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Application of Road Safety Audits in Japan —Organizational Culture and Absorptive Capacity Perspectives

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Abstract

Road safety audits (RSAs) have been applied in many developing and developed countries as a way to enhance the safety of road infrastructure since they were first introduced in the late 1980s in the United Kingdom. RSAs have proven to be an effective tool to enhance the design of both new and existing roads from an overall safety perspective. In the early 2000s, the Government of Japan (GOJ) reviewed RSAs as well as new public management (NPM) (both viewed as good practices in the United Kingdom and other countries) and now promotes RSAs in developing countries through its bilateral and multilateral official development assistance. However, although NPM has been applied within Japan, RSAs have not been applied on Japan's domestic road projects. This article reviews factors that may explain why the GOJ has not applied RSAs from the organizational culture perspective of the Ministry of Land, Infrastructure, Transport, and Tourism (MLIT), which administers the Japanese road transport subsector. The article also reviews an RSA pilot project started in 2013 in Chiba Prefecture, Japan and a nation-wide pilot program started in 2015. Factors that may influence how the GOJ can apply RSAs successfully are discussed in line with the MLIT's absorptive capacity.

Keywords: road safety audit, organizational culture, absorptive capacity

1. Introduction

The road safety audit (RSA) process was developed to proactively improve the safety of road networks by identifying and reporting on the safety status of the network. An RSA is a useful

device for identifying potential safety improvements at any time in the project's lifespan including the planning, design, construction, or as-built stage (Owers & Wilson, 2001). RSAs were first introduced in the United Kingdom in the late 1980s, and a guideline was published in the United Kingdom in 1990. Many countries have applied RSAs since then, and the World Road Association (referred to as PIARC based on its original name) published guidelines on RSAs for new road projects in 2011 (World Road Association, 2011) and on safety inspection for existing roads in 2012 (World Road Association, 2012). With the exception of Japan, major countries have applied the practice, although the Government of Japan (GOJ) promotes RSAs through its bilateral and multilateral official development assistance (ODA) to developing countries. This article attempts to conduct organizational analysis of the responsible national-level agency in road infrastructure—the Ministry of Land, Infrastructure, Transport, and Tourism (MLIT)—to determine why RSAs have not been applied and how they could be implemented effectively in Japan, especially from the organizational culture and absorptive capacity perspectives. The research is based on interviews conducted by the author with relevant government officials and stakeholders, in addition to a literature review and the author's first-hand experience.

Organizational culture is an important factor in organizational analysis (Smircich, 1983). Culture can be studied as an integral part of the adaptation process of organizations, and specific culture traits may be useful predictors of performance and effectiveness (Denison & Mishra, 1995). Organizational culture fosters innovation and imitation, and many factors have been shown to be determinants for supporting an innovative organizational orientation (Naranjo-Valencia, Jiménez-Jiménez, & Sanz-Valle, 2011).

Cohen and Levinthal (1990) introduced the concept of absorptive capacity as the ability of an organization to recognize the value of new, external information, assimilate it, and apply it to its activities. It is critical to the organization's innovative capabilities and is largely a function of the organization's level of prior related knowledge. Zahra and George (2002) distinguished between the capabilities to acquire and assimilate knowledge (potential absorptive capacity) and the capabilities to transform and exploit this knowledge (realized absorptive capacity). Potential and realized absorptive capacities can differentially influence the creation and sustenance of the organization's competitive advantage. Absorptive capacity is also dependent on the way organizations manage information inflow. Ishizuka (2005) pointed out that direct exposure of various individuals is a more effective means of absorbing external information as compared to the gatekeeping of information by a small number of individuals, particularly in a rapidly changing environment.

The concepts of absorptive capacity and organizational culture are closely interlinked. Organizational culture in management formalization is one of the key determinants of absorptive capacity (Lane & Lubatkin, 1998). Higher levels of innovativeness in the organizational culture are associated with a greater capacity for adaptation and innovation. In addition, higher levels of innovativeness are associated with cultures that emphasize learning, development, and participative decision making. (Hurley & Hult, 1998). Organizational culture acts as a determinant of absorptive capacity to influence the implementation of new technologies (Harrington & Guimaraes, 2005).

2. Road Safety Audit

2.1 Definition and Benefits

PIARC defined an RSA in its guidelines as: "a formal road safety examination of the road or traffic project, or any other type of project which affects road users, carried out by an independent, qualified auditor or team of auditors who reports on the project crash potential and safety performance for all kinds of road users" (World Road Association, 2011). The essential elements of this definition are that it is: (i) a formal process, (ii) an independent process, (iii) carried out by someone with appropriate experience and training, and (iv) restricted to road safety issues. PIARC took the initiative to define pro-active procedures at the project design stage as RSAs and the on-site review of existing roads by driving and walking as road safety inspections (RSIs) as shown in Figure 1. However, the term RSA is often in practice used more broadly to refer to both RSAs and RSIs without the above distinction. This article will review both RSAs and RSIs in Japan.

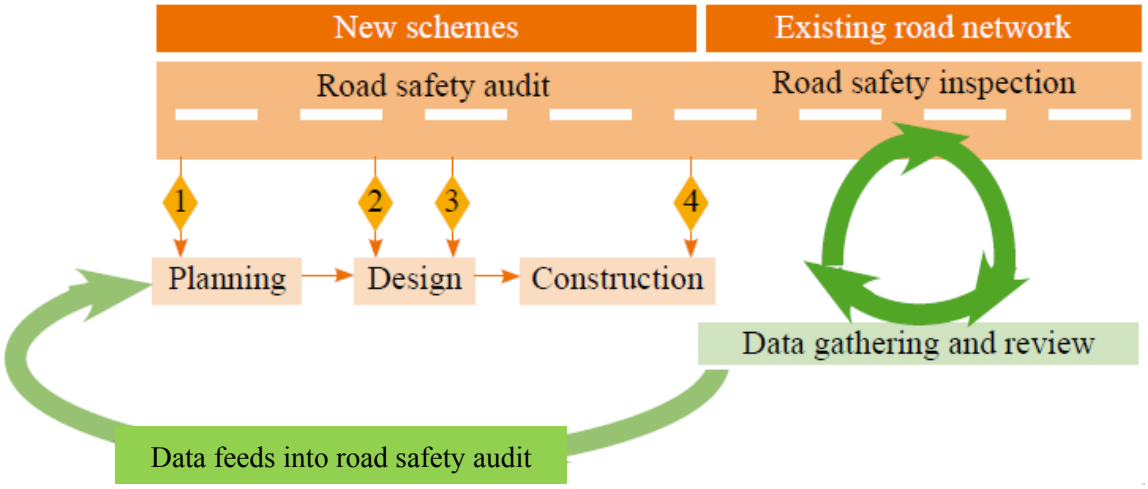

Figure 1. Concept of road safety audit and road safety inspection.

Source: World Road Association (2011)

Various studies have reviewed the effectiveness of RSAs and concluded they show strong benefits in proactively reducing accidents, thereby saving lives and decreasing damage. Wells (2000) assessed the benefits of the RSA program in the United Kingdom and found that making changes in the design phase resulted in considerable monetary benefits (€17,000 in average of 22 projects). The Dutch National Road Safety Research Institute (2007) showed clear monetary benefits of RSAs. Due to the independent nature of the safety auditors, the RSA recommendations were noted as being helpful when the road developers or managers worked with stakeholders such as political leaders, road users, or road side residents. The RSA process looks at roads from a purely technical safety viewpoint without outside influences.

2.2 Application in Various Countries

After their introduction in the United Kingdom in the late 1980s, RSAs were further developed in the United Kingdom, other European countries, Australia, and New Zealand.

Following successful implementation in these countries, other countries have also applied RSAs, and international organizations like PIARC have promoted their use through guidelines and conferences (World Road Association, 2011). Multilateral and bilateral development agencies have noted the benefits of RSAs and promoted their use in developing countries. The World Bank has advocated RSAs for new construction and traffic management schemes (Gwilliam & Shalizi, 1996), and the Asian Development Bank (ADB) prepared an operational tool kit for RSAs to be used in its developing member countries (ADB, 2003).

Many developed and developing countries have applied RSAs. According to the latest report by the World Health Organization (WHO), 147 out of 180 countries/areas worldwide require RSAs on new roads, and 138 countries/areas require RSIs on existing road infrastructure (WHO, 2015). Among G20 member countries, Japan, Mexico, and the United States are the only countries that have not applied RSAs, and India and the United States are the only countries that have not applied RSIs (Table 1). Only Japan and the United States have not applied RSAs among the ODA donor countries, or the 29 Development Assistance Committee member countries of the Organisation for Economic Co-operation and Development.

The U.S. federal government recently started promoting the use of RSAs. In 2014, the Federal Highway Administration (FHWA) of the Department of Transport announced in its website that the FHWA would "work with State and local jurisdictions and Tribal Governments to integrate RSAs into the project development process for new roads and intersections, and also encourages RSAs on existing roads and intersections" (FHWA, 2014). This leaves Japan as the only country among the major and development donor countries that has not applied RSAs in its domestic practice.

Table 1. Application of the road safety audit process by major countries.

Country	G20 member	OECD-DAC member	RSA for new roads	RSI for existing roads
Argentina	X		Yes	Yes
Australia	X	X	Yes	Yes
Austria		X	Yes	Yes
Belgium		X	Yes	Yes
Brazil	X		Yes	Yes
Canada	X	X	Yes	Yes
China	X		Yes	Yes
Czech Republic		X	Yes	Yes
Denmark		X	Yes	Yes
European Union	X	X	Yes	Yes
Finland		X	Yes	Yes
France	X	X	Yes	Yes
Germany	X	X	Yes	Yes
Greece		X	Yes	Yes
Iceland		X	Yes	Yes

India	X		Yes	No
Indonesia	X		Yes	Yes
Ireland		X	Yes	Yes
Italy	X	X	Yes	Yes
Japan	**X**	**X**	**No**	**Yes**
Korea		X	Yes	Yes
Luxembourg		X	Yes	Yes
Mexico	X		No	Yes
New Zealand		X	Yes	Yes
Norway		X	Yes	Yes
Poland		X	Yes	Yes
Portugal		X	Yes	Yes
Russia	X		Yes	Yes
Saudi Arabia	X		Yes	Yes
Slovak Republic		X	Yes	Yes
Slovenia		X	Yes	Yes
South Africa	X		Yes	Yes
South Korea	X		Yes	Yes
Spain		X	Yes	Yes
Sweden		X	Yes	Yes
Switzerland		X	Yes	Yes
The Netherlands		X	Yes	Yes
Turkey	X		Yes	Yes
United Kingdom	X	X	Yes	Yes
United States	X	X	No	No

DAC = Development Assistance Committee, OECD = Organisation for Economic Co-operation and Development, RSA = road safety audit, RSI = road safety inspection

Source: World Health Organization (2015)

3. Japan's Response to Road Safety Audit

3.1 Official Development Assistance

The GOJ has promoted RSAs in its bilateral and multilateral ODA projects and knowledge activities. Japan's bilateral ODA is provided mainly through the Japan International Cooperation Agency (JICA). JICA provided third-country training courses on "road safety engineering and management" in 2010–2015. The training, provided to senior government officials and engineers from nine countries (Cambodia, Laos, Myanmar, Viet Nam, Indonesia, Malaysia, Philippines, Thailand, and Timor-Leste), included the RSA process as one of the main components. JICA also provided similar third-country training on "road safety engineering and management for Africa" in 2015 to Botswana, the Democratic Republic of Congo, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda, and Zambia (JICA, 2016).

The GOJ is the largest shareholder of the ADB, and the ADB president has been Japanese, as

has been the largest number of international staff. The ADB introduced the RSA tool kit in 2003 (ADB, 2003) and committed to mainstream RSAs in its road projects through the Sustainable Transport Initiative (ADB, 2010). The ADB further prepared a road safety action plan in 2012 and requested that RSAs be included in every phase of the project cycle including planning, design, construction, pre-opening, and operation and maintenance (ADB, 2012). The World Bank also promoted the use of RSAs in its projects and non-lending activities in various developing countries including Nigeria, Tanzania, China, Argentina, Republic of Yemen, and India (World Bank, 2014).

3.2 Application to Domestic Road Projects

The GOJ's various promotion efforts of RSAs through bilateral and multilateral ODA did not stem from and were not reflected in its domestic road projects. There has not been an RSA framework for Japan's domestic road projects. Researchers in Japan have studied RSAs and provided policy recommendations since the 1990s. The Japan Society of Civil Engineers formed an RSA Working Group under its Standing Committee of Infrastructure Planning Study in 1997 (Nishimura, 2002). Imada et al. (1999) reviewed various aspects of the RSA process in other countries, studied Japan's practices in road safety, and recommended a step-by-step approach toward the application of RSAs in Japan as: (i) a pilot project of RSIs on existing roads, (ii) the full application of a RSI program, (iii) a pilot project of RSAs on new roads, and (iv) the full application of an RSA program. In March 1999, the study also conducted a survey of MLIT highway offices, municipal governments, traffic police departments, and consulting firms. The results showed only 6% (16 organizations out of the 287 that responded) were aware of the RSA approach and almost all the respondents neither knew what it was nor understood its benefits. It concluded that the dissemination of RSA methods and benefits was essential for the application of RSA practices in Japan.

Some researchers reviewed transport planning practices in the United Kingdom and recommended the use of RSAs and new public management (NPM). Takahashi et al. (2003) recommended that Japan establish a new road management framework under which the mandates of respective organizations would be clearly defined and practices like RSAs could effectively function. They noted that Japan's organizations did not have clearly defined mandates and lacked flexibility, and they called for re-forms to the awareness of road management organizations. Takano, Takahashi, and Kato (2003) recommended that Japan learn from the United Kingdom and adopt RSA and NPM systems. Imada and Nam Gung (2000) proposed the use of computer systems to support RSAs through the review of the UK practice. The MLIT adopted the NPM system eventually but not an RSA system (to be discussed further in the next section).

The MLIT's research agency, the National Institute for Land and Infrastructure Management (NILIM), studies new policy ideas before their actual application and often acts as the gatekeeper of incoming information for new technology. In the fiscal years 2001–2004, the road traffic department of the NILIM conducted a series of studies on methods leading toward the application of an RSA system in Japan (note: the fiscal year in the government of Japan starts in April and ends in March). The studies reviewed situations in other countries

and concluded that RSAs were effective for safety enhancement, cost reduction, and raising awareness. The NILIM recommended that the Road Bureau of the MLIT adopt an RSA system (Mori & Ikeda, 2003 and 2005).

4. Factors of Non-application of RSAs in Japan

The GOJ has not applied RSAs in its domestic road projects, although this was recommended by the NILIM and various researchers. Although the WHO (2015) considered that RSIs on existing roads were conducted in Japan, RSIs in Japan are not regular or formal audits and are limited to occasional inspections. In this section, the factors for non-application of RSAs in Japan's domestic road projects will be reviewed.

4.1 MLIT's Organizational Culture and Application of NPM

The Road Bureau of the MLIT is responsible for the overall development and management of roads within the GOJ and formulates policies in the road transport subsector. Based on interviews with MLIT officials, the organizational culture of the Road Bureau can be characterized by top-down decision-making, closedness (i.e., lack of openness), and sectionalism although some noted that it has recently begun to change gradually, especially since the implementation of NPM. The centralized, top-down characteristics often extend beyond the MLIT's headquarters and into the national highway offices, expressway and toll road corporations, and municipal governments across the country. The hierarchy is said to converge to the planning division especially for technical issues (Figure 2). Such an organizational culture is a typical "Kasumigaseki Culture," the GOJ's unique culture named by Nishio (2003) after the location of the GOJ headquarter buildings. Kasumigaseki culture is characterized by closedness, privilege driven, sectionalism, centralization-fusion, and mutual dependency and is far from being a culture of individualism, where innovative ideas spring from individual choice and responsibility. Such Kasumigaseki culture traits were even stronger in the Road Bureau than in other comparable bureaus in charge of large infrastructure development such as the Water and Disaster Management Bureau and the Ports and Harbors Bureau within the MLIT.

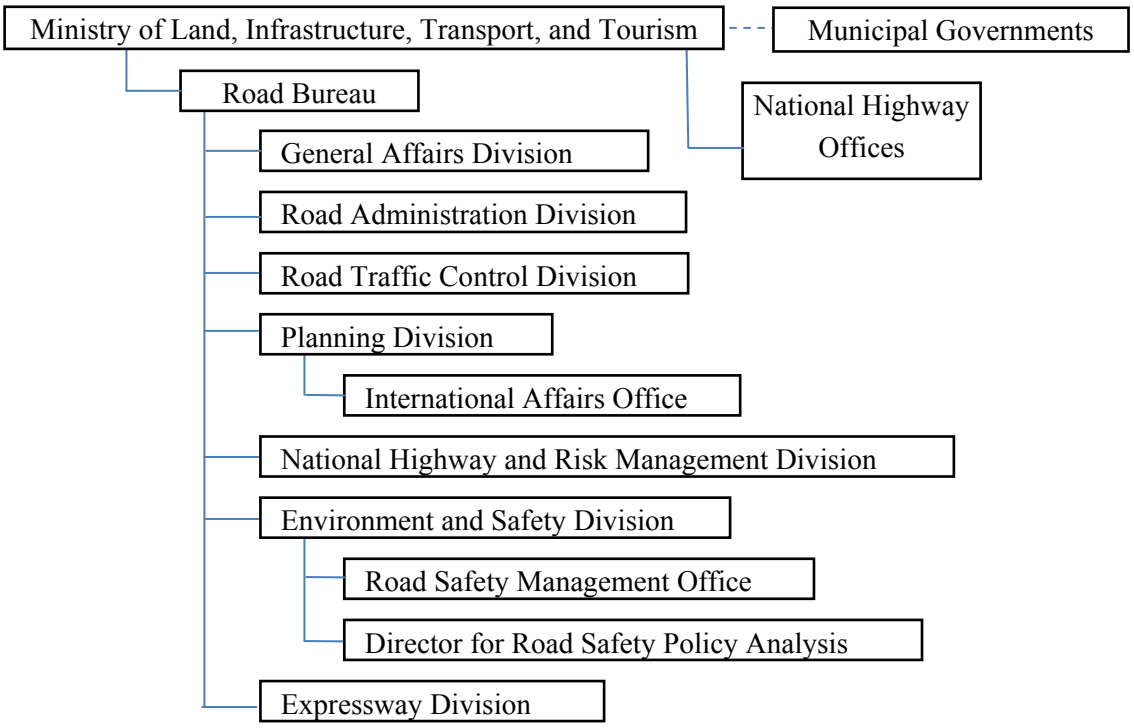

Figure 2. Organizational chart of the Road Bureau, MLIT.

Notes: As of 2016, offices below division-level, unrelated to road safety and international affairs, were omitted.

The Road Bureau was said to have a strong gatekeeping culture in terms of information gathering and importation of new policies. Information on international practices and JICA's activities were handled in the International Affairs Office, and road safety issues were handled by the Road Safety Management Office and the Director for Road Safety Policy Analysis. Interview results showed that the Road Bureau was more oriented to domestic issues than to international affairs in terms of information gathering and dissemination compared to, for example, the Water and Disaster Management Bureau, which hosted the World Water Forum in 2003 in Kyoto and continues its active involvement in international events like World Water Day (MLIT, 2014a).

As mentioned in the previous section, RSA and NPM systems were often recommended together in the early 2000s as related good international practices. Through the gatekeeping manner of information gathering of the MLIT, NPM was well recognized by the Road Bureau, especially in the Planning Division, and was assimilated and exploited to from the MLIT's realized absorptive capacity (MLIT, 2016a). It involved all levels of road organizations in a centralized, top-down manner (Figure 3), which illustrates well-adopted practices through the unique organizational culture of the MLIT, as the original NPM in the United Kingdom did not include such characteristics and was developed with decentralization of authority. Due to the limited capacity and interest in international affairs and closed gatekeeping, the full adoption of a NPM system by the MLIT also left an RSA system unapplied, and the researches on RSAs remained as a potential absorptive capacity of the MLIT.

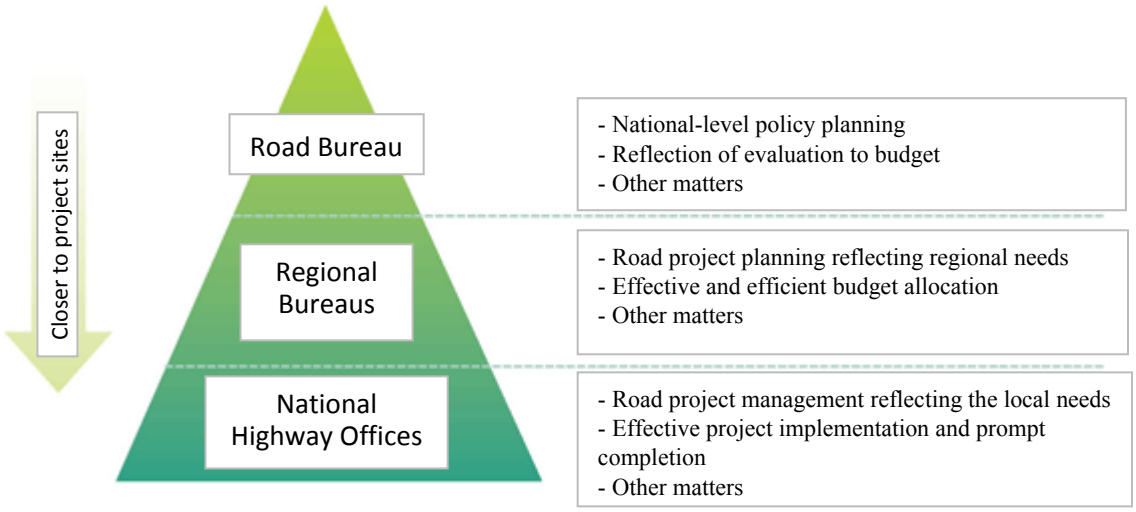

Figure 3. New public management in the MLIT.

Source: MLIT (2016a).

Another factor that may explain why the Road Bureau did not adopt an RSA approach could be its strong culture of closedness and mutuality. RSAs delegate strong independent authority to external auditors. Such an approach would change the balance of the well-established hierarchical management system under which all relevant organizations were mutually and closely reliant. The officials involved in the pilot project in Chiba noted that there were concerns over the word "audit" because of the strong implication of external authority, and the term used was eventually changed to "diagnosis" instead of "audit" in the nation-wide pilot program (to be discussed in the following sections). One of the factors explaining why the MLIT did not implement an RSA program could be avoidance of creating a new strong external authority.

4.2 Capacity in Road Safety

An RSA approach has proven to be effective and beneficial in reducing traffic accidents; but how is Japan's road safety capacity and performance without an RSA system? Loo et al. (2005) conducted an analysis on road safety strategies in six administrations comprising Australia, California, United Kingdom, Japan, New Zealand, and Sweden. It examined nine components: (i) vision, (ii) objectives, (iii) targets, (iv) action plan, (v) evaluation and monitoring, (vi) research and development, (vii) quantitative modelling, (viii) institutional framework, and (ix) funding. It concluded that Japan performed worst in "evaluation and monitoring" mainly due to the absence of RSAs, but was good at formulating and implementing action plans. Japan enacted the Traffic Safety Policies Law in 1971 and implemented a series of five-year road safety plans. Thanks to these efforts, the traffic fatality has been declining since the 1990s (Figure 4). Japan has developed a unique and effective approach and implementation schemes in road safety enhancement, as is often observed in other fields (Suzuki, 2008; Shin, 2014). However, as Loo et al. (2005) pointed out, the capacity could be further enhanced by applying an RSA approach and learning further from international good practices.

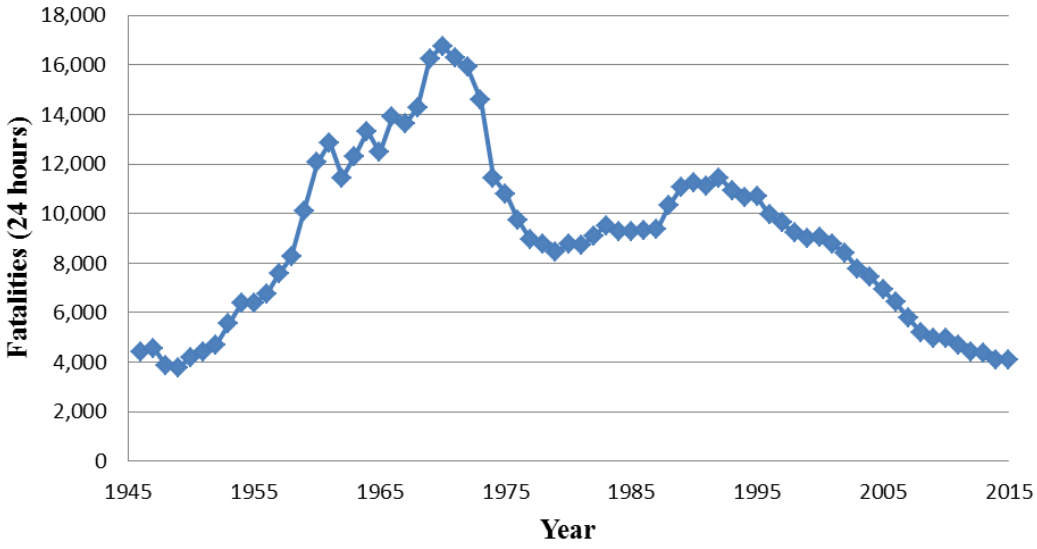

Figure 4. Road traffic accident fatalities in Japan.

Source: National Police Agency.

5. Towards a Successful Application of an RSA System in Japan

5.1 Pilot Project in Chiba, Japan

Chiba Prefecture is in the Tokyo metropolitan area. Throughout the period 2000–2015, and the traffic accident fatality rate in Chiba has been one of the four highest among 47 prefectures. The Chiba National Highway Office of the MLIT oversees the management and development of major sections of the national highways in Chiba. It started an RSA pilot project in 2013. No officials in the office except for the general manager knew about RSAs when the pilot project was proposed. The general manager had work experience with the ADB and initiated the pilot project based on his knowledge and experience. It was conducted as a RSI of existing roads on a section of about 20 km on the National Highway 126 (Figure 5). Four auditors were selected comprising a traffic operations practitioner (TOP), and a traffic operations engineer (TOE), both certified by the Japan Society of Traffic Engineers (JSTE), and two university professors. The auditors identified road safety risks especially at the two intersections (Sakatsuki and Miyata intersections) along the studied section of highway and made long- and short-term action recommendations (MLIT, 2014b and MLIT, 2015a).

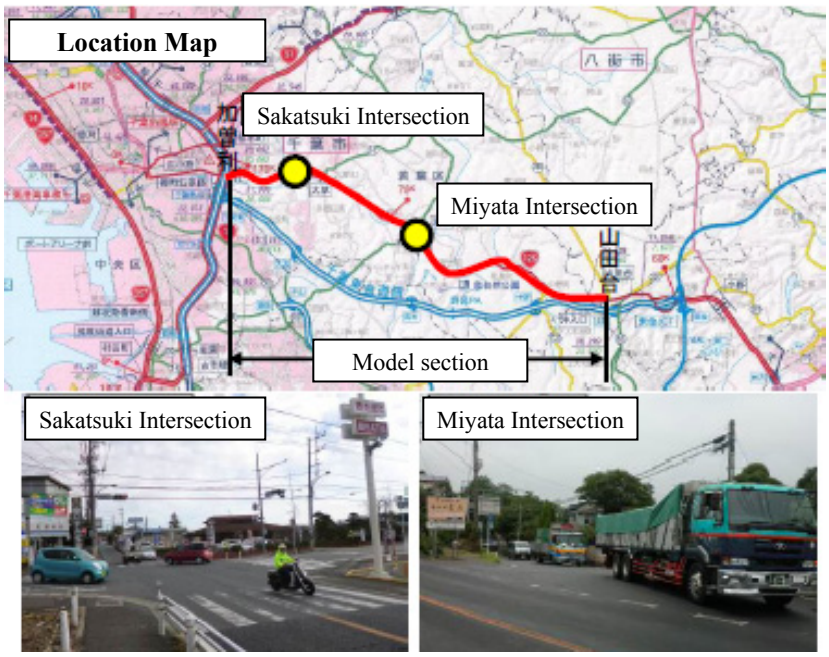

Figure 5. Model section of Chiba pilot project.

Source: MLIT (2014b)

The RSA of the pilot project was conducted through six steps: (i) desk analysis and field visit, (ii) analysis of risk factors, (iii) general approach of countermeasures, (iv) improvement of countermeasures, (v) design review, and (vi) evaluation of effects (Figure 6). The proposed countermeasures included intersection and road design change, road signage improvement, signal phase change, and removal of safety hazards such as disturbing billboards. Evaluation would be conducted after the countermeasures were in place to measure the effectiveness of the countermeasures mainly through vehicle behaviors (Table 2). Factors like surface conditions (dry/wet) and light conditions (day/night) should also be considered for the evaluation of changes before and after the countermeasures (Russo, Biancardo, & Dell'Acqua, 2014). The general manager noted that the MLIT staff could easily conceptualize the benefits of an RSA and implemented the pilot project although no staff member was aware of the RSA approach at the beginning. The experiences of implementing road safety five-year plans and applying NPM had built up the capacity of the relevant organizations.

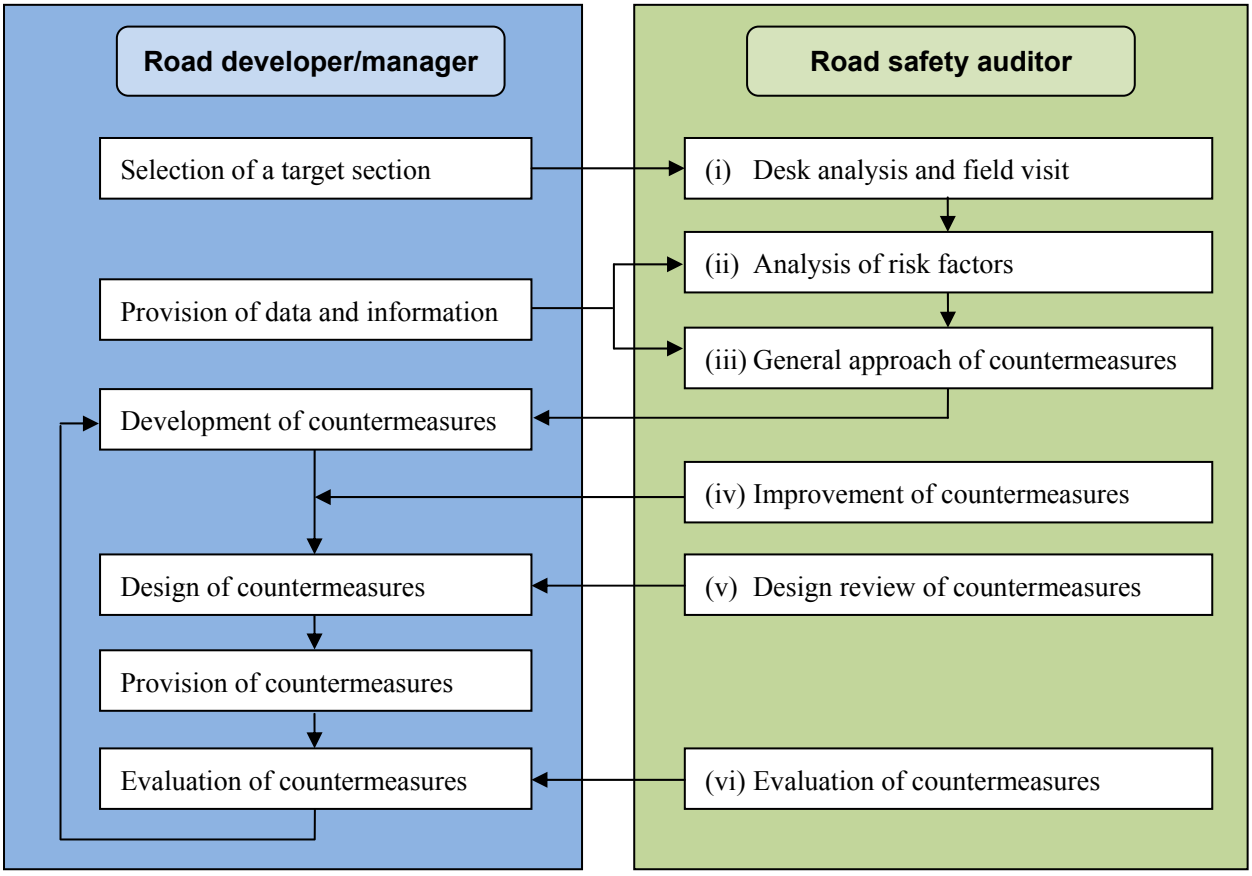

Figure 6. Auditing process of Chiba pilot project.

Source: The author, based on MLIT (2014b).

Table 2. Evaluation items for countermeasures of Chiba pilot project.

Category	Tools	Items to be measured of the changes
Vehicle behavior	Video surveillance of vehicles	(i) lane changing position, (ii) stopping position, (iii) paths of bicycles, (iv) distance between cars, etc.
	Probe data	(i)travel speed, (ii) sudden braking
	Speed gun survey	Travel speed
	Intersections passing time survey	Intersection passing time
	Braking frequency survey	Braking frequency
Driver behavior	Eye-camera survey	Attention points of drivers
User and public perceptions	Web-based questionnaire	Users' perceptions on safety, comfort, visibility, etc.
	Site questionnaire and interviews	Perceptions of roadside residents and business owners
	Public comment	Perceptions of public

Traffic accidents	Data from the Institute for Traffic Accident Research and Data Analysis	(i) the total number of traffic accidents, (ii) traffic accidents by category, (iii) ratio of fatal accidents, etc.

Source: The author, based on information from the Chiba National Highway Office.

The results of the pilot project were presented to the Chiba Prefecture Safety Enhancement Committee comprising various stakeholders including academia, NGO, road users, traffic police, and road management organizations (MLIT, 2014b; MLIT, 2015a). The audit recommendations and the road manager's responses were prepared, but the countermeasures had not been installed yet at the time of the committee. The committee members welcomed the pilot project results and noted the effectiveness of improving the safety of road infrastructure purely from a technical perspective and reducing any negative impacts of political interventions or sectionalism. The RSA approach would enhance adequate prioritization of safety enhancement measures and optimize allocation of limited resources available for safety enhancement. The committee recommended that the MLIT apply the safety audit to new roads using the word "diagnosis" instead of "audit" until an RSA approach was officially adopted in Japan.

5.2 Nation-wide Pilot Program

The pilot project by the Chiba National Highway Office was reported to the Road Safety Management Office, Road Bureau at the headquarters of MLIT. One of the senior staff in the office had work experience in a multilateral development organization, the World Bank. The staff, being aware of the need for and benefits of RSAs, further promoted the use of RSAs and RSIs. The office initiated a nation-wide pilot program in 2015. The program was offered to municipal governments and named "road safety diagnosis" (not "audit") following internal discussion in the Road Bureau (MLIT, 2015b). Some municipalities, such as Okayama City, started pilot projects based on this initiative (Figure 7), and the Road Bureau is further promoting the pilot program.

Figure 7. Road safety diagnosis pilot project by Okayama City government.

Source: MLIT (2016b).

5.3 Further Application and Absorptive Capacity of MLIT

A pilot RSA project in Chiba progressed to a nation-wide pilot program and initial actions towards establishment of a nation-wide system. The breakthrough was brought about by the

individuals with prior work experiences in multilateral development organizations. Such a breakthrough was not made in the early 2000s when the NILIM, as an official gatekeeper of such information, reviewed and recommended application of an RSA system. This section reviews factors that may lead to successful application of RSAs in domestic road projects in Japan.

One of the most important factors for a successful RSA is to have the right team with appropriate expertise (Ram, 2013). The Chiba pilot project utilized TOE and TOP experts certified by the JSTE in addition to academics and a consultant, and the team functioned effectively. Recommendations for team composition and authority should be further developed through the nation-wide pilot program.

Once the top management commits to implementation of new policies, the MLIT's centralized, top-down decision making culture is likely to function effectively to implement the policy and achieve broad coverage including some municipal governments. As noted earlier, the MLIT successfully adopted a NPM system, initially imitating the practice from the United Kingdom and developing it into a unique system. MLIT officials noted in interviews that even though only a very small number of individuals in the Planning Division of the Road Bureau promoted NPM quite strongly in the early 2000s, it led to nation-wide application, including some municipal governments, in a relatively short period. Suzuki (2008) pointed out that the GOJ's bureaucracy could demonstrate strong operational capability once clear goals were set. It is clear that the MLIT's Road Bureau has a typical GOJ bureaucracy in this regard. The organization can demonstrate tremendous absorptive capacity once the change—regardless of degree of innovativeness—is accepted as the organizational goal. Therefore, an important factor for successful application of an RSA system should be its acceptance and full commitment by senior management based on further results of the ongoing nation-wide pilot programs.

The MLIT's potential absorptive capacity has included RSAs since the early 2000s, but awareness has not grown much since then. Except for some individuals who had direct exposure to ODA or other overseas projects, the RSA approach has rarely been known to MLIT officials. However, as seen in the Chiba pilot project case, the potential absorptive capacity of the MLIT staff was reasonably high due to expertise enhanced through Japan's unique road safety implementation scheme, including the five-year plans. Therefore, the potential absorptive capacity for an RSA program could be fully used if not only external auditors, but also the capacity of internal in-house staff, are well utilized in the design of the RSA system in Japan.

Another key factor in absorptive capacity is diversity of knowledge. Further involvement of municipalities and traffic police in pilot programs would enhance such diversity and support more tailor-made development of an RSA program in Japan.

6. Conclusion

This article mainly reviews the following from MLIT's organizational culture and absorptive capacity perspectives: (i) why Japan did not apply an RSA approach despite its worldwide

application and Japan's promotion of it in developing countries through bilateral and multilateral ODA initiatives, and (ii) how Japan can successfully implement an RSA system given its current success with pilot programs.

The Road Bureau of the MLIT turned out to have strong traits typical of Kasumigaseki culture, which include closedness, gatekeeping of information inflow, and centralized/top-down decision-making. It also had relatively smaller engagement with and interest in international affairs compared to similar bureaus within the ministry. This organizational culture made the bureau devote itself to promoting only NPM, which had been recommended together with an RSA approach, and resulted in non-application of RSAs. However, the recent breakthrough with RSA pilot programs was brought about by individual staff members and not by the gatekeepers of information inflow. This can be regarded as a sign of changing organizational culture after the NPM application.

There are some positive factors that may contribute to the further implementation of an RSA approach following the recent emergence of pilot programs. First, the MLIT already has significant potential absorptive capacity with regard to such an approach. Although most staff members are unaware of the concept and methodologies of RSAs and a framework of official auditing does not exist, past studies by the NILIM and other researchers are still valid and applicable in the current institutional setting and road development and management practices. As the Chiba office demonstrated, the MLIT's national highway offices should have sufficient potential capacity and expertise to coordinate an RSA system, and such in-house capacity should be utilized in addition to the development of external auditors. Therefore, past studies and potential in-house capacity should be further applied and enhanced based on the results of the ongoing pilot programs. Second, the MLIT's organizational culture enables innovation from imitation, as was the case in NPM. The initial pilot program in Chiba Prefecture started as an imitation of ADB and other international practices. The program was gradually modified to fit the circumstances in Japan such as using TOE and TOP experts and changing the terminology from "auditing" to "diagnosis." Third, the broad influence of the MLIT's centralized, top-down decision-making culture—which extends into not only to the national highway offices, but also to some municipal governments—should quickly enhance the diversity of knowledge and experience through the nation-wide pilot program. As diversity enhances strong absorptive capacity, further involvement of municipal governments and other stakeholders should be another key factor in the successful implementation of an RSA system that fits the needs in Japan.

Finally, it is recommended that the MLIT should promote breakthroughs by individual staff members and learning from international good practices in other policy areas as well to fully realize the potential of the changes occurring in its culture, namely reduced closedness and information gatekeeping. Such breakthroughs and learning would enhance the diversification of knowledge and absorptive capacity of the organization.

Disclaimer

The views expressed in this article are the views of the author and do not necessarily reflect the views of organizations that the author has belonged to.

References

Asian Development Bank. (2003). Road safety audit for road project—An operational tool kit. Manila: Asian Development Bank.

Asian Development Bank (2010). Sustainable transport initiative operational plan. Manila: Asian Development Bank.

Asian Development Bank (2012). Implementation of sustainable transport initiative: mainstreaming road safety in ADB operations action plan. Manila: Asian Development Bank.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. Administrative science quarterly, 128-152. https://doi.org/10.2307/2393553

Denison, D. R., & Mishra, A. K. (1995). Toward a theory of organizational culture and effectiveness. Organization science, 6(2), 204-223. https://doi.org/10.1287/orsc.6.2.204

Dutch National Road Safety Research Institute. (2007). The Road Safety Audit and Road Safety Inspection. SWOV Fact Sheet.

Federal Highway Administration. (2014). Road safety audit. [Online] Available: http://safety.fhwa.dot.gov/rsa/ (October 15, 2014).

Gwilliam, K., & Shalizi, Z. (1996). Sustainable transport: priorities for policy reform.

Harrington, S. J., & Guimaraes, T. (2005). Corporate culture, absorptive capacity and IT success. Information and Organization, 15(1), 39-63. https://doi.org/10.1016/j.infoandorg.2004.10.002

Harvey, G., Skelcher, C., Spencer, E., Jas, P., & Walshe, K. (2010). Absorptive capacity in a non-market environment: a knowledge-based approach to analyzing the performance of sector organizations. Public Management Review, 12(1), 77-97. https://doi.org/10.1080/14719030902817923

Imada, H., Iwasaki, M., Okumura, M., Kashima, S., Saito, K., Takai, H., Tanaka, S., Nishimura, T., Hino, Y., & Funawatashi, E. (1999). Some considerations on the road safety audit. Infrastructure Planning Review, No.22 (1), 679-686.

Imada, H. & Nam Gung, M. (2000). Some problems of computer support systems for road safety audit−The present situation of Great Britain and Introduction into Japan−. Social Information Science, Journal of the Faculty of Social Information Science, Kure University, Vol. 6, 99-111.

Ishizuka, H. (2005). Solutions for Knowledge Transfer Obstacles. Bunkyo University Information Studies, 23-33.

Japan International Cooperation Agency. (2016). JICA knowledge site. [Online] Available: http://gwweb.jica.go.jp/KM/KM_Frame.nsf/NaviIndex?OpenNavigator

Lane, P. J., & Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning. Strategic management journal, 19(5), 461-477.

https://doi.org/10.1002/(SICI)1097-0266(199805)19:5<461::AID-SMJ953>3.0.CO;2-L

Loo, B. P., Hung, W. T., Lo, H. K., & Wong, S. C. (2005). Road safety strategies: a comparative framework and case studies. Transport Reviews, 25(5), 613-639. https://doi.org/10.1080/01441640500115892

Naranjo-Valencia, J. C., Jiménez-Jiménez, D., & Sanz-Valle, R. (2011). Innovation or imitation? The role of organizational culture. Management Decision, 49(1), 55-72. https://doi.org/10.1108/00251741111094437

Ministry of Land, Infrastructure, Transport, and Tourism. (2014a). World water day. [Online] Available: http://www.mlit.go.jp/mizukokudo/mizsei/tochimizushigen_mizsei_tk1_000013.html

Ministry of Land, Infrastructure, Transport and Tourism. (2014b). Chiba Prefecture Safety Enhancement Committee Meeting for Fiscal Year 2013. [Online] Available: https://www.ktr.mlit.go.jp/chiba/anzen/images/conference06.pdf

Ministry of Land, Infrastructure, Transport and Tourism. (2015a). Chiba Prefecture Safety Enhancement Committee Meeting for Fiscal Year 2014. [Online] Available: https://www.ktr.mlit.go.jp/chiba/anzen/images/project07.pdf

Ministry of Land, Infrastructure, Transport and Tourism. (2015b). Budget Request for Studies on Establishment of Road Safety Diagnosis Framework. [Online] Available: http://www.mlit.go.jp/page/kanbo05_hy_000845.html

Ministry of Land, Infrastructure, Transport, and Tourism. (2016a). New public management in the road subsector. [Online] Available: http://www.mlit.go.jp/road/management/index.html

Ministry of Land, Infrastructure, Transport, and Tourism. (2016b). Pilot program for road safety diagnosis. [Online] Available: http://www.mlit.go.jp/road/road/traffic/sesaku/torikumi.html#2-2

Mori, N. & Ikeda, T. (2003). Research on road safety audit. Annual report of road-related research in FY 2002. Technical note of National Institute for Land and Infrastructure Management, No. 117, 60-61. [Online] Available: http://www.nilim.go.jp/lab/bcg/siryou/tnn/tnn0117pdf/ks0117008.pdf

Mori, N. & Ikeda, T. (2005). Study of foreign county's policies and measures for road safety. Annual report of advanced road design and safety division in FY 2004. Technical note of National Institute for Land and Infrastructure Management, No. 252, 21-22. [Online] Available: http://www.nilim.go.jp/lab/bcg/siryou/tnn/tnn0252pdf/ks0252.pdf

Nishimura, T. (2002). Infrastructure planning one day seminar 24th. Road safety audit system: a frontier of road traffic safety measure. Proceedings of JSCE, 695, 1-2.

Owers, R. S., & Wilson, E. M. (2001). Safety analysis without the legal paralysis: The road safety audit program (No. MPC Report No. 02-129).

Ram, S. (2013). An industry view on road safety auditing. In Australasian Road Safety

Research Policing Education Conference, 2013, Brisbane, Queensland, Australia.

Russo, F., Biancardo, S. A., & Dell'Acqua, G. (2014). Consistent approach to predictive modeling and countermeasure determination by crash type for low-volume roads. Baltic Journal of Road & Bridge Engineering, 9(2). https://doi.org/10.3846/bjrbe.2014.10

Shin, Y. (2014). The formation and the change of administrative culture in East Asia. Hosei University Repository.

Smircich, L. (1983). Concepts of culture and organizational analysis. Administrative science quarterly, 339-358. https://doi.org/10.2307/2392246

Suzuki, S. (2008). Bureaucracy and innovation: organization as bundles of routines. Rikkyo University Business Review. Vol. 1, 62-81.

Takahashi, K., Kato, H., Takano, H., & Terabe, S. (2003). The present condition of United Kingdom of a road safety policy, and directivity of Japan. Sociotechnica, 1, 374-382. https://doi.org/10.3392/sociotechnica.1.374

Takano, Y., Takahashi, K., & Kato, H. (2003). Comparative study on road safety policies between Japan and the United Kingdom. Annual proceedings of Japan Society of Civil Engineers, IV-276, 551-552.

Wells, P. (2000). Benefits of Road Safety Audit (No. VTI konferens 13A, Part 6).

World Bank. (2014). Making roads safer: learning from the World Bank's experience. Washington, DC: World Bank. [Online] Available: https://ieg.worldbankgroup.org/Data/reports/road_safety_eval.pdf

World Health Organization. (2015). Global status report on road safety 2015. Geneva: World Health Organization.

World Road Association. (2011). Road Safety Audit Guidelines for Safety Checks of New Road Projects. *PIARC Technical Committee 3.1 Road Safety*.

World Road Association. (2012). Road safety inspection guidelines for safety checks of existing roads. *PIARC Technical Committee 3.1 Road Safety*.

Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. Academy of management review, 27(2), 185-203.

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