Factors Determining the Success of the Japanese Telecom Policy over the Past Decades†

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1. Introduction

It is an undisputable fact that the Japanese telecom market is presently one of the most advanced and dynamic telecom markets in the world. This is the result of the carefully designed and planned development in the Japanese telecom policy over the past years. However, this policy evolution cannot stand on its own. Further, it cannot be guaranteed that the same set of policy initiatives would generate equally fruitful outcomes in a different setting or another country. Therefore, it will be useful—particularly for developing nations currently seeking efficient methods to improve their telecommunications infrastructures—to understand the key success factors in Japan’s telecom policy development. Thus, this article aims to discover the contributing factors based on the decades-long experience of the Japanese telecom policy and to check their cross-country applicability. This article is structured as follows. In the next section, a brief history of the Japanese telecom policy is presented. Section 3 identifies a list of factors contributing to Japan’s telecom success, and Section 4 statistically tests some of their general applicability. Section 5 concludes the article with some policy implications.

2. Development of the Japanese Telecom Policy

Considering the primary beneficiaries of individual policy initiatives, the development of the Japanese telecom policy can be divided into three distinct stages, as shown in Figure 1. It is observed that over time, the Japanese telecom policy has shifted focus from first establishing a national communication infrastructure to enhancing market efficiency, and more recently, to improving the competitive position of the national economy by providing a better business environment for information service providers.

Figure 1 Staged Evolution of the Japanese Telecom Policy

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Stage 1 began with the establishment of Nippon Telegraph and Telephone Public Corporation (NTT-plc) in 1953 and ended with the liberalization of the market in 1985. This stage can be referred to as a regime of "quasi-state monopoly." Prior to 1985, the Japanese domestic market was legally monopolized by the state-run NTT-plc while the international market was dominated by Kokusai Denshin Denwa (KDD). During this stage, the main beneficiaries were the users of "plain old telephone services" (POTS). In order to fulfill the basic telecommunications needs of the general public as soon as possible, the government coordinated multiple policy instruments, such as a quasi-state monopoly, financing from subscribers, and severe restrictions on the scope of network usage. Under such an environment, NTT-plc was able to concentrate its resources on expanding the POTS network without worrying about accommodating enhanced users and competitors' cream skimming activities.

Stage 2 occurred in the period from 1985 to 2003, a period characterized by the fostering of competition or the practice of industrial policy in the telecom sector. In 1985, the most memorable year in the Japanese telecom history, NTT-plc was privatized and became Nippon Telegraph and Telephone Corporation (NTT), and both the domestic and international markets were opened to new entrants under the Telecommunications Business Law (TBL). Since then, consumers have enjoyed the ongoing sharp declines in calling rates and the successive introduction of new services, such as mobile phones and Internet access. Since the basic telecommunications needs had already been well addressed in Stage 1, Stage 2 primarily benefited the users of enhanced services, such as corporate users. Stage 2 can be further divided into two sub-stages by the NTT's structural reform of 1996, which unbundled its nationwide network, and be summarized as follows. During the first phase, before NTT was reorganized, the telecom authority stressed the incubation of new entrants through measures like infant industry protection; however, during its latter phase, it focused on establishing fair and effective competition through asymmetric regulations on the structurally split but still dominant NTT. This indicates that during this stage, the Ministry of International Affairs and Communications (MIC) had been acting as a practitioner of industrial policy than as a rule-maker of a competitive telecom market.

When the TBL was fully revised in 2004, the Japanese telecom policy entered its third stage, which aimed to establish a new regulatory style, and allowed the market self-regulate as much as possible. In other words, the MIC began acting as a rule-maker or a neutral troubleshooter. Since both basic and enhanced users were adequately served during Stages 1 and 2, in Stage 3, the greatest beneficiaries has been and will be the network service providers (such as telecom operators, content service providers, and broadcast stations). The revised TBL enables non-tariff-based services, providing ample scope for price negotiations between operators and enhanced users, thereby making enhanced users the second-most benefited.

3. “Inductively Generated” Factors for Success

Based on the overall economic and market conditions during this period and also considering the development of the Japanese telecom market till date, I propose a set of contributing factors or key drivers that have enabled Japan to achieve such success in the telecom sector. Five of the most influential factors are listed below.

1. A favorable overall economic environment
2. Gradual change in the telecom business environment that allowed an incremental approach toward problem solving
3. Cooperation among players in the development phase
4. Population density and geographic patterns
5. International competition among telecom authorities, accompanied with a “small government” orientation

Factor 1 assumes that sufficient purchasing power among users and a strong propensity toward IT/ICT investment by private firms—both of which are possible only when the overall economic conditions are favorable—are very important for achieving success in the telecom field. In Japan, with rapid economic growth in the 1960s followed by a steady economic growth in the 1970s, the basic consumer telecom demand was well addressed by 1979. Since then, due to a steady increase in the purchasing power, telecom users have continued to seek upgraded versions of existing services and/or more sophisticated and diversified services. Demand from corporate users plays an important role as well. Corporate users are charged a higher monthly fixed rate for POTS than residential users; therefore, corporate demand provides a stronger financial boost for telecom operators. Finally, in terms of a strong propensity toward IT/ICT investment by private firms, IT investment by Japanese firms has grown steadily even after the collapse of the domestic stock and real estate markets in 1991, contributing significantly to the Japanese telecom development.

The second factor considers an “incremental approach to problem solving,” which occurs via the synchronized development of technology/services and policy. When technological development becomes too fast-paced, it poses difficult challenges for administrative resource allocation, creating a risk of inappropriate programs that can damage overall efficiency. This negative scenario arising from such fast-paced technological development became apparent when the Japanese government and NTT chose fiber-to-the-home (FTTH) as a primary instrument to boost the broadband penetration in the 1990s. In retrospect, however, if the Japanese government had considered additional options, the Japanese would have enjoyed an unsurpassed broadband environment several years earlier, and Japan’s Internet economy would have taken off much earlier.

Factor 3 argues that cooperation among players, whether voluntary or mandatory, contributes significantly to success in the development stage. Since the telecom market has long been characterized by natural monopoly, the “intra-modal” competition, where new entrants rely on the incumbent’s facilities, is the only practical option for initial market liberalization. It is true that such cooperation between the incumbent and new entrants may cause serious damage to the incumbent’s bottom line; thus, although it may appear self-contradictory, “unshakable market dominance of the incumbent” can be an essential prerequisite because it allows the government to ignore such adversary impacts and practice “asymmetric” regulation. In Japan, such

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1 Economic theory states that cutthroat competition is adept at the efficient allocation of scarce resources; however, it may not be very good at incubating an industry sector, particularly when the market is dominated by natural monopoly and/or Marshallian externality. In such a case, governmental leadership combined with cooperative actions with market players can attain better results more easily. Since 1985, the MIC has organized numerous study groups and policy reports; in so doing, it has not only made its priorities public but has also set up an arena for the relevant stakeholders to establish a mutual understanding of their relatively long term objectives. Again, such an intervention can be effective only in the presence of a cooperative atmosphere among the related stakeholders.

2 Undoubtedly, it is theoretically possible that a government can allow the dominant operator to play on its own;
cooperation was fostered by the unshakable dominance of NTT, coupled with the well-supported telecom authority. During the initial period of opening the market, partly due to the MIC’s guidance and despite its competitive potential, NTT had—besides acting as a provider of essential facilities—defined itself as a price follower; it helped incubating competing operators and devoted its resources in developing new markets. In short, due to NTT’s size and stability, the Japanese government was able to foster new entrants without any significant threat to the universal POTS, with the purpose of attaining a more diversified and less expensive telecom service in the short run and a more competitive market in the long run.

Factors 4 and 5 are related to the factors outside the control of telecom authorities, at least in terms of the short run. Undoubtedly, the higher population density and flatter geographic patterns function to improve the overall coverage of telecom services. In addition, as competition increases, firms begin to require a more advanced—yet less expensive—communication infrastructure. This need is crucial to attain a competitive advantage at the national level and is also one of the most critical factors when a multinational firm chooses to establish a new headquarters or operating center. In response to these trends, the Japanese telecom authority has engaged in “yardstick-like” competition with its counterparts in other nations in delivering the most favorable business environment since the 1980s. Such a pro-competitive stance has been accelerated by a “small government” orientation, which had been triggered by the heavy fiscal deficits of the Japanese government since the end of the financial euphoria of the 1980s.

4. General applicability of Japan’s success factors

In the previous section, I presented five factors that contributed toward Japan’s success in the telecom market. In this section, I will review some of their cross-country applicability in the sampled OECD nations.

By employing an index of telecom services penetration as an explained variable, a two-equation system of equations (1) and (2) is prepared for statistical verification. The estimation method is a two-stage least square estimation procedure (2SLS) that explicitly controls for country-specific fixed effects. The specifications of the estimated two-equation system are as follows:

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\begin{align*}
\text{Demand} & : Y_{i,t+1} = \alpha_{0,i} + \alpha_1 X_{1,i,t} + \alpha_2 X_{2,i,t} + \alpha_3 X_{3,i,t} + \alpha_4 X_{4,i,t} + \alpha_5 X_{5,i,t} + \alpha_6 X_{6,i,t} + \epsilon_i \\
\text{Supply} & : Y_{i,t+1} = \beta_{0,i} + \beta_1 X_{1,i,t} + \beta_2 X_{2,i,t} + \beta_3 X_{3,i,t} + \beta_4 X_{4,i,t} + \beta_5 X_{5,i,t} + \beta_6 X_{6,i,t} + \epsilon_i
\end{align*}
\]

All the variables are constructed as an international (unbalanced) panel data set with explanatory variables that are lagged one year; the data set covers 30 nations from 1998 through 2003 and was obtained using the databases of ITU (2005) and OECD (2002, 2006). The variables are logarithmically transformed before the estimation; thus, the resultant equations are log-linear.

However, most nations that introduced competition have stipulated incumbents to cooperate with new entrants (Fuke 2007, p.41). Further, it should be noted that, due to technological development, new entrants can now obtain a foothold without relying on the incumbent’s essential facilities. As a result, the market dominance of the incumbent may no longer foster the cooperative attitudes among players in the most developed nations.

Using a single-equation model, Ros (1999), Wallsten (2001), and Fink et al. (2003) have already tested similar hypotheses under different settings. However, in order to obtain estimates that are theoretically more consistent, by partly following the approach of Roller and Waverman (2001), a two-equation system is employed in this article.
With regard to Japan's success factors, if the first factor, that is, favorable economic conditions, is effective on the sampled OECD nations' telecom development (Hypothesis 1), the demand side parameters on GDP per capita ($\alpha_1$), R&D expenses ($\alpha_2$), or Researchers ($\alpha_6$) are positive. If "cooperative attitudes among players" (Factor 3) works effectively in other nations (Hypothesis 2), then the supply side parameters on an incumbent's shares, $\beta_2$, $\beta_3$ and $\beta_4$, become positive. It is true that the signs of these three parameters cannot prove the existence of the cooperative attitudes themselves; however, as Fuke (2007) indicated, since market dominance in the telecom market is usually accompanied by some kind of regulations, this article assumes that whenever there is dominance, there is cooperation, whether voluntary or mandatory. Finally, a positive $\beta_6$ will confirm that population density (Factor 4) favorably affect the sample countries (Hypothesis 3).

The results of the hypothesis testing are summarized in Table 1. Hypothesis 1 was not feasible if only the basic POTS market is considered; however, it had a better validity in the more advanced market. This is not surprising at all since in the sample nations, which are all developed countries, POTS is increasingly becoming an essential commodity as well as less price-elastic; however, mobile phones and the Internet are not.

<table>
<thead>
<tr>
<th>Hypothesis 1</th>
<th>GDP per capita $\alpha_1$</th>
<th>Positive but Insignificant</th>
<th>Significantly positive</th>
<th>Significantly positive</th>
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<tbody>
<tr>
<td>R&amp;D expenses $\alpha_2$</td>
<td>Positive but Insignificant</td>
<td>Significantly positive</td>
<td>Significantly positive</td>
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<tr>
<td>Researchers $\alpha_6$</td>
<td>Mixed signs but insignificant</td>
<td>Positive but insignificant</td>
<td>Positive but insignificant</td>
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<tr>
<td>Hypothesis 2</td>
<td>Market dominance in the access market $\alpha_2$</td>
<td>Significantly positive</td>
<td>Negative but insignificant</td>
<td>Significantly negative</td>
</tr>
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<td>Market dominance in the long-distance market $\alpha_3$</td>
<td>Negative but insignificant</td>
<td>Significantly negative</td>
<td>Significantly negative</td>
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<tr>
<td>Market dominance in the international market $\alpha_4$</td>
<td>Positive but insignificant</td>
<td>Negative but insignificant</td>
<td>Negative but Insignificant</td>
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<tr>
<td>Hypothesis 3</td>
<td>Population density $\alpha_6$</td>
<td>Mixed signs but insignificant</td>
<td>Positive but insignificant</td>
<td>Positive but insignificant</td>
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The second hypothesis was found to be partly valid in the basic POTS market, but not in the more advanced market. In other words, competition in the market can achieve a higher performance in the advanced market, and dominance in the access market can achieve better results in the basic telecom market. The classical economic theory suggests that market dominance causes monopolistic behavior and results in fewer outputs; on the contrary, this empirical test suggests the opposite result in the basic POTS market. Considering the possibility of X-inefficiency (Leibenstein, 1966) in the less competitive market, this result becomes even more surprising.

Finally, the third hypothesis did not have a significant impact on the sampled OECD nations. Again, this is not surprising because the developed OECD nations have already achieved a sufficient level of universal

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4 Based on the household samples in the Tokyo metropolitan area in the late 1990s, Nakamura and Jitsuzumi (2007) statistically confirmed that income elasticity is negative both for POTS and mobile telephones.
telephone services and no longer have a strong incentive for building additional infrastructure. Obviously, I cannot rule out the possibility that the population density data does not accurately reflect the ease of developing telecom infrastructure as in a situation where the population is dense in a small area surrounded by a desolate wilderness.

5. Conclusion

Statistical verifications for the general applicability of some of the factors described above on the OECD nations were attempted, and it was discovered that Factors 1 and 3 have certain feasibility. Considering the path-dependent characteristic of these derived factors, it is surprising that some of them are still valid under the recent economic conditions observed in the sampled OECD nations. The most important finding is that the market dominance of the incumbent operator has a significant impact on the basic telecom development. However, due to the unavailability of data, verifying the applicability of the second and the fifth factors was not attempted.

The general applicability of the first factor explains the existence of the so-called “digital divide” between the rich and poor nations. This appears to be consistent with cross-country data revealing a strong positive correlation between telecom penetration and GDP per capita; thus, as consumer wealth increases, it is followed by a corresponding increase in the POTS penetration, followed by a demand for more advanced services such as mobile phones and Internet connection.

References
ITU. (2005), ITU world telecommunication indicators 2005. [Electronic version].