GOING DIGITAL: MAKING THE TRANSFORMATION WORK FOR GROWTH AND WELL-BEING

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* The views are my own and may or may not be those of the OECD and its Member countries

BETTER POLICIES FOR BETTER LIVES

The digitalisation is enabling transformation across the economy and society



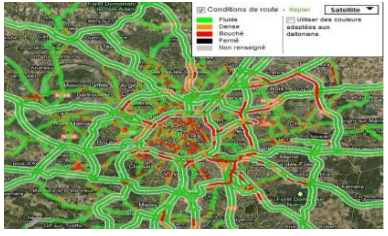




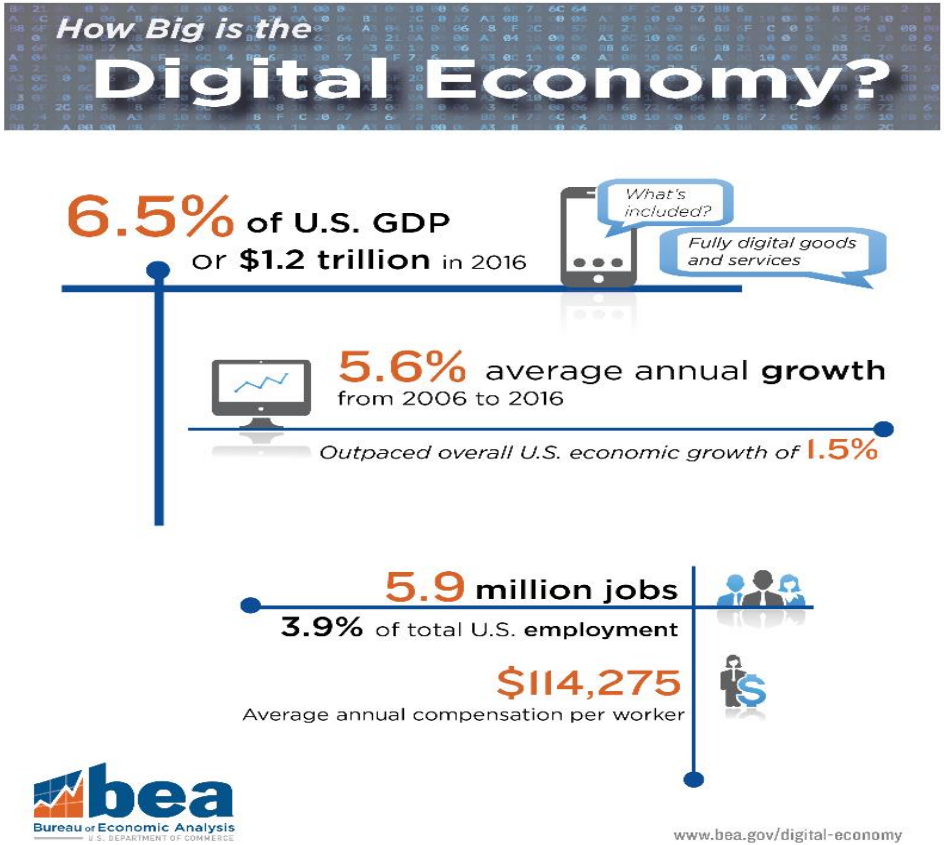








The size of the digital economy



The OECD Going Digital project: Horizontal work..

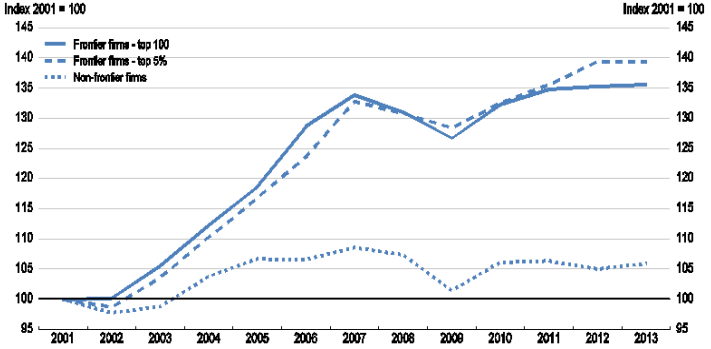
- **Understanding** digital transformation through a “vectors” approach
- **Responding** to digital transformation through the development of an integrated policy framework
- **Exploring** transversal issues:
  - Digital security
  - Policy design
  - Strategic foresight



…as well as in-depth work on some **key policy questions**



Jobs, skills and the nature of work



Productivity, competition & market openness

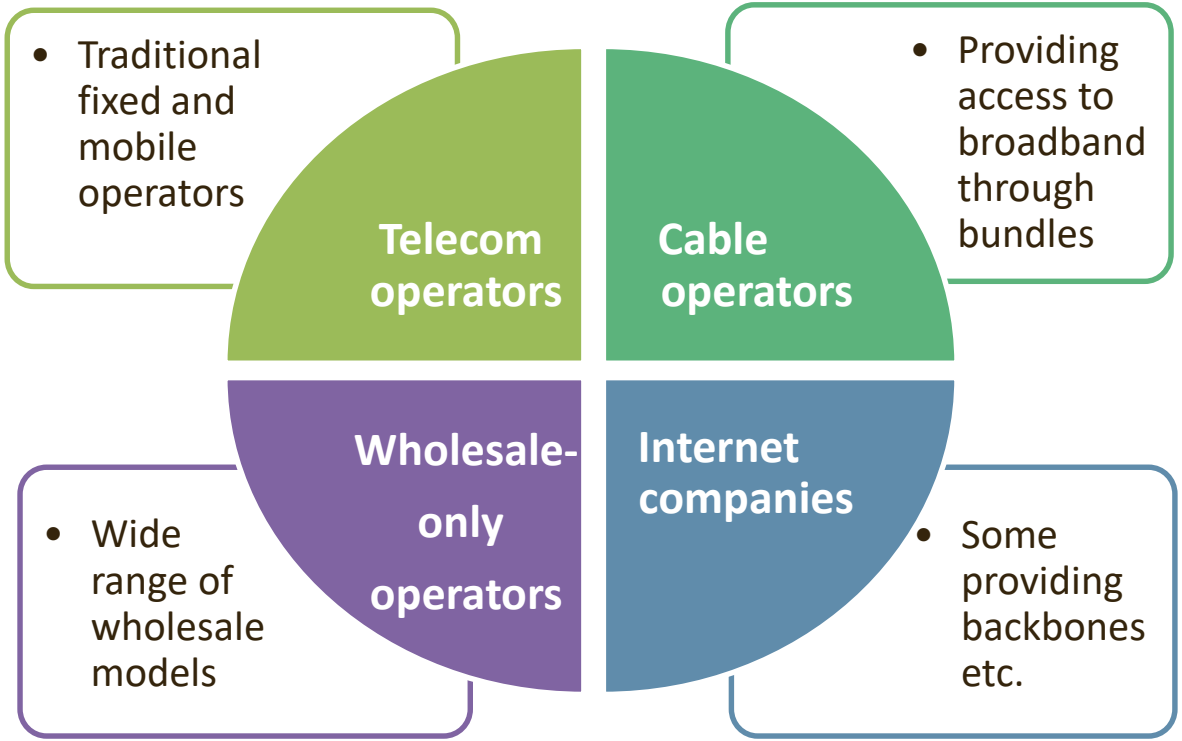


Well-being & inclusion



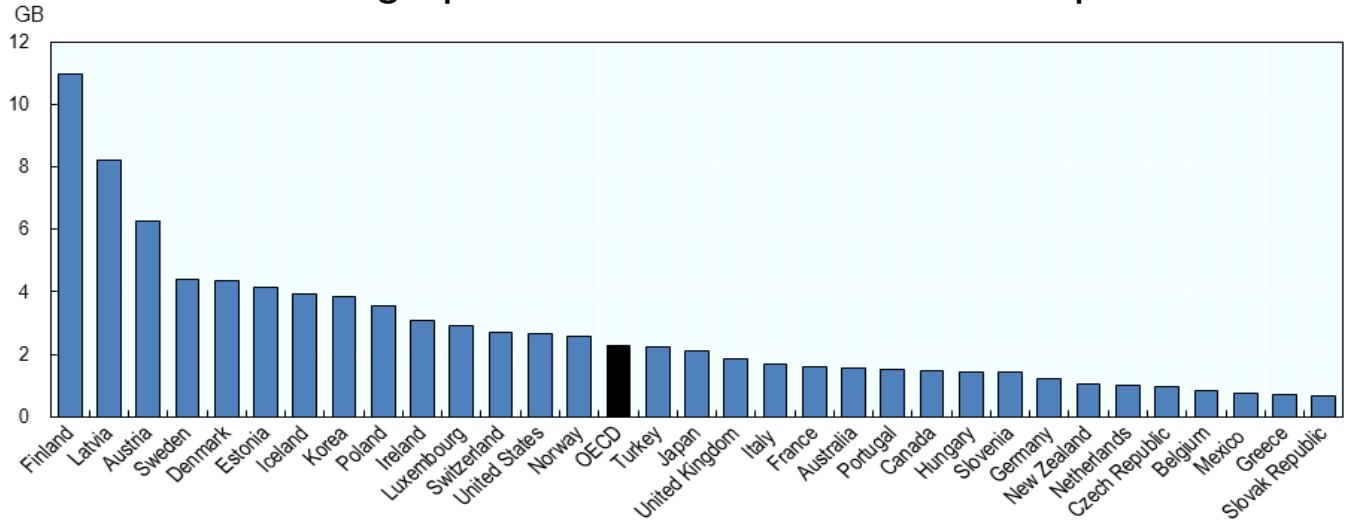
Measurement

The foundation of the digital economy: Communication providers



A growing demand for mobile data

Mobile data usage per mobile broadband subscription, 2016



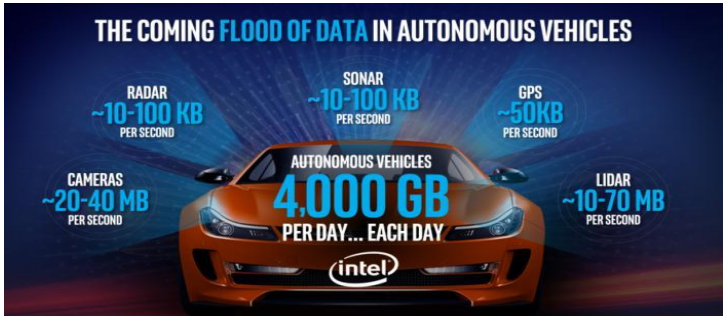
Countries also engage in the collection of M2M data

Sweden: Advanced M2M data collection:

- Revenue generated per year per M2M subscription
- Monthly M2M data traffic per subscription

The next level: A data tsunami?

- Emerging levels of connected cars are likely to generate large increases in demand on communication infrastructure
- **But how much data will be generated?**
- How much of the data needs to be transmitted?
- How much of this part is transmitted over mobile networks?



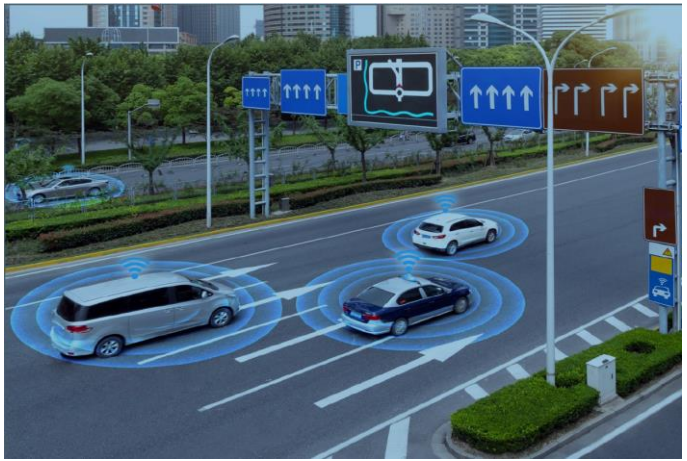
Source: Intel

	Today's iPhone	2050 Smart Car	Comparison
Data Produced (In Car)	~1-2 GB / Month	~40 TB / Hour	= 3,300 Years of iPhone Usage
Wireless Usage (Out of Car)	~1 GB / Month	~50-500 GB / Month	= up to 500x iPhone Usage
Total Wireless Data Transmission	~17 EB	~5,000 EB	= up to 300x Today's Transmission

Source: Morgan Stanley Research, Shutterstock

A potential new revenue stream for communication operators

- Study by Morgan Stanley
- Comparison of the cost of deployment versus the commercial value
- Forecasts of AV data consumption: revolutionary change for communication services (like the arrival of the smart-phone in 2007)
- AV data likely to represent the main monetisation of massive IoT



Base case scenario

- Autonomous vehicle data consumption: **nearly 2 GB / hour** (ca 10% of AV data transmitted)
- Base case assumes that AVs generate subscription revenues for global wireless operators (mobile ARPUs) that at least equate to the same as an average mobile consumer subscription today
- **Investment pay-back: 12 years**

Base Case

# of Autonomous Vehicles		Average Revenue per Vehicle (ARPV)		Time Compounder		Automotive Revenues Generated by Telcos in 2050
>300m	X	$25 / month	X	c2.5x	=	$217bn
Assuming very high utilization per vehicle		Global average		Growth of c3% CAGR 2017-2050 E		Global telecom industry

Source: Morgan Stanley

Bull case scenario

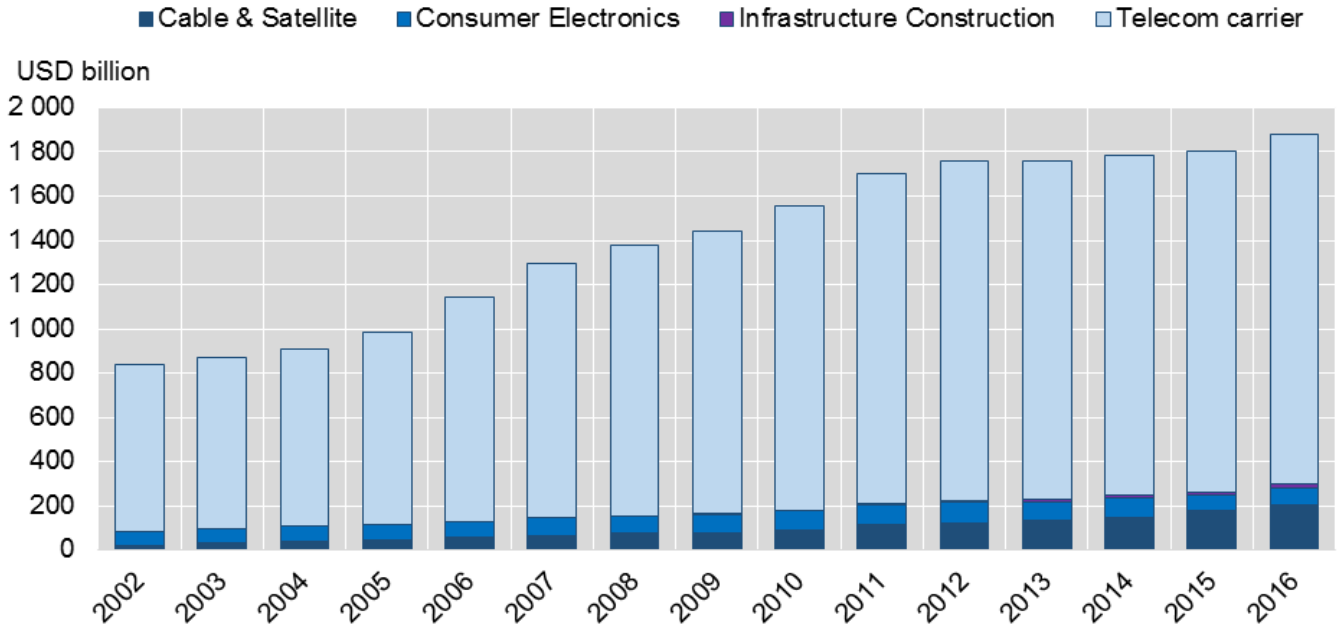
- Main assumption of the bull case: operators can **capture a portion of the value created in the autonomous vehicle ecosystem**
- New automotive data revenues could reach over 50% of global wireless revenues by 2050
- **Investment pay-back: 4 years**

Bull Case

# of Autonomous Miles		Average Revenue per Mile		Time Compounder		Automotive Revenues Generated by Telcos in 2050
>30tn	X	**<$ 1 cents**	X	**c4.8x**	=	**c$1.4tn**
Miles travelled in level 4 & 5 of autonomy		Global average		Growth of c5% CAGR 2017-2050 E		Global telecom industry

Putting the numbers into perspective

Revenues for different operator categories 2002-2016



Source: OECD based on Bloomberg data

Spectrum: Supporting mobile data growth

- Spectrum: Essential to support the growth of mobile data

- Current developments: Spectrum for 5G services
  - Specification of 5G standard
  - Countries designing and launching spectrum auctions for 5G services

Towards spectrum harmonisation

- International process to define the 5G standard led by ITU. 3GPP another key body for technology standardisation

- Europe: Development of harmonised technical conditions for spectrum above 24 GHz by the CEPT

Examples of spectrum made available for 5G

	Spectrum frequency band		
Country	**Low**	**Medium**	**High**
Mexico	600 MHz (700 MHz)	2.5 GHz	under p.c.
Australia	700 MHz		26 GHz
New Zealand	700 MHz		
Japan		3.6-4.2 & 4.4-4.9 GHz	28 GHz (27.5-29.5 GHz)
Korea	700 MHz		28 GHz (26.5-29.5 GHz)
European Union	700 MHz	3.4-3.8 GHz	26 GHz (24.5-27.5 GHz)
United States	600 MHz	3.6 GHz	24 GHz (28 & 39 GHz)

Ways of allocating spectrum

- In the past: Different approaches to allocate spectrum
- Auctions now a common practice across the OECD
- Over time, auctions have become more complex (meeting perceived challenges, obtaining desired outcomes)

Some thoughts on auctions

- Provide a transparent way to allocate spectrum for all stakeholders
- Arrive at explainable outcomes
- Appreciation of the market value of spectrum
- From a communication policy perspective: The allocation of spectrum should not be used to maximise public revenues from that auction