



What lessons can socioeconomic changes in Japan give to the transportation industry?



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ABSTRACT

Currently, Japan is confronting several major socioeconomic changes, which in turn are the primary causes behind transportation issues surfacing in Japan. These changes in socioeconomics can be identified in the four categories of declining birthrate in an aging population, globalization, technological innovation, and improvements in standard of living. In private and public transportation, technological innovation may impact maintenance of the transportation infrastructure by complicating user behavior. Further, improvements in the standard of living foster expectations of profit from demand for tourism even though these expectations are fraught with issues created by globalization. In terms of traffic safety, strategic measures against accidents are expected, with flags raised regarding changes in human behavior due to technological innovation, and suggestions to aim measures toward bicycle transportation through improved standards of living. By sufficiently investigating these socioeconomic factors that color Japan today and the transportation issues that they cause, other countries that may witness similar experiences may learn important lessons.

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1. Introduction

After the World War II, Japan established a position as an advanced nation through rapid economic growth. Particularly in its high economic growth period, Japan resembled BRICs and some Asian countries today. However, Japan is now grappling with many issues due to socioeconomic changes. For example, in macroeconomic terms, industries have started hollowing out due to currency issues and the sharp rise in labor costs, international competitiveness has dropped, and financial difficulties in national and local government have restricted development. The transportation industry is no exception.

The various issues being confronted in Japan today, borne out of socioeconomic changes, are not bound to its borders; indeed, similar problems may occur in other countries in the future. For example, the sudden manifestation of declining birthrates in aging populations is expected to be even more severe in China and South Korea. However, the objective of this text is to summarize and present topics and points at issue concerning how socioeconomic changes have caused problems

in transportation in Japan. The examination here may provide suggestions for countries that could face similar issues in the future.

This exposition is outlined as follows. **Section 2** presents the four socioeconomic factors Japan is facing. These four factors are analyzed from various perspectives in the subsequent sections. **Section 3** handles the issues related to private and public transportation. **Section 4** discusses the issues from the perspective of safety, and **Section 5** summarizes the arguments laid forth and focuses on the significance of this text.

2. Four socioeconomic factors changing Japanese society

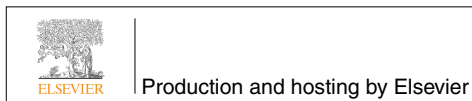
Japan is confronting socioeconomic changes that many advanced nations have experienced in many ways. These changes are affecting current problems in transportation in Japan. This section is devoted to framing these issues as starting points for future discussions.

First is the phenomenon of a declining birthrate in an aging population. Life expectancy in Japan has continually ranked the highest in the world in recent years, at 86.39 years old for women and 79.64 years old for men in 2010.¹ At the same time, the percentage of productive people and youth in the general population have been in a single decreasing

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¹ According to the World Health Organization [2], Japan, San Marino, and Switzerland are in first place for both sexes at 83 years old; 13 countries such as Australia and Canada are in second place at 82 years old; and 10 countries such as Finland and Germany are in third place at 81 years old.

trend, while the percentage of elderly is on the rise and expected to reach 30% in 10–20 years. In 2011, the total fertility rate was 1.39, which is even low for advanced nations (Ministry of Health, Labor and Welfare [1]).²

These statistics suggest that the declining birthrate in Japan's aging population is developing quickly. The fact that changes in the system cannot keep up to combat the current declining birthrate problem is quite a serious matter. As investment in the transportation infrastructure often requires considerable amounts of time, it is difficult to respond to the issue. Moreover, there are obstacles to revising cost-burden measures responding to depopulation.

The second factor is the development of globalization. Compared to the latter half of the 20th century, free trade has become increasingly loose. The development of the Free Trade Agreement, beginning with TPP, has brought about intense international competition, leading to unavoidable declines in nations that cannot maintain their ability to compete in international markets. One reason Japan is in a difficult position in terms of maintaining the international competition is its position among Asian nations demonstrating rapid economic development. This has led to a shift from what was called "Japan bashing" in the past to the "Japan passing" that now threatens the economy in Japan. This regression in Japan's ability to compete in international markets will inevitably erode the country's position in international transportation, a situation that will make a large impact on international marine and air transportation.

Globalization will also have a large effect on passenger transportation, not just freight transportation. Japan is as eager to attract tourists from abroad as other Asian nations. This can be viewed as intensification of international competition in mass transportation. However, there are several risks associated with ushering in a large number of people into Japan: the spread of communicative diseases at airports and terrorist acts on transportation systems are just two examples.

The third factor is technological innovation. Progress in technological innovation provides a stream of new possibilities over what previously could not be done. The same holds true in the field of transportation. Road pricing proposed by the Ministry of Transport [3] has been difficult to implement due to many technological problems. However, technological innovation has overcome these hurdles, and the GPS-based collection of road charges is now a reality.³ Processes that are complicated in business terms are carried out by deploying IT technology, making it possible for transportation companies to change fares and charges flexibly according to market conditions. Moreover, the shift toward cashless systems eliminates the hassle of collecting tolls while opening the doors to a more diverse toll system.

There have been also remarkable technological innovations in the field of transportation vehicles. Previously, it was known that transportation—characterized by the automobile—produced negative effects on the environment. Thanks to improvements in engine technologies, however, automobiles do not impact the environment to the degree they did before; hydrogen battery-powered automobiles, for example, place no stress on the environment. Technological advancements have made large contributions to transportation safety, as well. Double and triple safeguards in airplanes and ITS advancements in automobiles have drastically reduced accident rates.

The fourth factor is the improved standard of living. National income per capita has increased tenfold over the last 50 years. Demands in

quality of life have increased as the economy has grown and national incomes have risen. One could even say that the increased attention to quality of life owes a great deal to improvements in the overall standard of living. People now demand transportation services that are faster and more comfortable than ever before. The horrible morning and evening commute rushes that people around the world associated with Japan 50 years ago are unacceptable to Japanese standards of living today. Many people are even paying high fares to sit on their commute. Air-conditioned trains are as much a given today as non-air-conditioned trains were 50 years ago. More and more passengers are now focusing their complaints on things like temperature adjustments and humidity control. In addition, competition in the transportation market is more severe than before due to deregulation and liberalization in the transportation sector. Therefore, transportation companies prioritize customer satisfaction, which in turn raises demands in standards for transportation services by passengers.

3. Private and public transportation

Section 2 discussed how technological developments have led to the simple actualization of road pricing. In no uncertain terms, technological innovation has technically made tolls on public roads possible, allowing provisions for socially optimal road services. However, technological advances are also interfering with rational behavior in consumers.

Expressways in Japan currently use the ETC (Electronic Toll Collection) system, a system nearly identical to the ERP system in Singapore. Drivers are charged tolls when they use expressways according to the distance they drive and, after a set period of time, invoiced for the total amount of tolls. As Finkelstein [5] has shown, the implementation of ETC has desensitized drivers (consumers) to tolls. Drivers use toll roads without knowing what the precise tolls are, only finding out the total cost when they actually pay the toll fees. Assumptions of normal consumer behavior in economics presume that demand changes with prices, but the spread of technological innovation may be skewing this rational consumer reaction. The expressway toll system in Japan uses extremely complex, politically designed discounts that few drivers are aware of. This has led to an increasingly blurred line between cost and demand.

In fact, according to the Ministry of Land, Infrastructure, Transport and Tourism [6], drivers' reactions to 50% toll discounts varied negligibly from their reactions to 30% discounts.⁴ Technological innovation has made it difficult to estimate how future fares and toll measures will affect traffic, ultimately making it difficult to realize optimal scales of transportation infrastructure in the future.

The same phenomenon is happening not just in private transportation, which covers private household vehicles, but also in public transportation, as well. With the advent of automatic linefeeds, it is possible to apply flexible fare schedules that vary by time of day. On the other hand, the ubiquity of IC cards has desensitized railway passengers to the fares collected. Although technological innovation has made diverse fare systems possible, the resulting changes in user behavior do not necessarily follow these fare systems.

The current demographic trends in Japan cause more frustrating issues in public transportation. Public transportation in Japan differs from most other countries in that private companies often provide urban rail services. With the birthrate dropping and society getting older, the young and productive population that has supported stable revenues for railway companies is shrinking; as a result, the number of daily commuters to work and school is on the way down. The price elasticity of demand for commuters to work and school is low, and the commutes are an important source of revenue for railway companies.

² Total fertility rates in major countries are as follows: United States: 1.93 (2010); France: 2.00 (2011); Germany: 1.38 (2008); Italy: 1.41 (2009); Sweden: 1.94 (2009); and UK: 1.96 (2008).

³ The oldest road-to-vehicle communication system is Singapore's Electronic Road Pricing (ERP), which dates back to 1998. On-board device-based kilometer charging was implemented for trucks in Switzerland (2001) and Austria (2004). GPS-based kilometer charging was also implemented for trucks in Germany (2005). In the Netherlands, kilometer charging was planned for all vehicles and all roads via GPS or global systems for mobile communications (GMS), but it was suspended due to a change of government (Ministry of Land, Infrastructure, Transport and Tourism [4]).

⁴ In 2004, a 30% late-night discount was implemented as a result of the privatization of the Japan Highway Public Corporation. Furthermore, the Japanese government implemented a 50% discount in 2008 with national funding as part of its emergency economic measures.

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