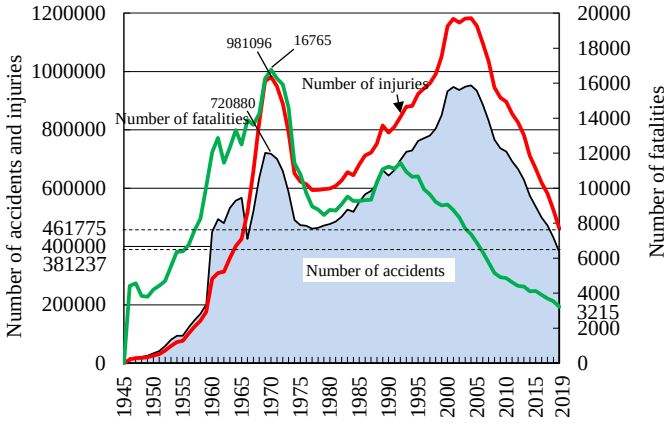
2-1 Trends and Present Situation of Road Traffic Accidents

Professor, Okayama University
Seiji Hashimoto

After the latest peak in 1992, the number of traffic fatalities has shown a downward trend; in 2019, it dropped to 3,215, continuing for 4 years under 4,000. There has also been a continuous reduction in the number of traffic accidents and the number of casualties. This is the first time since 1960 that the number of traffic accidents has fallen below 400,000. The use of seat belts has become mandatory for all seats due to the revision of the Road Traffic Act in June 2008. However, when viewed by age, the wearing rate of elementary school students is lower than that of adults, which leads to a smaller decrease in the number of casualties while riding in passenger cars of this age group.

Figure 1 Changes in the Numbers of Fatalities and Injuries from Traffic Accidents, and Changes in the Number of Accidents

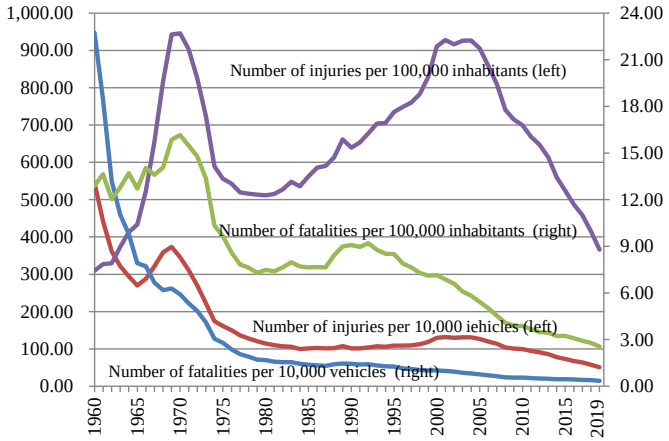
■ Both the number of traffic accidents and the number of traffic accident injuries have decreased, and the number of traffic accident fatalities has fallen below 4,000 for 4 consecutive years.



Source: Traffic Statistics 2019 (Institute for Traffic Accident Research and Data Analysis)

Figure 2 Changes in the Numbers of Fatalities and Injuries from Traffic Accidents, by the Number of Inhabitants and Vehicles

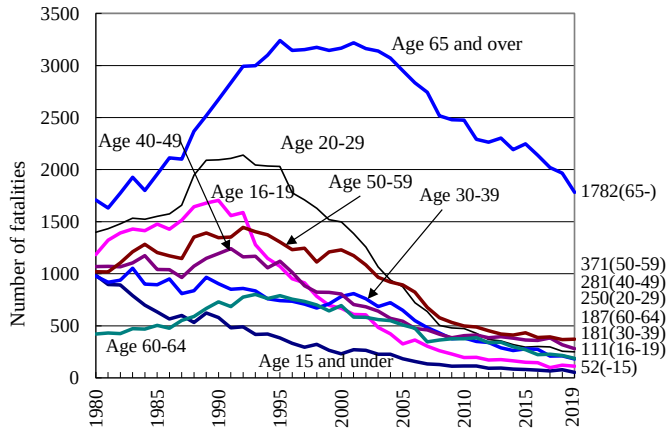
■ The number of fatalities per 10,000 vehicles are stable in low level.



Source: Traffic Statistics 2019 (Institute for Traffic Accident Research and Data Analysis)

Figure 3 Changes in Number of Fatalities by Age Group

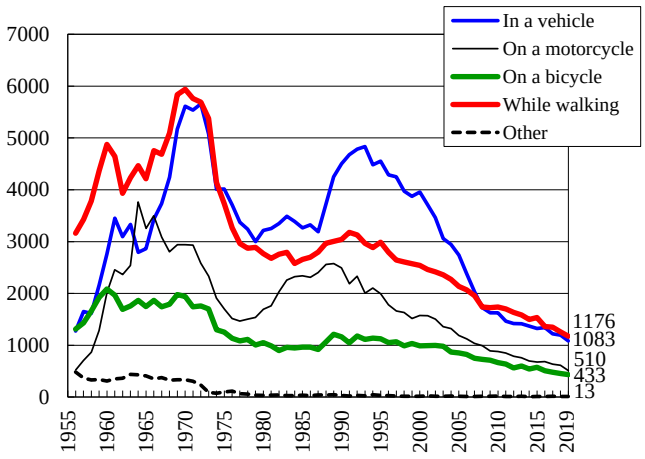
■ All in all, a downward trend is evident. The number of fatalities is high for the elderly (65 and over).



Source: Traffic Statistics 2019 (Institute for Traffic Accident Research and Data Analysis)

Figure 4 Changes in the Number of Traffic Fatalities

■ Fatalities “in a vehicle” decreased noticeably since 2008.

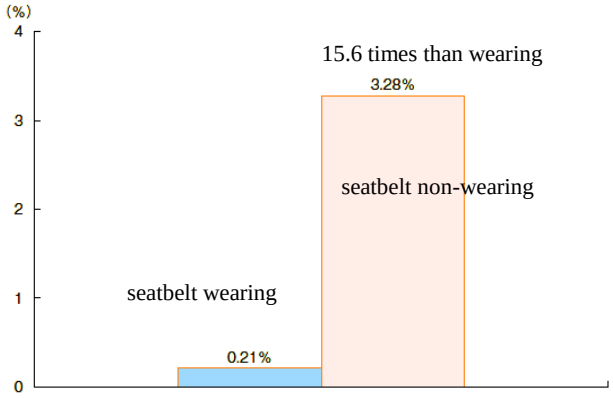


Source: Traffic Statistics 2019 (Institute for Traffic Accident Research and Data Analysis)

☐ It has been found that wearing a seatbelt greatly contributes to reducing the number of fatalities while riding a car in the event of a traffic accident. However, when viewed by age, the wearing rate of elementary school students is lower than that of adults, which leads to a smaller decrease in the number of casualties while riding in passenger cars of this age group.(Fig. 5-7)

Figure 5 Fatality Rate by Seatbelt Wearing or not in a Traffic Accident while Riding a Car (2019)

■ Wearing a seatbelt greatly reduces the fatality rate in a traffic accident.

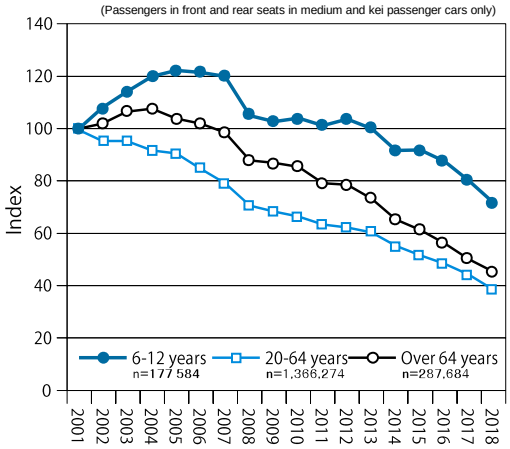


fatality rate = number of deaths / number of casualties × 100
Source : National Police Agency materials

Source: White Paper on Traffic Safety in Japan 2020

Figure 6 Changes in the Number of Fatalities per 100,000 Population by Age Group of Passengers (100 in 2001)

■ The degree of decrease in casualties in elementary school students age is smaller than in other age groups.

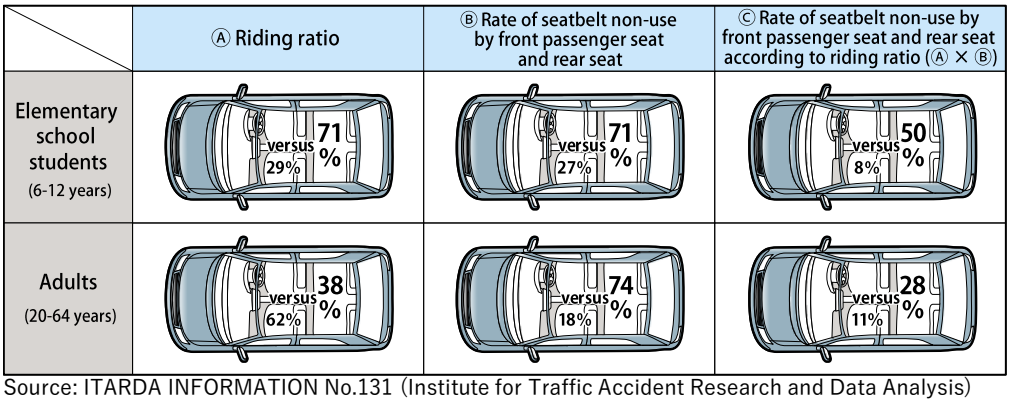


Source: ITARDA INFORMATION No.131 (Institute for Traffic Accident Research and Data Analysis)

Figure 7 Seatbelt Non-Wearing Rate in Traffic Accidents in Cars

■ Although there is no big difference in the non-fastening rate of seat belts at the back seats between elementary school students and adults(see (A)), there are many opportunities for elementary school students to get on the back seats(see (B)), and as a result, there is a high probability that children are not wearing belts(see (C)).

(Based on total number of fatalities or serious injuries in 2001 through 2018)



(A) ratio of seats for children to sit on = Number of fatal injuries in passenger seat : Number of fatal injured in rear seats
(B) Seatbelt wearing rate by seat = Number of fatal injuries people without seatbelt / Number of fatal injured people × 100
(C) Seatbelt wearing rate by seat according to the ratio of seats to sit on = (A) × (B)

Source: ITARDA INFORMATION No.131 (Institute for Traffic Accident Research and Data Analysis)

Table 1 Traffic Fatalities Worldwide, by Situation

Situation / Country	Number of fatalities	In a car	On a motorcycle	On a moped	On a bicycle	While walking	Other
Canada	1,841	1,122	197	3	48	299	172
(2017)	100.0	60.9	10.7	0.2	2.6	16.2	9.3
France	3,248	1,637	627	133	175	471	205
(2018)	100.0	50.4	19.3	4.1	5.4	14.5	6.3
Germany	3,275	1,424	619	78	445	458	251
(2018)	100.0	43.5	18.9	2.4	13.6	14.0	7.7
Netherlands	535	194	53	19	139	64	66
(2017)	100.0	36.3	9.9	3.6	26.0	12.0	12.3
Spain	1,806	732	359	62	58	386	209
(2018)	100.0	40.5	19.9	3.4	3.2	21.4	11.6
U.K.	1,856	823	355	3	103	485	87
(2017)	100.0	44.3	19.1	0.2	5.5	26.1	4.7
U.S.A.	36,560	12,775	4,901	84	857	6,427	11,516
(2018)	100.0	34.9	13.4	0.2	2.3	17.6	31.5
South Korea	3,781	725	640	99	207	1,487	623
(2018)	100.0	19.2	16.9	2.6	5.5	39.3	16.5
Japan	4,166	894	438	261	636	1,482	455
(2018)	100.0	21.5	10.5	6.3	15.3	35.6	10.9

Upper figure: number of fatalities; Lower figure: percentage of total (%)
For countries that used the coefficient to convert the number of fatalities into a 30-day figure, the total may not represent the sum of each figure.
Source: International Traffic Safety Data and Analysis Group (IRTAD)

Source: Traffic Statistics 2019 (Institute for Traffic Accident Research and Data Analysis)

Table 2 Number of Traffic Fatalities Worldwide by Age Group

age / country	Number of fatalities	5 and under	6-14	15-17	18-24	25-64	65 and over	Unknown
Canada	1,841	38	37	54	270	1,059	372	11
(2017)	100.0	2.1	2.0	2.9	14.7	57.5	20.2	0.6
France	3,248	33	53	106	503	1,711	842	-
(2018)		1.0	1.6	3.3	15.5	52.7	25.9	0.0
Germany	3,275	30	49	77	369	1,698	1,045	7
(2018)		0.9	1.5	2.4	11.3	51.8	31.9	0.2
Netherlands	535	5	10	13	57	259	190	1
(2017)	100.0	0.9	1.9	2.4	10.7	48.4	35.5	0.2
Spain	1,806	14	11	24	183	1,070	496	8
(2018)		0.8	0.6	1.3	10.1	59.2	27.5	0.4
U.K.	1,856	16	29	45	265	1,024	477	-
(2017)	100.0	0.9	1.6	2.4	14.3	55.2	25.7	-
U.S.A.	36,560	416	622	963	5,282	22,238	6,907	132
(2018)		1.1	1.7	2.6	14.4	60.8	18.9	0.4
South Korea	3,781	11	30	46	173	1,839	1,682	-
(2018)		0.3	0.8	1.2	4.6	48.6	44.5	0.0
Japan	4,166	30	47	66	252	1,385	2,386	-
(2018)		0.7	1.1	1.6	6.0	33.2	57.3	0.0

Upper figure: number of fatalities; Lower figure: percentage of total (%)
For countries that used the coefficient to convert the number of fatalities into a 30-day figure, the total may not represent the sum of each figure.
Source: International Traffic Safety Data and Analysis Group (IRTAD)

Source: Traffic Statistics 2019 (Institute for Traffic Accident Research and Data Analysis)

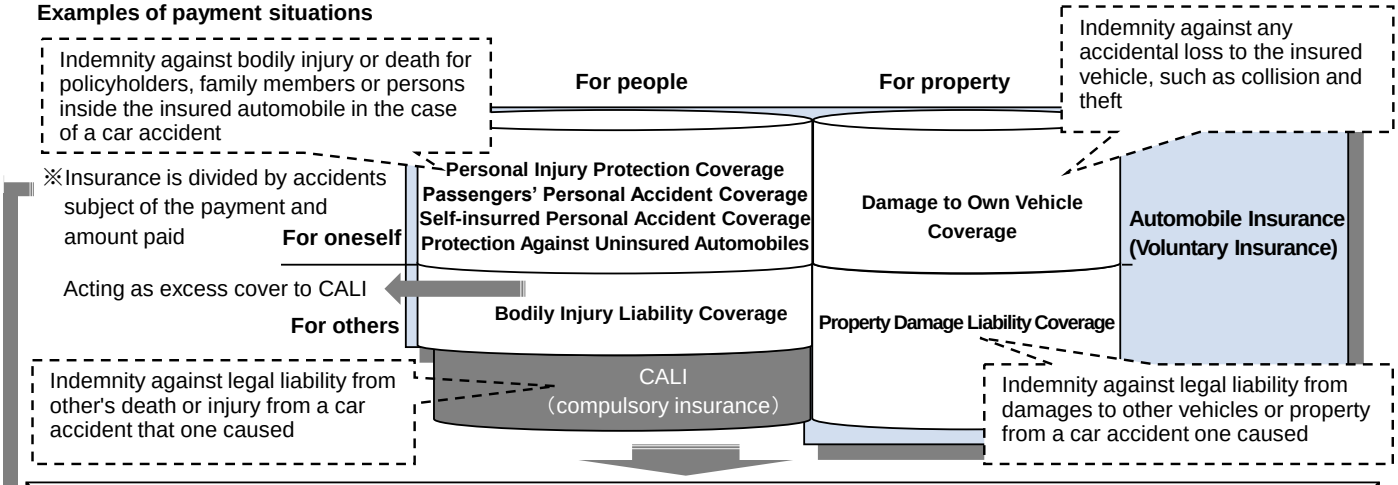
2-2 Automobile Insurance System In Japan

General Insurance Rating Organization of Japan
Fuhito Tanabe

There are two main indemnifications in the Japanese automobile insurance system, which are Compulsory Automobile Liability Insurance (CALI) and Voluntary Automobile Insurance. CALI provides basic indemnification for victims. When the amount of loss is more than the limits of CALI, Voluntary Automobile Insurance will be paid additionally. It is an excess cover to CALI. In order to charge premiums fairly between policyholders, voluntary automobile insurance has more classifications than CALI and premium sets adequately.

Figure 1 Compulsory Automobile Liability Insurance (CALI) and Voluntary Automobile Insurance

■ There are Compulsory Automobile Liability Insurance(CALI) which indemnifies for victims against an accident resulting in injury or death, and Voluntary Automobile Insurance which acts as excess cover to CALI in Automobile Insurance system. Various products are offered by putting together the coverage of Voluntary Automobile Insurance below.



A valid CALI certificate must be presented at each vehicle inspection which ensures that every automobile is insured by CALI (※1 compulsory insurance). Furthermore, it is stipulated that premium rates shall be as low as possible under ※2 no-loss, no-profit rule and CALI indemnifies within ※3 the limits of insurance.

※ 1 compulsory insurance
No automobile (including motorized bicycle) shall be operated without a contract for CALI.

※ 2 no-loss, no-profit rule
Under the Act, it is stipulated that premium rates shall be as low as possible within the range of compensating reasonable costs of insurance business under the efficient management.

※ 3 the limits of insurance
The limits of insurance currently in force are as follows.

Types of damage	The items of loss	The limits of insurance per victims
For bodily injury	- Hospital fees - Documentation fees - Loss of earnings due to absence from work - Damages for pain and suffering etc.	¥ 1.2 million
For permanent disability	- Loss of future earnings - Damages for pain and suffering etc.	¥750 thousand ～ 40 million depending on the grade
For death	- Funeral expenses - Loss of future earnings - Damages for pain and suffering	¥ 30 million

	Accidents subject of the payment		Amount paid
	Accidents while being inside the automobile	Other accidents	
Personal Injury Protection Coverage	○*		Actual amount of damage (calculate according to the standards under policy conditions)
Passengers' Personal Accident Coverage	○	×	Insured amount irrespective of actual amount of damage
Self-insured Personal Accident Coverage	○(only self-insured personal accident)	×	Amount under policy conditions irrespective of actual amount of damage
Protection Against Uninsured Automobiles	○* Will be paid only if -insured is killed or has sustained permanent disability -an automobile is not insured against bodily injury liability etc.		Amount in excess of CALI and Bodily Injury Liability Coverage within legal liability for an accident

＊Only "accidents while being inside the insured automobile" can be the subject of the payment depending on the contents of the contract.

Figure 2 Risk Classification for CALI and Voluntary Automobile Insurance

■ There are two types of risk classification. One is depending on characteristics and another is depending on coverage.

[CALI]

	Classification
Charac-teristics	Area (Ex. mainland, Okinawa, etc.)
	Vehicle Use & Type (Ex.passenger car, freight car, private car, business car, etc.)
Coverage	Term (Ex. 5 days, 1-37 months, 48 or 60 months depending on term of automobile inspection)

[Voluntary automobile insurance]

	Classification (Example＊)
Charac-teristics	Vehicle Use & Type (Ex.passenger car, freight car, private car, business car, etc.)
	Vehicle Model Code (17 classification depending on model code)
	New vehicle/ Old vehicle
	With AEB(Autonomous Emergency Braking)/ No AEB
	Main Driver's Age (Can be classified only when 26 years old or over)
	Bonus-Malus 20 grades according to claim history, the number of accidents, whether there was a contract previously Grade from 7 to 20 are divided into two, claim free and claim made
Coverage	Insured Amount, Deductible
	All ages / 21 years or over / 26 years or over (3 classifications depending on indemnified drivers' age) ※4
	the insured, and spouse / All drivers (2 classifications depending on the extent of indemnified drivers)

＊It shows main classification of Reference Loss Cost Rates above, and insurance companies set their own classifications.

※4 Premium change depending on the age as it shows below. Premium for person of advanced age is quite high. The smaller coverage is, the lower premium is. Also, over 90% of drivers is 26 years or over.

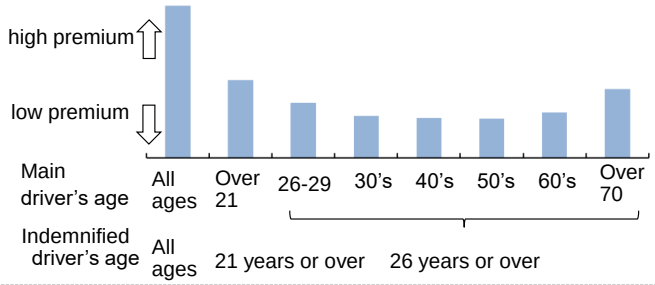


Table 1 Examples of Judicial Precedent for Large Amount of Compensation by Car Accident

■ Almost every policyholder set their insured amount of Liability Coverage to no limit because there are some judicial precedents more than 100 million yens. The % of insured amount to no limit for Bodily Injury Liability Coverage is 99.6%, and for Property Damage Liability Coverage is 95.0%.

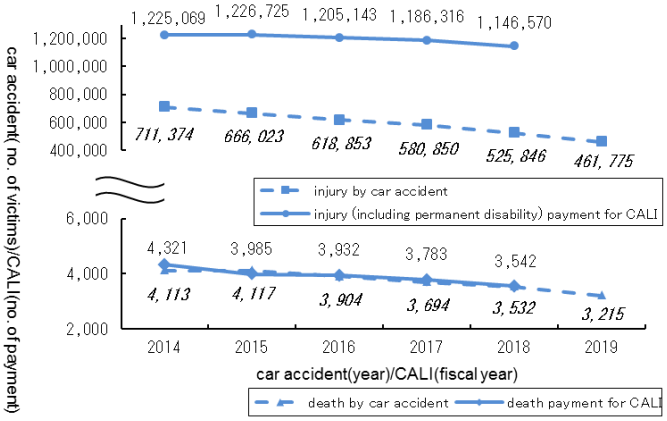
(Million yen)

Injury or death		Property damage	
Amount of damages	Date of judgment	Amount of damages	Date of judgment
¥528.53	1/11/2011	¥261.35	19/7/1994
¥453.81	30/3/2016	¥134.50	17/7/1996
¥453.75	18/7/2017	¥120.36	18/7/1980

Source: Disclosure document from General Insurance Rating Organization of Japan

Figure 3 Change in Number of Death and Injuries by Car Accidents and the Number of Payments for CALI

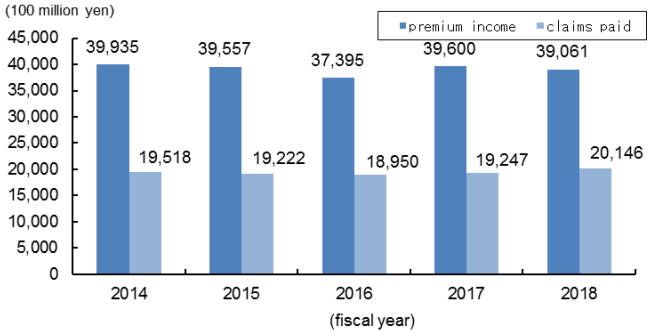
■ The number of death and injury by car accident, and payment for CALI decrease.



・Fiscal year represents the period starting on April 1 of the year and ending on March 31 of the following year

Source: Disclosure document from General Insurance Rating Organization of Japan and National Police Agency

Figure 4 The Change of the Premium Income and Claims Paid for Automobile Insurance (Voluntary Insurance)

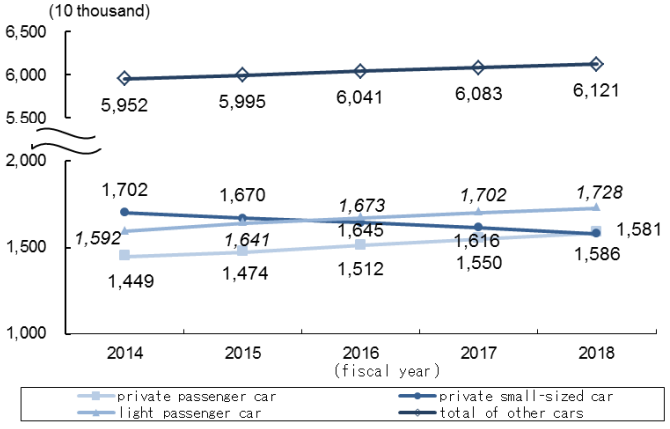


・Including expense loading in premium income

Source: Disclosure document from General Insurance Rating Organization of Japan

Figure 5 Change of the Number of Insured Cars for Voluntary Automobile Insurance (Bodily Injury Liability Coverage)

■ While the number of cars owned increases, especially the number of light passenger cars insured increases.



・Total of other cars include taxi and freight etc.

Source: Disclosure document from General Insurance Rating Organization of Japan

2-3 Traffic Safety Program

Professor, Akita University
Hidekatsu Hamaoka

Causes of traffic accident are widely distributed and influence each other. Moreover, occurrence of traffic accidents is rare, and it is hard to identify the cause. To decrease the number of traffic accidents, many countermeasures were conducted such as to implement measures against blindspots and to inform the location of blindspots to the driver. As a result of these countermeasures, number of fatalities was decreased below 5000. Now, under the Basic Principles of 10th Fundamental Traffic Safety Program, road management authority is strengthening to apply various countermeasures that focuses on the pedestrian safety especially for the elderly person to realize the most safe road environment in the world.

Table 1 10th Traffic Safety Basic Plan

■ 10th Traffic Safety Basic Program (FY2016-20) was designed on 11th March, 2016.

1. Three Factors that Constitute Transport Society
With regard to the three elements of human beings, transportation, and the traffic environment, while considering their mutual relationships, the Ministry formulates measures based on scientific research and analysis of traffic accidents and strongly promote them.

2. Use of Information Communication Technologies (ICT)
The Ministry will actively use Intelligent Transport Systems (ITS), enhance and strengthen comprehensive investigation and analysis of traffic accident causes, and promote necessary research and development.

3. Enhancement of Rescue and First-Aid Activities and Support of Victims
The Ministry will enhance rescue and first-aid activities when a traffic accident occurs, and further enhance the support of victims in all traffic safety fields.

4. Promotion of Traffic Safety Activities Based on Participation and Cooperation
In order to actively promote the voluntary participation of citizens in traffic safety activities, the Ministry will promote traffic safety activities based on participation and cooperation, such as the establishment of a mechanism in which each citizen can participate from the planning stage of a policy.

5. Implementation of Effective and Efficient Measures
The Ministry will ensure efficient budget implementation by engaging in measures that will produce the maximum effect in a concentrated manner according to the actual traffic situation of each community in view of the difficult financial situation.

6. Ensuring Further Safety in Public Transport
Maintenance audit and transport safety management evaluation will be enhanced and strengthened. In order to prevent an accident due to lack of health management or a sudden change in physical conditions of a driver, the use of the "Health Management Manual of Drivers of Fleet Vehicles" should be made thoroughly known.

Source: Cabinet Office

Table 2 Effort to Install Bicycle Safety Measures

■ Bicycle accidents become a social problem due to improper usage of bicycle. New legislation focuses on the following infractions:

1. Red light running **2.** Illegal usage of passage **3.** Over speeding at the pedestrian road **4.** Violation of passage **5.** Roadblock to pedestrian **6.** Irruption to closed railroad crossing **7.** Unsafe movement at the intersection **8.** Roadblock to prioritized vehicle **9.** Unsafe movement at the roundabout **10.** Violation of stop sign **11.** Illegal usage of the pedestrian road **12.** Using bicycle with defective brake **13.** Drunk driving **14.** Unsafe driving

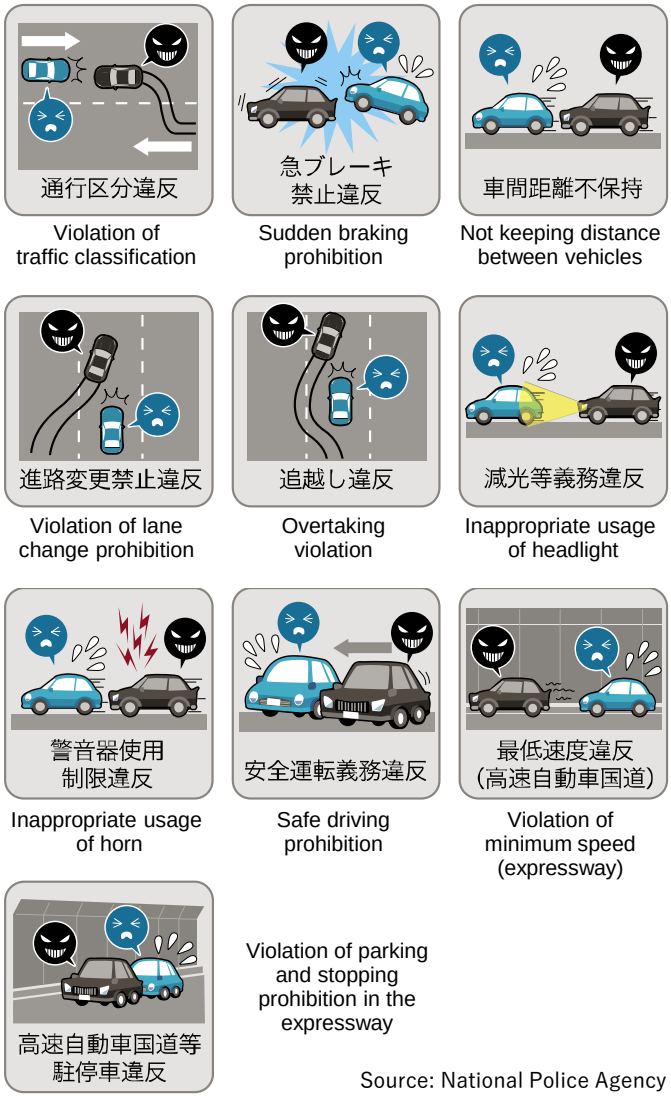
Source: National Police Agency

Figure 1 Establish New Legislation on Dangerous Driving

■ New legislation on dangerous driving was established on 10th June, 2020. Under this legislation, when a person drives dangerously, such as sudden breaking, or driving very close to the next car, he/she will be severely punished.

1. Obstruction of driving
- Imprisonment of up to 3 years or a fine of up to 500,000 yen.
- Revoke driver licenses for 2 years

2. Obstruction of driving caused danger situation
- Imprisonment of up to 5 years or a fine of up to 1,000,000 yen.
- Revoke driver licenses for 3 years



Source: National Police Agency

Table 3 Traffic Enforcement and Speed Regulation to Reduce Traffic Accidents Effectively

■ Recommendations to conduct traffic enforcement by utilizing the analysis of traffic accidents and to reconsider the principle to set the maximum speed were reported.

Recommendation to conduct traffic enforcement and to set maximum speed

Common understanding to organize recommendation
- Necessity to manage maximum speed

Maximum speed setting to avoid traffic accident
- Reconsideration of maximum speed at the road
- Share the concept to manage maximum speed
- Measures to lead to safe driving attitude
- Reconsideration of maximum speed at the expressway

Traffic enforcement to avoid traffic accident
- Traffic enforcement of speed violation to avoid traffic accident
- Inform the concept/contents of traffic enforcement

Measures to promote steadily to avoid traffic accident
- Strengthening traffic enforcement of hazardous violation and dangerous driving
- Cooperation with city planning
- Promote traffic education except drivers
- Evaluation of company's effort to avoid traffic accident

Source: National Police Agency

Figure 2 Prevent Head-on Accident at the Expressway with Two-way-two-lanes

■ At the two-way-two-lanes expressway, rubber poles were used to divide lanes. However, this could not avoid head-on accident because of its lower bearing power. By installing wire-rope instead of rubber pole, vehicle would not go opposite lanes.

Source: Ministry of Land Infrastructure and Transport

Figure 3 Prevent Wrong-way Driving in Expressways

■ Wrong-way driving in expressways can cause serious accidents. Various countermeasures such as antirollback system, road marking to show the traveling direction, and so on, were installed at the exit of the service area and the parking area.

Y-shaped junction with intersection
Source: Central Nippon Expressway Company

Lane dividing facilities inside of the toll plaza
Source: Ministry of Land Infrastructure and Transport

Figure 4 Countermeasure to Increase Pedestrian Safety

■ Many traffic accidents occurred at unsignalized intersection in the mid-section of the road. Two-step crossing method by utilizing the traffic island was demonstrated. Expected benefits include the ability of pedestrians to easily see approaching vehicles and shortened crossing distances.

Source: Yaizu City Office

2-4 Efforts toward Traffic Calming

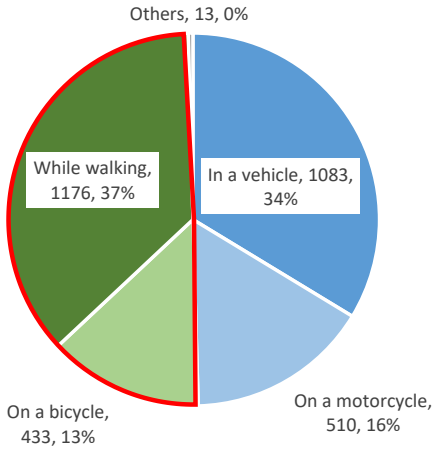
Professor, Okayama University
Seiji Hashimoto

Attention is being paid in Japan to the traffic safety in residential areas. A large number of pedestrian and bicycle fatalities is a characteristic of traffic accidents in Japan, and since many of them occur in places relatively close to home, traffic safety measures on residential roads are being promoted. Traffic calming devices such as speed humps and narrowings have not been used in Japan. However, in March 2016, the technical standards for speed humps and narrowings has been enacted, and it is expected that safety measures for living streets will be promoted in the future.

☐ The high number of fatalities caused by traffic accidents while walking or riding a bicycle is a characteristic of traffic accidents in Japan. Many of these pedestrians and cyclists did not violate the law, and it is necessary to create a safe traffic environment.

Figure 1 Number of Fatalities in Traffic Accidents by Condition

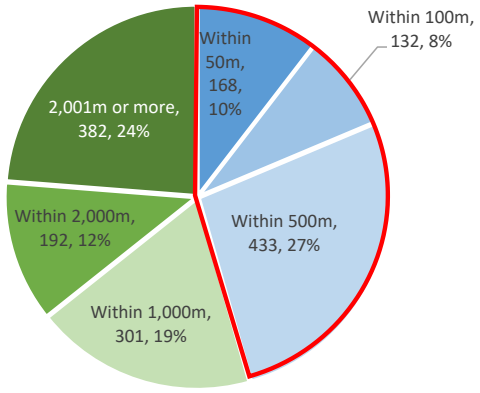
■ About half of the fatalities are while walking or riding a bicycle.



Source: Traffic Statistics 2019 (Institute for Traffic Accident Research and Data Analysis)

Figure 2 Number of Fatalities while Walking or Riding a Bicycle by Distance from Home

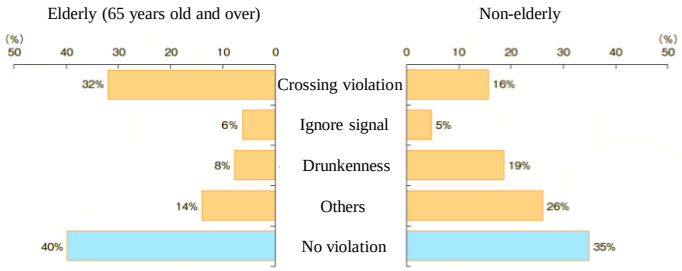
■ Approximately 45% of the fatalities while walking or riding a bicycle have an accident within 500 meters of their home.



Source: Traffic Statistics 2019 (Institute for Traffic Accident Research and Data Analysis)

Figure 3 Percentage of Fatalities while Walking by Law Violation (2019)

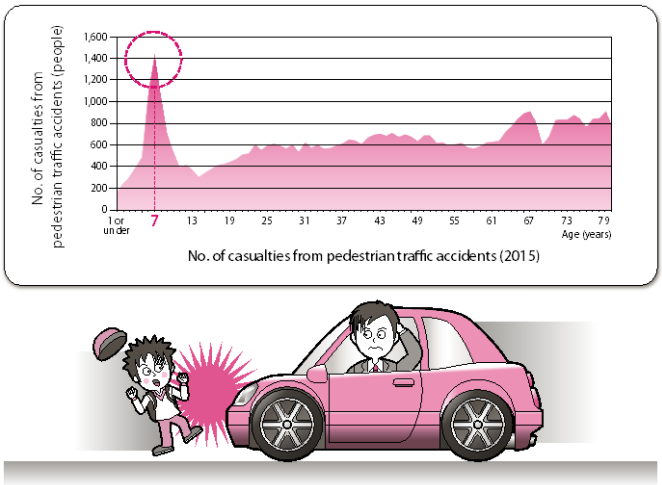
■ Focusing on legal violations of people who died while walking, "no violation" was the highest for both the elderly and non-elderly people.



Source: White Paper on Traffic Safety in Japan 2020

Figure 4 Number of Fatalities and Injuries by Age

■ By age, the number of 7-year-old fatalities and injuries is the highest.

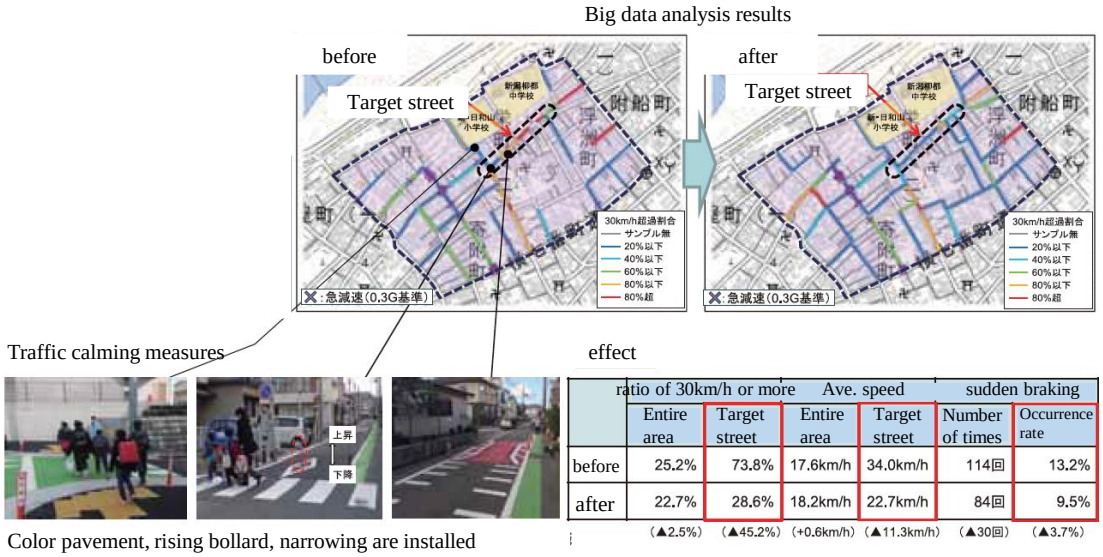


Source: ITARDA INFORMATION No.116 (Institute for Traffic Accident Research and Data Analysis)

☐ In recent years, based on probe data (driving history, behavior history) collected by ETC2.0 on-board equipment, etc., potential dangerous points such as over-speed and sudden braking have been identified and traffic safety measures have been taken. As specific speed control measures, in addition to the use of conventional traffic calming devices such as humps and narrowing, the introduction of rising bollards and speed camera on residential streets is being promoted.(Fig. 5-8)

Figure 5 Traffic Calming Measures and Effects by Utilizing Big Data

■ By using big data to visualize the vehicle running speed and sudden braking on each street, it is possible to deal with potential issues where accidents have not become apparent, and effective safety measures for the entire district.



	ratio of 30km/h or more		Ave. speed		sudden braking	
	Entire area	Target street	Entire area	Target street	Number of times	Occurrence rate
before	25.2%	73.8%	17.6km/h	34.0km/h	114回	13.2%
after	22.7%	28.6%	18.2km/h	22.7km/h	84回	9.5%
	(▲2.5%)	(▲45.2%)	(+0.6km/h)	(▲11.3km/h)	(▲30回)	(▲3.7%)

Source: White Paper on Traffic Safety in Japan 2020

Figure 6 Rising Bollard in the City (left: Geneva, right: Niigata City)

Photo: Seiji Hashimoto

Photo: Hisashi Kubota

Figure 7 Speed Reduction by Displaying the Running Speed

■ By clearly indicating the running speed of the vehicle, expecting speed control. (Photo is Ashford, England)

Photo: Seiji Hashimoto

Figure 8 Introduction of Speed Camera on Residential Streets

■ The speed camera has been downsized, and have installed on residential streets. It is expected to reduce accidents on residential roads.

Photo: National Police Agency

2-5 Progress of Bicycle Transport

Associate Professor, Osaka City University
Nagahiro Yoshida

In 2017, the Bicycle Use Promotion Act, which includes the principle of reducing the degree of dependence on automobiles, came into force, and the Cabinet endorsed the Bicycle Use Promotion Plan in 2018. The plan outlines 4 goals, 18 measures, and 83 actions to embody the 14 basic policies set out in the act. With regard to traffic accidents, although the number of bicycle-related accidents has been decreasing, the proportion of bicycle-related accidents to the total number of traffic accidents is large, around 20%, and the trend has shown a tendency to increase since 2016. Under new environmental, health, and tourism measures based on the promotion plan, an increasing number of cities have introduced bicycle sharing system, and the designation of National Cycle Route has also begun.

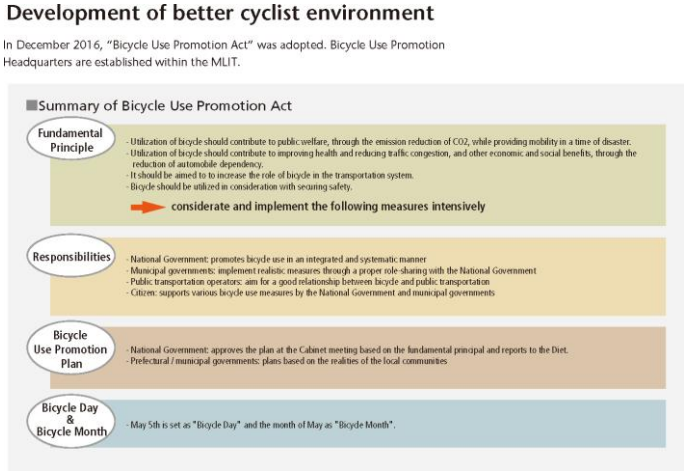
Table 1 Recent Changes in Relevant Bicycle Policies

■ Under the "Amendment of the Road Structure Ordinance" promulgated and enforced in April 2019, "bicycle traffic lanes" has been defined to ensure the safety and fluidity of bicycle traffic.

year	explanation
2007	Amendment of Road Traffic Act: Clarification of cases for riding standard bicycles on sidewalks.
2008	MLIT and NPA: Designation of 98 model areas across the country for improving bicycle traffic facilities.
2009	MEXT: the Amendment of the School Health Acts: Mandatory of school safety plans to ensure student transport including cycling.
2011	Amendment of the Ordinance on Road Signage and Marking: New "One-way Bicycle" signage allows one-way restrictions on bicycle paths and shared sidewalk. The NPA official notice: Promotion of Comprehensive Measures to Achieve Good Bicycle Traffic Order
2012	MLIT and NPA: Guideline for Creating a Safe and Comfortable Bicycle Environment
2013	Amendment of Road Traffic Act: For cyclists, riding on side strips is limited to the left-hand side of the road.
2015	Enforcement of amendment of Road Traffic Act：Providing bicycle driver training program for offenders. JSTE: A guideline to planning and designing intersections with consideration of bicycle traffic was published.
2016	MLIT and NPA: Revised Guideline for Creating a Safe and Comfortable Bicycle Environment. MLIT: Revised guideline for Bicycle Parking Facilities.
2017	Bicycle Use Promotion Act has come into force. MEXT: Cabinet approved the second school safety plan to promote safe transport.
2018	Cabinet approved Bicycle Use Promotion Plan.
2019	Amendment of Order for Road Traffic Act: Type of dangerous cycling has been defined. Amendment of the Road Structure Ordinance: Bicycle traffic lane has been defined and installation requirement for bicycle track has been clarified. The public-private partnership council for bicycle use promotion: Guideline on the introduction of bicycle commuting.
2020	JSTE: A guideline to planning and designing intersections with consideration of bicycle traffic is revised, Amendment of Road Traffic Act: Review of definition relating to the definition of the standard bicycles.

Figure 1 Bicycle Use Promotion Act

■ Bicycle Use Promotion Act came into effect in 2017.



Source: MLIT (2018)

Figure 2 Share of Bicycle Traffic by City Type (Commuting to Work)

■ The share of bicycles used for commuting to work on weekdays ranges from 6 to 16%, regardless of city type. The share tends to be higher in the central cities than in other cities.

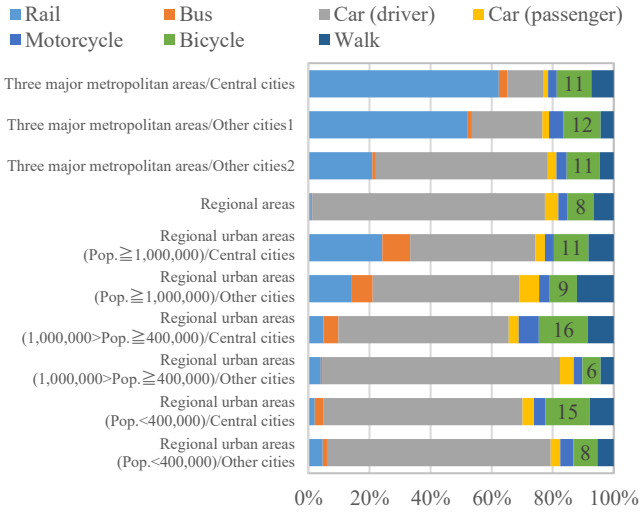
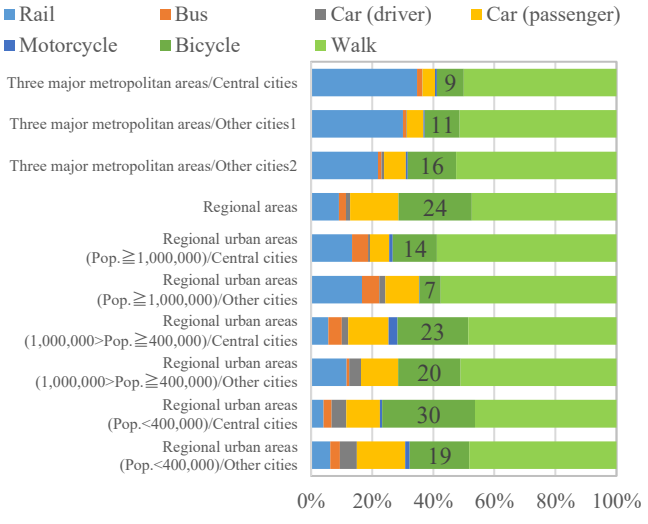


Figure 3 Bicycle Transportation Ratio by Urban Type (Commuting to School)

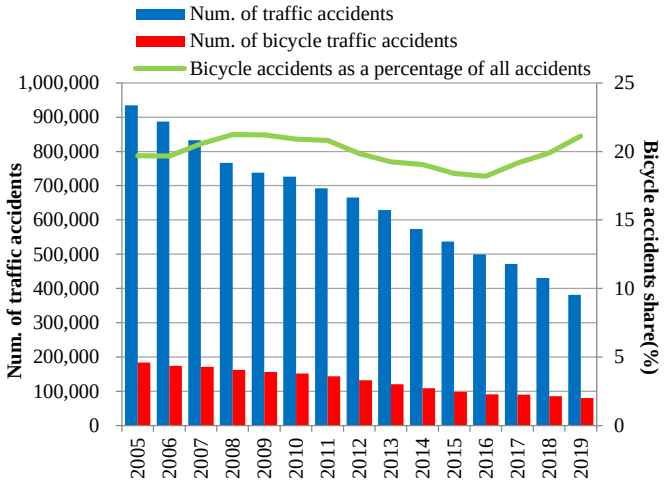
■ The share of bicycles used for commuting to school on weekdays ranges from 7 to 30%, with a high tendency in regional urban areas/central cities.



Source: Nationwide Person Trip Survey (2018)

Figure 4 Bicycle Related Accidents

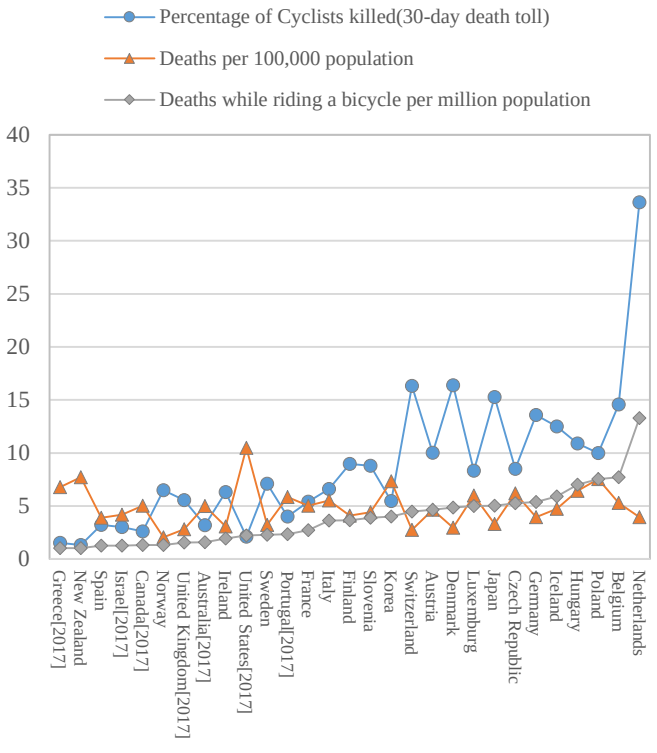
■ The number of bicycle accidents has been decreasing along with the number of all traffic accidents, decreasing to 53% and 56% respectively over the past 10 years. However, the proportion of bicycle-related accidents to the total number of traffic accidents is significant, at around 20%, and has been on an upward trend since 2016.



Source: NPA Bicycle related accidents etc.(2020)

Figure 5 International Comparison of Bicycle Related Accidents

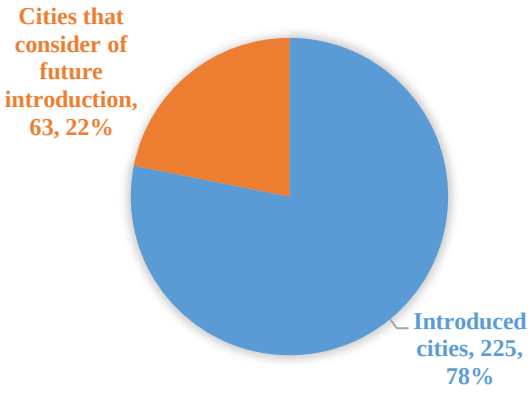
■ In terms of deaths per 100,000 population, Japan ranks among the safest countries in the world. However, percentage of cyclists killed in Japan account for a high proportion, and among the countries, deaths while riding a bicycle per million population is higher than in Switzerland and Denmark. This suggests that bicycle use in Japan is not safe enough.



Source: OECD etc.(2019)

Figure 6 Bicycle Sharing System

■ Many cities have introduced bicycle sharing system, reaching 225 by the end of March 2019. Electric assisted bicycles are also widely used. The main purposes for introducing shared bicycles are to promote tourism, supplement public transportation, and revitalize local communities. The number of ports as well as the density of these ports is increasing every year, especially in Tokyo.



Source: MLIT (2019)

Figure 7 Designation of National Cycle Route

■ The National Cycle Route, which designates routes that meet certain standards, was launched in 2019 in order to create new tourism value and to create new regions through the promotion of cycle tourism that organically links excellent local tourism resources.

Source: MLIT (2019)

2-6 Changes in Urban Parking Lot Policies

Professor, Nihon University
Masaharu Oosawa

The preparation for the quantity of parking lots has been continued actively so far. In the center of large cities whose modal share of public transport is high, the supply for parking lots exceeds the demand for them continuously. Therefore, Mandatory Parking Rules are reconsidered locally. On the other hand, the number of temporary parking on street does not come down and has remained constant. Recently, on-street parking spaces are recognized as important open space and how to utilize them in local circumstances results in a parking free street and green parking lots.

Table 1 Parking Lots by Type and Actor under the Parking Lot Act (Nationwide)

■ Parking both of cars and motorcycles are increasing in terms of lots and spaces.

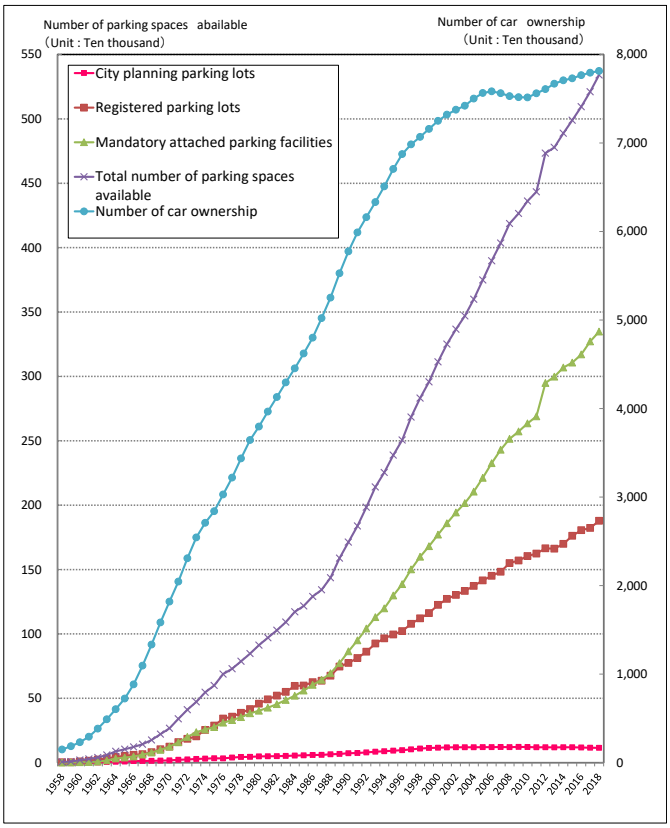
	Division	Parking lots	Rate	Year-on-year	Spaces	Rate	Year-on-year	Actor: Parking lots					Actor: Spaces				
								National and local governments	Municipalities	Investment organization	Tertiary sector	Private enterprise	National and local governments	Municipalities	Investment organization	Tertiary sector	Private enterprise
Cars	City planning parking lots	438	0.5%	−0.7%	114,835	2.1%	−2.8%	31	318	18	19	52	8,980	71,996	7,615	8,412	17,832
	Registered parking lots	9,869	11.9%	2.6%	1,878,182	35.2%	3.9%	233	1,290	47	196	8,103	77,248	246,703	20,576	54,067	1,479,588
	Mandatory attached parking facilities	72,908	87.6%	2.2%	3,347,922	62.7%	5.3%	973	1,230	303	262	70,140	76,875	93,816	26,434	41,358	3,109,439
	On-street parking lots	14	0.02%	0.0%	601	0.01%	0.0%	–	14	–	–	–	–	601	–	–	–
	Total	83,229	100%	2.2%	5,341,540	100%	4.6%	1,237	2,852	368	477	78,295	163,103	413,116	54,625	103,837	4,606,859
Motorcycles	City planning parking lots	132	5.6%	−3.0%	16,777	28.7%	1.5%										
	Registered parking lots	387	16.5%	8.8%	32,383	55.3%	9.6%										
	Mandatory attached parking facilities	1,829	77.9%	12.2%	9,359	16.0%	28.2%										
	Total	2,348	100%	10.8%	58,519	100%	10.3%										

City planning parking lots: Parking lot specified in the city planning
Registered parking lots: Parking lot of more than 500㎡ and collecting fee in the city planning area
Mandatory attached parking facilities: Parking lot required by a regulation, when a building beyond the pre-determined scale is built and enlarged
On-street parking lots: Parking lot installed on the road surface in the zone to provide parking place

Note 1: Motorcycles parking lots = Total of motorcycle-only, motorcycle and car parking lots.
Note 2: Investment organization = Only national and local governments.
Note 3: Private enterprise = Excluding tertiary sector.
Source: Created by the author using fiscal 2019 data from the 2019 Annual Report on Parking Lots (City Bureau, Ministry of Land, Infrastructure and Transport, 2020).

Figure 1 Nationwide Trend of Parking Spaces

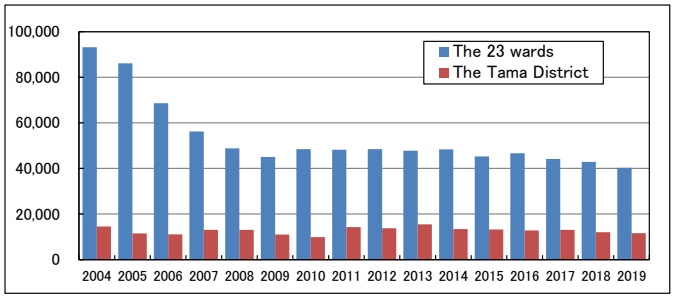
■ The number of parking spaces available has continued to increase. The number of parking spaces per 10,000 cars was 684 in 2018.



Source: Created by the author using fiscal 2019 data from the 2019 Annual Report on Parking Lots (City Bureau, Ministry of Land, Infrastructure and Transport, 2020).

Figure 2 Changes in the Momentary Number of Four-wheeled Vehicles Parked Illegally on the Streets in Tokyo

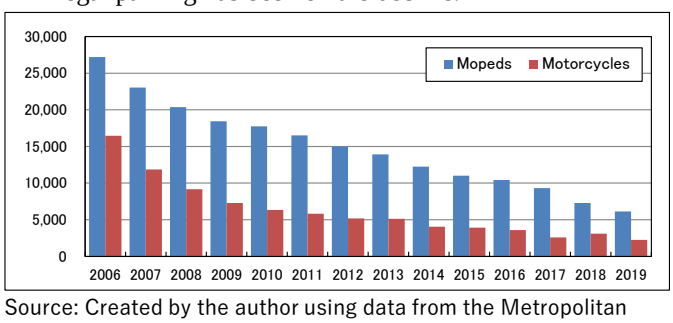
■ Illegal parking in the 23 wards has been flat since 2009, declining since 2016,and is the lowest at 40,312 spaces in 2019.



Source: Created by the author using data from the Metropolitan Police Department.

Figure 3 Changes in the Momentary Number of Motorcycles Illegally Parked on Streets in the 23 Wards of Tokyo

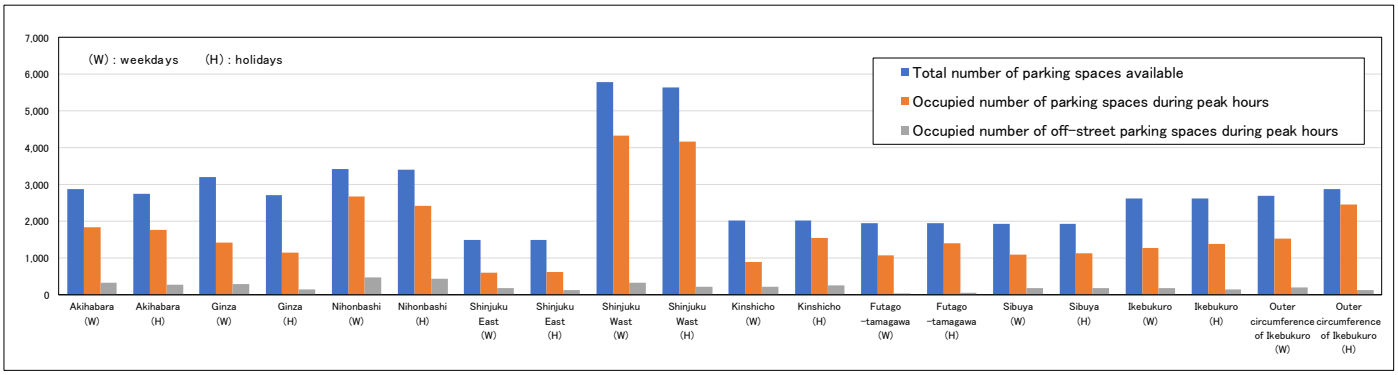
■ Illegal parking has been on the decline.



Source: Created by the author using data from the Metropolitan Police Department.

Figure 4 Parking Supply and Demand during Peak Hours in Tokyo

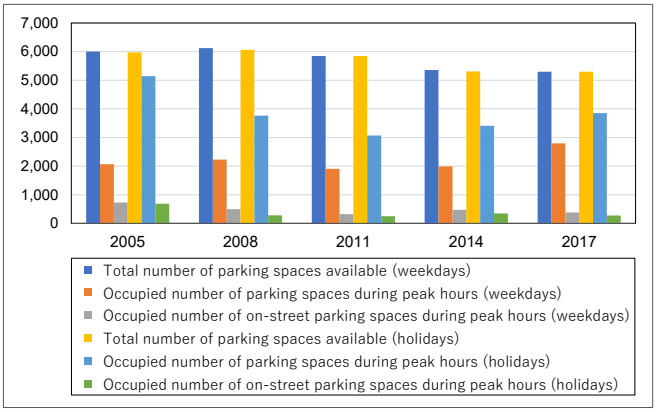
■ The Parking supply exceeds the parking demand even considering on-street parking demand around the rail stations both on weekdays and holidays.



Source: Created by the author using data from the 2017 Annual Report on Parking Lots (Tokyo Metropolitan Public Corporation for Road Improvement and Management, 2017).

Figure 5 Parking Supply and Demand during Peak Hours in Ikebukuro

■ The supply for parking lots exceeds the demand for them continuously.



Source: Created by the author using data from the 2017 Annual Report on Parking Lots (Tokyo Metropolitan Public Corporation for Road Improvement and Management, 2017).

Table 2 Building Floor Area per Parking Space and Allowable Distance for Remote Parking Lot

■ The Local rule has been introduced in many local governments.

	Department store,Store (㎡)	Office (㎡)	Specific use (Excluding department store,store, office) (㎡)	Non-specific use (㎡)	Remote distance (m)
Standard parking lot regulations	200	250	250	450	-
Sapporo	300	300	500	600	350
Sendai	350	350	550	900	200
Saitama	200	200	200	450	300
Chiba	200	200	200	300	200
The 23 wars	250	300	300	350	300
Yokohama	200	250	250	550	300
Kawasaki	300	350	350	600	300
Nagoya	350	500	650	900	300
Kyoto	300	350	450	600	500
Osaka	350	350	350	450	350
Kobe	200	350	350	550	350
Hiroshima	150	250	250	450	300
Kitakyushu	300	300	300	450	200
Fukuoka	300	300	300	450	300

Source: Created by the author using fiscal 2019 data from the 2019 Annual Report on Parking Lots (City Bureau, Ministry of Land, Infrastructure and Transport, 2020).

Figure 6 Sapporo City KITASANJYOU Square (AKAPLA)

■ The parking free street has implemented together with urban redevelopment.

Source: photo by Masaharu OOSAWA

Figure 7 Green Parking in Urban Areas

■ Green parking is one of measures against heat island effect.

Source: photo by Masaharu OOSAWA

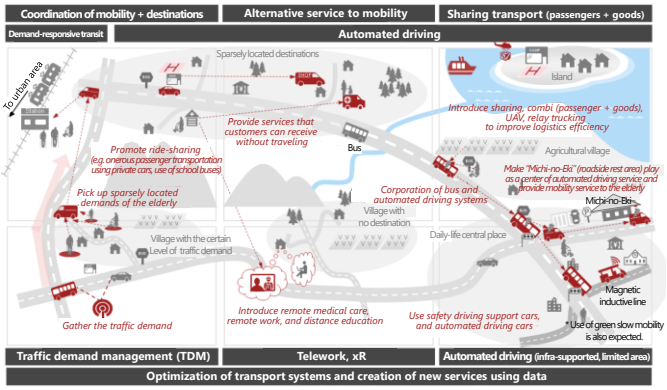
2-7 Recent ITS Research and Developments

Research Associate, The University of Tokyo
Azusa Toriumi
Professor, The University of Tokyo
Takashi Oguchi

"Public-Private ITS Initiative/Roadmaps" was first established in 2014 and have been updated every year by the IT Strategic Headquarters, describing the medium- and long-term goals of ITS developments which private companies and relevant ministries should address together. Their main targets are to develop and deploy safety driving support and automated driving systems, and to utilize various kinds of big data for transport. Furthermore, R&D of automated driving systems have been promoted as one of the Strategic Innovation Promotion Programs in the Cabinet Office since 2014, called as "SIP-adus". The second phase of SIP-adus started in 2018; currently field operational tests (FOTs) in the Tokyo Waterfront Area have been conducted since 2019.

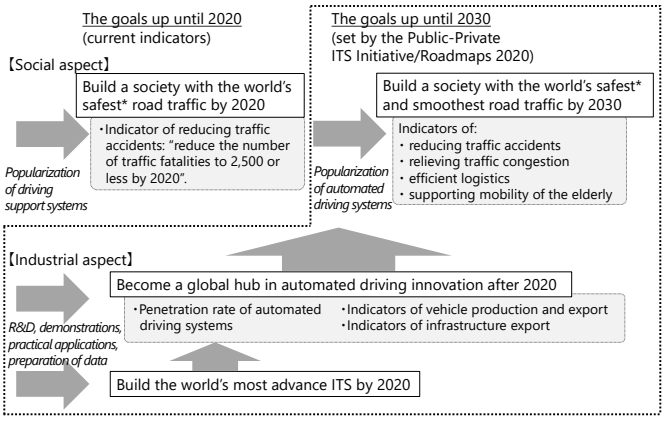
☐ "Public-Private ITS Initiative/Roadmaps 2020" delivers the visions for 2030 for the ITS development in rural areas, urban areas with private cars as major means of transport, and urban areas with public transport as major means of transport, based on their different mobility needs and problems. It also declares the goals on social and industrial aspects to realize the visions.

Figure 1 Vision of 2030 in Rural Areas



Source: Public-Private ITS Initiative/Roadmaps 2020 (translated by the authors)

Figure 2 Goals and Key Indicators

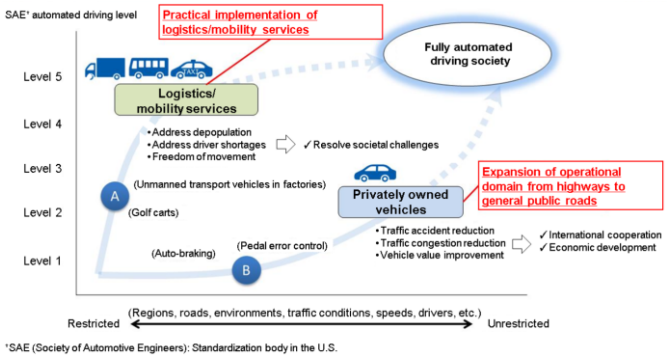


* To have the smallest number of traffic fatalities per population in the world.

Source: Public-Private ITS Initiative/Roadmaps 2020 (translated by the authors)

Figure 3 Two Approaches towards a Fully Automated Driving Society

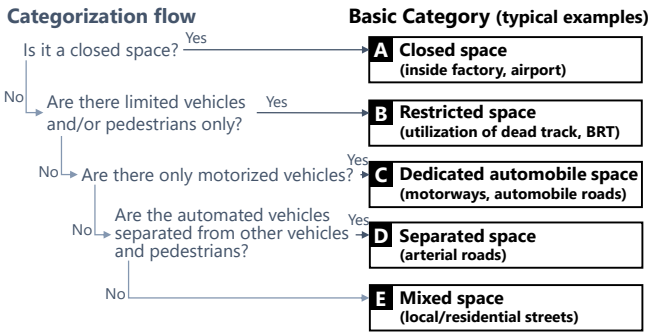
■ The aims of the second phase of SIP-adus, which started in 2018, are to implement logistics and mobility services using automated driving technologies in practice, and to expand the operational domain of automated driving systems from highways to general public roads. R&D are in progress from the two approaches: realizing "automation" of driving tasks under the limited conditions (for logistics and mobility services) and applying more sophisticated technologies for driving systems to deal with "various environments" (for private cars).



Source: SIP-adus

Figure 4 Driving Conditions for Automated Vehicles

■ Driving conditions of automated vehicles are determined by five basic categories and additional supplemental factors according to the Panel on Business Strategies for Automated Driving (METI and MLIT).



* Categories of A~E represent basic differences of their conditions, but other factors, typically shown below as the additional factors, also affects actual driving conditions. Therefore, A~E do not necessarily mean relative difficulties in realizing automated driving.

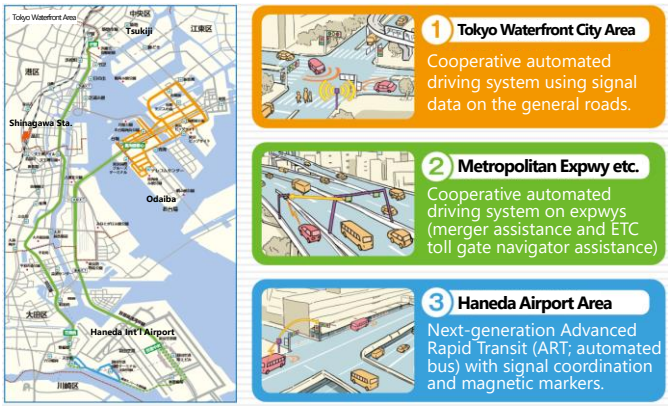
Additional major factors			
Speed	**Topography**	**Road**	
Automated driving speed (low/mid/high)	Area type (urban/ mountainous/...), Gradient, Curvature	Number of lanes, Presence of sidewalks, Pavement marking, Surface conditions (dry/wet/snow...)	
Environment	**Traffic condition**	**Time of day**	
Weather, Disaster impact, Lighting	Traffic volume, Congestion On-street parking volume, Obstacles on the road	Day-time/night-time	

Source: MLIT (translated and partially modified by the authors)

☐ FOTs in the Tokyo Waterfront Area were started in October 2019 in the second phase of SIP-adus. Validation of automated driving technologies based on the high-precision 3D map data (static information) as well as expressway merging conditions, traffic congestion, and traffic signal control information (dynamic and semi-dynamic information) will be done step by step.

Figure 5 FOTs in the Tokyo Waterfront Area

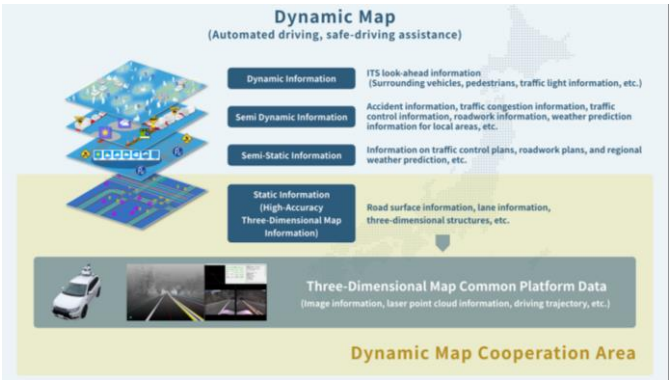
■ 29 organizations, including automobile manufacturers, suppliers, and universities in Japan and other countries take part in the FOTs.



Source: SIP-adus (translated by the authors)

Figure 6 Development of High-Precision 3D Map Data

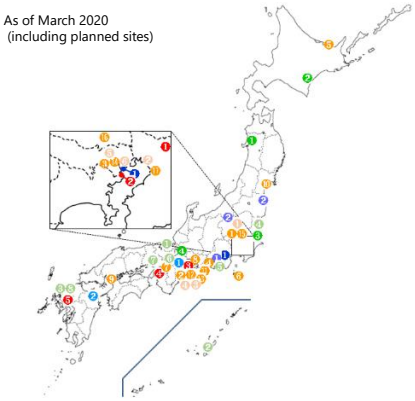
■ Initial preparation of the data for 29,205 km of the expressways and highways across Japan was completed in 2019. The data are now used for highly accuracy navigation, ADAS and automated driving applications.



Source: Dynamic Map Platform Co., Ltd.

Figure 7 FOTs of Automated Driving in Japan

■ FOTs are planned/under execution by relevant ministries, local municipalities, private companies, universities, etc., for different purposes such as technology validation, mobility services in depopulated and aging mountainous villages, mobility services for a last one-mile, improving logistics efficiency, etc.



Automated driving service around Michi-no-Eki (MLIT/SIP)
1Kamikoani, Akita 2Taiki, Hokkaido 3Hitachiota, Ibaraki 4Higashiomi, Shiga

Smart mobility challenge (METI & MLIT) 1Otsu, Shiga 2Oita, Oita

SIP projects (Cabinet Office) 1Tokyo Waterfront Area

Automated driving for last one-mile (MLIT & METI)
1Eiheiji, Fukui 2Kitadani, Okinawa

Automated middle-size bus (MLIT & METI)
3 8Kitakyushu and Kanda, Fukuoka 4Hitachi, Ibaraki 5Yokohama, Kanagawa 6Otsu, Shiga 7Mita, Hyogo

Truck platooning (MLIT & METI)
1Shi-Tomei Expwy (E1A) 2Joshin-etsu Expwy (E18) and Joban Expwy (E6)

Automated driving inside restricted area of an airport (MLIT)
1Narita airport 2Haneda airport 3Chubu airport 4Kansai airport 5Saga airport

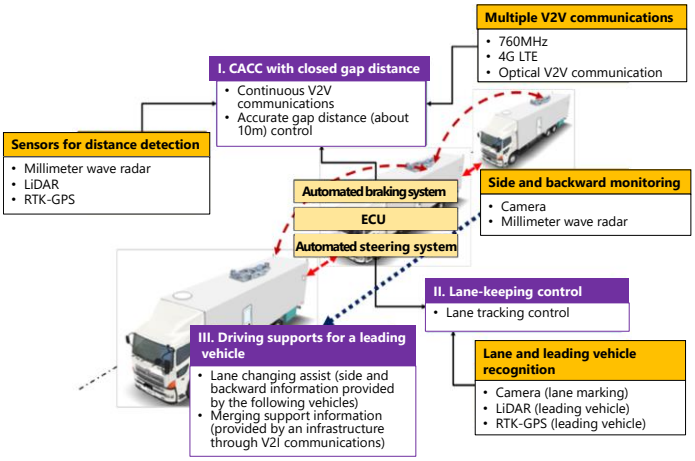
Smart city (MLIT)
1Utsunomiya, Tochigi 2Kashiwa, Chiba 3Shimoda, Shizuoka 4Kasugai, Aichi 5Chiyoda, Tokyo 6Koto, Tokyo

Major FOTs done by local municipalities, private organizations, and universities
1Kiryu, Gunma 2Kuwana, Mie 3Minato, Tokyo 4Iwata, Shizuoka 5Shari, Hokkaido 6Hachijo-island, Tokyo 7Sakai, Osaka 8Nagakute, Aichi 9Hiroshima, Hiroshima 10JR Kesennuma line 11Matsuzaki, Shimoda, and Fukuroi, Shizuoka 12Tobishima, Aichi 13Minamichita, Aichi 14Chuo and Chiyoda, Tokyo 15Maebashi, Gunma 16Kawaguchi, Saitama 17Chiba, Chiba

Source: Public-Private ITS Initiative/Roadmaps 2020 (modified and translated by the authors)

Figure 8 Truck Platooning on Expressways

■ Driverless truck platooning systems have been tested in the actual field, Shin-Tomei Expressway (E1A), since 2019.



Source: METI (translated by the authors)

Figure 9 Public-private Cooperative Platform for Smart Cities

■ A platform for smart cities, which incorporate AI and IoT technologies into urban development, was established by ministries, local municipalities, private companies, research institutes, etc.

Source: Public-private cooperative platform for smart cities

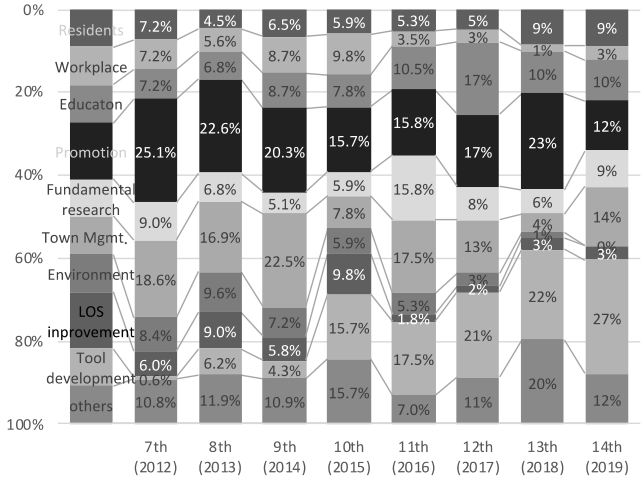
2-8 Recent Trends in TDM and Mobility Management Measures

National Institute of Technology, Kure College
Yusuke Kanda

Since the latter half of the 2000s, mobility management (MM) has been implemented in Japan, which emphasizes communication to promote socially preferable behavior. It has been developed in Japan as a measure against traffic congestion and a measure to promote the use of public transportation. Recently, it has been applied to various problems in transportation and city management, and along with discussions on the sophistication of IT and IoT and the introduction of MaaS, the development of MM tools is now progressing. In addition, MM is also applied to promote raise the travel demand, which is excessively shrinking due to the COVID-19.

Figure 1 Trends of MM Presentations in JCOMM

- In the latter half of the 2000s, when MM was positioned as a national and local government policy and began to be introduced, MM had been applied to residents and workplace to reduce car use. Recently, presentations related to updating digitalized MM tools, open-data and data-linkage, MM in overseas projects have increased.



Source: Japanese Conference of Mobility Management (JCOMM)

Table 1 Session Topics of Recent JCOMM Conferences

- In the discussions on MM in Japan, "strategy" and "subject" are continuously discussed, and recently, the possibility of integration with digital tools such as "MaaS", the basic approach of MM, and regional improvement are being discussed.

FY	Special and Oral session titles of JCOMM
2015	MM and Design // MM and IT MM and improvement of LoS of railway and bus
2016	MM and movement of socials MM and big data Past and future of MM
2017	MM and utilization of open-data QoL of Seniors and MM Rethinking the role of MM for improving local mobility
2018	Overview of future mobility service and MM Health, mobility and town management
2019	MM and MaaS Informatization, open-data and MM Rethinking MM's basic approach from overseas cases

Source: Japanese Conference of Mobility Management (JCOMM)

Table 2 Discussion of MM in ECOMM

- At the ECOMM (European Conference on Mobility Management), annual MM conference held in Europe, methodologies for the social implementation of new mobility systems such as electric vehicles, hardware development, and transportation policies are discussed. Also, at the latest meeting, the possibility of MM for better town development has been discussed. In 2020, it will be held online due to the influence of COVID-19. Main topics of discussions were MaaS and sharing, and the utilization of the "Nudge Theory", which won the Nobel Prize.

FY	Theme of ECOMM
2016	Smart Solutions for People and Cities
2017	Teaming up for liveable cities
2018	Mobility in disruption – fast-forward to smart and sustainable societies
2019	Cancelled
2020	New Mobility… New Governance… New Realities for People and Cities -

Figure 2 Overseas Expansion of Japanese MM Skills

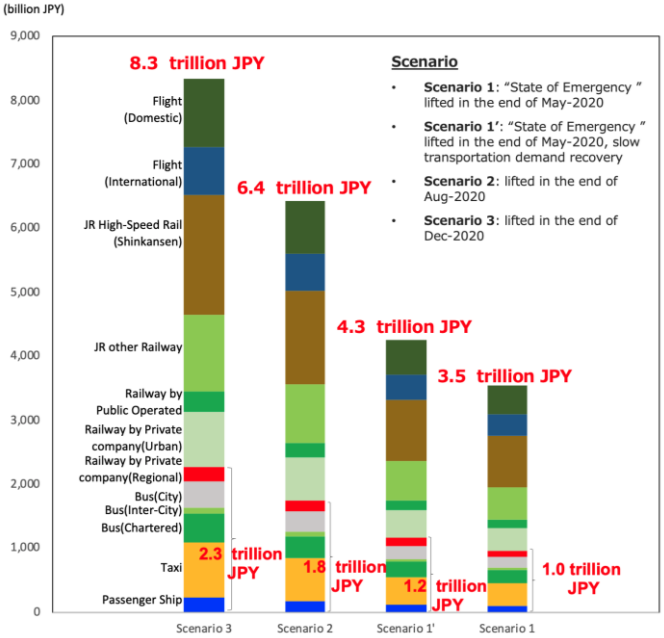
- Traffic congestion has been a big problem in Southeast Asian countries where economic development and modal shift to automobiles continue. As countermeasures, improvements in the attractiveness of public transportation such as buses (photo: utilization of buses donated by the Kyoto Municipal Transportation Bureau) and motivation for using public transportation utilizing MM measures are being conducted in various places.

Source: Japan International Cooperation Agency (JICA)

☐ In 2020, intercity and intracity transportation services throughout the country were significantly affected by COVID-19. In present, it is difficult to foresee convergence of COVID-19. However, MM have been introduced to mitigate the effects of excessive demand restraint.

Figure 3 Estimated Loss of Annual Fare Income Affected by COVID-19

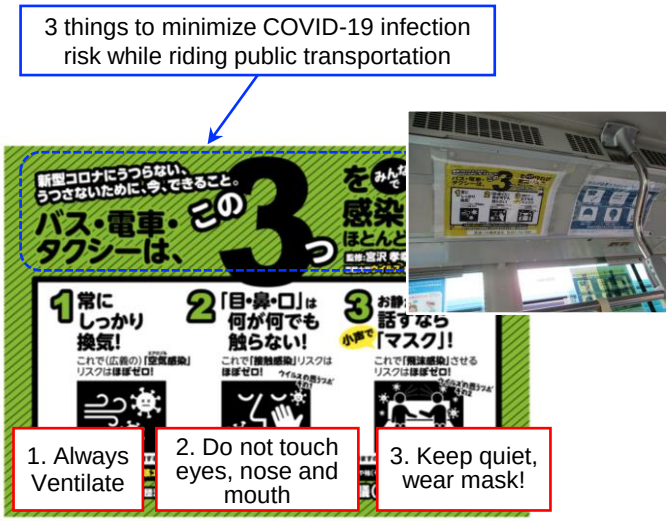
■ Due to the spread of COVID-19 and the government's request for going-out self-restriction, the travel demand has decreased significantly, with about 90% decrease for intercity transportation, and about 60% decrease for intracity transportation. As a result, management of public transportation is in a critical situation.



Source: Japanese Conference of Mobility Management (JCOMM)

Figure 4 Promoting to Use Public Transportation with Properly Understanding the Risks of COVID-19

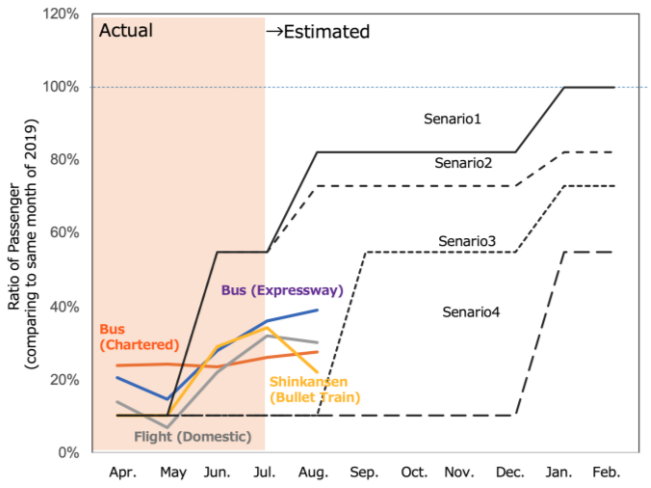
■ Due to the spread of COVID-19, people refrained from going out. In addition, public transportation, which many unspecified people use and a high density in the transit, has been shunned as one of the "three Cs", To address this issue, mobility management is being developed to properly understand the risks of COVID-19 and promote the use of public transport, with the supervision of virology experts.



Source: Japanese Conference of Mobility Management (JCOMM)

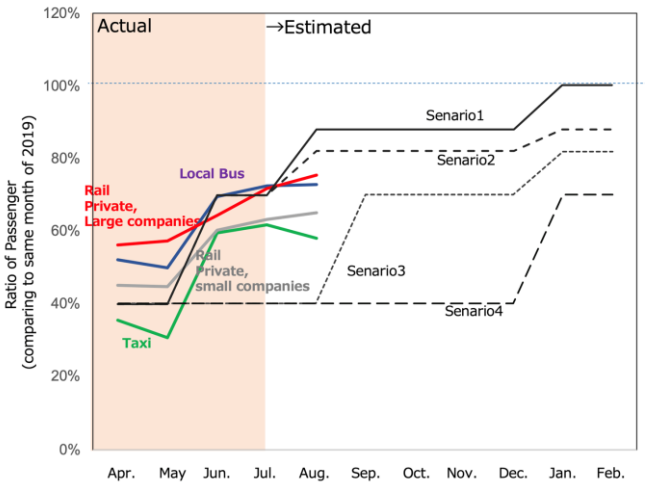
☐ Due to the spread of COVID-19, the government has adopted a going-out self-restriction policy for about a month from April 2020. After the policy was relaxed, the negative impact of this policy can still be observed. In particular, it has had a large impact on business and tourism travel demand, it has seriously affected the profitability of intercity transportation. It is not expected that the travel demand will return to pre-COVID-19 levels.

Figure 5 Decrease and Recovery for Intercity Transportation



Source: MLIT-Japan, JR-Tokai

Figure 6 Decrease and Recovery for Intracity Transportation



Source: MLIT-Japan