ESRC Review: Economy and Organizations

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Abstract and Keywords

This chapter describes the analyses and results for the ESRC Economy and Organizations domain, guided by two main questions: How do we construct the digital to be open to all, sustainable, and secure? And what impacts might the automation of the future workforce bring? The chapter first provides an initial overview of the major insights from the literature review and analysis, the Delphi surveys, and workshop discussions about the relevant range of the concepts of economy and organization (initially, economy and sustainability). Four main topics emerged: digital technology uptake by both business and consumers; social and economic capital of citizens; digital skills; and economic growth and change. Analysis of a specially curated set of 1900 articles over the 2000-2016 period showed perhaps the greatest change in focus over time of all the domains. The earlier literature emphasized information as a product (involving property rights, markets, law), and some technologies. The later literature highlighted knowledge seeking, skills, communication, and uses. The analyses also identified the roles of theory (rather under-utilized but, when used, were primarily from sociology) and methods (the most common being literature reviews) in this domain. The chapter ends with a discussion of future research directions (e.g., the shaping and development of the digital economy while also fostering sustainability and participation, and impacts of digital labor on people's life experiences) and research challenges (e.g., measuring overall impact of a digital technology on a business, and measuring new ways of working and consuming).

Keywords: automation, digital economy, digital labor, digital technology, economic growth and change, ESRC economy and organizations, ESRC Review, future workforce, sustainability

Introduction

THIS chapter provides an overview of the analyses of the Delphi process, literature review and any relevant workshops material for what was originally defined as the Economy and Sustainability domain. This domain proved difficult to define via the Delphi work —it both broadened out to wider economic issues while also overlapped with many of the

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other domains. Interestingly, the interpretation of “sustainability” remained predominantly within the economic realm rather than in relation to social, environmental, or climate change realms. The chapter first explores the results of the various digital humanities analyses of the literature and the review of methods and theory. The chapter then sets out the results of the Delphi Process, concluding with the key questions, topics, and challenges identified by the process. The final section presents the recommendations for areas of future study. The initial ESRC scoping questions for this domain were

- How do we construct the digital to be open to all, sustainable, and secure?
- What impacts might the automation of the future workforce bring?

Initial Comments

This domain proved the most difficult for which to collect data. Response rates to the Delphi process were low, and the data provided were more limited than in other domains. One of the major current social, political, and economic concerns for this domain is the impact of augmentation and automation, although that is notably absent (p. 324) from the analysis of prior literature. The potential impact of automation and augmentation was extensively addressed by two dedicated workshops jointly funded by the ESRC and the UK Defence Science and Technology Laboratory, and by the ESRC and US National Science Foundation, respectively. We speculate that a review of this domain undertaken in the coming years would see this topic emerge as a major theme. Chapter 24 details more fully the outcomes from these two workshops. In the present chapter, we report the Delphi data in full, but we caution that this is not as large or robust a data set as that provided for the other domains, so the data sets used for the consultation workshop were more limited; therefore, the workshop participants provided additional commentary. Although very useful, this makes the results here dependent on a smaller set of mainly UK expertise.

Literature Analysis

The literature analysis is designed to identify two sets of data. The first data set comprises the key topics within the existing literature, which will allow the comparison with areas of importance identified by the Delphi review. The second data set is a content analysis of the literature to explore the predominance of specific, theory, methods, and approaches.

Topics

Despite the lower number of Delphi responses, the recommended literature was of comparable size to the other domains. Table 11.1 lists the 10 most common (2% or more of the identified cases) concepts identified in the Round 1 literature. Table 11.2 lists concept pairs.

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Table 11.1 Analysis Concepts Ranked

Concepts	Percent
Information	13.4
Knowledge	10.3
Computer	9.2
Internet	6.6
Communication	6.0
Work	5.1
Datum	4.9
Medium	3.1
Chain	2.1
Organization	2.0

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Table 11.2 Concept Pairings—Main and Secondary Concepts

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Concepts	Percent	Concepts	Percent	Concepts	Percent
chain	**3.4**	**datum**	**7.8**	**knowledge**	**16.4**
datum	1.9	industry	1.6	likelihood	1.3
system	1.4	mortgage	1.2	work	.9
communica-tion	**9.6**	observation	.9	seeker	4.2
competence	3.4	work	1.1	task	2.7
equipment	1.3	standard	3.0	technician	1.1
sage	1.1	**information**	**21.3**	transfer	5.0
spectrum	1.7	literacy	2.8	uncertainty	1.2
stress	2.1	mickey	.9	**medium**	**5.0**
computer	**14.7**	producer	2.6	narcissism	.7
construct	.8	production	7.7	newspaper	1.0
course	2.1	proposition	1.3	outlet	.7

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education	2.5	sale	1.2	platform	1.9
female	1.0	supply	2.0	story	.8
measurement	1.0	technician	.9	**organization**	**3.2**
personality	1.2	visibility	2.0	production	2.2
student	3.8	**Internet**	1.5	property	1.0
teacher	1.0	literacy	2.4	**work**	**8.1**
trait	1.0	servant	1.4	technology	2.2
van	.4	skill	5.8	time	2.3
		telecommunica-tion	1.0	work	3.6

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(p. 325) All the literature collected from both rounds was analyzed using Wordstat. Wordstat identified 13 topics, presented in Table 11.3.

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Table 11.3 Wordstat Analysis of Topics

Topics	Keywords	Eigen-value	Freq	Cases	% Cases
Social capital	SUPPORT; MEMBER; GROUP; SOCIAL; MEDIAT; COM-MUN	10.64	30,941	546	96.1
Supply chains	SUPPLI; JU-RISDICT; SUP-PLIER; IN-TANG; CUS-TOM; TAXAT; CHAIN; VAT; BUSI	3.60	9442	454	79.9
Smart energy	STRENGER; YOLAND; EN-ERGI; SMART; EVERYDAI; LIFE	3.27	6168	446	78.5

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Economic growth	MARKET; NATION; GROWTH; INDUSTRI; COMPETIT	2.81	15,685	521	91.7
Democracy and public sphere	DEMOCRACI; SPHERE; POLIT; DEMOCRAT; CIVIC; CITIZEN; PUBLIC; MEDIA	2.36	17,342	529	93.1
Urban migration and mobile	MIGRANT; CHINA; URBAN; MOBIL; CHINES; PHONE; CITI; CLASS; ICT THRIFT; LEYSHON; FINANCI; GEOGRAPHI; SPACE	2.13	4169	401	70.6

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Facebook and Internet use	FACEBOOK; USER; ONLIN; SITE; WEB; INTERNET; GOOGL; NETWORK	1.96	27,056	537	94.5
Digital education and skills	EDUC; SKILL; CHILDREN; ADULT; HOUSEHOLD; LITERACI; GENDER; INTERNET; SURVEI	1.91	7928	478	84.2
Marxist analysis	MARX; CAPIT; CAPITALIST; LABOUR; FUCH	1.75	6447	388	68.3
Twitter	TWEET; HASHTAG; TWITTER	1.66	1478	109	19.2

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Product and technology development	DEVELOP; PRODUCT; TECHNOLOGI; KNOWLEDG; DESIGN; COLLABOR; AR; PRACTIC; SOFTWAR; THI	1.63	69,507	555	97.7
Intellectual property	PROPERTI; INTELLECTU; LAW; GOVERN; PRIVAT	1.57	9190	507	89.3
Taxation	TAX; OECD; BEP; TAXAT; DIGIT; ECONOMI; JURISDICT GST; VAT	1.55	692	47	8.3

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In this case the two analyses do not strongly overlap except in the areas of digital skills and product development. This may reflect substantive differences in the round 1 and round 2 data sets, but as noted in chapter 2 (Methods), these are new and to an extent experimental methods. Further research work is needed to explore the different representations that alternative concept and topic modelling tools provide. We would also note that the idea of "sustainability" was predominantly interpreted as the development of "technologies to support environmental sustainability" such as smart meters. Also, it is clear that our round 2 respondents took a broader "political economy" definition into account. Finally, a considerable number of identified texts overlapped with the Citizenship and Participation (chapter 16), Communities and Identities (chapter 14), and Governance and Security (chapter 22) literature. Looking at the underlying keywords in each analysis, seven key areas stand out (see Table 11.3):

(p. 326)

1. Product and technology development
2. Social and economic capital
3. Facebook and Internet use
4. Democracy and public sphere
5. Economic growth and change
6. Intellectual property
7. Digital education and skills

(p. 327) Of these, Facebook use, and democracy and the public sphere, have been dealt with in the Communication and Relationships (chapter 8), Community and Identities (chapter 14), and Citizenship and Politics (chapter 16) domains.

Looking over time at the smaller curated literature for the subject "economy," we can see an early focus in the literature (2000–2004) on information as a product: goods and production; costs; information as property, and information rights; markets, transactions, strategy, law, organizations and firms; with a small focus on technologies, such as networks, websites, the web, and channels. By 2012–2016, there was almost a complete shift to emphasizing knowledge seeking, skills and experience, communication, uses (purposes such as health, support, and attitudes such as anxiety and ambiguity), and more global issues such as energy and the information society. But in general the pattern of concepts over time becomes quite diverse. Figures 11.1 and 11.2 display the changing nature and frequency of concept pairs in the "economy" subject, from 2000–2004 and 2012–2016.[1]

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Figure 11.1 Economy 2000–2004: Most frequent concept pairs.

Note: Bubble chart showing frequency of the top 50 concept pairs, based on concept modeling (described in Chapter 2) within the Domain for 2000–2004. The diameter of each circle reflects the frequency of the concept pair, with the most frequent pair beginning in the center.

Figure 11.2 Economy 2012–2016: Most frequent concept pairs.

Note: Bubble chart showing frequency of the top 50 concept pairs, based on concept modeling (described in Chapter 2) within the Domain for 2012–2016. The diameter of each circle reflects the frequency of the concept pair, with the most frequent pair beginning in the center.

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(p. 328) In the workshops and stakeholder engagements, the impacts of automation, artificial intelligence, and augmentation on economy and society were often highlighted (and these issues are dealt with elsewhere; e.g., chapters 12 and 24). This was a strong societal and media topic at the time of this work, so the ESRC commissioned the team to run two further workshops on these topics. We therefore introduce some themes from the stakeholder workshops run before and during the project. In these, SMEs (small and medium sized enterprises) and corporate and government stakeholders predominantly raised issues with regard to: product and technology development and uptake, the use of social media and Internet platforms (Facebook, Twitter, Google), economic growth, intellectual property, and digital education and skills.

Given the variations between the analyses of the literature and the additional concerns of stakeholders, picking key topics in the literature was challenging. We have therefore focused here on the topics with a strong economic aspect that point to wider social issues:

(p. 329)

1. Digital technology uptake by both business and consumers
2. Social and economic capital of citizens
3. Digital skills
4. Economic growth and change

Digital technology uptake. In the ESRC and NSF workshop one of the economics contributors noted that “small investments in digital innovations can lead to disproportionate accumulations in wealth.” This comment reinforces one of the key features of our digital economy is the extent to which the initial development of digital systems can be relatively low cost but have high economic returns. This has been the underlying drive behind the substantive venture capital investment in digital start-ups. At the same time, governments have identified basic and advanced digital skills and digital infrastructure investments as key to developing national productivity (for example the UK government’s digital and industrial strategies at the time of writing). It’s therefore clear that digital technologies have and will continue to change, transform, and even transform many aspects of the economy and business practices and processes. Social research therefore needs to understand and examine the processes by which digital products are developed, deployed, and taken up by both businesses and consumers.

A key business context where uptake of digital technologies is a challenge is that of SMEs. In the UK close to 30% of SMEs are limited users of the Internet (see chapter 13). This is a concern for many countries. For example, Ifinedo (2011) examines Canadian SMEs and the reasons behind their use (or non-use) of Internet and e-business technologies (IEBT). They concluded that the primary factors influencing adoption of the Internet are: perceived benefits (the most salient factor), management commitment/support, and external pressure. At the same time, there is a lack of awareness and knowledge of Internet services, which are accompanied by a lack of vendor support and access to financial support from the Canadian authorities. The issue of governmental intervention to support the development of a “digital society” is considered in chapters 22 and 23. Within organi-

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zations, Ifinedo notes that digital leadership is key to the uptake of digital technologies: “The views of the participating SMEs seem to be indicating that top executive support is considered crucial for IEBT to the accepted in the adopting organization” (Ifinedo, 2011, p. 269).

Another key issue is how digital technologies change how organizations function, are managed, and perceive themselves. There is a large body of literature exploring the particular and general impactions of specific technologies or of digital tools in general that we cannot explore in depth here. But as we note in the content analysis to come, no clear theoretical position or approach stood out in the literature analyzed. There are examples, though, of work that seeks to apply digital- or technology-oriented theory to these issues. As an interesting take on this issue, Flyverbom et al. (2016), in their introduction to a special issue on “visibility” in the digital age, argue that in order to understand how contemporary organizations operate in a digital context, we need to understand how they manage the “visibilities” provided by digital technologies. That is, how do they make things transparent or keep things hidden within the organization? This in part refers to the extent that such technologies allow for the observation of work (content) **(p. 330)** and workers (connections). Flyverbom et al. identify four central affordances in digital technologies that are enacted in the contemporary workplace: visibility, persistence, editability, and association. They argue that taking

> an affordance perspective on digital technology use for understanding visibility management seems appropriate in that it allows scholars not only to focus on the features of technologies that enable visibility but also to simultaneously probe how those features interact with and produce people’s goals in ways that encourage them to orient toward visibilities in entirely new ways.
>
> (Flyverbom et al., 2016)

They conclude:

> Visibility is a root affordance in the digital age that helps to enable other branch affordances, including persistence, editability, association, and likely many others. In other words, these other affordances are possible because of the visibility affordance.
>
> (Flyverbom et al., 2016)

Similarly, there is the need to understand and theorize complex networks of people and systems created by digital technologies—within companies, among citizens, and across society and the economy. Contractor, Monge, and Leonardi (2011) provided a typology for such multidimensional networks that draws from and builds on actor-network-theory and includes multiple kinds of nodes and multiple kinds of relations, involving both human and nonhuman actors. At the core of their argument is the claim that failing to conceptualize human actors and machines or technologies in complex multifaceted networks as in-

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terrelated in dynamic processes would provide incomplete and partial research or theory. They argue:

> … making technologies endogenous to networks will offer researchers the ability to begin thinking about networks composed of different types of nodes (e.g., persons, databases, books, etc.), and about where the relationships among these varying nodes also differ (e.g., one might have a friendship relationship with another person, but an information-retrieval relationship with a database). We call these "multidimensional networks."
>
> (Contractor, Monge, & Leonardi, 2011, p. 685)

Adoption of technologies by consumers has also been extensively studied across a range of disciplines. Such work often blends into the policy domain, as there is a focus on issues such as digital inclusion, service provision, innovation, and market development. An example would be LaRose et al.'s (2012) study that examines broadband adoption and use and offers design and monitoring of sustainable broadband adoption interventions. Again this is an area where a variety of theories are employed. The authors develop a new theory that takes people's psychological considerations into account, rather than only demographic factors, when thinking about broadband adoption. Another concept that is taken under consideration as an improvement to the Diffusion of Innovation theory is self-efficacy, as they argue that, "habitual Internet use can be expected to provide additional opportunities to observe and directly experience the outcomes of broadband (p. 331) adoption while bolstering beliefs about individual abilities to use the Internet effectively" (LaRose et al., 2012). They conclude and reinforce this argument by stating that their "results suggest that demographic variables such as age, income, and race play a relatively smaller role in intentions to adopt broadband, whereas socio-cognitive theory variables such as self-efficacy and habit strength play a relatively larger role" (LaRose et al., 2012).

Social and economic capital. The other side of the discussion around the socio-economic impact of digital media and technologies is that of growing "digital divides." Though discussion of digital inequalities can be found in all the domains reported in this book, a good number of papers address this in terms of economic, social or cultural capital (see also chapters 5 and 15). For example, Helsper (2012) proposes a theoretical model that links social and digital exclusion. She shows how fields of social, economic, cultural, and personal resources influence digital exclusion. Helsper further argues that offline exclusion fields influence digital exclusion and are mediated by access, skills, attitude, or motivation. But Helsper also contributes to the debate by noting how digital exclusion influences social exclusion, which she categorizes as four digital impact mediators: relevance (usefulness), quality of experience (ease of use), ownership (agency and empowerment), and sustainability (social and financial). Helsper argues:

> The four top level fields of offline and digital exclusion relate to each other; an individual who is excluded from one is also likely to be excluded from another. Nevertheless, the fields are separate constructs addressing different (macro and micro) aspects of exclusion. These economic, cultural, social, and personal fields are

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> operationalized through underlying specific resources that are similarly interrelated.
>
> (Helsper, 2012, p. 417)

This is of course an issue across the globe. As an example, Cartier, Castells, and Qiu (2005) examine the category of "information have-less" which described millions in China's income groups such as rural migrants, pensioners, and fired employees who are sitting in a gray zone of China's digital divide. Because of their lack of financial resources, they have to use inexpensive ICTs such as Internet cafes, prepaid phone cards, and limited smart mobile phones. The people of this category tend to use "have-less" ICT, which has three characteristics: inexpensive technologies and services; limited mobility and low functional choice (usually constrained by time and space); and limited ability to perform critical informational functions. They note:

> The growth of have-less ICTs in China reflects the country's economic boom since the 1980s, which is characterized by increasing income inequality … Structural inequality and institutional constraints can systematically keep the have-less from accessing regular and high-end ICT services.
>
> (Cartier, Castells, & Qiu, 2005, pp. 22–23)

Skills. Within the debate on digital inequalities, a key concern is not just material access but also skills. A considerable focus of such work is on the acquisition of digital skills (p. 332) relevant to both work and to aspects of digital exclusion. Van Deursen and van Dijk (2010), building on their prior work, point to four types of digital skills:

1. Operational Internet skills
2. Formal Internet skills
3. Information Internet skills
4. Strategic Internet skills

Using two surveys of the Dutch population, Van Deursen and Van Dijk consider how the levels of such skills vary with key demographics, concluding that

> the original digital divide (defined as the gap between people who have and do not have physical access to computers and the internet) has developed a second divide that includes differences in the skills to use the internet … In digital divide research, the conclusion that operational and formal internet skills are not sufficient for an effective use of the internet so far only received little attention. Information and strategic internet skills are also required. In contemporary (and future) information society these skills increasingly determine people's positions in the labor market and in social life. Unfortunately, these skills appear to be the most problematic and a large part of the Dutch population seems to be struggling to equip themselves with the skills they need to participate in contemporary society.

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> (Van Deursen & Van Dijk, 2011, p. 908)

Looking at a specific workplace context, Van Deursen and Van Dijk (2010) examine Dutch civil servants' Internet skills (operational, information, and strategic) across different types of civil servant roles (administrators, executive, and policy advisors). As with the general population, the authors found that these civil servants do not perform well when it comes to skills involving information and strategic tasks. They conclude that "the levels of operational and formal internet skills are higher than the levels of information and strategic internet skills" (Van Deursen & Van Dijk, 2010, p. 140).

They also noted key variations by age:

> Age and position appear most important for the civil servant's level of operational and formal internet skills. Younger civil servants performed better than their older counterparts, and the executive employees performed worse than policy advisors and administrators.
>
> (Van Deursen & Van Dijk, 2010, pp. 140–141)

Economic change and growth. A key area of concern is of course the specifics of economic change and growth that comes with the use of digital technologies and media. This includes the challenges of creating global markets for digital technologies, how such technologies and their users change both industries and markets, and shifts from "material" to "digital or knowledge" products. This is an area of research that has been ongoing since the rise of ICTs, predating much of the review work reported here. A part of such work has been the understanding of how technology standards function to underpin markets for digital technologies, or, conversely, the use of digital technologies (p. 333) to underpin markets. For example, David and Steinmueller's (1996) article examined Global Information Infrastructures (GII) and the way that standards influence potential contributions to international trade. They point to a fundamental need to reconcile various information and communication technology standards:

> Technical compatibility standards play an essential role in bringing about international convergence in the production of these investment goods, and, thereby, tend to promote competition in telecommunications equipment markets.
>
> (David & Steinmueller, 1996, p. 821)

Especially because GII is not under the governance of one country, this brings new challenges whereby parties try to negotiate power and control through common agreements on standards. The authors argue that there are three economic reasons behind problems around interoperability: innovation, individuals' mass adoption of a particular technology, and attractiveness of "super-setting" (adding features to a popular product on top of accepted standards).

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Somewhat supported by history, Sarkar, Butler, and Steinfield (1998) argued that intermediaries, termed as cybermediaries, and multi-organization structures, and what we may now consider to be “platform economics” of organizations and platforms such as Amazon, Netflix or Facebook, will play a key role in electronic markets:

> … in electronic marketplaces, unique features of environment, the nature of the underlying technology, and other traditional economies of scope and scale combine to make it unlikely that the average production firm will be able to perform channel functions as efficiently as specialized cybermediaries.
>
> (Sarkar, Butler, & Steinfield, 1998, p. 217)

The literature also examines the question of a shift from manufacturing to data or knowledge-based economics (see also chapter 1). Steinmueller (2002) points to the transition in the structure of economic activities towards a knowledge-based economy, and its implications for social development. The special characteristics of a knowledge-based economy—where information is the main economic product—mean that there is a need for new analyses and measures for economic growth that take into account their influence. Steinmueller provides a brief and simplified summary of the unique characteristics of information:

> Information, in turn, has important economic properties not shared by other economic commodities, namely: (1) nonexcludability (i.e., an individual’s possession of information does not prevent another from using it as well); (2) non-rivalry in use (providing a copy of information does not reduce information ‘holding’); and (3) low marginal cost of reproduction (once the first copy of information has been produced, subsequent copies are much cheaper to reproduce).
>
> (Steinmueller, 2002, p. 144)

Some of the problems that arise are searching for, filtering, and evaluating information as part of knowledge management. There are also regulatory issues that arise when trying (p. 334) to commodify information, such as intellectual property right and competition policy. Furthermore, there is a need to re-examine individual versus collective knowledge production.

The openness of the Internet and the rapid ability to exchange information therefore potentially undermines more traditional aspects of material-based markets. This tension between the ease of reproduction and market value has been played out in a range of industries, especially media industries, which are based on the creation, distribution, commodification, and, more recently, collection of information (see Rice, 2008), of the last decade. Steinmueller, points out that restriction of access and digital “ownership” rights are required in such markets:

> Information can be transformed from a public good into an economic commodity to the extent that its reproduction can be limited. The most direct way to limit re-

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> production is to assign property rights in information. By creating 'legitimate owners' of information, the initial conditions are in place for the operation of a market.
>
> (Steinmueller, 2002, p. 144)

As a counter-point to the optimistic and marketplace orientations of much of this literature, there is also a strong element of critical assessment of the socio-economic impact of digital media, mainly focused around the work of key authors. Clearly the work of Castells (2011) falls into this category. Literature that specifically takes a critical social science view on the digital can be found in a number of works by Fuchs. For example Fuchs (2016) provides a comparative political-economic analysis of China's social media, specifically Baidu (search engine), Weibo (micro-blogging), and Renren (social network) with the USA dominant platforms Google, Facebook and Twitter. One of the key differences pointed out by Fuchs is that the Chinese state owns three of the dominant platforms, while two of them use advertising, which means that commercial and profit logics are guiding the development of the Chinese Internet in a similar manner to the US case. The work also challenges the common belief that only Chinese platforms are being monitored and censored, whereas Fuchs argues that both Western platforms and Chinese sites employ Internet filtering and control mechanisms. In addition, media companies in the West and China enjoy low or no tax regimes. Furthermore, both the US and Chinese platforms use relatively similar terms of use and privacy policies that enable them to use and commodify people's personal data for various commercial purposes. As Fuchs notes:

> User data are both in China and the West's surveillance-industrial complexes first externalised and made public or semi-public on the Internet in order to enable users' communication processes, then privatised as private property by Internet platforms in order to accumulate capital and finally particularised by secret services and the police who bring massive amounts of data under their control that are made accessible and analysed with the help of profit-making security companies.
>
> (Fuchs, 2016, pp. 30–31)

He further points out the strong links between the various elements of the economy, especially the information and finance sectors, in both China and the United States:

(p. 335)

> This circumstance is an indication that the capitalist information economy is both in China and the USA not independent from the finance industry, but dependent on its investments, support and loans, which results in an interconnection of informational capitalism and finance capitalism and a dependence of informational capital on finance capital.
>
> (Fuchs, 2016, p. 35)

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Theory, Method, and Approach

As in the other review chapters this analysis builds on Borah (2017), though as noted in the introduction, the data collected in this area was not as strong as in the other domains. Most of the analyzed papers (59%) were inductive, either describing findings or building theory. The remainder were deductive, undertaking theory testing or assessment (see Table 11.4). Just under a third of the papers (30%) undertook primary data collection, with 55% being discursive reviews of, or reflective on, existing research (see Table 11.5).

Concerning the role of theory, only actual use of theory for the purposes of design or analysis were coded, while general reference to prior work and theory were not. The majority of papers (76%) did not utilize theory in the analysis of data. The main discipline from which theory was taken was sociology (72% of all theory used). There was considerable variety in the specific theories applied from any disciplines and no clear preference. No one theory appeared more than three times. The main research method was literature reviews (36%; Table 11.6). The majority of the empirical work focused on specific groups, with a limited number of general population studies (see Table 11.7). No papers were based on the use of big data.

Table 11.4 Epistemological Approach

	Percent
Deductive (testing of existing theory)	41.3
Inductive (conclusions driven by data)	58.6

Table 11.5 Empirical Approach

	Percent
Discursive/descriptive (no new data or theory)	28.9
Primary empirical (data collected and analyzed)	30.4
Secondary empirical (analysis of existing data)	14.4
Theoretical (synthesis of current or prior work)	26.4

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Table 11.6 Research Method	
	Percent
Literature review (general or narrative)	36.2
Survey	11.0
Theory building	11.0
Interview(s)	9.2
None	8.3
Other	6.8
Ethnography	6.1
Content analysis	5.8
Focus groups	4.0
Experiment	1.2
Social network analysis	.3

Table 11.7 Study Population	
	Percent
Case study(ies)	1.5
General population	8.0
Specific group	34.8
No study group	56.0

As noted earlier, this domain may have the least reliable Delphi data set and therefore the least explicit starting point for the literature collection, although the identified literature (p. 336) data set is of a similar scale to all the other domains. The literature appears to be predominantly reflective and review-based as opposed to being based on empirical data collection and testing. It also appears to be strongly sociological, as reflected in the

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strong political economy aspects of the topic analysis. Selecting areas for future work is therefore more problematic here, especially as the issue of the automation of work has been addressed separately.

Delphi Review

The following sections summarize the results of the Delphi process for the domain covering: suggested scoping or research questions, key topics to address within these questions, and key challenges to researching these questions.

(p. 337) Scoping Questions

The Delphi review responses indicated that the two ESRC scoping questions were deemed broadly appropriate for the domain:

- How do we construct the digital to be open to all, sustainable and secure?
- What impacts might the automation of the future workforce bring?

Only a limited number of additional questions were provided, so they were not grouped or coded:

- How is the digital economy constructed through economic, cultural, and political processes, and how could it be constructed to enable greater participation and sustainability?
- How to guide and assist all participating actors in the digital economy to ensure it is open to all stakeholders, sustainable, and secure?
- How can the digital and society be shaped in order to be sustainable, participatory, and fostering co-operation and inclusion?
- What interventions are feasible and desirable in order to shape the digital according to any set of preferences?
- How should those preferences be established? How should those preferences be negotiated, taking into account the global nature of digital?
- Under which conditions and in what contexts is it desirable to construct a digital world that maximizes openness, and in which contexts is it desirable to construct a relatively closed digital environment?
- What conditions and problems can hinder the establishment of a participatory co-operative, sustainable, inclusive information society and digital society?
- In a given context, which approaches to openness are sustainable from a variety of stakeholder points of view?
- What issues of security arise in each of these contexts that then limit the openness of the digital world?

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As noted previously, we have introduced some themes from the stakeholder workshops (Digital Leader Salons) run before and during the project. In these, SME and corporate and government stakeholders predominantly raised issues with regard to product and technology development, the use of social media and Internet platforms (Facebook, Twitter, Google), economic growth, intellectual property, and digital education and skills. The confirmatory survey asked respondents to select the most important of these, presented in Table 11.8. The three most frequently mentioned scoping questions (24% each for the first two and 19% for the third) involved (1) the shaping and developing of the digital economy, especially in ways that promote participation and sustainability, (2) the shaping of the interrelations of the digital and society to improve sustainability, co-operation, and inclusion, and (3) the conditions and problems hindering such shaping.

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Table 11.8 Delphi Review Scoping Questions

Question	Percent
How is the digital economy constructed through economic, cultural, and political processes, and how could it be constructed to enable greater participation and sustainability?	23.8
How can the digital and society be shaped in order to be sustainable and participatory and foster co-operation and inclusion?	23.8
What conditions and problems can hinder the establishment of a participatory cooperative, sustainable, inclusive information society and digital society?	19.0
What interventions are feasible and desirable in order to shape the digital according to any set of preferences. How should those preferences be established? How should those preferences be negotiated, taking into account the global nature of digital?	14.3
Under which conditions and in what contexts is it desirable to construct a digital world that maximizes openness, and in which contexts is it desirable to construct a relatively closed digital environment?	9.5
In a given context, which approaches to openness are sustainable from various stakeholders' points of view? What issues of security arise in each of these contexts, which then limit the openness of the digital world?	9.5
How can all participating actors in the digital economy be guided and assisted to ensure that the digital economy is open to all stakeholders and is sustainable and secure?	0

(p. 338) The consultation workshop noted potential gaps in the suggested scoping questions and offered the reworked question:

- How do specific digital technologies impact SMES, entrepreneurship, business opportunities, and collaborations; labor markets, work, and productivity; nature of employment, gig economy, self-employment, job insecurity, and cybercrime; taxation; gig

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economy (Uber), Amazon, eBay, and online selling; rural and informal economy, and regional or geographical implications (e.g., specialist regions)?

Topics

The topics identified in the Delphi review were coded into 14 categories, listed in Table 11.9. The most frequently mention topic was the role and impact of major corporate platforms, followed by disruptive technology, environment and sustainability, forms of digital labor, and governance. Table 11.10 presents the ranked importance of these from the confirmatory survey, which closely matches the initial Delphi list.

Table 11.9 Key Topics Ranked by Percent of Cases

Topic	Percent	Topic	Percent
Role and impact of major corporate platforms	31	Digital divides	4
Disruptive technology	12	Digital literacy	4
Environment and sustainability	8	Finance and capital	4
Forms of digital labor	8	Methods	4
Governance	8	Politics	4
		Productivity	4
		Public vs. private	4
		Surveillance	4
		Theory	4

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Table 11.10 Key Topics Ranked by Importance from Delphi Survey

Topic/percent	Very important	Important	Neutral	Unimportant	Very unimportant
Role and impact of major corporate platforms	85.7%	14.3%	0.0%	0.0%	0.0%
Forms of digital labor	71.4	28.6	0.0	0.0	0.0
Environment and sustainability	71.4	0.0	28.6	0.0	0.0
Disruptive technology	57.1	14.3	28.6	0.0	0.0
Governance of digital economy	42.9	42.9	14.3	0.0	0.0

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The consultation workshop offered a number of additional topics, some of which overlap with those presented earlier:

- Impacts of digital labor on people's life experience; impacts on firms of digital platforms

(p. 339)

- Technology adoption in organizations
- Role of digital monopolies and large corporations; digital impacts on the state: taxation, feedback to society
- Inequality and justice, social divides, financing, investment, crowd funding, lending
- Implications of the digital for energy/resource use (i.e., increased paper consumption)
- Enabling of sustainability through digital means through new platforms and apps
- Regional urban/rural development

Challenges

The challenges in undertaking research in this area identified by the Delphi panel were grouped into six categories. Table 11.11 lists these categories, ranked by the number of coded items, with those deemed to be domain specific by the consultation workshop (p. 340) marked in bold. By far the highest percentage of cases involved new methods and tools to study the digital economy, followed at much lower levels by access to data on the digital economy, ethics, and representativeness of data. Table 11.12 shows their ranking by the confirmation survey. There is an inverse relationship here between these lists, but given the low response rates, we should not infer too much from this.

Table 11.11 Challenges Ranked by Percent of Cases

Challenge	Percent
New methods and tools to study the digital economy	**47**
Access to data on the digital economy	**13**
Ethics	13
Representativeness of data	13
Sustainability and digital technologies	7
Understanding impact and development of algorithms	7

Note: Domain-specific challenges in **bold**

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Table 11.12 Challenges Ranked by Importance from Delphi Survey

Challenge	Very important	Important	Neutral	Unimportant	Very unimportant
Sustainability and digital technologies	57.1%	42.9%	0.0%	0.0%	0.0%
Understanding the impact and development of algorithms	42.9	42.9	14.3	0.0	0.0
Access to data on the digital economy	42.9	14.3	42.9	0.0	0.0
Ethics	28.6	28.6	42.9	0.0	0.0
New methods and tools to study digital economy	14.3	42.9	28.6	14.3	0.0

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Representativeness of big data on digital economy and society	14.3	42.9	28.6	14.3	0.0

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The consultation workshop proposed a set of further challenges, some of which overlap with those mentioned previously. A number of these are reflected in the cross-cutting challenges discussed in chapter 25. Here are the challenges, with domain-specific ones in italics:

- The social sciences need to take place within a more technology-oriented area.
- Funding landscape is inevitably shaped by the status quo/current economic modes—possibly making it harder for radically different modes to be researched.

(p. 341) • Concerns over the allure of "novelty," as some "older topics" may also be highly needed.

- *Measuring overall impact of a digital technology on a business is very difficult.*
- Is there a bias towards quantitative data?
- *Similarly measuring scale and scope of new ways of working and consuming*
- *Fluctuating and differentiation of prices make certain qualifications challenging (e.g., consumer price index).*
- Challenges around interdisciplinary/cross-sector working
- Incorporating new forms of data, limited resources, extracting information

Conclusion

Given the more limited data for this domain, making both broad and in-depth conclusions are harder than it is for the other domains. The literature and the various inputs from Delphi process, stakeholders, and review workshops tended to focus on the social and organizational aspects. The theme of sustainability has not come through strongly, nor has formal economics work. This likely points to the foci of the theme questions and limitation of the sample. But we would argue it also points to the fact that understanding the economic impact of digital systems has a strong social and sociological element that needs to be explored.

Overall further work needs to be done to explore the specifically economic disciplinary issues that digital technologies engender. Within the context of this review we would argue, caveats concerning the representativeness of the data notwithstanding, that the workshops, Delphi results, and stakeholder input have defined the following key areas for future research:

1. The role and impact of major corporate digital platforms, including impacts on firms of digital platforms and the role of digital monopolies and large corporations.
2. The uptake and impacts of digital technologies in organizations, especially automation and augmentation on work and the economy.
3. Tied to both key areas 1 and 2 are forms of digital labor, including impacts of digital labor on people's life experience, and the gig economy (linked to platforms).

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Two of the key challenges that cross-cut these are the finding of new methods and tools to study digital economy, and access to data on the digital economy.

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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 Visualizations* 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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Simeon J. Yates (PhD, Open University UK, 1993) is Professor of Digital Culture and Associate Pro-Vice-Chancellor Research Environment and Postgraduate Research at University of Liverpool. His research on the social, political, and cultural impacts of digital media includes a long-standing focus on digital media and interpersonal interaction. More recently, he has worked on projects that address issues of digital inclusion and exclusion. He was seconded to the UK Government's Department of Digital, Culture, Media, and Sport (DCMS) in 2017 to act as research lead for the Digital Culture team. He remains the joint-chair of the DCMS Research Working Group on Digital Skills and Inclusion. His prior work covered topics such as the use of digital technologies in the workplace, digital media use during crises, and ICT use by the security services. The majority of his research has been funded by the Economic and Social Research Council (ESRC), the Arts and Humanities Research Council (AHRC), EU,

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and industry. Simeon's work has often been interdisciplinary and has predominantly involved creative and digital industry partners. He led on a major Engineering and Physical Sciences Research Council (EPSRC) funded interdisciplinary program (Engineering for Life) while at Sheffield Hallam. Simeon has been researching the impacts of the internet and digital media on language and culture since 1990. His PhD thesis (1993) is a large-scale linguistic comparison of speech, writing, and online interaction. Subsequent published work has covered analyses of gender differences in computer-mediated communication (CMC), gender and computer gaming, email and letter writing, and science in the mass media. Simeon has written text books on social research methods—in particular, linguistic and discourse analytic methods. https://www.liverpool.ac.uk/communication-and-media/staff/simeon-yates/

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Elinor Carmi

Elinor Carmi (PhD, Media and Communications Department at Goldsmiths, University of London) is a digital rights advocate, feminist, researcher, and journalist who has been working, writing, and teaching on deviant media, internet standards, feminist-technoscience, sound studies, internet history, and internet governance. Currently, she is a postdoctoral research associate in digital culture and society at Liverpool University (UK), where she works on several ESRC and AHRC projects around digital ways of being, digital inclusion, and digital literacies. In addition to writing her book about spam, she is also working on two special journal issues: One about "sonic publics," together with Ram Sinnreich for the International Journal of Communication, and the other about (re)designing time, together with Britt Paris, for Theory, Culture & Society.

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