Who wants a faster horse?

Living in an age of disruption

Gerard Reid
Co-Founder & Partner, Alexa Capital

August 2020
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A step back in time
A look at the future
Implications
LET’S NOW GO BACK TO 2010 AND TRY TO PREDICT SOME OF THE MAJOR THINGS GOING ON TODAY IN THE WORLD OF TRANSPORT

“IF I HAD ASKED PEOPLE WHAT THEY WANTED, THEY WOULD HAVE SAID: FASTER HORSES…”

Henry Ford
COULD YOU HAVE PREDICTED THAT MOBILITY **TESLA** WOULD BE THE MOST VALUABLE CAR COMPANY IN THE WORLD?

**EVs**

- **Tesla**: $287 billion

**Incumbents**

- **Toyota**: $180 billion
- **Volkswagen**: $81 billion
- **Daimler**: $43 billion
- **BMW**: $40 billion
- **GM**: $34 billion
- **Ford**: $22 billion

*Source: Bloomberg*
COULD YOU HAVE PREDICTED THAT **OIL PRODUCERS WOULD HAVE TO PAY PEOPLE TO TAKE THEIR OIL?**

**Price of a barrel of oil on April 20, 2020**

West Texas Intermediate crude futures prices for delivery in May

Source: Bloomberg
WHO COULD HAVE PREDICTED THAT YOU COULD COMMERCIALY FLY AN ELECTRIC PLANE?
WHO COULD HAVE PREDICTED THAT **YOU COULD BUY A SELF-DRIVING CAR?**
COULD YOU HAVE PREDICTED THAT A PRIVATE COMPANY SpaceX WOULD REVOLUTIONISE SPACE TRAVEL?
COULD YOU HAVE PREDICTED THE EXTENT OF THE PRESSURE TO DECARBONISE?

A Fundamental Reshaping of Finance

1. The evidence on climate risk is compelling investors to reassess core assumptions about modern finance

2. Investors are increasingly reckoning with these questions and recognizing that climate risk is investment risk.

3. Because capital markets pull future risk forward, we will see changes in capital allocation more quickly than we see changes to the climate itself’

*Larry Fink, CEO Blackrock*
COULD YOU HAVE PREDICTED THAT MICRO-MOIBILITY WOULD BECOME SO POPULAR?

84m of shared micromobility trips taken in the US in 2018

Source: NACTO
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A step back in time

A look at the future

Implications
ELECTRICITY IS BECOMING THE WORLD’S MOST IMPORTANT ENERGY SOURCE
DRIVER #1: OUR DIGITAL WORLD CAN NOT SURVIVE WITHOUT ELECTRICITY!
DRIVER #2: PHYSICS AND ECONOMICS ARE DRIVING AUTOMOBILES TOWARDS AN ELECTRIC FUTURE

<table>
<thead>
<tr>
<th>ICE</th>
<th>Hybrid</th>
<th>EV</th>
</tr>
</thead>
<tbody>
<tr>
<td>25% efficiency</td>
<td>28% efficiency</td>
<td>77% efficiency</td>
</tr>
<tr>
<td>Oil</td>
<td>Plant to tank</td>
<td>Thermodynamic losses</td>
</tr>
<tr>
<td></td>
<td>Oil</td>
<td>Plant to tank</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Renewables</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6 litres per 100km</th>
<th>4.5 litres per 100km</th>
<th>15.5kWh per 100km</th>
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</thead>
<tbody>
<tr>
<td>€6.50</td>
<td>€4.50</td>
<td>€4.65</td>
</tr>
<tr>
<td>$4.80</td>
<td>$3.64</td>
<td>$1.75</td>
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</tbody>
</table>

Source: Alexa Capital
DRIVER #3: ECONOMICS ARE ACCELERATING BUS FLEET ELECTRIFICATION

Lifetime Cost of Single Deck Electric vs Diesel Bus

Electric bus

<table>
<thead>
<tr>
<th>Cost Type</th>
<th>Electric Bus</th>
<th>Diesel Bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase price</td>
<td>330</td>
<td>190</td>
</tr>
<tr>
<td>Equipment replacement</td>
<td>150</td>
<td>40</td>
</tr>
<tr>
<td>Maintenance costs</td>
<td>105</td>
<td>210</td>
</tr>
<tr>
<td>Fuelling costs</td>
<td>109</td>
<td>393</td>
</tr>
<tr>
<td>Total cost</td>
<td>694</td>
<td>833</td>
</tr>
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</table>

Source: Alexa Capital

Confidential – August 2020
IN ADDITION, BATTERY COSTS ARE GOING TO FALL FURTHER IN THE NEXT YEARS AND PERFORMANCE AND LIFETIME IS GOING TO IMPROVE

$\$/kWh

1000+km range EVs are in sight!

Source: BNEF & CATL
DRIVER #4: LOW COST RENEWABLES...

LCOE by technology in different markets

Source: Alexa Capital
Confidential – August 2020
DIGITALISATION 2.0 IS **THE KEY TECHNOLOGY DISRUPTOR** OF THE NEXT DECADE, AND WILL TRANSFORM THE WAY WE THINK ABOUT ENERGY & MOBILITY

Impact of Big Technology Shifts on Economic Development
DRIVER #1: ECONOMICS

BIG DATA
DRIVER #2: EASE OF USE
**DRIVER #3: COVID-19 IS ACTING TO ACCELERATE THE DIGITAL TRANSITION**
INNOVATION WILL ACCELERATE
DRIVER #1: ARTIFICIAL INTELLIGENCE – SELF LEARNING COMPUTERS

Amount of Search per Decision

- Human Grandmaster: 100’s of moves
- AlphaZero: 10,000’s of moves
- State-of-the-Art Chess Engines: 10,000,000’s of moves
DRIVER #2A: COMPETITION FROM CHINA NOTING THAT THEY ALREADY DOMINATE THE GLOBAL EV VALUE CHAIN

Electric vehicle sales

Li-ion battery capacity

Electric bus sales

Electric scooters sales

Rare earth metals

Graphite

Source: Alexa Capital /Roland Berger
China

**DRIVER #2B:** THEY ARE LEADING THE WAY IN KEY NEXT GENERATION TECHNOLOGIES...

Source: WIPO, Oliver Wyman
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1. THE FIRST MASS USAGE OF ARTIFICIAL INTELLIGENCE WILL BE IN VEHICLES
2. MY DAUGHTER WILL NOT LEARN TO DRIVE
3. VALUE IN TRANSPORT IS MOVING FROM PRODUCTS TO NEW MOBILITY SERVICES

VALUATION OF THE BIGGEST EUROPEAN CAR MANUFACTURERS VS UBER

in billion $

<table>
<thead>
<tr>
<th>Company</th>
<th>Value (billion $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uber</td>
<td>67</td>
</tr>
<tr>
<td>Volkswagen</td>
<td>55</td>
</tr>
<tr>
<td>Daimler</td>
<td>36</td>
</tr>
<tr>
<td>FCA</td>
<td>31</td>
</tr>
<tr>
<td>Renault</td>
<td>16</td>
</tr>
<tr>
<td>Peugeot</td>
<td>13</td>
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</tbody>
</table>
4. VALUE IN THE AUTOMOBILE IS GOING TO SOFTWARE AND DIGITAL HARDWARE

**TODAY**
- 80/90% hardware
- 10/20% software

**TOMORROW**
- 40% hardware
- 50% software
- 10% digital hardware
5. EVERY CAR SOLD WILL BE FULLY ELECTRIC WITHIN A DECADE
6. BIG OIL AND BIG AUTO WILL BECOME MAJOR PLAYERS IN ELECTRICITY?

Volkswagen is entering the energy industry with ‘Elli’

January 9, 2019 / by Ethan Jupp
7. WE WILL SEE NEW FORMS OF TRANSPORT

TWO SEATER DRONE VEHICLE

The Lilium Jet
All-electric. Affordable. With the Push of a Button.
THERE IS AN OPPORTUNITY TO CREATE GLOBAL CHAMPIONS AS AT THE START OF THE 20TH CENTURY

BOSCH

GE

DAIMLER

Ford

ExxonMobil

bp

FIAT

GM