

“Technical Research and Development for Road Policy Quality Improvement” Study Summary

No.	Title	Principal Researcher
No.2022-2	Development of a social decision-making system for transport appraisal based on the concept of “social efficiency” and “human rights for national minimum” and a practical measurement method for infrastructure value	Kobe Univ. Prof. Atsuhiko Koike

This study aims to revise the Japanese transport appraisal system, which is heavily weighted toward the benefit cost ratio (BCR). We will develop a revised a social decision-making system for transport appraisal based on the concept of “social efficiency” and “human rights for national minimum” and a practical measurement method for infrastructure value.

1. Backgrounds and Objects

In Japan, where the population is declining and aging, and the economy is suffering from fiscal problems and low growth, economic appraisal based on the BCR is an effective indicator, but economic appraisal alone does not guarantee that the people can lead affluent lives with peace of mind. For citizens living in regional cities where demand cannot be fully projected, it is important to continue living in their hometowns in order to lead affluent lives with peace of mind, and it is also important to consider social infrastructure development that makes the most of regional characteristics. In this study, the concept of BCR as an economic appraisal is extended and the concept of human rights for national minimum is incorporated into transport appraisal. We will also develop a new guideline for the revision of transport appraisal in Japan and a calculation method for benefit/effect indicators necessary for the revision.

2. Activities in Research Period

We clarify the revised the guideline of transport appraisal based on the concepts of human rights for national minimum and efficiency from the following two perspectives.

➤ **Economic evaluation based on the Japanese version of “Value for Money” based on advanced measurement of infrastructure value.**

With reference to the framework of the British version of Value for Money, which is an extension of BCR, we will develop an evaluation method based on the Japanese version of Value for Money, as well as evaluation indices and calculation methods for the indices. This economic appraisal will include indicators that are difficult to be converted into money, thus creating a framework that enables evaluation not only from the perspective of efficiency, but also from the perspective of human rights for national minimum. In addition, we will clarify the concept of the "strategy" that needs to be developed consistently with the economic appraisal.

➤ **Decision-making to protect the human rights for national minimum to continue living in rural areas" for which demand cannot be adequately forecasted.**

In order to make decisions on infrastructure development in regional cities where demand cannot be fully anticipated, investment decisions should be made to maintain local traditional culture and other unique resources and to "protect the human rights for national minimum to continue living in the region", independent of the investment decision criteria based on economic appraisal. For this kind of decision-making, the current project appraisal needs to be fundamentally revised, and this study proposes a decision-making method that separates the viewpoints of efficiency and human rights for national minimum as a mid- to long-term revision guideline.

3. Study Results

We have organized a revised guideline for transport appraisal in Japan based on the above viewpoints, clarifying the indicators required for Value for Money, estimating the parameters of Wider Economic Impacts using both structural and inductive approaches, and clarifying the method for estimating the willingness to pay for non-market goods benefits using conjoint analysis.

Numerical simulations show that it is difficult to secure the human right for national minimum to receive medical services through road development alone, and the importance of comprehensive decision-making, including policies of other ministries and agencies, is demonstrated.

4. Papers for Presentation

- Keisuke SATO, Shintaro KATAYAMA and Atushi KOIKE: Analysis of Prediction Characteristics of GRP Change by the SCGE Model for the Linkage of Road Development and Regional Industrial Policy, Selected Proceedings of World Conference on Transport Research (WCTR) Montréal 2023.
- Shintaro KATAYAMA and Atsushi KOIKE: SCGE Modeling Considering Passenger and Freight Transport, Selected Proceedings of World Conference on Transport Research (WCTR) Montréal 2023. Transport Research (WCTR) Montréal 2023.
- Keisuke Sato and Atsushi Koike: "A review of transport appraisal system in the UK and its implications for Japan," The 68th Conference of Infrastructure Planning and Management, 2023.
- Takeshi Sasaki, Keisuke Sato, Daisuke Yoshino, Shintaro Katayama and Atsushi Koike: Measurement of benefits of disaster anxiety reduction by conjoint analysis: Significance and limitation of benefit measurement for transport appraisal, The 68th Conference of Infrastructure Planning and Management, 2023.
- Shuichiro Otani, Kaito Ujiie, Atsushi Koike and Hajime Seya: "Comprehensive Analysis and Policy Proposal of Transportation Infrastructure Improvement and Medical Facilities Maintenance Policy", The 68th Conference of Infrastructure Planning and Management, 2023.

5. Study Development and Future Issues

- Based on the results of this study, it is necessary to continue to provide training for those in charge of transport appraisal practices and consultants to deepen their understanding of the basic principles and various analytical methods of transport appraisal.
- This study showed the importance of expert judgment. On the other hand, this study does not deeply mention who should make such expert judgments. It is necessary to discuss what kind of organizational structure is desirable in the future, keeping in mind the current experts such as project evaluation monitoring committees, staff of the Ministry of Land, Infrastructure, Transport and Tourism, and consultant engineers from the private sector.
- It is also important to consider how to revise the transport appraisal so as not to place an excessive burden on the staff in charge of transport appraisal at the MLIT, etc. For example, for indicators that require estimation of willingness-to-pay (indicators subject to conjoint analysis), it would be effective to reduce labor by setting standard unit prices in each region, etc.
- As for the Wider Economic Impacts indicator, it is necessary to continuously collect the latest academic information and the status of its introduction into practice, and to revise the parameters and study the method of introduction.

6. Contribution to Road Policy Quality Improvement

In this study, based on the formulation of a strategy and an economic evaluation based on value for money consistent with the strategy, a guideline of revision under the current transport appraisal as a short-term measure and a policy of fundamental revision of the current transport appraisal as a medium- to long-term measure are presented. In addition, we developed various analytical methods necessary for this revision. The clarification of the revision guideline and the development of analytical methods are expected to contribute to the improvement of the quality of road policy as a means of determining truly necessary road project development.

7. References, Websites, etc.

On the website of the Committee of Infrastructure Planning and Management (<https://jsce-ip.org/>), an overview of the one-day seminar held as "No. 106 Philosophy and Practice of Transport Appraisal from the viewpoint of "Human Rights for National Minimum" and "Economic Efficiency"" and a video of the day of the seminar can be viewed.