

***Mobility in a Digital World –
Perspectives on the Digimotive Industry***

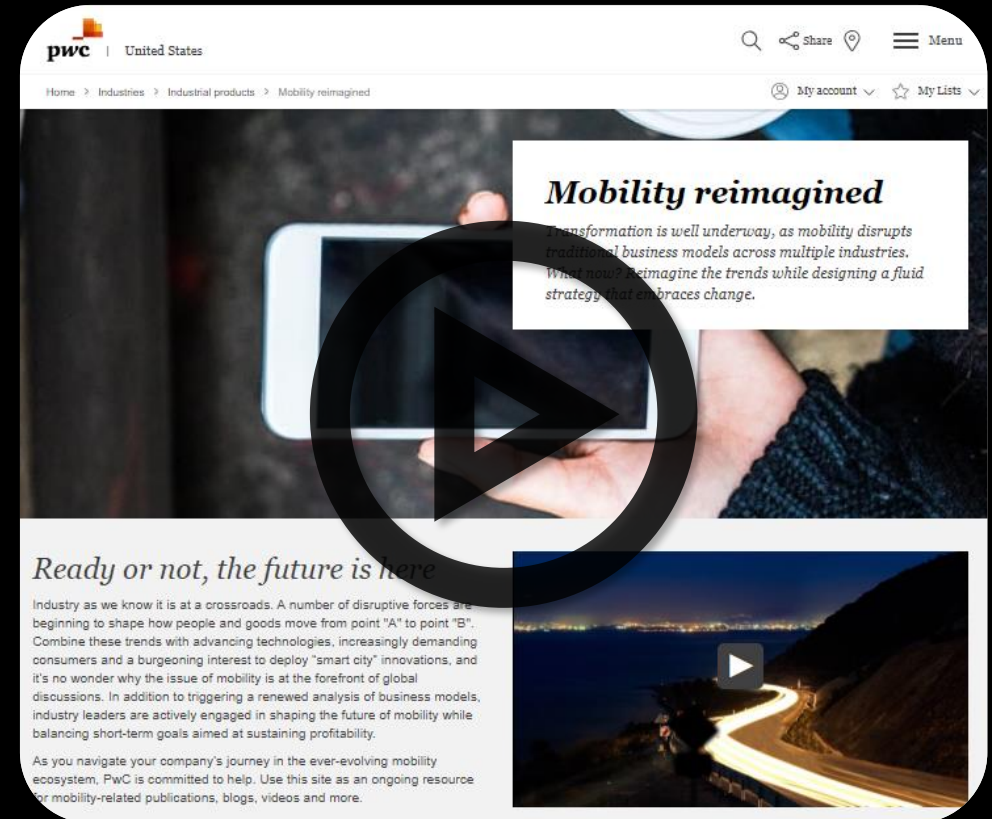
Microsoft Automotive Summit - June 5th

Heiko Weber, Head of Automotive PwC Strategy&



Mobility economy: when will we get there?

- The constant re-imagining of mobility opens up exciting possibilities of what its future state could look like.
- This video outlines:
 - key variables relating to the new mobility economy
 - the anticipated timeline of when we will get there



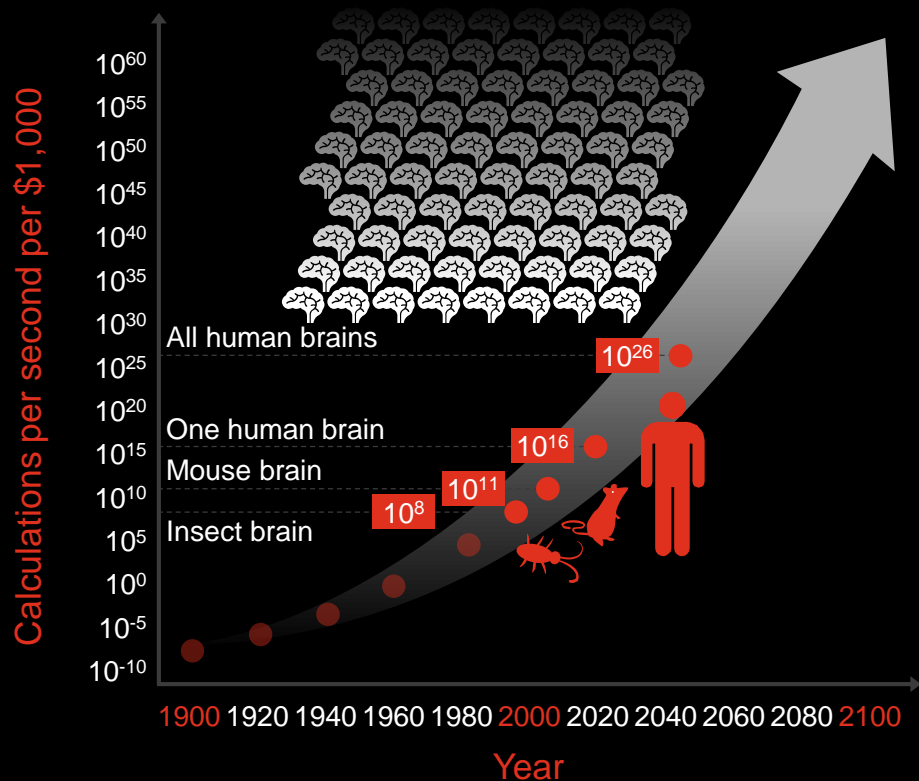
Website: <https://pwc.to/2AU141g>

Youtube: <https://www.youtube.com/embed/-YCalqjxRSo?rel=0&autoplay=1> (1:08)

*Mobility Economy: when will
you get there?*

Computing performance and internet speed are advancing exponentially, which brings severe change to our lives

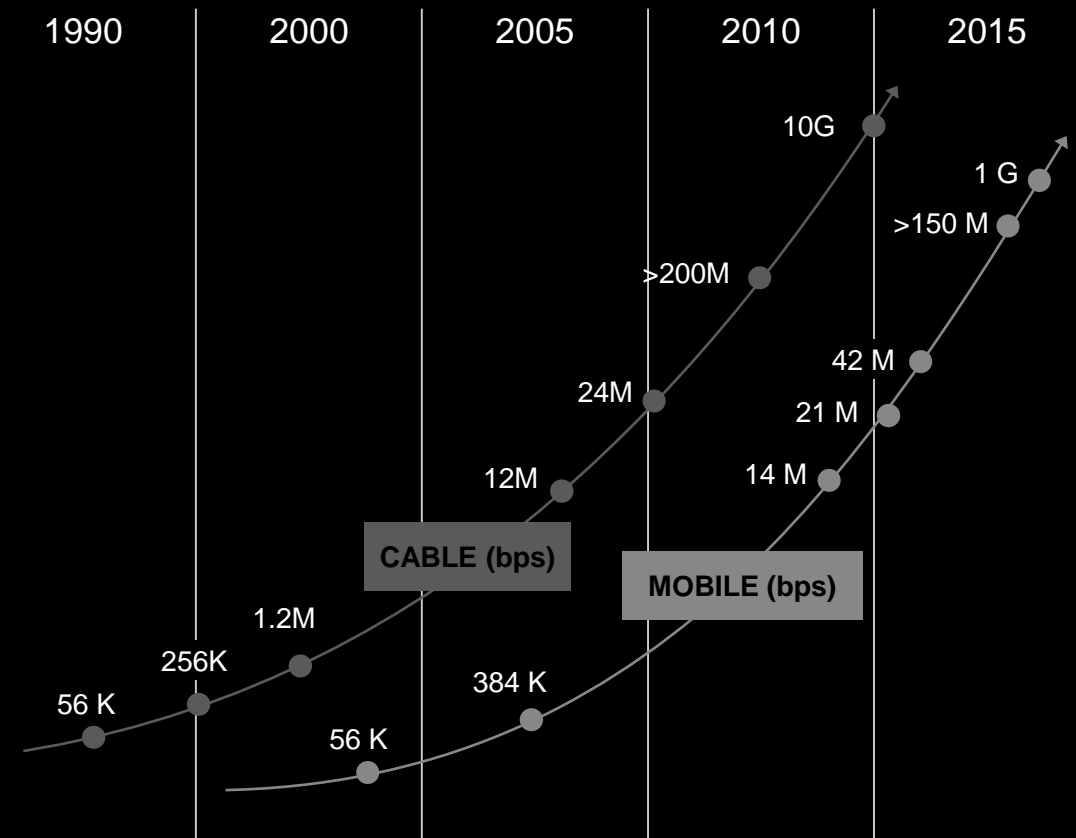
Computing Performance Exponential growth of computing



Source: Ray Kurzweil and Kurzweil AI.net, T-Mobile Strategy& | PwC Strictly Confidential

Microsoft Automotive Summit

Internet Speed



5 June 2018

Music

then...



...now

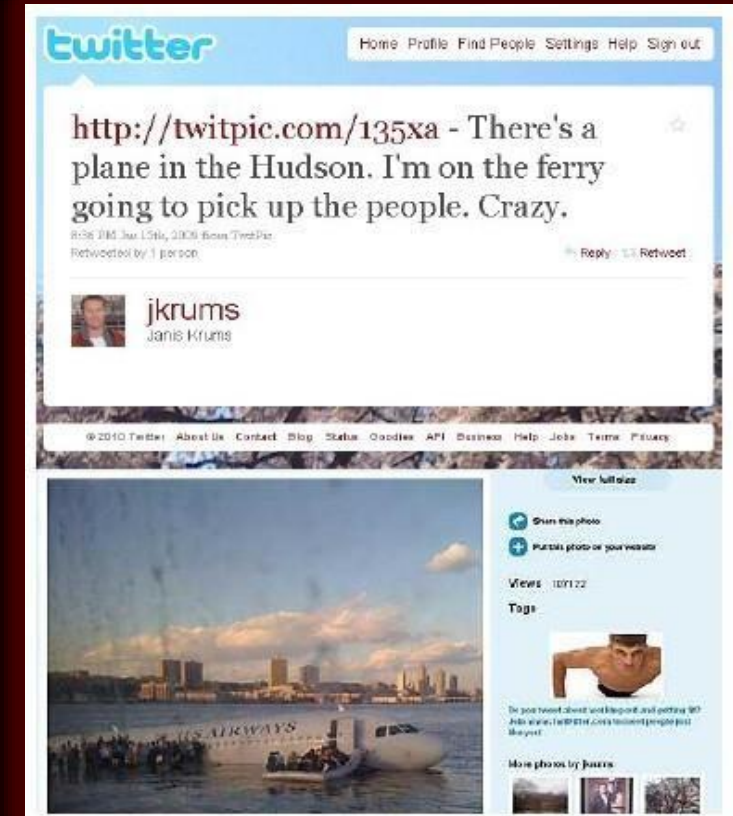


News

then...



...now



then...



...now

The image displays four screenshots of the 13CABS iPhone app interface, arranged horizontally. Each screenshot shows a different screen of the app, demonstrating its features. The first screenshot shows the 'Home Menu' with options like 'Bookings', 'Booking History / Status', 'Fare Estimator', 'TaxiTracker', and 'Call 13CABS'. The second screenshot shows the 'Wheelchair Booking' screen with options for 'One Wheelchair', 'Two Wheelchairs', and 'Scooter'. The third screenshot shows the 'Booking Info' screen with fields for 'Pickup Address', 'Building Type', 'Car Type', 'Notes To Driver', 'Ready to Go', and 'Pickup Time'. The fourth screenshot shows a 'shake to whistle' feature with a graphic of a whistle.

Faster Better
With a completely revamped user interface and a raft of cool new features 13CABS' iPhone App (v3) makes it easier to book a cab. It's much faster too.

Wheelchair Accessible Cab Bookings
You asked for it so we listened. Make Wheelchair Accessible Taxi (WATs) bookings for one or two wheelchairs or even a scooter straight from your iPhone.

MAXI Cab Bookings
Now you can make MAXI Taxi bookings for up to eleven people using 13CABS' App. Brilliant!
Due to the limited number of MAXIs available we do suggest booking multiple sedans where appropriate.

Can't Whistle?
For those times when you need to hail a cab. A language all cabbies understand. Whistler. Cute, huh?
Available on the App Store

Digital players are turning traditional business models upside down, and the automotive industry is among the next to be disrupted

UBER



facebook



Worlds largest cab company

Worlds most valuable eCommerce site

Worlds biggest media company

Worlds largest hospitality provider



owns no cabs

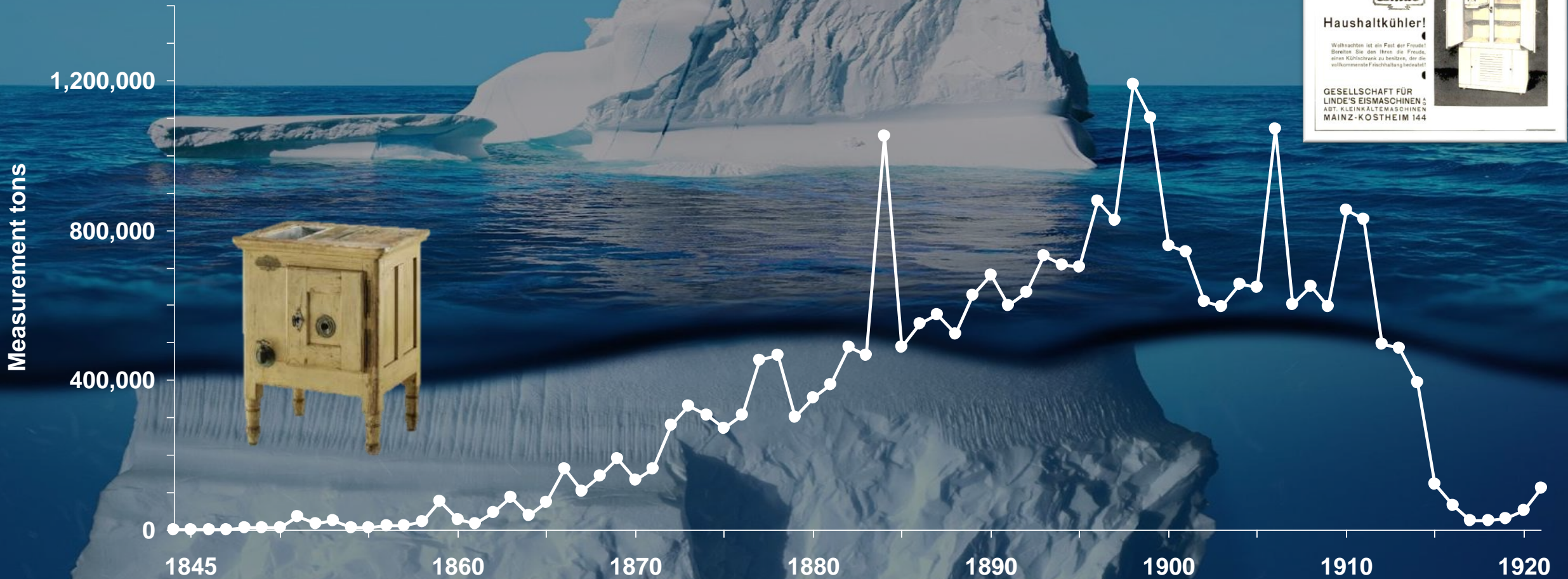
has no warehouses

doesn't create content

owns no hotels

Worry or be happy ? Digital is not the first (and will not be the last) disruption in history

Norwegian export of ice 1844 - 1921



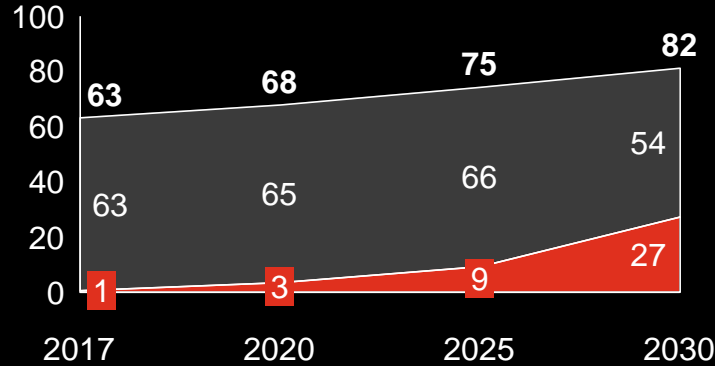


*Is **your** company prepared to
face disruption?*

New vehicle registrations (USA, EU, China): "Connected", "Electric", "Shared" and "Autonomous" will evolve in the next 10 years

Shared

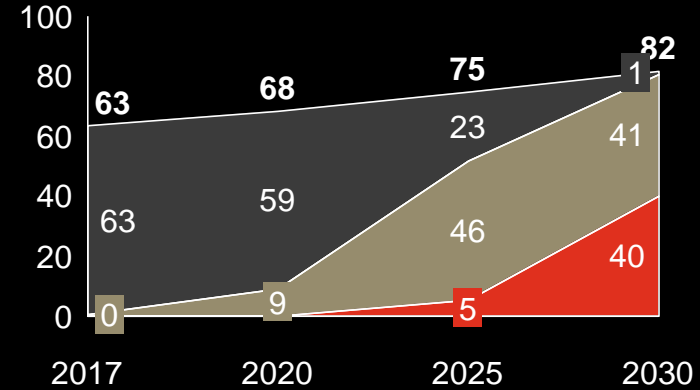
Legend: Personally Owned (Grey), Shared (Red)



- "Shared" mobility is growing at ~30% p.a. until 2030
- Every third car will be for shared operation in 2030

Autonomous

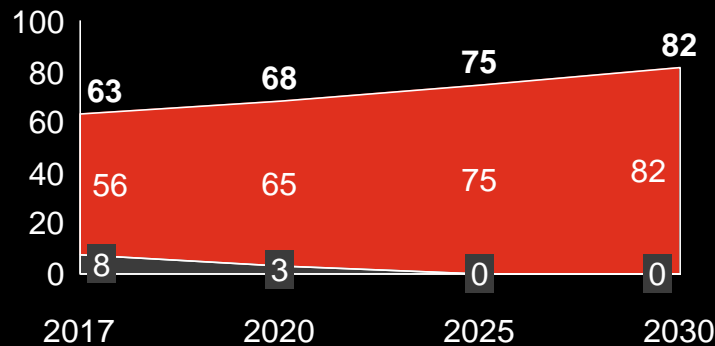
Legend: Level 0/1 (Grey), Level 2/3 (Olive), Level 4/5 (Red)



- Technological progress allows level 4/5 driving from ~2028
- Market demand for "Robo-Taxis" starting ~2025

Connected

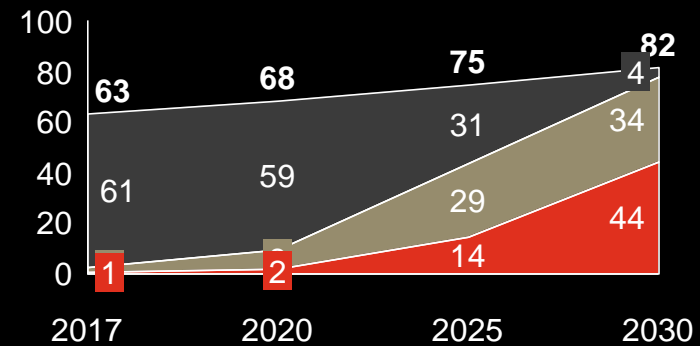
Legend: Not connected (Grey), Connected (Red)



- 100% of new registrations from ~2022 are "connected"
- High demand due to regulatory and customer requirements

Electric

Legend: Combustion (Grey), Hybrid (Olive), Electric (Red)



- Regulatory benefits from ~2020
- Nationwide charging infrastructure and price reductions from ~2028

Three revenue pools emerge: digital services, mobility, ecosystem

Disruptive change

Digital products and services

- Cars becoming **autonomous, electric, and connected**
- Large-scale emergence of **shared mobility and digital services**

Digital customer experience

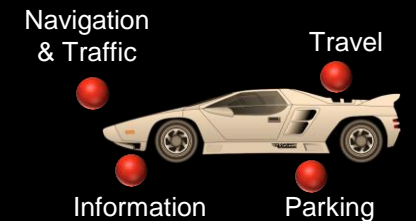
- Omnichannel, digital commerce, and **personalization**
- Customer **insight**/ data analytics, **predictive** services
- Marketplaces

Digital enterprise

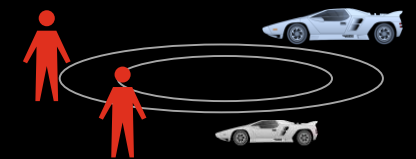
- IT transformation
- ID, cybersecurity, payments
- Industry 4.0 - horizontal and vertical **integration** between suppliers and partners

Future Revenue Pools

Vehicle-related Digital Services



Mobility Services (Cross-modal)



Fifths-screen Ecosystem



Vehicle-related digital service roadmaps become must-haves

Vehicle-related Digital Services



Navigation & Traffic



First and Last Mile Routing
e.g. Porsche Carfinder



Community based Routing Optimization
e.g. Mercedes Waze Android auto collab.



Intermodal Route Planning
e.g. Tesla Smart Navigation



On-Street
Hazard Warning
e.g. Tesla collision avoidance



Information



Rich POI Information
e.g. Audi POI Search (w/ City events)



Natural Language-based Search
e.g. Jaguar
Land Rover Sayer



Personalized
user interface (HMI) e.g.
Cadillac My Driver Preferences in CUE



Proactive Service Locator and
Scheduling
e.g. Mercedes me connect

OEMs are challenged, as many features quickly become a commodity

Vehicle-related Digital Services



Travel



Integrated Ride/Car Sharing (digital multi-user car access)
e.g. Mercedes-funded Turo



Preference-based Route Recommendation
e.g. Porsche Portal Personal POIs



In-vehicle Payment for Toll Roads
e.g. Electronic Toll Collection



Improve-your-driving review and gamification
e.g. Dash



Parking



Reservation, Access and Payment
e.g. Audi Connect



In-Garage Routing/ Valet Parking
e.g. Audi AI parking pilot





On-Street Parking Prediction
e.g. Parkopedia



Remote Camera View of Car Environment
e.g. Infiniti Around View Monitor

Digital services are a radical departure from designing and selling cars

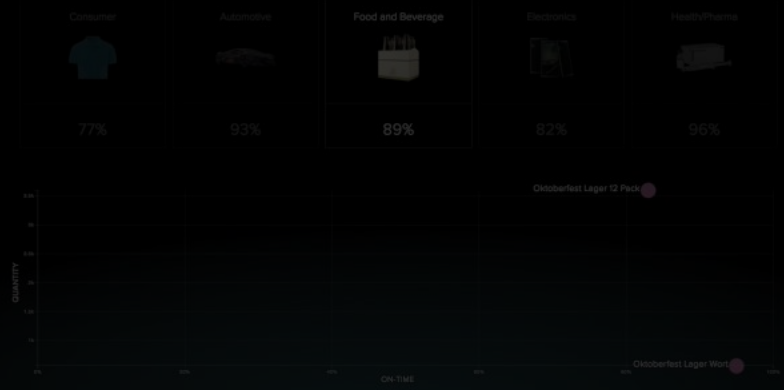
Characteristics of traditional vs. digital services business

	 Vehicle business	 Digital services business
Customers	Dealers/workshops, few end customers in B2B	End customers (direct interaction)
Frequency of interaction with customers	Monthly to yearly (sales, service, maintenance, accident)	Real time to weekly (sales, activation, usage, billing, etc.)
Customer feedback	Only via dealers, modification with new release/face-lift	Direct from end customer, instant reaction and modification
Customer problems	Infrequent; defects in product; solved at the dealer	Frequent; bugs in services, access, etc.; solved in customer operations center
Channel mix	Dominant: dealer/service partner	Dominant: digital
Portfolio	Single category, 10 to 20 variants, numerous options	Many categories, need to be simple
Portfolio changes	Low frequency (2 or 3 per year) Long lead times (3 to 5 years)	High frequency (<monthly) Short lead times (months)

Outlook

- Digital services business is fundamentally different from vehicle business
- Need for a dedicated end-to-end operating model

SUPPLY CHAIN HEALTH: ELECO 1 of 5

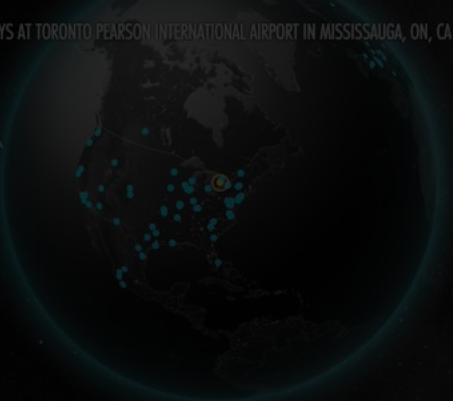


EVENTS 13 of 20

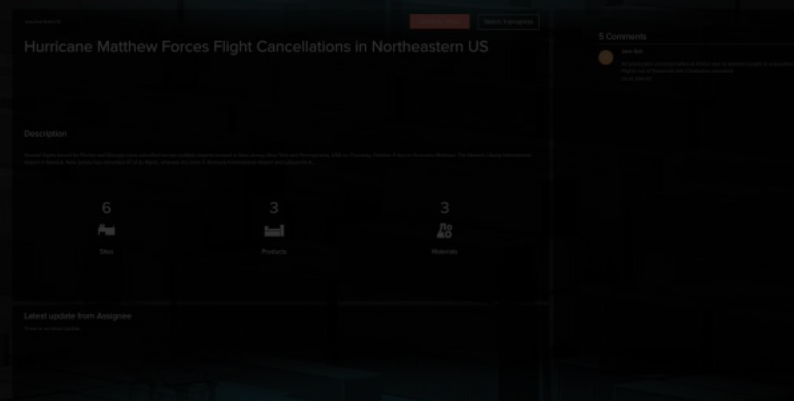
SEVERE EVENT
 STRIKE CAUSES CARGO DELAYS AT TORONTO PEARSON INTERNATIONAL AIRPORT IN MISSISSAUGA, ON, CA
 JULY 28, 2017

1 DIRECT IMPACT

MAGNA INTERNATIONAL
 78 Walker Drive Brampton Ontario CA



Current Issues 8 of 50



ROUTES 14 of 52



News 8 of 20

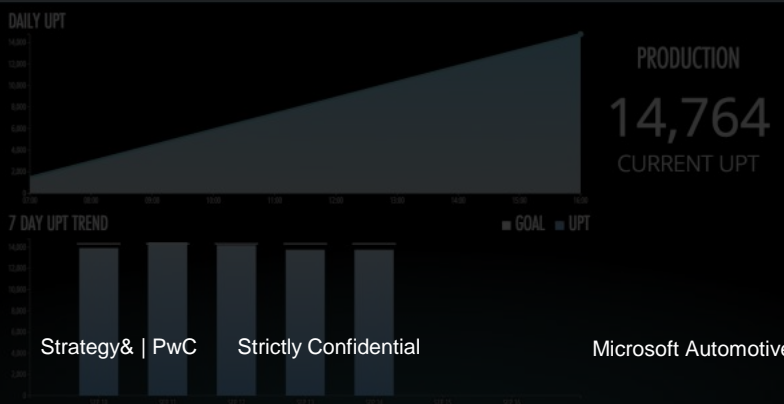


BOTTLENECKS 14 of 38



Where is **your** place in a digitized, end-to-end value chain?

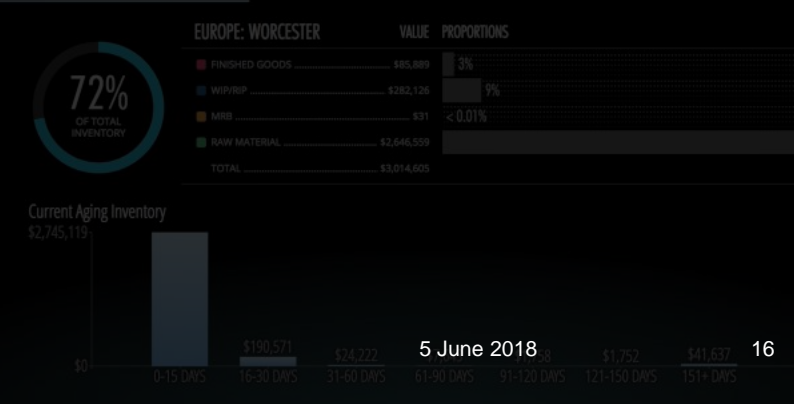
OUTPUT: ELECO PUMPKIN SPICE SYRUP 8 of 12



In-Transit Shipments: Asia 2 of 3



INVENTORY AGING 2 of 3



How will digital operations look like?

Global Digital Operations Study 2018 | Industry 4.0

- Industry 4.0 encompasses end-to-end digitization and data integration of every aspect of the value chain:
 - offering digital products and services,
 - operating connected,
 - digitizing and integrating all operations and internal activities

The screenshot shows the website for the 'Global Digital Operations Study 2018 | Industry 4.0' report. The header includes the Strategy & PwC logo and navigation links. The main content area features a large image of a robotic arm and a hand interacting with a tablet. Below this, a dark box contains the title 'Global Digital Operations 2018 Survey' and a brief description of the report's focus. A statistics section follows, with four red boxes containing the following data: 1155 manufacturing executives surveyed, 26 countries represented, 10% of global manufacturing companies are Digital Champions, and 66% of companies say their leadership does not have a clear vision for the digital future. Below the statistics is an 'Introduction' section with a paragraph of text. To the right of the introduction is a diagram titled 'Global Digital Operations Study 2018 | Industry 4.0' showing a network of interconnected nodes labeled 'Operations', 'Customer Solutions', and 'Partnerships'.

strategy& | Global

PwC > Consulting > Strategy > Services > Operations > Industry 4.0

Global Digital Operations 2018 Survey

In our report, *Digital Champions: How industry leaders build integrated operations ecosystems to deliver end-to-end customer solutions*, we examine the characteristics of Digital Champions and offer a way for companies to transition into the digital leadership category.

1155 manufacturing executives surveyed	26 countries represented	10% of global manufacturing companies are Digital Champions	66% of companies say their leadership does not have a clear vision for the digital future
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Introduction

Distinct from Industry 3.0, which involved the automation of single machines and processes, Industry 4.0 encompasses end-to-end digitization and data integration of the value chain: offering digital products and services, operating connected physical and virtual assets, transforming and integrating all operations and internal activities, building partnerships, and optimizing customer-facing activities.

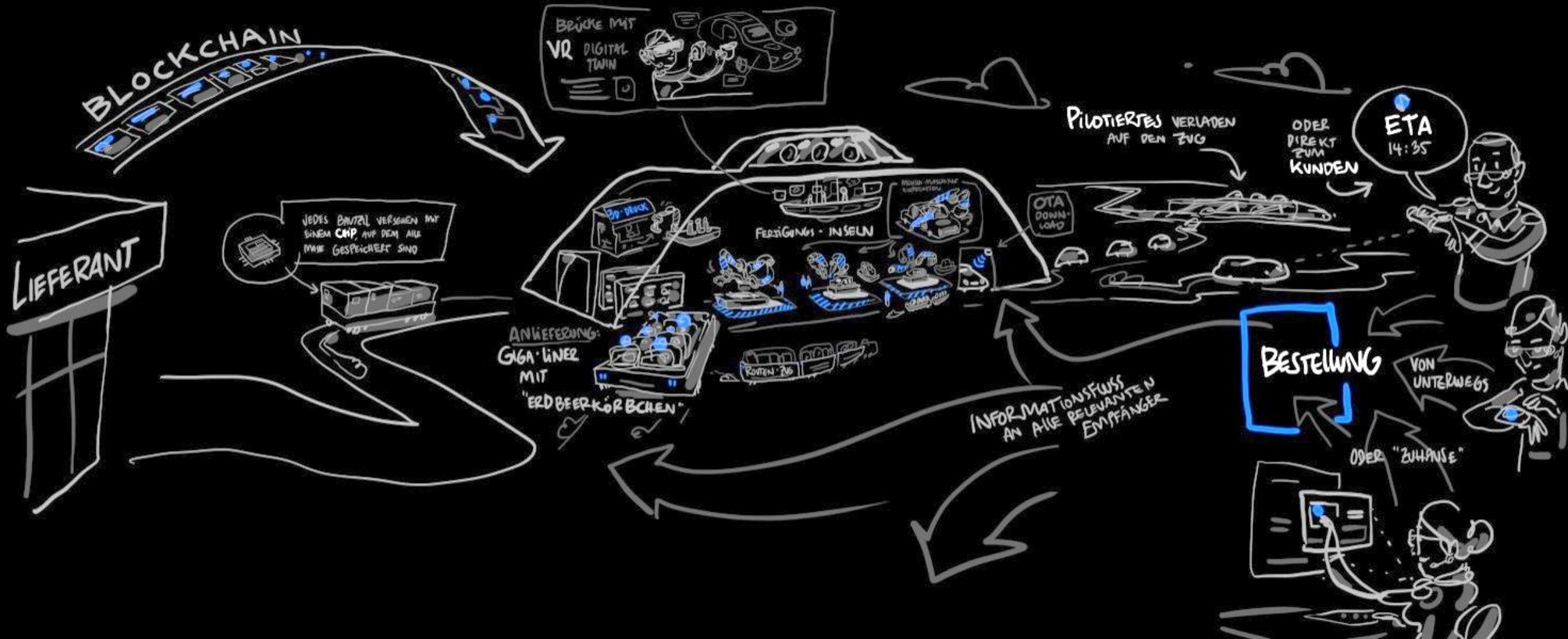
Global Digital Operations Study 2018 | Industry 4.0

Operations, Customer Solutions, Partnerships

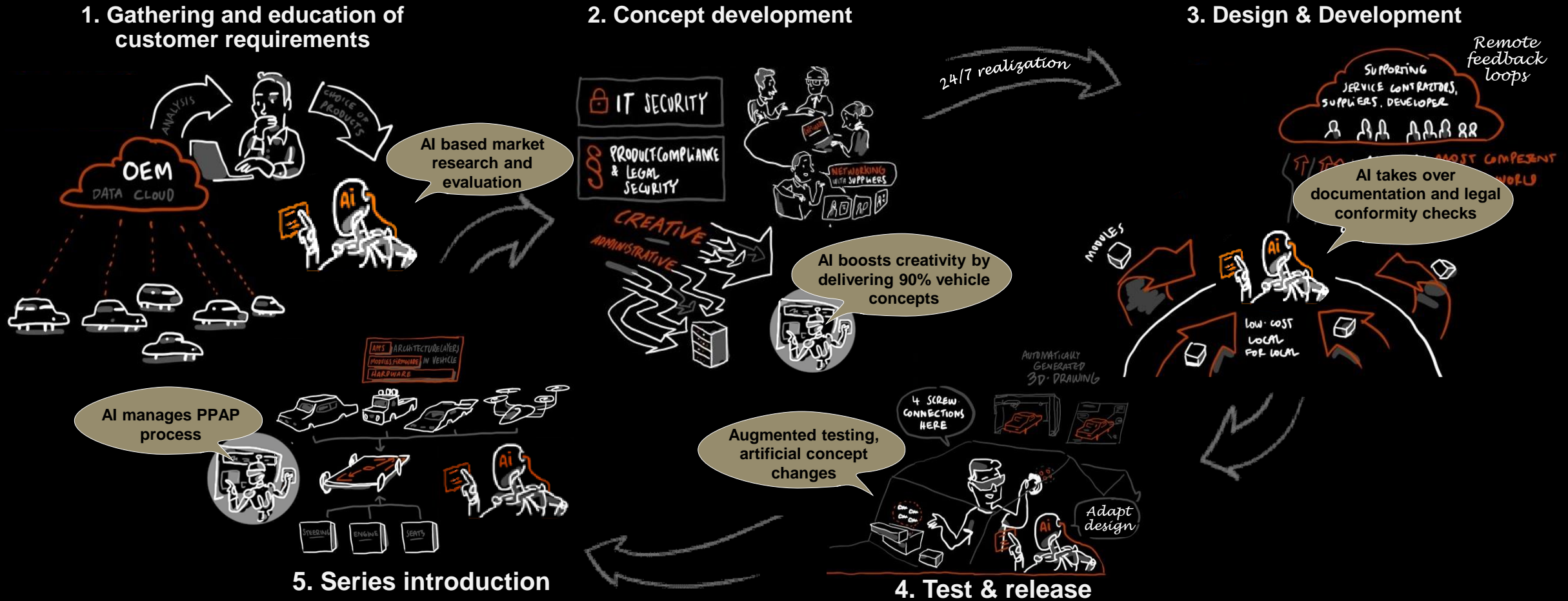
Website: <https://www.strategyand.pwc.com/industry4-0>

Youtube: <https://www.youtube.com/embed/-RwIIZP2lvU?rel=0&autoplay=1> (1:39)

A truly digitized, end-to-end value chain integrates data at every step and offers the customer digital products and services



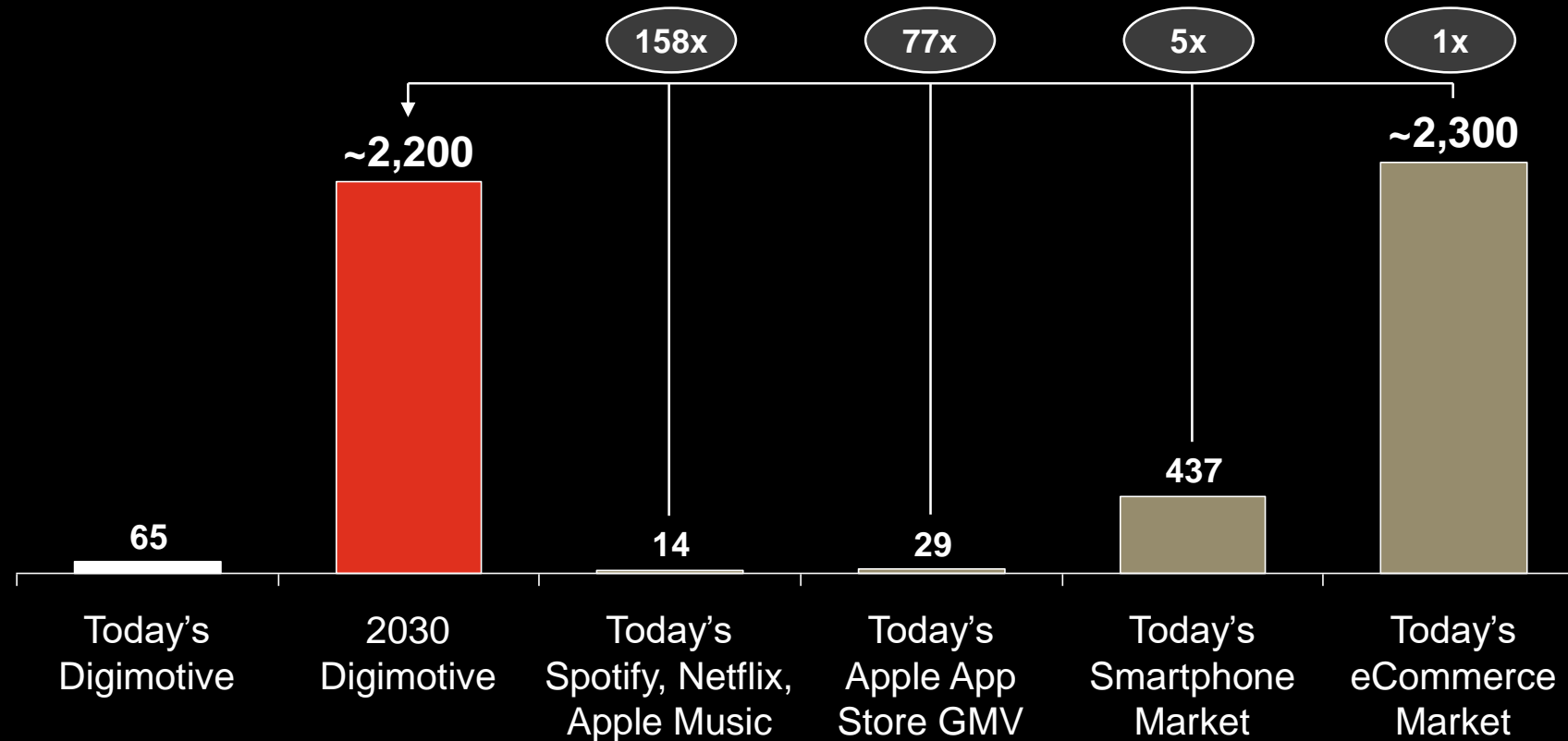
In R&D AI may perform a high portion of legacy activities while top engineers will focus on emotional design and creativity input



The full Digimotive Services is a \$2.2 trillion industry in 2030 – its size will match today's eCommerce market

Scale Comparison – Digimotive

in US\$ bn



Remarks

- 2030 Digimotive market will be close to today's eCommerce market
- Digimotive outgrows today's smartphone market by factor 5
- **Participants (incl. OEMs) need to create a new digital services business**

*What will be **your**
“way to play” in the
digital mobility services
ecosystem?*



strategy&

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Let's discuss – Q&A