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## **GEOPOLITICS IN THE INFRASTRUCTURAL IDEOLOGIES OF 5G**

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This paper explores how infrastructural ideologies function as tools in geopolitical struggles for dependence and independence of world powers. Meese Frith and Wilken (2020) suggest that controversies around 5G stem from infrastructural anxieties best examined in the framework of geopolitics. We build on this work by analyzing the emerging infrastructural imaginary of 5G in light of the changing global division of labor. Sociotechnical imaginaries (Jasanoff and Kim 2015) refer to the vision of technologies themselves, while ideologies refer to the totality of social relations, translating the objective reality of material conditions to subjective lived experience (Bory 2020). The Western imaginaries around 5G infrastructures reflect, deflect, translate and sublimate the infrastructural anxieties tied to the development and deployment of new network paradigms. Their controversial nature, contradictory content, and fragmented presentation is a necessary part of living through the trauma of lost historical agency on the part of Western superpowers. We engaged in code ethnography (Rosa 2019) of GSM, internet, and 5G technologies, as well as participant observation in the main standard-development organizations of the internet and 5G, and semi-structured interviews with equipment vendors and network operators. Our methodological assumption, taken from World Systems Theory (Wallerstein and Wallerstein 2004), is that the character and content of imaginaries and their underpinning ideologies creatively reflect the position of actors in the global division of labor. This paper contributes to the understanding of the role of infrastructures in geopolitical power tussles and straddles the fields of science and technology studies and international relations.

### **Imaginaries of Connection and Control**

We reconstruct in brief the geopolitical conditions that allowed for the Internet to be promoted as the technology that brings freedom, while also being acknowledged as a United States (US) enterprise. Such legitimacy exchange between the values associated with the technology and the hegemonic position of the US in the global division of labor legitimized US cultural and infrastructural imperialism that "opened the markets" for neoliberal globalisation. In this context, the Internet have been a

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fundamental material infrastructure for funneling profits to the core economy from the half peripheries, and eventually -- through the inflection of GSM from the periphery of the global World System. Inversely ideological association between freedom and the Internet, (which veiled the real material conditions of US economic expansion through neoliberal economic statecraft), allowed to position China in the narrative as the underdeveloped ("developing"), authoritarian, industrial capitalist nation state -- the convenient antithesis of not only the US, but the supposedly value-neutral infrastructural development of the Internet itself.

5G then, reverses this narrative, indicating the changing global division of labor in the World System, where the US now plays the role of the hegemon in decline, and China asserts its research prowess in addition to its already recognized industrial capacity. The network ideologies behind the development of the early Internet on the one hand, and the new network paradigms on the other hand, reflect the particular configuration (diagram) of state, capital and civil society in the US and China respectively. The associated infrastructural imaginaries show how it is possible to make sense of these ongoing social conflicts culturally.

### **Hegemony and Networking Paradigms**

We show the social conditions necessary to the production of a new network paradigm: mainly a hegemonic geopolitical position. The early Internet that emerged from the interdisciplinary research cultures incubated in places like the Radar Laboratory at the MIT reflected and contributed to the newly established hegemonic position of the United States after the Second World War. The associated diagram of power shows the logic of de-militarization, bringing military technology and research organization into the civilian market sphere (cf. Eisenhower's military-industrial-academic complex). Fashioned after the diagram of the market, Internet standards assume a dumb network with intelligent edges, capitalizing on the assumption that a simple system can produce complex results in an emergent way. Its ideology of freedom legitimized US cultural and technological imperialism in the second part of the 20th century, where freedom often appeared as the ideology of the Internet itself, veiling its US origins. The ideology of freedom was also reflected in the US-led international standardization process that produced the protocol stack through a completely new set of standards bodies such as the IETF and others. The latter were an instrument to articulate rising hegemony through bypassing the old system of standardization -- and global division of labor.

Meanwhile, the old hegemon -- Western European nation states -- restored and exploited their entrenched geopolitical position in the world system, and the traditional standards bodies such as the ISO, through the development of the GSM and the advancement of mobile telephony. The GSM standards reflect the logic of telecommunications companies as national monopolies. These are intelligent systems with dumb edges, managed by the operator.

The rising geopolitical hegemony of China once again established the historical conditions for the production of a new network paradigm: 5G. The diagrammatic design of the system brings together an intelligent network with intelligent edges. While in the US demilitarization through a transition of technologies to the market sector was a central concern, in Chinese bureaucratic capitalism the logic of the military, capital and

civil society are more consistent. The technical design of the 5G protocol stack reflects their material conditions of emergence in a strong bureaucratic state economy organized on a large scale. The articulation of power on a global scale and both in the scope of the intelligent network and the intelligent edges, is only possible through algorithmic power and optimization, which automatizes the translation of policies into specifications and configurations. The 5G standards mainly developed within 3GPP subsume both GSM and Internet standards, just as China subsumes its hegemonic position in the global division of labor.

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