulimia, self-harm, and suicide. Whilst there is little disagreement in the academic literature as to the potential harm of such sites, there is uncertainty about the balance between the dangers of normalizing damaging behavior, and the value for vulnerable youngsters of finding a non-judgmental space to discuss personal problems with similar others (Slavtcheva-Petkova et al., 2015). There is also as yet little research which shows that otherwise healthy children or teenagers are at risk from such content. Indeed, many studies in this field show that children who are vulnerable as a result of difficult personal or family circumstances are more likely to demonstrate behaviors associated with digital risks. For example, acknowledged predictors of exposure to pornography, self-harm material, or other online risks include depression, sexual abuse, eating disorders, or risk-seeking behavior offline (Wolak et al., 2007; Mitchell and Ybarra, 2007). Such children may be doubly at risk in the sense that they also lack resources or "resilience" to cope with risky content or relationships, and may also be less likely to seek support from family or other responsible adults. This poses particular challenges for policy, suggesting a need to more effectively target resources at vulnerable groups.

Counterintuitively though, other studies have revealed that greater opportunities of use also go hand in hand with greater exposure to digital risks, meaning that older, more sophisticated users, or those from middle-class households who enjoy better access, also encounter more risk (Livingstone, 2009). These findings suggest that policy-makers seeking to reduce exposure to digital risks need to find ways of supporting children who are most vulnerable on other measures, as well as those who are privileged and confident Internet users—potentially two very different groups.

Policy Responses—Serving our Children Well?

As noted earlier, media and policy preoccupation with the negative aspects of children's Internet use is problematic if this results in policy outcomes which *restrict opportunities* at the same time as *reducing risks*. In practice, this is a real concern, as many available policy tools offer protection only by reducing opportunities for the free exchange of information or speech. The importance of balancing these competing goals is recognized in legal or constitutional protections in many countries and in international instruments such as the United Nations Convention on the Rights of the Child.[2] In this next section, we ask whether political imperatives (driven by media pressure) result in policies that generally do strike the right balance between the protection of well-being and protection of free speech.

It is worth noting at the outset that our concern here is activities which may pose risks for children, rather than those which illegally harm children (such as creation or circulation of child-abuse images). It is often argued that in a situation of such uncertainty it's better to employ precautionary principles to minimize the occurrence of possible harms, particularly when seeking to protect potentially vulnerable individuals. It should also be acknowledged that whilst research evidence may be scarce, there are many other factors (moral, cultural, religious, economic, etc.) that can legitimate policy intervention. But it shouldn't be forgotten that there are also some very poor reasons for policy intervention, such as the "symbolism" of being seen to do something even if that "something" fails to ameliorate the original policy problem (Heins, 2001).

A standard policy response to many of the risks outlined in this chapter, for example, is that certain sorts of digital content deemed potentially harmful to children should be blocked or filtered, a child-protection solution with a long history in other media (Heins, 2001). Filtering methods can be applied at different "choke points" across the Internet, ranging from state-directed filtering schemes where blocking is carried out at backbone level, to filtering by search engines or Internet Service Providers (ISPs), all the way down to filtering at the level of the household or institution. Although advocates of free speech argue that filtering decisions should be made as closely as possible to the individual user, several countries, including Denmark, South Korea, and the United States have introduced legislation requiring publicly funded schools and libraries to install filtering software to protect children using their facilities. Other countries, such as the UK, have introduced "active choice" policies, whereby households signing up to new broadband contracts must be asked whether they wish to install family-friendly filters at household level, which would then filter

[2] Available at www.ohchr.org/EN/ProfessionalInterest/Pages/CRC.aspx. (Accessed April 10, 2018).

content across all content-accessing devices. This may leave parents with a measure of control, but even so remains a rather blunt tool that cannot distinguish between the differing degrees of protection needed for various members of the household.

The introduction of mandatory filters may seem to be a positive step toward reducing access to potentially harmful materials for young children, but it remains a controversial policy and there is little empirical evidence of its efficacy (Przybylski and Nash, 2017). First, because it restricts access to otherwise legal content, often for adults as well as children, but also because no filter is ever one hundred percent effective, meaning that legitimate content may be erroneously blocked or undesirable content let through. Over-blocking is particularly problematic if the material has educational or informational value, such as that pertaining to relationships, sexual health, or even art. There is also a danger that when filtering mechanisms are in place, parents or educators may be lulled into a false sense of security, believing that no further risks exist. Unfortunately, calls for mandatory filtering are politically attractive as they articulate a decisive policy response, and are more clearly understood than subtle calls for improved digital literacy training or more effective parental interventions.

If we are to question whether filtering policies effectively protect children from significant risk or harm without undue damage to their rights to freedom of expression and information, we must also ask whether access policies do enough to support *equal* rights. Although sections of this chapter have noted the near-universal efforts in Western developed countries to get schools online, there are still significant inequalities in the availability and use of digital technologies in schools, and children lacking easy Internet access at home remain at a disadvantage. In the absence of wide-scale investment in home access, it is vital that better support is provided for well-planned integration of digital technologies in schools, including teacher training and curriculum development. Just as importantly though, it would be highly beneficial if after-school and holiday provision could find ways of providing access to digital devices in ways that support autonomy and exploration, better mimicking informal home use.

To a large degree, policy debates around children's Internet use have long been dominated by concerns about harmful content and access, but other newer policy issues are emerging rapidly, and to do justice to the next generation of Internet users these must be given more consideration. Of these, probably the most important is privacy. In a context where ever younger children are using a broadening array of digital media, the data trails left by minors are increasing exponentially. Internet-connected toys that promise speech or haptic interactions may record a child's most intimate conversations. Their well-being and health are subject to surveillance and reporting by a fast-expanding market of

Internet of Things technologies, such as smart baby socks or nappies, and fitness or tracking devices. In schools, pupils' behavior and activities are recorded on corporate-provided databases and apps, with biometric markers such as fingerprints regularly utilized to provide access to services. Despite these developments, children are ill-served by privacy laws (Matwyshyn, 2012). Whilst there have been efforts to introduce legislation to address the specific needs of those too young to contract on their own behalf, such as the US Children's Online Privacy Protection Act 1998 (COPPA) or the EU's General Data Protection Regulation (GDPR), in practice this has just meant that many popular services or products apply a minimum age limit of thirteen,[3] but lack effective means of policing this (Macenaite and Kosta, 2017). This leaves young users with little protection, and potentially encourages both children and parents to lie about their age to gain access to a desired service, whilst also denying younger users autonomy. It's also hard to see how consent-based regulatory systems will operate in a context where more and more digital interactions take place without the need for a screen, or indeed any other interface where complex terms and conditions might be displayed.

There is as yet little evidence of demonstrable harms resulting from the use or misuse of children's data, or the failure to respect their privacy. We do have emerging evidence of pathways to harm, however: connected toys or home devices that can be hacked to enable communication with or to surveil a child; or the expanding market for children's digital identities, enabling fraudsters to take out loans or purchase goods in their names. More worryingly, we might want to question the ethics of our direction of travel: toward a world where good parenting relies ever more heavily on digital monitoring or surveillance (Leaver, 2017), or where products are designed and marketed for the "algorithmic child," based on rich and deep personal data profiles collected from their online behaviors. It may be harder to quantify or observe this range of privacy-related risks, but it doesn't mean they matter less than the content or conduct-related risks so frequently discussed in policy circles.

Conclusion

For many, there could be no better illustration of the "dark side of the Internet" than the media's hysterical portrayal of children's daily exposure to pedophiles, pornography, and gambling. Yet, although such risks undoubtedly do exist and merit serious-minded attention from policy-makers, the moral panic surrounding their prevalence serves to obscure another dark

[3] The GDPR allows member states to set a minimum age of digital consent between thirteen and sixteen, meaning that in practice this age limit will vary.

corner of this debate, namely the misrepresentation of children in Internet policy and regulation, and the common tendency to favor policy measures that restrict, rather than expand, access to information and speech. This chapter has sought to clarify how purported concern for the well-being of our children and teenagers is shaping the future of the Internet. Although there's certainly nobility in such concern, it's unfortunately not obvious that children's interests are necessarily well served by the dominant trends in Internet policy which seem to promote protection but not empowerment (Lund and Livingstone, 2012).

Reflecting on the research discussed in this chapter, we can draw out four more specific observations that could help us improve child-focused Internet policies. First, too much emphasis is placed on reducing some of the most feared (but not necessarily most harmful) risks by introducing technical fixes such as filtering, rather than engaging with the messy realities of parenting and child development, or the data-driven economies of the platform society. Second, there is too little acceptance of children's rights to freedom of expression and information, often regarded as less important than their rights to protection from harm, even when that harm is uncertain or unlikely. Such an imbalance may be partly understood as a result of a general failure to accept that childhood is itself a socially defined construct, and that media portrayal of children as helpless, vulnerable victims of online harms is outdated at a juncture where youngsters are capable of both perpetrating online abuse and helping to protect themselves against it. Third, more effort must be made to support positive use or help those who are most vulnerable, rather than the easy-to-reach middle classes' children with anxious parents. Finally, and perhaps more importantly, there needs to be a wider recognition that no one is well served if genuine concerns for child protection are manipulated and misused in the pursuit of other less noble political goals, such as the quiet pursuit of moral conservatism and social control. Many of those who oppose heavy-handed content filtering might be more easily appeased if significant policy resources were also devoted to promoting access, participation, and positive Internet use, underscoring a genuine political commitment to supporting children's well-being. The Internet, quite simply, poses both risks and opportunities for young users, and a serious-minded policy approach should embrace all the resulting trade-offs and complexities without being driven by a politics of fear.

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22

Looking Ahead at Internet Video and its Societal Impacts

Eli Noam

Media economics provides a basis for Eli Noam in setting out the logic behind a series of expectations he shares about how the transition from regular linear TV to online video will lead to major changes in culture, politics, and society. His perspective on the dramatic implications of this shift suggests comparisons with the fundamental changes brought about by the introduction of first-generation TV over seventy years ago, with both exciting advances and also disturbing problems. Noam is able to raise serious questions about new and enduring cultural, consumer-oriented, political, economic, educational, and other social implications of what might sound like a mere technical shift to a new style of video.

Few questions are fraught with more long-term implications than the way we shape our communications systems. If the medium is indeed the message (McLuhan 1964), and if these messages influence people and institutions, then tomorrow's media, and today's media policies, will govern future society, culture, and economy.

It is therefore important to understand that we might well be on the verge of one of humanity's greatest leaps in media communications, and consequently also of one of its major disruptions of social, cultural, political, and economic arrangements. Based on technological and economic trends,[1] change in media will keep speeding up, and generate an unprecedented acceleration in the transformation of culture and politics.

[1] Koh and Magee (2006).

In an earlier chapter of the first edition of this reader,[2] I analyzed the nature of content in a high-performance, dynamic, online environment.[3] While the societal implications of the changes underway are controversial and far from determined, the present chapter will seek to put forward some hypothesized impacts of the new style of television on economy, society, and culture, with the aim of shaping debate over research and policy agendas around the media.

Technology is one key driver of change. And with information technology progressing exponentially at the speed of Moore's Law,[4] it is not too early to think about the next generation of television—ever-changing, globalizing, experiential, individualized, immersive, often interactive, and increasingly absorbing attention away from reality. It is not too early to think about its technology, societal impact, public policy issues, and economics.

When we look ahead, we conclude that the central players in the next generation of TV will be companies we call "video cloud providers" or simply "video clouds" (Noam, 2014b).

These are operators that provide intermediary functions of storage, content delivery, advertising placement, financial settlements, and technological interoperability. Such providers will play a dominant role in the emerging media environment around the world, but there will be relatively few of them in number, they will operate globally, and they will be vertically integrated into content production and technology. They will provide many advantages and opportunities for unprecedented creativity and innovation in technology, content, and business models, but they will also create new problems, or require old problems to be dealt with in new ways. These are conclusions about the future, and they therefore cannot be verified by hard data. They are reached by an extrapolation of technology trends in North America, followed by an analysis of the implications of such trends, using an analysis inspired by social sciences in general, media economics in particular, and media history as a background. Unavoidably, there are speculative elements in such a forward-looking interpretation.

The most fundamental change in TV is its transition from a system that is slow-moving, tightly controlled, and standardized in technology to one more resembling the dynamics of the Internet and the information technology (IT) sector. Television has been around since the late 1930s as a consumer medium. In those eighty years, it has moved from an analog black and white imaging technology to color digital multicasting at a somewhat sharper resolution. Its bit rate per distribution channel has increased by a technological

[2] Noam (2014a). See also Noam (2014b).

[3] This is further developed in a forthcoming monograph: Eli Noam. *Into the Era of Cloud-TV*. Manuscript in preparation.

[4] Moore (1965).

compound annual growth rate (CAGR) of about four percent per year, if one is generous. In honor of the guiding spirit of the first decades of mass market TV, this rate should be described as "Sarnoff's Rate," for the leader of the US company RCA, which dominated TV technology for its first generation. In contrast, "Moore's Law" rate—with its doubling for every two years—describes technological change in the IT sector based on advances in the underlying semiconductor components, and comes to about forty percent a year, ten times as fast as that for TV.

But, in many high-income countries, TV is migrating to distribution over the Internet,[5] for example with over-the-top applications to offer movies directly to viewers. In the process it is moving away from the control of traditional TV organizations. This has been widely noted. But the attention has been mostly on the level of the widening of content options and providers. This is important, of course, but arguably even more fundamental in the long run is the breakdown of the system of (almost) uniform TV technology in favor of a system of multiple parallel types of TV. As the video system moves onto the Internet, and as TV sets become computer-like devices, different technologies can be offered.[6] Competing providers of various technology modules, distribution systems, and content technology are emerging, and their rivalries will transition TV from a system of technical uniformity to one much more resembling that of mobile devices, games, and apps.

Putting the emerging technology elements together enables TV to be a high-resolution, immersive, participatory, individualized, social, worldwide experience. Of course, a good amount of video will continue to be linear, traditional, classic television in a twenty-five-minute program format, surviving in the same way that newspapers, books, and magazines have remained. But they will decline in their economic and cultural roles. The leading edge of creativity—technologically, culturally, and economically—will be in the new media. The kind of television that is emerging is partly a "widening"—more of everything. But more interesting is the "deepening." More impulses, more information, more sensory impressions, greater richness. This continues a historic process going back to Gutenberg.

What will be the impact of the new media system? Obviously, it will be full of exciting advances, but also disturbing problems. Such is always the case with fundamental innovation. It is equally common that the promoters of the new do not wish to address the problems, either because they are too excited and occupied by the opportunities to anticipate problems, or because they fear that even identifying them will help the protectors of the old to gang up against them. This is not my intention, but neither should issues be

[5] Nielsen and Sambrook (2016). [6] Abreu et al. (2017).

swept under the rug. While the future remains unpredictable and certain to yield unexpected outcomes, this chapter outlines my analysis of the most likely and significant positives as well as negatives of the emerging system. Together, they provide an agenda for research on the societal implications of Internet video.

Positives of Next-Generation Video

1. *Media Use Will Move from Passive Consumption to Active Experience*

For many years, entertainment and much of culture were passive experiences. The user's main contribution was to choose the allocation of her time (and often money) to a particular piece of content. Thereafter, the creators and distributers took over, that is, authors, producers, performers, aggregators, etc. On the whole, the roles of user and provider were clear. The former consumed; the latter produced. This was not always the case. In ancient times, people were both producers and consumers as they sat around the fire, singing and storytelling. In time, the two activities diverged but never fully separated.

Today, IT enables a two-way interactivity, both vertical and horizontal. Of course, much media use will remain unidirectional. There will always be couch potatoes. However, once the option of engagement is offered, people often choose it. In the process, media evolves far beyond the simplistic interactivity of today to a much more participatory *experience*. The expansion of what content is today to generating those experiences is a central frontier in creativity for the artistic as well as technological and entrepreneurial communities.[7] We are on the verge of take-off on a largely new journey of creative civilizations into unexplored territory.

2. *Life Experience Will Be Enhanced*

The virtual experience takes the participant out of the humdrum of ordinary life into an often magical world. So does a trip to the Grand Canyon or to Venice. These are great experiences; it's too bad they are expensive and take a lot of time. With the new media, people's horizons can be widened. They learn new skills, meet new people, are asked new questions, find themselves with new challenges, yet are usually quite safe and can control the level of stimulus that is comfortable and affordable for them at any given moment.

[7] Pine and Gilmore (1998).

3. *Socialization and Education Will Be Enriched*

Experiential video is of particular benefit for those people who are limited in mobility, whether for reasons of age, economics, responsibilities, or physical limitations. The new style of interactive, experiential, immersive, and individualized video will be used for functions beyond entertainment. Education is an obvious example. This goes beyond school learning, including socialization more generally. The new technology allows this to be done much more effectively. This has both positive and negative aspects. The negative aspects are clear: a societal training toward conformity in the guise of social harmony and best fit for the individual. But the positives are there, too: the ability of parents to become more "productive" in terms of bringing up their children, by leveraging themselves through technology that functions, to some extent, in loco parentis.

The new tools of video, with their varieties of immersion and interactivity, can be effective in teaching students. Customization to the special needs of a student becomes possible, and this has numerous advantages which in the aggregate revolutionize the school system. But it is also a pathway to the outmigration from the public school system, and to a move to more segmented learning communities. Immersive and interactive media can also be used effectively for skills training. For instance, "body memory" can be acquired, and language skills can be practiced in a setting where one converses with virtual partners.

4. *Creative Activity Will Be Boosted*

In the emerging mediascape, the creative community is widened to include what used to be called consumers. On top of that, the connectivity with creatives around the world, and the ability to search and readily find contributions in many languages and from past generations, greatly enlarge the knowledge pool of humanity. While it is not clear where this expansion will take us as a civilization, it seems clear that it accelerates innovation and change.

Is the next-generation video content local in nature, or is it necessarily global? The answer is—both. There will be international, high-value entertainment of the Hollywood or Bollywood type. But it will be supplemented by content from nearby countries, in regions that share a similar culture. And there will be local content from established media organizations as well as from local "long tail" providers.

The globalization of culture is being routinely and ritualistically decried. Of course, diversity of origin is a good thing, and domination by a handful of companies and a small set of countries is a problem. But so is the domination by a domestic media oligopoly. Online video media is global in reach, and one should expect a more diverse media system to emerge in most countries than was available previously. However, many domestic local-only providers may fall behind and decline, which is a major negative. This is an issue that would require addressing through various forms of supportive policies.

5. *Politics Will Become More Open to Change*

The new media system generates more transparency and participation. Candidates can be observed, or present themselves, in ways such that voters can better judge their personalities. The interactive and immersive aspects of the emerging video media allow a deeper connection with the personalities involved. The interactive media offers people the possibility to directly interact with politicians in a way they probably never achieve in person.[8]

The rapid change in political culture is often seen as negative. But what is wrong with overcoming the negative elements of a culture? Would one not wish for changes in the internal cultures of some states, regions, and societies, from Saudi Arabia to Belarus and many points in between? Opening media to different perspectives can make a big difference. Of course, there is a fine line between introducing new views and subverting traditional values, but we also must recognize that those values are often those of a domestic power structure. Changed societal norms accelerated by media technology thus enable social change like the Arab Spring, the collapse of the Soviet system, and a pushback to corruption.

6. *Communications Infrastructure Will Be Rapidly Upgraded*

A media system built on online, individualized and peer-to-peer, multi-device, high-resolution entertainment requires prodigious amounts of bandwidth. This means substantial upgrades of networks in some countries. The good news is that this bandwidth and supportive infrastructure, driven by entertainment usage, can also serve many other applications. Tele-medicine, shopping, working at home, and education are examples.[9] No doubt there will be many we can hardly think of today. Whereas in the past tech-type applications started the Internet and let consumer entertainment ride the system too, now this is being reversed, and the prodigious demand for entertainment—in both rich and poor countries—becomes the driver and financial model for infrastructure and platforms.

7. *Technological Innovation Will Accelerate*

We discussed earlier how the video system moved from the stately pace of "Sarnoff's rate" to the torrid rate of Moore's Law. Perhaps the most positive

[8] Brichacek (2017). [9] Federal Communications Commission (2010).

aspect of the new system is, therefore, that it unleashes technology innovation on numerous levels: infrastructure; consumer devices; storage; compression; payment systems; human–machine interaction; bio-electronics; holography; real-time rendering; semantic networks; and many more.

The reason why one can expect such innovations driven by the video field is that the consumer base for media-oriented technology is huge, is global, and is coupled with a willingness to pay. It is a large market for innovations. A second reason is that the media sector is familiar to every potential innovator, and hence receives much attention from such people.

Rapid innovation favors small firms and start-ups to take a lead. This is the case in technology, content genres, and applications. It is less true for the infrastructure itself, or for technology development where huge resources are required, such as flat-screen video panels, semiconductor manufacturing, or smartphones. In some cases the start-ups might grow and become large players. But many are likely to be bought up by the established firms.

Negatives of Next-Generation Video

As we have seen in the previous section, the advantages of the new emerging media system could be huge. But no gain comes without pain. There is no point in denying them, ostrich-like, or conversely, magnifying them into terrifying scenarios of doom and gloom. Instead, we should identify the issues and consider how to deal with them through research, policy, and practice.

1. *Market Power in Media in Next-Generation Video Media Will Be Significant and Global*

Perhaps the one issue to watch most is global concentration and power over video media. The fundamental economics of the emerging media point to market concentration on several levels of the system. This is the case on the level of video transmission infrastructure: wired and wireless networks, Internet service providers (ISPs), and the content distribution networks (CDNs) that move the video materials from the online providers to the ISPs. Observing market concentration in this segment is not particularly new, it has always been considered somewhat of a “natural monopoly” (or, more recently, oligopoly) that has therefore been subjected to state ownership or tight regulation. Market structures in infrastructure, it should be noted, are usually national or regional, with different players dominating different geographical and product markets. Often, they can therefore be dealt with by the traditional regulatory/antitrust systems, modified for the new technology.

It is a different story for the next level, video cloud service provision. Here, the economies of scale and network effects are so strong, the effects of distance so little, and the technology so expensive and fast-moving, that one must expect global players, supplemented by regional providers specializing in regional fare, such as Arabic or Indian film content. But when content moves to the level of immersion, interactivity, and customization, this becomes harder. The advantages of leading edge, technologically savvy, and large-scale firms will rise. The prime examples are video cloud firms such as Amazon, Apple, Facebook, and Google.

The third level is the creation of the content itself. Here emerges a bifurcation: "long tail" content provided by numerous individuals and small producers, and "next generation video" of immersive, interactive, special effects, and customized nature which is produced by big and sophisticated media firms with a global scale.

The fourth level is that of technology devices. Here, too, large IT and consumer electronics firms are globally dominant, supplemented by innovative start-ups that are bought up once their concepts have proven successful.

Taken together, this spells out a major media concentration, and one that is on the global level.[10] There have been trends of vertical integration across those levels, with infrastructure companies moving into content aggregation and production (e.g., Verizon/AOL/Yahoo; Comcast/UNBC). Or, device makers moving into cloud services (Apple). Or, content retailers moving into cloud services and production (Amazon or Alibaba). Or, device makers moving into content (Sony). The challenge is how to protect openness, diversity, national content creation, innovative R&D, and competitive pricing in such an environment without creating protectionist barriers.

2. *De-Industrialization and Inequality Are Rising*

For many years, policy-makers in developed countries have believed and hoped that digital activities such as video would replace and enhance industrial jobs. This was important to developed countries as their traditional manufacturing activities were either being automated or were outmigrating to developing or emerging countries. Such new jobs, with their replacement of low-paying factory drudgery with well-paying creative tasks, were also considered to reduce class division and inequality.

The conventional story is one of great success. Media industries that have been negatively affected tend to be viewed as inefficient oligopolies such as the music industry, daily newspapers, or TV networks. In contrast, the digital

[10] Noam (2016).

economy has supplied much growth. The Internet is supposed to have caused a GDP growth of up to twenty-one percent in five years in high-income countries.[11]

But what kind of jobs have been generated? In the US, most of them were in e-commerce, not in creative occupations such as in video media but mostly in order fulfillment, that is, packaging and shipping. The problem is not just the loss of traditional employment in manufacturing and retailing at a pace that is hard to counteract with digital employment, but also that the losses are distributed unequally. In the United States, half of the 7.5 million jobs lost during the Great Recession were in industries that pay middle-class wages. Since then, nearly seventy percent of new jobs have been in low-pay industries, and twenty-nine percent in industries that pay well. In the seventeen European countries that use the euro as their currency, the numbers are even worse. Almost 4.3 million low-pay jobs have been gained since mid-2009, but the loss of mid-pay jobs has not stopped. In Japan, a report from Hitotsubashi University in Tokyo documented a 'substantial' drop in mid-pay, mids-kill jobs in the five years through 2005, and linked it to technology.[12]

The data shows that middle-income occupations are losing out, while upper- and lower-income occupations have been gaining.[13] This has a lot of implications. It means that the job mobility from lower to middle class, which had been the historic way to individual progress, is becoming more difficult. The lower occupations are blocked. Social mobility is thus declining. For much of the twentieth century, people's job prospects rose with extra education. While this is still true, the effect is lessened at the lower end. And this happens at a time when the cost of education keeps climbing steeply.

Thus, the emerging unequal employment system may well be the result not of failure but of success. It is the result of fundamental economics that restructures economies fundamentally. And because this reflects basic forces it is very hard to deal with through government policy. The creative industries, with video a leader, are often promoted as an antidote. Yet they cannot possibly succeed in that role. In America, the number of industrial jobs lost has been five million, including the multiplier effects.[14] The number of retail jobs lost has been over a million.[15] The number of people in the US with jobs in journalism, books, TV, film, theater, music, is less than one million.[16] So if creative jobs alone should do the compensation one would have to expand that sector by a factor of seven. Who would watch, read, or listen to all this new creation? People are not going to watch seven times more TV when they already watch seven hours a day. Plus, many people produce content as volunteers, not as a

[11] Du Rausas et al. (2011). [12] Condon and Wiseman (2013).
[13] *The Economist* (2010). [14] lle Kurtzleben (2012). [15] Wright (2012).
[16] Bureau of Labor Statistics. Reporters, Correspondents, and Broadcast News Analysts (2018).

job. On top of that, the globalization of media means that every other country's content is also available, and is also expanding, by the same logic. And, who is going to pay for all this, so that these creators actually get a paycheck?

3. *The Cost of Content Will Rise*

Many people believe that the cost of creating and distributing content will drop, since everything digital is becoming cheaper. The latter is indeed true but it does not logically lead to the former. The reason is that the product itself becomes much more ambitious, complex, and data-intensive. The complexity of the new styles of content, including immersion, personalization, interactivity, etc., requires much more of an effort than classic linear, one-way content. Asynchronous distribution requires much more bandwidth. All these new bells and whistles add to cost, even if each of them becomes cheaper.

There is also increased competition to create or licence premium content among platforms seeking to differentiate themselves. Marketing costs are rising. Audiences are more fragmented and thus smaller. They also have a shorter attention span, which means a shorter product cycle for content. The result is a rise in cost of content to the cloud provider, which translates itself, in time, into a higher price to consumers, too, and hence to issues of affordability.

4. *The Pricing Model Will Be One of Price Discrimination*

On the one hand, a next-generation video system is likely to lead to premium content which is widely attractive but also more expensive, thus raising equality issues for people with low incomes or who live in low-density areas. On the other hand, by reducing the need to pay for full bundles, as they exist today for cable and satellite "prix fixe" bundles, many users are freed from paying for channels in which they have no interest, and this reduces to some extent the financial burden. Another mitigating factor is that the marginal cost of the content is close to zero, which means that it lends itself well to a price discrimination that charges low-income users lower prices. This would not happen because of social-policy mandates but if price elasticity were greater, they would be still profitable customers, just at a lower price, as long as those with a higher willingness to pay do not get a price reduction, too. The electronic platforms enable such refined pricing, almost on the individual level. They also enable the offering of different quality levels.

Nevertheless, the question arises, for the next generation of video content, what its price is going to be, whether it is affordable across the social spectrum, and how the market power of cloud providers and ISPs affects pricing.

5. *User Privacy and Security Are Dropping*

As more data becomes available, and as it becomes easier to collect, store, correlate, and distribute data about an individual and his/her transactions, the individual's privacy sphere is shrinking. Cloud service providers or ISPs have vastly more information available about the individual user, including his/her other, non-video activities and profile.

Some criticism of personalization goes beyond the privacy issue. The argument is that provider-based, algorithm-driven, personalized narrowcasting negates consumer sovereignty.[17] When people receive and consume only content that is in line with their worldview and socio-demographics, and based on company-set algorithms on what they are expected to like, they never change.

When it comes to security, online video (especially interactive ones), provides a rich target area for mischief, data theft, and impersonation. Given such possibility, people are likely to self-censor their video consumption.

6. *Attention Spans Shorten*

A survey of Canadian media consumption studied attention span and found that while in the year 2000 the average attention span, defined in a certain way, was twelve seconds, in 2016 that same measure had dropped to eight seconds. Researchers assume that people are multitasking more but concentrating less.[18] Media providers must find ways to grab and keep the attention of a user. One can already observe changes to make programs shorter, more action-packed and story-driven.[19]

- The length of news articles has shrunk significantly. (This is partly due also to smaller devices used for accessing media, like smartphones.)
- Journalists create more attention-seeking content and headlines in order to reach readers. Roughly sixty percent of Americans admit they only scan headlines.
- News companies like USA Today, Fox News, and others have shortened their content to make it easier and faster to consume.[20]
- A Pew Internet study argues that the current generation of Internet consumers shows a "loss of patience and a lack of deep thinking" resulting from their instant access to information from numerous sources.[21]

[17] Kant (2014). [18] Watson (2015); Wilmer, Sherman, and Chein (2017).
[19] Liao (2016). [20] Kiisel (2012). [21] Weatherhead (2014).

7. *The Communications Process Is Intensified and Slanted toward Sensationalism*

As content producers and providers fight for the limited attention available, content changes. In an attempt to break out of the clutter, it becomes shorter, punchier, more self-contained, more simplistic, and more sensationalized. Other content brands itself as the opposite and seeks a market for sober and thorough content. But these attributes increasingly fall flat as users become used, since childhood, to the more attention-catching styles. Content moves in the same trajectory as urban newspapers did when they were engaged, more than a century ago, in fierce battles. The result then was a substantial "yellow press" of screaming headlines, short simplistic articles, and outright fabrications.

This has a negative effect on the political process and on an informed citizenry. Perhaps the greatest long-term impact of the new style of media is that it ratchets up the intensity of information consumption. The media experience provides a greatly increased amount of bits per second. This means that the level of sensory stimulus is being raised.

8. *Involvement with Real Life Declines*

Users can outmigrate from the physical community to the online community. In effect, the user has isolated him/herself from people, and interacts with machines, yet without feeling at all like a recluse. To the contrary, they may feel like exploring new horizons of social interaction. The traditional forms of interactions seem humdrum, boring, slow-moving, repetitive, whereas the virtual experience is controllable and can be constantly stimulating at just the level that the user feels comfortable with. It can be enormously varied, visually arresting, comforting, scintillating, and altogether a much better place than the real world. Its characters, style, and experiences are almost addictive. One should therefore not be surprised if many people find themselves increasingly drawn into such a world, and staying in it for long periods. In effect, they drop out of the real world, at least for extended periods between the times when they need to resurface for purposes of eating, earning a living, and sex. (And the latter two might be conducted online, too.)

9. *The Spheres of Work and Private Life Are Blurring*

Two electronic trends conflict with each other. One is to mobility. And the other is to a self-contained digital home. Are we going to be nomads, or are we going to be couch potatoes? In a way, both. What both trends of the digital lifestyle have in common is to weaken the traditional location of white-collar work, the office. The digital home becomes also the digital office, and vice versa. The two become seamlessly connected with each other. People add work hours at home. From 2012 to 2016, the share of people who reported working remotely four to five days a month grew from twenty-four to thirty-one percent.[22] As people work remotely they also become connected and supervised by always-on video and other electronics.

The separation of the work and the private spheres blurs. In a way, we are returning to how it used to be in the past for farmers and artisans, whose work and family life were collocated and intermingled.

10. *Societies Fragment*

If one makes some forms of communication more powerful and cheaper, one also makes other forms of communication less powerful and less convenient. As one integrates in new ways, one also contributes to a disintegration of some established ways. According to one survey, people who use social networks such as Facebook and LinkedIn are thirty percent less likely to know their neighbors and have twenty-six percent fewer personal friendships. While there are counterarguments to this perspective [see Rainie and Wellman, Chapter 1, this volume], another survey found that the average American was feeling more socially isolated owing to the upsurge of the Internet and cell phones.[23] A British study found that children (aged ten to eleven years) who spend more than two hours per day in front of a screen have a higher likelihood of developing psychological problems.[24] There is a clear need for continuing research on such issues.

11. *Cultural Change Is Accelerating*

There is a close connection between content and platform. As technology changes, so does content, being able to do new things or old things in new ways. And when technology accelerates, content changes faster, too. This is the situation in today's media environment. The exponential acceleration of technological change, whose shorthand is "Moore's Law," leads to an acceleration in content and, more generally, in culture.[25] More creations, more innovation, shorter life cycles, more change, more global trends, more cultural change. How do societies handle this? Badly, if the past is a guide to the future. Cultural conservatism is deeply ingrained. Most individuals like the foods we grew up with, the music we courted to, and the ideas we encountered at home or in college. Societies are even more traditional, extolling their classic heroes of literature, poetry, arts, and music. Change was accepted but it had to be

[22] Chokshi (2017). [23] Olsen, S. (2009). [24] Moore, E. A. (2010).
[25] Bentley and O'Brien (2017); Webster (2013).

gradual. But the pace is accelerating. Inevitably this creates cultural conflicts. The 1960s and 1970s introduced similar cultural dissonances when "youth culture" broke out of the somnambulant culture of the 1950s, creating conflicts that still reverberate fifty years later. Then, too, the change was precipitated by the emerging broadcast TV medium with which that youthful generation had grown up, and the music that broke out of the parental styles. Today we observe culture wars, with moral traditionalists on one side and progressives on the other. Culture wars are an even greater problem in traditional societies and countries.

The acceleration of cultural change is a topic discussed by the German sociologist Hartmut Rosa.[26] Rosa observes three elements of the speed-up process: *acceleration of the technological change*, of the means of transport and communication, that should have resulted in slowing down the pace of life; *acceleration of the pace of life*, that is to say, the increase of the number of episodes of action or experience per unit of time, made of stress, sense of urgency and lack of time; *acceleration of the social change*, perceived as the evolution and instability of family patterns, lifestyles, religious beliefs, and careers.[27] These trends are destabilizing. As Rosa said, "The core of modernization, acceleration, has turned against the project of modernity that originally motivated and grounded it." Others have similarly observed that the digital society is an unstable society, with economic and social boom–bust cycles.[28]

12. *National Culture Weakens*

National culture is affected, not only vertically across time in terms of continuity vs. change, but also horizontally across geography. As the long-distance distribution of content and applications becomes easy and inexpensive, they move beyond national frontiers. Language issues are reduced by translation and dubbing technologies and by the spread of language skills, mostly in the direction of English. Cultural affinities rise, especially among the young. Shared interests and perspectives become more important. National identities remain important, of course, but not on the level of nationalism of days past. Cultures become less "pure" and differentiated, and more cross-pollinating and shared. In video and film productions, the economics of appealing to a worldwide audience leads to creations of multinational and multiethnic appeal, simply as a business strategy. In particular, the media system of poor countries becomes challenged, and this is typically a politically highly sensitive area.

[26] Rosa, H. (2010). [27] Carette (2012). [28] Noam (2004).

13. *Politics*

What is the impact of the new media system on politics? There has long been a romanticization of the potential of electronic media to elevate democracy and participation in the political process. Radio, and then television, were supposed to strengthen political participation and the level of information. Yet they proved to be instruments of the simplification of politics, and that made money and campaign contributions more important.[29] Cable television was envisioned as a public-access medium, in which citizens could discuss issues and candidates, yet in the end it became dominated by strident channels. Online video media, too, was seen to come to the rescue of democracy by enabling wide public participation and mobilization. The problem is that it enables everyone. At that point a costly arms race of online mobilization and persuasion takes place. This will be particularly true for online video of the kind we have been discussing. It is not cheap to produce, update, and customize. The deep pockets become even more important than before.

Conclusion

The preceding sections are not meant as a Luddite lament. The positives, which have been addressed first, much outweigh the negatives, in my view. But the negatives must be on the table, too, or else one ends easily in the land of hype, with the subsequent disappointment leading to backlash.

For all of these reasons, it is necessary to look ahead, continue to track change over time, identify the drivers of change, and critically consider in what direction they are taking us. This is not a predetermined future, but nor is it science fiction. We know what the trends are, what technologies can be used for, what leading-edge adopters are already doing, and what technology companies are offering in hardware and applications. Of course, details of developments are unfathomable in advance, but the broad outlines of current trends are arguably discernible.

It has been characteristic of individuals, institutions, industries, and entire societies to misjudge the future. This has been particularly the case in the field of communication. On the one hand, we tend to succumb to the various merchants of hype, overestimating the short-term spread of technology or its salutary impact. On the other hand, we tend to underestimate the long-term impact of fundamental technologies. The automobile and the radio were seen as convenient substitutes for horseless carriages or wireless telegraph, rather than as the agents of revolutions in cityscape and mass media, of living

[29] Noam (2002).

patterns and politics. It is easy to be smug about the short-sightedness of past generations. But what about our own today? Might we, too, overestimate the short-term yet underestimate the long-term? The challenge to the research community is to find ways to think more systematically about the mid- and long-term future and develop research strategies to track and understand their societal implications in ways that inform policy and practice.

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23

The Social-Media Challenge to Internet Governance

Laura DeNardis

Just as Internet governance has come to be seen as inherently global, for example in supporting cybersecurity (Creese et al., Chapter 9, this volume), there are forces pulling in opposite directions, such as efforts to localize data, and global platforms privatizing governance within business and industry (Casilli and Posada, Chapter 17, this volume). Laura DeNardis focuses on the ways in which social-media platforms are creating new challenges to Internet governance. What will this mean for the privacy of personal data and freedom of expression? Who should regulate and govern the Internet as well as privacy and expression in the digital age?

Emerging social-media technical architectures and business models pose several challenges to individual civil liberties, democracy, and the Internet's historic openness and interoperability.[1] A number of excellent scholarly enquiries have examined the salutary relationship between social media and political transformation, and ways in which social-media platforms expand freedom of expression and facilitate new forms of citizen journalism and alternative media (Howard et al., 2011). Antithetically, there is of course increasing concern about foreign-influence campaigns in social media designed to affect the outcome of elections, such as alleged Russian attempts to manipulate public opinion with disinformation and partisan acrimony during the 2016

[1] Originally published in *Society & the Internet* (2014) and revised for this updated volume.

US presidential election.[2] Social-media companies and policy-makers are grappling with how to address foreign-election influence in these platforms and the proliferation of so-called fake news. They are also struggling to develop effective strategies to identify and address bot accounts, considering that many social-media users are not people but software code designed to exert social, political, or economic influence. Indeed, social-media platforms, in how they mediate content, such as hate speech, foreign election meddling, cyber-bullying, and violence, are mechanisms of privatized governance profoundly shaping the public sphere.[3]

Critical questions focusing on social-media content and usage should not distract from a different set of infrastructure questions about the evolution of the technical and transactional architecture concealed beneath content and how these infrastructures potentially constrain the future of individual civil liberties and technical openness. The technological affordances underlying social-media platforms are themselves shaping Internet governance. There are many definitions of social media (boyd and Ellison, 2007). This chapter defines social media as possessing three characteristics: the affordance of user-generated content, the ability for individuals to directly engage with other individuals and content, and the ability to select and/or articulate network connections with other individuals. With this capacious definition, social media encompasses social networking platforms, content aggregation sites, and various forms of interactive media and journalism.

The technical architectures and business models enabling these broad forms of social media present four challenges to Internet freedom and governance. Most social-media alternatives are freely available to users and financially supported by online advertising business models. This financial model is only sustainable if information intermediaries are able to collect and aggregate personal information about their users and then target the delivery of online ads based on ad hominem user profiles. This chapter begins by examining the implications of this relinquishment of individual privacy, whether visible to users or not, as the price for free Internet goods. Second, there is an increasing disconnect between perceptions of online anonymity and the technically embedded identity infrastructures that, at a minimum, enable direct traceable anonymity. Some social-media platforms inherently require real-name identification, but even the ones that do not require real names have underlying identity infrastructures based on unique technical identifiers. This chapter addresses this erosion of the possibility of anonymous speech, governance

[2] Twitter Public Policy Blog Posting, "Update: Russian Interference in 2016 US Election, Bots, & Misinformation," September 28, 2017, https://blog.twitter.com/official/en_us/topics/company/2017/Update-Russian-Interference-in-2016–Election-Bots-and-Misinformation.html.

[3] See, generally, Laura DeNardis and Andrea Hackl, "Internet Governance by Social Media Platform," Telecommunications Policy, 2015.

trends toward real identification mandates, and the long-term implications of this shift for freedom of expression. Third, the increasing deployment of proprietary social-media platforms is challenging the Internet's underlying principle of global interoperability and universality. Finally, the chapter concludes with an examination of the ways in which social-media platforms provide centralized and privatized points of control for concentrating government censorship and surveillance. In all of these examples, the mediation of the technical and social values at stake—whether privacy, anonymity, expressive freedom, or interoperability—rests with the private sector, raising a broader insight into how Internet governance is evolving in practice (DeNardis, 2013).

Online Advertising as Faustian Privacy Bargain

Social-media industry revenue models involve trading individual privacy for free information goods (Anderson, 2009). Much scholarly and policy attention has been trained upon the evolution to free *information* and the implications of this shift for traditional and dominant media industries. Less attention has been devoted to the similarly transformative shift from models of *software* as purchased consumer goods to industry models of software as entirely free consumer goods. Social-media software and services such as Twitter and Facebook are essentially free. The public similarly uses email products like Gmail and search engines like Bing, Google, and Yahoo! without having to pay for these services. Even online content-hosting sites like Flickr and YouTube are free to users. This business model created an entirely new industry even while posing enormous challenges to the revenue approaches of traditional media. The opportunity to use free software and free online services is so entrenched and ingrained that users sometimes do not even think about how they are freely given these information software products.

The provisioning of free software goods does not emanate from pro bono altruism; it is simply based on a different business model. The operating expenses of a company like Google are enormous, totaling billions of dollars per quarter (Google, 2012).[4] Revenues are similarly massive. Rather than the flow of currency occurring between users and social-media providers, it flows between these providers and an ecosystem of third-party paid online advertising. Revenue generation has shifted from subscribers to third parties.

The underlying currency is not only the attention economy of hundreds of millions of eyes absorbing advertisements. The value added for advertisers is

[4] Google's operating expenses for the quarter were $4 billion; other cost of revenue (e.g. data center operational expenses) totaled $2.41 billion.

the data about individuals that is collected and aggregated during usage of information-intermediation software like social media and search engines. Yochai Benkler explains the benefits of this removal of material barriers to information production for individual freedom and autonomy (Benkler, 2006). But the reason why these barriers to information production have fallen is the availability of free software platforms and the hidden and mechanized monetization networks that support them. The free software movement has famously advocated for "free" as in "free speech" rather than "free" as in "free beer." The questions that need to be asked are whether what has actually unfolded is free as in free beer and what the implications are for freedom of expression.

Social-media embedded advertising is not monolithic. Embedded in social media are several distinct forms of online advertising, each with a different set of implications for individual privacy. Contextual ads are targeted commercial messages that appear alongside the information a consumer is viewing or contributing via social media. The content of these advertisements is dependent upon the information appearing on the page. Behavioral advertising involves the tracking and retention of user activity (e.g., websites visited, links clicked, sales conversions made) over a period of time and subsequently serving ads that target the individual's likely consumer preferences as determined by this behavior. It is increasingly standard practice for an individual's behavior to be tracked over numerous unrelated websites by a private third party that has no direct relationship or contractual agreement with this individual. Location-based advertising has become one of the most common forms of online ad serving. Internet users are tethered to mobile devices fixed directly to location at any moment in time, whether via a Wi-Fi connection, a connection to a cellular base station, or via a GPS. Location-based ad platforms serve ads tailored to this location, for example listing a nearby retail store or restaurant. There are many other kinds of online ads, such as the old-fashioned online classified ad approaches like Craigslist, or stealth advertising and ad-vertainment approaches, in which the paid message is a Trojan horse appearing like a product review or form of entertainment content.

The tracking of individual behavior and the retention and sharing of this data for financial gain is the underlying basis of online social-media business models and a significant challenge to Internet governance. Data retention can produce harms such as identity theft and social and economic injury due to consumer data breaches. When consumers understand how online advertising works, it can produce chilling effects on freedom of expression. On the other hand, abrogating all individual data retention and targeted advertising would erode the business models that have brought free online platforms to users and all the benefits to freedom of expression and innovation that accompany these platforms. The salient Internet governance challenge involves finding the balance between acceptable approaches to directing targeted ads to individuals, and allowing the new business models that have helped make platforms freely available to anyone. The related question involves who should decide what constitutes this acceptable balance.

Governance of online advertising can occur in five ways: international agreements among governments; statutory frameworks within sovereign nation states; voluntary best practices among corporations involved in online advertising; private user agreements between individuals and the platforms they use; and individual and technologically mediated user choice about what and how data is collected, retained, and shared.

Many countries have statutory frameworks that address specific aspects of online privacy, such as laws against identity theft, protection of financial and health transactions, or prohibitions on collecting information from children, spam, or taking street-view pictures for map applications. For example, the European Union recognizes the protection of personal data as a fundamental human right. As technologies and business models change, translating these types of protections into practice is increasingly complicated.

Governments also have an interest in not restraining the data collection activities of social-media platforms because this data serves as the basis of law enforcement and intelligence-gathering practices of the state, as became publicly understood after Edward Snowden's disclosures of the massive data-collection practices of the US National Security Agency (NSA) and the public–private partnership necessary for this mass surveillance.

Most social-media platforms provide privacy policies that inform users about how these corporations gather, retain, and share personal information. These policies reveal a great deal about how data is aggregated and shared. Information that, to the user, "seems" private is not actually private. Information is scanned or gathered during almost all transactions. Some of this data is content-based but some is also more specific to a user's location, physical hardware, or logistical circumstance. Specific examples of information collected about individuals include IP addresses, mobile phone number, time of call, unique hardware identifier, and physical location (based on Wi-Fi, global positioning system, or cellular signal information).

The routine collection of this type of personally identifiable information is quite a departure from the Internet's original design of locating intelligence at endpoints and using IP addresses as virtual identifiers, rather than tying an information exchange to individual identity or usage context.

Individual data collection is at the heart of online advertising and new business models. It is yet unclear how this balance between new business models and individual privacy will unfold, but its resolution will be a significant Internet governance decision with implications for both individual rights and industry stability. At a minimum, disclosure of these policies and user choice about what information is shared seem extremely reasonable and would help eliminate the introduction of additional laws that would possibly homogenize the degree of privacy for everyone and invite additional regulatory interventions on an emerging industry.

Complicating the governance regime around online advertising and privacy is the open question of how to address, either statutorily or through voluntary corporate measures, ads designed for unlawful purposes such as exerting foreign influence on democratic elections. Questions include how to authenticate purchasers of ads, considering the massive number of self-serve ads; the degree to which ad buys should be transparently disclosed; and whether there should be regulation of, or at least disclosure about, how ads are targeted to social-media subscribers.

Trending Away from Anonymity

Even amidst questions about requiring authentication of advertisers and news sources, there is still a disconnect between the perception of online anonymity and the actuality of a multilayered identity infrastructure beneath content. The historical traditions of the Internet and its underlying technical architecture have been to afford anonymous communication, or at a minimum traceable anonymity in which law enforcement could secondarily obtain identity information from a service provider. Peter Steiner's famous 1993 cartoon in *The New Yorker* portrayed a Web-surfing dog along with the caption "On the Internet, Nobody Knows You're a Dog." On social media, some know you're a dog, as well as your relationship status and favorite song.

At the level of content, there can be the appearance of anonymity. It is possible to establish a Twitter account with a pseudonym or create a blog that reveals nothing about one's personal identity. But the identity infrastructures within the technologies that enable these content transactions erode anonymity. For example, if someone sets up a blog using a domain name they register, the WHOIS database (pronounced "who is") has historically allowed anyone to look up who has registered the domain name. Unless the subscriber has used a proxy registrant, the database includes not only the registrant's name but also their physical address and email address. Technical identifiers are more deeply embedded: at the hardware level via mobile phone device identifiers and unique binary addresses on Ethernet cards; at the logical level via Internet Protocol addresses, globally unique phone number, unique software attributes on a computer, and cookies; and at the geographical level with location-based information easily traced via Wi-Fi antenna position, GPS, cellular base-station triangulation, or the network segment of an IP address.

These technically situated identification mechanisms allow for traceable anonymity, meaning that a law enforcement agency can approach a network or application provider and request the real identification of the individual associated with a unique technical identifier, or combination of identifiers.

Some social-media approaches have progressed beyond this traceable anonymity to require the use of real-name identifiers. Facebook requires its subscribers to use their real names and information and prohibits them from providing false information. There are many rationales for pushing back on anonymity, not just in social media but more broadly: discouraging anonymous cyberbullying; providing accountability; thwarting foreign-election influence, and promoting civility in comment sections on media sites (Citron and Norton, 2011). But in the global networked environment, real-life identification requirements of social-media platforms that ban anonymity also provide openings for repressive governments to crack down on dissent and free expression. Narratives linking social-media usage with revolutionary uprisings can sometimes overlook the ways in which governments exploit social media to suppress expression. Governments can monitor platforms in advance of protests and identify pictures of individuals who have been photographed already participating in protests.

Real-identification requirements on social-media platforms at least present individuals with some choice about whether to participate, although a person can find themselves being photographed and tagged online by others even if they have never used social media. But explicit requirements for real-identification registration have evolved beyond technical identity infrastructures and social-media usage policies. Much of this follows from the ways in which Internet access has evolved. There are increasing global requirements for the presentation of ID cards at cybercafés. Anything that requires a billing arrangement, such as a mobile phone subscription or home Internet access service, also necessitates the presentation of an individual identification card such as a driver's license.

An open question of Internet governance is whether national governments will increasingly mandate real-identification requirements to accompany online usage and speech, not just in cybercafés but via any type of access route. Indeed, statutory restrictions on anonymity are on the rise (Froomkin, 2011). Whether real identification is mandated by service providers, social-media platforms, or national governments, this move away from anonymous or pseudonymous speech will have implications for freedom of expression and for the character of political discourse and culture on the Internet. As in many other areas of Internet governance, these policy decisions, whether enacted by private industry or sovereign nation states, have to balance competing values—in this case freedom of expression and privacy versus law enforcement, national security, and civil discourse.

Losing Internet Interoperability

Another social-media challenge to Internet governance relates to interoperability, the fundamental principle upon which the Internet was originally designed. A common protocological language enables computing devices to embed standard data formats, software interfaces, and network characteristics that enable interoperability among devices adhering to these standards, regardless of manufacturer or geographical location. The Internet works because of these standards, the blueprints that provide universal order to the stream of 0s and 1s that represent emails, movies, audio, and other types of information. Internet use requires the basic TCP/IP protocols underlying the Internet as well as the deployment of countless formats that standardize how music should be encoded and compressed (e.g., MP3); video and image should be formatted (e.g., MPEG and JPEG); information should be transmitted between a web browser and web server (e.g., HTTP); or voice transmitted over the Internet (e.g., VoIP).

Interoperability is not a given. Only decades ago, computing devices made by one manufacturer could not exchange information with a different manufacturer's computers. These products were based on proprietary (undisclosed) specifications, and the basic business model was precisely to have products incompatible. In this way, a business purchasing a manufacturer's products would be locked into this single vendor for future purchases. Examples of the proprietary network protocols of this era include IBM's Systems Network Architecture, Digital Equipment Corporation's DECNET, Novell's Netware, and Apple's Appletalk. Even in the early days of online consumer services, such as email, there were completely non-interoperable proprietary systems such as American Online, CompuServe, and Prodigy. Someone using America Online could not "speak" to someone using Prodigy. It was a difficult industry transition from these incompatible systems to a new environment based on standard and openly published Internet protocols such as TCP/IP, which provided interoperability regardless of computing device, email program, or operating system.

Some social-media approaches are drifting back to the era where interoperability was not a valued principle, and this is not a positive development for the Internet's technical architecture or for innovation. Social-media approaches erode interoperability in four distinct ways: lack of inherent compatibility among platforms; lack of Uniform Resource Locator (URL) universality; lack of data portability; and lack of universal searchability. In all of these cases, standard approaches are available, but companies have explicitly designed interoperability out of their systems. Internet governance approaches, especially via the design of technical architecture, have historically embedded principles of compatibility, data portability, universal searchability, and URL accessibility. This approach is no longer the de facto technical norm for Internet applications.

For example, Skype, while excellent and serving an important social function, is ultimately a proprietary specification that technologically constrains compatibility with other voice systems. Skype is an instant messaging application that allows individuals to communicate with other Skype users by voice, video, or text. The application has become widely popular as a video calling service, not only because it works well. The software can be downloaded for free and the cost of Skype-to-Skype long-distance calling over an existing Internet connection is free. Skype, purchased by Microsoft in 2011, has become popular with hundreds of millions of users. Skype is also a protocol, a proprietary protocol. It uses an unpublished, closed signaling standard that is not natively compatible with other Voice over the Internet (VoIP) applications.

Proprietary protocols enable a certain type of business model. Someone with a Skype application wishing to make an off-Skype call has to subscribe to unlock this interconnectivity feature. This proprietary approach has gained a great deal of market traction, but is quite a departure from traditional Internet applications like web browsers and email clients that are natively compatible with other browsers and email clients without having to unlock interoperability or pay an additional fee. For example, someone using a Yahoo! email address can automatically reach someone using a Gmail address. If email had remained proprietary, this would obviously not be the case.

There is a similar technical and business model retreat from universality in Uniform Resource Locators (URL), also sometimes called Uniform Resource Indicators (UNI). The Web was designed explicitly to provide a universally consistent way of reaching a website from any browser in any part of the world. Social-media sites like Facebook have traded this open approach for more siloed nomenclature in which hypertexts among information sources remain relegated within this silo and are not necessarily accessible from other platforms or applications. Web inventor, Tim Berners-Lee, has cautioned that social-media platforms have become closed silos that fragment the Web and tear down a universal space for information (Berners-Lee, 2010).

Social-media platforms are what the market has selected, but this selection has consequences. There is not the interoperability among social networking platforms that exists for other web platforms or email applications, for example. This is a very real shift from an open, unified Web to a more balkanized Internet. This is also the case in emerging areas such as the Internet of Things. In an open, universal Web, standards are published. This open publication of standards has contributed to rapid Internet innovation because any company can use the standard to develop new products and features. In an open, universal Web, standards are developed, for the most part, in openly participatory groups such as the W3C (World Wide Web Consortium) or the IETF (Internet Engineering Task Force). In social-media realms that are partitioned, protocols are controlled by individual companies, and the only applications permitted are those authorized by these gatekeepers. Social-media approaches are compelling and have enormous market inertia but, from the standpoint of Internet governance, they are diminishing universal Internet interoperability.

This deprioritization of interoperability is likely to extend into emerging Internet architectures such as cloud computing and eHealth systems. For example, approaches to cloud computing by different software companies are not yet settling on industry-wide compatibility standards. This lack of ex ante standardization for cloud computing could present challenges to consumers, such as vendor lock-in and lack of data portability.

Implications of Social-Media Choke Points for Freedom of Expression

Social-media technical approaches also aggregate public content in medias res rather than decentralizing content at endpoints. This centralization inherently positions private companies as arbiters of freedom of expression, and also creates concentrated technical points of control for Internet security attacks and government censorship and surveillance, usually delegated via private ordering. In other cases, governments ban a social-media service outright, as happened with China's prohibitions on Twitter usage. Even when government-imposed censorship and surveillance are not present, this private mediation constrains what individuals can express because it requires permission and administration by an information intermediary.

Twitter terminated the personal account of a British journalist during the 2012 London Olympic Games. The reporter had been posting tweets criticizing aspects of NBC's Olympic coverage, including some of its editing and the time delay making Americans wait to view certain events until the prime-time recorded broadcast. The reporter also tweeted an NBC executive's email address to encourage viewers to complain about these delays. Twitter claimed that the suspension was due to this publication of the executive's email, which was deemed a violation of Twitter rules. This decision was met with a great public outcry, in part because of the perception that the company's decision was influenced by its promotional partnership with NBC during the Games.

Twitter fairly quickly reinstated the account, admitting that it was a Twitter employee who prompted NBC to file a complaint, and stating that the company should not be monitoring and flagging content (Macgillivray, 2012).

In addition to this direct private mediation of content, social-media platforms also serve as levers for external parties wishing to censor specific voices. This censorship can happen without the cooperation of the social-media platform, for example through Internet security attacks that disrupt the entire platform, or through censorship requests in which a government orders the information intermediary to take down specific content or suspend a specific account.

Most major social-media platforms and information intermediaries have been the target of distributed denial of service (DDoS) attacks, orchestrated virtual sit-ins in which a targeted site is bombarded with so many requests that it becomes unavailable for legitimate use. A telephone analogy would be the effects of thousands of concurrent calls to a 911 dispatcher, flooding the system so that legitimate calls could not connect. A unique characteristic of this attack is that it does not involve unauthorized access or modification of the targeted site. It simply overwhelms a site with enough requests to effectively disable the system. Attacks have interrupted, at least temporarily, global access to Twitter, YouTube, Facebook, and companies in almost every sector of the economy from energy to financial services. Such an extensive assault requires attacks to be launched simultaneously from tens of thousands of hijacked computers, whose owners are often unaware of this activity.

DDoS attacks are often motivated by political conflict, illustrating the collateral damage to freedom of expression when an intermediary platform is disrupted to silence particular voices.

Private social-media companies also grapple with direct government requests to remove content or block individuals from these sites. The inability of governments to directly block digital content has drawn their attention to information intermediaries and their underlying support infrastructures. This phenomenon is known as delegated censorship. Many of these delegated requests attempt to enforce national laws related to hate speech, defamation, privacy, blasphemy, pornography, or political speech restrictions. Delegated censorship requests are sometimes also attempts by repressive governments to silence citizen journalists, independent media, or political opponents.

In deciding which requests to execute, social-media companies have to navigate numerous national legal contexts, each with its own unique set of laws, such as those that outlaw the online distribution of Nazi propaganda, laws against hate speech against various groups of minorities, laws against insulting a monarch, and laws against defamation. It is also difficult for social-media companies to legitimate the veracity of each appeal.

Some companies have decided to publicly reveal the types of requests they receive to censor content. For example, Google's "Transparency Report" presents a snapshot of the types of state requests the company receives to remove content from its various platforms such as YouTube, Google+, its Orkut social-media platform, and other online properties. Examining some specific cases of what the company has refused to remove, or not, provides insight into the challenges information intermediaries face, particularly because of the differing circumstances of national legal frameworks and cultural norms. With wording taken directly from the Google transparency reports, the following are just a few of the government-initiated content-removal requests with which the company did and did not comply.

Examples of Google Compliance with Government Content-Removal Requests

- Requests from Thailand Ministry of ICT to remove 149 videos allegedly insulting the monarchy (removed seventy percent) (2011)
- Request from United Kingdom's Association of Police Officers to terminate five user YouTube accounts (2011)
- Brazilian electoral court order to remove four Orkut profiles owing to political campaign-related content (2011)
- Request from United Kingdom's Office of Fair Trading to remove 93,360 fraudulent/scam advertisements (2010)
- United States court order for the removal of items from Google Groups in a defamation case (2010)

Examples of Google Non-Compliance with Government Content-Removal Requests

- Request from Canadian passport office to remove a YouTube video of a Canadian flushing his passport down the toilet (2011)
- Request from Pakistan's Ministry of Information technology to remove YouTube videos satirizing the Pakistan army and politicians (2011)
- United States local law-enforcement request to remove a blog post alleged to personally defame a law-enforcement official (2011)
- Request from Polish Agency for Enterprise Development to remove a search result critical of the agency (2011)
- Request from local ministry in Kazakhstan to remove a YouTube channel supportive of its political opposition (2010)

Social-media companies have become powerful intermediaries, determining when information is or is not censored, just as they have direct power over allowing the publication of certain content and just as they are tasked with the responsibility for battling denial of service attacks and other Internet security breaches with collateral damage to freedom of expression.

The evolution of the Internet's architecture into this dominant model of private intermediation calls attention to this privatization of Internet governance. A core objective of freedom of speech is to enable a communicative context necessary for the preservation and advancement of democracy (Post, 2009). As these cases demonstrate, communicative contexts of freedom of expression are increasingly exercised through intermediary technologies and shaped by these same technologies, which are in turn controlled by the private companies that operate them.

The degree to which digital media creates a robust public sphere for the formation of public opinion and the democratic legitimation of the state depends not only on state protections and interventions but also on the architecture of underlying technical protocols, content intermediaries, and infrastructures. In all of the examples presented in this chapter—privacy, anonymity, interoperability, and expression, individual civil liberties are constructed and mediated by private ordering. Social media has engendered both the technical mediation of the public sphere and the privatization of civil liberties. This development in the governance of the online public sphere follows directly from both the evolution of social-media technical architecture and business models.

As these private intermediaries increasingly establish policies about basic civil liberties online, the broad Internet governance community—governments, international institutions, private industry, consumer groups, and technical design communities—must grapple with the types of processes and transparency that are necessary to increase the legitimacy of privately mediated governance. How these governance questions unfold will determine the future of the Internet's openness and technical universality, and the degree of individual freedom of expression in the online public sphere.

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24

The Unfinished Work of the Internet

David Bray and Vinton Cerf

Vinton Cerf is internationally recognized as "an Internet pioneer"—one of the "fathers of the Internet"—regarding his work with Bob Kahn in co-inventing Internet protocol (TCP/IP). David Bray is Executive Director for the People-Centered Internet Coalition and a champion of positive "change agents" in turbulent environments. For this concluding chapter, we asked Vinton Cerf and David Bray to provide a future-focused perspective on the Internet's role in shaping media and information. Arguably, over the past twenty years, there has been no greater development shaping global information technology, policy, and practices than the rise of the Internet and related communication technologies such as the Web, social media, and mobile Internet. Looking to the future, will the Internet play as central a role? Their answer is yes, noting that much work remains to be done if the Internet is to remain an uplifting force for both individuals and communities.

On December 9, 1968, computer science pioneer Douglas Engelbart gave a demonstration that later became known as "the Mother of All Demos" in which he showed a computer screen with a graphical user interface, a mouse pointer, the ability to click on text and jump to other documents by clicking on hyperlinks, version control for files, and many more features that nowadays we associate with how we interface with computers. For 1968, his demo of the future was truly groundbreaking (Waldrop, 2001; Jacobsen, 2015).

The Internet has come a long way since its origins in the ARPANET.[1] December 2018 will mark fifty years since Douglas Engelbart's famous

[1] The ARPANET was a research project sponsored by the US Defense Advanced Research Projects Agency (DARPA) to explore the use of packet switching to interconnect multiple, heterogeneous computers and to provide a resource-sharing capability in aid of more rapid progress in computer

"Mother of all Demos"—and this will also be around the time when it is estimated that fifty percent of the Earth's population will be connected to the Internet, approximately 3.8 out of 7.6 billion people (Graham, Ojanperä, and Dittus, Chapter 3, this volume).

Yet we still have much work to do to help connect those on the planet who want the Internet or improved access to it, or to address the digital divide even in places where the Internet is available. Many of us also want to ensure a more open Internet for everyone and to find new ways to address the challenges of human biases with regard to news and information.

An Evolving Internet

Since the mid-1990s, when consumer adoption of the Internet was accelerated with home dial-up service and early browsers for surfing the World Wide Web, such as Mosaic and Netscape Navigator, the Earth has seen a rapidly growing number of networked devices and an ever-increasing amount of data. These changes also include a rapid decrease in the cost and increase in the global accessibility of advanced technologies.

In 2015 there were approximately 14 billion network devices for 7.3 billion human beings. That's up from just 7 billion network devices two years earlier in 2013. By 2020, Cisco and other firms predict there could be approximately 50 billion or more network devices globally, relative to about 8 billion people. By 2030, Cisco predicts 500 billion devices will be online.[2]

When considering the unfinished future work of the Internet ahead, it is worth remembering that Engelbart also had a vision that human intelligence could be augmented through computer-based tools. This included the idea that technologies could help humans connect, share ideas, and become "living learning communities" where could be found knowledge of how to thrive, adapt, and coexist in ways that celebrate a plurality of views and insights (Waldrop, 2001). Internet access began to accelerate in 1988, as commercial service arrived the following year. Several of Engelbart's ideas, realized in the World Wide Web, contributed to periods of exponential content and activity growth: hyperlinking of web pages, sharing of knowledge online, and helping humans connect.

science and artificial intelligence research then undertaken by a dozen or so universities. See https://en.wikipedia.org/wiki/ARPANET. (Accessed June 23, 2018).

[2] www.cisco.com/c/dam/en/us/products/collateral/se/internet-of-things/at-a-glance-c45-731471.pdf. (Accessed June 23, 2018).

Table 24.1. The more technical work that needs to be done for the future Internet

Standards (IETF, W3C, IEEE, and more)
Reliable and updatable software
Strong, end-to-end authentication
Confidentiality and privacy protection
IPv6 address implementation (for Internet of Things, Cyber-Physical Systems, Mobiles)
Long-term digital preservation of records
Stable identifier systems (beyond domain names)
Expanded wired and wireless access for the world
Open software-defined networks (switch and software)
Improving the reliability, safety, privacy, security, interoperability, and autonomy of systems
Solutions to address malware and buggy software (especially for autonomous systems)

Table 24.2. Social work that needs to be done for the future Internet

Closing the digital divide to ensure Internet access for all who want it
Improving digital literacy and digital skills
Solutions to address misinformation and disinformation concerns
Consensus on ethics regarding data, privacy, and use of artificial intelligence/machine learning

If we embrace the recognition that the Internet—or at least human interactions on the Internet—might be the greatest reflection of humanity, then its future too is tied to what choices humanity makes in how we develop, expand, and enhance its features. These choices will influence future outcomes.

From the technical perspective, the Internet still needs much work such as is shown in Table 24.1. This work recognizes that the Internet invites evolution and emphasizes the importance of continued Open Access, Open Standards, Open Source, and Open Applications to foster growth and improvement.

In addition, in terms of social outcomes, the Internet also requires critical work to reinforce transnational public trust of and security in its use. As shown in Table 24.2, steps that can be taken include empowering entrepreneurship that can span national boundaries as a high priority, as well as concerted efforts to encourage a more people-centered Internet in keeping with Engelbart's vision of "living learning communities" that use the Internet to link different people together rather than separating them.

Recognizing that predicting the future is fraught with challenges, this chapter strives to highlight the still unfinished work of the Internet with a people-centered approach that focuses on the human impacts of both the technical and social work that need to be done, to include five categories. These five categories focus on the Internet and (1) the Future of Work and Augmented Intelligence, (2) the Future of Cybersecurity and Digital-Resiliency, (3) the Future of Pluralistic (vs. Fragmented) Societies, (4) the Future of Data Ethics and Machine Learning, and (5) Efforts Toward a More People-Centered, Positive Future for the Internet.

The Internet and the Future of Work and Augmented Intelligence

The last two decades have demonstrated how exponential periods of advances in relevant technologies have made computing capabilities less expensive and more available globally. Individuals half a world away can compete in a global marketplace. On the one hand, a global marketplace is beneficial, enabling those with ideas to collaborate in ways that would have previously been impossible because of physical distance. Consistent with this view, there are some economists who believe that ultimately, even if there is an initial period of disruption where individuals used to a higher standard of living are disrupted by pricing mechanisms of the global marketplace—everyone will get used to a shared standard of living globally and this will then begin to "raise everyone's boats" (Levitt, 1993).

On the other hand, in the space of products and services, competition favors lower cost so lower-cost labor will displace higher-cost labor. Other economists have recently begun to wonder whether the next industrial revolution—one that includes autonomous systems, machine learning, and robots—may bring a prolonged period of job displacement, longer than in other industrial revolutions of the past (Sassen, 1999), including disenfranchisement of higher-cost workers competing with lower-cost labor doing the same tasks (Graham and Anwar, 2018).

Every industrial revolution has displaced and impacted jobs—this happened with coal, steam, and trains. It happened again with oil, steel, and electricity. Eventually more jobs were created to offset the jobs lost; however, there was most certainly a period of turmoil and transition. Moreover, even with new jobs eventually available, displaced workers might not have had the skills needed to undertake the new jobs (Nordfors, Cerf, and Senges, 2016).

One area where the Internet may be of use in the future of work is in helping individuals to (1) find resources to help in training or retraining for new jobs, and (2) find resources to help with possible job displacement should the next industrial revolution impact their industry. Helping individuals cope, learn, and thrive in a period of job displacement may be one of the best uses of the Internet for the decades ahead—if the digital divide (i.e., uneven Internet access) can be closed.

Improving digital literacy and digital skills for everyone on the planet will be necessary as we become more globally interconnected—especially if a decade of job displacement tied to the next industrial revolution occurs. Metaphorically, consider clear cutting a lush rainforest. A new rainforest does not grow up overnight. In fact, clear cutting in a rainforest may actually yield a desert if intentional efforts to reseed and reforest aren't also made. The same is true with job displacement linked to a future industrial revolution.

The Internet can and should be used to help individuals cope, learn, and thrive in a period of job displacement, including with personalized training for second or third careers in new types of work. It also can be used to help groups provide how-to guides and online encouragement of entrepreneurial, community-enhancing activities at local levels, including education for people who don't normally see themselves as entrepreneurs, assisting them to get started. The Internet can also help groups provide opportunities, recognitions, and micro-grant support for individuals who want to contribute to their local neighborhoods or pursue hobbies or vocations as part of a larger community.

Globally, if the next decade of advances in technologies does result in accelerated job displacement, one hopes that both the private and public sectors will find ways to use the Internet to engage and assist communities that are impacted to find new ways to thrive.

In the past, our species, *Homo sapiens*, used tools (also known as technologies) to overcome the limitations of our bodies. More recently, the advent of the printing press, mass production of books, the creation of the Internet, the World Wide Web, mobile apps, and related information technologies have also allowed us to augment the limitations of our minds.

Since 2018, algorithms have been in place that can perform medical diagnoses, carry out computer-aided design, provide machine translations, and successfully drive vehicles. Automated technologies able to help augment some elements of human creativity in the workplace may also be on the horizon. As noted in the earlier section of this chapter, we humans are going to have to prepare for a future in which all of us will need to continuously learn new skills, as what we know and what is useful in the workplace will change at a speed faster than before (Partnership for Public Service, 2017).

One of Engelbart's visions for the future of technology was that computers could augment human intelligence through computer-based tools—and later work by Thomas Malone and others looked at "collective intelligence," specifically exploring how people and computers can be connected so that collectively they act more intelligently than any one person, group, or computer has ever done before.

This could include a future in which teams composed of both human and intelligent tools, including digital assistants using some form of artificial intelligence, work together on accomplishing certain tasks (Winograd and Flores, 1987; Malone, Laubacher, and Dellarocas, 2009). Such teams may float across organizations, akin to a freelancing team that brings its own devices, software, and algorithms to bear on challenging problems. Some of this already exists. For example, TopCoder is a collection of freelance, networked, and collaborating programmers, who bid on software projects and execute them, delivering results through the network.

For the longer-term future of augmented intelligence, organizations may be replaced by networked teams bidding on work assignments, accomplishing them, and moving on to new assignments. The use of contractors and contracted work already parallels this (Richter, Bray, and Dutton, 2010). For such a future, what will be interesting and different from contracted work in the past is that automated technologies connected to the Internet can help the teams manage talent and time more effectively: highlighting issues for different teams to focus on, suggesting what the best matching of different team members might be to tasks, and removing some human biases from decision-making, including for decisions to recruit and promote—or at least identifying where a possible bias may exist.

Software is not infallible. In fact, we know software will have bugs and biases that human programmers may have included—which means future pioneers of augmented intelligence will need to experiment with ways to evaluate the effectiveness of teams of both human and digital assistants working together to identify and fix bugs. Future pioneers also will need to explore new ways of making what an algorithm does more openly understandable to all human participants so that they can spot bugs or biases if they exist.

The Internet and the Future of Cybersecurity and Digital Resiliency

Improving the reliability, safety, privacy, security, interoperability, and autonomy of systems will be essential for the future. The Internet of Things will increase cybersecurity risks for the average consumer. Current approaches to cybersecurity, that is, relying on human experts to build and maintain "tougher digital locks" and "higher (fire)walls," will not be sustainable as the Internet of Things expands the potential attack surface. Who will guard your grandmother's car or refrigerator from being hacked, or if it is hacked, who will detect this and then notify your grandmother or law enforcement? A new model is needed that recognizes the rapid growth of the Internet of Things and the challenges of multiple, proprietary interfaces for them.

The Internet of Things will make even more visible the flaws present in buggy software and the challenges of guaranteeing that any IT system is secure. We can encourage good "Internet hygiene" practices and take preventive measures to reduce risk and improve the overall security posture of a system. However, if a device or system is connected to the Internet, it's at risk, especially from unscripted, zero-day exploits to which there may be no defense until after an attack has surfaced the exploited bug and a software fix developed.

Taken together, these three concerns mean communities might want to consider tackling cybersecurity differently (Cerf, 2017). One approach might include focusing on digital resiliency and a strategy more akin to "Internet public health" aimed at both preventive measures and rapid detection, containment, and mitigation of digital threats: infectious disease control for the Internet. Modeled after public health systems, such a method would emphasize teaching individual Internet hygiene to communities to reduce the likelihood of outbreaks occurring. It would also emphasize establishing good digital threat detection procedures focused on signs, symptoms, and behaviors as a way of responding to polymorphic digital threats such as malware that changes signatures. Equal emphasis is needed to protect the privacy of individuals. In addition, a public health-like approach to digital resiliency would include mobilizing the equivalent of Internet epidemiologists with the training necessary to characterize, contain, and remediate malware or a digital threat as quickly as possible, should one emerge; the actors in this scenario could be both human and autonomous intelligent algorithms.

Extending the parallels to infectious disease control, public health at the federal level in the United States does not collect protected health-identifying information for individual patients—focusing instead on public health signs, symptoms, and behaviors. Thus a public-health-like approach to digital resiliency equally could protect privacy and improve resiliency by anonymously sharing the equivalent of digitally mediated signs, symptoms, and behaviors that different network devices are experiencing to a "digital Center for Disease Control for the Internet" that could scan for abnormal, odd digital behaviors within the data.

Individuals and organizations could choose to "opt in" and stream digital behavior-related information from their Internet of Things-connected hardware and software devices. Sharing information on behaviors would protect the confidentiality of individual companies and consumers while at the same time improving the ability to spot zero-day exploits, where no known signature of a digital threat may exist yet, just a set of anomalous behaviors that don't fit a normal pattern. The goal would be to characterize abnormal, odd patterns, contain potential malware or digital threats, and minimize the "dwell" time of such threats through rapid mitigation.

A "digital Center for Disease Control for the Internet" equivalent could pair a combination of human experts with machine-learning algorithms to make sense of the data. Already humans produce a minority of Internet traffic, with automated programs ("bots") comprising more than fifty percent of traffic in 2017—some of these bots are helpful, others are not. For the purposes of Internet epidemiology, in the short term, use of intelligent algorithms alone to characterize, contain, and remediate a digital threat probably would be insufficient and humans would need to sort through false positives and provide context to the data; at the same time humans alone would be insufficient, given the sheer volume of data.

For the longer-term future, such intelligent algorithms might become sufficiently robust to address most digital threats to the Internet—or advances in quantum computing might make traditional algorithms based on Von Neumann architecture moot and completely transform how information on the Internet is processed and the practice of cybersecurity and digital resiliency performed. The von Neumann architecture, on which most computers for the late twentieth century and early twenty-first century operated, basically included memory, a communication bus, and a processor. Data moved between the processor and memory via the bus. Looking toward the future, new architectures blend these functions, and may dramatically depart from classic binary processing to include application of quantum entanglement effects.[3]

The Internet and the Future of Pluralistic (vs. Fragmented) Societies

At the time of writing this chapter (2018), it seems as if the Internet has become a source of division and frustration in society, not fully succeeding in its goal of bringing different groups of humans together. The Internet can bring us together—yet it can also contribute to the devolution of social institutions that used to require us to interact in person and have conversations as a way of achieving social unity in various human cultures (Dutton and Blank, 2015).

For each of us, interactions with our friends, coworkers, media, political institutions, and social networks can all be mediated by the Internet in such a way that they reinforce our individual worldviews, at the expense of exposure to other ideas and perspectives. Internet dialogues, which are often faceless, can produce negative emotions and in particular "shaming" of the outsider or someone who is different. All political persuasions are subject to these effects, and the idea of pluralistic societies where it is acceptable to have different views seems to be eroding.

If civilization is defined by its members not automatically killing a newcomer—or new idea—we risk becoming less civilized, less tolerant of a diversity of perspectives, and more tribal in our behavior. This has happened before. Media outlets (at least in the United States from 1895 to 1898) "emphasized

[3] www.encyclopedia.com/computing/dictionaries-thesauruses-pictures-and-press-releases/non-von-neumann-architecture. (Accessed June 23, 2018).

sensationalism over facts," according to an account of yellow journalism practices present at that time.[4] One reason for this "bump in the road" partly had to do with our human natures—we all have biases, including confirmation bias, which manifests when we actively seek information that reinforces what we already think to be true and dismiss information that challenges our beliefs (Dutton et al., Chapter 13 in this book).

There's also cognitive ease where the more something is repeated, the more it becomes easier for us to think it must be true (even if it isn't). The journal *Science* published a study in which the researchers classified news:

> as true or false using information from six independent fact-checking organizations that exhibited 95 to 98% agreement on the classifications. Falsehood diffused significantly farther, faster, deeper, and more broadly than the truth in all categories of information, and the effects were more pronounced for false political news than for false news about terrorism, natural disasters, science, urban legends, or financial information. (Vosoughi, Roy & Aral, 2018)

The big take-away: we humans will be naturally motivated to believe fiction when doing so feels better than believing the truth. While this is irrational, cognitive ease and confirmation bias are part of human nature.

It is this human nature, on a global, interconnected scale, that challenges us when we attempt to achieve Engelbart's vision of an open Internet that could help humans. Solving the challenges of misinformation, disinformation, and growing fragmentation of societies probably will be an eighty percent people-focused endeavor, with technology able to provide only twenty percent (or less) of the solution. We propose six specific steps to address the human-centric, Internet-amplified challenges of misinformation, disinformation, and erosion of trust that we believe could be the basis of universal steps for communities around the world (Cerf, 2017).

Step one: start with raising questions, ideas, and possible solutions to "what comes next" for the decades ahead—and most importantly, what social institutions will allow for pluralistic human coexistence and encourage peaceful resolution (and forgiveness) of disputes.

Step two: focus on being positive. It is important to focus on positivity here even in the face of hate or darkness—getting angry, sad, or giving in to those arguing against coexistence removes our ability to empathize with others and strive to find the common humanity in us all.

Step three: reach across groups and ideological divides. President Abraham Lincoln once noted: "I don't like that man, I must get to know him better."

[4] https://history.state.gov/milestones/1866-1898/yellow-journalism. (Accessed June 23, 2018).

If we only take the time to use the Internet to associate with and get to know people we like, find caring, and find supportive of our worldviews, then such interactions will only reinforce an age-old human paradigm of "us vs. them" and miss the opportunity to try and find merit in the compassion or insight in people we might not agree with in principle.

Step four: find ways to benefit multiple groups, not just groups we self-identify with (lest we accelerate tribalism) or from which we benefit.

Step five: work across communal groups and help build a world in which different ideas and people can coexist.

Step six: identify what choices we are making that are disconnecting rather than connecting us to others and strive to build bridges. On the Internet, it has not been possible for even a committed user to have an informed sense of context to enable some of these choices. We need better designs to facilitate better outcomes.

Cumulatively, these six steps to address the human-centric, Internet-amplified challenges of misinformation, disinformation, and erosion of trust could frame the work of many organizations for the decade ahead—recognizing that such challenges cannot be met by technology alone. Some of these steps could be easier or harder depending on how opaque or transparent are the architectures, algorithms, and attributes of the interfaces that mediate human interaction in any given context.

Over the last 150 years, as a species we have built interconnected technologies that allow us to talk to anyone around the world by telephone. We still must work to connect the rest of the world to the Internet should they so desire. While human nature itself has not changed, we have found ways to coexist as 7.6 billion people.[5]

For the future of the Internet, we are facing new and novel challenges unprecedented in human history regarding concerns about fragmentation, tribalism, misinformation, disinformation and more—yet we need to recognize the lessons of history and of human nature, and strive to be brave, bold, and benevolent in finding ways wherever we can at the local level across organizations or sectors to build bridges.

The Internet and the Future of Data Ethics and Machine Learning

Artificial intelligence has evolved in parallel with the Internet. In 1957, early AI pioneer Herbert Simon partnered with Allen Newell to develop a general

[5] This number is as of 2018, up from 5.3 billion people in 1990—2.5 billion in 1950—and just 1.8 billion one hundred years ago in 1918.

problem solver that separated information about a problem from the strategy required to solve a problem. Since then, the field of AI has experienced two more waves of innovation. Starting in the mid-1960s, the second wave of AI innovation included work on rule-based expert systems represented mainly as "if-then" statements instead of procedural code. The goal of such systems was to perform tasks that expert humans could also do, such as evaluate geological sites or perform medical diagnoses (Bray, 2018).

Approximately fifteen years into the twenty-first century, cumulative advances in the speed, size, and scale of microprocessors and computer memory reached a tipping point that triggered a third wave of AI innovation. It has become possible to do machine learning with sufficient speed and scale to benefit real-world and even real-time applications. Machine learning employs large data sets to statistically train a machine to make accurate categorizations of what something is or is not; for example, training a machine to identify images accurately of different objects, places, or entities, or to enable natural language translation, among many other innovative applications.

It is important to recognize that machine learning is only as accurate as the data provided to it; a textbook example of the computer science mantra "Garbage In, Garbage Out" where poor-quality data will result in a poor-quality machine learning. Moreover, the technology can be "brittle" in the sense that it may fail in unexpected ways with small variations in input. Nowadays with the Internet, large data sets potentially exist that could train machine-learning instances—however the need exists to address data privacy, brittle function, data quality, and bias.

In the future, organizations implementing machine learning using data obtained from the Internet may need the equivalent of a "data ombudsman" function that reviews the data being fed to a machine learning instance, both to ensure that the data sets are appropriately diverse and to protect individual privacy. The same data ombudsman function for an organization could also review the conclusions reached by algorithms to make sure they are correct in some sense, as free from bias as possible, and do not make spurious correlations—such as divorce rates in Maine supposedly being linked to margarine production. With large data sets, false correlations will occur without some level of contextual review (Bray, 2018).

Regarding an increasing future need for ethics concerning data, privacy, and use of artificial intelligence/machine learning, it might be that lessons from how "the professions" originally arose might apply to the future of the Internet. Historically, humans have always wandered but as groups settled into agricultural lifestyles, most members of these groups did not travel far from their settlements. As trade and technology progressed, increasing numbers of people traveled away from towns and cities to distant destinations. Upon arrival, travelers were unsure of the trustworthiness of local practitioners of medicine, law, or advanced studies (Bray, 2007). To address these questions of trust, the idea of professional certifications and "professional societies" arose, representing organized groups that promised the public to self-police themselves in the same way as activities of a profession cumulatively assure members of the public that you can trust a "credentialed" member.

Guilds preceded professional societies, offering the opportunity to individuals to learn a trade and prevent anyone who was not a member of the guild from practicing that trade. Later, professional societies extended the concepts of early guilds, focusing on addressing who they permitted to be admitted as members into the profession, what demonstrated "know-how" and experience was needed to be a member of the profession, and what code of ethics members of the profession were expected to follow.

Professional societies were also designed to address what contributions to the public and demonstrated value to society the professional group embodied and when members would be censured or suspended from the profession if they did not adhere to professional standards. As a result, nineteenth- and twentieth-century societies afforded professional societies the ability to self-police themselves insomuch as the public felt that this was a benefit and they weren't taken advantage of by professional members. If scandals occurred or if it was revealed the profession wasn't doing a good job of self-policing, the public would rein in the freedom of the profession and add more oversight (think of State Boards of Medical Examiners).

For our exponential times, we may need a renaissance of "digital professional societies" around data ethics, machine learning, and more—with the caveat that such self-policing will work only if it operates with a level of integrity that maintains demonstrated value to society and the public interest. This would need to be done recognizing that the Internet has tended to democratize (some might even say flatten) expertise—beyond traditional institutions and organizations. In some cases, the democratizing of expertise has empowered more people to contribute to communities and freed what traditionally had been closed-door institutions (Shirky, 2009; Malone, 2018). At the same time, the flattening of expertise has created a world in which informative experiences and cumulative expertise may be less valued when others can find information that supports their own confirmatory biases or presupposed views of the world—even if this contradicts what an experienced expert might perceive. For example, the Internet has information to support non-medically trained individuals self-diagnosing themselves with regard to physical ailments. In this context, sometimes doctors need to be challenged, while at other times the doctors have the training and expertise to know what a specific medical condition actually is, which may differ from the conclusions of a layperson.

For the future of data ethics and machine learning, if "digital professional societies" are to be re-cultivated, we need to also encourage an essential openness and collaboration among such societies with the public so that they do not revert to closed-door institutions. Openness is needed, while at the same time it is not conceivable to think the public can be the expert in everything. Some degree of professionalism and expertise needs to exist for different disciplines. One way to balance the need for openness and collaboration with the need for expertise and professionalism includes the ability for the public to monitor the efforts of a digital professional society. If such a professional society, focused on data ethics and machine learning, only pursues their own interests and not that of the public, one potentially could expect the public to respond with concerns surrounding their integrity and need for oversight.

Efforts Toward a more People-Centered, Positive Future for the Internet

A more people-centered, positive future of the Internet will require collaborations across sectors and national boundaries and most likely the creation of new institutions. Such institutions will need to work with civil societies, private-sector companies, and public-sector organizations to produce a future with more beneficial choices, options, and freedoms for everyone. Public-sector organizations will need to support inclusive, open, affordable Internet access to the public, given that the Internet has become such a connective element in everyday life. Private-sector companies will need to ensure the services they provide offer both informed choices and value to help both individuals and communities. Such public and private services should encourage productive uses of the Internet that are not divisive of communities or exploitive of individuals. The public as a whole will need to encourage such activities, potentially pioneering community projects or start-ups that show in a "better, more inclusive way," a more people-centered Internet going forward.

Tackling the unfinished work associated with the future of the Internet raises many questions: how do we maintain those things to which we want to hold true as individuals, as communities, and as a world—while also adapting to rapid change? The Internet and its successors, whatever they may be, will weave together a tapestry of human and computing threads. Just what images will be found in this tapestry will depend on the nature of the threads and the skill and creativity with which the weaving is accomplished. It seems clear from the considerations in this chapter that we must adopt a realistic appreciation for the way in which computing in all its generality is applied to solve social and economic problems, such as how our choices of algorithms affect whether all members have equal access to the potential benefits these computing tools offer. At the same time, we will need to guard against biased and even abusive applications of these technologies by creating institutions and practices that expose weaknesses and spotlight harmful behaviors. The computing tools themselves may help us in this aspiration.

We may well benefit from revisiting Norbert Wiener's prophetic work, "The Human Use of Human Beings," to guide our thinking along constructive lines (Wiener, 1988). Specifically, Wiener argued for the benefits of automation to society. He analyzed the meaning of productive communication and discussed ways for humans and machines to cooperate, with the potential to amplify human power and release people from the repetitive drudgery of manual labor, in favor of more creative pursuits in knowledge, work, and the arts. The risk that such changes might harm society (through dehumanization or subordination of our species) was also explored by Weiner with suggestions offered on how to avoid such risk—several of these suggestions mirror similar proposals held in this chapter on a wide range of issues.

The authors believe that the challenges that technologies pose for our societies must be addressed in a multi-stakeholder fashion. Governments, technologists, civil society and the private sector have shared and sometimes very specific responsibilities to settle issues and solve problems that arise. Once policies are established, perhaps using multi-stakeholder methods, they must be implemented by the parties best able to carry them out. The decade ahead will require us to continue to adapt more quickly to change. Undoubtedly there will be successes and multiple bumps along the road. If we work towards Engelbart's vision of "living learning communities"—to include sharing of insights in how to thrive, adapt, and co-exist in ways that take advantage of a plurality of different views—then together we can work to ensure the Internet and the future of humanity will be bright.

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