

Mobility and exponential technologies



By [Simon Carpenter](#)

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It has been a long journey; one that started slowly and then accelerated at an exponential pace as we moved from the first wheel 5,000 years ago to the first steam-powered vehicle in the late 1700s to the internal combustion engine 159 years ago, the world's first production motorcar 27 years later (Karl Benz in 1886) and then very rapidly to flight, jet engines, gas turbines and today's electric motors.



Simon Carpenter, chief technology advisor at SAP Africa

Along the way, the various modes of transport we have created have made incalculable contributions to socio-economic development and human progress. Apply your mind for just a moment and it's hard to come up with a facet of modern life that is not impacted by some mode of transport or vehicular activity; whether it's moving food from the farm to the fork, workers from the suburb to the workplace, tourists to their holiday destinations or patients to a hospital, transport and vehicles are inextricably involved in making society and economies work.

But, there is a downside to all this utility. As we stand at the tail-end of the industrial revolution and contemplate the future of humanity, it is clear that our love affair with the internal combustion engine has created some wicked problems.

The downside of mobility

Globally, the urban sprawl that personal mobility made possible in the first place has morphed into an unproductive commute in slow-moving traffic amplified by the fact that many of us travel alone in our cars.

Today most people spend an increasingly frustrating chunk of their day and their disposable income simply getting to work. This problem is exacerbated in South Africa by the legacy of apartheid spatial planning which sequestered black people in townships far away from where they could find work. Most of those people are impoverished and therefore must spend a disproportionate and inequitable amount of time and money on their commutes.

The industrial-era paradigm of car ownership means we devote copious amounts of personal capital and social goods to acquire and house (i.e. park) vehicles that are used for a brief period each day. Those resources could be better used to address even more pressing concerns such as food security.

There is growing evidence to support the fact that vehicle emissions, both greenhouse gases and particulates, contribute not just to global warming but also the growing burden of chronic illnesses. Recent studies have linked traffic pollution with reduced lung and cognitive function, and an increased risk of asthma, breast cancer, lung cancer, childhood leukaemia, heart disease, emergency hospital admissions and death.

And, of course there is the huge cost in lives and treasure associated with vehicle accidents. In South Africa alone 14,000 people die on the roads every year in accidents which cost our beleaguered economy R142bn.

One thing is clear; if we carry on addressing the need for mobility using the same paradigms and behaviours (such as car ownership and single person occupancy) that have existed since the early days of the Industrial Revolution we will doom ourselves to disaster, possibly even extinction.

Reversing the challenges we have created will not be easy due to their multifarious, integrated nature and the many vested interests that will fight for the status quo. But, there is a solution at hand: Exponential Technologies, many of them digital in nature, accompanied by cultural, generational and societal shifts and innovative thinking offer us the opportunity to completely reshape how we move ourselves and our stuff around on this over-crowded little planet called Earth.

Exponential technologies to the rescue

Uber is arguably the seminal example of how networked technologies and digital platforms can change an industry and human behaviour at an exponential pace. Uber's system demonstrates the possibilities that emerge when exponential technologies such as smart mobile devices, networks and machine learning are synthesised with innovative thinking.

Another example is Nanjing City in China where authorities are using SAP's real-time computing platform to gather data in real-time from cars, taxicabs, buses, traffic cameras and public transport users (via loyalty cards/tickets and mobile applications).

Marrying this big data together (it amounts to some 23 billion individual records per year) provides deep insights into traffic patterns and trends. The beauty of the approach is that citizens get real-time data that helps them plan their commutes better while city authorities use that same data to support short-term tactical decisions and long-term policy decisions such as where to invest in new roads or bus lanes.

These are great examples of how exponential technologies such as IoT, Big Data, Artificial Intelligence and real-time computing can come together to solve complex problems in the real world. They are equally applicable in South Africa, where the apartheid regime's spatial planning was such that black people were confined to townships on the outskirts of cities far from commercial and industrial centres.

This legacy means that today the residents of these townships, often impoverished to begin with, must spend disproportionate amounts of time and disposable income to travel to their place of work. Exponential technologies could go a long way toward informing better policies from government and at the same time alleviating the daily travel woes of most of our population.

As the digital revolution takes hold we stand at a unique moment in human history with the opportunity to reshape our mobility systems for the better. Only we can choose - and only action will make it so.

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