The Legitimacy Acquisition Process of Shinkansen Speeding Up

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Abstract: Novel ideas tend to be resisted within existing organizations. Mobilizing resources requires that legitimacy be secured in some form. In the case of the development of JR Central’s 300-series Shinkansen, Japan National Railway, which had existed to date, was broken up and privatized, and JR Central, which generated most of its revenue from the Shinkansen, was established, limiting players and allowing the company to gain the approval of most internal organizations. In other words, the company was able to acquire legitimacy by increasing the ratio of supporters rather than the absolute number of supporters.

Keywords: innovation process, creative legitimation, organizational reform, resource mobilization

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Introduction

In the post-war era of high growth, Japan introduced and improved foreign technology, thereby achieving economic growth. Later, research and development investment began to exceed the amount invested in plant and equipment (Kodama, 1991), and in recent years, it has come to be a cliché that Japanese firms bring about innovation. However, intra-organizational isomorphism (Sakakibara, 1995) brings with it growing resistance to novel ideas as has been noted by Baer (2012), and it becomes difficult to implement those ideas. Therefore, acquiring legitimacy is critical toward securing resources for realizing innovation (Takeishi, Aoshima, & Karube, 2012).

According to Kikuchi (2016), it was difficult to bring about improvements to the operating speed of the Tokaido Shinkansen during the period of Japan National Railway (JNR). Figure 1 shows a summary of the test car speed; the actual operational speed; and the scheduled speed of the Shinkansen.¹ The speed of test cars is the technically possible speed, which acts as a proxy variable for technical limits (Takahashi & Kikuchi, 2017). Conversely, the actual operational speed and scheduled speed show the speeds in actual operation. This figure shows that there was a time lag between the improvements made to technical limits and the improvements to operating speeds.

Since it began operation in 1964, the Tokaido Shinkansen was constrained in its operational speed for more than 20 years, and no time shortening was achieved in the route between Tokyo and

¹ The test car speed is the highest recorded speed reached in advanced testing using test cars. The actual operational speed is the fastest speed between operating locations. The schedule speed is the speed calculated by dividing the distance between operating locations by the time required except time spent stopped in stations.
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Osaka. The significant increase in speed was achieved after JNR was split and privatized in 1987. In the process of privatization, JR Central was established and became the operator of the Tokaido Shinkansen. It developed the 300-series Shinkansen cars, created the “Nozomi” trains, and achieved the actual operational speed of 270km/h in 1992. However, research and development for speed improvements to Shinkansen trains was done in the JNR era as well, and there had been results from such research. Prior to the 1980s on the chart, the maximum speed of test cars had increased, and in 1982, the report of a research facility was of the opinion that “in the future operational speeds of 300km/h are achievable.” This paper shows that how the result of this research acquired legitimacy and was implemented during this time.

Figure 1. The transition of Shinkansen speed

Source: Kikuchi (2016), Figure 1.
Case Study

Period of Japan National Railway

The Railway Technical Research Institute (RTRI), which existed in the time of JNR, conducted experiments to increase speed using two test cars (Akiyama, 2012). The first was a 951-series test car, which was used in February 1972 to achieve a record of 286 km/h. The second was a 961-series car. It was made in 1973, but the timing coincided with the oil crisis, and the experiment had to be shut down for a while for the purpose of energy conservation (Kotsukyoryokukai, 2015). However, this car was used again in later speed tests, setting a speed record in 1979 of 319 km/h (Akiyama, 2012). From the results of these tests, RTRI found that there were no fatal obstacles up to 330 km/h and that stable operation could be undertaken in the future (Sokudokojokenkyukai, 1982).

Despite that, speed improvements were not made because of multiple factors during the JNR period. First, the decision making of JNR was not done by its top management, and there was a need to get approval from the Diet to implement any proposals. However, at the time, politicians had much interest in creating new railways in their districts, with budgets funneled to new railway construction.2 New construction of local railways became a way for Diet members to bring money into their districts, and after a railway was completed in one area, in the following year, budgets would be allocated to new railway construction in the other districts of other Diet members. Also, although decades had passed since the Tokaido Shinkansen began operation, causing it to become deteriorated; there was no problem for ordinary operation in that line; and it functioned as a profit-generating cash cow, no major investments

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2 The term “gaden intetsu” was used to denote the primary interest of politicians.
were budgeted for it. The profits of the Tokaido Shinkansen were used to balance local lines running at a loss, in accordance with the internal subsidy system used by JNR (Mitsuduka, 1984; Yayama, 1987). In addition, the bulk of executives’ attention was given to labor issues. Board meeting agendas prioritized labor union relations at the expense of technology development, and meetings ended with nothing being done with such development. On the human resources side as well, those with superior abilities were used to deal with labor unions and not assigned to technology development. Consequently, aggressive investments were not made at the time (Yamanouchi, 2008).

The number of customers using airliners between Tokyo and Osaka decreased in 1964 with the opening of the Shinakansen, and the Osaka–Nagoya and Nagoya–Tokyo air routes were discontinued. Although the Shinkansen had become predominant in the 1960s, some new movement of airlines, such as the creation, or increase in the number, of local routes in the 1970s; the increasing use of jets at regional airports; and the acceptance of large planes, stimulated the growth of airlines. Moreover, fare increases by the national railways created a feeling that airlines were relatively inexpensive, and in addition, the opening of the Narita Airport in 1978 and the exclusive use of Haneda Airport for domestic routes scripted the recovery for airline travel. Routes connecting the Haneda and Osaka airports were called “Business Express Deliveries,” being a used more by business people. This shows that airlines had already captured users as a mode of transportation connecting the capital and the Kansai area of Japan, along with the Shinkansen.

After privatization: JR Central

However, with the exposure of the national railways’ true state of affairs in 1982, calls for reform grew more vocal, and JNR was split and privatized. The Tokaido Shinkansen fell under the operation of
JR Central. Figure 2 provides an overview of the ratio of operating income of the Tokaido Shinkansen to the total operating income of the company around the time of JNR reform. As can be seen in Figure 2, for JR Central both then and now, 80% of profits come from the Tokaido Shinkansen. During the era of national railways, the Tokaido Shinkansen was thought to be “one of the routes that JNR operated.” However, after privatization, JR Central regarded it as the “lifeblood of JR Central”. Hence, efforts to improve the competitiveness of the Shinkansen gained legitimacy within JR Central.

In addition, at the time of JR Central’s beginnings in 1987, airlines, the rivals of the Shinkansen, initiated some new movements, such as expanding Haneda Airport into Tokyo bay and opening the Kansai International Airport. Thus, although the Tokaido Shinkansen maintained its dominance on the Tokyo–Osaka route, it was expected...
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that competition on the Tokyo–Osaka route was entrenched. The “Hikari” train was the fastest service on the Tokaido Shinkansen at the time, and took three hours and ten minutes to traverse the Tokyo–Osaka route although airliners could make the same trip, including wait times and connection times, in about two-and-a-half hours.

If JR made no move, it was certain that the passengers on that route turn to airliners because of the increased convenience of using airlines, such as the expansion of the Haneda Airport and opening of the Kansai International Airport. Such a decrease in the number of customers endangered the management of JR Central. Hence, to deal with such a problem, the company set a goal for the top speed of the Shinkansen to be 270 km/h and the transit time between Tokyo and Osaka to be two-and-a-half hours. This figure was estimated through a belief that the Shinkansen could steal customers away from air travel if air travel times, including wait times and connection times, between Tokyo and Osaka were greater than two hours. Increasing the speed of the Tokaido Shinkansen came to be viewed as an extremely important issue for JR Central management (Kondo 2010; Otsuki, 1994; Tokairyokakutetsudo, 2007).

Through splitting and privatization, in 1988, the “Shinkansen Speed-up Project Committee” gained legitimacy; was kicked off within JR Central; and led to the development of 300-series cars and the development of the “Nozomi” train. Problems with operational stability caused by speed increases had already been solved, but further research was necessary to solve environmental issues tied to speed improvements. Consequently, JR Central achieved an operational speed, and a maximum speed, of 270 km/h, and moreover, it created a 300-series Shinkansen that resolved environmental issues. This new car cut Tokyo–Osaka travel times down to two-and-a-half hours (Otsuki, 1994).
Discussion and Conclusion

In the era of JNR, the Tokaido Shinkansen was no more than a route operating in a certain area under the national organization. The need to make speed improvements was seen only by certain organizations. More than this, the construction of regional lines was viewed as being a more important issue of the national railways as a whole, leading to resource mobilization and justification for the construction and deficit covering of local railways. Hence, initiatives such as speed improvements to the Tokaido Shinkansen were not legitimized.

However, the breaking up and privatization of JNR in 1987 resulted in the creation of JR Central, which was the main operator in the Tokai region, and of the Tokaido Shinkansen. Decision making came to focus on improving the competitiveness of the Tokaido Shinkansen, the source of 90% of JR Central’s income, in an effort to ensure the survival of JR Central and to further develop income. At that time, the convenience of competitor airlines grew dramatically, causing JR Central to become very concerned about shortening travel times between Tokyo and Osaka to two-and-a-half hours to keep pace with the airlines and allowing the company to create legitimacy for mobilizing resources to making speed improvements that were shown to be possible by RTRI.

That said, Takeishi, Aoshima, and Karube (2012) proposed the idea of creative legitimization after securing the resources needed to realize innovation. The process of creative legitimization is one that aims to capture resources required to achieve goals by providing generic reasons for innovation that begins with specific reasons—all this in the process of chasing after revolutionary ideas that begin with individuals championing an innovation. This process can take three possible routes. The first route is to acquire more supporters as a specific reason is given. The second route is to
acquire more supporters by working toward a specific reason. The 
third route is to mobilize more resources as the number of supporters 
is given.

Although the interest is mainly in the absolute number of 
supporters, in reality the relative ratio of supporters as a variable is 
the heart of the matter. In actuality, in the case of the development of 
the 300-series Shinkansen treated in this paper, the splitting up of 
an organization created fewer players, which contributed to the 
Tokaido Shinkansen by allowing research and development related to 
the Tokaido Shinkansen to gain legitimacy and by enabling resource 
mobilization.

In other words, the splitting up of the organization limited the 
number of people with the ability to make decisions on certain 
innovations; creating a majority of people supporting those 
innovations; and thereby, legitimizing those innovations and 
enabling the mobilization of resources. A similar phenomenon has 
been seen in the breakup of Sony in 2014, with the VAIO Corporation 
focusing on PCs and PC-related products. The key point here is the 
ratio of supporters, rather than the absolute number of supporters, 
and the acquisition of legitimacy by increasing that ratio. This is 
borne out by the “creation of a small-scale organization” prescription 
described in the Innovator’s Dilemma of Christensen (1997).³

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³ Kikuchi and Iwao (2016) mention dynamic capabilities as the 
entrepreneurial capabilities pointed out by Penrose. The ability to capture 
legitimacy as discussed herein can be through of as a specific example of 
these capabilities.
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