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Research Activities at International Project Lab

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Sustainable Development of Infrastructure in Low-income/Emerging Countries

In many low-income countries, the poor performance of basic infrastructure such as unreliable design of roads, substandard water/energy supply networks, and insufficient telecommunication facilities has failed to raise the quality of life of the local population, both in rural areas where many poor agricultural farmers reside and urban areas where slums have spread. They often face difficulties in escaping from poverty because they are more vulnerable to the damaging effects of natural disasters and have limited opportunities to raise their income level. Meanwhile, in emerging countries, transformational socio-economic changes have occurred, such as high economic growth rates, migration from rural to urban areas, uptake of new technologies, and increasing motorization. Many governments in the developing world suffer from a chronic shortage of infrastructure to meet the soaring demand seen with rapid economic development. Our study team has been tackling these challenges through practical studies to obtain knowledge that contributes to finding solutions to these issues, by carefully examining the local contexts while, at the same time, building theories and methods that can enhance our understanding of the realities and proposing implications for future policy actions. We are studying many cases in developing regions with colleagues from those regions in addition to international development aid organizations such as Japan International Cooperation Agency and Asian Development Bank.

Related publications:

1) Alves, L. B. O., Maeda, S., Morikawa, S., Kato, H. (2020). Land titles and farmer's perceptions about ease of conducting transactions: A case study in Brazil. *Development in Practice* (accepted).
2) Setthasuravich, P., Kato, H. (2020). The mediating role of the digital divide in outcomes of short-term transportation policy in Thailand. *Transport Policy*, 97: 161-171.
3) Idei, R., Kato, H., Morikawa, S. (2020). Contribution of rural roads improvement on children's school attendance: Evidence in Cambodia. *International Journal of Educational Development*, 72: 102131.
4) Phun, V. K., Kato, H., Chalermpong, S. (2019). Paratransit as a connective mode for mass transit systems in Asian developing cities: Case of Bangkok in the era of ride-hailing services. *Transport Policy*, 75: 27–35.
5) Inaba, H., Kato, H. (2017). Impacts of motorcycle demand management in Yangon, Myanmar. *Transportation Research Procedia*. 25: 4856–4872.

Technology Transfer and International Aid in Infrastructure Engineering

Japan has cultivated civil-engineering technology over many years and developed high-quality infrastructure systems such as the nationwide high-speed railway network and resilient global cities like Tokyo. Due to a lower birthrate and aging population, however, Japan is expected to experience a decline in domestic demand for new infrastructure while at the same time finding ways to economize through smarter operation methods and sustainable maintenance of existing infrastructure. Meanwhile, many engineers from emerging countries, mainly in Asia, have been requesting Japanese engineers to share their past experiences of infrastructure development and current efforts of infrastructure management. In response to their requests, the Government of Japan has been promoting the transfers of Japan's technology and its operational skills to overseas markets through infrastructure business and development assistance. We are supporting the Government's strategy through empirical studies in collaboration with various international/domestic institutes and foreign researchers. The empirical studies include: (i) systematic reviews of Japan's infrastructure development projects and their impacts; (ii) case studies of successful/failed infrastructure projects in developed and developing regions including Japan, (iii) policy analysis for deriving lessons and implications from successful cases for other countries/regions; (iv) the development of new methods for effective application of existing technologies to other markets; and (v) the customization of original technologies, taking into consideration local contexts. They are expected to contribute to not only the implementation of Japanese government strategy but also sustainable development in emerging economies.

Related publications:

1) Yashiro, R., Kato, H. (2019). Success factors in the introduction of an intermodal passenger transportation system connecting high-speed rail with intercity bus services. *Case Studies on Transport Policy*, 7: 708–717.
2) Abe, R., Kato, H. (2017). What led to the establishment of a rail-oriented city? Determinants of urban rail supply in Tokyo, Japan, 1950–2010. *Transport Policy*, 58: 72–79.
3) Le Maout, E., Kato, H. (2016). Life cycle cost-estimation model for building, operating, and maintaining high-speed rail systems. *Asian Transport Studies*, 4 (1): 245–260.
4) Asao, K., Miyamoto, T., Kato, H., Diaz, C.E.D. (2013). Comparison of revenue guarantee programs in build-operation-transfer projects. *Built Environment Project and Asset Management*, 3 (2): 214–227.
5) Kato, H., Diaz, C.E.D., Onga, M. (2010). The impact of foreign aid on local institutional systems: Case study of institutional spillover effect on the Batangas Port Development Project in the Philippines. *Transportation Research Record: Journal of the Transportation Research Board*, 2163: 144–150.

Transportation Planning and Policy

The physical movement of people and goods is one of the most essential elements in human activities. An efficient and resilient transportation system enables individuals and organizations to secure mobility, achieve better accessibility, enhance amenities, stimulate the economy, and support sustainable development. Transportation is a typical complex system, in which many stakeholders including government agencies, public and private businesses, and individuals are involved, and covering various transportation modes, infrastructure, operations, management, and services. It should be a part of human history in which transportation development has assisted civilization and development of many societies. Even now, innovative technology is emerging such as autonomous driving, which is further expected to upgrade our safe and efficient transportation in the future. We have been studying wide-ranging aspects of transportation-related issues such as: (i) analyzing travel behavior; (ii) examining effective transportation strategies; (iii) proposing integrated transportation plans; (iv) developing and adapting smart technologies; (v) investigating interaction of transportation and land-use markets; (vi) assessing the socio-economic impacts of transportation investment; and (vii) understanding associations between transportation and the environment. Our research highlights not only single transportation modes but also multimodal issues, while its geographical scale ranges from the human level to the global scope, including both developed and developing regions. It deals with both passenger and freight transportation and our research often employs multidisciplinary approaches covering engineering, economics, psychology, law, development studies, urban/regional science, sociology, and geography.

Related publications:

1) Murakami, J., Kato, H. (2020). Airport accessibility, employment density, and labor productivity: Spatial strategy and economic progress in Tokyo. *Applied Geography* (accepted).
2) Abe, R., Kato, H. (2019). Long-run studies of daily travel: Methodological review and convergence of distance traveled per capita across cities. *Transport Reviews*, 39 (4): 443–462.
3) Phun, V. K., Kato, H., Yai, T. (2018). Traffic risk perception and behavioral intentions of paratransit users in Phnom Penh. *Transportation Research Part F: Traffic Psychology and Behaviour*, 55: 175–187.
4) Kato, H., Fukuda, D., Yamashita, Y., Iwakura, S., Yai, T. (2017). Latest urban rail demand forecast model system in the Tokyo Metropolitan Area, Japan. *Transportation Research Record: Journal of the Transportation Research Board*, 2668: 60–77.
5) Kato, H. (2013). On the value of business travel time savings: Derivation of Hensher's formula. *Transportation Research Record: Journal of the Transportation Research Board*, 2343: 34–42.
6) Kato, H., Kaneko, Y., Inoue, M. (2010). Comparative analysis of transit assignment: Evidence from urban railway system in the Tokyo Metropolitan Area. *Transportation*, 37 (5): 775–799.
7) Kato, H., Matsumoto, M. (2009). Intra-household interaction in a nuclear family: A utility-maximizing approach. *Transportation Research Part B: Methodological*, 43 (2): 191–203.

Transportation Network Development from a Global or Interregional Perspective

Currently, goods tend to be produced in diverse regions, transported from one place to another, and consumed in various places around the world, while more people travel long distances, frequently across borders, for business and leisure in an era of rapid globalization. The complicated production-consumption structure we see today is largely thanks to a globalized logistics system in which products are transported internationally, whereas long-distance journeys largely rely on well-developed intercity and international transportation network. The development of efficient international and interregional transportation networks such as maritime shipping, international/domestic aviation, and cross-border and/or inter-regional intermodal transportation are critical elements for enhancing sustainable development in the world. However, there are many technological challenges associated with the establishment of a sophisticated transportation network, efficient management of infrastructure, development of effective institutional structures, and consensus-building among stakeholders. Negative aspects of globalization have been also pointed out. One of the typical issues indicates a “core-periphery” structure, wherein the core contains the major wealthy and powerful countries, with countries that cannot reap the benefits of global wealth located at the periphery. This may lead to protectionism and isolationism tendencies in some countries. Our research team have been conducting studies related to these issues from the viewpoints of infrastructure and transportation.

Related publications:

1) Shibasaki, R., Tanabe, S., Kato, H., Lee, P. T-W. (2019). Could Gwadar Port in Pakistan be a new gateway? A network simulation approach in the Belt and Road Initiative. *Sustainability*, 11 (20): 5757.
2) Shibasaki, R., Usami, T., Furuichi, M., Teranishi, H., Kato, H. (2018). How do the new shipping routes affect Asian LNG markets and economy?: Case of the Northern Sea Route and Panama Canal Expansion. *Maritime Policy & Management*, 45 (4): 543–566.
3) Murakami, J., Matsui, Y., Kato, H. (2016). Airport rail links and economic productivity: Evidence from 82 cities with the world’s 100 busiest airports. *Transport Policy*, 52: 89–99.
4) Tanabe, S., Shibasaki, R., Kato, H. (2016). Impact assessment model of international transportation infrastructure development: Focusing on trade and freight traffic in Central Asia. *Asian Transport Studies*, 4 (1): 159–177.
5) Wang, X., Kato, H., Shibasaki, R. (2013). Risk perception and communication at maritime transportation to and from Japan after the Fukushima Daiichi nuclear power plant disaster. *Transportation Research Record: Journal of the Transportation Research Board*, 2330: 87–94.