Conclusion: Cross-Cutting, Unique, and General Themes in the *Oxford Handbook of Digital Technology and Society*

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Abstract and Keywords

We conclude the *Handbook of Digital Technology and Society* by identifying topics that appear in multiple chapters, are more unique to some chapters, and that represent general themes across the material. Each of these is considered separately for the ESRC theme chapters and the non-ESRC chapters. In the ESRC theme chapters, cross-cutting research topics include digital divides and inequalities; data and digital literacy; governance, regulation, and legislation; and the roles and impacts of major platforms. Cross-cutting challenges include methods; theory development, testing, and evaluation; ethics; big data; and multi-platform/holistic studies. Gaps include policy implications, and digital culture. In the non-ESRC chapters, more cross-cutting themes include future research and methods; technology venues; relationships; content and creation; culture and everyday life; theory; and societal effects. More unique, these were digitization of self; managing digital experience; names for the digital/social era; ethics; user groups; civic issues; health, and positive effects. The chapter also shows how the non-ESRC chapters may be clustered together based on their shared themes and subthemes, identifying two general themes of more micro and more macro topics. The identification of both more and less common topics and themes can provide the basis for understanding the landscape of prior research, what areas need to be included in ongoing research, and what research areas might benefit from more attention. The chapter ends with some recommendations for such ongoing and future research in the rich, important, and challenging area of digital technology and society.

Keywords: cross-cutting challenges, cross-cutting themes, cross-cutting research, digital technology and society, Economic and Social Research Council (ESRC)

Introduction

THE range of issues raised by the study of digital technology and society are both broad and deep: moving from research and theory, to design and constant technological developments, through policy and economics, to management, use, adaptation, and effects. Further, these issues are inherently interrelated, as all play a part in shaping, and being shaped by, information and communication technologies. So it should be no surprise that many topics and themes appear in multiple chapters in this Handbook. As a conclusion and review of the themes in the Handbook, we summarize both the common and unique, and the general and specific, topics and challenges presented. We look first to the ESRC Domain chapters, and then to the non-ESRC chapters. Drawing on the chapters and the overarching analysis from the ESRC project, we make some suggestions for areas of medium-term future digital media and society research.

Throughout the chapter we will talk about the "social impact of digital"—however, this in no way implies that we are taking a technological determinist stance. As the chapters in the volume clearly demonstrate, the key issues are understanding and unpacking where possible the complex web of interactions between digital media systems, the processes of their design and implementation, the different forms of appropriation by users, and the multiple consequences of their use—intended and unintended. It is this complexity we seek to encompass via the shorthand of "social impacts of digital." We are very aware of the challenge of not falling into the trap of what Grint and Woolgar (1997) (p. 700) called "technism" whereby technological determinism implicitly creeps into social analysis; on the other hand, of course Grint and Woolgar's Actor Network Theory approach (also see Latour, 2005) is not used by the majority of the writers in this volume. We are also aware that in the analysis of actual use and practice, the limiting and determining features of technologies (what are often called "affordances") are key to the analysis—whatever their socio-technical antecedents and the social processes behind their original design.

Cross-Cutting Topics and Challenges in the ESRC Review Chapters

As we have noted before (especially in chapter 1), the interconnections among topics is a key feature of studying digital society, as the very nature of digital systems is to interconnect content, people, programs, and entities, within and across contexts.

Co-occurring Terms and Cross-cutting Topics

To get a sense of the changing prevalence of major concept interconnections, Figure 25.1 shows the most frequent concept pairs from 2000-2004, and Figure 25.2 shows those for 2012–2016.[1] Early on, the most frequent concept pairs emphasized the new communication technologies, their users, and their uses. Table 25.1 summarizes those most frequent concept pairs from Figure 25.1 comprising these three foci. By 2012–2016, the most frequent concept pairs had shifted emphasis somewhat. First, technology as a communica-

tion medium is the most frequent pair, but communication as a use does not appear much thereafter (compared to the prior period). While combinations among technology, users, and uses still dominate, we now see an increased focus on data, access, and privacy issues (including data collection for research), and interventions and research (studies or projects applying technology to effect changes, typically in health contexts, analysis, student or group participation). Table 25.2 summarizes those most frequent concept pairs from Figure 25.2 comprising these five foci.

Figure 25.1 All seven domains 2000–2004: Most frequent concept pairs.

Figure 25.2 All seven domains 2012–2016: Most frequent concept pairs.

Table 25.1 Main Themes of Concept Pairs, 2000–2004

Concept pair	Technology	User	Use
Internet/use	X		X
Internet/user	X	X	
Site/web	X		
Access/Internet	X		
Communication/medium	X		
Group/support		X	X
Man/woman		X	
Group/member		X	
Community/member		X	
Communication/interaction			X
Community/network		X	
Group/participant		X	
Health/support			X
Child/computer	X	X	
Communication/relationship			X
Care/health			X
Network/support	X		X
Information/source		X	X
Interaction/relationship			X
Other/people		X	

Network/tie			X
Home/internet	X		X
Culture/medium	X		X
Life/people		X	
Citizen/government		X	X
Group/interaction		X	X

Note: Concept pairs listed in decreasing order of frequency, as shown in Figure 25.1.

Table 25.2 Main Themes of Concept Pairs, 2012–2016

Concept pair	Technology	User	Use	Data, access, privacy	Interventions, studies
Communication/ medium	X				
Internet/use	X		X		
Care/health			X		
Analysis/datum				X	X
Internet/user	X	X			
Access/datum				X	
Datum/privacy				X	
Access/internet	X			X	
Participant/stu- dent		X			X
Intervention/ study					X

Health/interven-tion			X		X
Group/partici-pant		X			X
Care/patient		X	X		
Medium/news	X		X		
Datum/project				X	X
Health/support			X		
Datum/source				X	
Intervention/ participant					X
Information/pri-vacy				X	
Group/support		X	X		
Network/sup-port		X	X		

Intervention/trial					X
College/student		X			
Model/variable					X
Datum/research				X	X
Collection/datum				X	X

However, looking at the main topics identified in each domain provides a deeper analysis of shared concerns across the domains. The cross-cutting topics can be dealt with in two ways: either as *research areas* to be addressed, or as key *methods and challenges* for future research projects within the domains examined in this book. Several topics and challenges appear across the ESRC Review chapters. Table 25.3 details the most common topics and Table 25.4 the most common challenges. To create these lists the topics and challenges were recoded into a standard format for all domains. Those topics that cross more than three domains are in bold. The highest ranked cross-cutting challenges are common to all the domains.

Table 25.3 Cross-cutting Topics in ESRC Themes

Topics	Percent
Digital divide	8.0
Privacy	6.8
Data access and literacy	6.1
Citizenship	4.5
Device, environment and service design	4.5
Participation	3.2
Methods	3.2
Governance	2.9
Education	2.6
Role and impact of major corporate platforms	2.6
Mobilization	2.6
Talk	2.3
Cyber security	2.3

Note: Topics in **bold** cross-cut more than three of the seven ESRC domains.

Table 25.4 Most Frequent Cross-cutting Challenges in ESRC Themes

Topics	**Percent**
Methods	38.0
Theory	12.0
Ethics	9.5
Big data	8.7
Co-design	5.0
Multi-platform studies	3.3
Holistic understanding	2.9
Digital divide	2.5
Education	2.1
Data access	2.1
Interdisciplinarity	2.1

(p. 701) Cross-cutting Research Questions

In regard to research questions, we would argue that there are two research topics that are strongly cross-domain but that also warrant separate consideration. Nearly all the questions you can ask about the social impacts of digital media start with who has access (digital divides) and what uses they can make of or what can they do with the media (data and digital literacy):

- Digital divides and digital inequalities—including the two-way interaction between digital inequities and other areas of social inequity
- Data and digital literacy—not just skills but also the depth of understanding citizens have of the systems they use, their use of them and the uses that are made of citizens data

All the work we have covered raises questions of digital inequality. Chapter 15 (Yates & Lockley) examines this question in more detail. The key argument is that such inequalities are not just about access. The issue is how variations in access, skills, knowledge,

(p. 702) and practice are in correspondence with other aspects of social inequality—such as access to education or health care, wealth, employment, housing, or cultural and community life. Digital technologies have the possibility to reduce but also to further exacerbate these issues. Within this research topic there are then two broad sets of questions:

- How digital media are incorporated into existing systems and processes that generate inequity, the specifics of how they correspond and interact with systems of inequity and distinction, and how they themselves include levels and forms of inequity and distinction. For example, how does access to digital media affect employment opportunities and outcomes?
- How are digital media used and deployed by citizens, institutions, organizations and governments to seek to address either digital inequities, or broader social inequities? For example, how can digital media be used to improve educational outcomes?

(p. 703) These are not necessarily new questions, but each iteration of technological change brings new possibilities and new consequences—intended and unintended—that need to be understood.

We would also argue that two other topics cross cut, but they also need to be considered in and of themselves. These are

- Governance, regulation, and legislation in regard to digital media—how societies chose to manage (or not) the development, implementation, and uses of digital media.
- Roles and impacts of major platforms—many corporate platforms (e.g., Google, Facebook, Uber), as well as core technology providers (e.g., Intel, Cisco).

These scenarios are more likely to be dependent on social, national, or technology contexts. *Governance* issues vary from such things as debates in the United States over (p. 704) net-neutrality to issues of Internet censorship of different kinds in various nations. These are also driven by the new circumstances of technology use. Some examples include how to legislate for and address hate speech on-line across jurisdictions, defining liability for automated and AI systems, or national and international market regulation of digital products and services. Global *digital platforms* for services have become a norm in the current digital environment. Though the dominant digital platforms may change over time (Myspace to Facebook) or vary between regions (Facebook/Twitter/WhatsApp vs. Weibo/WeChat) it can be argued that we are currently in period where “platforms” are key to social, cultural, and economic behaviors and outcomes. These platforms have both numbers of members and financial turnover greater than a large proportion of countries in the world. We would strongly argue that understanding the role of platforms is key to understanding our current digital world in all the domains addressed in this volume. The dynamics of a platform economy, of identity management via the limiting constraints of a few platforms, or of the political implications of platform-based social networks, are questions where the role of platforms is key to three of the domains discussed in this volume.

We acknowledge that disruptive technological, political, or economic changes might overturn the importance of platforms as currently understood.

(p. 705) Cross-cutting Challenges

In the ESRC project we asked what the key challenges researchers are facing in each of our domains. Looking across the chapters in this volume it is clear that many of these are cross-cutting and pertinent to any work on the social impacts of digital media. We would therefore argue that all near-term projects on digital technology and society should seek to examine or address each of the following:

Methods innovation. This should include reflection on and evaluation of: digital tools, analytic approaches, and the digital representation of results. This could and should (p. 706) include taking risks based on the efficacy of new tools and methods as they are tried out and tested.

Theory testing and evaluation, with theory development where needed. In all the domains, we found a great variety of theory, but much of that was used as a general backdrop without operationalization or evaluation. For example, many of the sociology-based items reference “Network Society” theory without operationalizing this in any clear manner. In contrast, much of the psychology work directly applies theory, but with extensive variety. We would caution about the need to develop new theory for its own sake. As was noted by participants in the consultation workshops, just because digital technologies are new, they may not need new social science theories to understand their uses and implications. There may be a need for greater clarity on “most relevant” theory and on incremental theory development as opposed to a need for “digital specific” theory development. This makes theory testing, new and old, essential.

Ethics. Ethics, especially around the use of publicly visible social media data, remain a challenge for researchers, though clearer guidance is being provided by academic organizations (e.g., the Association of Internet Researchers, and the British Psychological Association). There are also considerable ethical questions around what researchers, government, businesses, and organizations do with the data of respondents, citizens, and consumers data. Further, the increasing integration of digital technologies into medical, social, work, and biological contexts raises a wide variety of general as well as novel ethical issues. We would argue that projects should have a component that assesses the ethical challenges faced, in order to help build a knowledge base of best practices and key concerns. In the United Kingdom, the Nuffield Foundation (http://www.nuffieldfoundation.org/), which supports innovative social research, has established the Ada Lovelace Institute to address these research questions and promote ethical practices, importantly by convening “diverse voices to build a shared understanding of the ethical questions raised by the application of data, algorithms, and artificial intelligence.” Similarly, the UK government has established a Centre for Data Ethics and Innovation to advise on data ethics policy. Social research can make considerable impact here through

addressing these issues both through research about the ethical challenges and by developing ethical research practices.

Big data. Many research funding agencies are currently supporting initiatives that address big data (however that is understood in their disciplines; e.g., chapter 18 (Yates, Robson, Rice, & Carmi), chapter 19 (Hintz), and chapter 20 (Nugent-Floan & Edmond)). We would caution against focusing specifically on this as a methodological issue separate from the context of the discipline (or set of disciplines) within which research is taking place. The key challenge is that many disciplines now face the possibility of documenting, archiving, and analyzing what would have previously been impossibly large amounts of data to assess in analogue format. Separate from methods innovation, we would argue that projects which seek to use "big data" should include a robust element of reflection and evaluation on the usefulness, limitations, tools used to analyze, and representativeness of the examined big data sets.

(p. 707) **Multi-platform/holistic studies**. Analyses of the literature shows that research has often focused solely on one technology or platform, though with much good work already been done exploring specific technologies—Twitter, Facebook, Google, Uber, mobiles, smart phones, blogs, specific government systems, etc. However, the reviews also note an increasing trend in which research is undertaken in a comparative way between existing and new technologies or platforms. In general people do not use digital media platforms or technologies in isolation from each other nor separate from other social action (e.g., as covered in most of the Handbook chapters, but especially chapter 4 (Meier et al.), chapter 8 (Yates et al.), chapter 9 (Rice et al.), chapter 10 (Cecchinato & Cox), chapter 15 (Yates & Lockley), chapter 19 (Hintz), chapter 20 (Nugent-Folan & Edmond), chapter 23 (Jacobs et al.), and chapter 24 (Yates & Blejmar)). Such work is necessary to understand the specifics of technologies or socio-technical contexts. The Delphi responses have strongly argued for the need to look at digital technology use overall, and in combination, to ask broad social science questions and then explore which technologies are relevant to citizens' actual practice and in what ways. From this we can develop a more holistic picture of the integration of digital into everyday lives (or not, in the case of digital inequalities). This does not preclude single technology studies where this has relevance, but such decisions should have a strong social science basis—not simply one of the accessibility of data or the novelty of a new device or app. For example, there appear to be class differences in the uses of different social media platforms. If this is valid, a case could be made for a project to focus on a specific platform as used by a specific community (i.e., mobile phones in low-income areas). One area where this may be more acceptable would be in the economic domain, as the study of the impact of a platform on a sector might be limited to one technology (e.g., Uber). However, overall, the Delphi and workshop results highlight a contemporary need to "reverse the telescope" and focus on the breadth and depth of citizens' digital worlds, as they navigate among multiple technologies and platforms. This puts social science questions to the fore within which a mix of digital technologies may play a part.

Missing Areas and Gaps

One of the separate policy workshops brought together scholars from across the disciplines covered by this review, as well as from the UK's media regulator Ofcom, the ICT sector, the UK's Department for Digital, Culture, Media and Sport, and the UK's Department of Work and Pensions. Resonating with the gaps identified in the ESRC Domain chapters as summarized above, the workshop identified two other areas where digital facing research may inform policy: impact and policy implications, and digital culture.

What are the broader *policy implications* of the results of our social science work on digital media? Research outputs should not remain isolated and can contribute to evidence-based policymaking. This is clearly crucial in all our domains, but especially (p. 708) areas such as politics, governance, health, economics, and social inclusion. The ESRC project did not look to explore the links between research and policy, though we feel that work documenting the policy relevance and impact of research on digital media is needed, importantly to identify where high-quality research may not be reaching policymakers. Key areas for policy identified in the workshop were: digital inclusion and exclusion; creative and digital industry sector policy/regulation, digital skills, digital and social policy, and arts and culture policy. A related issue was further research needed on the general use of, and also evaluating the effectiveness of, digital tools that support policy*making*, as well as how digital tools and media may impact the *methods* of policymaking—such as the rise of "agile" policymaking. Finally, more work should be done on how digital media are used, with what implications, in the policy *delivery*.

The other gap is the *role of digital media in culture*. There is of course a whole body of work on Digital Humanities and a vast body of practice around digital arts. But processes of digital consumption and digital cultural practices clearly cut across social science questions. This includes questions such as how digital consumption corresponds with social inequalities; how digital cultural production (from YouTube to more conventional art forms) intersects with questions of community or the role of platforms; how cultural institutions are addressing the impacts of digital systems; or how arts and cultural governance and funding might intersect with new(ish) digital media formats such as games, virtual reality, and augmented reality. There is a need to ensure such questions are considered from both social science and arts perspectives—that they are not solely about the aesthetics or the value of the practices—especially as variations in taste, consumption, and practice may be key to how people utilize digital media, with positive and negative implications.

Cross-cutting and Unique Topics and General Themes in the non-ESRC Chapters

As with the ESRC Domain chapters, the non-ESRC chapters also manifest a wide range of themes and subthemes, some of which cross-cut more or less frequently across the chapters, and some of which are fairly infrequent and unique. Further, the patterns of relation-

ships among the themes and the chapters provide some basis for identifying larger, more general themes associated with digital technology and society.

Common and Unique Themes

We began with the coding typology developed in chapter 1, based on 89 recent books on digital technology and society. However, we added relevant emergent codes in NVIVO (p. 709) as we re-read and coded each of the 14 non-ESRC chapters, consolidated "participation, engagement" (non-civic) into C5 Inclusion, exclusion, discrimination, and deleted all of the initial subthemes that did not appear in these chapters. This resulted in 22 themes with 144 subthemes. Table 25.5 presents the number of chapters that included each (p. 710) (p. 711) (p. 712) (p. 713) theme or subtheme, and the number of instances each theme or subtheme was coded overall (i.e., a given subtheme could be coded multiple times within one chapter, but only if it was presented in a different context).

Table 25.5 Non-ESRC Chapters: Number of Themes and Subthemes by Chapters and by Total Instances

Themes and Subthemes	**# Chapters**	**# Instances**
A1 Theory	10	45
Actor-network theory	1	1
Attitude change, persuasion	1	1
Behavior change, motivations, perceptions	2	3
Boundary theory	1	2
Citizenship theories	2	2
Collective action theory	1	1
Diffusion of innovations	2	2
Digital divide, digital inclusion	1	1
Domestication theory	1	1
Dramaturgical approach (Goffman)	1	1
Economic rationalism	1	1
Industrialization and capitalism	1	1
Media mastery	1	1
Mediation theories	2	2
Network theory	3	3
Practice theory	2	2
Public good	1	2

Self-determination theory	1	1
Social capital	1	2
Social comparison theory	1	1
Social construction of technology	2	3
Social exchange theory	1	1
Social identity theory	1	2
Social loafing	1	1
Socio-technical	1	2
Space vs Place	1	1
Structuration	2	2
Technology acceptance model	1	1
Transactive memory theory	1	1
A2 Names for new social era	5	9
Datafication	1	1
Digital age, society, revolution	2	2
Digital citizenship	1	2
Digital natives, immigrants	1	1
Information, knowledge society	1	1
Liberation technology	1	1
Second machine age	1	1
B1 Technology venues	13	58
Algorithms	2	5

Artificial Intelligence	1	3
Computer-mediated communication	2	2
GPS, locational	1	1
Infrastructure	1	2
Intelligent machines	1	1
Internet of things	3	4
Knowledge sharing systems	1	1
Mobility, mobile phones	5	7
Multiple media, ICTs	1	1
Other	2	2
Resource usage feedback technologies	1	1
Robots & social robots	2	4
Smart homes, cities, e-government	4	7
Social media, networking sites	6	9
Sustainable HCI	1	2
Ubiquitous computing	1	1
Visualization	1	1
Wearable computing, devices, sensors, smartwatches	3	4
B2 Technology characteristics	9	17
Affordances	4	5
Habitual, familiar, updating	2	3

Materiality	1	1
Mediation vs. objects, devices, apps	1	1
Usage types, forms	3	7
C1 Content, creation	9	25
Crowdfunding	1	1
Design	2	4
Emotional content, responses	2	3
Humor, memes, hashtags	1	2
Knowledge sharing	1	1
Online expression	1	3
Producers, users, producers, sharing	6	10
Storytelling	1	1
C2 Big data, data mining, data storage, analytics, user data	7	32
Attention industry, marketplace, merchants, customers	2	4
Big data, data mining, data analytics, data definitions	4	14
Data user, personal, online, digital traces	2	3
Privacy, surveillance, security, anonymity	5	11
C3 Civic issues	5	33
Civic media, citizenship, democracy, public sphere, the news press	4	7
Digital countercultures, underground	1	1

Engagement, participation civic	3	6
Free speech, censorship	1	7
Political, politics	2	2
Power	4	6
Social movements & digital activism (incl. feminist activism, play as resistance), collective action	2	4
C4 Ethics, ethical issues	4	8
C5 Inclusion, exclusion, discrimination	8	20
Class (social, economic)	1	3
Digital divide, access	4	6
Discrimination	1	1
Gender	1	3
Inclusion, exclusion; equality, inequality	2	6
Participation, engagement	1	1
C6 Manage digital experience	4	16
D1 Digitization of self, others	1	1
Biosensing, quantified self & animals	1	1
D2 Health	6	28
Digital health	5	8
Healthspan and lifespan	1	1
Online information, interventions	2	2

Psychological condition or effect (e.g., well-being, depression, stress)	5	10
Support, coping (psychological, physical)	3	7
D3 Relationships	12	59
Community, offline and online	3	6
Families	2	5
Friendship, friends	3	4
Identity, selfhood, self-presentation, self-disclosure	7	12
Individual, collective; public, private	2	2
Intimacy	1	1
Social (interactions, relationships, net-works, group identity)	7	14
With machines, devices	5	15
D4 User groups	4	6
College students	1	1
Elderly	1	3
User types	1	1
Women	1	1
D5 Culture, everyday life, education, learning, training	10	33
Consumption	3	5
Culture — organizational, national	7	9
Education, learning, training	4	4

Everyday life, practice, contexts	3	4
Literacy	5	11
D6 Work and organizations	8	26
Business models	1	1
Innovation, adoption, acceptance	4	9
Labor, creative, digital, employment	1	4
Media use policies	1	1
Organizations & business	2	2
Work, work-life boundaries	5	9
D7 Law, policy, regulation	7	17
E1 Effects Negative	9	47
Addiction, problematic use	3	7
Attention, brain, overload, interruptions	4	9
Cyberbullying, harassment	3	5
Danger, harm, risk	4	4
Disconnection (among people), loneliness	1	1
Fake news, alternative facts	1	5
Fragmented media devices and platforms	1	1
Free riding, social loafing	1	1
Knowledge sharing costs	1	2
Multitasking	2	3
Online hate and shaming	1	1

Pressure for access, connectedness, response	3	6
Work difficulty, processes	1	1
Work-Life conflict	1	1
E2 Effects Positive	7	12
Collaboration, cooperation, sharing	2	2
Connectivity, connectedness	3	3
Knowledge sharing benefits	1	1
Safety	1	2
Social capital	1	1
Technology interventions (sustainability)	1	1
Work ease, effectiveness, efficiency, productivity	1	1
Work-family enrichment	1	1
E3 Effects Societal	8	17
Crime	1	1
Economy, economics	1	2
Environment implications of digital media	1	3
ICTs for development	1	2
Institutions	1	1
Societal impacts	8	8
E4 Effects contradictions, paradoxes, tensions, unintended	7	15

F1 Future research, methods	12	39
Methods	5	9
Research	11	30

First, we consider common or cross-cutting themes—those (aggregated across their subthemes) appearing in over half (8 or more) of the 14 chapters. These include B1 Technology venues (in all but one chapter); D3 Relationships, and F1 Future research and methods (12 chapters); A1 Theory, and D5 Culture, everyday life, education, learning, training (10); B2 Technology characteristics, C1 Content, creation, and E1 Effects negative (9); and C5 Inclusion, exclusion, discrimination; D6 Work and organizations; and E3 Effects societal (8).

The most unique theme, appearing in only one chapter, was Digitization of self & others. Other infrequent and thus unique themes were C4 Ethics, ethical issues; C6 Manage digital experience; and D4 User groups (4 each); and A2 Names for new social era; and C3 Civic issues (5 each).

The themes that appear more frequently across the chapters can be interpreted as more pervasive or central themes, while those appearing less frequently can be seen as more unique and less central themes, associated with digital technology and society. This distribution does not necessarily imply that the less frequent themes represent “gaps” or under-researched areas; some themes and subthemes may be just more specialized or more narrowly focused (e.g., digitization of self, ways of managing one’s digital experience, particular user groups), or more relevant to books about the macro issues of digital technology and society (such as particular names or terms for the era), or of particular interest to only a few of the authors.

However, the overall distribution of more or less frequent themes can be useful in identifying more common themes as a guide for literature reviews, or less frequent and more unique themes as opportunities for more in-depth and novel research. For example, we should expect that F1 Future research and methods reasonably appears in all chapters, and B1 Technology venues in all but one. Particularly interesting is that all but two chapters also discuss D3 Relationships. This frequent and common focus highlights that the inherent nature of information and communication technologies and systems involves relationships within individuals (e.g., well-being, identity and self-presentation), among users (e.g., caregivers and the elderly, or online communities), among users and technologies/devices (e.g., between individuals and their smartphones or smarthomes), among users, their media, and third parties (e.g., big data and the attention economy), among different social and cultural groups (e.g., power, digital divides, inclusion/exclusion, literacy levels), and among systems and devices (such as the Internet of Things). Also, instances of negative, positive, societal, and contradictory effects were all discussed by about the same number of chapters (from 7 to 9), indicating again that neither a fully utopian nor a

fully dystopian perspective towards relationships between digital technology and society seem justified (for example, see Katz & Rice, 2002, for an explication of the synthesizing Syntopian perspective, which rejects both utopian and dystopian approaches).

(p. 714) Perhaps more fundamental is that, as described in chapter 1, the seven guiding ESRC Domains resulted from a comprehensive analysis of the literature designed to identify possible new research areas for funding, and these 14 non-ESRC chapters were submitted to the follow-up conference, and selected, largely as complements to those seven themes. Thus, some topics appearing in recent books simply were not included in the overall project's domain. Certainly, the literature associated with digital technology and society is vast and would include a much wider array of topics than are included in this Handbook. These would include more technological, computer, software, and engineering aspects; more contexts related to arts and humanities; more legal and policy issues; more business and economic dimensions; more context from other countries and cultures; other use contexts such as gaming, virtual reality, wearable and embedded media; more focus on the needs and uses of groups such as low income, rural, differentially abled, ethnic, feminist, activist, and LBGTQ, among many others; more consideration of cultural differences in access, meaning, use, and implications; and more focus on qualitative and case studies (for just a few examples, see Borah, 2017; Lee, Ho, & Lwin, 2017; Rice & Fuller, 2013; Rice & Leonardi, 2013; Röhle, 2005).

More General Themes Emerging from Relationships among the Chapters

In addition to assessing common and unique themes, we can also identify how the non-ESRC chapters relate to each other, reflecting a more general view of shared foci in this Handbook. Table 25.6 indicates which themes appeared in which chapters.

Table 25.6 Non-ESRC Chapters Including at Least One Instance of Each Theme

	Chapters														
Theme	04	05	06	07	09	10	12	13	15	17	19	20	21	23	**Total**
A1 Theory	X	X		X	X	X	X	X	X		X		X		10
A2 Names for new social era				X		X	X			X	X				5

B1 Technology venues	X	X	X	X	X	X	X	X	X	X	X		X	X	13
B2 Technology characteristics			X	X	X	X		X	X	X		X	X		9
C1 Content, creation	X		X	X	X				X	X	X		X	X	9

C2 Big data, data mining, data storage, analytics, user data			X	X						X	X	X	X	X	7
C3 Civic issues				X					X	X	X			X	5

C4 Ethics, ethical issues			X				X					X		X	4
C5 Inclusion, exclusion, discrimination	X	X	X		X			X	X		X			X	8

C6 Manage digital experience		X	X		X	X									4
D1 Digitization of self & others			X												1
D2 Health	X	X	X		X	X	X								6

D3 Re-la-tion shi ps	X	X	X	X	X	X	X		X	X	X		X	X	12
D4 Use r gro ups		X	X		X				X						4

D5 Culture, everyday life, education, learning		X	X	X	X		X	X	X	X	X	X			10
D6 Work and organizations	X	X	X	X		X	X	X						X	8

D7 Law, policy, regulation		X					X	X	X	X	X			X	7
E1 Effects Negative	X		X		X	X	X	X		X			X	X	9
E2 Effects Positive	X		X	X	X	X		X					X		7

E3 Effects Societal		X		X	X		X		X	X	X			X	8
E4 Effects contradictions, paradoxes, tensions, unintended	X	X		X	X		X						X	X	7

F1 Future research, methods	X	X	X	X	X		X		X	X	X	X	X	X	12
Total themes for each chapter	10	13	16	14	15	10	13	9	12	12	12	5	10	13	—

Notes: 04 = MeierDomahidiGuentherCMCMentalHealth; 05 = WaggDigitalInclusionWomensHealth; 06 = PetrieDarzentasDigitalTechOlderPeople; 07 = GreenComberKuznesofDigitalNexus; 09 = RiceZamanzadehHagen-MediaMastery; 10 = CecchinatoCoxBoundariesCommTechsFinal; 12 = CoombsHislopTanevaBarnardChangingNatureOfWorkIntelligentMachines; 13 = YatesLockleyDigitalCultureAtWorkAndTheUptakeOfDigitalSolutions; 15 = YatesLockleySocialMediaSocialClass; 17 = LeeScottBaumannDigitalEcologyFreeSpeech; 19 = HintzDigitalCitizenship; 20 = NugentFolanEdmondDataDefinitions; 21 = HocevarAbeytaRiceMotivationsOnlineKnowledgeSharing; 23 = JacobsEdwardsCottrillSaltGovernanceAndAccountabilityInIoTNetworks

All but one chapter included from 10 to 16 (out of 22) themes. Thus, most chapters portray over half of the themes, with chapters 6 (Petrie & Darzentas: Digital Technology for Older People), 9 (Rice, Zamanzadeh, & Hagen: Media Mastery for College Students), 7 (Green, Comber, & Kuznesof: A Digital Nexus), 5 (Wagg Cooke, & Simeonova: Digital Inclusion and Women's Health …), and 12 (Coombs, Hislop, Taneva, & Barnard: Changing Nature of Work with Intelligent Machines) involving the most. Clearly, we would not expect chapters by different authors to engage the same themes, much less all of them. However, partially as a byproduct of the bounded number of themes (22) across the chapters (14), partially because of the interrelatedness of these themes within most any treatment of digital technology and society, and partially because of the focused nature of the ESRC project and the conference call for papers, there should be considerable commonality.

Figure 25.1 displays a hierarchical clustering of the 14 chapters, based on the Jaccard similarity coefficients derived from the co-occurrence of the 22 theme codes among all the themes (and their aggregated subthemes) across the chapters (provided through NVIVO 11). We can see two large clusters. The top cluster represents more macro and conceptual or definitional issues, emphasizing knowledge, citizenship and free speech, data, and digital technology venues (sustainable HCI, intelligent machines, and Internet (p. 715) (p. 716) of Things). The bottom cluster emphasizes more contexts and implications of digital technology uses, at both social (class, inclusion, digital divides) and psychological levels (work-home boundaries, older uses, mental health, and media mastery).

At least two implications for readers and researchers follow from the clustering. First, based on the extent to which the chapters shared codes from the more general coding framework derived in chapter 1, the chapters in this Handbook could be regrouped and resequenced from the current table of contents and sections. Possible sections could be concepts, venues, social issues class and inclusion, and psychological issues of health, well-being, and media mastery. Second, researchers focusing on any of these general areas may wish to use the relevant chapters as initial literature reviews and foundations for further research.

Figure 25.3 Hierarchical clustering of non-ESRC chapters based on co-occurrence of coded themes.

Conclusion

The ESRC project was defined as a scoping review to identify key areas for future research. One potential outcome from such a project would have been to identify one or two pressing research concerns. The reality of digital media use is that they pervade nearly all aspects of contemporary society and have touched nearly all aspects of everyday life, and conversely are shaped and adapted by a wide range of actors and contexts. Even those who do not use digital media are directly and indirectly affected, as lack of access or skills creates substantive disadvantage in societies where services and even everyday interaction are predominantly undertaken via digital devices. In each of the main domains we have sought to identify key future research questions and challenges—those issues that we need to better understand in order to get a clearer and more (p. 717) comprehensive picture of the contexts and implications of digital media use. Focusing on just one area within a domain, or claiming that just one domain has priority, would be both limiting and a false assertion. Having said this, we can see some key commonalities in the overall results, and we would argue that bringing these together provides a broad set of themes that might serve as a medium-term framework for exploring digital media and society. We believe that combing the overlaps between the following areas creates two substantive and relatively integrated domains of study in regard to digital media:

- Communication and relationships *with* communities and identities
- Citizenship and politics *with* governance and security

Based on discussions in the workshops, we would argue that a third major medium-term area of study has to be

- Social, economic and cultural impacts of automation, augmentation, and virtual reality

We would then suggest four smaller focused areas that could stand alone or cross cut these three main areas:

- Digital economy, with a focus on the impact of major platforms
- Data and digital literacies
- Health and well-being focused on workplace, every day and governance issues
- Digital divides and digital inequalities, including the two-way interaction between digital inequities and other areas of social inequity

We would also strongly emphasize the need for projects that address the following:

- Multi-platform/holistic studies: To ask broad social science questions and then explore which technologies are relevant to citizens' actual practice and in what ways. To develop a more holistic picture of the integration of digital into their lives (or not, in the case of digital inequalities).

- Methods innovation: Including risk taking on digital tools—with a strong methods evaluation component.
- Theory development, testing, and evaluation: We are agnostic on the need to inherently develop new theory to understand the everyday uses and impacts of digital technologies. The literature content analysis has found little evidence of consistent dominant theory in the area. There may be a need for greater clarity on "most relevant" theory and on incremental theory development as opposed to a need for "digital specific" theory development.
- Ethics: This needs to cover both ethics with regard to methods, but also wider social ethics around social, commercial, and government use of data, systems automation, and human augmentation.

(p. 718) The work we have undertaken here has highlighted the very large amount of research and scholarship dedicated to understanding the impacts and roles of digital media in contemporary society. At the same time, it is clear that much work remains to be done. It is a concern that funding (from government and industry) remains focused on technology development and implementation—with the clear policy goal being economic growth. For example, the recent UK Industrial Strategy Challenge Fund, the UK Digital Economy program, and the EU Framework and H2020 programs have all funded high-quality work focused on the creation of new technologies and their commercialization. This has included funding for creative and digital industries. Yet funding to support the evaluation of the social impacts of these innovations, their ethics and governance, the process of their adoption, and the social process of their creation remains far more limited. We also have some concern that some social science colleagues continue to view digital issues as secondary to, or as "add-ons" to formal social research questions—rather than seeing these as fundamentally integrative to contemporary social research. Understanding contemporary interpersonal interaction or understanding UK benefits policy is not separate from the digital technologies being used to create and maintain these relationships or manage these services.

Finally, and most importantly, the key point we draw from the chapters in this Handbook is both exciting and challenging—namely the vast range of research opportunities that the study of digital media still provides and will continue to generate. This includes not only the range of questions that still need answering, nor simply the new innovative methods and data sets being developed and becoming more accessible, but importantly the chance to be part of understanding and influencing some of the most historically important social, political, economic, and cultural changes taking place in contemporary society

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Notes:

([1.]) As part of the review, the Digital Humanities Institute at the University of Sheffield applied concept modelling techniques to a curated corpus of 1,900 journal articles from the period 1968 to 2017. Concept modelling is a computational linguistic process that involves identifying the emergence of concepts, or key ideas, via lexical relationships. For the purposes of the review, lexical relationships were limited to high frequency co-occurrences of terms as pairs and trios. The process is entirely data driven and resulted in 2 million rows of data. The website https://www.dhi.ac.uk/waysofbeingdigital/provides access to the top 50 most frequently occurring pairs and trios through a series of data visualizations. Click on *View Data Visualisations* at the top. Then check/submit which of the seven ESRC domains you are interested in (including all). Then choose the visualization. These show configurations across selected time frames. Choose bubble chart, tree map, zoomable pack layout, or network diagram, by individual subject or by all seven subjects combined, by document or concept frequency. You can similarly search the analyzed documents (all, by subject, author, concept, concept trio, and year) by clicking on *Browse Articles* at the top. Also, see https://waysofbeingdigital.com/literature-analysis-interactive-results/for interactive visualizations with mouse-overs of the main clusters of concepts within each domain, and the relative frequency of concepts associated with each cluster.

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