FROST & SULLIVAN

Evolution of Mobility – New Business Models and Impact on the Value Chain

THE 2ND INTERNATIONAL CONFERENCE ON
FutureMobility
INNOVATION IN SMART, CLEAN AND CONNECTED MOBILITY

المؤتمر الدولي الثاني
لمركبات المستقبل
الابتكار في المركبات الذكية و الصديقة للبيئة

Kaushik Madhavan, Mobility Practice

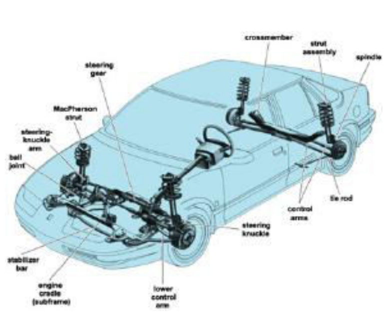
November 2016

Transformational Shifts Reshaping the Future of Mobility

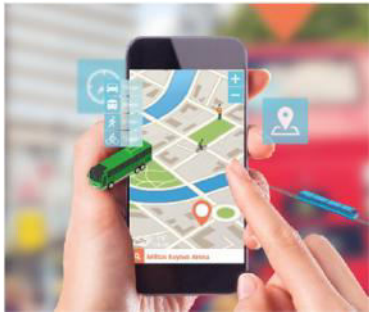
Connectivity

Cognitive Era and Autonomous Mobility

Digitization of Auto Retail



Integration of Vehicle Systems



New Business Models

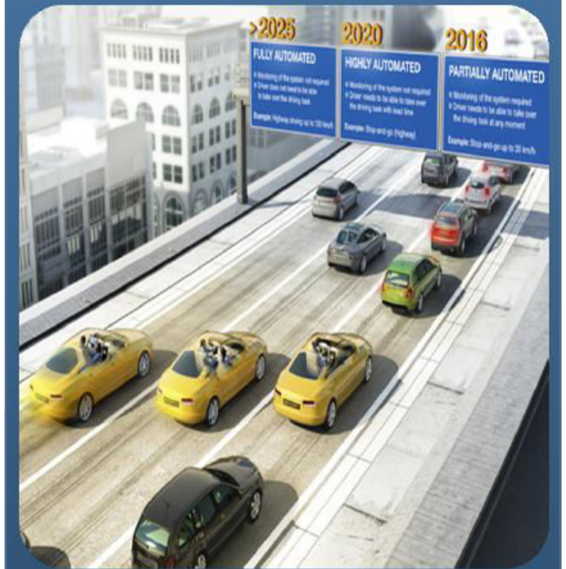
Health Wellness and Wellbeing in Cars

VW Dieselgate & Electrification

Industry 4.0

Implication: 5G and Satellites boom will make our cars cognitive and intelligent

High to Fully Automated Driving



Over 2 Gb data needs to be harnessed at a given point. Needs 5G speed

Over the Air Updates

Smart compression and high internet speeds will reduce update times by 50%

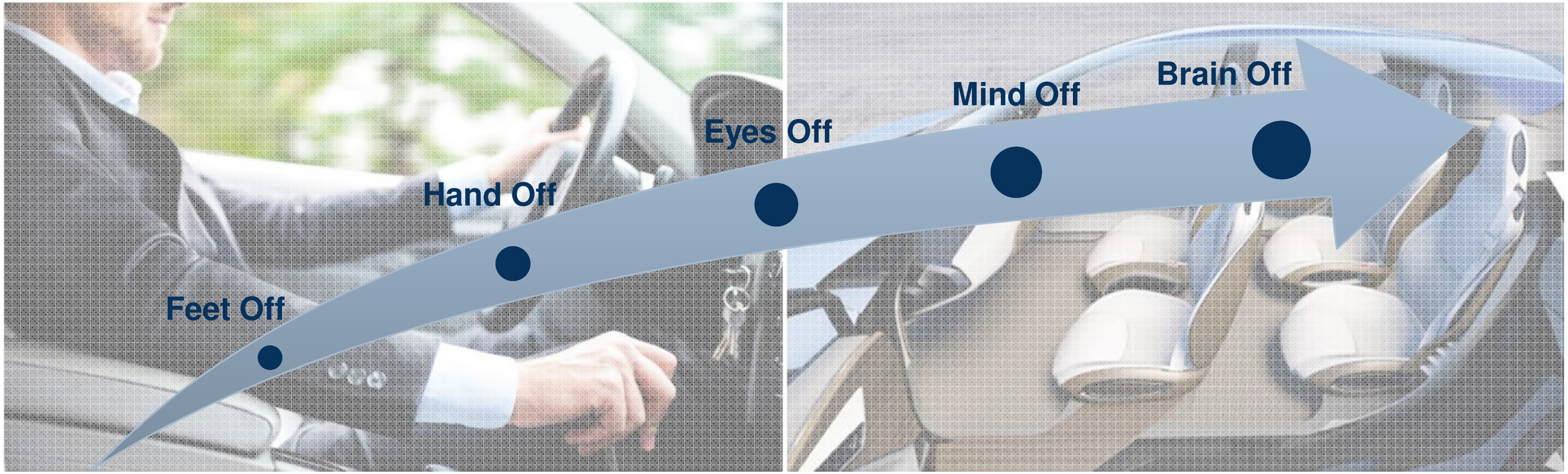
Augmented and Virtual Reality

Continuous processing of real-time information to windshield

Source: Frost & Sullivan

Sub Trend: Autonomous Cars - $60bn per annum market opportunity in 2030

Human —— Change in Responsibility ——> Machine



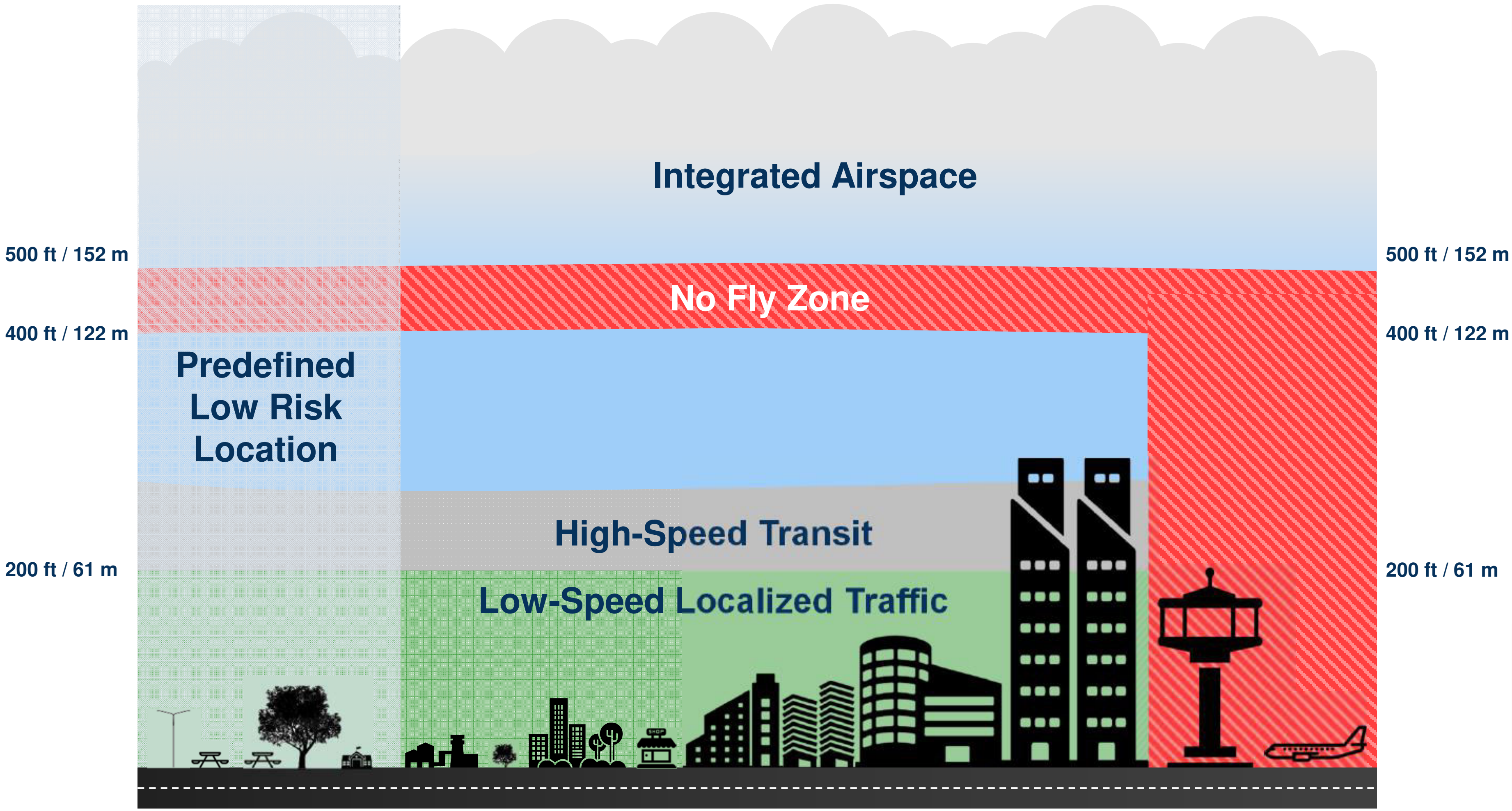
Current Level

	2011	2016	2018	2025	2030
No Assist	Early Warning Systems	Traffic Control	Awareness for Takeover	General Awareness	Full Autonomous Driving
Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
New Vehicles	40 million	15 million	5 million	2 million	1 million

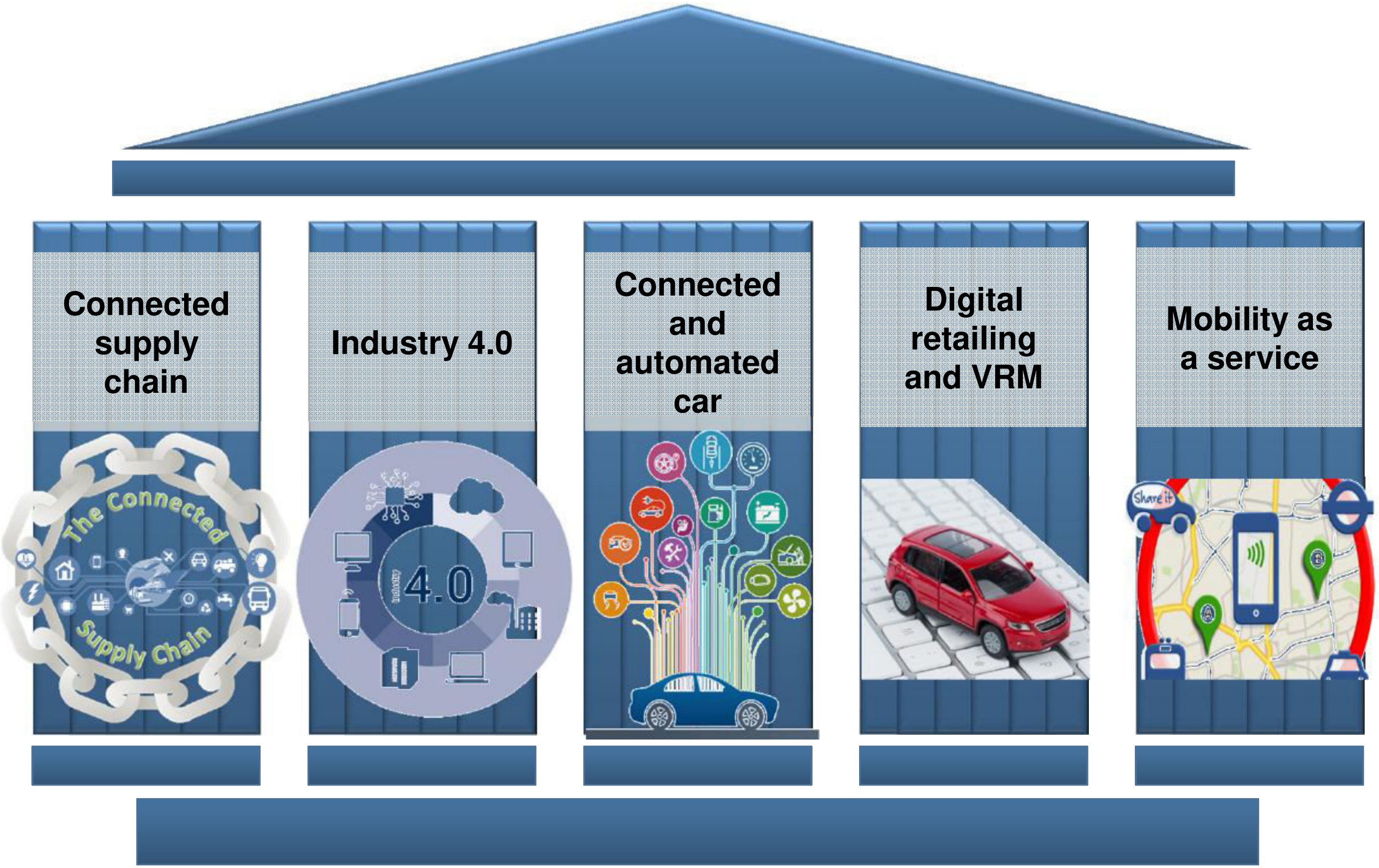
Future of Delivery Case Study ; Amazon Prime - Airspace

Amazon proposes a 200-foot designated airspace – between 200 and 400 feet from the ground – to be reserved for drone flights,

Amazon Airspace Design for Small Drone Operations

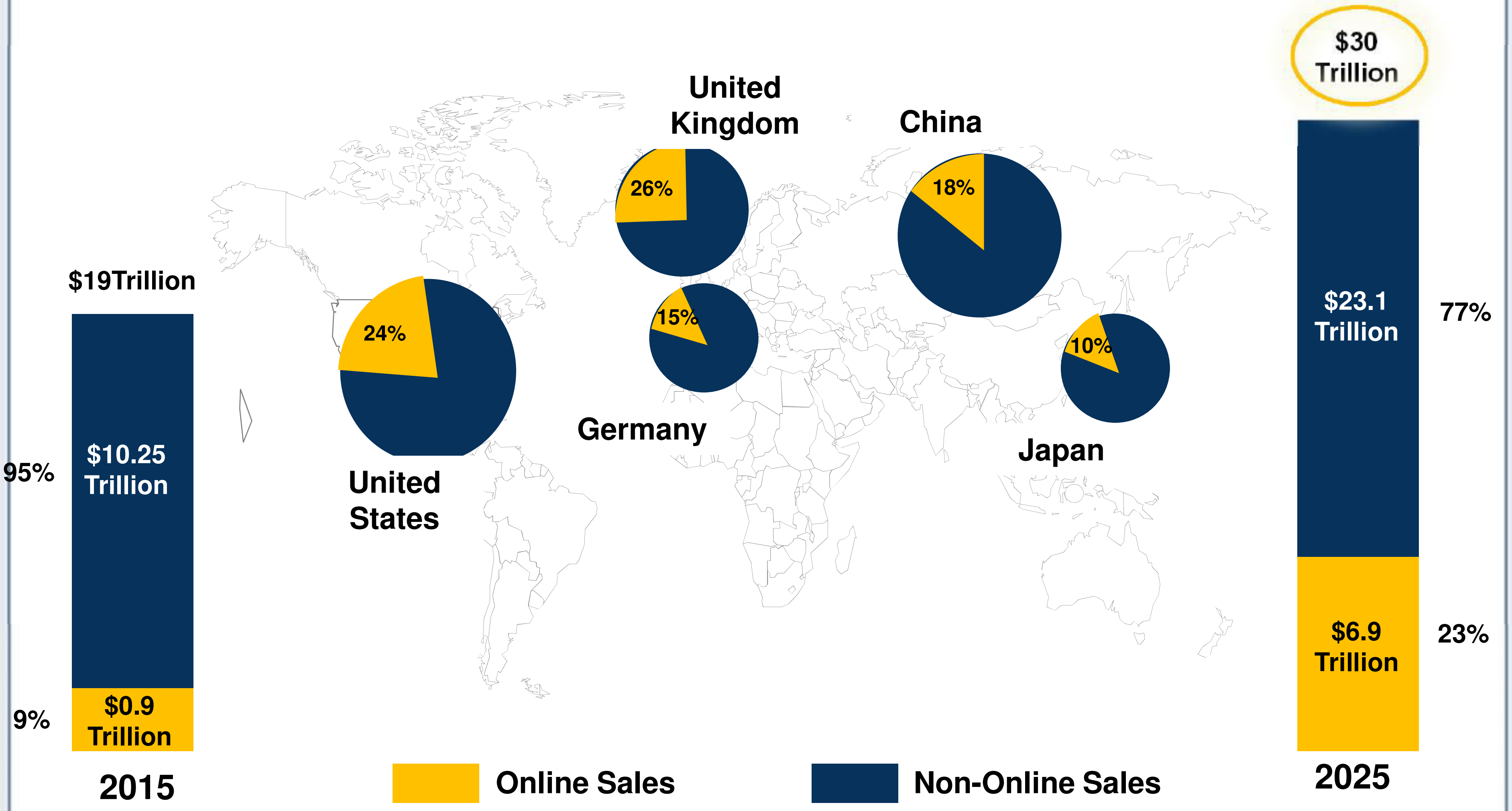


The Five Pillars of Digitization For The Automotive Industry to Reach Nirvana



Digitization of the Retail Network

Global Online Retail Sales To Reach $6.9Trillion By 2025 Accounting for 23% of Total Retail

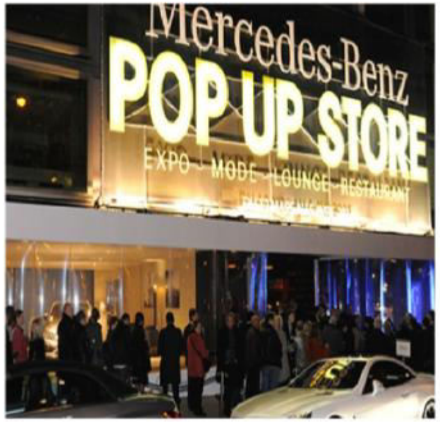


Source: Frost & Sullivan

Bricks n clicks in Car Retailing

Digital Flagship Stores

Lifestyle Stores



Pop Up Stores

Mobile retailing

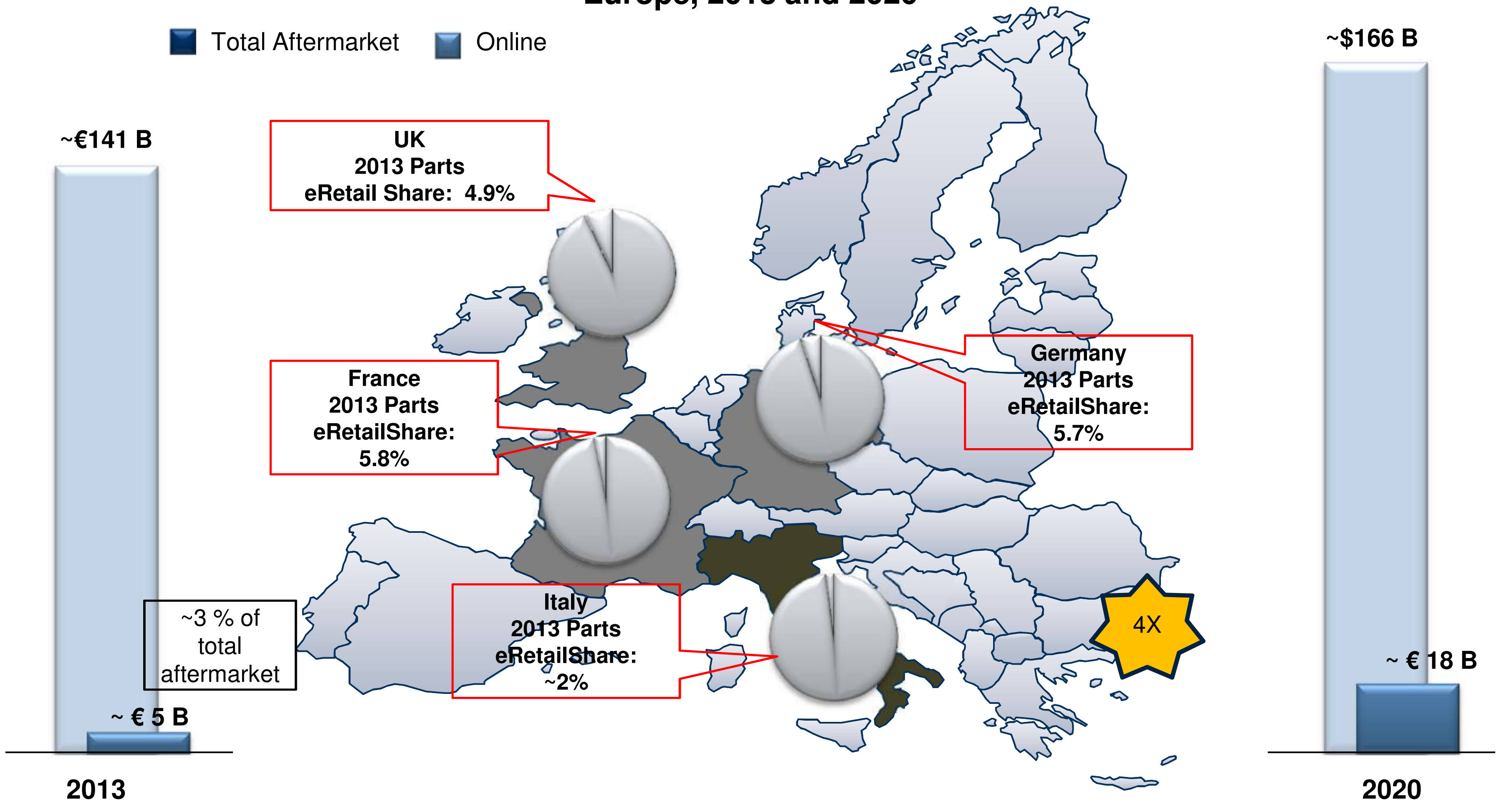
On-line retailing

3rd Party Online Stores

Digitalization of the Aftermarket Parts Market

€5bn worth of parts sold on-line and expected to grow four folds by 2020 in EU

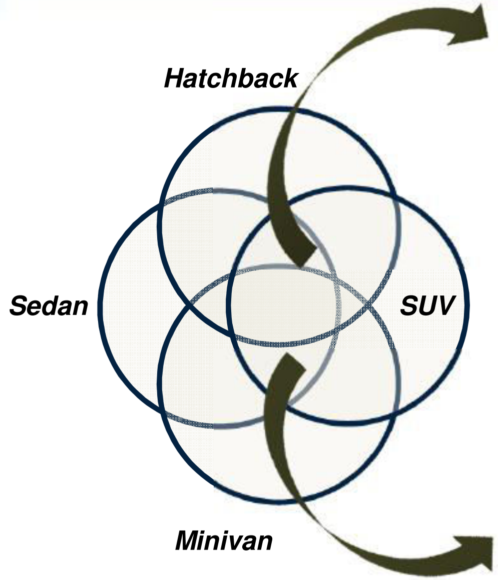
Automotive Parts and Service eRetailing Market: Online Parts vs. Total Aftermarket, Europe, 2013 and 2020



Note:. All figures are rounded. The base year is 2013. Source: Frost & Sullivan

Scaling up of Trifecta Vehicle design

OEMs are adopting a triple crossover vehicle design to provide optimal cabin space with maximum vehicle performance.



The Trifecta proposition , where more 3 traditional body styles are crossed for a "hybrid".

Trifecta	Body Type 1	Body Type 2	Body Type 3	Example
1	Sedan	Minivan	SUV	Tesla Model X
2	Minivan	SUV	Hatchback	Volvo V40cc
3	SUV	Hatchback	Sedan	Suzuki SX4
4	Hatchback	Sedan	Minivan	Mercedes B Class

Mercedes-Benz

GLA

A Class

Luxury OEMs differentiating lower segment vehicle models through trifecta design

HONDA

H-RV

CRZ

Volume OEMs adapting trifecta design in SUV/Higher segment models

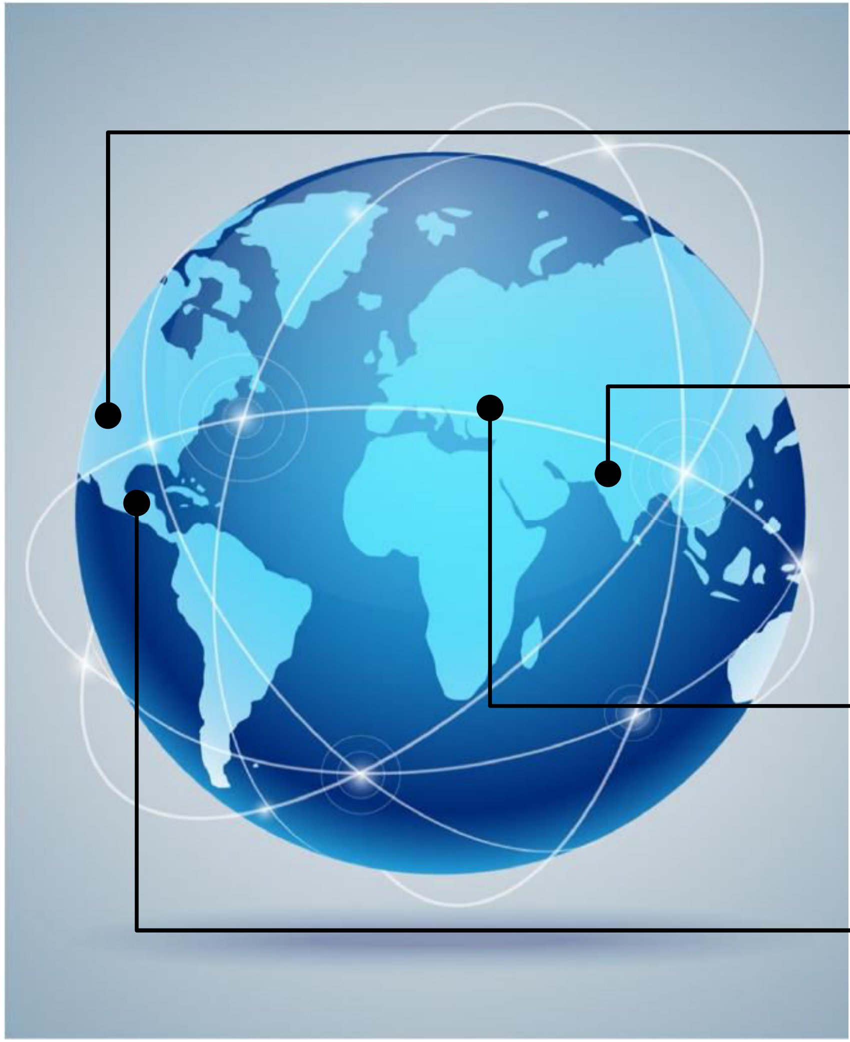
Insight

Model X

OEMS adapting trifecta design to electric and hybrid vehicles for better aerodynamics

Mobility Business Models - Traditional Carsharing's Untapped Potential

The global car sharing market has grown by over 30% over the past year to reach 8 million members today



Region		No. of Users	No. of cars	Carsharing Cities	Carsharing Operators	New Entrants
North America		1.6 Million	24,644	~127	38	4
	2025	11.04 Million	137,367			
Asia Pacific		3.09 Million	36,660	~127	38	2**
	2025	7.22 Million	90,382			
Europe		3.16 Million	50,041	~1,305	197	6
	2025	17.30 Million	186,746			
Latin America		16,743	291	12	6	2
	2025	419,522	4,983			

Sub Trend: Proliferation of the e-Hail Concept

One in Two taxis are now connected to a tech platform

Taxi Industry: Snapshot of Key Taxi Apps, Global, 2015

USA

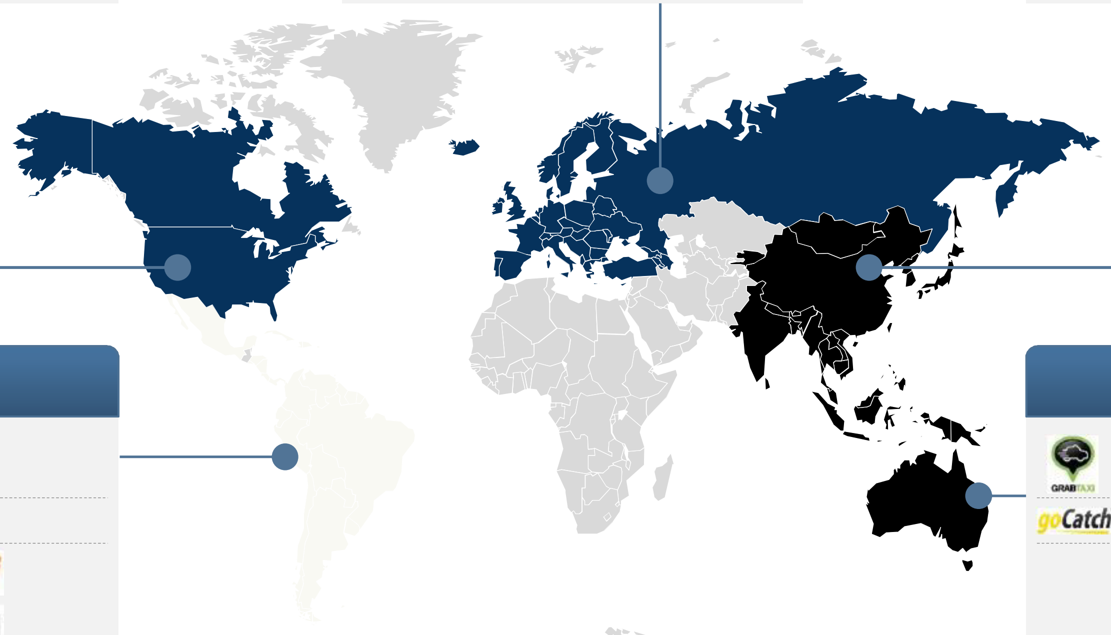
UBER	More than 8 million users
lyft	631,000 users

Europe

HAIL O	More than 4 million users
mytaxi	10 million users

SE Asia

快	250 million users
OLA	25 million users



LATAM

EASY TAXI	17 million users
TAPPSI	1 million users

Asia Pacific

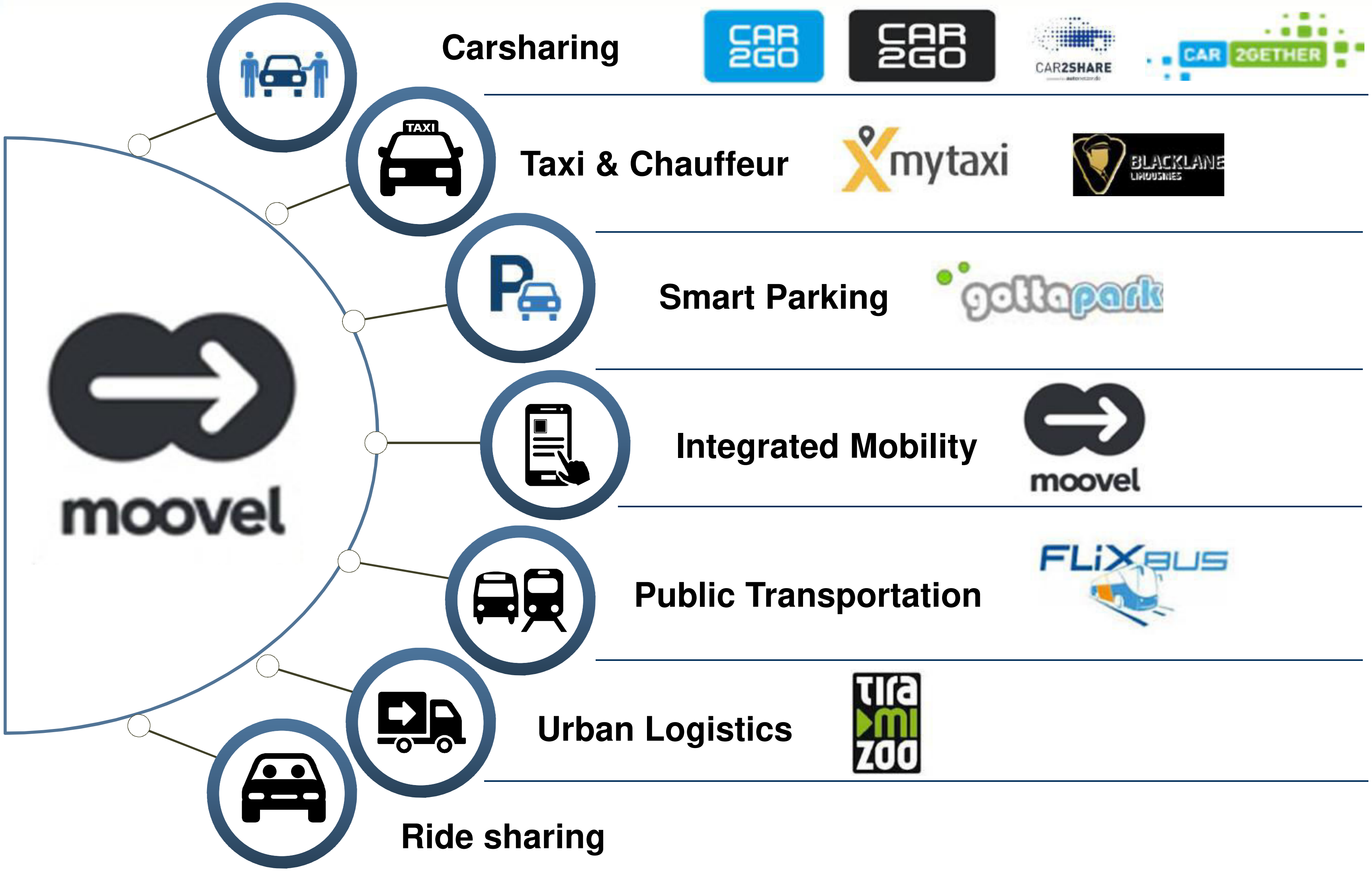
GRABTAXI	40,000 monthly users
goCatch	350,000 users

Number of Connected Vehicles: > 2,000,000 | 500,000 - 2,000,000 | < 500,000

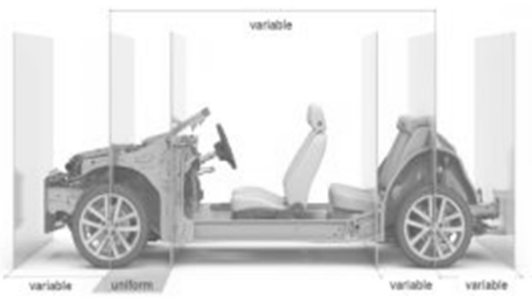
Source: Frost & Sullivan

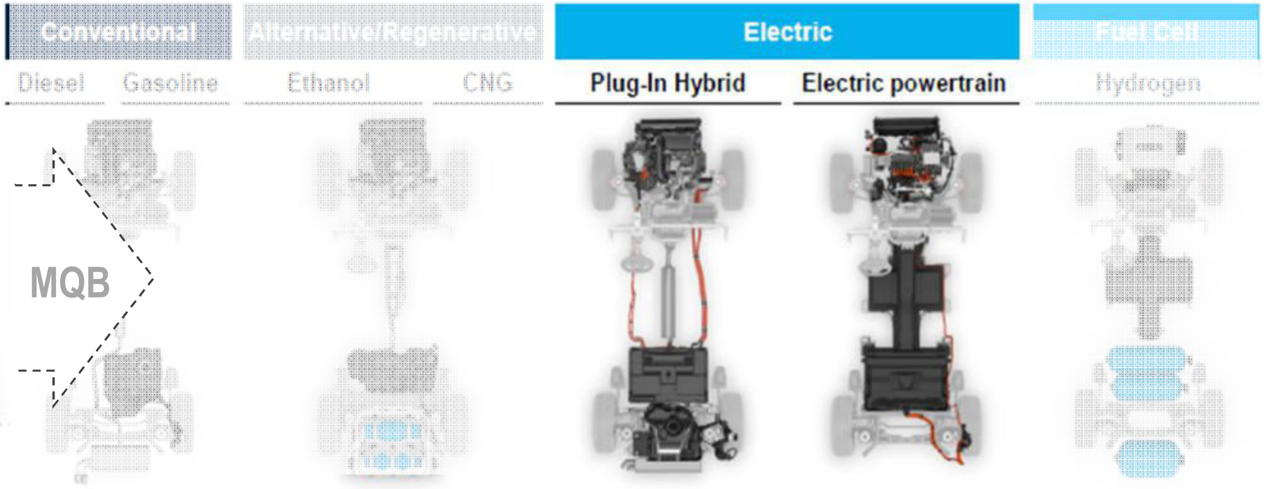
Sub Trend: OEMs moving toward CAAS – car as a service –

Case Study: Daimler (Moovel gmbh) Daimler's mobility services have reached over €100mn in revenue in 2014 and, the company has targeted revenues of €800mn by 2021/2022



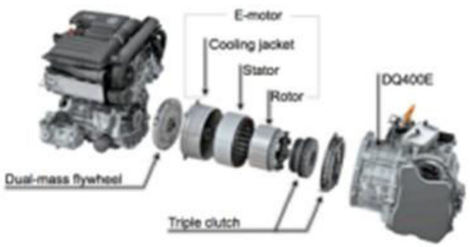
VW Dieselgate reshaping the auto landscape VW and the global automotive Industry is shifting gears to a electrified future (2025 and beyond) as a more sustainable solution.





Battery pack of varying capacity, an 85-kW electric motor system, and/or a motor-integrated version of its DSG.

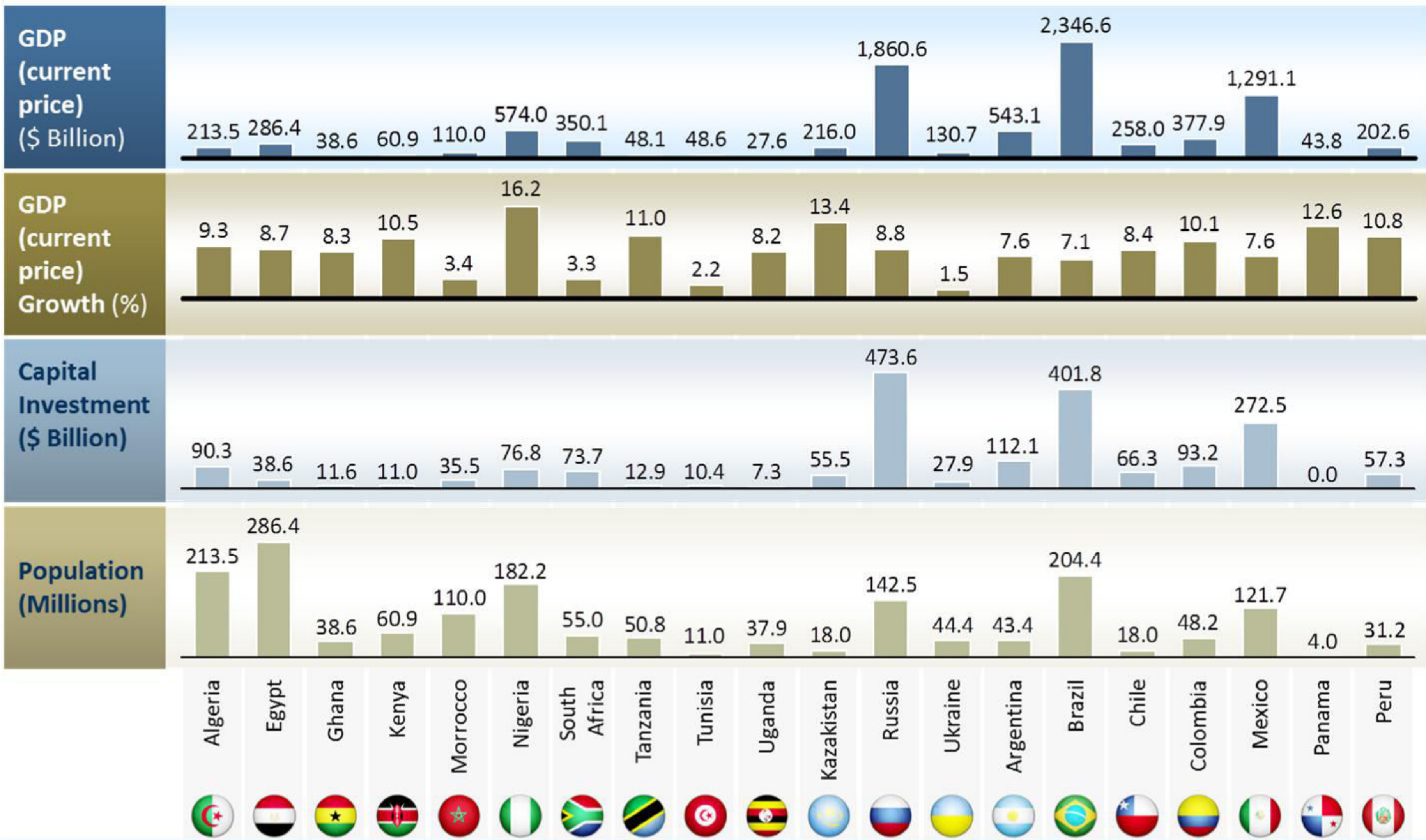
Flexibility in packaging afforded by:
- -MQB platform
- -Vehicle-electrification toolkit



2012-2015			Beyond 2016
e-Golf (all-electric hatchback)	**Audi A3 e-tron** (sporty plug-in hybrid),	**Golf GTE** (companion plug-in hybrid model).	**Others** (Planned PHEVs). • Tiguan crossover • Larger mid-size SUV.

Macro Economic Parameters directly impacting the Automobile Industry

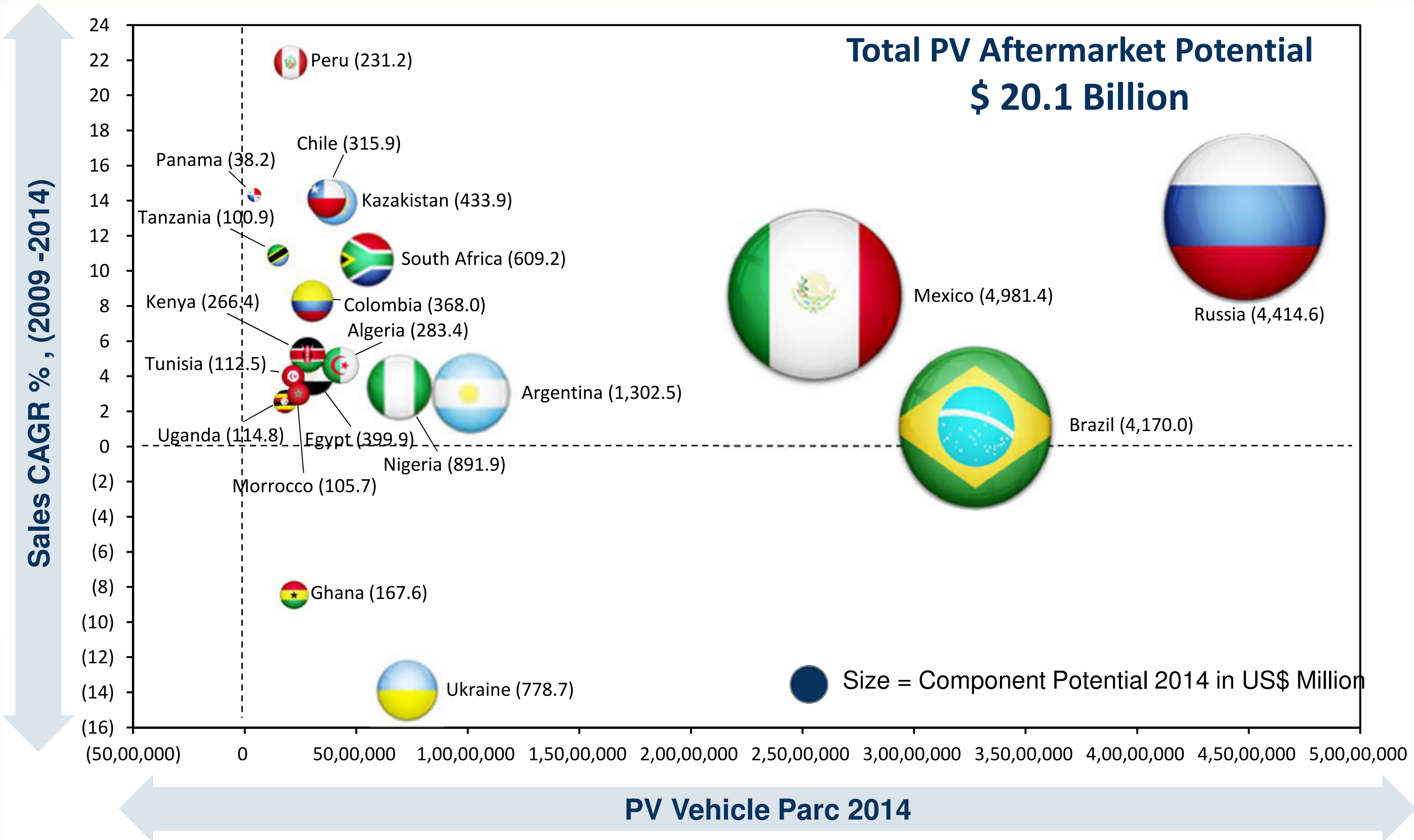
Argentina, Algeria and Columbia are the upcoming economies within the set of 20 countries



Confidential

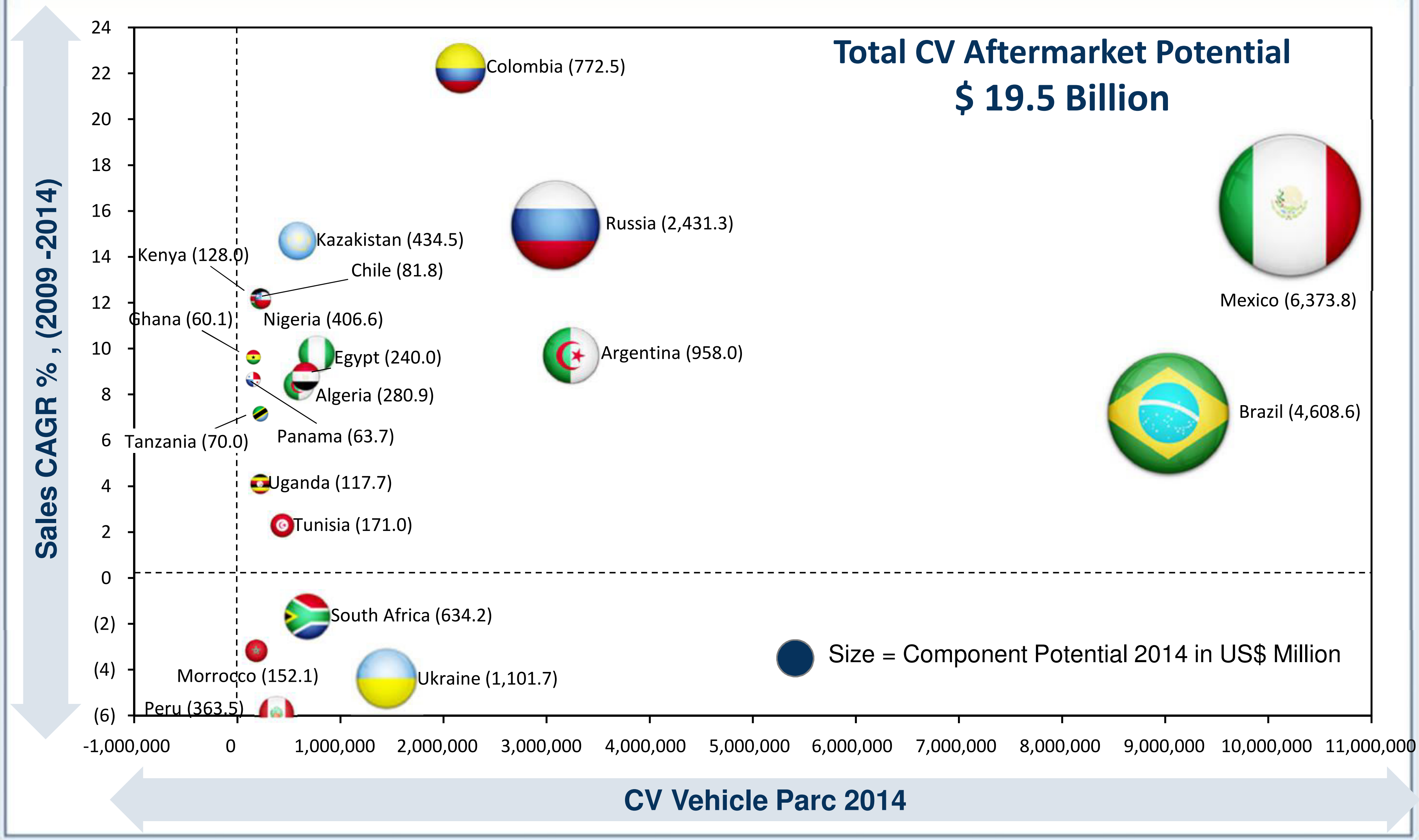
Total PV Parc vs. Component Potential vs. Sales CAGR

Ukraine has high potential, however the last 5 years CAGR is negative



Total CV Parc vs. Component Potential vs. Sales CAGR

Colombia has the highest CAGR in last 5 years



Aftermarket Outlook—Trends Impacting Vehicle Service

Service bay of the future are going to evolve under influence of both vehicle as well as market related trends

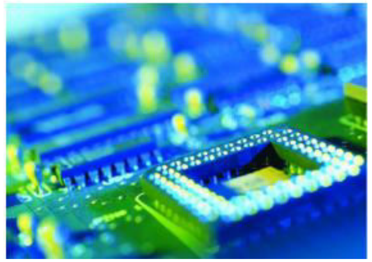
Global Automotive Aftermarket Outlook: Top Trends Impacting Vehicle Service Bay of the Future, 2015

Vehicle Side

Connected Vehicles
Telematics, Remote diagnostics

Electric Vehicles
Plug and play components

Light Weighting
Materials unfriendly to repairs

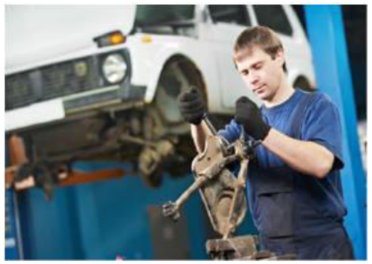


Electronics
Increased complexity

Market Side

Increasing Average Vehicle Age
Long maintenance spend life

Regulatory Environment
Free competition



Technician Skill Gap
Service inefficiency

Eye on Convenience
Power to the hand (hand held tools for technicians)

Note: Images have been used for illustration purpose alone. Source: Frost & Sullivan

Aftermarket Outlook— Future Service Delivery Models

Technology will be at the core of any evolution in future service delivery

Global Automotive Aftermarket Outlook: Future Service Delivery Enablers and Models

Connected Store

Service Delivery Enablers

Service Aggregators	Mobile Applications	Handheld Tools	Telematics
Online presence	Service booking, DIY Corner	Diagnostics, Tablets	Connected Tools

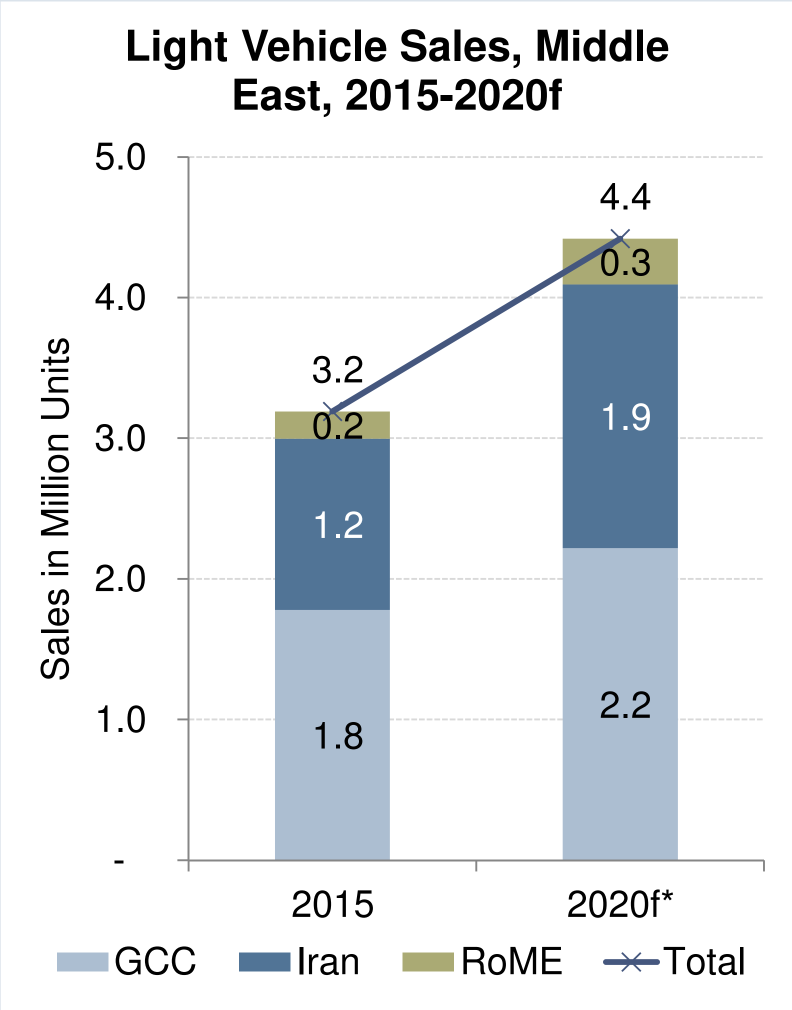
Service Delivery Models

- Remote Diagnostics
- Quick Fit
- Mobile Servicing
- DIY Support

Source: Frost & Sullivan

Vehicle Sales in the Middle East — Review

…oil prices and limited government investment negatively **impacting vehicle sales in 2016** in the GCC countries; in Yemen, Syria and Iraq market potential already reduced to half, however, in most of the ME countries we expect nearly double digit growth from 2017



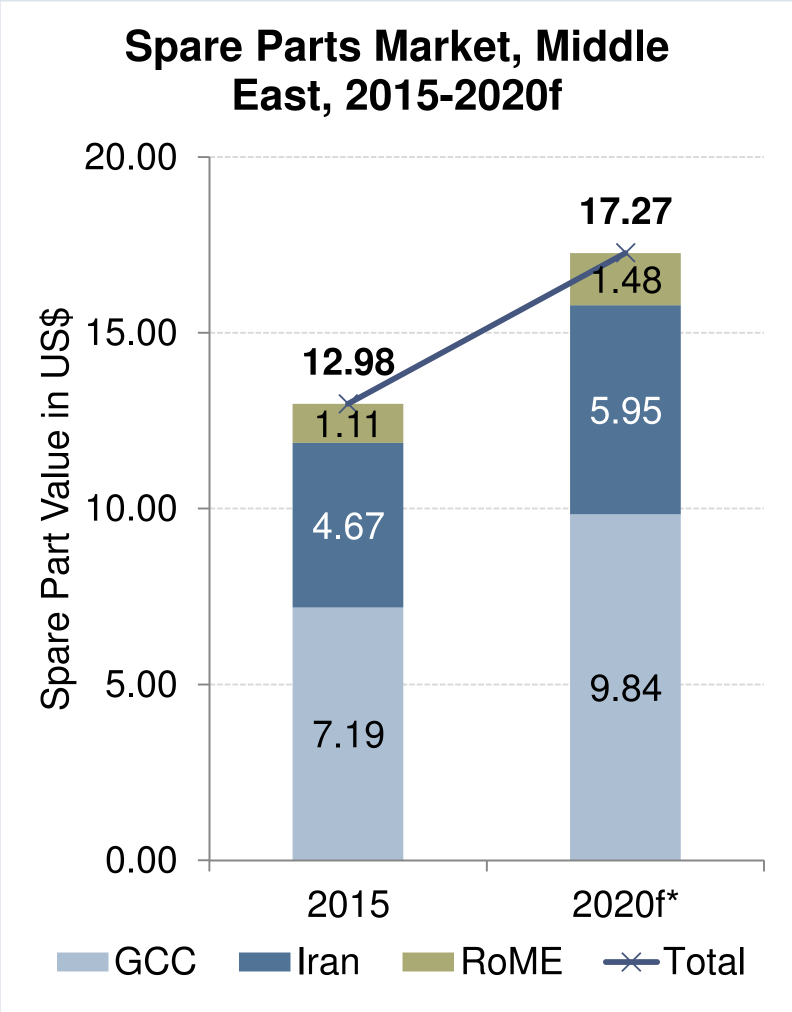
- We are expecting overall CAGR of **9.1%**
- The **GCC countries** likely to grow at **8.5%** CAGR, however 2016 would see decline in vehicle sales, a recovery is expected 2017 onwards
- Iran is ready to lead the region with near double digit growth expected in next 5 years
- **RoME is mainly driven by market recovery in Jordan and Lebanon**. We also expect Yemen to get back to business as usual by 2018 (pertinent to note that **Yemen sold 22,355 vehicles in 2014 which has come down to 7,760 in 2015, similar was the case with Iraq with 44% drop in overall sales [year on year])**
- At overall level **RoME** likely to post **+14% CAGR** by 2020

(*) f=forecast; GCC = Gulf Cooperation Council
CAGR = Compound Annual Growth Rate

Source: Frost & Sullivan Analysis

Spare Parts Demand in the Middle East

…total spare part demand in Middle East estimated at **<u>US$ 12.98 billion (2015), expected to reach US$ 17.27 billion by 2020</u>**
…part per vehicles are highest in **<u>UAE (US$ 512) with an overall average of US$ 373</u>**



- The overall Middle East spare part industry expected to grow at **<u>CAGR 5.9%</u>** (15-20)
  - The GCC = 6.5% CAGR
  - Iran = 4.9% CAGR
  - RoME = 6.0% CAGR
- Parts Per Vehicles (PPV) estimated at $493 for the GCC, $277 for Iran and $333 for RoME, overall we are expecting 4-5% increase in PPV by 2020.
- In the GCC, **<u>Saudi Arabia and UAE together dominate 72.5%</u>** market share where as **<u>RoME led by Jordan and Lebanon with +70% market share</u>**

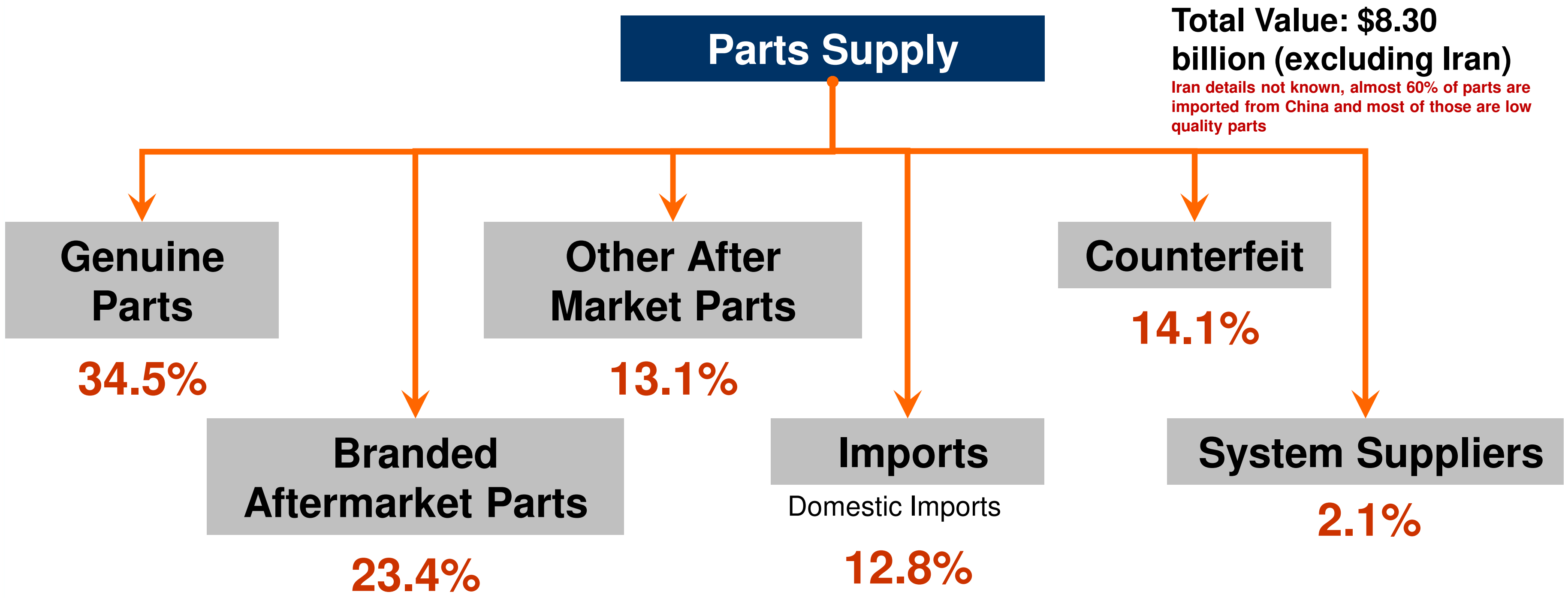
<u>Note</u>: For Iran it includes part fitted with locally assembled vehicles whereas for all other countries it is replacement demand

The market revenue does not include labor and accessories
f=forecast

Source: Frost & Sullivan Analysis

Spare Parts Demand—Channel Analysis (excluding Iran)

…**<u>6 routes exist</u>** for supply of parts in the Middle Eastern Aftermarket with increasing competition from Branded and Other After Market Parts



The Genuine Parts, Branded Aftermarket Parts are the categories accounts for nearly 58% in total part sales

Note : OES – Original Equipment Spares
OE Parts – OE fitted brands supplied in independent after market
Alternate parts – Brand other than OE brand supplied in the independent after market
Spurious – Products which are not original and branded as original popular brands in the market
Imports – It includes domestic imports, which means a part is directly getting imported from the country of origin without involving local operation other supplier
System suppliers – They supply the brand under their name eg. Bosch braking products – Example : Bosch Chassis Systems supplying brake components

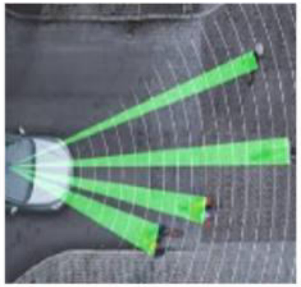
Note: All figures are rounded. The base year is 2015. Source: Frost & Sullivan Analysis

How OEMs Will Differentiate Their Brand In Future (to 2025)

DESIGN & STYLING

DRIVING DYNAMICS

SAFETY



SUSTAINABILITY &ENVIRONMENT

AUTOMATED MOBILTIY

QUALITY & RELIABILITY

COMFORT & CONVENIENCE

COST OF OWNERSHIP

CONNECTED MOBILTIY

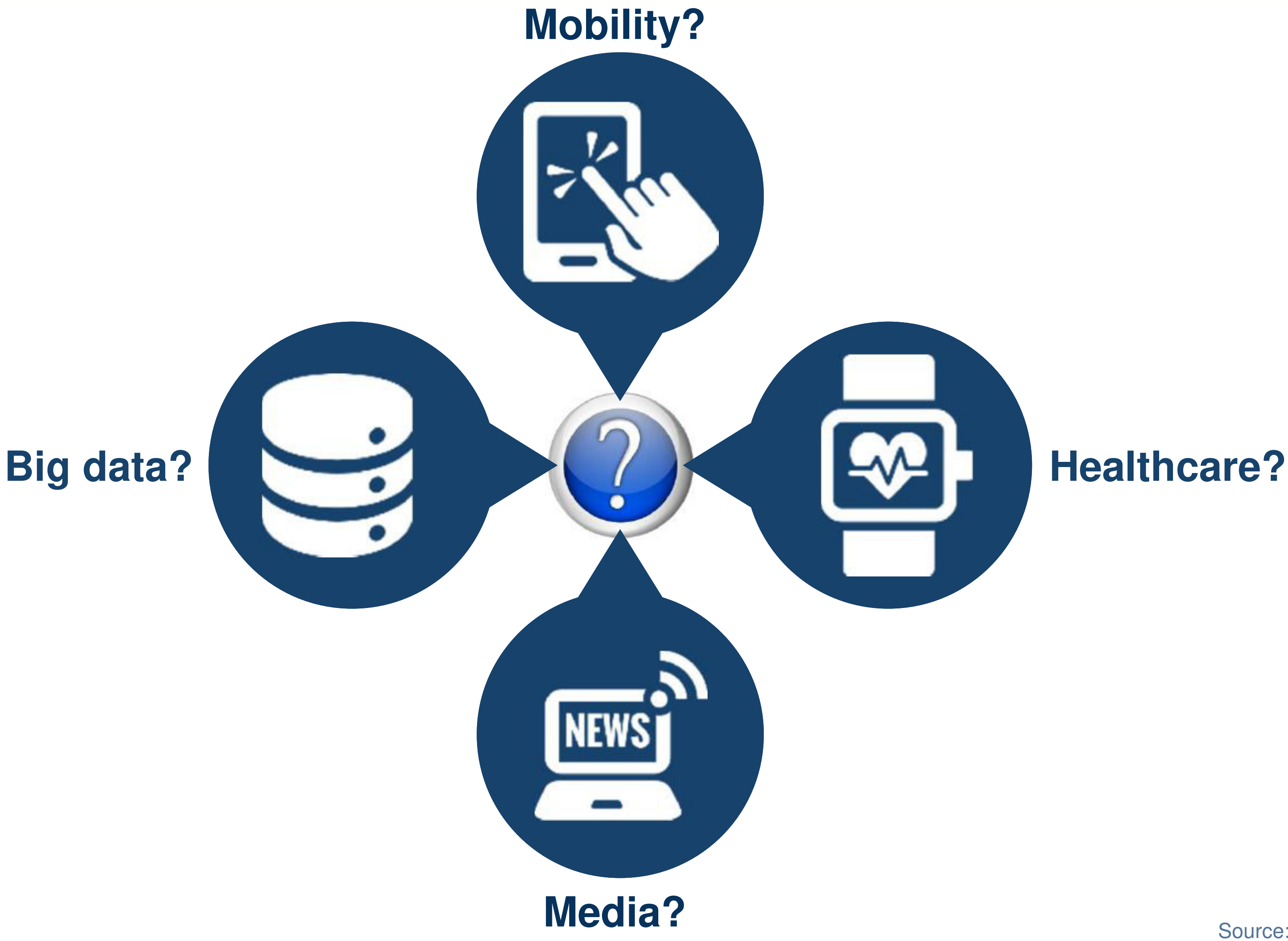
HEALTH, WELLNESS & WELLBEING

PRE 2000 (Design & Styling, Driving Dynamics, Safety, Quality & Reliability, Comfort & Convenience, Cost of Ownership)

TODAY (Sustainability &Environment, Connected Mobiltiy)

FUTURE (Automated Mobiltiy, Health, Wellness & Wellbeing)

21st Century Utilities: What is the Future ?



Source: Frost & Sullivan

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