Economic Benefits of Advanced Driver Assistance Systems (ADAS)

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Road Traffic Accidents in Japan

Reduction of economic losses of secondary parties will be needed to reduce economic losses due to road traffic accidents further more. Diffusion of ADAS or automated vehicles is essential.

Economic Losses for a Victim (at 2012 prices)

Thousand yen at 2015 prices (Thousand yen at 2012 prices)

Thousand yen ≒ 9.1 at the rate of 110 Japanese Yen to USD

	Death	Serious Injury	Slight Injury
Monetary Losses	31,122	9,546	1,599
	(30,166)	(9,252)	(1,550)
Non-monetary losses	210,326	8,479	234
	(203,865)	(8,219)	(227)
Total	241,449	18,025	1,833
	(234,031)	(17,471)	(1,776)

Source: Calculated by author in reference to Cabinet Office, Government of Japan, *Report of the Survey on Economic Analysis on the Damage and Loss of Road Traffic Accidents*, March 2012 (in Japanese)

Monetary Losses

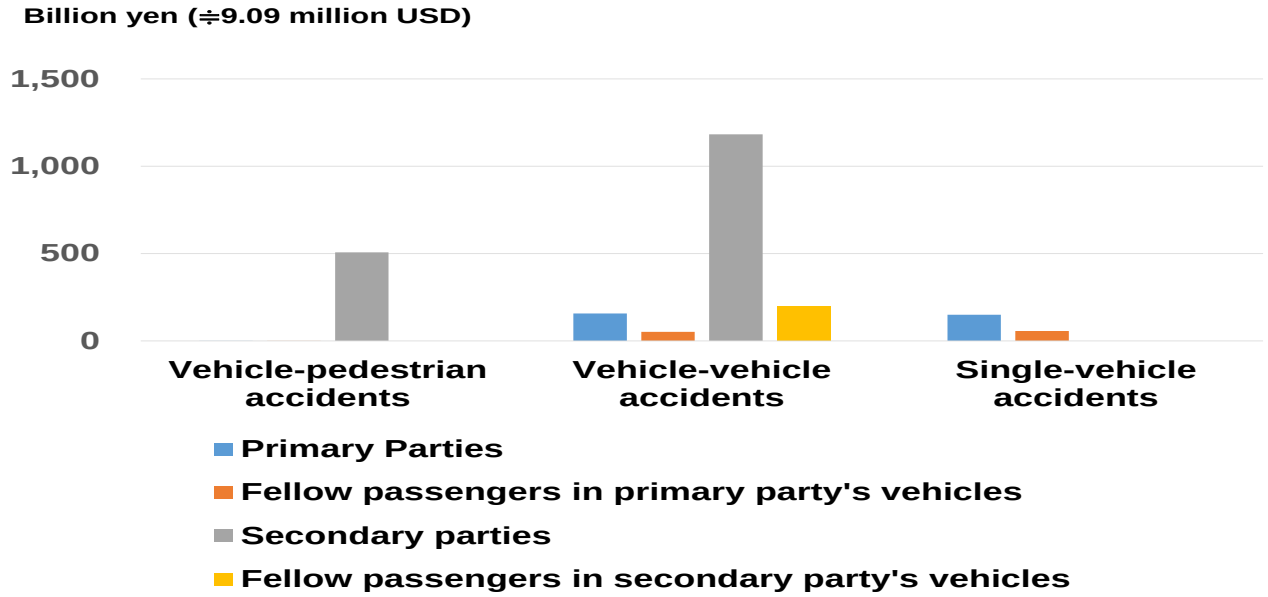
- **Personal losses**: e.g., medical expenses and lost wage for missed work.
- **Material losses**: e.g., damage to vehicles or structures requiring repairs.
- **Losses incurred by corporate entities**
- **Losses incurred by various public institutions**

Non-monetary Losses

- Physical or emotional suffering on the part of victims (included),
- Emotional pain and suffering experienced by the families and friends of the victims (*not included*),
- Psychological burdens experienced by the persons responsible for causing the accident, as well as their families and friends (*not included*),.

Economic Losses by Accident Type

Economic Losses by Accident Type in 2015 (at 2015 prices)



Note: The number of traffic accidents whose primary party's vehicle is 4-wheeled are counted.

Source : Calculated by author using data provided by the ITARDA (Institute for Traffic Accident Research and Data Analysis)

2 Economic Features of ADAS

Economic Features of Rear–End Collision Prevention Technologies

System types	New User's Benefit	Externalities	
		Enjoyed by	Contents
Stand alone	Avoidance of collisions *with all vehicles ahead*	*All Vehicles*	Increase of the probability of avoiding collisions with vehicles behind
V2V	Avoidance of collisions *with already equipped vehicles* ahead and behind	*Already equipped vehicles* (Network externality)	Increase of the probability of avoidance of collisions with vehicles ahead and behind

Economic Benefits of ADAS

The average benefit derived from a large and medium-sized vehicle by utilizing rear-end collision prevention technologies should be larger than that derived from a standard-sized vehicle or a light vehicle.

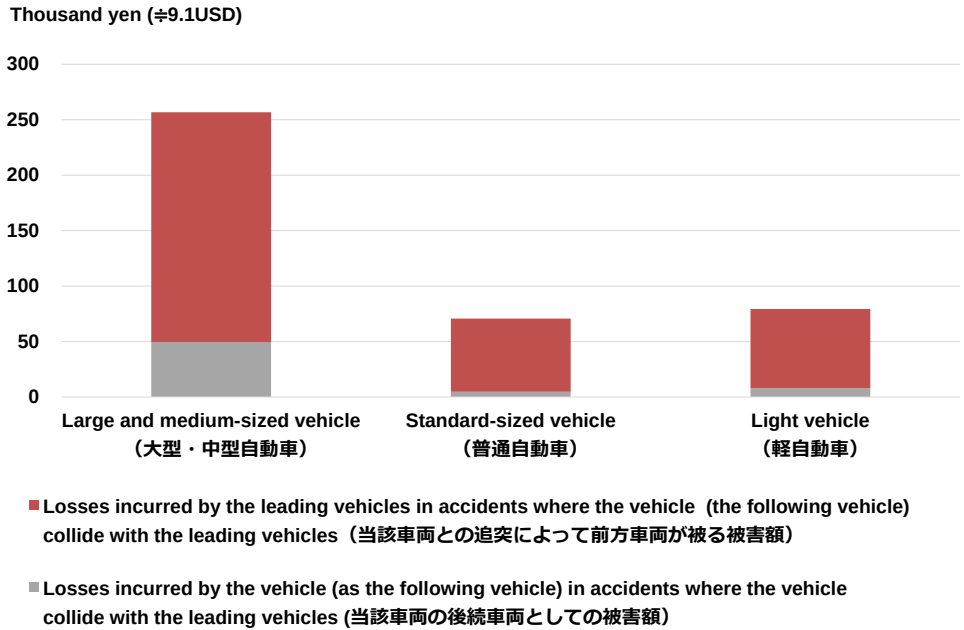
Within the scope of this research, the average benefit by utilizing vehicle-pedestrian accident prevention technologies may be less than that of rear-end collision prevention technologies. Further analysis is needed

Types of Vehicle and Their Average Life Expectancies

Types of vehicles	Average life expectancies
Large and medium-sized vehicle （大型・中型自動車）	19.0
Standard-sized vehicle （普通自動車）	12.6
Light vehicle （軽自動車）	15.8

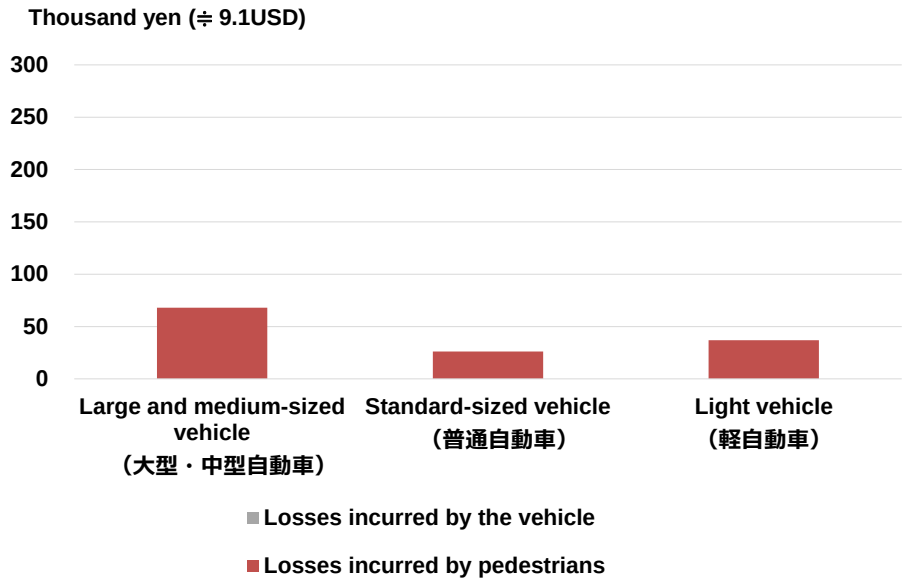
Note: Classification of vehicle is based on Japanese Road Traffic Act
Source : Calculated by author

Economic Losses per Vehicle during the Average Life Expectancy: Rear-end Collisions



Note 1: Rear-end collisions between 4-wheeled vehicles are subjected to estimation
Note 2: Values denote discounted present values (the discount rate is 0.04)
Source: Calculated by author using 2012 accident data provided by the ITARDA

Economic Losses per Vehicle during the Average Life Expectancy : Vehicle-Pedestrian Accidents



Note 2: Values denote discounted present values (the discount rate is 0.04).
Source : Calculated by author using 2012 accident data provided by the ITARDA

Note 1:
Vehicle-pedestrian accidents that satisfy the following 4 conditions *at the same time* are subjected to estimation.

1) Primary party's vehicles: 4-wheeled.
2) State of motion of vehicles : going straight ahead
3) Primary party's human factors causing accidents: looming and inattentive driving, or not confirming safe conditions
4) State of motion of pedestrians : crossing roads

Conclusion

Conclusion

- Reduction of economic losses of secondary parties will be needed to reduce economic losses due to road traffic accidents further more. Diffusion of ADAS or automated vehicles is essential.
- The average benefit derived from a large and medium-sized vehicle by utilizing rear-end collision prevention technologies should be larger than that derived from a standard-sized vehicle or a light vehicle.
- Within the scope of this research, the average benefit by utilizing vehicle-pedestrian accident prevention technologies may be less than that of rear-end collision prevention technologies. Further analysis is needed.


Thank you
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on Connected and Automated Driving Systems