HOW CAN ISA BE INTRODUCED IN JAPAN?: RESEARCH CONDITION, LATENT POSSIBILITY OF ACCEPTANCE AND SUPPOSED PROCESS OF ACTUALIZATION

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ABSTRACT

1. ISA in Japan. Japanese interest in ITS has been focused on highly automated driving equipment for hands-free cruising or proximity monitoring etc. However, although the technology has been largely perfected, such systems have so far proved too expensive for actual implementation in existing traffic systems. They are out of step with the reality of current daily life, and thus do not appear a promising method to suppress accidents in the near future. On the other hand, although it is not a major trend, one kind of speed limiting system has already been implemented. In September 2001, a new regulation was introduced that every heavy truck has to be fitted with a speed limiter which restricts the maximum speed on a highway to 90 km/h. All heavy trucks will have to have the equipment by their first inspection after September 2004. Another example is a field experiment of a system controlling speed in specified areas such as the environs of schools, which will be started by the Ministry of Land, Infrastructure and Transport. The maximum speed of cars is regulated using GPS or transponders on the road. The experiment will begin in 2002 and last three years.

2. People’s attitudes to ISA. Ordinary people’s attitudes regarding ISA have an important role in implementing the system in society. Some surveys have been conducted with a variety of social classes. The results revealed that many are in favor of the system while a small number opposed it strongly. There were some differences in their attitude depending on the kind of ISA. Positive attitudes increased when the estimated number of lives saved by ISA was given in the questionnaire.

3. ISA Implementation Process. The mass media could play an important part in the introduction of ISA. If an influential TV station like NHK broadcast a special program on ISA as a critical measure against fatal traffic accidents, and successive arguments were repeated by a variety of mass media within a limited period, some politicians or government officials might take up the problem. And if the trend of public opinion showed a positive attitude, ISA legislation would be easily accepted.

4. Learning From the Swedish Approach. The Swedish Government set a goal in 1997 to reduce the number of deaths and serious injuries in traffic accidents, ultimately to 0, which is called nollvisionen (Vision Zero). The budget for the project was 7,500,000 krone (1,000,000,000 yen). The background to support for such a policy may be that respect for human rights and logical stance in tackling problems. The ISA field experiment project based
on nollvisionen has the background of very simple and clear reasoning regarding the relationship between the speed factor and traffic accidents. We should learn from their attitude and search for realistic measures. ISA could be one critical option for this.

**ISA (INTELLIGENT SPEED ADAPTATION) IN JAPAN**

ISA can be considered a kind of ITS (Intelligent Transport System). Though the development of ITS research in Japan will not be discussed in detail here, it is not regarded as a realistic measure for the suppression of accidents. Safety is among the aims of its development, but generally it is just an ideal model for a pleasant and efficient traffic system, and its potential for implementation is not sufficient to manage the present situation of traffic accidents. The cost of the infrastructure needed for hands-free automated cruising would limit its availability to only a part of all roads, such as expressways and ramps. Collision surveillance and avoidance systems are also being developed, some of which are technically completed.

On the other hand, ASV (Advanced Safety Vehicle), which focuses on individual cars, is also being developed, with many safety-system-equipped model cars being manufactured by automakers. It will, however, take some time for these cars to be driven by the general public. One reason is that these safety systems are expensive. Large-scale infrastructure preparation might be necessary. The possibility that some of the systems may conversely induce dangerous driving (risk compensation) has been also pointed out (Wilde, 1994), which requires field research. Because of these factors, research on ITS and safety vehicles in Japan may not be completed in the near future, though they are worthwhile as future ideal models. We cannot therefore expect these ITS safety systems to suppress accidents effectively in the near future.

It is essential to design an ITS which is realistic and effective as an accident prevention measure. As the key factor in the occurrence of accidents is speed, it should be carefully examined. The most fundamental causes of accidents are drivers’ errors in perception, judgement, and maneuvering. The factor of speed is related to these errors, and also determines the seriousness of the accident. Simply stated, driving at high speed deprives a driver of time for proper perception, judgement, and maneuvering, and the seriousness of the accident is in proportion to the square of the speed. I believe that speed-controlling ITS is realistic and practical.

Proper driving speed control is basically up to drivers at present, supplemented by speed limits regulated by the Road Traffic Law. Maximum speeds in Japan are 60 km/h on ordinary roads and 100 km/h on expressways. Lower speed limits may be set for some sections of roads. These speed limits are based on empirical grounds and have not been scientifically calculated. They are nevertheless the yardsticks for traffic violations. A lot of drivers recognize the speed limit as a standard, but actually drive at the speed they think is safe in the traffic environment, which includes other road users. This subjective safety standard is effective for most drivers in most cases. For certain people with a tendency to rush, or in certain circumstances which encourage speed, however, the safety standard does not work and vehicles are driven at a comparatively more dangerous speed. In-depth research regarding collision and distance in traveling direction was conducted by Katsuya Matsunaga, Kyushu University. Human biological sense of speed, and ability to judge safety, are not able to deal with high-speed transportation, such as automobiles. Sometimes humans fail to recognize risk at high-speed.

A lack of speed control capability during driving is one cause of accidents. That means that humans sometimes fail to decide the driving speed appropriate to processing information
Overview of European and Japanese Work on ISA

(perception, judgement, maneuvering) and need physical support systems. Such a system is ISA (Intelligent Speed Adaptation). MASCOS (Maximum Speed Control System) by Taniguchi (1993a) divides road environments into ordinary roads and expressways, and compulsorily changes a vehicle’s maximum speed according to the road. For example, on local streets it limits a vehicle’s speed to up to 70 km/h, while on expressways and other car-only roads it allows speeds in excess of 100 km/h, though still limited, in order to prevent the vehicle from travelling at extremely high speed, which may cause a serious accident. On the other hand, another ISA in Sweden forcibly switches maximum speed according to speed limits segmentized by road section, holiday, and time (Várhelyi, 1996).

Such speed-limiting ITS is not mainstream in Japan. A kind of speed-controlling traffic system is already being implemented for specific types of cars. In autumn 2001, a new regulation stated that all heavy trucks have to be equipped with a speed limiter which restricts the maximum speed on expressways to 90 km/h. After a three-year period of grace, from automobile inspection in the fall of 2004, all heavy trucks must be equipped with the limiter.

The Land Infrastructure and Transport Ministry will start field experiments of a speed control system as a pilot study in some specified areas such as the environs of schools. GPS and transponders on roadsides will control maximum speeds of vehicles. This experiment is planned to run from 2002 for three years.

The Soft Car Millennium Project Team represented by Yukio Oguri (Chiba University of Commerce), is researching speed control traffic systems. This research project was adopted in 1999 as part of the Science and Technology Agency’s Millennium Project for the development of new technologies. As the first stage of their research they are examining a system to display vehicle speed externally. They are planning to include ISA experiments in it.

PEOPLE’S ATTITUDE TO ISA

Taniguchi (1993b) pointed out some problems regarding the implementation of MASCOS in Japan. One of the problems is the social consensus about introducing MASCOS. In order to form consensus, it is necessary to find out what kind of attitudes ordinary drivers have toward MASCOS, and to clarify the causes of those attitudes. Taniguchi (1994, 1998a) pointed out that the system can be accepted by society if it is based on the ethics of respect for life, even if it entails some inconvenience. Taniguchi (1998b) revealed the relationship between drivers’ ages and their attitude toward MASCOS and other related matters.

For MASCOS, 56.7% agreed to ‘compulsory maximum speed switching between local road and expressway’, and 32.2% disagreed. 48.3% agreed to ‘compulsory maximum speed switching in each section of the road’, and 34.3% disagreed. 20.0% were for ‘voluntary maximum speed switching’, and 66.8% were against it. When the effect of the system was mentioned as 2000 lives saved, 74.1% agreed to implementation of the system, and 8.8% disagreed. Thus appealing to the ethics of respect for life is effective in influencing attitudes toward traffic policy. But still 8.8% were against MASCOS even at the cost of 2000 lives. 17.2% had escaped from danger by rapidly increasing speed, 59.7% said that the system can be accepted in Japan, and 5.4% would want to remove the equipment so that they could speed.
ISA IMPLEMENTATION PROCESS – ROLE OF THE MASS MEDIA

The mass media, including TV, newspapers, and magazines, play a big role in shaping national opinion. Accident coverage on TV, through visual information, has a great impact on general impressions. People’s identification of the frequency, seriousness, and importance of social incidents is not objective. Rather it depends on how the mass media report the incident. Thus we can say that public opinion is formed by the mass media.

Producers of programs or articles do the specific work in the mass media. It also depends if their proposals are adopted or not by the authority. A critical factor is the presence or absence of someone with insight into the specific topic, someone who is aware that controlling maximum vehicle speed is effective in reducing traffic accidents.

The mass media usually focus on specific topics for a limited time. It is rare that the same topic be covered for a long time, as there are a lot of problems in our society and the mass media always pursue various kinds of news. They delve into only the problems which are very important for society, repeatedly and from different angles, for a relatively long period. Still such cases are rare, and most media chase after the latest news to keep the audience interested. Therefore coverage on the effectiveness of MASCOS would be limited to a short time.

If people get interested in a specific topic for this limited period, influencing administrative authorities, such as Diet members or top government officials, big changes in social structure are possible. The top-down current would bring about drastic changes.

On the other hand there can be a bottom-up innovation process. A big contradiction boils over, and the issue receives coverage when the mass media can no longer ignore the problem. This is what should have occurred regarding measures against traffic accidents. Even though a lot of fatal accidents are reported every day, they are regarded as a part of daily life and left unattended. The deep sorrow of bereaved family members doesn’t inspire them to get together and appeal to the authorities, except when there is someone apparently responsible. Most people think that police and other relevant authorities already do their best regarding traffic accidents, which are inevitable, with no decisive measures taken against them.

LEARNING FROM THE SWEDISH APPROACH

The Swedish Government set a goal in 1997 to reduce the number of deaths and serious injuries in traffic accidents, ultimately to 0, and pushed through legislation. This long-term goal is called nollvisionen (Vision Zero). The population of Sweden was 8,854,000, and the number of automobiles 4,145,000, as of December 1998. The number of accidents resulting in injury in 1998 was 21,130 (including 3,930 serious injuries), and the number of deaths was 540, representing 6.1 per 100,000 people. In 1964–1966 the number of deaths were more than 1,300 (17 per 100,000), and deaths have continued to decrease up to now. The Swedish National Road Administration (SNRA) aims to reduce the death toll to less than 270 in 2007 as an interim goal to nollvisionen. It also had a goal of a maximum of 400 deaths in 2000, which was not considered achievable (Swedish National Road Administration, 1999).

SNRA reexamined previous measures against traffic accidents to achieve nollvisionen. The result was that whole traffic system, not only human factors, should be examined to find out where the problem was, and vehicle speed was focused on. SNRA decided to conduct a field
experiment of some thousand vehicles as a project on speed control. The budget for the project was 7,500,000 krone (1,000,000,000 yen) from 1999 through 2001.

The background to support for such a policy may be that respect for human rights is high among people in Sweden. The same background makes Sweden famous as the most advanced welfare state. The wellbeing, safety, and life of each individual is respected there. This fundamental attitude is the motive behind trying to eradicate fatal traffic accidents. Another background is their logical stance in tackling problems. They deal with problems scientifically and rationally, even with some seeming stubbornness, trying to apply desk theory to reality. This approach entails considerable failures, which, however, can be overcome and lead to subsequent more successful trials. That is, they accommodate reality by experimenting.

The ISA field experiment project based on nollvisionen has the background of very simple and clear reasoning regarding the relationship between the speed factor and traffic accidents. Data from field experiments on some traffic systems clarify the potential, effectiveness, and problems of accident prevention measures focused on the speed factor in traffic accidents. It leads unfailingly to the next step, illuminating the ways to develop speed control as practical measures against accidents.

The Japanese approach to social issues is greatly different from that of Sweden. We should learn from their attitude and search for realistic measures to defend safety for as many people as possible, as early as possible, rather than sacrificing 12,000 lives per year as if it were inevitable. ISA could be one critical option for this.

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