Institutional Banking & Markets

# **Driverless vehicles**

**Opportunities and challenges in a new networked world.** 



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# **Preparing for a networked world**.

We are on the cusp of another technological revolution. Its impact on our society and economy is likely to be far-reaching, radically transforming the way the global community uses and manages energy resources, cares for the health of our citizens and manages its entire transport system.

At the same time, this revolution will create new issues around safety, privacy and security that the world is only beginning to fully understand.

# The next digital wave will be physical

Powering this transformation is the emerging internet of things, an intersection of physical and digital technologies set to create a fully networked world. The internet of things combines the innovations of the late 19th and early 20th centuries in transport, electrification, production line manufacturing and labour-saving appliances with the digital innovations of the last 50 years.

The result is a world of connected objects that can identify, sense, communicate with and even manage and control each other. Current innovations such as wearable technology, self-parking cars and personalised advertising are just the tip of the iceberg — and are evolving far more rapidly than anticipated just a few years ago. While estimates vary, it is likely that by 2020 there will be up to 50 billion connected devices across the globe<sup>1</sup>.

# The driverless ecosystem

The next five years are also predicted to see the rise of one of the most visible symbols of the internet of things: the driverless car. Ten million such vehicles are forecast to be cruising the world's highways by 2020<sup>2</sup>.

The advent of the driverless cars is a powerful illustration of both the benefits and the challenges that the internet of things will generate. While driverless cars have enormous potential to improve our quality of life, they also raise critical questions about how we create a digitally managed ecosystem that is robust, highly functional and exceptionally secure.

To understand why, let's examine both the opportunities and the challenges that driverless vehicles are set to create.

# Industry impacts 1: Retail and the internet of things

The internet of things brings a host of potential innovations to retail — from personalised advertising and smart price tags, to networked kitchen cupboards that automatically place an order when you run out of coffee. The internet of things will also revolutionise supply chains, with autonomous robots stacking shelves, and sensors that check the freshness of perishables.

As driverless cars bring down delivery costs, we believe that more customers are likely to shop online. This could see bricks-and-mortar shops becoming more like showrooms, requiring less stock and less physical space. It could also accelerate the trend towards disintermediation, making it easier for consumers to order and receive

goods directly from the farm, the manufacturer or the wholesaler – delivered directly to their door.

# The rise of the driverless car.

The technologies required for a car to drive itself are already present in most new vehicles, underlying features like self-parking, cruise control and lane control. They include radars, lasers and cameras to sense the three-dimensional world, and a GPS to navigate<sup>3</sup>.Meanwhile, Google's driverless vehicles have clocked up over three million kilometres<sup>4</sup> and fully autonomous vehicles have been tested on Australian roads.

As the pace of innovation in this space continues to gain momentum, autonomous vehicles are likely to be in use far more quickly than most of us realise. And, like the previous digital revolution, they will create incremental but lasting impacts throughout the value chain of every business. Here are just some of the many some possibilities we can expect.

# **Driving productivity**

Automated vehicles could make transport faster, easier and safer. We can expect less congestion, with vehicles travelling closer together and traffic flows managed by continuous GPS communication between vehicles and road infrastructure, allowing them to avoid bottlenecks, accidents, roadwork and red lights. These faster, easier commutes will mean significantly enhanced productivity.

Add to this the productivity potential as vehicles transform into workplaces – with internet and the freedom to work while you commute.

Moreover, while most road accidents are caused by human error<sup>5</sup>, even in the developmental stage, the safety record of driverless cars looks promising. Until this year, Google's cars had only been involved in 17 minor crashes over six years — and none where they were at fault<sup>6</sup>. But in February, a Google car caused a minor accident with a bus, causing Google to refine and update its test scenarios software<sup>7</sup>.

As well as the social benefits, increased road safety will reduce costs to government by freeing up emergency services and hospital beds, while reducing the medical and productivity costs of disability and rehabilitation.

# Shared economies

Autonomous vehicles are also likely to drive uptake of shared models of vehicle ownership, like that recently proposed by General Motors in partnership with US ride-sharing company, Lyft. Such a model could see a decline in private vehicle ownership as commuters switch to a simpler, cheaper, pay-per-use model.<sup>8</sup>

With the average household currently spending up to 16% of their budget on transport, this could result in significant savings<sup>9</sup>and consumers having more disposable income to spend in other areas.

Micro-deliveries, like those already seen via Uber, look set to grow as transport costs ease.

# **Changing business models**

As the driverless revolution takes hold, business models will begin to evolve.

New and profitable industries will begin to emerge, with traditional carmakers joining forces with large technology firms. For example, a recent KPMG study for Britain's Society of Motor Manufacturers and Traders estimated that, by 2030, the driverless car industry will be responsible for creating up to 320,000 new jobs in the UK alone, boosting Britain's economy by as much as £51 billion.<sup>10</sup> At the same time, the changes are likely to have a disruptive effect on industries like tow trucks and crash repairs, and radically alter the underwriting and underlying business models for vehicle and injury-related insurance.

Airlines may also see less demand for shorter distance flights – such as Sydney to Canberra – if more people opt to travel by driverless car.

As car ownership declines, so will the need for parking, which may significantly impact bricks and mortar businesses. For instance, shops and cafes relying on passing trade from parking lots will lose customers. Meanwhile, building designs could change as allocated staff parking is no longer needed, and we could see large parking lots move further out of town, freeing up property in prime locations.

Our cityscapes and transport infrastructure may change, as roads are optimised for driverless vehicles and fast flow traffic.

In our communities, autonomous vehicles could also play a vital role within growing sectors such as aged and disability care. With their promise of improved mobility and independence for the aged, older people may be able to stay in their homes longer, and socialise more. This could result in an increase in home care and social activities tailored for the elderly and a decrease in aged care facilities.

# Industry impacts 2: Insurance and driverless cars

With few or no drivers, declining car ownership and far fewer accidents, autonomous vehicles will cause a major disruption to the insurance industry and will completely transform underwriting.

Instead of assessing risk based on the driver, risks could be based on the vehicle or the trip.

Insurers may switch from selling policies to individuals to vehicle manufacturers, with the cost of insurance bundled into the vehicle purchase or lease. This would dramatically reduce the number of policies sold and increase competition within the industry.

Investigating accident and personal injury claims will potentially be simpler and fairer –and could even be automated, given the large amount of data that a networked environment will be able to generate.

As this new environment emerges, insurance companies will need to adapt their underwriting, marketing and systems to create a new business-to-business operating model.

This may require significant upfront investment, at the same time that traditional income streams fall away and competition intensifies. However, partnering with manufacturers also provides the potential for a steady, long term income stream, without the need for high consumer marketing and management costs.

#### Industry impacts3: Logistics & supply

The rise of autonomous vehicles will also have huge implications for delivery supply. Trucks will be able to drive 24 hours a day and deliver at any time, although some downtime will still be required for charging of electric vehicles and general maintenance. This will mean safer, more reliable and lower cost deliveries — but will also create unemployment in the transport and freight industries.

Wage costs will fall and efficiency could improve, with fewer deliveries rejected because no-one's available to accept them. By pinging the location of the recipient ahead of time, logistics businesses could reduce administration, storage and redelivery expenses – and increase customer satisfaction.

Smart contracts that set out and automatically enforce delivery requirements could see transport and logistics become more automated – all the way from packing to payment. For example, cargo could be monitored more closely while it's on the move, without the need for manual intervention. On delivery, payment could take place automatically, with ownership instantly transferred– saving administration time, reducing payment risk and all but eliminating fraud.

There may be substantial disruption as established players compete with smaller and faster delivery services, like automated vehicles and drones. At the same time, logistics and supply companies may need to make large capital investments in new transport systems, such as driverless containers or ferries that are digitally managed and connected to a secure system network. This could potentially create capital management issues, with businesses forced to borrow to make these structural changes.

#### Industry impacts 4: Government and regulation

A shift to a driverless world could see a substantial decrease in the funds government needs to commit to transport, including the \$10 billion a year<sup>11</sup> it spends on public transport subsidies.

While significant spending may still be required on maintaining roads, increased efficiency could see a greater return on this investment. Fewer traffic lights, guard rails and signage would be needed, and the services of rangers, traffic wardens and highway patrollers could become largely obsolete.

With better data allowing detailed modelling on where investment is needed, governments can get more benefit from the money they do spend. Healthcare costs are also likely to reduce as road accident trauma decreases – also contributing to a rise in the nation's productivity.

However, governments would need to consider the loss of key revenue streams, including individual registrations, licences, and income from fines. As transport becomes more convenient and cost-effective, there may also be new health costs, as the population misses out on exercise walking to and from public transport.



Sources: Google, National Centre for Social and Economic Modelling (NATSEM), Bureau of Infrastructure, Transport and Regional Economics (BITRE), The Economist.



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# Managing emerging risks.

Autonomous vehicles are set to overcome many of the risks of road travel today. Imagine vehicles that always obey road rules and which aren't distracted by tiredness, passengers or texting.

Yet as these risks disappear, new challenges will emerge — challenges that are again symptomatic of a networked world. Software crashes and communication failures have the potential to paralyse a digitally managed network. And without powerful security countermeasures, hackers and cyber-terrorists could create chaos or even fatalities by infiltrating an automated system. This danger was illustrated by a recent car hacking incident in the US, where hackers took control of a car's lights, navigation system, brakes and steering through its infotainment system<sup>12</sup>.

Gartner predicts that security will be the number one focus of organisations at the forefront of the internet of things in 2017 and 2018. Cyber-security expertise is in demand, with autonomous car designers and related industries working hard to safeguard their platforms against intruders.

Managing these risks will require a new generation of technologies designed for an interconnected network without a single centralised core – similar to the blockchain technology that underpins digital currencies like Bitcoin.

# Working capital implications

As we transition into the new connected world, businesses will face both challenges and opportunities when it comes to managing their working capital.

More automation will see employee costs fall, with less funds needed on hand to pay workers every month, or to cover annual leave, sick pay or payroll tax.

If workers are replaced with robots or automation, employers are also likely to benefit from increased productivity, with a 24-hour, 7-days a week workforce.

On the other hand, significant investment may be required up front to automate currently manual processes. New equipment could be needed, as well as sophisticated digital systems to ensure the benefits of driverless economy can be realised. This will likely see more businesses needing to rely on funding from borrowing or falling back on free cash reserves.

Alternatively, we may see financing solutions like leasing become more widespread, as businesses and governments seek to spread the upfront costs of investing in driverless technology over its useful life,

As such, businesses will need to carefully weigh the long term benefits against the upfront costs – and keep a close eye on competitors to ensure they won't be left behind.

In the meantime, we will continue to investigate and develop the potential of these new technologies — so we can help your business adapt to the changing demands of a networked world.

# Are you ready for a networked world?

Driverless vehicles and the internet of things will change the way we live, socialise and do business. Is your business ready to adapt?

### Five key questions for your business

- 1 Have you modelled the potential impacts of a networked world on your industry?
- 2 Do you understand how the arrival of autonomous vehicles will affect your business, from shopfront traffic to fleet management?
- 3 Are you ready to capture value from additional flexibility and potential disintermediation in your supply chain?
- 4 Have you identified expert partners who can help you plan and adapt?
- **5** Do you understand the potential applications of blockchain and related technologies in your own business?

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<sup>1</sup> Gartner (2015) Gartner Says 6.4 Billion Connected "Things" Will Be in Use in 2016, Up 30 Per cent From 2015

<sup>8</sup> NPR (January 11, 2016) Lyft, GM Teaming Up to Create Fleet of driverless cars

# About the author

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Understanding the potential and social implications of new technology is one way we can continue to evolve to meet our customers' changing needs. As head of our Technology Innovation team, Dilan is at the forefront of exploring the disruptive power of new technology, and its potential to enhance our customers' wellbeing.

His key areas of focus include:

- big data
- internet of things (IoT)
- cyber identity
- blockchair
- next generation computingplatforms and atomic computing
- smart machines
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ag-tech

multiple industries, Dilan has a strong track record in building global networks of collaborators to commercialise concepts and technology.

Dilan is a regular speaker at conferences and events, using his enthusiasm and deep technical knowledge to bring abstract ideas and complex technologies to a wider audience.

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