

Information Society, Geography of

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Abstract

This article provides an overview of the sociospatial processes associated with the massive growth of information technologies over the past 20 years, as well as the intellectual developments that have sought to describe and analyze these processes. While geographers took on a key role in combating notions of the 'death of distance' in the 1990s, early research on the geography of the information society failed to create a coherent disciplinary approach. Recent work in geography has, however, created a more unified approach to understanding key sociospatial processes in the information society.

The 'information society' refers to the large-scale shift in contemporary societies where processes and practices of information production, analysis, and consumption take on an increasingly dominant role in social life. While the term typically refers to a broad array of information and communication technologies (ICTs), it has become most closely associated with the development of the Internet, the commercialization and popularization of which made the reality of an information society more visible and accessible to a wider range of people. Most recently, the spread of mobile phones throughout the developing world and the explosion of social media have made the previously new and exciting facets of the information society ever more routine through greater integration into the daily lives of people around the world.

The geography of the information society refers to the study of the new technologies and practices centered on information; the focus is on how these technologies and practices both are structured by longstanding sociospatial processes and act to reconstruct and reconfigure such processes. Given the centrality of the Internet in popular imaginations of the spatial expression of the information society, much of this research has focused on the so-called network of networks. Geographers have also been keenly interested in the growth of geographic information science and associated technologies over the past two decades, especially as Global Positioning System-enabled devices and spatially based search have become increasingly common in the past 5 years.

This article situates the concept of the information society in its historical and geographical context, while tracing the development of research on the geographies of the information society from their beginnings in the early 1990s to conceptual and methodological shifts that have taken place since the mid-2000s.

Situating the Information Society

Ultimately, any understanding of the 'information society' must begin from the context in which the concept emerged, which is intimately related to an understanding of what the information society is not, or at least what it is imagined not to be. While there is no single accepted definition of the

information society or point at which society made a wholesale transition into the information society, the term is inextricable from the economic context of the 1970s, at which time deindustrialization and crisis were widespread in the developed Western economies (Bluestone and Harrison, 1982).

In response, many commentators pointed to the emergence of an economy, indeed an entire society, organized not around the production, exchange, and consumption of tangible, manufactured goods that were increasingly being produced more cheaply elsewhere, but of information (Touraine, 1971; Bell, 1973). Such ideas have continued to be influential, as more recent commentators such as Robert Reich (1992) and Richard Florida (2003) have argued that the future of Western economies rests on what they respectively refer to as 'symbolic analysts' or the 'creative class.'

The problem with such constructions of an 'information economy,' of course, is that they tend to neglect the fundamental interconnections between industrial and informational production, as well as the role of information in primary-extractive activities (e.g., the importance of information processing in petroleum exploration). Information has always been a crucial element of social and economic life, even in the industrial and preindustrial eras, just as material resources continue to be extracted and factories continue to manufacture goods in the supposed information age. After all, the computers, fiber-optic cables, server farms, and mobile devices that undergird today's information society have clear material presences and often significant environmental footprints as a result of their production, consumption, and disposal (Zook and Shelton, 2012).

So while computers, mobile phones, the Internet, and geographic information systems have all made significant impacts on social life in the last 20+ years, it is necessary to situate these technological developments within broader histories and understand that they exist along a continuum of quantitative intensification of information use, rather than as wholesale shifts or qualitatively different ways of living in and understanding the world. So while the information society as it is known is marked by real and important differences from previous areas, it is also deeply structured by the historical and geographical forces from which it emerged.

The Death of Distance?

The earliest commentaries on the geographies of the information society emphasized the new spatialities of economic activities related to globalization. Popular writing by non-geographers predicted that new ICTs would mean the 'death of distance' (Cairncross, 1997). Of course, such pronouncements were not without historical precedent, as similar claims were made of earlier advances such as the telephone, telegraph, and even of the postal service (Fischer, 1994).

Nonetheless, it was these popular, if fallacious, accounts that provided the impetus for a great deal of research on the geography of the information society, leading to a refutation of the claims of such popular writers. Rather than seeing these new technologies as having inexorable social effects, which in this case amounted to a spatial expression of technological determinism, geographers and other social scientists attempted to situate these new technologies in their social and spatial context, to understand them as contingent outcomes of particular processes with contingent effects. As Kirsch (1995) argues "space is not 'shrinking,' but rather must be perpetually recast" (p. 544).

But perhaps the earliest programmatic statement against such views of the space-transcending power of technology came from Manuel Castells' theorization of the network society, constituted by the divergent space of flows and space of places. Castells (1996) argued that the use of new communications technologies provided the means through which a new social organization could emerge, organized around the network logic of an electronic 'space of flows' overlaid on cities and localities. He argues that "[t]he space of flows is not placeless, although its structural logic is. It is based on an electronic network, but this network links up specific places, with well-defined social, cultural, physical, and functional characteristics Both nodes and hubs are hierarchically organized according to their relative weight in the network. But such a hierarchy may change depending upon the evolution of activities processed through the network" (p. 413). Thus, the 'space of flows' associated with the information society can enable a reformulation of place-based interactions into virtual interactions, but is merely a space of opportunity rather than a predetermined outcome. Instead, one sees the continued influence of places and their cultural and economic systems on the structure of the information society. Castells argues that these local factors, the longer standing 'space of places' in opposition to the newer 'space of flows,' determine the role of each place within the network and its importance or irrelevance.

While Castells' work promoted an interdisciplinary spatial perspective on the information society, early research on the geography of the information society tended to be somewhat diverse, with scholars addressing the Internet or associated technologies from a particular disciplinary or theoretical standpoint (Hepworth, 1990; Kellerman, 1993). For instance, while some political geographers studying the Internet might focus on the way social movements incorporated the Internet into organizing or protest strategies, economic geographers were investigating how the Internet was integrated into existing networks of production. Although the influence of such disciplinary divisions made it difficult for geographers

to produce a unified body of theoretical and empirical work around the information society, and thus promote a lasting institutional home for this research, it is important to review and understand this work in this context.

Geographies of Urban and Economic Restructuring in the Information Age

Just as the definition of the information society itself tended to revolve around ideas of economic restructuring, so too did the earliest and perhaps most prominent work by geographers on the topic. Although geographers were always quick to point to the lack of nuance in arguments about the end of geography, even the earliest works touching on the geographic implications of new ICT offered ideas such as 'time-space compression' (Harvey, 1989) that highlight the connection between new technologies and globalization.

But further developments have tended instead to emphasize the simultaneous concentration and dispersal of economic activity. That is, while ICTs undoubtedly have allowed for economic transactions to take place over much greater distances, this process has been accompanied by a concurrent concentration of certain activities in particular places. So rather than seeing urban dispersal and dissolution as the result of these new technologies, urban and economic geographers have argued that cities continue to be crucial players in the information society.

On the one hand, the prototypical industries of the information economy have remained largely clustered in a handful of locations that specialize in knowledge production and innovation. Places like Silicon Valley in California, Route 128 in Massachusetts, the Research Triangle in North Carolina, as well as Cambridge in the United Kingdom and Tokyo in Japan, remain home to some of the world's most important electronics and biomedical companies. Instead of representing the death of distance, these clusters testify to the enduring relevance of agglomeration economies. Similarly, it is clear that economic activity in the information society tends to cluster in cities. Rather than exhibiting a placeless character, the infrastructure of the Internet, has emerged from long-standing political and economic processes, meaning that prominent 'global cities' such as New York and London have not been threatened by the Internet, but in many ways have been made even more important (Malecki, 2002). In addition, the information processing industry as a whole, including both those specializing in the development of the technologies themselves and those specializing in producing informational content, also remained highly clustered in a few cities, although in this respect cities like San Francisco were able to gain a relative advantage, solidifying their importance to the global system to which they had previously been peripheral (Townsend, 2001; Zook, 2005).

But the geographic contours of urban and economic restructuring in the information society are not limited simply to the positionality of major cities in the global economy. Indeed, the growth of the information economy affects the internal spatial structure of cities as well, ranging from growth in traffic congestion to changing roles for various

neighborhoods in the aforementioned cities. For instance, [Graham \(2002\)](#) documents how the dot-com boom in San Francisco led to a pattern of 'cyber gentrification' in some neighborhoods, marginalizing poor and minority populations in order to make way for wealthy tech start-ups. Areas zoned for light industry saw the influx of mixed-use loft developments that met the letter of the law while greatly increasing real estate costs, thus forcing manufacturing firms to close or relocate. So while the new activities and capabilities of the information society have enabled the restructuring of economies and city-regions, these new processes demonstrate the persistently variegated and multiscalar processes of uneven geographical development typical of earlier iterations of capitalism.

Globalizing Identities and Protest Movements

Just as urban and economic geographies have brought their own conceptual frameworks to the study of the information society, so too have a number of cultural and political geographers, although their numbers have been considerably smaller and somewhat less prominent. The most common thread woven through political geographies of the Internet have focused on the potential of the Internet to reconfigure the spatial relations of protest, allowing oppositional social movements to 'scale up' and reach broader audiences, which might in turn be able to promote their cause ([Adams, 1996](#)). And while there has always been significant skepticism about the ability of the Internet to enact change independent of broader social structures, the Internet continues to be seen as a key tool for social movements in that it offered a relatively unregulated space where oppositional and counterhegemonic discourses could flourish ([Warf and Grimes, 1997](#); [Froehling, 1997](#)).

Similarly, cultural geographers have seen the Internet as an important contributor to the formulation and maintenance of identity. In some cases, the Internet has allowed diasporic groups to maintain a level of social cohesion despite the lack of colocation ([Adams and Ghose, 2003](#)), while in other examples the Internet has allowed identity to become more fluid in virtual space, perhaps even becoming divorced from corporeality ([Roberts and Parks, 1999](#)). Although cultural and political geography approaches to new technologies have become increasingly prominent in recent years, as will be described in the following section, these interdisciplinary perspectives were largely peripheral to debates going on elsewhere in the discipline and in studies of the information society more generally.

Toward New Geographies of the Information Society

While earlier approaches to Internet geographies were largely approached from preexisting disciplinary perspectives, with the Internet as a common object of analysis, theoretical and methodological shifts, along with technical developments and ever-expanding access to these technologies, have led most recently to efforts to create a more integrated approach to understanding the geography of the information society, with a series of central themes or problematics. While much work

remains to be done, the authors identify four interrelated themes that have emerged within the past decade, and which promise to extend this line of research into the future.

Hybrid Spaces and the Virtual/Material Binary

The first and most important of these themes is the issue of the relationship between virtual and material spaces. Perhaps the most important contribution to this literature has been the conception of space as hybridized, or as variegated mixture of both material and virtual, rather than a so-called real world and an ontologically distinct cyberspace that we can choose to integrate into or remove ourselves from ([Graham, 2013](#); see also [Aoyama and Sheppard, 2003](#)). As such, it becomes more and more difficult to conceive of the Internet as an analytically distinct object of analysis, leading one to conceive of practices, processes, and geographies of information as a unified set of phenomena worthy of study. Instead, one should understand "These cyberplaces are not simple floating and static mirrors of the physical world. They are instead often a component of the palimpsest of place. The virtual Earth and digital representations of place are often characterized by a reflexive relationship with their physical counterparts: they are shaped by, and, in turn, shape the physical world" ([Graham, 2010](#): p. 423).

This unity includes everything from how one's movements through urban space are controlled in part by information profiles about him or her as individuals and types (e.g., radio frequency identification tags, biometric scanning, and pattern recognition), to the ways in which one's interpretation of cultural landscapes are shaped and influenced by increasingly available information and commentary about places that can be engaged with *in situ* and in real time. In short, the growing importance of computation to social life, beginning in the 1950s with the processing of government and insurance records, has become so deeply integrated into everyday life that the idea of 'the information society' is somewhat passé. Therefore, one might say that the geography of the information society is the geography of society writ large.

Rethinking Places and Flows

In addition to an understanding of space as hybridized has been a rethinking of the binary logics that underpinned earlier theorization about flows vs places, or of spatial distanciation vs localization. As was mentioned previously, many of the necessary correctives to death of distance thinking still involved an understanding of social relations stretched over wider and wider geographic areas.

In contrast, the last 5–10 years of work on the geographies of information have increasingly focused on how ICTs do not simply lead to a stretching of social relations but in many cases are implicated in the production of more intensely localized social relations, allowing for a closer connection to one's own place as much as, if not more than, allowing one to connect to someone half a world away.

This awareness of the place-based character of ICTs necessitates a rethinking of the classic Castellan binary between places and flows. It is necessary to understand, following the idea of hybrid spaces, that spatial relations are simultaneously

place based and flow based. For instance, the effects of ICTs on economic processes are no longer seen to allow simply for the outsourcing of production facilities or back-office functions around the world. Instead, it is clear that flows of material goods around the planet – a phenomenon in no way limited to the last 30 years of globalization – are fundamentally supported by accompanying flows of virtual information. As commodities are produced and consumed, the global economy is increasingly dependent on information produced about and attached to these commodities in order to connect them to their places of origin, their conditions of production, and their final resting place in the form of waste (Zook and Shelton, 2012). So just as one has been able to move past binaries between the virtual and the material, so too is it necessary that one moves past binaries between the local and the global, or between spaces of places and spaces of flows.

Code/Space

Another important theme in recent writing on the geographies of the information society has focused on the role of software in the remaking of social and spatial processes. Software code embedded in buildings, roads, traffic signals, and automobiles, among other things, acts as a constraint on the range of possible choices, allowing particular spaces to be used only in particular ways while simultaneously enabling certain forms of action. For instance, the failure of software-mediated processes can quickly repurpose a grocery store into a massive warehouse when check-out scanners no longer work or an airport into a simple waiting room when electronic tickets become inaccessible. Similarly, the code embedded in computers, mobile phones, and various search engines and social media applications structures one's ways of seeing the world by automatically sorting the massive amounts of information available to provide one with simplified and algorithmically constructed view of the built environment through which he or she moves (Zook and Graham, 2007).

Kitchin and Dodge (2011) understand the role of software code as a process of simultaneous translation and transduction. While the production of software code entails the inscription of certain commands, values, and social structures into automatically enacted instructions, the use of this code in turn produces new effects in the world, altering the ways that new iterations of code will structure one's experiences in the world. But, as Thrift and French (2002) lament, the incredible power of software in the world has not been subjected to the same critical scrutiny as other similarly powerful technologies. They argue that attention to the spatialities of software has been limited because we are trained not to see it, to ignore its presence in the interstices of our lives and social processes due to its absence from our field of vision. While this research remains relatively new, it is promising insofar as geographers have been at the forefront of such studies, integrating an explicitly spatial perspective into the interdisciplinary field of software studies.

Volunteered Geographic Information and Big Data

But the importance of such information does not come only from being produced and implemented from the top-down.

For another key element of the information society has been the shift in who is producing the information at the heart of our society. Increasingly, such information is being produced by amateurs rather than professionals and shared openly through a variety of online platforms, or what has been described as the shift from Web 1.0 to Web 2.0. And as that information is increasingly tied to particular places through the practice of geotagging, it opens up new opportunities for citizens to produce their own digital representations of place through what is known as 'volunteered geographic information' (Goodchild, 2007). This layer of virtual information is a key element in the production of hybrid landscapes – blurring the boundaries of the virtual and material – in which the understandings of the material world are influenced by representations in the virtual world, which in turn influence how one lives in and reproduces those same spaces. While Graham and Zook (2011) outline a methodology for understanding these layers of place-based information and interrogating the ways they do and do not reflect sociospatial processes offline, these methods have similarly been applied to understand topics as diverse as disaster response (Crutcher and Zook, 2009) and religious landscapes (Shelton et al., 2012).

When collected, aggregated, and cross-referenced with other large databases of information, this user-generated content becomes one part of a mass of so-called big data, providing potentially unprecedented insights into social interactions. While big data offers researchers a rich source of contextual data from which to work, equally interesting work has emerged on the social conditions giving rise to the phenomenon of big data and how it is shaping academic research and modes of thinking, as well as the way we as citizens and consumers relate to the public and private sector institutions we are dependent upon (cf Crampton et al., 2013). And while big data remains a nascent and contested idea with a variety of possible futures, it has the potential to reconfigure social and spatial relations in new and interesting ways, just as other rounds of technological innovation in the information society have done.

See also: Citizen Mapping; Geographic Information Systems; Location, Absolute and Relative; Networks, Geography of; Surveillance and Privacy, Geography of; Time-Space in Geography; Urban Geography.

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