



Rigorous empirical  
research on  
intellectual property

# The Value of Connectivity in Automotive A First Look

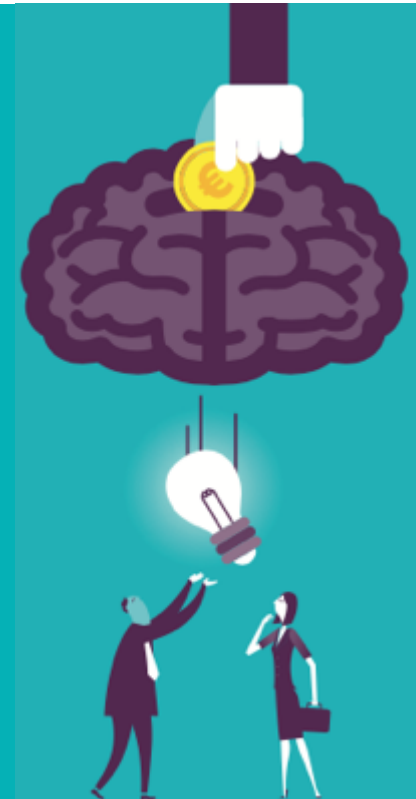
**Dr. Bowman Heiden**

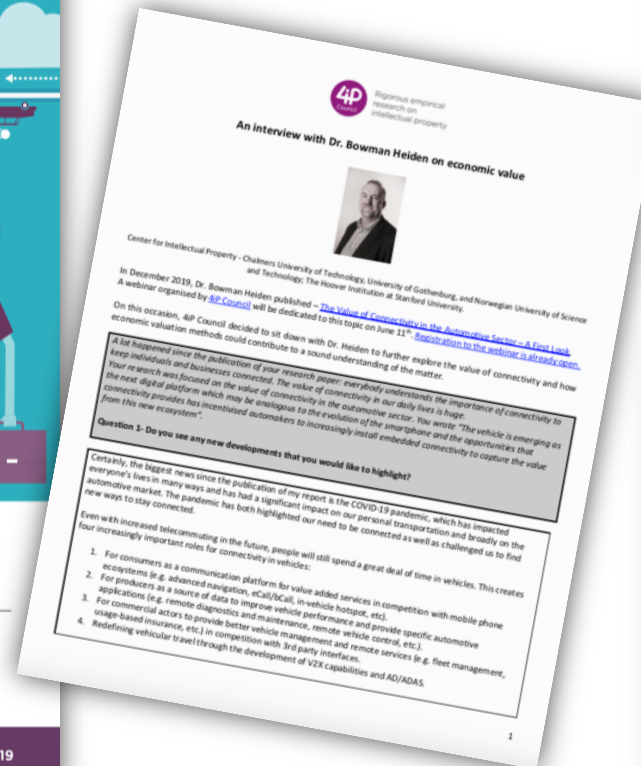
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11 June 2020





**Case Law post CJEU ruling *Huawei v ZTE***

**4iP Council** Case law home **CJEU Huawei v ZTE** German court decisions Italian court decisions English court decisions English/Irish court decisions Romanian court decisions French court decisions Dutch court decisions **National Courts Guidance**

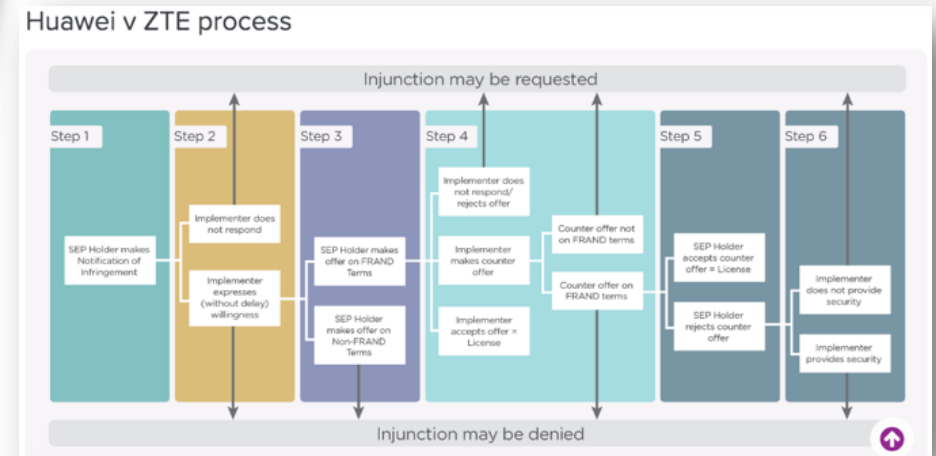
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## National Courts Guidance


### Negotiating Licenses for Essential Patents in Europe

Increased clarity provided on the principles established by the Court of Justice of the European Union in *Huawei v ZTE*.

The Court of Justice of the European Union clarified, in *Huawei v ZTE* (Case No. C-170/13), European law relating to the availability of injunctive relief for infringements of FRAND-based standard essential patents. In doing so, the Court provided a legal framework focused on the good faith



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# Rigorous empirical research on intellectual property

Types of IP
Benefits of IP
IP for Business Growth
4 Reasons to Patent
4 Reasons 4 Copyright
4 Reasons 4 Trademarks
SME Features
Research

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### 4 REASONS TO PATENT

- 1 - MARKET ACCESS
- 2 - NEGOTIATING
- 3 - FUNDING
- 4 - STRATEGIC VALUE

Explore how patents add value with our **interactive guide**.

### 4 REASONS 4 COPYRIGHT

- 1 - COMPETITIVE EDGE
- 2 - REPUTATION
- 3 - COLLABORATION
- 4 - FUNDING

Explore the benefits of copyright with our **interactive guide**.

### 4 REASONS 4 TRADEMARKS

- 1 - DIFFERENTIATION
- 2 - PROTECTION
- 3 - REPUTATION
- 4 - REVENUE

Explore the benefits of trademarks with our **interactive guide**.

### 4 REASONS 4 DESIGN RIGHTS

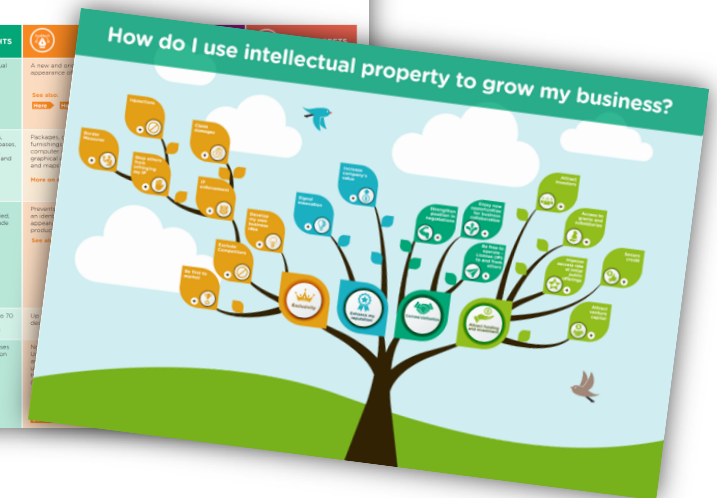
- 1 - EXCLUSIVITY
- 2 - COMMERCIALISATION
- 3 - REPUTATION
- 4 - VALUE

Explore the benefits of design rights with our **interactive guide**.

Which types of intellectual property do you need?

Filter table columns

	PATENTS	COPYRIGHTS	TRADEMARKS
What do they protect?	An invention, a new and innovative way of doing something, or solving a technical problem <a href="#">See also</a> <a href="#">More</a>	A work, an original intellectual creation <a href="#">See also</a> <a href="#">More</a>	A new and distinctive sign <a href="#">See also</a> <a href="#">More</a>
Examples of what is protected	Inventive products and processes in all areas of business For examples of successful inventions by SMEs <a href="#">See also</a>	Audio-visual works, pictures, graphics, architecture, databases, software, designs, literature, novels, poems, plays, music and video, graphic works <a href="#">See also</a>	Packaging, logos, slogans, names, and other distinctive signs <a href="#">See also</a>
How are my rights protected?	Prevents unauthorised making, using or selling of the patented invention	Prevents the work being copied without authorisation; restricts publication, distribution or public performance and display of the work Protects the integrity and attribution of the work Related rights: Public performance and display of the work <a href="#">See also</a> <a href="#">More</a>	Prevents an unauthorised use of the trademark <a href="#">See also</a>
How long is my innovation protected?	Up to 20 years	Lifetime of the author +50 to 70 years after death (depending on the country)	Indefinite
Do I have to register it?	Yes, filing an application to a patent office is required More on patent applications in: <a href="#">UK</a> , <a href="#">EU</a> , <a href="#">China</a> , <a href="#">USA</a> , <a href="#">India</a> , <a href="#">Japan</a>	No, copyright protection arises automatically with its creation <a href="#">See also</a> <a href="#">More</a>	Yes, filing an application to a trademark office is required <a href="#">See also</a> <a href="#">More</a>





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# Connectivity is one of the automotive megatrends

## Megatrends

- Autonomous driving
- Connectivity
- Electrification
- Shared mobility

“But the transformation of the car will go far beyond drives. It is becoming a highly complex, connected device, like a “tablet on wheels”, if you like.”

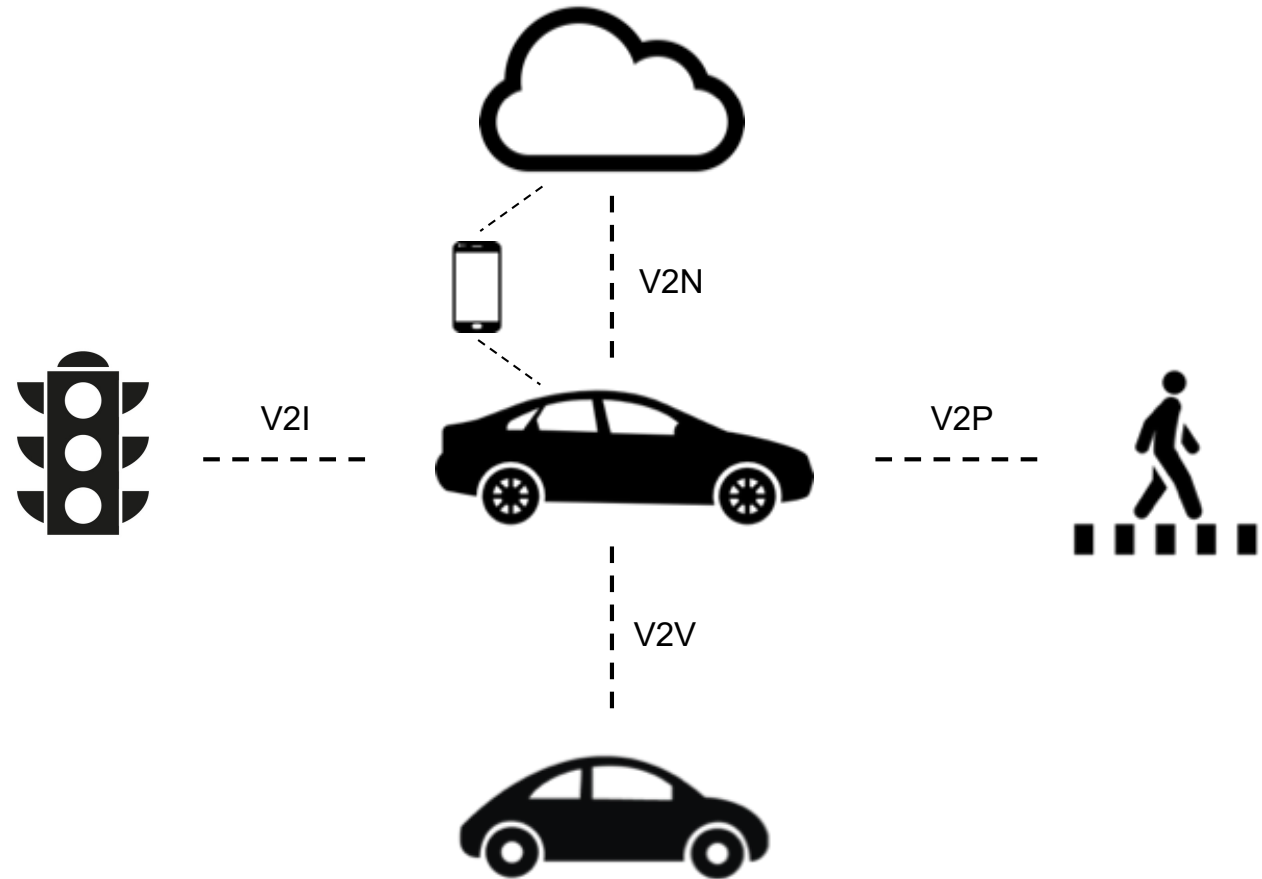
- *Herbert Diess, Chairman of the Board, VW Group in Letter to Shareholders, 2018*

“Our aim remains to be both a driving force and an innovator, able to lead individual mobility into a new era for our customers: one that is sustainable, connected and autonomous.”

- *Harald Krüger, Chairman of the Board, BMW in Letter to Shareholders, 2018*

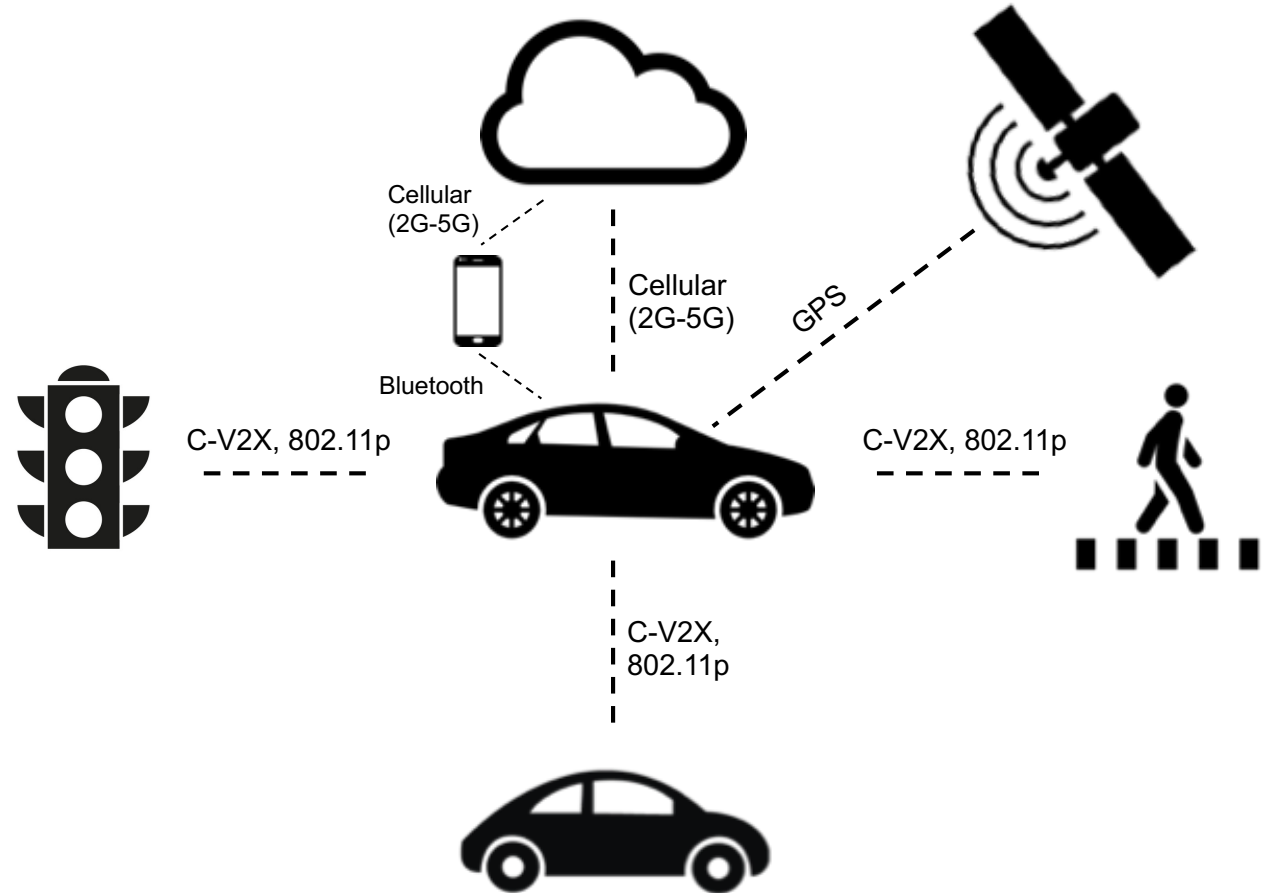
# The growing value of connectivity in vehicles

- **Present**  
Primarily complementary value-added services
- **Future**  
Mandatory system defining core vehicle functionality



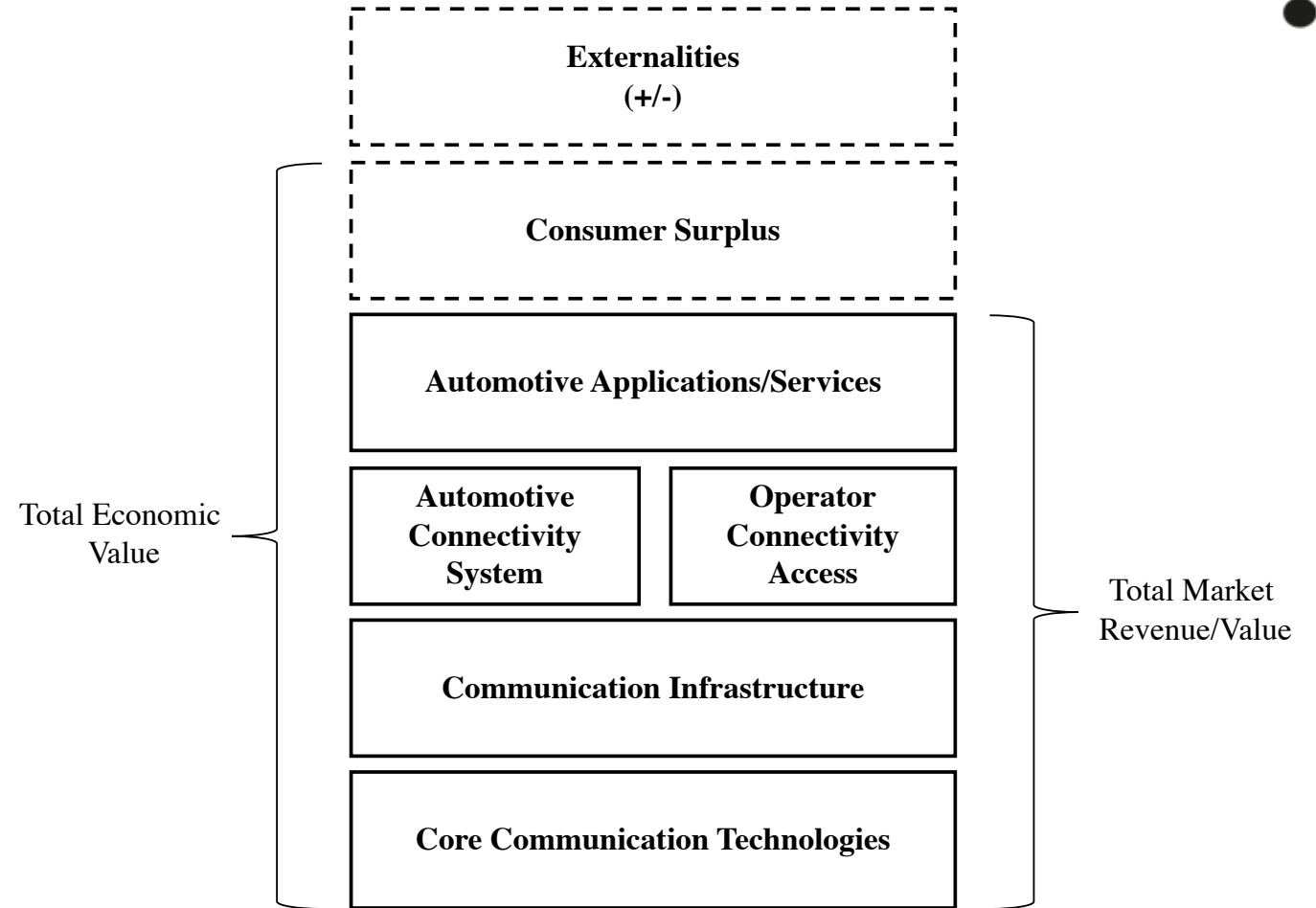
# The growing value of connectivity in vehicles

- **Present**  
Primarily complementary value-added services
- **Future**  
Mandatory system defining core vehicle functionality



# The automotive connectivity value stack

- Total value of connectivity – direct and indirect
- Focus on the value enabled by connectivity, not the vehicle value
- Competition between vehicle and smartphone platforms





# Automotive connectivity value pools

- Consumer WTP: \$210-1,215
- Producer WTS: \$330-22,645
- Total Revenue (per connected vehicle)
  - \$670 (US)
  - \$593 (WW)
- Total Revenue (per 4G vehicle with GM Onstar)
  - \$1,522 (US)
  - \$634 (WW)

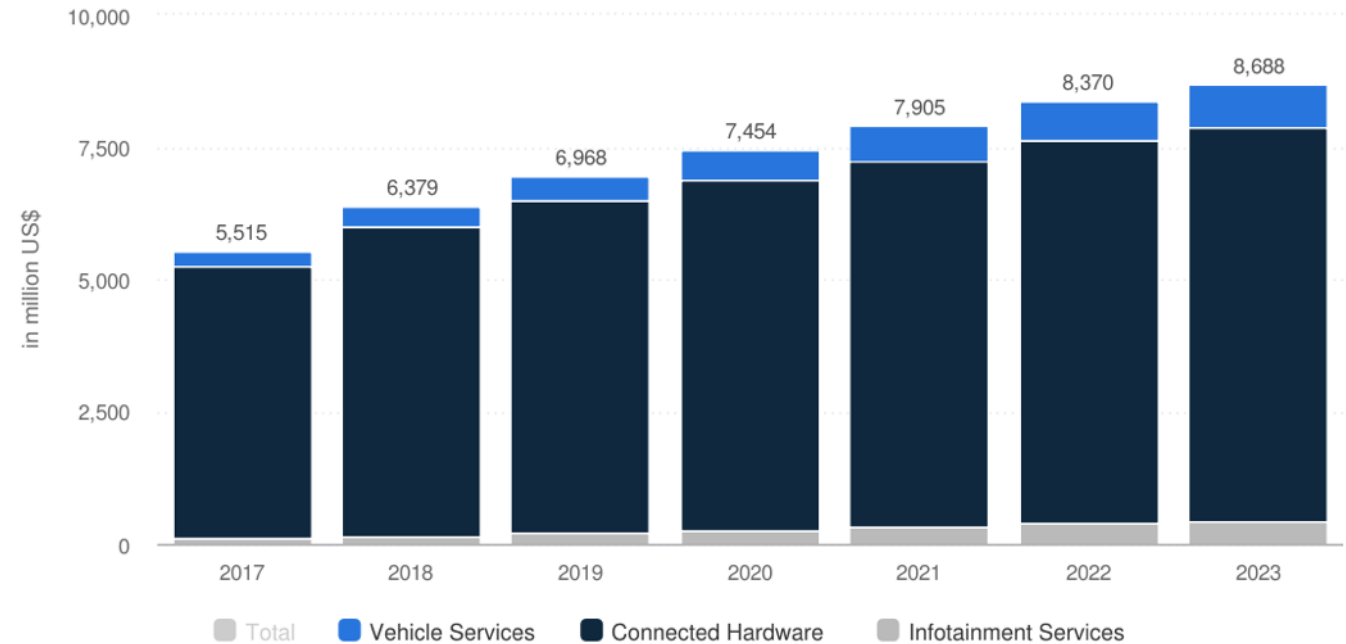
Revenue pool	2018	2023
Vehicle hardware	17,511	27,901
Vehicle services	885	2,335
Infotainment services	346	1,284
Usage-Based Insurance (UBI)	15,620	65,342
Smart parking	17,800	35,800
Fleet management services	16,756	31,636
Ride-hailing	153,591	318,765
<b>Total</b>	<b>222,509</b>	<b>483,063</b>

# Present - Automotive connectivity as a complementary service(s)

- Embedded Car Revenue:
  - \$6.4B US (2018)
  - \$18.7B WW (2018)
- Connected Cars:
  - 10M/39M US (2018)
  - 32M/119M WW (2018)
- Revenue/Car:
  - \$670 US (2018)
  - \$593 WW (2018)

## Revenue in the Connected Car market

in million US\$ (United States)



Source: Statista, March 2019

statista

Source: Statista (2019). Author's calculations

# Future - The vehicle as a connectivity-enabled value proposition

- Implementation of V2X
- Autonomous Vehicles
- Increase in positive externalities
- Connectivity-enabled services forecast over \$250B by 2025 and over \$2T by 2030



Source: GSMA (2019), Bosch (2017), Machina Research (2017), McKinsey (2016).

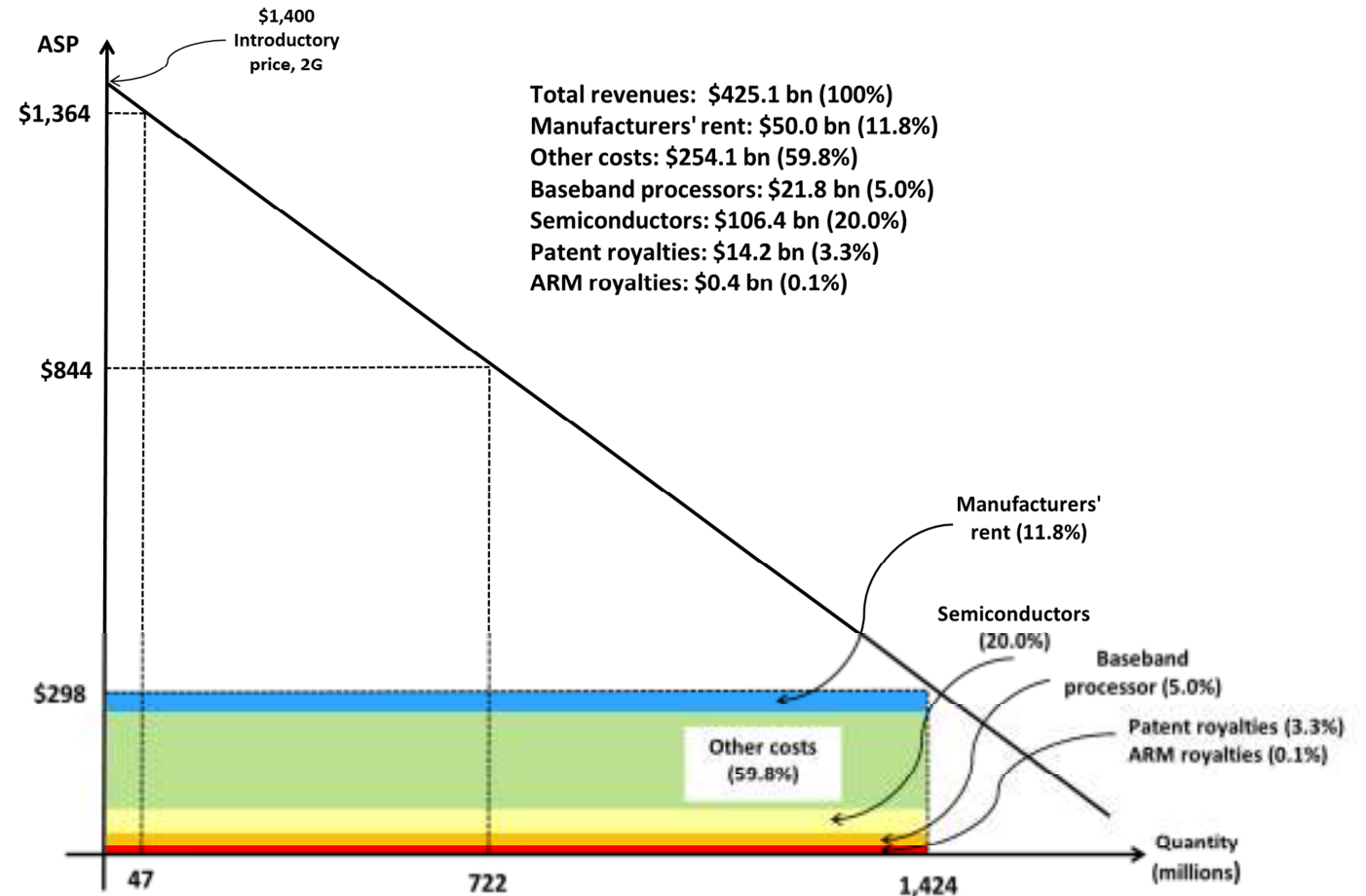
# The battle of two market failures in mobile telephony

- **Upstream** – R&D
- **Downstream** – Products/Services



# The empirical evidence from the smartphone market

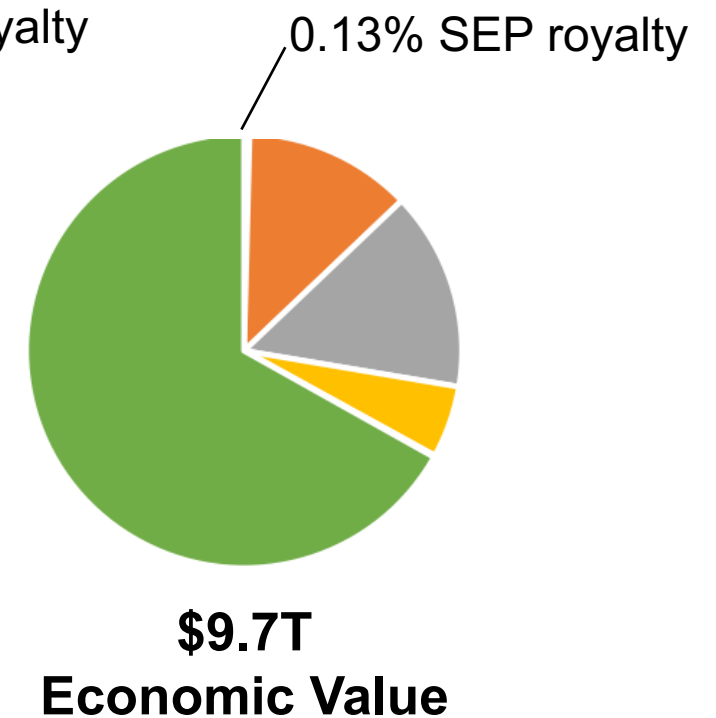
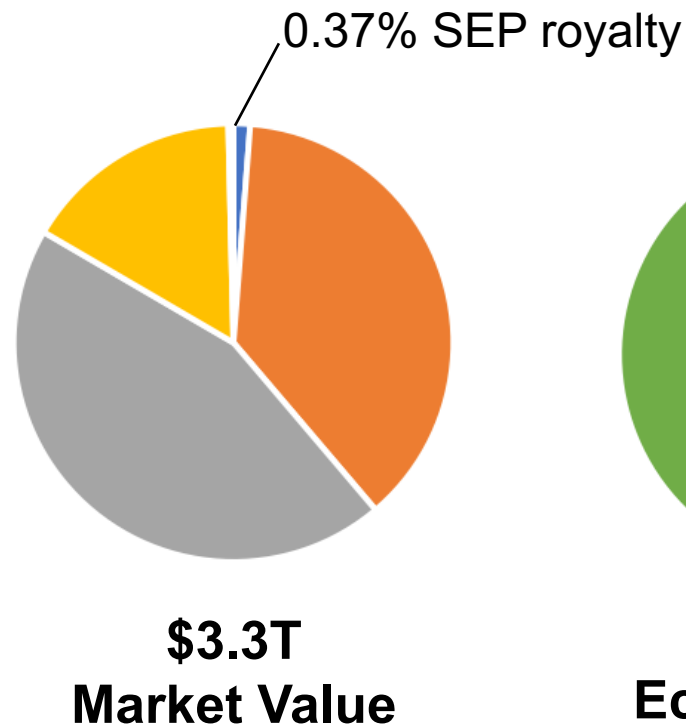
- Total Revenue: \$425B (2016)
- Consumer Surplus: \$784B (2016)
- SEP Royalties: \$12.4B (2016)
- SEP Royalty Rate:
  - 2.9% (revenue)
  - 1.0% (economic)



Source: Galetovic, Haber, and Zaretzki (2018)

# The share of SEP value in comparison with total mobile economy

- Total Mobile Revenue: \$3.3T (2014)
- Consumer Surplus: \$6.4T (2014)
- SEP Royalties: \$12.4B (2016)
- SEP Royalty Rate:
  - 0.37% (revenue)
  - 0.13% (economic)

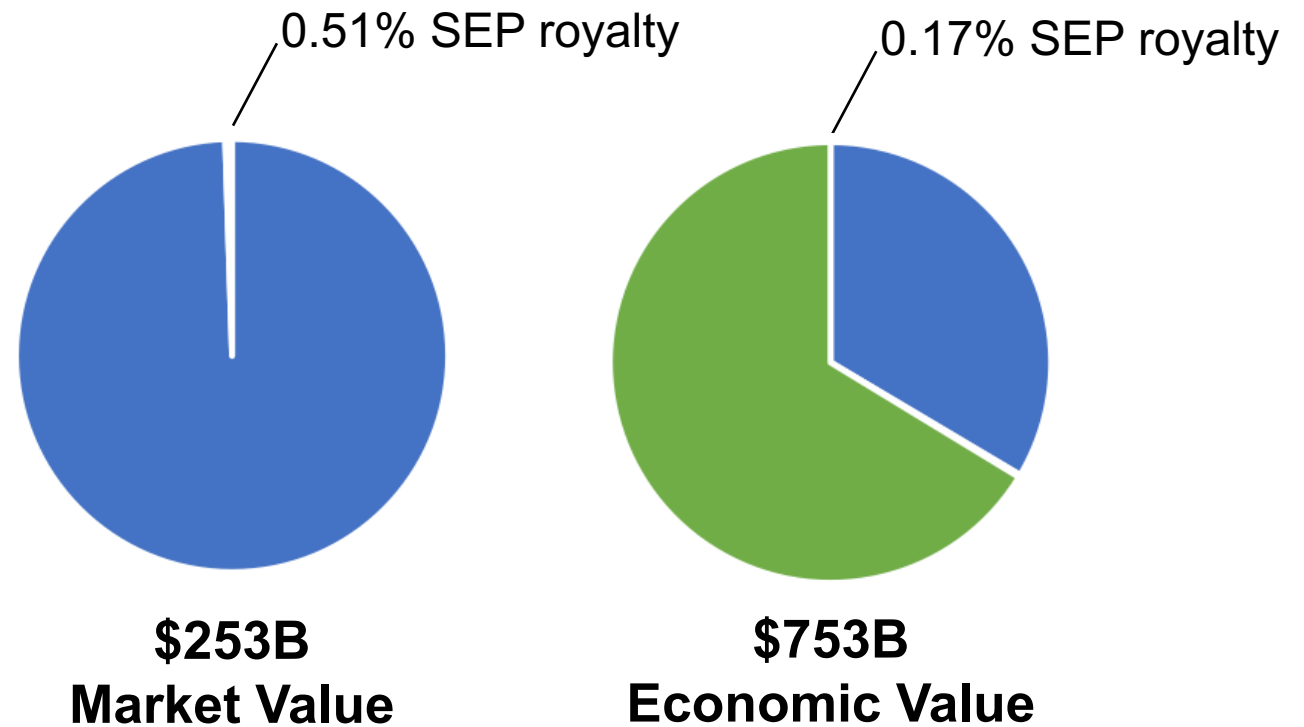


Source: BCG (2014). The Mobile Revolution: How Mobile Technologies Drive a Trillion-Dollar Impact. Author's calculations.



# The share of SEP value in comparison with total connected vehicle economy

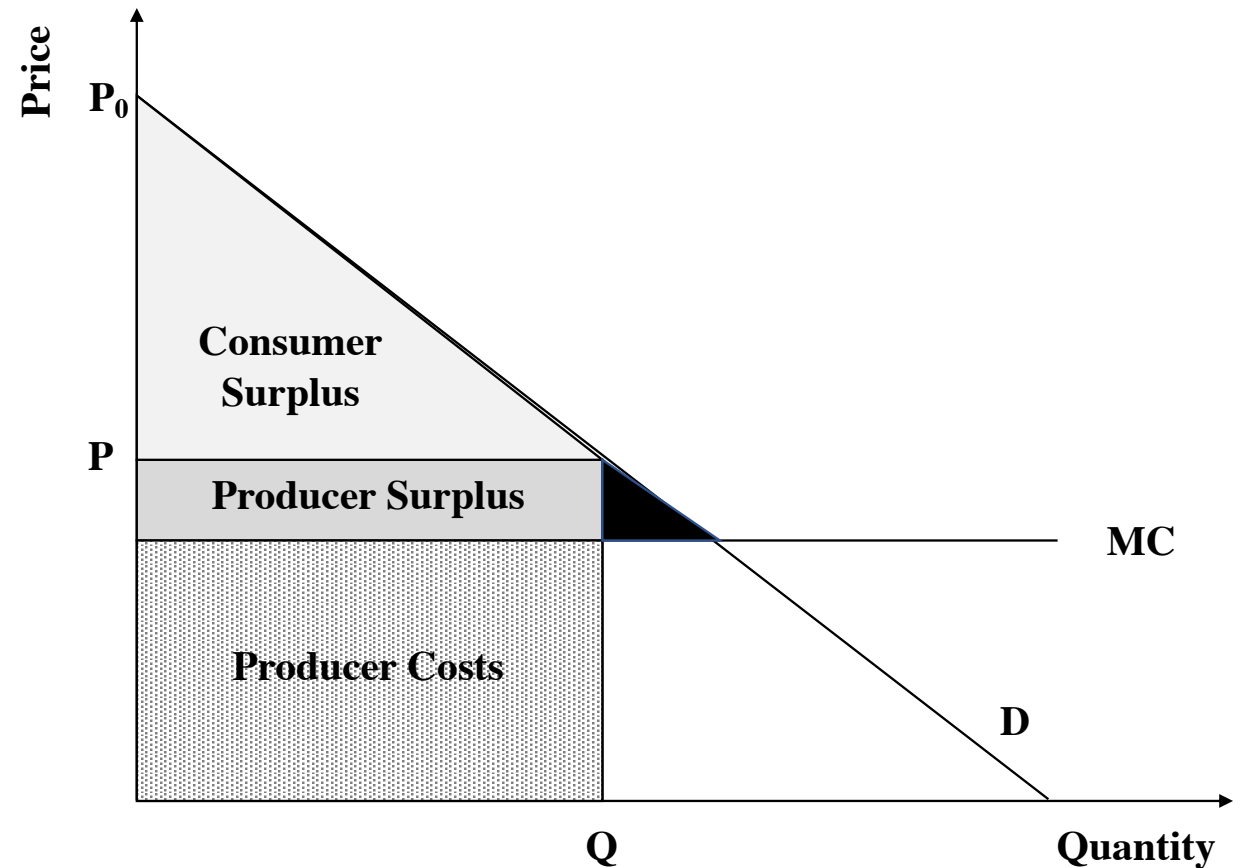
- Total CV Revenue: \$253B est. (2025)
- Consumer Surplus: \$500B est. (2025)
- SEP Royalties: \$1.3B est. (2025)
- SEP Royalty Rate:
  - 0.51% (revenue)
  - 0.17% (economic)



Source: Machina Research (2017). Author's calculations.

# Principles of (SEP) valuation

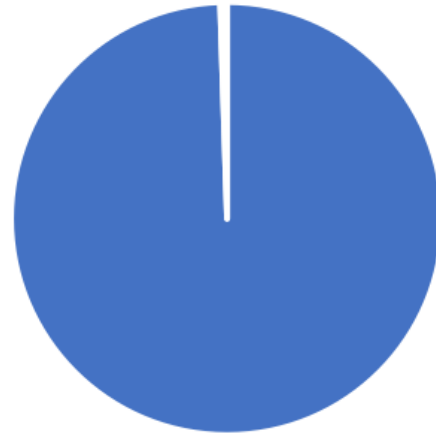
- Price theory defines value as the consumers' WTP
- Connectivity is an enabling technology that underpins value creation in different use-cases
- Market transactions are the means by which value is revealed
- Externalities are also important sources of value
  - Multi-sided markets
  - Other value spillovers





## For discussion ...

- Good news – connectivity is creating value for everyone
- Implementers need to prioritize the other 99.5%



- SEP holders need to focus on norms and timing

## Q & A

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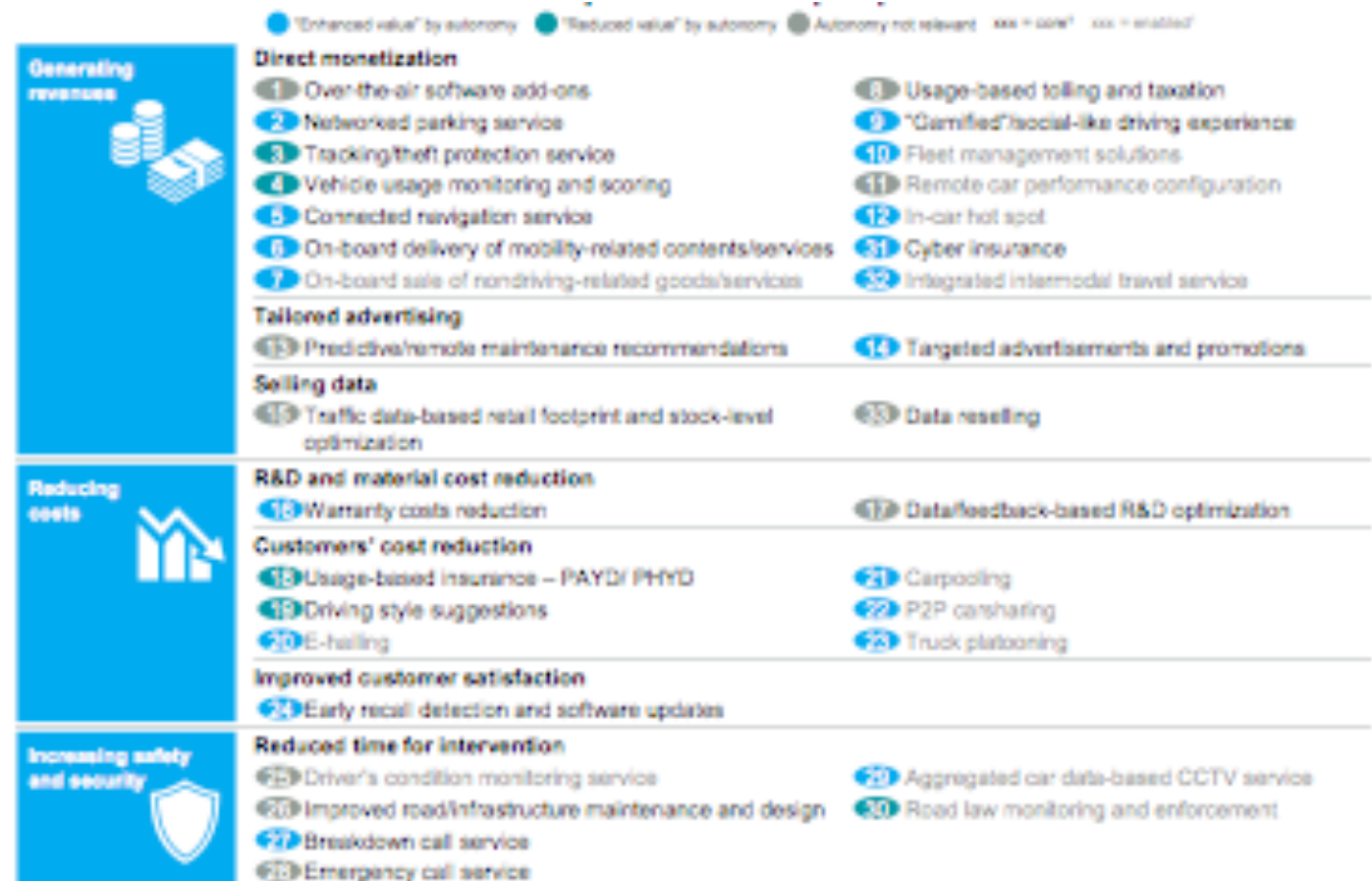
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# Present - Automotive connectivity as a complementary service(s)

- Valuation:
  1. Increase in vehicle revenue at sale
  2. Service revenue over the life of the vehicle
- Revenue vs. Cost
- Car vs. Smartphone



Source: McKinsey Center for Future Mobility (2018). From buzz to bucks – automotive players on the highway to car data monetization.

# Dynamic factors influencing future value

- The growth of connected vehicles
- The growth and adoption of connected vehicle applications, especially V2X and AD/ADAS functionality
- The growth in performance of connectivity standards
- Potential changes in the structure of the market and the choice of business models
- The competition between the vehicle and the mobile ecosystems
- Governmental policies and regulations