Mega Trends and Their Impact on Future of Mobility

Key Note

Presentation by:

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Senior Partner

FROST & SULLIVAN

Today's Agenda

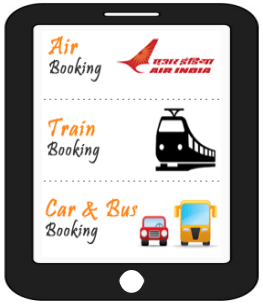
Introduction:

- Transformational Shifts Reshaping the Future of Mobility

- New Mobility Business Models
- Mobility Integration
- Convergence of Corporate Mobility
- The City as a Customer
- Women and the Automotive Industry
- Focus on Health Wellness and Wellbeing in the Automotive Industry
- Connected and Automated Mobility
- Growth in high Speed Rail and Public transport spending
- Autonomous Cars New Business Models
- Conclusions, Q&A

Top Transformational Shifts Expected to Shape the Future of Mobility

New Business Models



Mobility integration

Convergence in corporate mobility

City as a customer

Women Empowerment

Health Wellness and Well-being

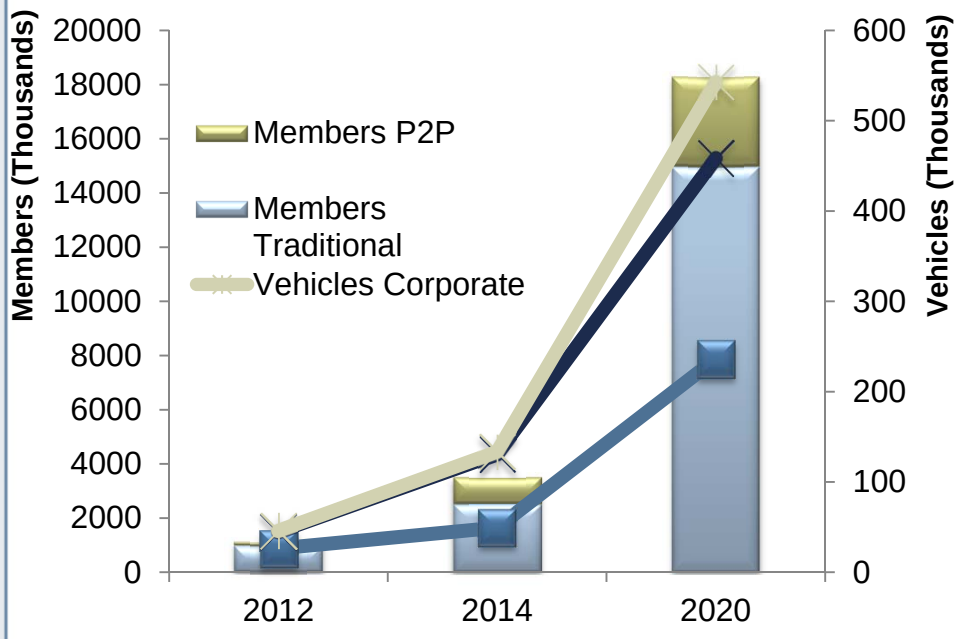
Connected and Automated Mobility

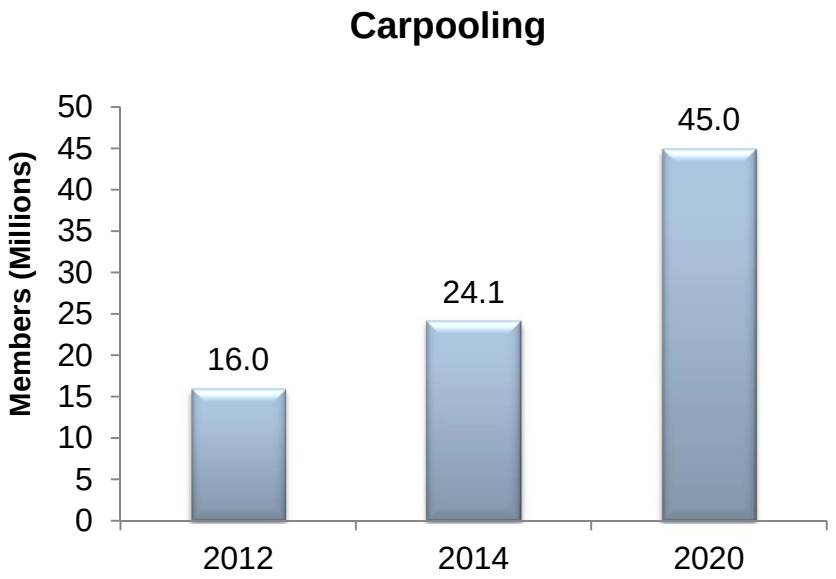
Growth in high Speed Rail and Public transport spending

Transformational Shift No. 1: New Business Models - Growth of Car Sharing Over 543,000 vehicles to be shared in Europe by 2020

2014		
Traditional	49,368	2.5 million
P2P	81,380	1 million
Corporate	2,896	250 companies

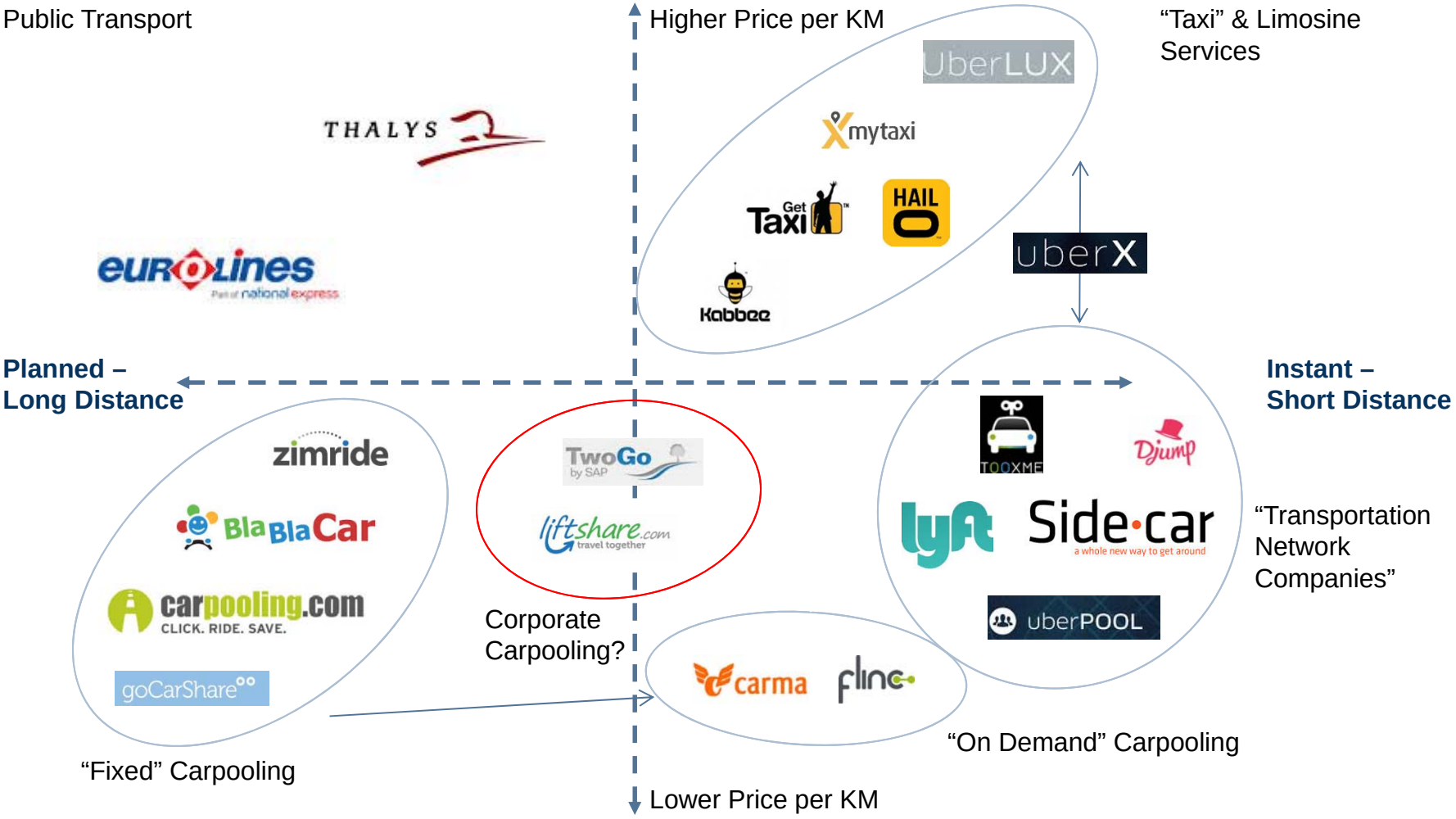
2020		
Traditional	236,145	14.9 million
P2P	222,210	3.3 million
Corporate	84,649	4,000 companies





Transformational Shift No. 1: New Business Models cont. - Growth of Ride Sharing Business Models

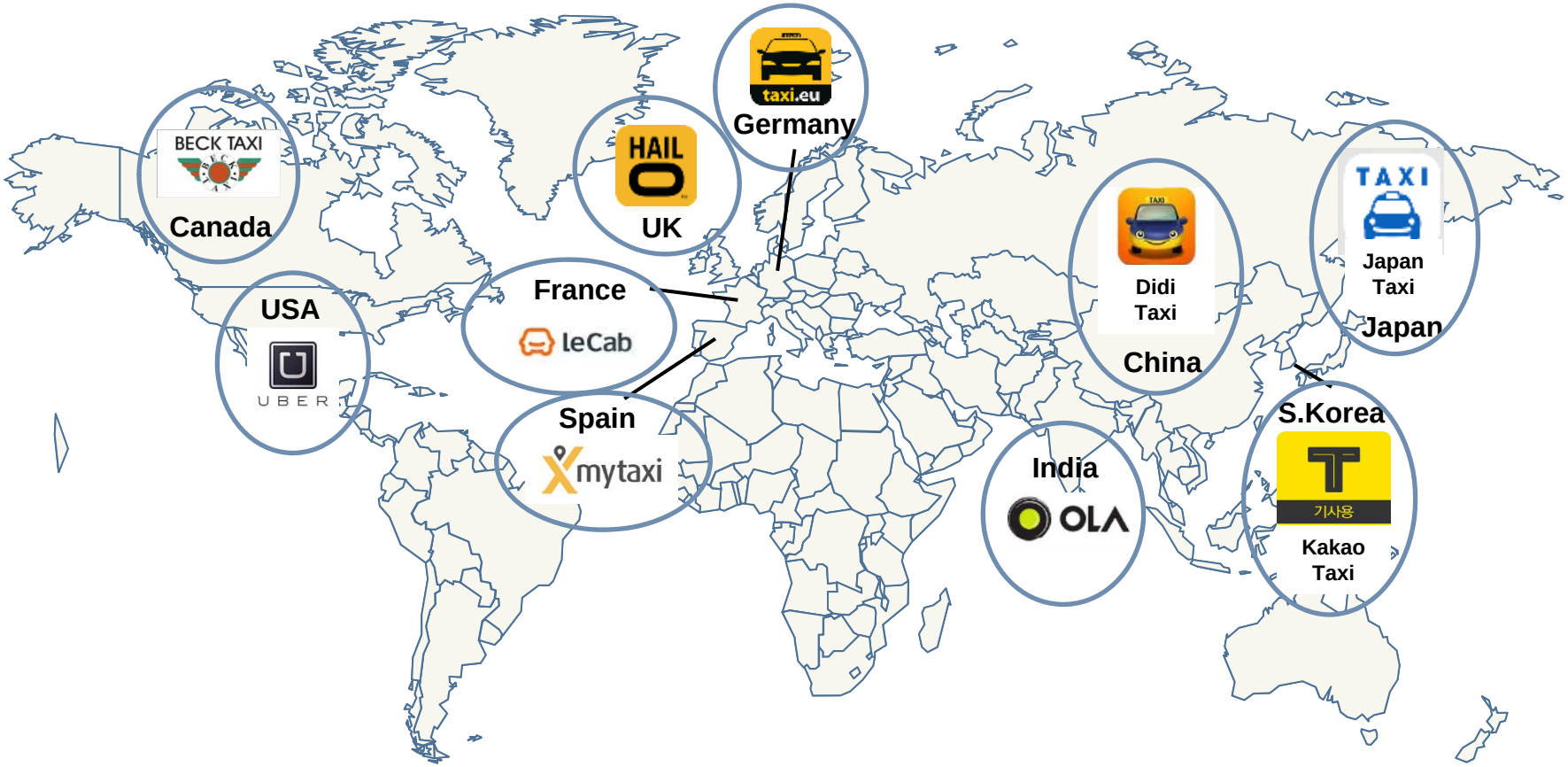
Comparative Market Positioning of Ridesharing business models



Source: Frost & Sullivan

Transformational Shift No. 1: New Business Models cont. - Within 3 years ehailing taxis control close to 20% of the global taxi market

eHailing is dramatically revolutionizing the taxi industry business model. By 2020 the global taxi market is expected to reach 5 million vehicles growing at a CAGR of 4%



Transformational Shift No. 1: New Business Models Cont. - The rise of Uber and more is yet to come

UBER

Logistics / Courrier

Private Hire / Limo

Ridesharing

Taxi

Groceries (UberEssentials)

Food (UberFresh, UberEats)

Retail delivery (UberRush)

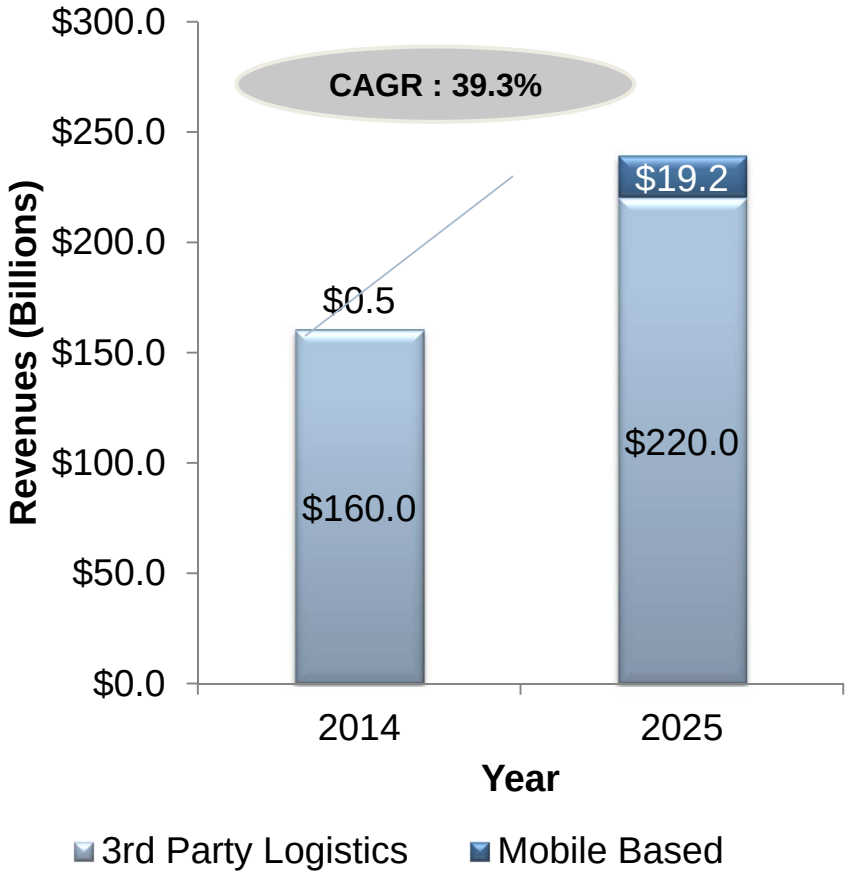
Parcels & Logistics (UberCargo)

As of Jan 2015

Countries	**58**
Cities	**311**
Driver	**324,074**
Customer	**7,417,139**

The Arrival of Uber for Trucking Signifies a Dynamic Change in the Trucking Landscape

Mobile Based Freight Brokerage Market: Revenue Scenario Analysis, North America, 2015 and 2025



cargomatic

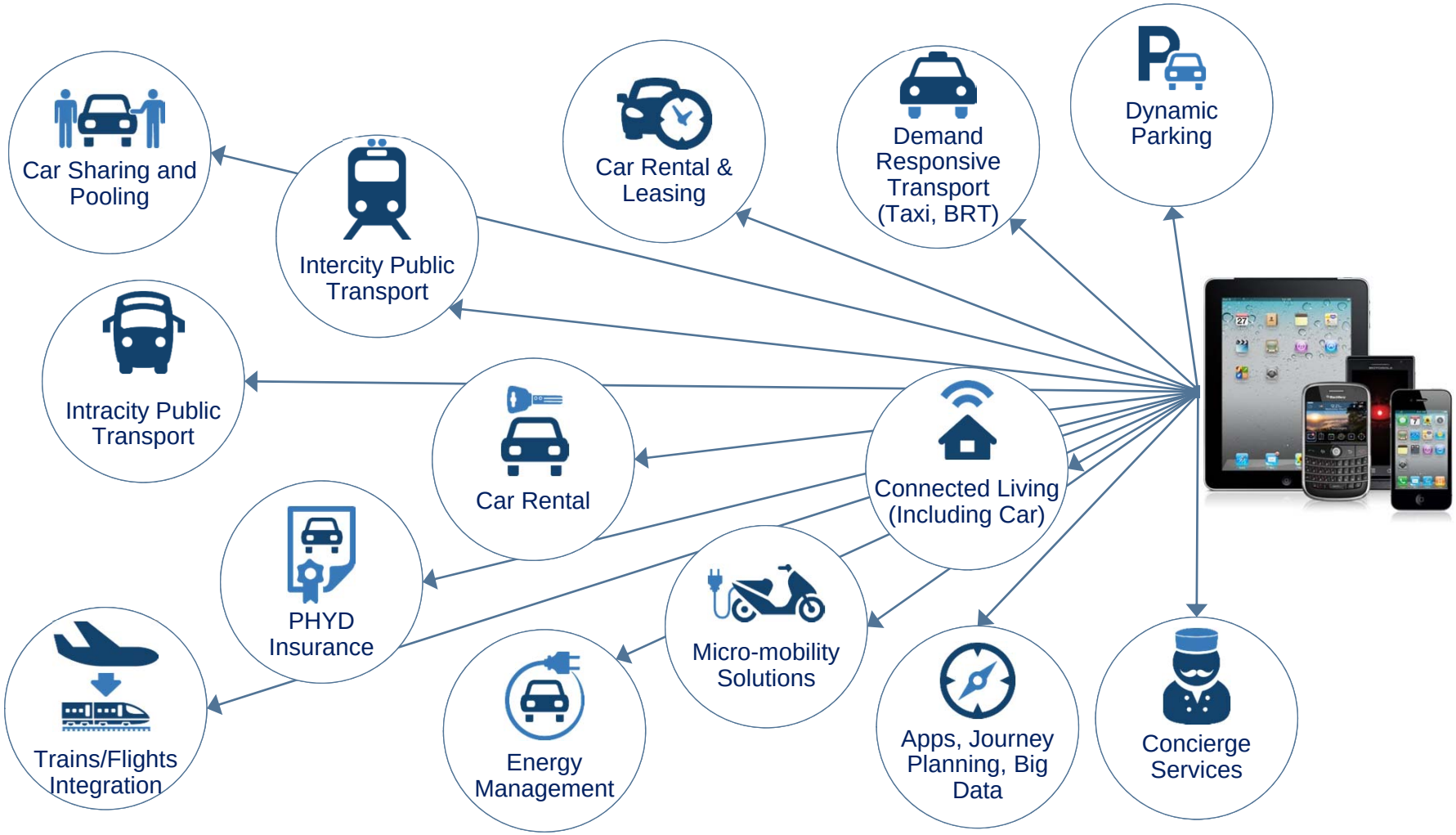
COYOTE

TRANSFIX

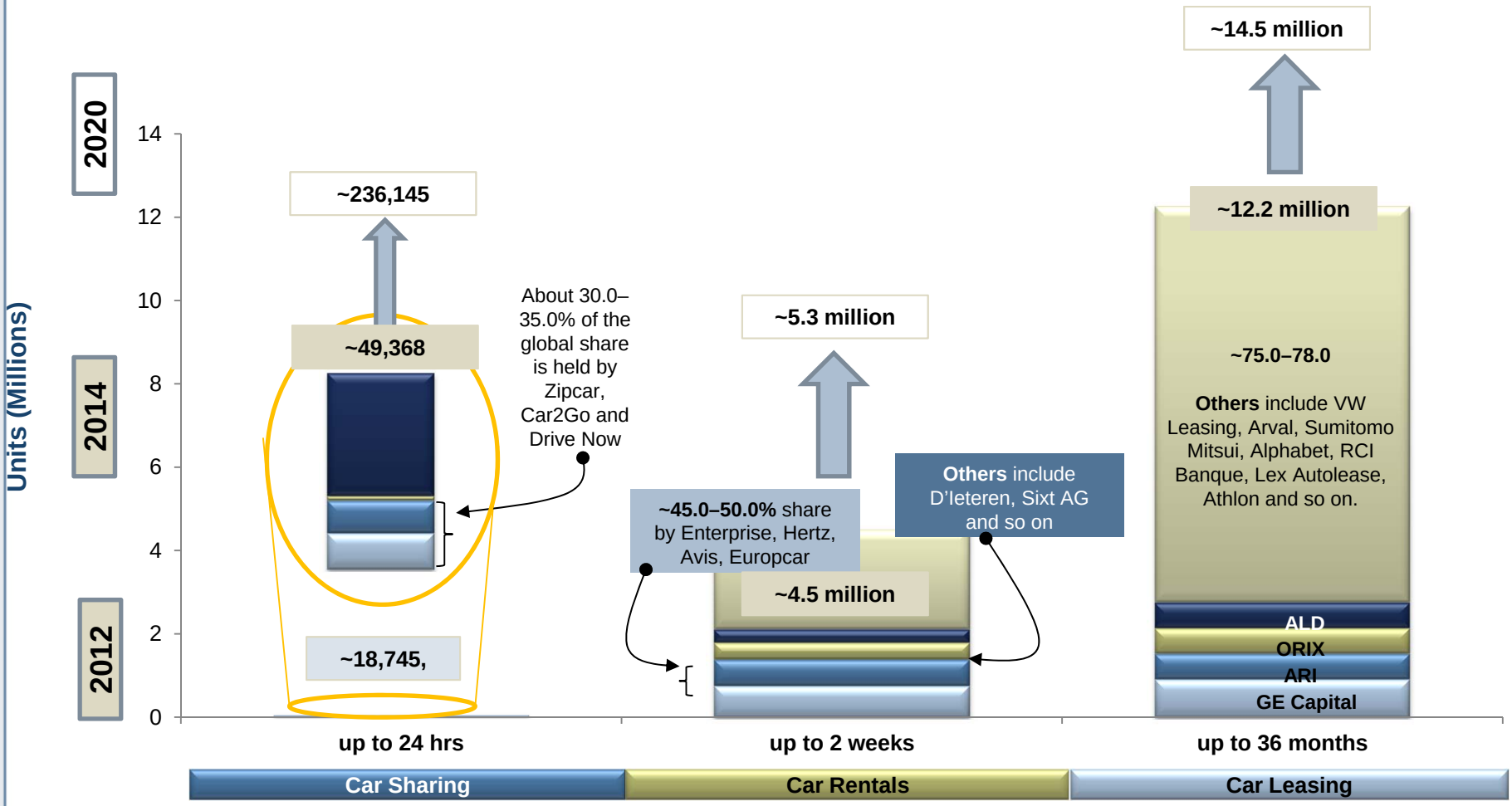
KEYCHAIN LOGISTICS

Transformational Shift No. 2 : Integrated Mobility

Technology enabled, any device delivery of real-time, door-to-door, multi-modal travel encompassing pre-trip, in-trip and post-trip services bringing Convenience, Time & Cost Savings to the Mobility User

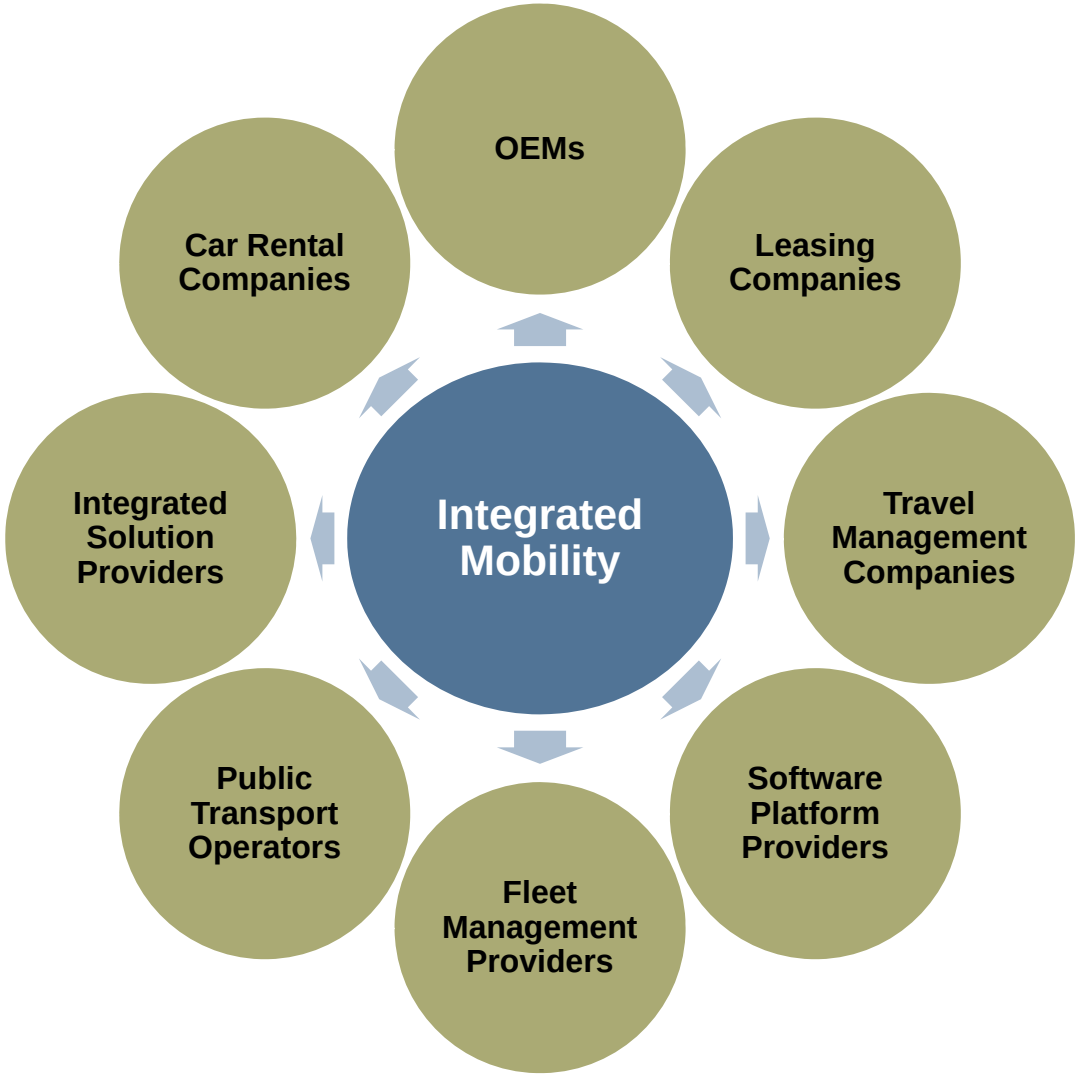


Transformational Shift No. 2 : Convergence of Vehicle Rental Business



Note: All figures are rounded; the base year is 2014. Sources: LMC Automotive, Frost & Sullivan.

Transformational Shift No. 2 : Mobility Landscape – Many Actors, New Partnerships, New Models, New Competitors



Transformational Shift No. 2 : Mobility Integration Platform Example

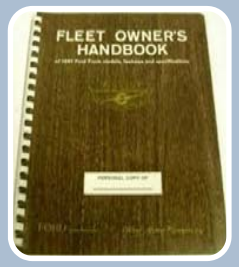
Case Study - Qixxit – Deutsche Bahn Launches Mobility Integration Services

Current Services	Integrated booking	Real-time information of integrated means of transport	Alternative routing	Cross- & upsell-products (Hotel, luggage service…)	Social travelling
					

Current partners

Rental car	Taxi	Local public transportation	Bicycle	Car Sharing	Car	Flight	Long-distance transport	Coach
SIXT, AVIS, Europcar	BetterTaxi	DB + partners	DB BAHN Call a Bike	Flinkster, multicity, book-n-drive	ADAC, PTV GROUP	via start.de …mein Reiseportal	DB + partners	BerlinLinienBus, FlixBus, IC Bus

Transformational Shift No.3: Future of Corporate Mobility - From TCO to TCM



Total Cost of OWNERSHIP

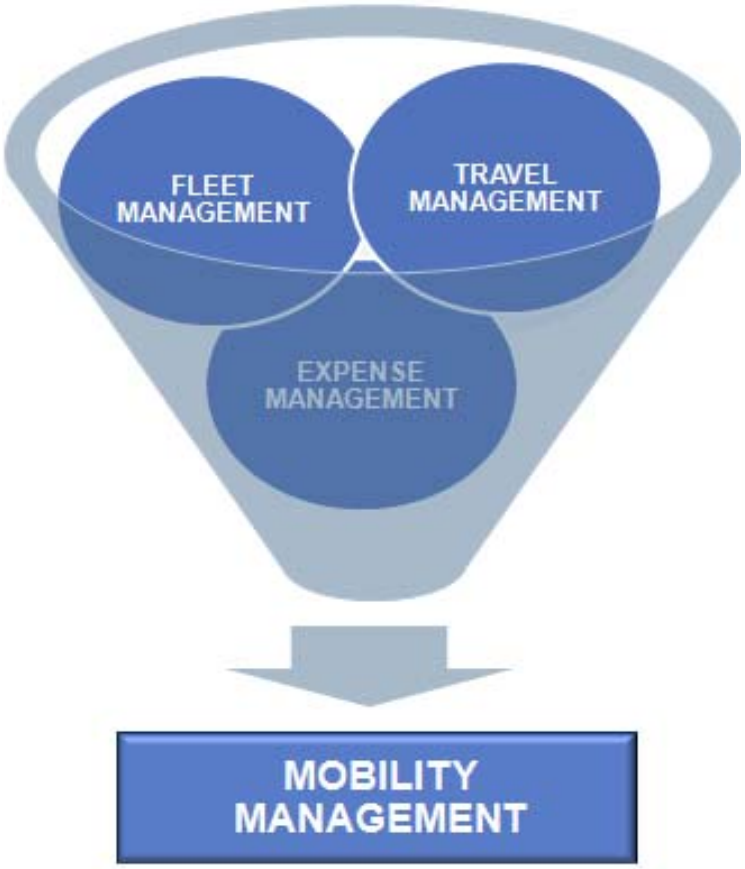
- Running Core Fleet & Keeping Company Drivers Informed

Total Cost of USERSHIP

- Managing Overall Fleet & Educating All Company Drivers

Total Cost of MOBILITY

- Delivering Integrated Services & Empowering All Employees



Transformational Shift No.3: The Business & Leisure Convergence = "Bleisure"

Business travellers

82% Business travellers explore the city

60% take a "Bleisure" trip

30% added 2 vacation days

54% Bleisure travellers bring family

But…Policy is Unclear...only 14% of employees are aware of a Business & Leisure travel policy

Reason for interest:

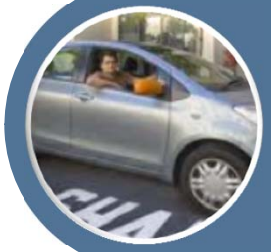
Business Travel is a **>$1** Trillion Market and Moving Towards A Self Service Concept

Source: Bridgestreet Hospitality Bleisure Report 2014.

Transformational Shift No.3: Frost & Sullivan's Vision for the Future of Corporate Mobility

Integrated Multi Modal Platforms (for business)

OEMs increase Corporate Mobility footprint



Growth of "sharing" reducing need to own / sole use (e.g. company car)

Mobility Auditing & Mobility Budgets

Changing working locations/patterns change mobility requirements

Rise of Internet Aggregators (smartphone enabled)

Transformational Shift No.4: City as a customer Over 5 million vehicles in the global taxi fleet by 2020. Close to 500,000 taxis to be replaced every year globally

London
LTI Blackcab and Mercedes Vito both (£35,000-40,000)

Dubai
Toyota Camry (86,900AED)

Beijing
Hyundai Elantra (￥90000)
Sonata (￥120,000)
Volkswagen Jetta (￥115,000)

Toronto
Toyota Camry ($24,900)
Chevrolet Impala ($30,395)
Lincoln Town Car

Tokyo
Toyota Comfort ,
Nissan Crew
($18,500-20,000)

Hong Kong
Toyota Comfort,
Prius
(HK$420,000)

New York
Ford Escape ($21,215)
Toyota Prius ($26,650)
Nissan NV200

Paris
Peugeot 406 (€12000)
Mercedes C (€35224)

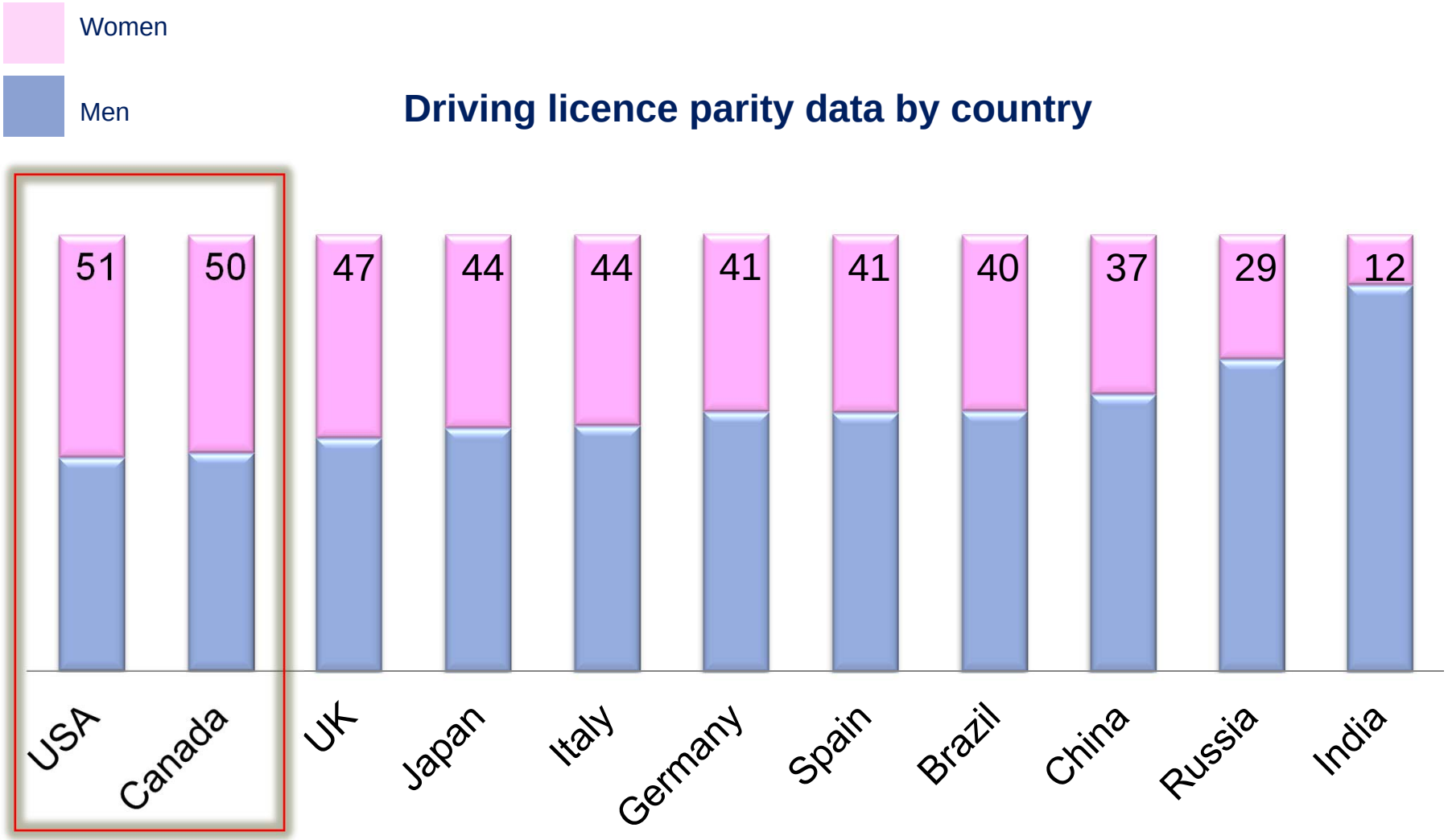
Mumbai
Tata Indigo, Renault Logan, Toyota Innova

Singapore
Hyundai Sonata

Sao Paulo
Fiat Siena, Fiat Idea,
Chevrolet Spark

Source: Frost & Sullivan

Transformational Shift No.5: More women drivers and customers in future than men …and women prefer leasing vehicles



Source: Frost and Sullivan Analysis

Transformational Shift No.5: Case Study : Nissan's 300 'Lady First' Dealerships

Spacious children's play area

Stylish interiors - polished wooden floors

Female staff – sales and mechanics

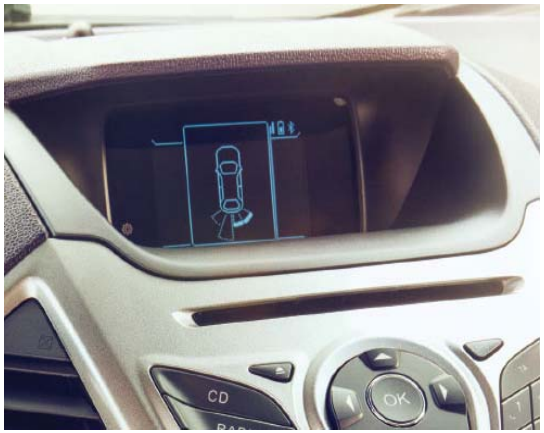
Larger, pink painted parking spaces for women*

*Seoul only currently

Source: Nissan website, image – YouTube, Frost & Sullivan

Transformational Shift No.6: Health, Wellness and Wellbeing the Next Big Differentiation Factor for OEMs

Built-in (Embedded)



Brought-in (Peripheral Integration)

Cloud-enabled (Broadcast)

Source: Frost & Sullivan

Transformational Shift No.6: HWW Focal Points - HWW features are focused on the mind, body, and soul

Automotive HWW Technologies: Key Features List, Global, 2014–2025

- Outside ambient air quality monitoring

- Pollen/allergen level monitoring
- Drunk-driving prevention

- Driver drowsiness detection
- Fatigue monitoring
- Stress level monitoring

- Heart rate monitoring
- Blood pressure monitoring
- Breathing rate monitoring
- Glucose level monitoring

- Muscle therapy
- Palm and facial temperature monitoring
- Erratic driving pattern recognition

- Comfort/ease of access/egress

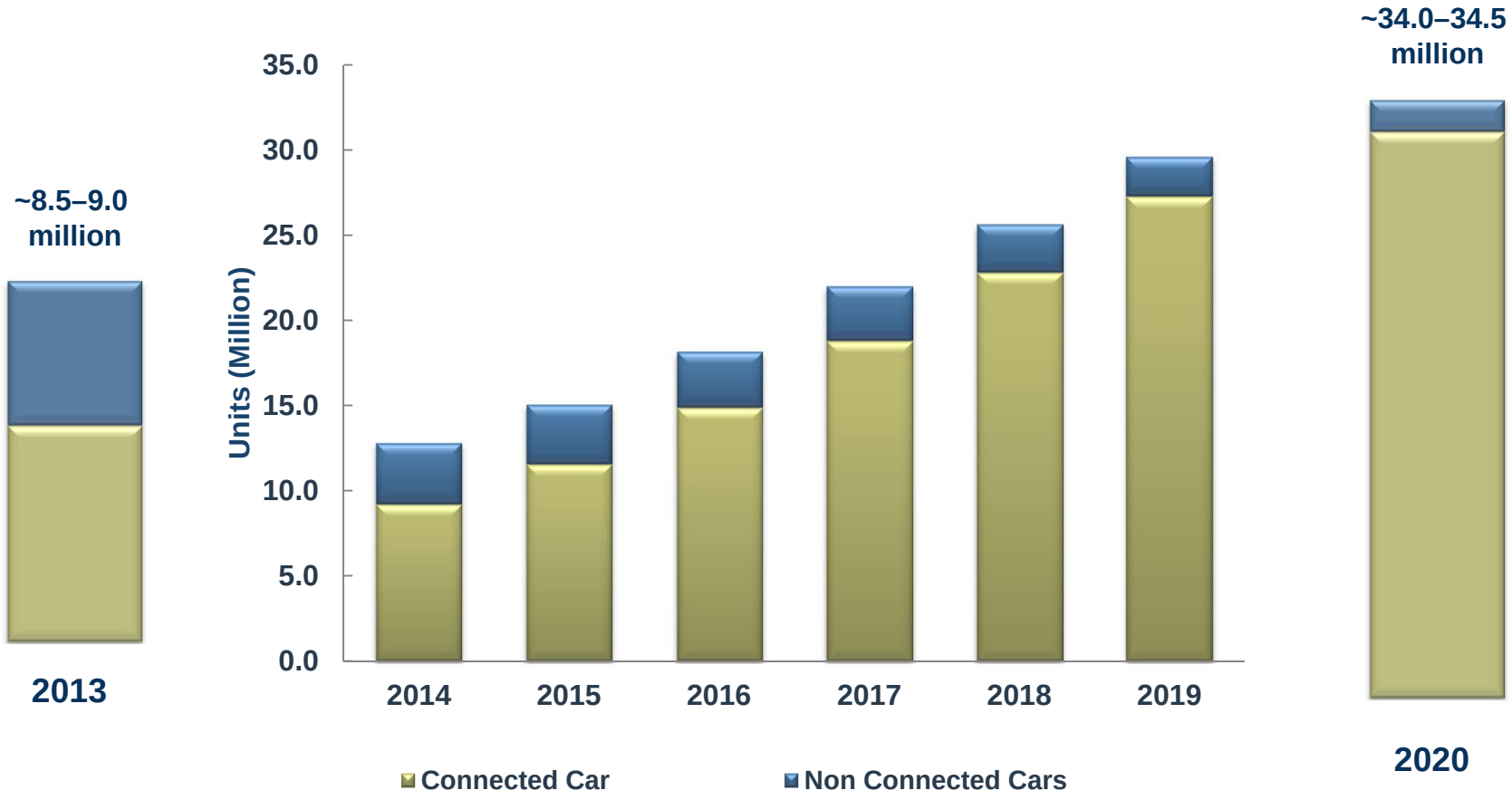
- In-car ambient temperature monitoring
- In-car ambient lighting monitor
- Driver workload estimation

Body
Mind
Soul

Source: Frost & Sullivan

Transformational Shift No. 7: Connected Cars Accelerating Big Data Opportunities

Connected and Non-Connected Cars, North America and Europe, 2013 and 2020



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

Transformational Shift No. 7: Impact of Connected Cars: Big Data

Digital Leads

Internet Aggregators

Warranty Costs Reduction, Predictive Maintenance

Product Performance Analysis, Production and Supply Chain

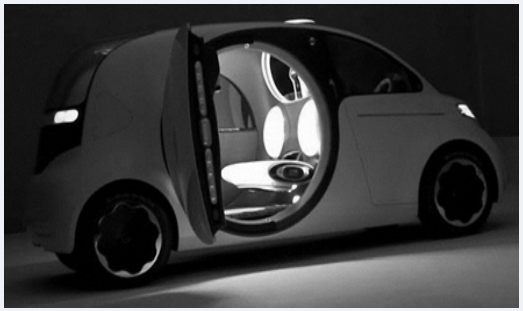
User & Dealer Satisfaction

Advanced Mobility services, Dynamic Navigation and Parking

Images and logos are only for representation Source: Frost & Sullivan analysis.

Transformational Shift No. 7 : From Hands Free to Mind Free : Future Will See Fully-automated Vehicles

Drive and Let Drive Concept



Can be manually driven or self-driven by the vehicle

Predetermined A-to-B

Ideally suitable for Personal Rapid Transit (PRT)

Personal Mobility with Route Inputs

Ideally suitable for urban commuters and people with special mobility needs

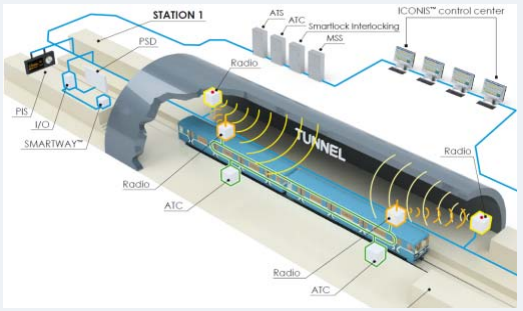
Autonomous Adaptive Mobility Vehicles

Fully-automated vehicles hold the potential for fundamental rethinking of vehicle designs. For instance, partially collapsible vehicles also save parking space when not in motion

Source: Frost & Sullivan

Transformational Shift No. 8: Driverless Technology Not Just a Trend for Cars, Rail has a Better Business Case

Automatic Train Protection (ATP) → **Automatic Train Operation (ATO)** → **Automatic Train Supervision (ATS)**

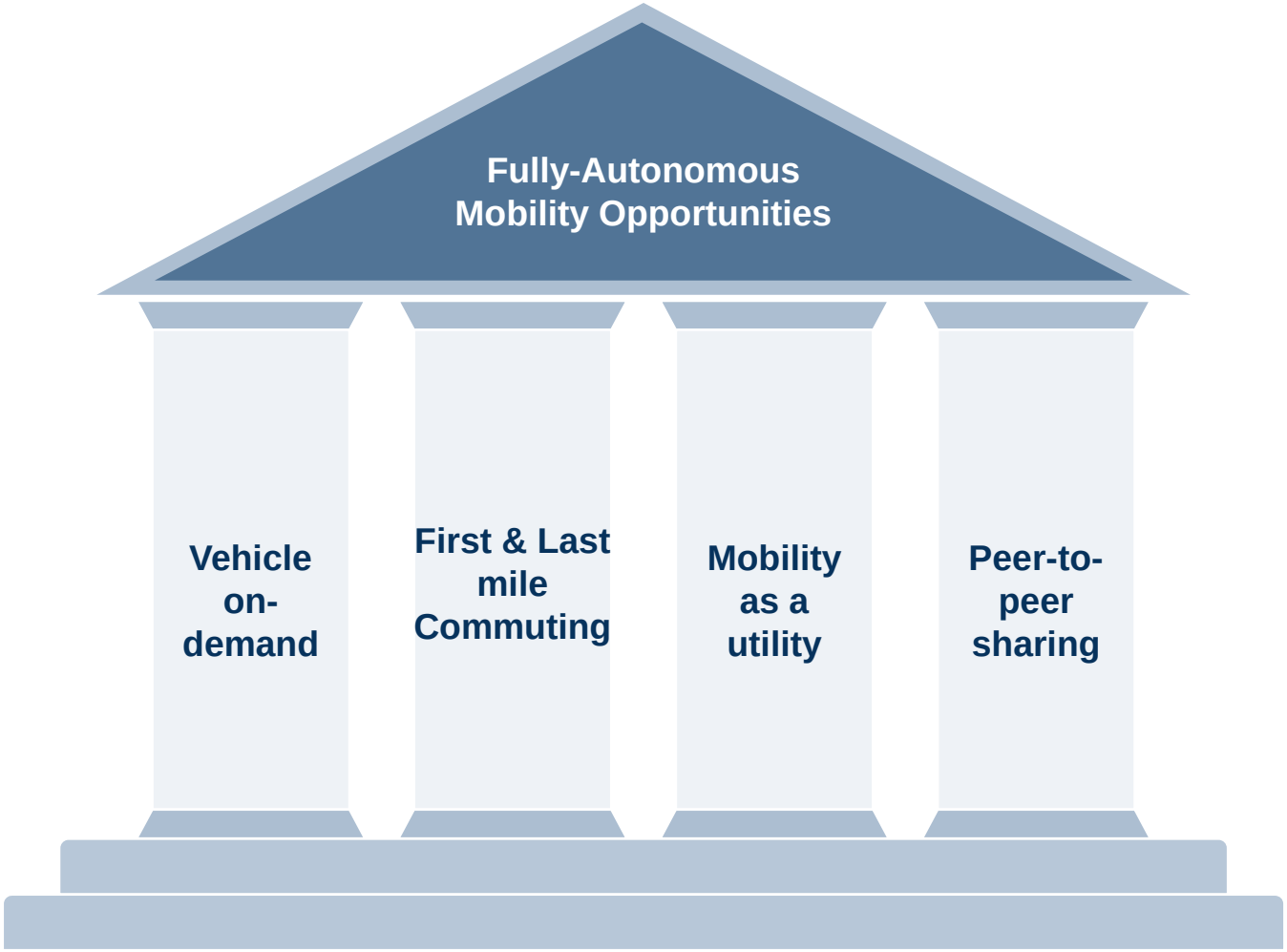
ATP is the first step towards automation. All primary safety functions are automated.	Driving functions of the train can be automated through the ATO (basic driving to zero staff).	Real time automation of train management and operations regulation through ATS.
Empty Driving cab concept	**Higher speeds of operation**	**High speed end to end connectivity**
		
Can be manually driven or self-driven by the vehicle	Maximum wait time of 60seconds on the platform for the next train	Rapid dissemination of data and information to all parties involved

Transformational Shift No. 8: 200 Year old rail Will Still be a Mega Trend in 21st Century Over 10,000km of HSR planned in Europe by 2030

Autonomous Cars New Business Models

Autonomous Cars New Business Models Four key areas impacted by Fully-Autonomous Mobility

Opportunities from Fully-Autonomous Mobility, Global, 2015



Source: Frost & Sullivan

Autonomous Vehicles to revolutionize the e-Hailing Business Model – Case Study – New York Yellow Taxi

Automated Driving Business Models: Case Study – New York Yellow Taxi, NA, 2015

Current Taxi Market	Parameter	Future Taxi Market
36	**Average number of daily Trips per taxi**	~50 ↑
200	**Average Daily Miles Covered by a Taxi**	~350 ↑
7.1%	**Taxi User Base (% of Population)**	15-20% ↑
22.39	**Number of Taxis per 1000 Daily commuters**	~18 ↓
$540 (2013)	**Driver cost per day**	$0 ↓
50,000	**Number of Drivers**	0 ↓
$6.31 (2013)	**Average Fare per mile**	~$4 ↓
$29,700 (2014 Nissan NV200)	**Taxi Price**	$40000 ↑

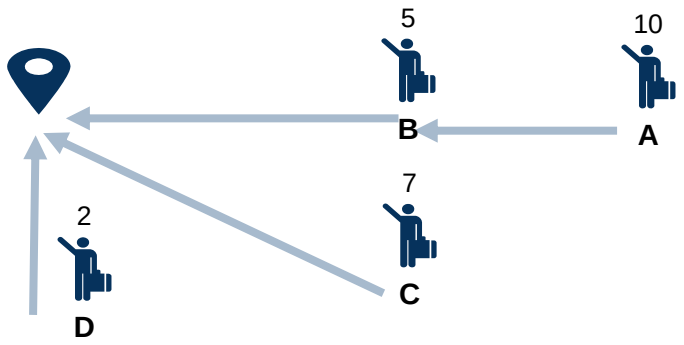
Note: Taxi user base in New York City was 600,000 passengers per day in 2014

Source: NYC Taxi And Limousine Commission, Frost & Sullivan

Group Rapid Transit to Replace Public Transport Buses To reduce congestion and reduce queuing in the event of demand spike

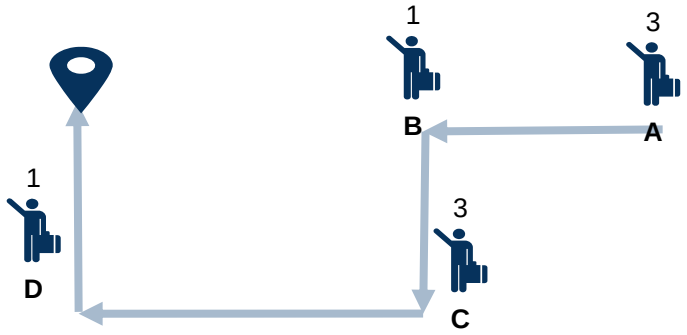
Peak Hour Routing

Scenario 1



- During peak hours, group rapid transit (GRT) will act as a point-to-point service, picking passengers en route.
- Frequency is increased to meet the demand.
- No of GRT Required to transport passenger: 3

Scenario 2



- During off-peak hours, group rapid transit (GRT) will picks more passengers to make optimal utilization of capacity.
- No of GRT Required to transport passenger: 1

GRT is assumed to have a capacity to transport 8 passengers.

Source: Frost & Sullivan

Case Study – Public Transport in London

Automated Driving Business Models: Case Study – Public Transport in London, Europe, 2015-2050

Current Public Transportation	Parameter	Future Rapid Transportation
1,073	**Fleet size per million Population**	~3000
56 - 87	**Seating Capacity per Vehicle**	8 - 56
4.86	**Average Waiting Time for a Bus Along Frequently Availed Route (Minutes)**	2 - 3
Government appointed body	**Ownership**	Could be owned by housing society
Predefined/Supply Driven	**Route**	Demand Driven
Designated along main road	**Boarding and Alighting Point**	Flexible to accommodate origin and destination of journey desired by user group
Commuter waits for the vehicle	**Basis of boarding**	Charted GRT awaits designated commuter

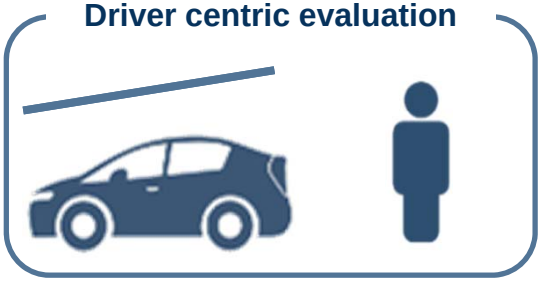
Note: Current and Future transportation includes only road based vehicles such as buses

Source: TfL, Frost & Sullivan

With Increasing Autonomy, Insurance Liability Likely to Shift to OEMs

Present-day Motor Insurance Model in driver centric

Driver centric evaluation



Future Motor Insurance Model

1. Brand centric evaluation

Crash Prevention, Crash Worthiness, Algorithm.

Or

2. Product centric evaluation

Pods, personal vehicles, group rapid transit vehicles

Or

3. System centric evaluation

Increased Comfort, Option To Take Manual Control.

>80%

Manufacturers Product Liability

<20%

Users share of liability

*Vehicle owner pays premium to cover some excesses such as stray incidents like theft, fire and vandalism

Source: Frost & Sullivan

At Present, Driving Behaviour & Incident History Key to Calculating Premium

Driver-related

- Age/Driving Experience
- Claim Frequency
- Occupation
- Driving intervals and duration
- Type of cover (Comprehensive vs third party)
- Driving record and no-claims bonus

Social Trends

- Residential Locality
- Average number of occupants
- Coverage Gaps
- Accident history of locality (route)
- Where the car is parked (secured, covered space, curb side, garage)
- Frequently used routes

Insurance Premium Risk Calculating Factors

Vehicle-related

- Brand, Vehicle age & Value
- Model features (safety technology)
- Performance
- Vehicle Size and Usage
- Modifications
- Annual Mileage
- Desirability (vulnerability to theft)

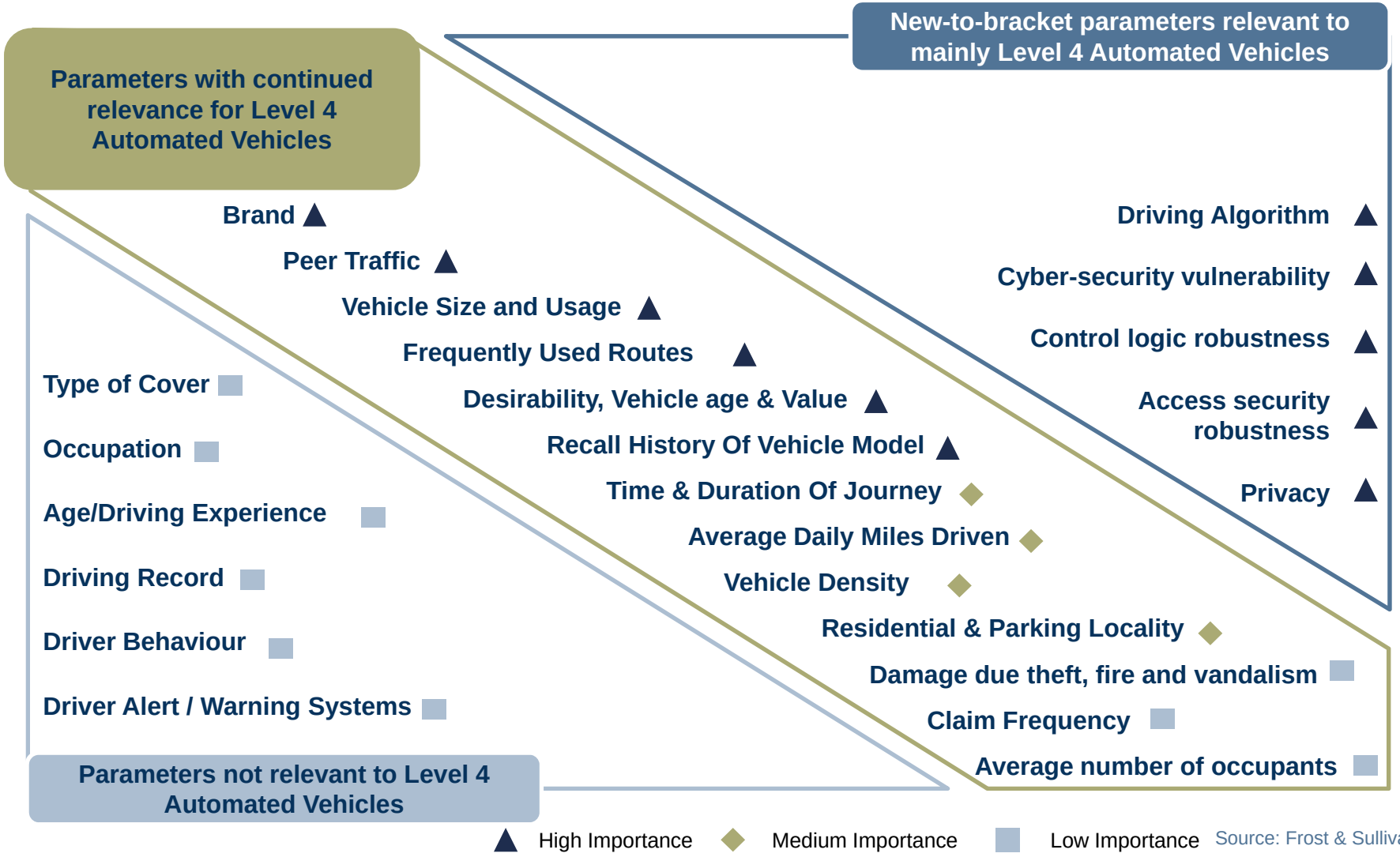
Stray causes

- Damage to public property
- Damage through natural calamity
- Damage due theft, fire and vandalism
- Other Excesses

The above is not an exhaustive list and it contains some of the key parameters.

Source: Frost & Sullivan

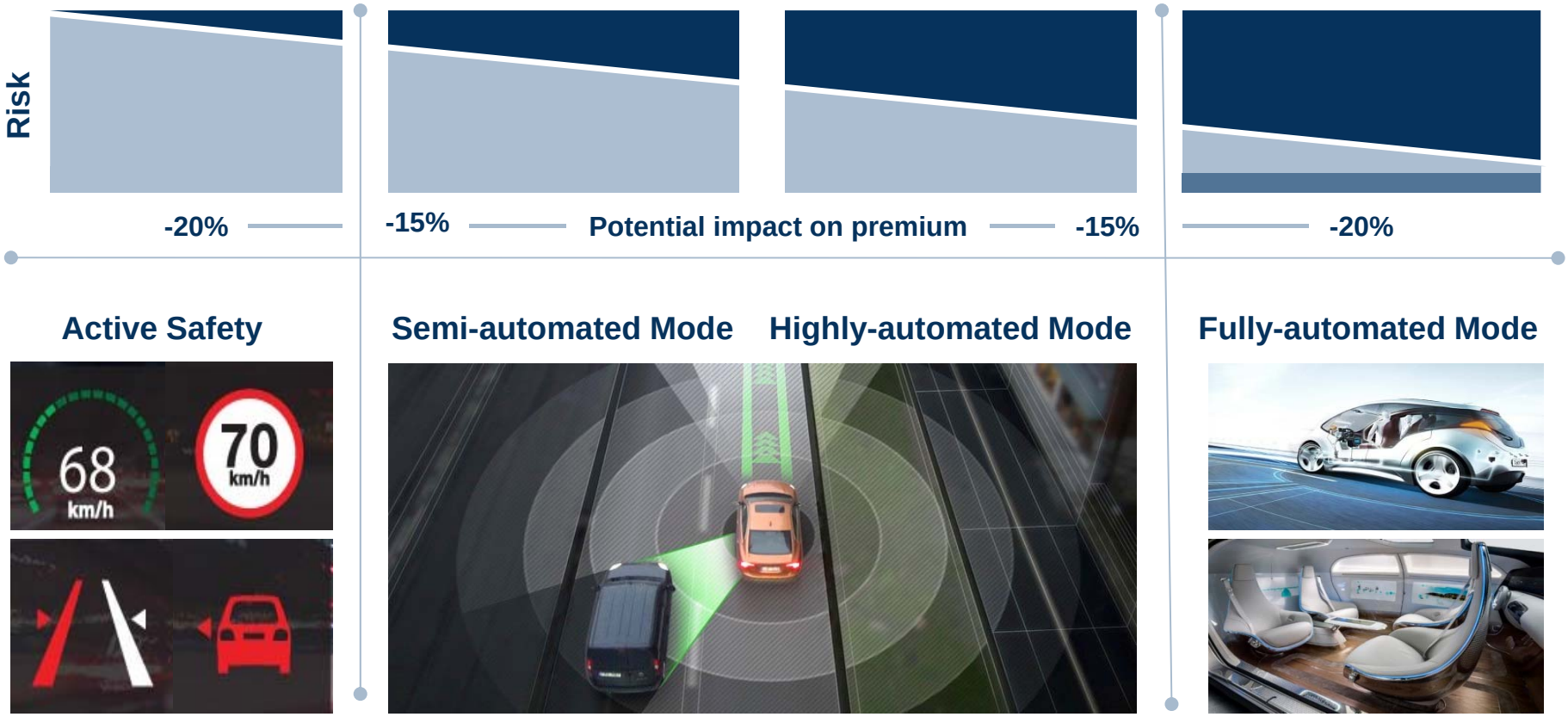
Parameters Considered for Motor Insurance Premium Calculations



Source: Frost & Sullivan

Risk slicing and risk-sharing models are to evolve, with manufacturer's product liability and other stakeholders' limited liability offsetting the risk borne by the insured

Motor Insurance for Automated Driving: Risk Split Between Entities, Global, 2015 - 2050



Source: Frost & Sullivan

With decline in average premium per vehicle, the EU motor insurance market is expected to reduce by a CAGR of 3.88% over the next 35 years

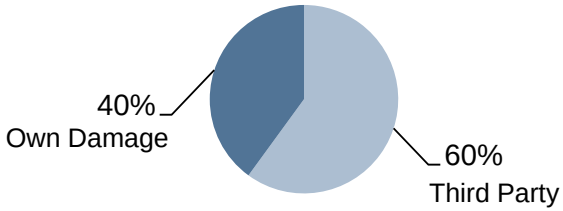
In 2013, Motor Insurance accounted for 29% of the total non-life insurance premiums in Europe.

€130 Billion

-0.5% Y-o-Y

Total Motor Premium (2013)

Coverage Split (2013)



€103 Billion

4.8% Y-o-Y

Total Motor Claims (2013)

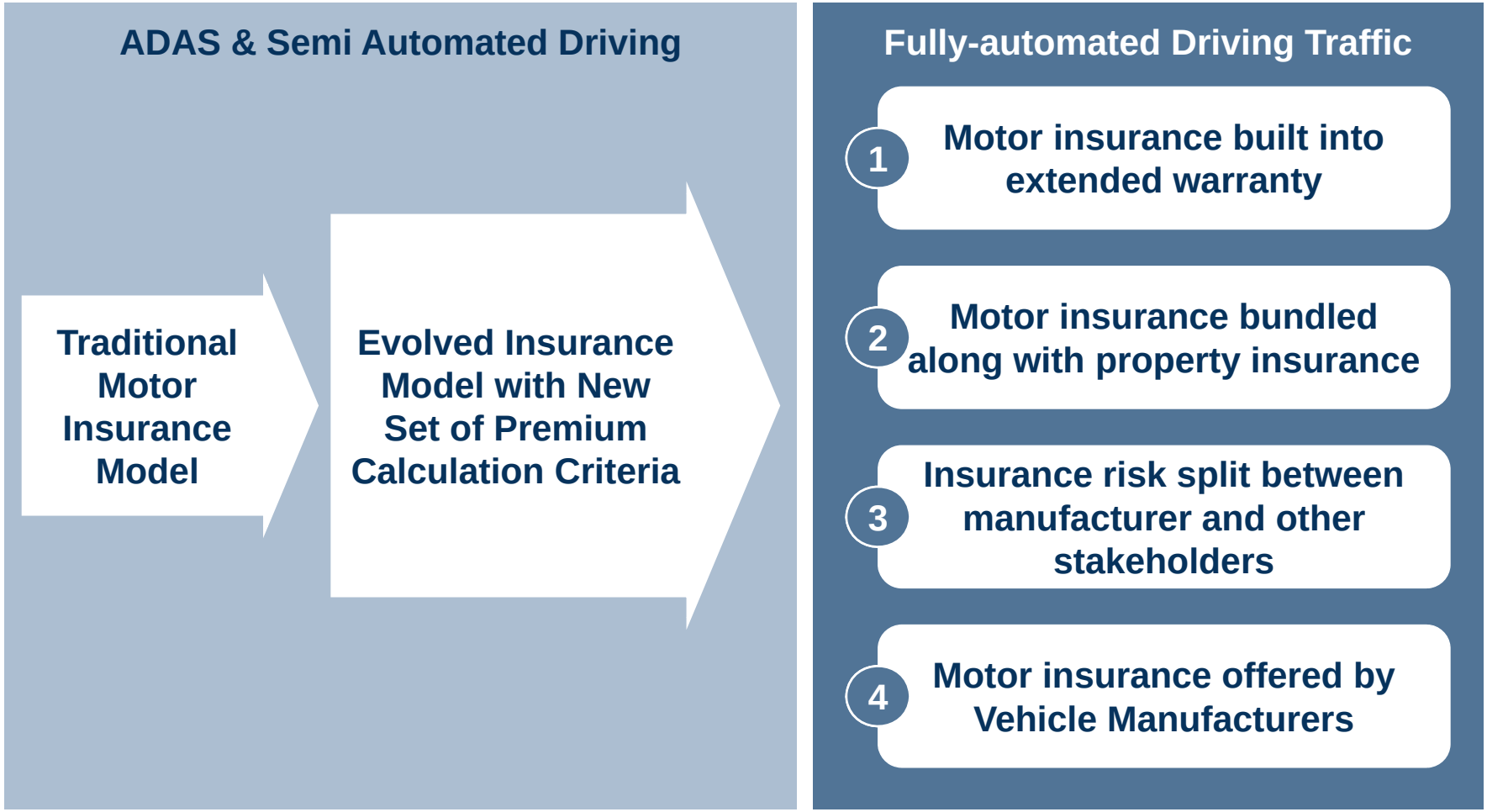
Average premium per vehicle is €470

2050	Scenario 1	Scenario 2
Assuming vehicle in use to reduce by	10%	30%
Vehicle in Use (Million)	249.3	193.9
Total motor insurance market size	**€70.30 Billion**	**€54.67Billion**

Assuming average premium per vehicle for motor insurance to decrease by 50%

Source: Frost & Sullivan

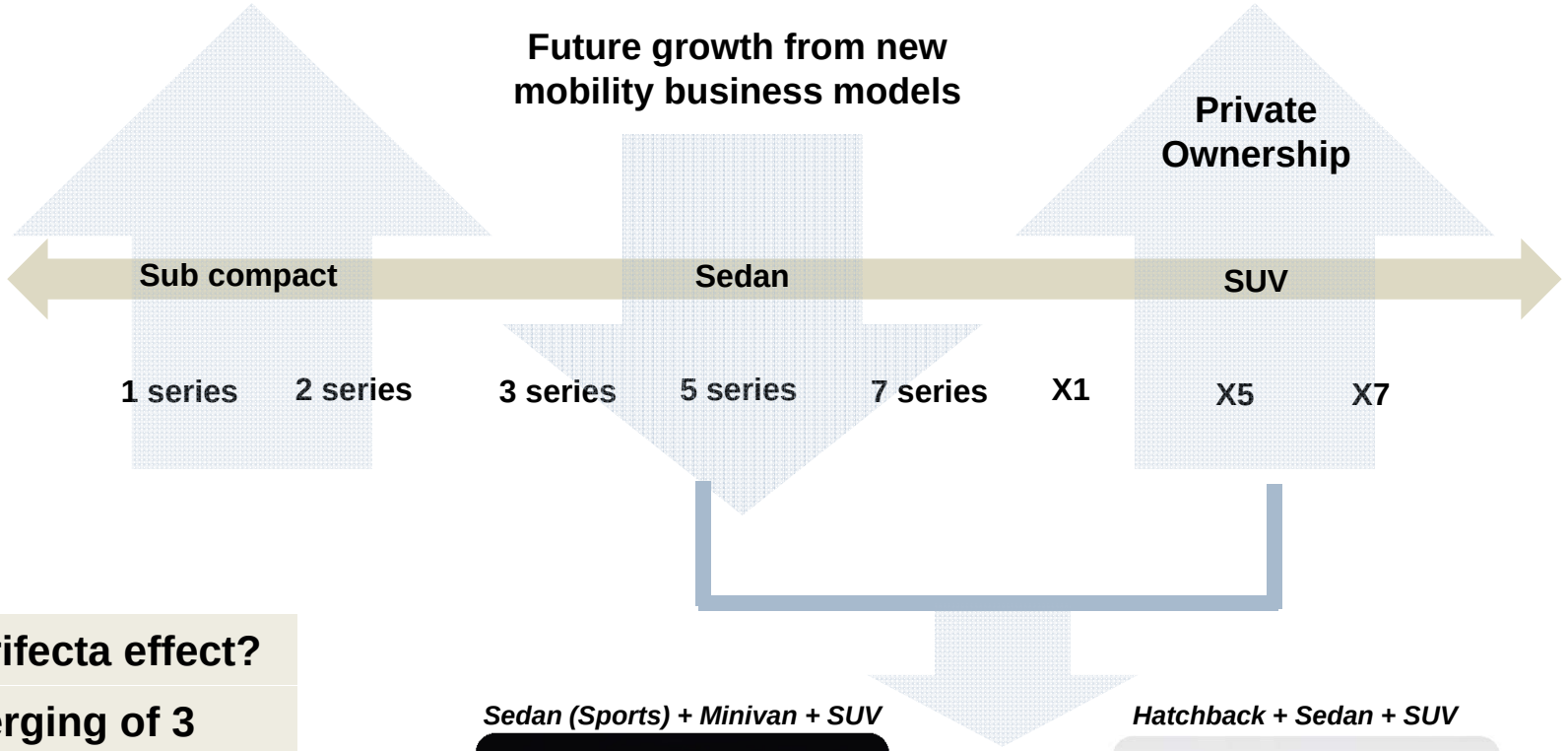
Future to evolve to bundling of motor insurance with other services



Source: Frost & Sullivan

Conclusions and Recommendations

Impact of Mobility Business Models on OEMs impacting Design, Size and Shape



Trifecta effect?

Merging of 3 segments

- **SUV**
- **Sedan**
- **Minivan or Hatchback**

Sedan (Sports) + Minivan + SUV

Tesla Model X

Hatchback + Sedan + SUV

Volvo S60 Cross Country

Key Takeaways on Future of Mobility

1. Transformational shift to tech enabled platforms – driving customer expectations

2. New mobility business models changing the automotive landscape – vehicle sharing business models estimated to reach €10bn by 2020

3. Door to door is the way forward – driven by public and private integration

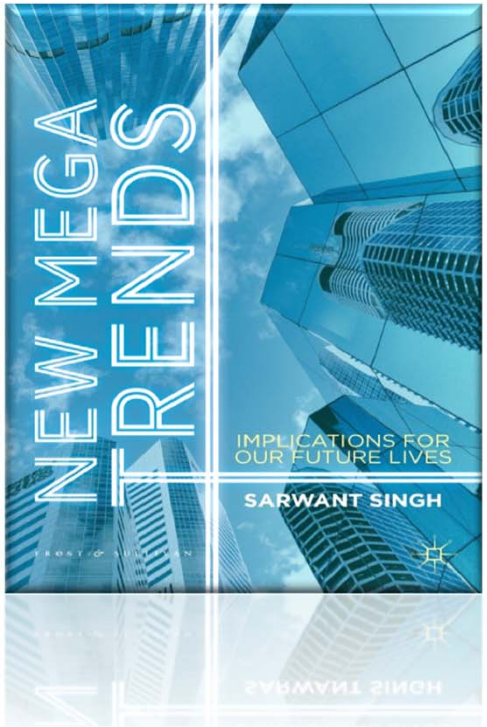
4. Competition, cooperation and collaboration between stakeholders in the field

5. Corporate mobility to be a key focus area with the merger of fleet, travel and expense management

6. Future mobility solutions need to be tailored to customer groups, e.g. women, gen Y , corp.

Source: Frost & Sullivan

Learn More About “New Mega Trends”



Published Book:
New Mega Trends
Implications for our Future Lives
By Sarwant Singh

Publisher: Palgrave Macmillan
http://www.palgrave.com/products/title.aspx?pid=577423

Mega Trends
Defining Our Future: Are You Ready?

Join Our Mobility and Mega Trend Groups On LinkedIn

Mega Trends: Strategic Planning and Innovation Based on Frost & Sullivan Research

Forbes

Follow Sarwant’s series on Mega Trends on Forbes.com
http://www.forbes.com/sites/sarwantsingh/

A Distinguished Panel . . .

Shai Agassi, Newergy
(Founder & CEO,)

Steve Yianni, Transport Systems Catapult
(CEO)

Jay Nagley, UK Trade & Investment
(Senior Specialist Automotive)

Dr.George Gillespie, MIRA
(OBE, CEO)

Andrey Berdichevskiy (World Economic Forum)
Senior Manager
Automotive Community