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Global political economy of technology standardization: A case of the Korean mobile telecommunications market

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Abstract

This paper examines empirical cases of standardization in the Korean mobile market as vehicles for approaching the broader political and institutional context of standardization in telecommunications. A consideration of Korean standardization in the mobile telecommunications market is particularly interesting because it reveals how the state's political interests influence standards decisions, which are primarily driven by market and technological changes in telecommunications. Judged from the social construction of technology perspective which sheds light not only on technology itself but also on political, social and economic interests that surround transformations in technology, this paper highlights power relations among the major actors that have made technology standards decisions in Korea regarding second (2G) and third-generation (3G) mobile telephony. The paper also attempts to show how the Korean government has dealt with the diverse interests of various market actors while pursuing its own policy agenda.

Keywords: Standardization; Mobile telecommunications; IMT-2000; Digital mobile technology

1. Introduction

Over the past two decades a growing body of economic literature has made large strides into studying the role of technical standards in shaping telecommunications markets (Antonelli, 1998; David & Steinmueller, 1994). Such research has focused on the emergence of technical standards driven by the technical and economic interests of firms in telecommunications markets while paying less heed to the political dimensions and the context surrounding standardization in the telecommunications industry. A standard does not develop solely according to technical logic or any other single economic phenomenon. The political and social interests and pressures behind technical standardization play a crucial role in defining the path of technical and industrial development (Dosi, 1982; MacKenzie & Wajcman, 1985). Thus, a broad range of political and social factors as well as economic and technical considerations can, and more often than not, influence the selection of a technology standard.

This paper examines empirical cases of standardization in the Korean mobile market as evidence of the broader political and ideological context of standardization in telecommunications. A consideration of

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Korean standardization in the mobile telecommunications market[1] is interesting because it reveals the impact that political interests and international and technological changes have on technology standards decisions. Although some technocrats and scholars assume that the development of the mobile telecom market was the inevitable outcome of technological development, standardizations for the second generation (2G) and the third generation (3G) were the products of that standardization process only in so much as technological availability has altered the interests of powerful government policy makers and companies. Moreover, market and technological changes provide the basis for new economic strategies and arrangements between the state and telecom companies. Thus, the choice of a standard is contingent upon how unique power relations between the state and businesses in domestic politics respond to developments in the telecom market and technology. In this sense, every stage of selecting a new standard involves a set of choices between different options and is a multidimensional process involving the interests and strategies of political institutions and companies.

This study is concerned with revealing how a technology standard is chosen, as the wireless telecom industry becomes exposed to fiercer domestic and global competition as well as rapid technological change. In the 2G mobile telecom market, the Korean state initiated local technology development—Code Division Multiple Access (CDMA)[2]—and started to enforce this system as the national standard for the digital mobile telecom market. However, as the mobile market developed further, the selection process involving 3G technology standards led to serious disputes between the government and carriers: Korean companies wanted to adopt Wideband Code Division Multiple Access (W-CDMA)[3] while the government insisted on at least one CDMA2000-based service. Why and how did the government and telecom companies choose CDMA technology over the already commercialized Time Division Multiple Access (TDMA)[4] technology and launch a 2G mobile telecom service based on the CDMA standard? Why did most telecom service providers prefer to use W-CDMA as the technology standard for the next generation 3G service while the Korean state insisted on keeping at least one 3G service based on its local CDMA technology? This study seeks to understand the context within which standards selection takes place and to analyze national institutional structures for technological dynamism and the role of government policies. Based upon the theory of the social shaping of technology, this paper highlights the difference in power relations and interests between 2G and 3G technology standards decisions and shows how the Korean government has dealt with the diverse interests of various market actors while pursuing its own policy agenda.

2. Nature of standardization

Rejecting the conventions of technological determinism, this section surveys the literature on the social shaping of technology, which argues that technology and its standards evolve in path-dependent ways and the choices of major actors, within certain constraints, determine the general course and effects of technologies and standards (MacKenzie & Wajcman, 1985; Pinch & Bijker, 1987).

2.1. Political and social shaping of technology standardization

The neo-classical paradigm argues that technological developments occur along a single predetermined trajectory and that people have little room to drive or influence the direction of their development. In neo-

[1]Wireless communications is an access method or a transport mechanism, which uses radio transmission rather than wired lines to provide telephone services. While wireless communications is similar to a wired telephone system, its capacity is not restricted to a single circuit, because many services can be simultaneously provided for a wide variety of media (Noll, 1995).

[2]CDMA is one of the digital access technologies that has been commercially developed in Korea and the US. In CDMA technology, unique *code* is assigned to all conversations and signals for all calls are spread across a broad frequency spectrum.

[3]W-CDMA is the dominant technology standard for 3G embraced by many of the global Time Division Multiple Access–Group Special Mobile (TDMA–GSM) carriers. As it can provide several simultaneous services to end-users for multimedia services, W-CDMA provides greater capacity and improved spectrum efficiency relative to current 2G technology.

[4]TDMA is the earliest form of digital radio technology developed in Europe. It assigns both different frequencies and *time slots* to each conversation on a wireless system. Other digital radio technologies are CDMA and Group Special Mobile (GSM). GSM is a digital wireless standard which uses TDMA as its air interface technology.