The exponential technological evolution of the past decades suggests the future will not be a simple extension of the present, as it was not in the past. The invention, discovery, and adoption of new technologies in societies will again change the logic and hypotheses of today’s thinking. Automation in road vehicles will begin by affecting the choice of transport mode, but will later impact urban planning, the “sharing economy” and ultimately society. Many researchers, from academia to the industry, are debating the pros and cons of autonomous vehicles in this transition period. One of the pros of SAE International Level 5 autonomous vehicles mentioned most frequently is the reduction of traffic accidents.

This research analyses and discusses the arguments relating road safety to autonomous vehicles based on extensive literature. We compare the factors underlying mistakes and road unsafety, and the following dimensions are put into perspective: (1) the influence of human factors in driving; (2) the decision-making process and reliability of autonomous vehicles; (3) the uncertain interaction between human and autonomous drivers in the transition years.

This study aims to explore how the diffusion of autonomous vehicles might impact road safety based on the literature. The different variables contributing to the probability of an accident, both for human drivers and autonomous drivers are analyzed. Also, the known statistics for road safety in Portugal are discussed.

Age is frequently correlated with experience. In the context of driving, experience leads to a better prediction ability on the road. On the other hand, age also brings a cumulative number of physical and mental constraints. Likewise, drunk or fatigue affect cognitive and motor function negatively and the probability of having an accident increases. The literature suggests human error is the cause of 90% of all traffic accidents. A preliminary analysis of the statistics known on Portugal suggests a lower number, but still close to 90%. The literature suggests that the introduction of autonomous vehicles in the market may lead to fewer road accidents and may yield fatality levels comparable to those in the aviation industry. SAE Level 5 autonomous vehicles will be prepared and tested to handle different traffic, weather and pavement conditions. Nonetheless, statistically "proving" autonomous vehicles to be safer than human drivers may take longer than ten years (with a fleet of 100 autonomous vehicles navigating the roads 24 hours a day). If we also take into account the evolution of autonomous vehicles technology in this time frame and the variation of fatality rate each year, the problem quickly becomes unmanageable. Alongside the technological evolution, there’s the issue of perception of safety: as autonomous vehicles are perceived as safer, carelessness might follow in both pedestrians and drivers. While both systems co-exist - i.e., autonomous vehicles and human drivers - autonomous driving may yield a false sense of safety, misleading humans into additional risks. For some cohorts, road safety might deteriorate, but overall, it is the believed that it would improve.