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Geographies of global telephony in the age of the internet

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ABSTRACT

This paper offers an overview of the massive regulatory, technological, and social changes that have reshaped the world's telephony markets since the rise of the internet. It begins by examining how neoliberalism has reworked the world's telecommunications markets, and then turns to the global wave of deregulation that this transformation has entailed. It then focuses on the geographies of mobile or cellular telephony, which exceeds traditional landlines by a factor of 10 and is having substantial impacts, particularly in the developing world. The fourth part delves into the rapidly expanding domain of Voice Over Internet (VOIP) telephony such as Skype, which comprises more than a quarter of the world's telephone traffic.

1. Introduction

Four decades after the start of the microelectronics revolution, telecommunications continue to be closely associated with economic growth (Madden and Savage, 2000). Although there has been much attention devoted to the geographies of the internet, the workhorse of information flows remains various forms of the telephone, which, despite email and the World Wide Web, is still by far the world's most commonly utilized form of telecommunications. Overshadowed by the focus on the internet, the geography of telephony has received remarkably little attention over the last two decades. This silence is peculiar given that in the age of the internet, global telephony has undergone a profound and sustained transformation with important repercussions about how much of the planet talks with one another.

There is an extensive literature on the early history, geography, and impacts of telephony, which need not be recapitulated here. However, given the massive technological changes (that is, digitization and the microelectronics revolution) and a globalized, neoliberal regulatory climate, the literature on the geographical implications of contemporary telephony is surprisingly sparse. Several studies examined international telephone calls, noting their close relation to prevailing patterns of wealth and poverty, particularly trade and tourism, as well as cultural and linguistic factors such as the presence of transnational migrant communities of callers (e.g., Sandbach, 1996; Alleman et al., 2000; Palm, 2002). For much of the twentieth century, the geographies of what Graham and Marvin (1996) aptly called "plain old telephone service" (POTS) – dominated by closed national markets, low rates of technological change, high prices of calls, and state-owned or regulated monopolies – characterized the provision of telephone service worldwide. Even today, the distribution of landline telephones (Fig. 1), a dying technology, reflects the depressingly familiar landscapes of global inequality.

However, the world of POTS and landlines is an historical relic, and distinctly new geographies of telephony have come into being. Cowhey and Aronson (2012) argue persuasively that innovations in information technology have been among the greatest driving force unleashing a maelstrom of change in global capitalism, particularly as many components of the global information infrastructure have become essentially ubiquitous (e.g., mobile phones) and the increasing modularity of different systems (e.g., television, broadband, internet) allow them to be integrated with one another to an unprecedented degree, decisively blurring the boundaries between hitherto distinct markets. Rapid innovation, even more rapid diffusion and adoption, and a competitive global information economy have raised thorny questions for corporations, regulators, and consumers alike (Fransman, 2010).

Deregulation and digitization, two hallmarks of globalized neoliberal capitalism, have created a new telecommunications industry that has secreted new geographies in its wake. This paper examines contemporary geographies of global telephony in four steps. First, it summarizes the neoliberal sea-change in this industry. Second, it explores the deregulatory tsunami that washed over telecommunications markets, in which national controls were lifted and public corporations sold to private investors. Originating in the US, this process is now largely complete worldwide. Third, it

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focuses on the geographies of cellular or mobile phone usage, including the now-ubiquitous use of text messaging. Fourth, the paper looks at internet telephony (VOIP), particularly Skype. It concludes with the argument that the global ubiquity of telephony has rendered irrelevant conventional spatial interpretations of information cores and peripheries, and that more nuanced perspectives are called for rooted in contemporary theorizations of relational space.

2. The neoliberalization of telephony

Theorizations of contemporary telecommunications typically situate the industry's transformation within the broader context of neoliberal, post-Fordist capitalism (Harvey, 2005). Telecommunications assumes a central role in this process. Conventional portrayals of the industry centered on network effects (Allen, 1988; Capello, 1994), which were typically assumed to validate "natural monopolies" on the basis of their economies of scale and scope. Because telecommunications systems involve high fixed but low marginal costs, the lack of competition that traditionally characterized telecommunications markets was justified as necessary to avoid duplication of infrastructural investments. Public rather than private control was held to be necessary to ensure universality of service delivery, particularly in underserved areas such as rural regions, and the maximization of positive network externalities. This perspective was used to legitimate state-owned or dominated telecommunications firms in almost every country of the world until the late 20th century, including, for example, the US regulation of A&T from the 1930s to the mid-1980s as well as similar firms such as British Telecom, Deutsche Telekom, and Nippon Telegraph and Telephone.

Neoliberalism upended this worldview. Suddenly national restrictions were seen as impediments to global competitiveness. In this reading, national monopolies were supremely unsuited for the age of global competition. Deregulation, it was held, would encourage competition, innovation, and risk-taking, lower prices, and improve service quality (Mosco, 1990; Farrell, 1997; Lehn, 2002).

While neoclassical theory posits the transition from state-owned monopolies to competitive markets as unproblematic, in practice, the deregulation and privatization of telecommunications is a lengthy, complex, and politically contested process that takes variegated forms in time and space. Despite the common assertion that neoliberalization homogenizes local policy design and implementation, national policies and cultural norms matter very much as to how telecommunications are regulated and the resulting spatiality of their deployment. Often national telephone markets remain only partially deregulated, with state-imposed limits over price increases, sales of stocks and infrastructures of privatized public monopolies, differential regulations for voice versus data or local versus long distance markets, and restrictions on foreign ownership.

In this climate, telecommunications providers typically engage in "cherry picking," that is, servicing only high-profit clients on a "pay per" basis while effectively abandoning poorer ones (Graham and Marvin, 1996). Frequently this process occurs through selective investments in areas with high volumes of calls, often lucrative business centers, and disinvestment in low density and low income areas (Miller, 2001; Malecki, 2002). Cherry-picking by telecommunications providers has thus resulted in widening discrepancies between wealthy and impoverished areas within many countries, a phenomenon that resembles and in turn contributes to the digital divide in access to the internet.

Simultaneously, the industry underwent a powerful round of technological changes. As telephone companies began rapidly replacing older copper wire cables with fiber optics, digital media came into its own (Warf, 2006). Throughout the 1990s and 2000s, consortia of telecommunications companies laid an enormous global grid of fiber optic lines, first across the North Atlantic, then across the Pacific, and more recently across the Indian Ocean. Optical fiber transmissions were greatly enhanced by the development of optical amplifiers, which simplified the electronic repeater, increased reliability, and by dense wavelength division multiplexing, making it possible to transmit multiple wavelengths over a single pair of fibers and raising maximum transmission capacities from 280 megabits per second in the 1980s to 12 terabits by 2008, a 42,800% increase. Not surprisingly, the explosive growth in the world's fiber optic capacity led to overcapacity and declining utilization rates; transmission prices plunged in a deflationary spiral throughout the first decade of the 21st century, often by as much as 90%. Global fiber capacity utilization rates fell below 50%, leading to large quantities of unused "dark fiber" (Warf, 2010). In short, the glut of global fiber capacity ushered in a new era in which long distance telephony was far cheaper than it was three decades earlier (Hogendorn, 2011).

At the same time, wireless telephony and Voice Over Internet Protocol (VOIP) telephony began to appear. Wireless or cellular telephones, which now comprise 90% of the phones on the planet, contributed heavily to a dramatic worldwide increase in telephone usage, particularly in the developing world (as examined in more detail later). VOIP, while still in its infancy, nonetheless likewise exhibits similar potential for another transformation.

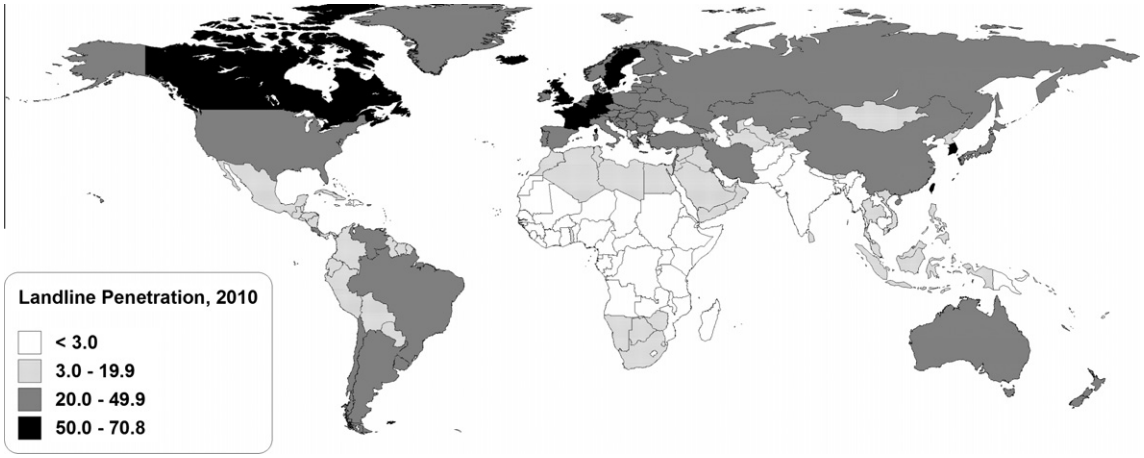

Fig. 1. Landline telephones per 100 people, 2010. *Source:* International Telecommunications Union.