

Acceptability of Urban Road Pricing from the Perspective of Freight Transportation: A Case Study of Tokyo

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ABSTRACT

This paper surveyed the problem structure identified by stakeholders, particularly from the perspective of freight transportation in the discussion of introducing the road pricing scheme in Tokyo, Japan. In order to survey the problems identified by the stakeholders, eight subjects were interviewed: officers in the Tokyo Metropolitan Government (TMG), members of the Road Pricing Feasibility Study Committee, truck operators, and retailers. The survey results show that stakeholders recognized the problems in different ways, even though they were discussing the same policy. The circumstances surrounding the stakeholders; the business style, size, and regulation of truck operators; the truck operators' trust in regulators; the time frame; the stakeholders' roles in the market; the scope of the stakeholders; and the domestic commercial customs are the key factors that influenced the stakeholders' problem identification.

INTRODUCTION

Traffic congestion is one of the most serious problems in many major cities. It not only influences the global and local environments but also has a devastating effect on the economic activities in cities. Recently, in order to solve the problem of traffic congestion, investment has been made to develop road networks, and the existing highways have also been improved. Although the above measures have contributed to increasing the capacity of highways, they have also induced a new traffic demand and caused new traffic congestion. Further, transportation demand management (TDM) has focused considerable attention on controlling the traffic demand (1, 2, 3). Road pricing is a measure taken by TDM that requires car owners to pay a certain amount under specific conditions in order to drive their cars (4). Although there have been innumerable theoretical and political discussions on road pricing in the transportation research field, it has been brought into practice only in a limited number of areas such as Singapore, Bergen, Oslo, and London (5, 6, 7). One of the most difficult aspects of introducing road pricing is establishing a consensus among stakeholders (8, 9, 10).

This paper focuses on stakeholders, particularly those involved in freight transportation. Although there have been numerous publications describing the impact of road pricing on the behavior of passenger car users (11, 12, 13), few have dealt with its impact on freight carriers (14). In general, road pricing impacts freight transportation in various ways. For example, it may force truck drivers to change their routes, truck size, transport frequency, and departure time. It may be more difficult to shift the mode of transportation from a truck to another mode in freight transportation than in passenger transportation. This implies that the introduction of a road pricing program influences the stakeholders in freight transportation more seriously than those in passenger transportation. It is important to recognize and adequately understand the stakeholders' concerns and the problem identification with respect to freight transportation in order to introduce road pricing successfully. Thus, the major actors in urban freight transportation were interviewed and the problems they identified were surveyed in discussions regarding the introduction of the road pricing scheme in Tokyo. It is noteworthy that road pricing in Tokyo was suspended and has not yet been realized as of August 2008.

This paper is organized as follows. The first section presents the research background and its goals. The next section describes the history of the introduction of the road pricing scheme in Tokyo. Section 3 presents the survey method and the results of the interviews conducted with the stakeholders. Section 4 analyzes the results by highlighting the differences in problem identification among stakeholders and their dynamic changes during the discussion process. The final section summarizes the paper and proposes the policy implications.

INTRODUCTION OF THE ROAD PRICING SCHEME IN TOKYO

In Tokyo, the urban traffic demand has increased sharply since the 1960s due to the rapid motorization in that era. Since the road network, particularly the ring roads, was insufficiently developed, traffic congestion has been a major urban problem for several decades. Although the new road constructions were promoted, they were completed at a very slow pace, particularly in the more highly developed urban areas. This is because many citizens opposed the road construction project in these areas. Thus, the Tokyo Metropolitan Government (TMG) began emphasizing the importance of TDM policies in reducing the urban traffic demand.

TMG established a new project team—"Recycling Society Production Team" (RSPT)—in 1997. Its primary objective was to develop an environmentally sustainable society in Tokyo. The team discussed the feasibility of introducing TDM policies as an environmental policy. Subsequently, the team established the "Tokyo Transportation Demand Management Committee" in 1997. The chairman of the committee was a university professor in the urban engineering field, and the members of the committee included academic experts and national/local agencies including TMG, wards, and cities in Tokyo. The committee examined the likely problems with respect to TDM policies and discussed the future vision of urban transportation in Tokyo. In February 2000, TMG published a report—"TDM Tokyo Action Plan"—that reflected the discussions held within the committee. The report presented the basic designs of TDM policies and highlighted the promotion of public transport and reduction of travel generation. The report also listed nine TDM schemes including road pricing. It proposed the establishment of a research committee that would examine the feasibility of introducing road pricing in Tokyo. Following this, TMG announced that it would establish a "Research Committee on Institutional Feasibility of Road Pricing" by the end of 2000. It also recommended the implementation of the demonstration project of road pricing immediately after the fiscal year 2003.

The abovementioned team was disorganized during the administrative restructuring of TMG in March 1999. The Department of Environment (DOE) in TMG took over TDM policies in 2000, and the "Road Pricing Feasibility Study Committee" was established in August 2000. DOE acted as the secretariat of the committee. The chairman of the committee was the same professor who had chaired the previous committee, and the

committee members included academic experts and representatives from the relevant national agencies and the local government including TMG. The committee held six meetings in which they discussed the technical problems of road pricing in Tokyo. Its final report was published in June 2001. The committee proposed the cordon pricing scheme, which covered the central business district of Tokyo with an area of 16 km². The proposed price for a passenger vehicle was 400 to 600 yen, while that for a heavy vehicle was 800 to 1200 yen. The proposed duration of the pricing was from 7:00 am to 7:00 pm on all weekdays. Further, the Tokyo Metropolitan Expressway Company Ltd. introduced the demonstration project of road pricing along the limited urban expressway in 2001. However, there was no further discussion. As of August 2008, the road pricing scheme has yet to be realized in Tokyo.

During and after the discussions regarding the road pricing scheme in the committees, other TDM policies were also introduced in Tokyo. First, TMG published the report, “No Diesel: Automobile Strategy,” in August 1999 and introduced five proposals including “no use, no purchase and no selling of the diesel vehicles,” to prevent air pollution in Tokyo. It also proposed ten action plans including online voting on the use of diesel vehicles. Finally, a regulation involving the use of diesel vehicles was introduced in October 2003, which prohibited diesel vehicles from driving in the Tokyo Metropolitan Area. Second, the “Act against NOx and PM Emissions from Automobiles” was enforced in June 2001 to mitigate the environmental damage caused by automobiles. Third, the “Rational-use-of-Energy Act” was amended in April 2006 to reinforce restrictions on the use of energy while driving cars. Fourth, the Road Traffic Law was amended in June 2006, which enabled the police to regulate illegal on-road parking more strictly to reduce traffic congestion.

INTERVIEW SURVEY

Survey Method

Stakeholders were interviewed by the survey method proposed by Kato et al. (15) in order to ascertain the problem identification regarding the road pricing scheme proposed by TMG. A “stakeholder” is defined as a participant who can influence or be influenced by the corresponding transportation problem; thus, the stakeholders were selected on this basis. The manner in which a stakeholder was selected depended on the availability of data. In this study, local university professors provided their recommendations for the selection of potential stakeholders. Eight interviewees—TMG officers including RSPT and DOE; members of the Road Pricing Feasibility Study Committee; truck operators; and retailers—were selected. The truck operators were categorized into two types according to their operation license: “Tokuzumi,” who are mainly involved in inter-urban mixed goods transport, and “Kuiki,” who are mainly involved in local goods transport in urban areas.

Second, the stakeholders were sequentially interviewed in order to comprehend their perceptions of the problem. The interviews were conducted in the period of July to November 2007. Further, hypothetical cognitive maps were prepared by collating the stakeholders’ profiles via literature surveys or online searches. The maps contained the following three types of information: (1) the causal factors influencing other factors and/or result factors influenced by other factors; (2) the exogenous factors or factors that the stakeholder expects the other stakeholders to act upon; and (3) the behavioral goal of the stakeholder. The arc connecting the items denotes a causal flow, which begins from a causal factor and terminates at its result factor. The stakeholders were interviewed in terms of their hypothetical maps and were requested to reveal their behavioral targets, constraints, and expectations from other stakeholders. On average, each interview lasted for approximately two hours; after the interviewees were given an explanation of the aim of our research, they were requested to freely comment on the hypothetical maps. In most cases, two or three people were interviewed; most of them were either chief executives or officials responsible for managing their organizations. The interviewers comprised a study team from the University of Tokyo including the authors of this paper.

Third, the cognitive maps were revised according to the results obtained from the interviews. The incorrect or less important factors or actions were discarded from the hypothetical map and additional factors or actions were inserted wherever necessary. Finally, the maps revealed the following three bases of categorizing the perceptions of the stakeholders: causal flows in relation to the problem, impact flows in relation to the stakeholders’ current actions, and interactions with other stakeholders.

Problem Identification of TMG

TMG played a central role during the policy discussion process. It was hypothesized that RSPT has a different perspective from that of DOE, although both share the same idea that the road pricing scheme will help reduce economic loss and environmental impacts.

Problem identification of Recycling Society Production Team (RSPT)

RSPT was one of the project teams directed by the governor. As the then governor Mr. Shintaro Ishihara emphasized the importance of reducing traffic congestion in Tokyo, RSPT was expected to support the governor's policy. The results obtained from the interview indicate that RSPT identified the following four problems in introducing the road pricing scheme. First, they identified the legal problem. As the Highway Law did not levy any charges for road use, road pricing was not accepted by the law. However, as there were several exceptions including toll roads and toll expressways, RSPT did not consider it impossible. They examined whether the proposed road pricing scheme conformed to the existing legal system. Second, RSPT identified the technical problems. They were concerned that the charge collection system would fail or prove to be extremely costly because the expected area covered by the scheme may be larger than that of any other city. RSPT recognized the necessity to develop an efficient low-cost, high performance technical system. Third, they were concerned about the feasibility of consensus-building among stakeholders. Several departments in TMG had negative incentives to introduce the scheme. Therefore, TMG's first responsibility was ensuring that discussions were conducted among its departments. Finally, RSPT identified the budget problem. As the financial design had yet to be determined, they were unsure whether TMG could afford to introduce the new road pricing system. Although they considered the cordon pricing system to be the most feasible, they had to make a careful decision about the charging area or cordon line because it would critically influence the introduction cost.

RSPT also recognized that road pricing has a considerable impact on truck operators. However, they did not think that the negative impact would last only for a short period; hence, they emphasized the benefits rather than the drawbacks of the scheme. They were of the view that road pricing contributes to the reduction of urban traffic congestion and that this improves the efficiency of truck operation. Additionally, they expected that the road pricing scheme may encourage small-scale private truck operators to restructure themselves into large-scale commercial truck operators. This restructuring contributed to improving the efficiency of urban goods transportation. Although RSPT anticipated that truck operators would oppose the pricing scheme, they did not discuss compensation with them. This was due to the high future uncertainty. Therefore, RSPT simply asked the truck operators to support the proposals.

Problem identification of Department of Environment (DOE)

DOE took over RSPT's works related to the TDM policies. The interviewees from DOE stated that the final goals of DOE were the same as those of RSPT. This is because DOE took over the works by following the usual business norms. However, certain changes in the circumstances had rather serious impacts on DOE's problem identification with respect to road pricing. First, the influence of the governor on DOE became weaker than that on RSPT. This is because DOE is one of the ordinary departments in TMG, while RSPT is a special task-force team that reports to the governor. Second, the governor's motivation to introduce the road pricing scheme was weakened because other TDM policies were gradually coming into effect. The governor was rather satisfied with the effects of introducing the diesel vehicle regulation, among other policies. Third, the truck operators opposed the road pricing scheme; although they had not achieved the expected results of the road pricing scheme in the initial stages, they gradually came to identify the unexpected externalities and unreasonable inequalities caused by road pricing at the feasibility study stage. DOE gradually lost the support of the truck operators. Hence, they found it difficult to introduce the road pricing scheme immediately. Although public opinion indicated that many people supported the introduction of the road pricing scheme, they were not satisfied with the results. They considered that public opinion could support only the demonstration project.

Problem identification of the TMG Road Pricing Feasibility Study Committee

The TMG Road Pricing Feasibility Study Committee was composed of experts in transportation research, urban planning, and law and representatives of central/local governments including National Police Agency, Ministry of Land, Infrastructure and Transport, the Tokyo Chamber of Commerce and Industry, and Japan Automobile Federation. Most of the committee members were of the opinion that it would be impossible to introduce the road pricing scheme immediately. They carefully reviewed London's case and found that extensive discussions would be required to realize the project in Tokyo. They also recognized that the feasibility of road pricing should be examined step by step. Moreover, they believed that the agenda discussed in the committee was one of the many policy issues related to the scheme and that many other agendas should be discussed in the future.

However, the final report that was published following the committee discussions presented a different viewpoint from that of the committee members. For example, it stated that the legal and technical problems accompanying the road pricing scheme are not serious. It also included the results of the traffic simulation

analysis, which illustrated that the negative impact is much smaller than the positive one. This difference is probably due to the fact that the report reflected the intentions of TMG. It is noteworthy that TMG was the secretariat of the committee and that it was the main contributor in the completion of the committee report. TMG may have intended to continue the discussions regarding the road pricing scheme, because it was aware that it was impossible to introduce the scheme immediately.

Problem identification of truck operators

Tokuzumi Operators

“Tokuzumi” operators have provided regular freight truck services since the late 1950s. They collect, carry, and deliver goods in local cities and also transport them between cities. After the goods are gathered in the local terminals, they are transported from one local terminal to another. Tokuzumi operators had their own local terminals in Tokyo and, thus, established the Tokyo Route Truck Association. This association consists of 1.9 million trucks belonging to 281 companies all over the nation. They include the biggest three operators in Japan: Yamato Transport Co., Ltd., Sagawa Express Co., Ltd., and Nippon Express Co. Ltd.

The license authorizes “Tokuzumi” operators to collect goods from unspecified contractors and regularly drive their trucks along the specified routes. They are obliged to drive their trucks even if they have no goods to transport. In our interview, the interviewees from Tokuzumi operators stated that they would not change their route or departure time even if the road pricing scheme was introduced. They doubted that road pricing would sufficiently reduce traffic congestion.

The interviewees clarified that the identified problems vary among the Tokuzumi operators. First, some large-scale Tokuzumi operators recognize their social responsibility to support TDM policies. Such operators understand the concepts of TDM policies well and support TMG in improving the efficiency of urban transportation and reducing environmental damage. They are willing to work with TMG on the introduction of the road pricing scheme.

Second, some Tokuzumi operators with a nationwide transportation network expected to benefit from the shift of local private truck operators to business truck operators. They are rather convinced of the shift because nationwide truck operators have higher competence than private truck operators, as they have already developed an efficient transportation system including the Internet-based distribution system. The restructuring of private truck operators may reduce competition among truck operators. In addition, they also contribute to the reduction of urban traffic volume because road pricing may exclude unnecessary slow moving private trucks.

Third, some Tokuzumi operators recognize their service as public service. They believe that their service has the same characteristics as those of public transit. This is because (1) they carry mixed goods ordered by various unspecified shippers and (2) they are required to drive their trucks regularly along a fixed route with a fixed timetable between the specific areas and/or points. They believe that Tokuzumi operators should be exempted from the charging system.

Fourth, many Tokuzumi operators complain that they are burdened by the road user charges. This is because it is difficult for them to transfer the additional cost to shippers or customers. There are two reasons for this. The first reason is technical in nature. A Tokuzumi truck often carries a number of goods ordered by as many as 1,000 shippers. Thus, Tokuzumi operators doubt the feasibility of properly allocating the additional cost to each shipper; irrespective, the charging system for shippers is incredibly complicated. The second reason relates to business. Even if the shippers/customers accept the complicated charging system for the transportation of goods, they may not be willing to bear the additional cost. The truck operators who bear the road user charges can offer the same service at a cheaper rate than the other operators who request their shippers and/or customers to pay the additional cost.

Finally, many Tokuzumi operators have expressed that the on-road working conditions for truck services should be improved before they can accept the road pricing scheme. As on-road parking regulation has been strictly imposed since June 2006, trucks cannot be parked along the road as it reduces the working efficiency. However, off-road parking space is not well developed in Tokyo’s urban areas. Truck drivers suffer as a result of the lack of parking space. Thus, Tokuzumi operators have strongly requested consideration of the package approach, which includes road pricing and parking schemes such as investing in small-scale on-road parking space and off-road parking lots.

Kuiki Operators

“Kuiki” operators, or local truck operators, are small-scale enterprises that work with relatively small and few—five on average—trucks in specific licensed areas. Kuiki trucks carry goods ordered by a specific shipper from the specified origins to the requested destinations in the licensed area. There are no constraints on their routes and timetable.

One of the interviewees from Kuiki operators stated that they face tough business circumstances such as a steep rise in the gas price, strict regulations on illegal on-road parking, and diesel vehicle regulation. As they have already improved their works and cost efficiency under the tough business conditions, it may be difficult for them to accept road pricing. Most Kuiki operators strongly oppose the road pricing proposals. Although TMG believed that road pricing would promote the introduction of a cooperative delivery/collection system among the Kuiki operators, they did not agree with TMG’s view. This is because Kuiki operators were apprehensive that joining the cooperative delivery/collection system would have a negative effect on the customers and that they would lose them.

Although Kuiki operators understand that road pricing may improve traffic conditions and result in better business conditions in the long run, they also recognize that the benefit can be achieved only through burden and sacrifice. As Kuiki operators have less competence than Tokuzumi operators, the former identify more severe impacts resulting from the introduction of road pricing than Tokuzumi operators do. Kuiki drivers have suggested that private cars, which have higher price elasticity, should be charged rather than trucks. Additionally, Kuiki operators are strongly dissatisfied with TMG’s communication process with stakeholders. For instance, they complain that although TMG revealed the benefits of the road pricing scheme, it did not clearly explain its drawbacks.

Similar to Tokuzumi operators, Kuiki operators also complain about the additional burden of the road user charges because it is difficult to transfer the additional cost to the shippers or customers. This is mainly because the competition among Kuiki operators is so intense that they must minimize transport charges so as to prevent losing their customers. Kuiki operators requested TMG to promote a transportation policy other than that of TDM. They included the construction of additional ring roads in the Tokyo Metropolitan Area, discounting the night-time charge of the Tokyo Metropolitan Expressway, and further investment for urban truck operation such as truck terminals.

Problem Identification of Retailers

Since various retailers exist in Tokyo, it is almost impossible to include all of them in our interview survey. Thus, a major home electronics chain was selected as the representative retailer. It is considered as a typical retailer with a large-scale transportation network in the Tokyo Metropolitan Area. As it has its own shops, trucks, warehouses, and delivery centers, it can manage sales, control the transportation system, and arrange stock in the supply chain. In terms of transportation, the impact of road pricing is expected to be observed in two types of freight transportation: one that carries goods from manufacturers to retailers and one that transports goods from retailers to consumers.

The interviewees from the company revealed that many major retailers including them have already dealt with the reduction of truck mileage, particularly due to corporate social responsibility (CSR). The interviewed company optimized its logistic system to minimize the traffic entering the central business district, although it has many chain stores in the central business district. To realize optimization, it allocated the delivery centers in the suburban areas to match customer demand while allocating trucks to the delivery centers.

The interviewees further stated that if road pricing is introduced, they may reduce the frequency of truck operation crossing the cordon line. However, by doing so, they fear an increase in truck mileage. This is because trucks must detour to reach more destinations in a journey. An increase in truck mileage may cause an increase in gas consumption, the result of which could be a more negative impact on the environment. Therefore, they do not agree with a drastic change in truck behavior caused by the introduction of road pricing. This may imply that large-scale retailers question the positive influence of the road pricing scheme. They requested TMG and academics to present the expected impact of the introduction of road pricing in a simulation analysis using appropriate truck behavior models.

They are also forced to make a decision with respect to the road charges. Under Japanese commercial customs regulation, the transportation cost of goods transported from producers to retailers is usually borne by producers, whereas that of goods transported from retailers to consumers is usually borne by the retailers. This implies that the goods price offered by producers includes the transportation cost from their end to retailers, whereas the goods price offered by retailers includes the transportation cost from their end to consumers. Therefore, retailers are concerned with the price of carrying in goods offered by producers as well as that of

delivering the goods that they offer. If producers raise the goods price after the introduction of road pricing, retailers may also raise the goods price. However, if retailers raise the goods price, they may lose their customers owing to competition in the market. Therefore, retailers would face difficulties in decision-making if road pricing is introduced.

DISCUSSIONS

The interviews revealed the different concerns among stakeholders as well as the dynamic changes in their problem identification. Such differences and/or time-series changes are due to several reasons. The factors affecting stakeholders' concerns are summarized as follows.

First, a change in the circumstances surrounding the stakeholders influenced their problem identification. The first example is the changes in TMG's problem identification. They changed their strategies with respect to the introduction of road pricing in the discussion process. This is because the policy environment changed after DOE took over the TDM policies from RSPT. As the other transportation policies including diesel vehicle regulations gradually contributed to the reduction of traffic congestion, the stakeholders including TMG came to regard the introduction of the road pricing scheme as somewhat unnecessary. This reduced TMG's motivation to introduce the road pricing scheme urgently. However, interestingly, the interviewees who had worked at DOE accepted this change, while those who had worked at RSPT did not. This is probably because RSPT considers road pricing to have been unsuccessful because DOE invested less efforts than that expected by RSPT. The second example is the changes in the truck operators' problem identification, particularly Tokuzumi operators. In the early stages, they understood the social benefit of the road pricing scheme positively and supported TDM policies. However, they gradually changed their views when they discovered the serious impact of a series of TDM policies introduced by TMG and/or the central government. They feared that road pricing would additionally burden their operation after they became aware of the negative impact of TDM policies.

Second, the business style, size, and regulation of truck operators caused differences in problem identification among the truck operators. First, the seriousness of the expected damages caused by road pricing depends on the operators' efforts to improve their business efficiency. Truck drivers who have already taken many efforts to optimize their operation opposed the introduction of the road pricing scheme, while those who did not invest much effort accepted the introduction. Second, business license and/or regulation influenced the problem identification of truck operators. Tokuzumi operators whose service is more strictly regulated than others opposed the introduction of road pricing because they could not modify their services easily. Kuiki operators whose service is less strictly regulated than that of Tokuzumi accepted the road pricing scheme because they could modify their service to make it more flexible. Third, the CSR of truck operators impacted problem recognition. Large-scale operators with a nationwide freight transportation network tend to support TDM policies because they expect the market or their customers to appreciate their efforts and increase their value for money. In Tokyo's case, large-scale Tokuzumi operators cooperated with the government in introducing the road pricing scheme, while small-scale operators did not. Finally, the size of truck operators also affects their problem identification. As small-scale operators who own three to five trucks do not have enough capital to change their operation system, they may not survive when the road pricing scheme is introduced. As shown earlier, in Tokyo, Kuiki operators mainly comprise small-scale operators, who are opposed to the introduction of the scheme. Some major Tokuzumi operators even expect that a reduction in the number of small-scale operators may contribute to the improvement of urban goods transport in Tokyo.

Third, one stakeholder's distrust in another stakeholder influences the former's problem identification. In our case, the truck operators gradually lost their trust in TMG during the policy discussion. As a result, they strongly opposed TMG's proposal. This is because, first, TMG discussed the road pricing scheme while introducing other TDM policies simultaneously. These TDM policies were introduced without any compensation to the truck operators, although the policies burdened them rather seriously. Therefore, the truck operators doubted that TMG would reintroduce the scheme without any compensation. Second, the truck operators lost their trust in TMG concerning the discussion process. The Road Pricing Feasibility Study Committee organized by DOE (TMG) did not include representatives of truck operators. One of the ex-members of DOE revealed that truck operators were not included because the committee aimed to merely discuss the expected problems rather than coordinate the interests among stakeholders. He also said that they considered it too early to include all the stakeholders in the committee. However, the truck operators were extremely disappointed with their exclusion from the committee.

Fourth, differences in the recognized time frame influence the stakeholders' problem identification. TMG and large-scale truck operators considered the long-term effects of the road pricing scheme, while small-scale truck operators considered the short-term effects. This is because, first, small-scale truck operators have a

financially weaker foundation than large-scale truck operators do. Survival is what matters most to small-scale operators. The second reason is that the government considers the policy impact from a macroscopic viewpoint, while small-scale individual operators consider the same from a microscopic viewpoint. TMG forecasts the market selection including the restructuring of the freight transportation market. However, individual operators cannot accept the market selection easily.

Fifth, stakeholders' roles in the freight transportation market influence their concerns. In particular, the regulator has a different perception of the freight transportation market than that of the regulatees. TMG considered it necessary and feasible to increase the economic efficiency of the urban freight transportation; however, the truck operators did not agree with this view. Another example is the agenda management in the committee. Although TMG considered that the discussions on the compensation to the truck operators would begin after the discussions on the feasibility study, truck drivers expected that the interest management or coordination should be included in the agenda lists from the beginning.

Sixth, the scope of stakeholders also influenced their problem identification. One example is TMG's manner of collecting the stakeholders' information. TMG communicated with limited actors before and during the discussions on the road pricing scheme. They closely interacted with the large-scale truck operators and the representatives of the association of small-scale truck operators, but did not directly interact with the small-scale truck operators. This implies that TMG may have collected biased information about the truck operators. The views of small-scale operators and retailers were not correctly understood. This may be one of the reasons that TMG introduced a series of TDM policies, which deteriorated the business of small-scale truck operators without any compensation for them.

Finally, social customs impact the stakeholders' problem identification. The transportation cost of goods transported from producers to retailers is usually paid by the producers, whereas that of goods transported from the retailers to consumers is usually paid by the retailers. This makes it difficult for retailers to make their decisions regarding road-use charges.

CONCLUSIONS

This paper surveyed the problem structure identified by stakeholders, particularly from the freight transportation viewpoint, in the discussion of introducing the road pricing scheme in Tokyo, Japan. The survey results show that stakeholders recognized the problems in different ways, even though they discussed the same policy. The circumstances surrounding the stakeholders, the business style, size, and regulation of truck operators, the truck operators' trust in regulators, the time frame, the stakeholders' roles in the market, the scope of stakeholders, and the domestic commercial customs are the key factors that influenced the stakeholders' problem identification in the case.

The results of our survey may contribute to the decision-making process in the future with respect to the introduction of the road pricing scheme in Tokyo. First, TMG should invite the truck operators to the meeting from the planning stage. This will secure the trust of truck operators and make it easy to obtain their acceptance. Second, TMG should not regard the truck operators as a single stakeholder but as various stakeholders. Different stakeholders with different licenses, business size, and characteristics have different concerns and identify the expected problems in different ways. Third, TMG should manage the order of agenda discussed in the meetings. They should show the expected impact of road pricing on each stakeholder even in the early stages, for example, they should review the past examples regarding the compensations introduced in the road pricing scheme. Although it is difficult for TMG to determine the compensation in the early stages, it may be worth indicating that they will take some actions including the package approach. Fourth, TMG should explain that the discussions on road pricing usually take several years until the final decision is made by discussing previous examples in other cities. This is because some stakeholders expect the immediate introduction of the scheme, while others consider the introduction from a long-term viewpoint. Fifth, TMG should invest more efforts in obtaining the viewpoints of various stakeholders including small-scale truck drivers and retailers. Although this requires considerable efforts, it may be worth communicating with them in order to get their acceptance.

Finally, it should be noted that the data collected from the interviews may not cover all the problems identified by all the stakeholders. Eight stakeholders were interviewed. This is mainly because it was difficult to find interviewees. As eight years have passed since the committee discussed the scheme, most of the people involved in the project have changed their jobs or positions and some have even retired. For example, the urban expressway company (Metropolitan Expressway Company Ltd.) and the local police agency (Tokyo Metropolitan Police Agency) may identify different problems than those expressed by the interviewed stakeholders. As they may have influenced the discussions, interview should be conducted with them as well.

The effectiveness of the results is also noteworthy. Their real intentions could be understood by conducting interviews with them. As the road pricing scheme was a controversial issue eight years ago, accurate information was not necessarily be collected, even when the interviews were conducted immediately after the political discussions. This is because they discussed political issues with less political stress than they did in the past. However, it is uncertain whether the discussions reflected their real concerns. Thus, from the methodological viewpoint, it may be interesting to identify the best timing to review the past political issue by considering the tradeoff between the availability of interviewees and the feasibility of collecting real information.

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