

**CO-EVOLUTION OF MOBILE TECHNOLOGY AND INSTITUTIONS:  
THE CASE OF JAPANESE OPERATORS' TRANSITION FROM 2G TO 3G**

Muhammad Suryanegara

Kumiko Miyazaki

Graduate School of Innovation Management  
Tokyo Institute of Technology

**Extended Abstract**

The mobile technology system can be structured by using the innovation system framework concerning its knowledge, network, institutions and actors. The framework of innovation system explains the importance of interaction between technology and social aspects. The evolutionary perspective, in particular co-evolution among actors guides the analysis under the dimension of Mobile Telephony Innovation system. We define 4 (four) main actors in the system, which are: Regulator, Operators, Market and the Technology developers, in which operators, regulator and market are grouped as an institution. Combining with the perspective of technological change, we point out that co-evolution between the actors is present along the mobile telephony technological path (1G, 2G and 3G). All actors are both generating and using new knowledge as an input for their main activities.

Mobile technology has been developed from one generation to another leading to several consequences to actors in the system. For operators, such changes affect their strategic management and differentiation strategies. In parallel, the regulator will have to response by matching their regulatory agenda with impacts of technological changes. On the other hand, the relationship between market and technology is taking place continuously leading to a sustainable interaction. New technological capabilities might be emerged as a response to market demand, but it might also turn to be the driver of market's preference.

Our work is to explore how the mobile operators co-evolutes with other actors along the technology evolution path from 2G to 3G. To explain the co-evolutionary mechanism we take case study of Japanese operators (DoCoMo, KDDI, Softbank) by looking at details of their interaction with other actors in the Japanese Mobile Innovation System. We further analyze how the operators' strategic perspective was developed to response regulatory policies and the dynamic changes of market.

On the transition from 2G to 3G, the relationship between operator and regulator was indicated by a close interaction regarding standards and market competition. The Japanese operators involved in regulator's public consultancy as a process to decide 3G standard. The process had setting out a compromise of multiple standards' demand, which indicated a co-evolutionary mechanism between the operators and regulator. In addition, a need of digital economy drove a motivation from Japanese market to launch immediate 3G networks. The transition had also transformed Japanese market from a closed-market of Japanese 2G standard to an open market of global 3G standard.

The technological change from 2G to 3G has shifted operators' strategic focus from selling the voice to data service. It further established life style application as the main content offered to mobile subscribers. Similar to 2G market, the close linkage between handset and service has become the important value of 3G-business perspective. However, Japanese market has reached maturity level that affected operator's strategic differentiation. Efforts to retain subscribers were getting more significant in a tight competition whereas *DoCoMo*, as a market leader tried to build image as the most innovative operator. KDDI relied on efforts to create different appeals on top of

its technical standard differentiation. As the late comer, Softbank has established a market attraction with their “economic value” strategy.

Our analyses signify that co-evolutionary mechanism was taking place towards the stability of system. Since the commencement of 3G service in 2001, the Japanese 2G standards were gradually taken away from the market. The elimination process was not only part of operators’ strategies but also influenced by market alteration, in which 3G came with abilities to support the changing of society infrastructure, e.g. 3G has data service which support digital economic transaction. We conclude that it is the interaction between actors in the system giving particular transition mechanism; then guiding the diffusion of new technology and elimination of the old one. The interactions were generated as a result of mobile telephony technological change which profoundly affected all the settings of innovation system.

Keywords : Strategy, Co-evolution, Operators, Mobile technology