



Social Implementation of Information-Sharing Road Safety Measures: Case Study of Thailand

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Introduction



Current Problem

- According to the WHO reports, fatalities by road traffic accidents in many countries of Southeast Asia region, especially Thailand, are increasing year by year.
- To overcome these serious problems, the Thai government is focusing on road safety measures.
- The MLIT and the JICA in Japan have begun active support based on their past experiences in reducing the number of fatalities in road accidents in Japan.
- However, even if successful road safety measures in Japan are adopted in Thailand, it is uncertain whether it will work well.
- It is necessary to clarify the issues and systematize the process for implementing road safety measures in Thailand.

Research Purpose

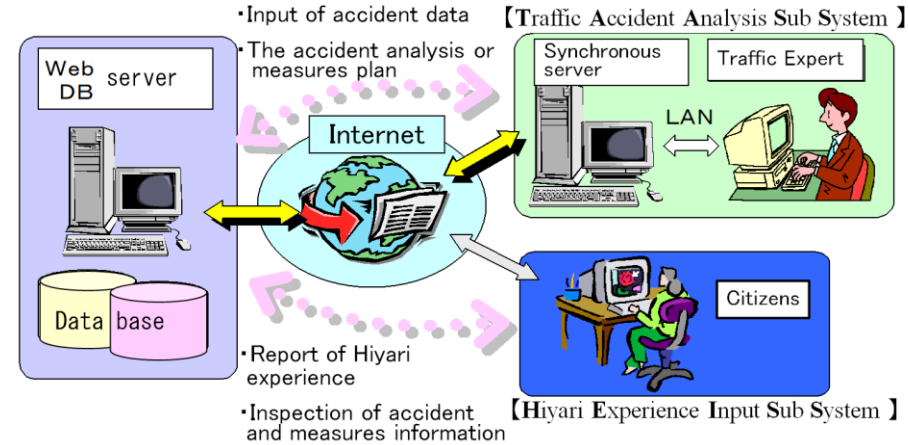
This study aims to apply the "information-sharing traffic safety measure," one of the successful road safety measures in Japan, to the social implementation of road safety measures in Thailand.



What is “Information-Sharing Road Safety Measure”?

- A process by which the data of road traffic accidents and road traffic safety countermeasures are collected and shared among stakeholders.
- Integration of the management data of road traffic accidents and Hiyari experience data collected from citizens using the web GIS technology.
- Related parties can share Hiyari experience and traffic accident data to find effective road traffic safety measures and provide feedback on the results.

*Hiyari/Hiyari-Hatto: Japanese term that describes the incidences, near-misses, or risks that have been used as safety precaution procedures.



Traffic Safety Measure Support System



Literature Review

- **Timmermans et al. (2019): Traffic accident countermeasures identifying the high potential areas with traffic accidents**

Analyzed crash data from 2010 to 2016 to evaluate the road traffic crash (RTC) rate over time and understand the influencing factors related to the frequency of RTCs.

- **Howat et al. (2001): Conceptual frameworks of road safety measures**

Discussed a road safety measure framework based on community participation and identified the barriers to community participation in road safety activities.

- **Sigua and Palmiano (2005): Road safety assessments in ASEAN countries**

Summarized the issues and concerns of the 10 ASEAN countries regarding road safety, analyzed the significant causes of accidents and trends in the number of casualties based on population, GDP, and vehicle registration.

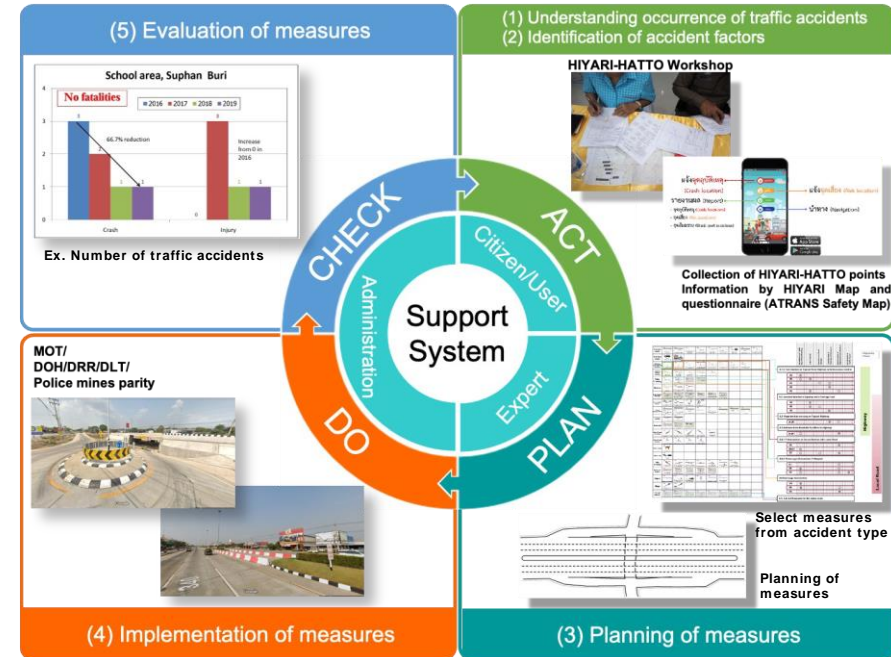


- Many studies have analyzed potential black spots using data such as Hiyari experiences.
- There are few attempts in which stakeholders hold a road safety workshop, share information with each agency, and formulate and implement road safety measures in actual societies, especially ASEAN countries.



Methodology: Overview

- Applied the process framework as a PDCA (Plan, Do, Check, and Action) cycle to cases in Suphanburi, Thailand, in the form of critical points for analyzing traffic accidents and developed countermeasures based on the experiences in Japan.
- The five steps: (1) understanding the occurrence of traffic accidents, (2) identifying the accident factors, (3) planning of measures, (4) implementation of measures, (5) evaluation of measures.
- This study proposed that residents, municipalities, and experts should jointly implement traffic safety countermeasures based on the PDCA cycle to succeed in the social implementation of information-sharing road safety measures.
- Finally, this study proposed a method for implementing appropriate road safety measures for hazardous spots and clarified the issues and limitations of applying the “Hiyari-Hatto” method based on Hiyari experiences data obtained from the residents/communities.



PDCA Cycle for the social implementation of the road safety measure



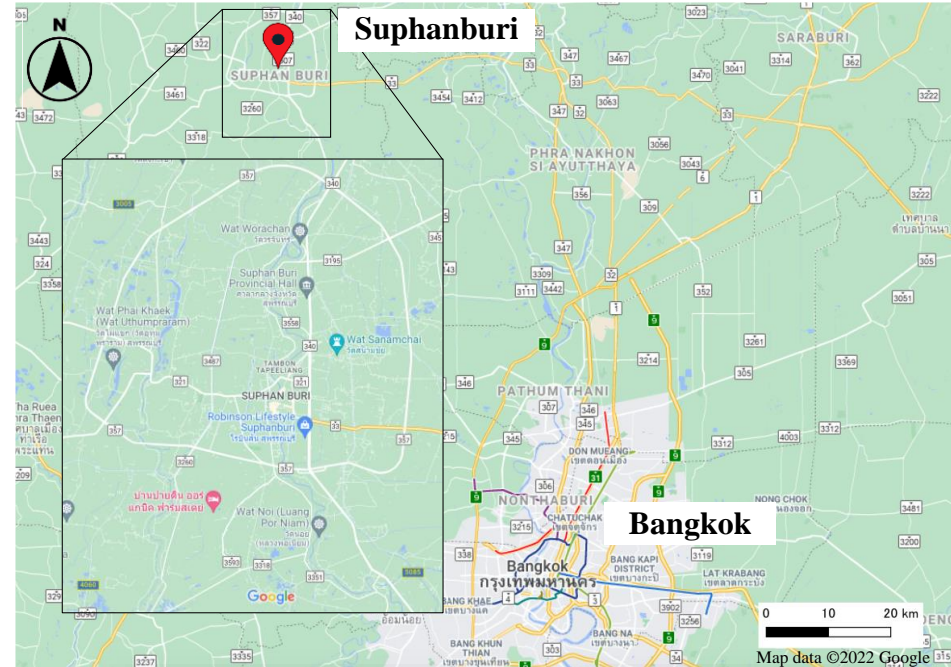
Methodology: Study area

Suphanburi, Thailand

- This city is focusing on the road segments in this province located 114 km away from Bangkok along the northwest direction.
- Suphanburi is a district with strong collaboration among stakeholders and cooperative implementation of road safety measures.
- Road safety initiatives by the MOT* and the MLIT** started in November 2016 (Road safety workshops have already been held nine times).

*MOT: Ministry of Transport (Thailand)

**MLIT: Ministry of Land, Infrastructure, Transport and Tourism (Japan)

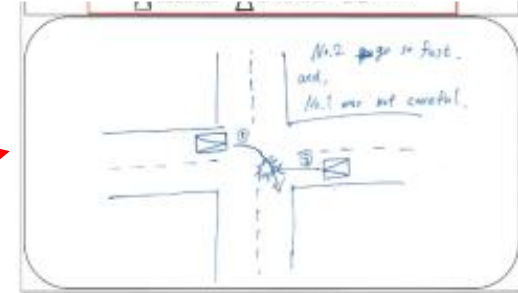




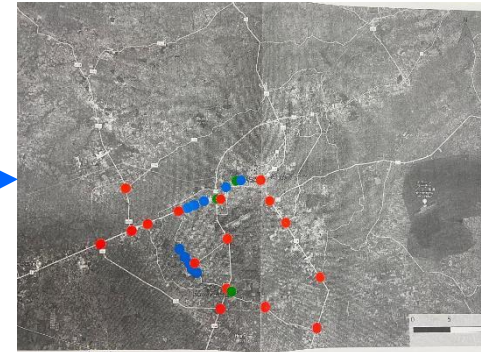
Methodology: Data collection

Collection of Hiyari-Hatto Data at Workshops

- The Hiyari-Hatto data was collected at several one-day workshops held in Suphanburi from 2017 to 2019, which described detailed information regarding where, when, and how the Hiyari-Hatto events occurred.
- Participants: 40 individuals with local authorities and residents.



Questionnaire Survey



Hiyari Map



Methodology: Data collection

Hiyari-Hatto Data from the ATRANS Safety Map App

- The App comprises 4 functions: (1) crash location data, (2) risk location data, (3) data analysis report, (4) navigation.
- In the case of Suphanburi, we provided guidance to participants on how to use the App in the Hiyari map development workshop and asked them to report their Hiyari-Hatto experiences.

Traffic Accident Information

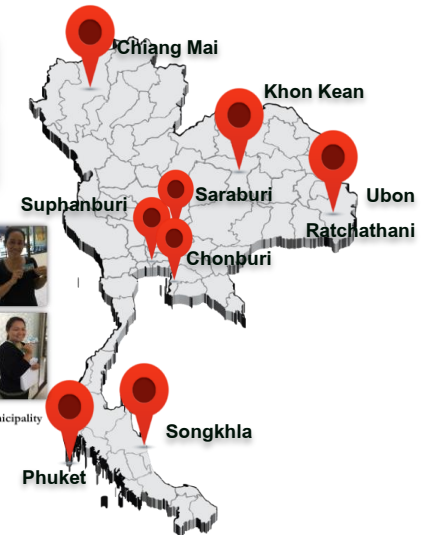
Hiyari-Hatto Information

Results

Navigation



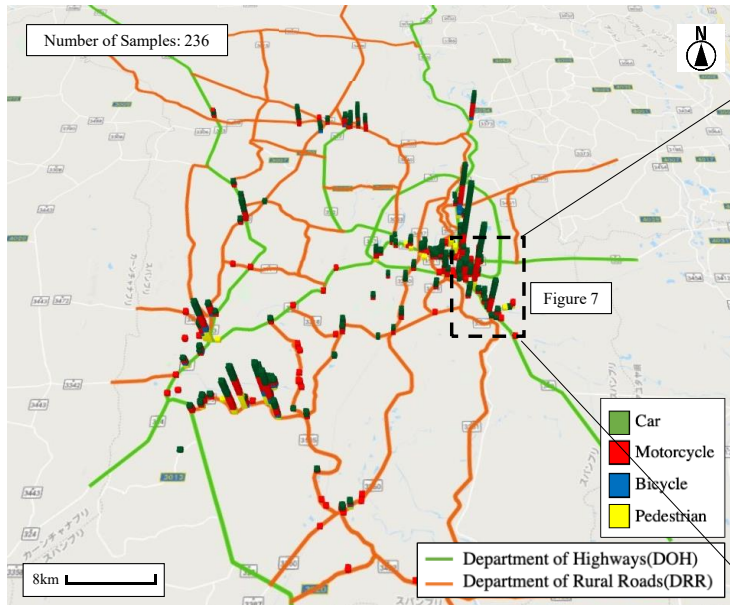
Implementation



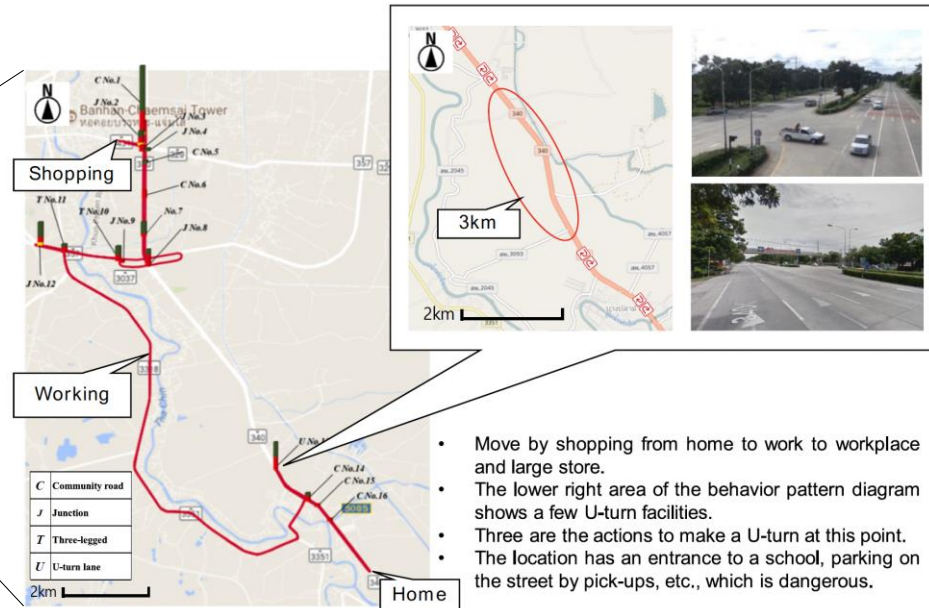


Results: Hiyari-Hatto locations

- The locations where a relatively large number of Hiyari-Hatto events occur are dominated by cars, motorcycles, and pedestrians as a characteristic point because the spot is a potential black spot. -> Should be prioritized for road safety measures.
- e.g., to enter the national highway's mainline from the nearest interchange, there were several cases of people driving in the opposite direction, causing more Hiyari-Hatto at intersections, U-turns, or junctions clearer.



Number of Hiyari-Hatto Occasions and Their Locations Using GIS



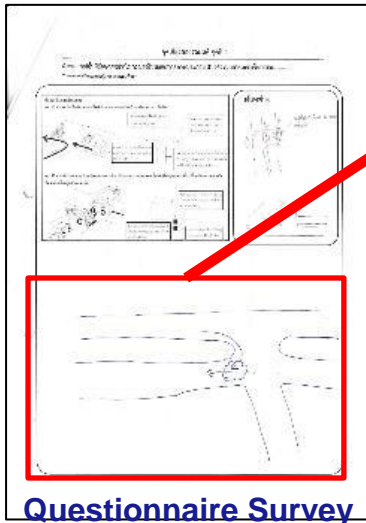
Relationship between Hiyari-Hatto occasion points and the people's daily activities

- Move by shopping from home to work to workplace and large store.
- The lower right area of the behavior pattern diagram shows a few U-turn facilities.
- Three are the actions to make a U-turn at this point.
- The location has an entrance to a school, parking on the street by pick-ups, etc., which is dangerous.



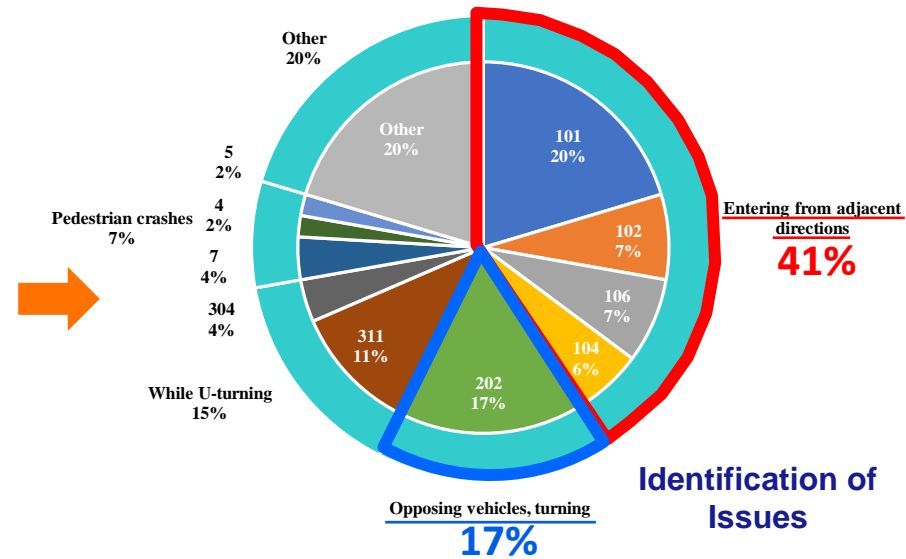
Results: Hiyari-Hatto experiences

- The collision diagram to classify the Hiyari-Hatto experiences based on the road accident classification table by the MOT.
- The original collision diagram considering the lack of characteristic events and classified Hiyari-Hatto events into 20 collision types using the collision diagram.
- Added the collision type of U-turn in the diagram considering several Hiyari-Hatto events occurred at U-turn lanes of Suphanburi.



Classification of Hiyari-Hatto Events

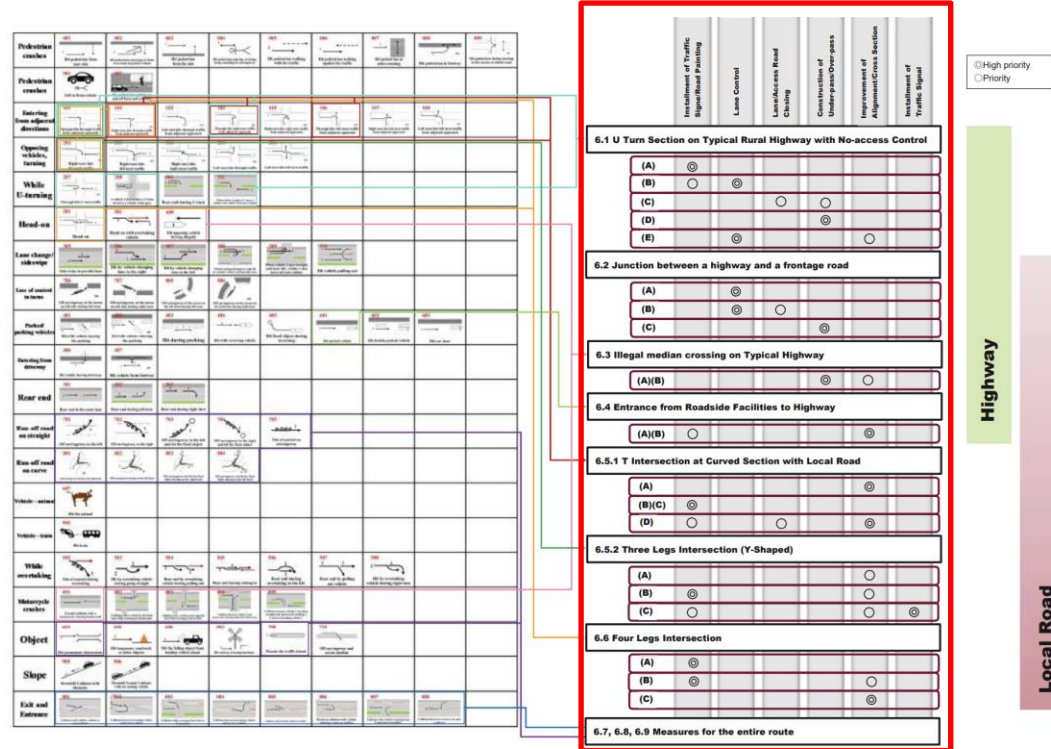
Pedestrian crashes	[Diagram]	[Description]	[Diagram]	[Description]
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Entering from adjacent directions	[Diagram]	[Description]	[Diagram]	[Description]
Opposing vehicles, turning	[Diagram]	[Description]	[Diagram]	[Description]
While U-turning	[Diagram]	[Description]	[Diagram]	[Description]
Other	[Diagram]	[Description]	[Diagram]	[Description]
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Results: Appropriate road safety measures

- This study proposed appropriate road safety measures to reduce traffic accident risks after identifying the black spots by analyzing the Hiyari-Hatto experiences and classifying them into collision types using the collision diagram.
- This diagram systematically summarizes a collision diagram to identify each road accident risk factor and classify the 8 road sections (black spots), including the U-turn section, junction, median, and entrance to roadside facilities.

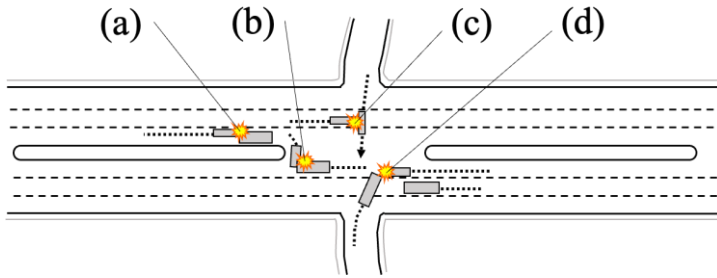


Selection of Appropriate Road Safety Measures based on Collision Diagram



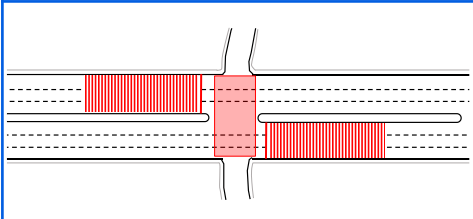
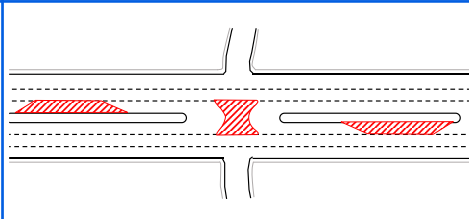
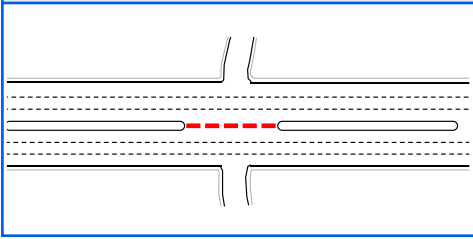
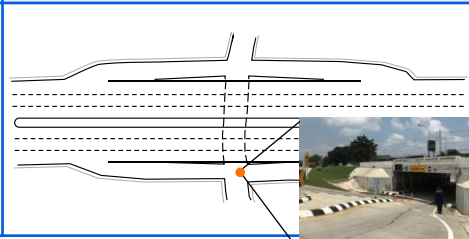
Example of Appropriate Road Safety Measures

- The procedure of selecting the road safety measures for the U-turn section on a typical rural highway without access control.
- Hiyari-Hatto experiences and traffic accidents occurred at the road section near the U-turn sections in Suphanburi.



- A rear-end collision with a car coming at high speed from behind at U-turn lane
- A collision accident at the U-turn section by a car coming from the opposite lane
- The cars entering the community road from the U-turn lane or crossing the highway connected to the U-turn section
- Multiple cars or motorcycles may enter the blind spot, resulting in a U-turn or crossing



(A) Laying rumble strips and road markings	(B) Laying U-turn lane and road marking
	
(C) Closing U-turn section	(D) Laying a frontage road paralleled with a road and closing U-turn lane
	

Conclusion

Discussion

- The “information sharing road traffic safety measure” method enhances the stakeholders from government sectors, academia, local citizens/residents/communities, and the private sector sharing road safety information based on their Hiyari-Hatto experiences by identifying and clarifying particular problems at near-miss and black spots and selecting appropriate road safety measures to suit the local circumstances of the targeted areas.
- Data collection/acquisition via the Hiyari-Hatto method can be helpful to any developing country where there are inefficient and insufficient road traffic accident data because developing a system for acquiring and analyzing data regarding road safety measures is useful.

Limitation and Further Studies

- Lacking collaboration among stakeholders at an early stage.
- Difficulty developing systems for acquiring data such as road traffic accidents and Hiyari-Hatto.
- Delay in Actual implementation of road safety measures at the road sections caused by different road administrators.
- Privacy issues in terms of personal information and how much information can be shared among stakeholders.

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THANK YOU

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