# Preface

For probably the first time in history, human beings are confronted with the fact that physical mobility is regressing. During peak hours, residents of big cities can lose 4 h in traffic jams and things will only get worse. Due to massive urbanization, cities with 15–30 million inhabitants are popping up all over developing countries. These cities are imploding and under this densification process, transport problems are increasing exponentially. Not only are there more people to transport, but with greater wealth and easier access to financing, the number of cars is exploding and will reach 1.7 billion 20 years from now. To add to this bleak vision, under galloping demography and the surge of millions of new middle-class citizens, the past 2 % average worldwide energy consumption—mainly $CO_2$ driven—is unlikely to change. Everyone realizes that temperature will rise by 2 °C and with it drastic changes will happen affecting the environment and the economy, but no one wants to change his or her lifestyle. Transportation is one of the main drivers of this energy consumption, accounting for 27 %. This is why any transport improvement will help to stabilize temperature rise and limit pollution emission.

If people won't change their lifestyle, relief will need to come from new transportation technologies, changes in work patterns and from personal choices on transportation means that the e-mobility revolution can bring. This revolution is happening under the convergence of IT and wireless telecommunication, and in association with improvements to power electronics and battery performance improvements.

People can already see this revolution in action. Electric and hybrid cars are starting to hit the roads in greater numbers. New plug-in technologies should reduce charging times to 5 mins and battery improvements should increase autonomy and reduce costs, making electric cars more attractive to consumers. For Governments, supporting transport electrification by supplying the necessary infrastructure is mandatory if they are to meet their $CO_2$ emission commitments.

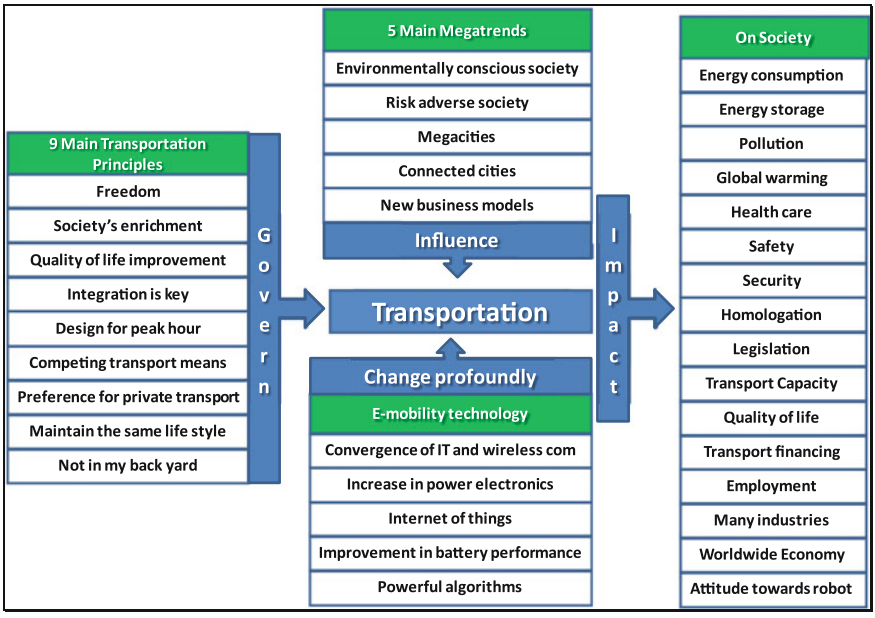
Each year nearly 1.3 million people die as a result of road traffic accidents, a number likely to double following the same worldwide car growth trend. Under constant government scrutiny, the railways have been able to improve their safety track records. This was achieved by applying three safety principles—block

interlocking, block signalling and system integrity—and by eliminating the human factor. By applying the same principles and with driverless technology leapfrogging from other industries, manufacturers and Governments cannot ignore the fact that going driverless will save millions of lives every year. Although most experts expect driverless cars to be sold around 2025, unmanned technology will not happen out of the blue. Instead, a continuous flow of new safer technologies will be presented to the market, ranging from driver based, semi-autonomous to unmanned classification.

This book is about explaining how the e-mobility revolution can help save millions of passengers from injuries, reduce millions of deaths from pollution-related diseases, bring better quality of life, reduce global warming and decrease transportation costs. It is also about showing with simple concepts how new business models, innovative financing solutions and technologies can increase infrastructure capacity while reducing transportation demand. By showing the challenges facing the transportation industries and demonstrating the solutions e-mobility can bring, it gives every reader insights into how to make the right choices to avoid immobility.

The first chapter will give an overview of the main principles and trends that affect transportation. It will provide the readers unfamiliar with transportation challenges, a vision on how e-mobility technologies are being developed to help society apprehend such fundamental changes. It will show which features of society will be impacted by these new technologies.

The following figure summarizes which element will be profoundly changed.



In the following chapters, we will explain in details how e-mobility technologies will directly address issues raised by the five megatrends and as a consequence affect the social features described above.

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The Choices between E-mobility and Immobility

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