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# **Who Enjoys the Benefits of Automated Driving Systems?**

**3rd SIP-adus Workshop  
on Connected and Automated Driving Systems**

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- **Economic benefits of the automated driving systems will be enjoyed not only by the users but also by many economic entities including non-users, firms, public institutions.**
  - **Magnitude of benefits and their attribution differ depending on utilized technologies.**
  - **Reallocation of benefits and costs burden among the related economic entities will be necessary for facilitating diffusion of the automated driving systems in the society, considering economic features of each technology.**
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内閣府『交通事故の被害・損失の経済分析に関する調査報告書』2012年3月

**Cabinet Office of the Japanese Government (2012), *Report of the Survey on Economic Analysis on the Damage and Loss of Road Traffic Accidents*, March 2012 (in Japanese)**

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# **Classification of Economic Losses due to Road Traffic Accidents 5**

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## ***Monetary Losses***

- 1. Personal losses:** Medical expenses, lost wages due to missed work, etc.
- 2. Material losses:** Damage to vehicles or structures requiring repairs, etc.
- 3. Losses incurred by corporate entities:** Reduction of added value due to missed work, death, or residual disability, etc.
- 4. Losses incurred by various public institutions:** Emergency transportation costs and costs of handling the accident by the police, etc.

## ***Non-monetary Losses***

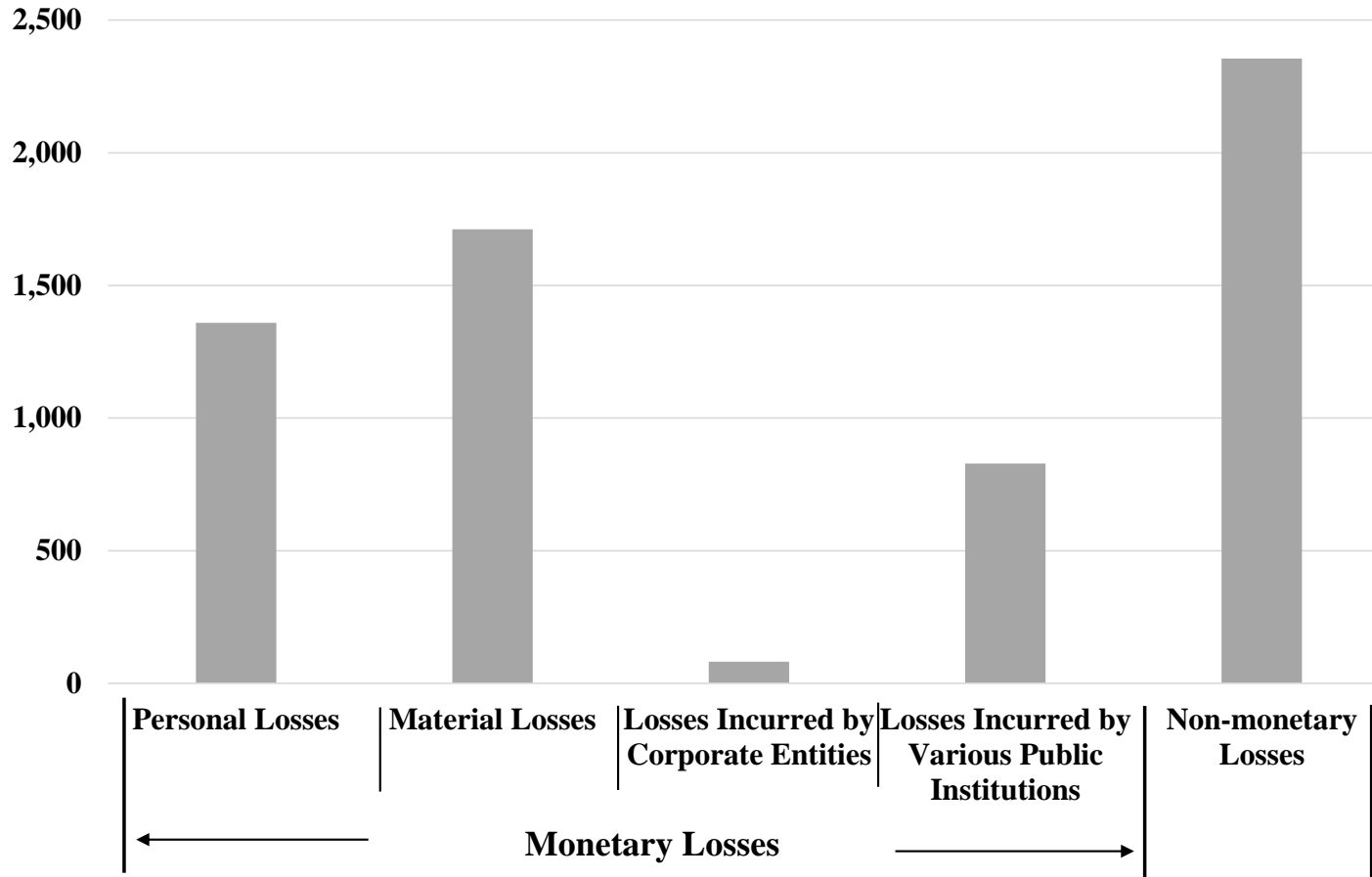
- 1. Physical or emotional suffering stemming from bodily injury or property damage that is endured by the victims of road traffic accidents.**
- 2. Emotional pain and suffering experienced by the families and friends of the victims.**
- 3. Psychological burden on individuals and the families and friends of individuals who are responsible for the accident.**

**Source: Cabinet Office (2012) (slightly modified and translated by author)**

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# Economic Losses due to Road Traffic Accidents in Japan (2009)

Billion JPY ⇌ 9.5 million USD



Source: Prepared by author in reference to the Cabinet Office (2012)

# Economic Losses for a Victim (in 2012 JPY)

Ten thousand yen  $\doteq$  95 dollars

	<b>Deaths</b>	<b>Serious injuries</b>	<b>Slight injuries</b>
<b>Monetary Losses</b>	<b>3,017</b>	<b>925</b>	<b>155</b>
<b>Non-monetary losses</b>	<b>20,387</b>	<b>822</b>	<b>23</b>
<b>Total</b>	<b>23,403</b>	<b>1,747</b>	<b>178</b>

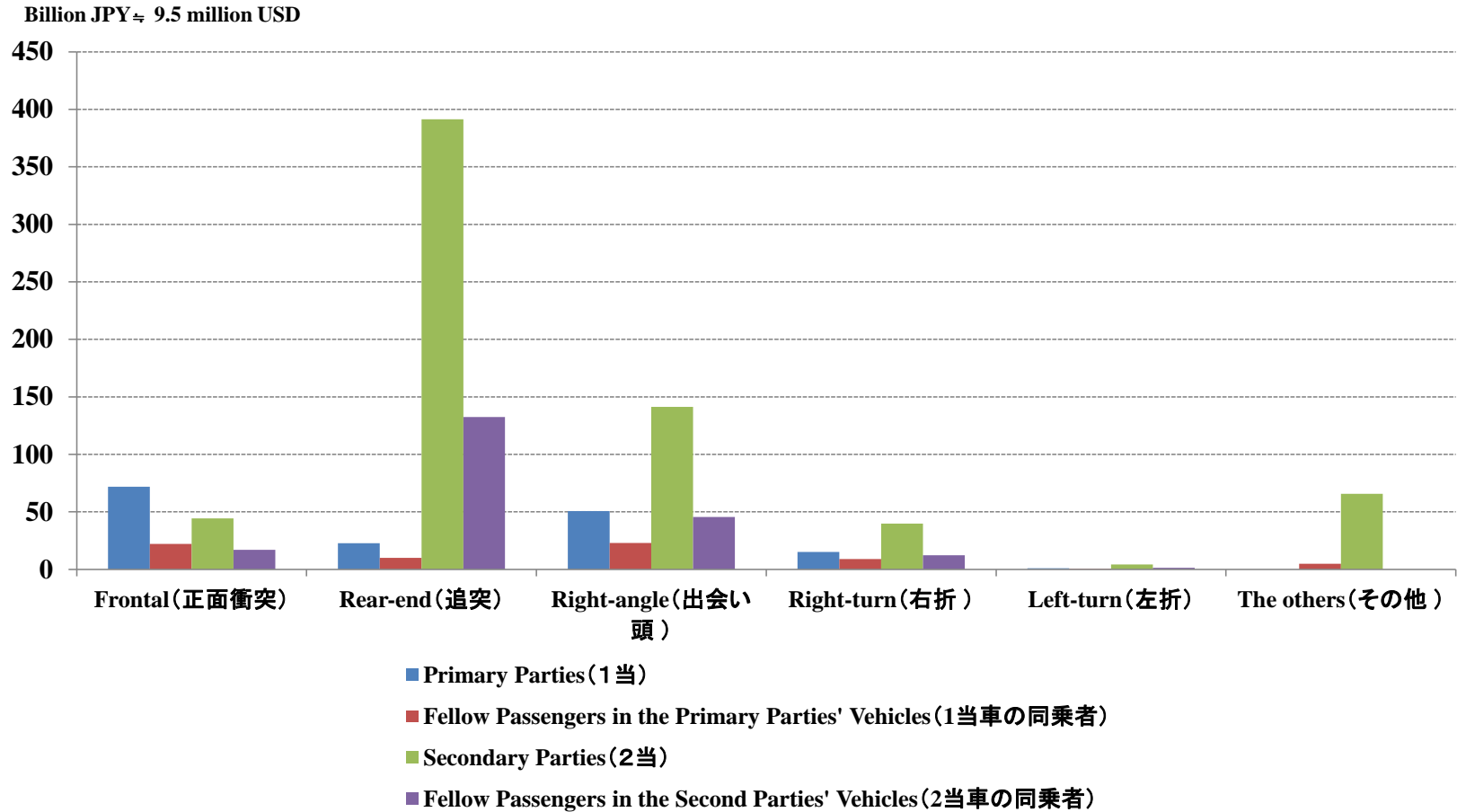
Source: The 2009 values established by the Cabinet Office (2012) are adjusted by using GDP-deflator.

Note 1: “Deaths” are cases in which a traffic accident results in death within 24 hours of the accident. “Serious injuries” are injuries requiring medical treatment for 1 month (30 days) or more. “Slight injuries” are injuries requiring medical treatment for less than 30 days.

Note 2: The Cabinet Office (2012) categorizes injuries into two sectors of “Injuries with residual disability” and “Injuries without residual disability,” while the ITARDA’s Traffic accident data classify injuries into two classes of “Serious injuries” and “Slight injuries.” Here, we have assumed that the ITARDA category of “Serious Injuries” corresponds to “Injuries with residual disability” in the Cabinet Office (2012), while the “Slight Injuries” category corresponds to “Injuries without residual disability” in the Cabinet Office (2012)

# Losses by Accident Type in 2012

## (Accidents between Four-Wheeled Vehicles)



Source : Calculated by author using data provided by ITARDA



**Magnitude of benefits and their attribution differ depending on utilized technologies.**

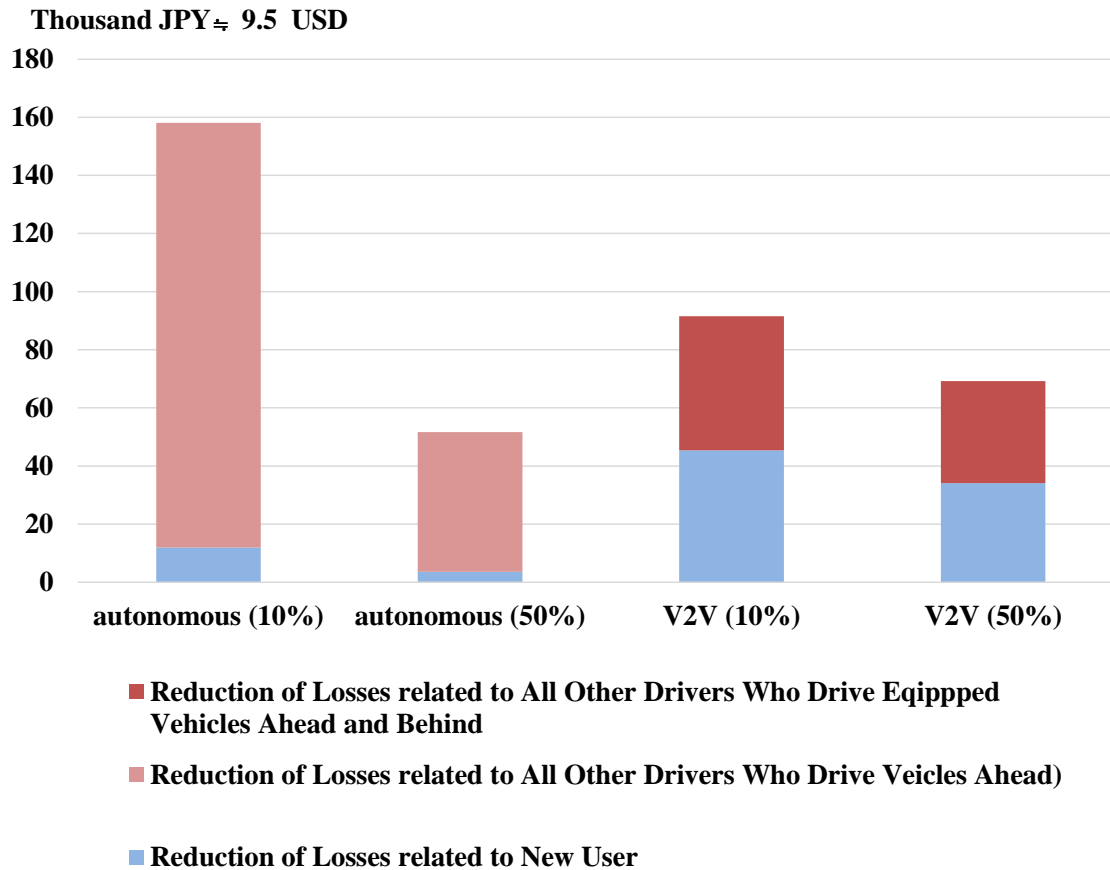
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## Rear-end Collision Prevention

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System types	New User's Benefit	Externalities	
		Enjoyed by	Contents
<b>Autonomous</b>	<b>Avoidance of collisions <i>with all vehicles ahead</i></b>	<b><i>All Vehicles</i></b>	<b>Increase of the probability of avoiding collisions with vehicles behind</b>
<b>Vehicle-to- Vehicle (V2V)</b>	<b>Avoidance of collisions <i>with already equipped vehicles ahead and behind</i></b>	<b><i>Already equipped vehicles</i> (Network externality)</b>	<b>Increase of the probability of avoidance of collisions with vehicles ahead and behind</b>

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**Note: Benefits enjoyed by a passenger car during the average life expectancy under the condition that other types of vehicles are not equipped**

**Source : Estimated by author using traffic accident data provided by ITARDA**

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**Thank you for your kind attention!**

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