ITS AND THE EFFECTS ON VULNERABLE ROAD USERS: 
THE CASE OF PEDESTRIANS 

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ABSTRACT OF PAPER

INTRODUCTION

Intelligent Transport Systems (ITS) has existed as a generic concept for more than 20 years. After many years of focusing on vehicles only, a trend of addressing traffic issues associated with the safety of vulnerable road users (VRUs), i.e. pedestrians, bicyclists and motorcyclists, emerged. A specific part of this reorientation has been the development of ITS addressing safety issues of VRUs. However, the group of vulnerable road users is heterogenous: One group uses powered two-wheelers, the two others are un-powered road users. All these road-user groups are unprotected and vulnerable in a crash with a car, but some significant issues may be overlooked when treating these sub-groups as one, “homogenous” road-user group. Hence, individual studies, and an analysis of each of the groups separately, is justified (Vaa, 2015). One such study, the case of motorcyclists, has been elaborated and was presented at the RS5C-conference in Rio de Janeiro in 2016 (Vaa, 2016).

The present paper will focus only on pedestrians, a vulnerable road user group which is completely unprotected, no passive safety system is developed to reduce the level of injuries if hit by a vehicle. The relative difference of speed, and the mass-difference between a pedestrian and a car, both cause the kinetic energy of a moving car with the higher mass to be transferred to the deformation of the human body. A driving speed of 30 km/h is regarded as the limit of what a human body can tolerate when hit by a car without being killed or inflicted by irreversible personal injuries (Anderson et al, 1997).

The first study to consider the potential effects on accidents of what later would be labeled Advanced Driver Assistance Systems (ADAS), was the Marburger et al study of 1989. What we have observed since Marburger et als’ study in 1989, is a confusing landscape of what exactly has been achieved in the last 25-30 years, especially regarding the impact of ITS on behaviour and accidents. We still miss attempts to provide systematic overviews, which try to systematize these effects. One study, which addressed ITS in vehicles and infrastructure, was done in 2007 (Vaa et al, 2007). Two other comprehensive studies were done by Bayly et al (2007) and Linder et al (2007), the former describing a total of 138 ITS-systems.

AIM OF PAPER

More recently, the EU-project VRUITS, Improving the safety and mobility of vulnerable road users through ITS applications, completed their activity in 2016. It was expected that VRUITS should map and give some State-of-the-Art (SoA) of ITSs addressing the vulnerable road user groups. However, it was rather disappointing to experience that the VRUITS consortium did not provide any systematic overview or SoA of effects of ITS on
behaviour and accidents involving pedestrians. Instead, they chose a very unsatisfactory alternative by asking 34 experts to assess the effects of ITS-systems by using a Delphi-like method (Scholliers et al., 2016). The Delphi technique is a structured communication technique developed as a systematic, interactive forecasting method which relies on a panel of experts. In the VRUITS case, the experts were asked to estimate, in two rounds, the effects of ten, pre-selected ITS-systems. The Delphi method does not use or ask for empirical data, the estimates are solely beliefs or opinions from the experts minds. The only input to the experts before round 2 was the provision of the average estimate from round 1, which means that the experts would be anchored in their judgment by that estimate.

As said, the VRUITS approach was disappointing especially as the expectation was directed towards beliefs that the project would provide effects of ITS on VRUs - VRUITS focused on all three VRU-groups – which were empirical, i.e based on studies from evaluations in real traffic. The main aim of present paper is hence, to sort more rigorously between reviews which do not contain any result on the effects of ITS, and those studies which do have a quantitative appraisal of a given system. It follows that the aim and ambition of the present paper is to search for and systematize effects of ITS-studies which has been conducted in real-life contexts including a provision of effects on behavior and/or accidents involving pedestrians.

METHOD

In order to add ITS-systems and their potential effects, studies have been sought for in Google Scholar, Science Direct, IEEE, ITS World Congresses and ITS European Congresses. Of these, Google Scholar is the source which provides the highest number of studies. The most important scientific journal, in terms of the number of studies addressing the present problem statements, has been IET Intelligent Transport Systems.

RESULTS AND CONCLUSION

The initial ambition, i.e. to apply meta-analysis on studies providing a number of accidents, as was done by Vaa et al in 2007, had to be abandoned because of the lack of appropriate studies. A more qualitative approach in the analysis of empirical studies is still ongoing, and the conclusion will be presented at the 18th RS5C in Jeju Islands in May 2018.

REFERENCES


