



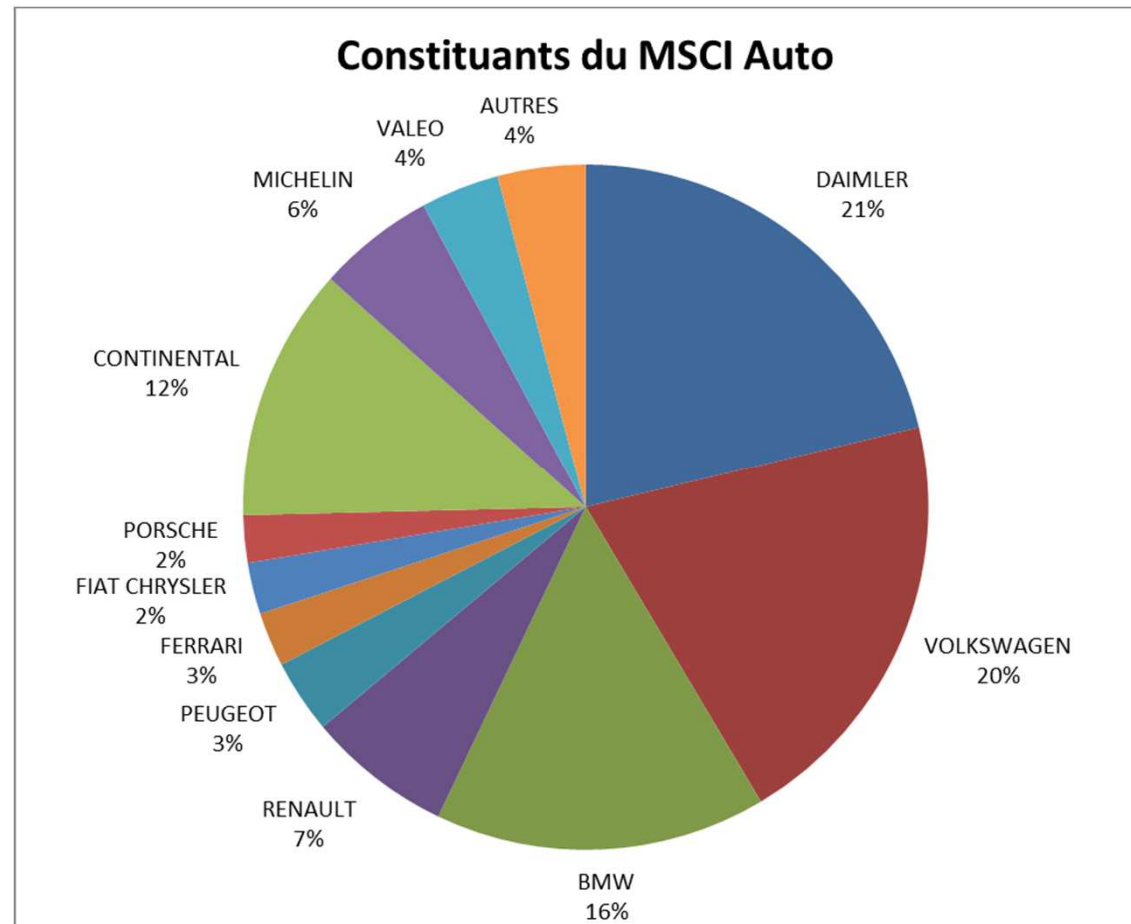
La Finance Et L'Automobile

Club Auto INSEAD



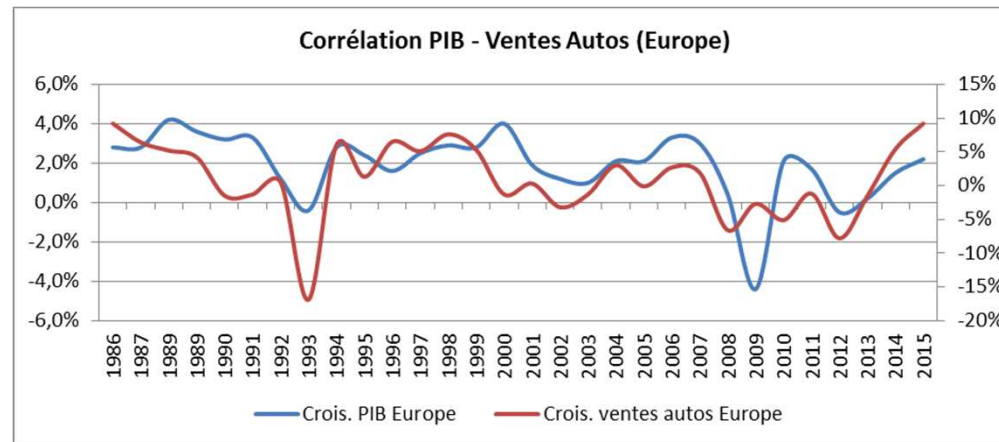
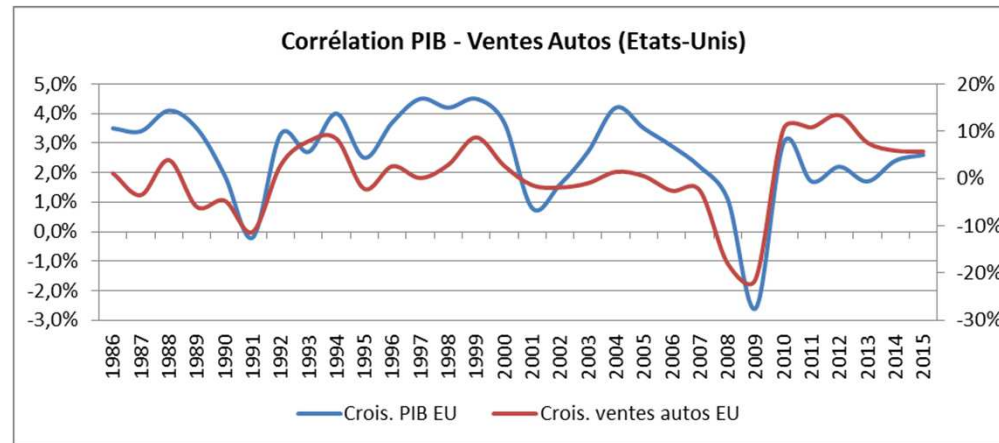
Frédéric LABIA – 09/2016
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Définition du secteur auto européen en bourse



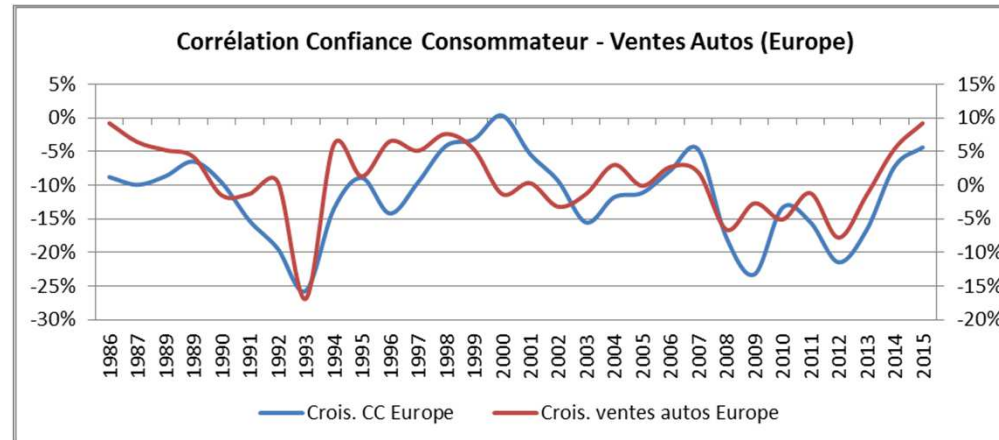
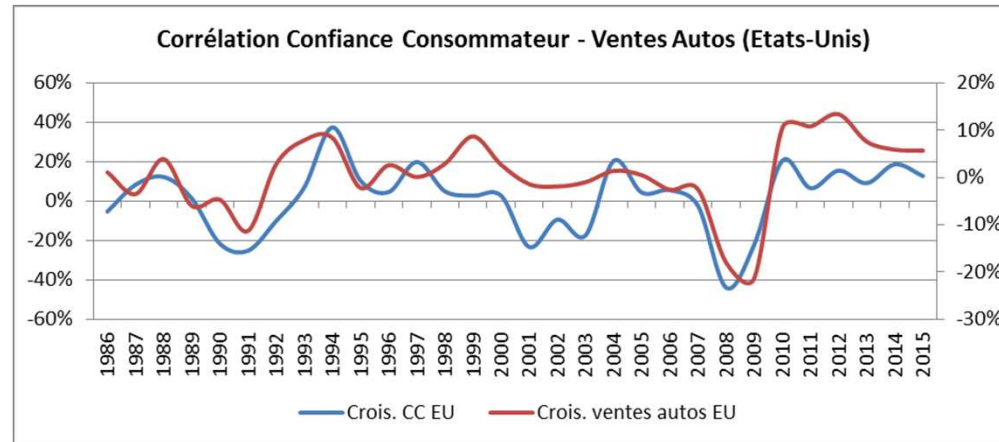
Un secteur cyclique et ...

Bonne corrélation entre variation PIB et variation des ventes Autos



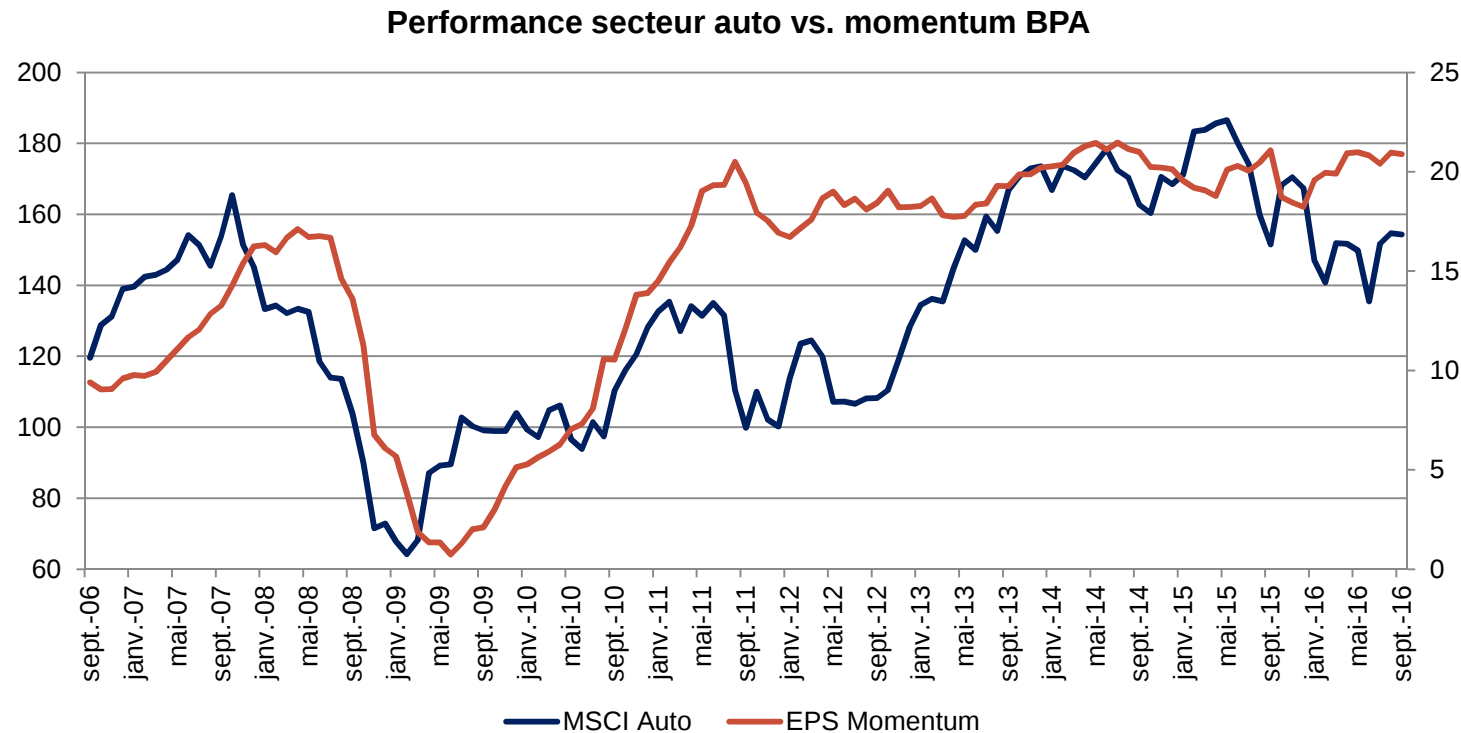
... Un secteur « conso »

Forte corrélation avec la confiance consommateurs



La dynamique des résultats explique la performance

Forte corrélation entre momentum résultats et performance secteur



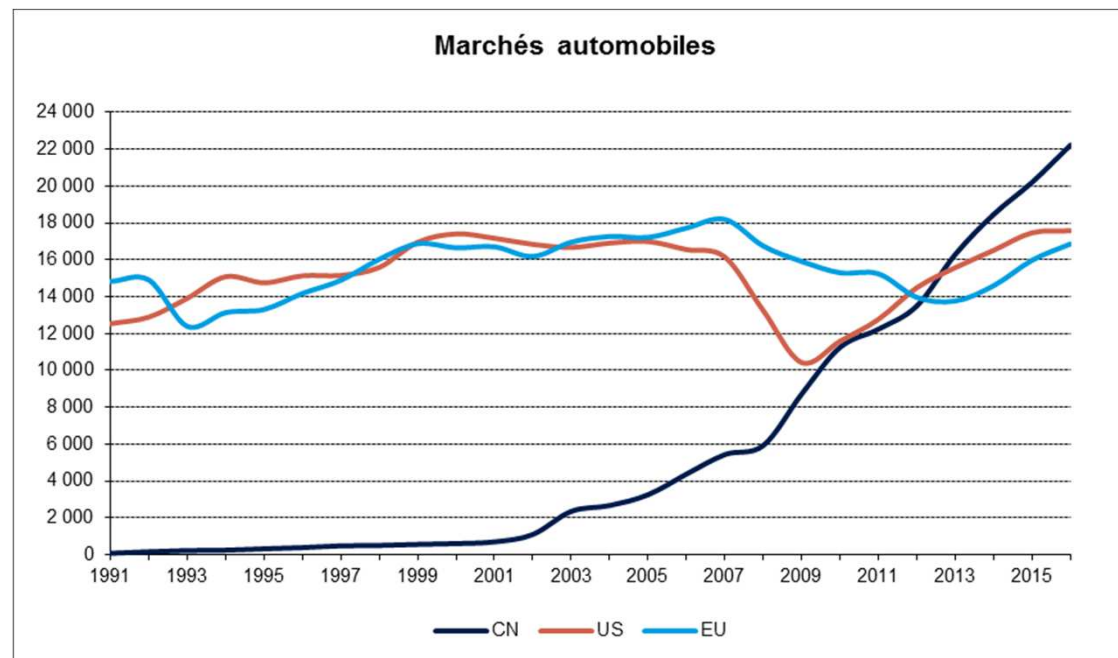
Etape 1 – Analyse cycle économique

Prévisions marchés automobiles ...

Europe (16m LV in 2015)
+9% in 2015
+6% in 2016e

USA (17.5m LV)
+6% in 2015
+1% in 2016e

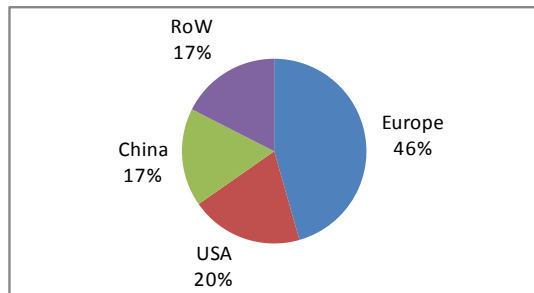
China (20.2m PV)
+9% in 2015,
+10% in 2016e



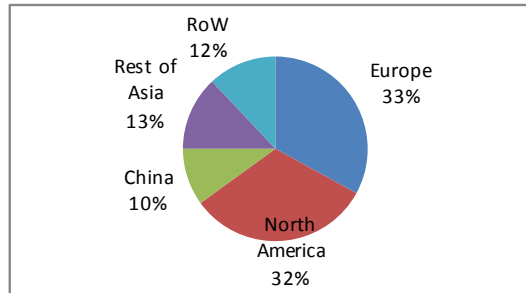
Etape 1 – Analyse cycle économique

... appliquées au mix géographique des sociétés

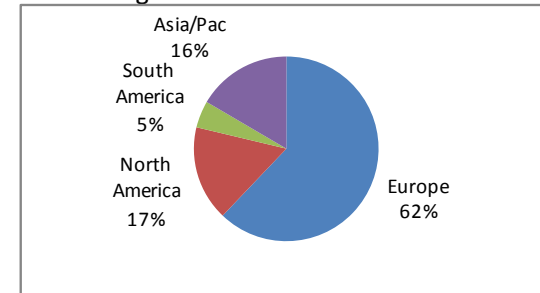
BMW



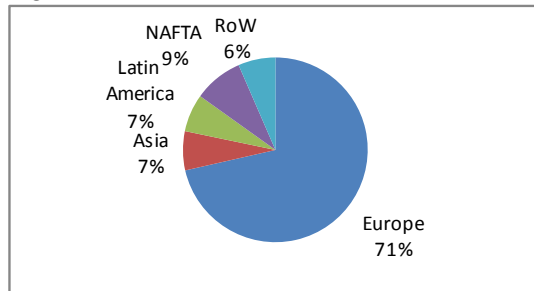
Daimler



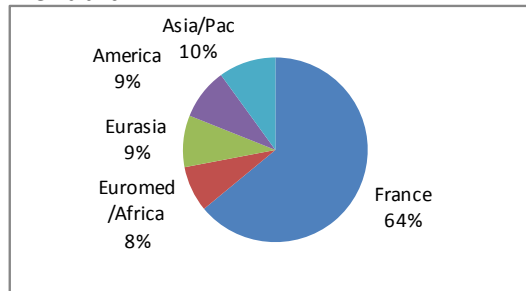
Volkswagen



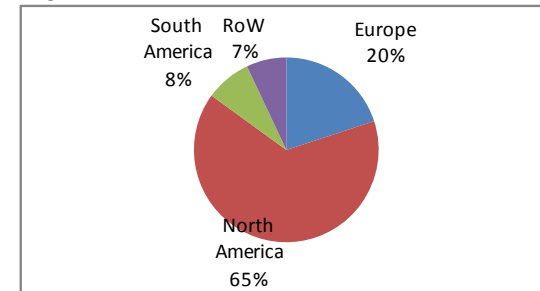
PSA



Renault

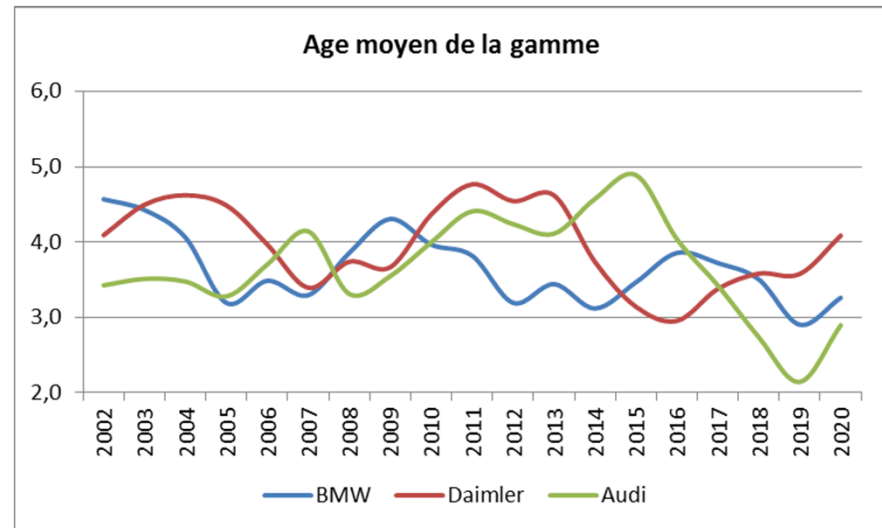
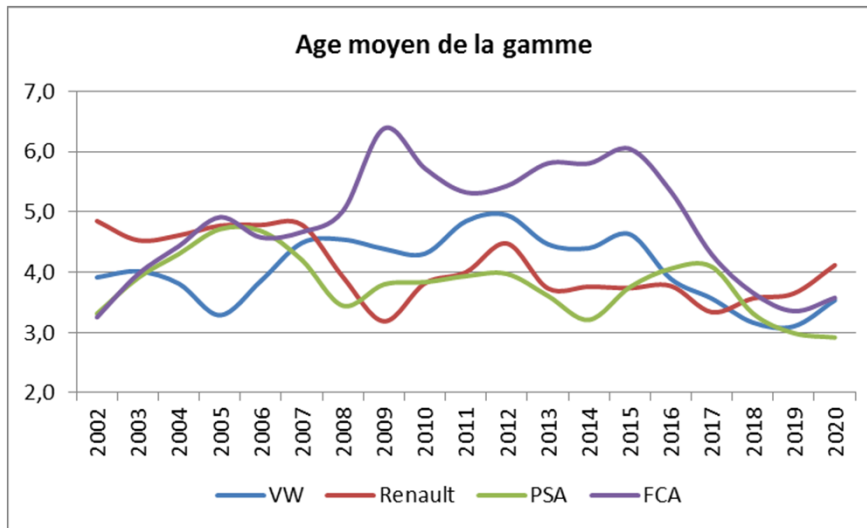


FCA



Etape 2 – Analyse cycle produits

Etude du cycle produits comme vecteur de sous-/surperformance



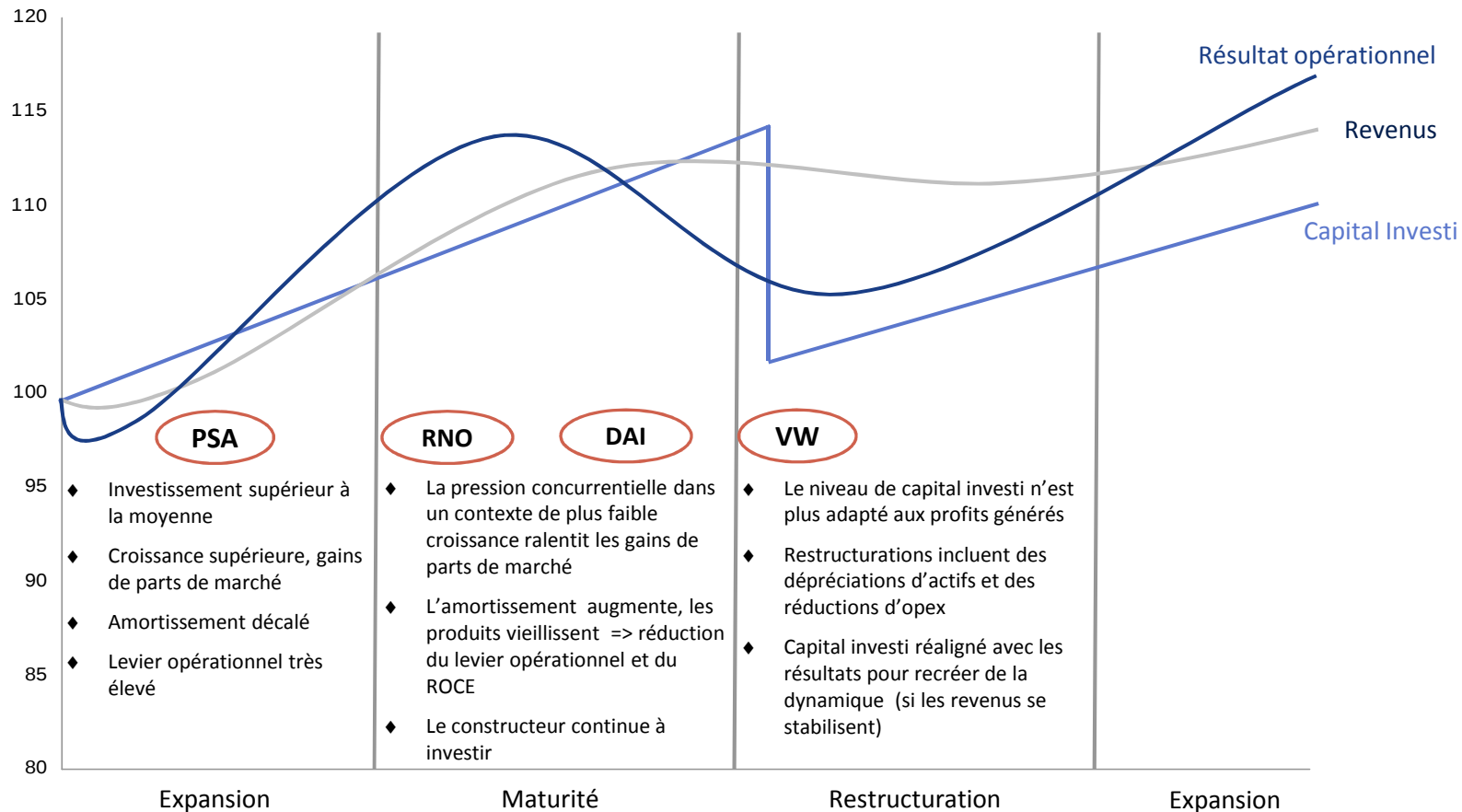
Etape 2 – Analyse cycle produits

Calendrier deancements de véhicules-clés

2014E		2015E		2016E		2014E		2015E		2016E		2014E		2015E		2016E							
BMW Group						VW Group						PSA Group						FCA Group					
BMW	4-Series Cabrio (N)	2-Series Cabrio (N)	5-Series (S)	Audi	TT (S)	R8 (S)	Q5 (S)	Citroën	C1 (S)		C3 (S)	Alfa Romeo			Giulia (N)	169 (N)							
	2-Series Coupe (N)	2-Series Gran Tourer (N)	X2 (N)		Q7 (S)	A4 (S)	A5 (S)			C4-Cactus (N)			Jumpy (S)			MiTo (N)							
	2-Series AT (N)	X1 (S)	Z4 (F)			A5 Sportsback (S)	C-MPV (N)	Peugeot	108 (S)		3008 (S)				D-CUV (N)								
	X4 (N)	7-Series (S)					A1 (S)				3008 (S)	Fiat		500X (N)	500+ (N)								
	X6 (S)						A8 (S)				Expert (S)			Linea (S)	500 (S)								
	i3 (N)						Q2 (N)				408 (S)	Maserati			GranTurismo (F)								
i8 (N)			Seat	Altea (S)	C-CUV (N)		DS			DS3				Levante (N)									
Mini	Mini (3-door, S)	MINI Clubman (S)		Mini Spacebox (N)	Leon (N)				Renault						Chrysler	200 (S)	300C (F)	E MPV (N)					
	Mini (5-door, N)	MINI Coupé (S)	Mini Countryman (S)	Skoda	Fabia (S)	Superb (S)	Roomster (S)	Dacia	Sandero (S)	Duster Pickup (N)				Town & Country (S)									
						Yeti (F)			Yeti (S)		Dokker (F)		Jeep	Renegade (N)	Cherokee XL (N)	Grand Wagoneer (N)							
Daimler								C-SUV (N)	Renault	Trafic (S)	Espace (S)	Scenic (S)				C-CUV (N)	Grand Cherokee (S)						
Smart	Fortwo (S)			Volkswagen	Passat (S)	Touan (S)	Crossblue (N)			Twingo (S)	C-CUV (N)	Latitude (S)	Dodge	Challenger (S)									
	Forfour (S)				Touareg (F)	Tiguan (S)	Polo (S)		Mégane (S)	Fluence (S)	Charger (F)												
Mercedes	C-Class (S)	GLK (S)	E-Class (S)		Polo Hatchback (F)	Transporter (S)	Jetta (S)	GM Group		Laguna (S)		Ford Group											
	GLA (N)	C-Class Coupé (S)	GLC (N)		Golf Sportsvan (S)	Caddy (S)	Scirocco (S)		Opel	Corsa (S)	Astra (S)	Ampera (F)	Ford	Transit M VAN (S)	Mondeo (S)	Explorer (F)							
	S-Class Coupe (N)	MLC (N)	GL-Class (F)		Porsche	Cayenne (F)	911 (F)			Panamera (S)					Transit Courier (N)	Mustang (S)	B-Max (F)						
	V-Class (S)	ML-Class (F)		918 Spyder (N)						Vivaro (N)	Spark (N)	Mokka (F)		Focus (F)	Galaxy (S)								
										Meriva (F)						S-Max (S)							

Etape 3 – Analyse cycle investissement / restructurations

Etude du positionnement dans le cycle d'investissement



Valoriser le secteur

Méthodes de valorisation absolues et relatives

■ L'actualisation des cash flows futurs (DCF)

- La valeur d'une entreprise se définit comme la valeur présente de ses free cash flows futurs
Valeur d'entreprise = somme des cash flows futurs actualisés au taux d'intérêt k
- Le taux d'intérêt k est égal au coût moyen pondéré du capital pour la société, autrement dit la moyenne pondérée entre le coût de sa dette et le coût de ses fonds propres
- La détermination du taux d'actualisation varie en fonction de la structure financière de l'entreprise, son niveau de risque spécifique (beta) et la prime de risque du marché.

■ Les multiples relatifs

- $PER = \text{Cours} / \text{Bénéfice net par action}$
- Valeur d'entreprise / Chiffre d'affaires
- Valeur d'entreprise / Résultat opérationnel

La méthode de valorisation par les multiples fait l'hypothèse que toutes les entreprises d'un même secteur doivent se traiter sur le même multiple puisqu'elles connaissent des problèmes de marketing, technologies et ressources similaires et doivent partager les mêmes schémas d'organisation et de valorisation.

Analyse « extra-financière » ou stratégique

De la valeur fondamentale à la valeur stratégique

■ Analyse des éléments extra-financiers

- Il existe des raisons objectives expliquant qu'un titre puisse se traiter durablement avec une prime ou une décote sur sa valeur fondamentale calculée ou bien sa moyenne sectorielle.
- Les raisons de cette décote ou de cette prime peuvent être multiples: profil de croissance, solidité du business model, management, risque M&A, liquidité, contrôle ...
- Par exemple un constructeur généraliste se paie entre 10 et 20% de son chiffre d'affaires tandis qu'un constructeur « premium » sera valorisé entre 40 et 50% de son CA.
- Par ailleurs, il faut rester conscients de la valeur stratégique d'un actif ou d'une société pour ses pairs, ne pas négliger le risque d'acquisition qui pèse sur les actifs en détresse (valeur des synergies, modification du paysage concurrentiel ...)
- Il faut donc tenir compte des optionalités stratégiques qui existent sur une valeur et estimer la probabilité d'occurrence des différents scénarios afin de rendre son jugement plus complet.

Le cas Tesla

Pourquoi Tesla vaut près de 5x Peugeot

- Tesla a vendu 50,000 unités en 2015 pour un chiffre d'affaires d'environ 5Md\$. La société n'a jamais été rentable et brûle du cash. Elle est valorisée près de 30Md\$
- PSA a vendu 3 millions d'unités en 2015 pour un chiffre d'affaires d'environ 55Md€. La société a atteint 5% de marge et généré plus de 2Md€ de FCF. Elle est valorisée autour de 6Md€ (cash inclus).
- La valorisation de Tesla repose sur:
 - Son positionnement stratégique unique: des véhicules 100% électriques, de plus en plus recherchés.
 - Son expertise technologique des batteries: construction de la gigafactory en partenariat avec Panasonic
 - Sa capacité à innover et créer de nouvelles sources de revenus: batteries domiciles
 - Un plan de développement ambitieux: 500 000 ventes en 2018, 1 million en 2020

- Attention aux effets de mode!

Quand vous achetez



vous n'achetez pas



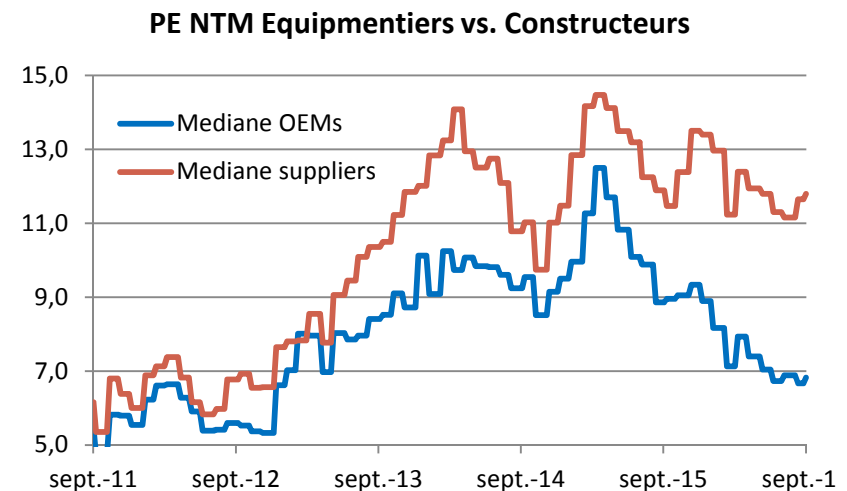
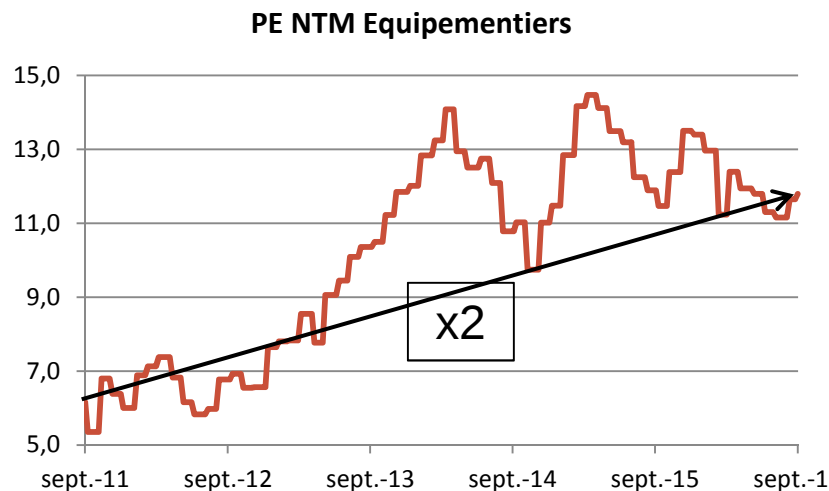
vous achetez



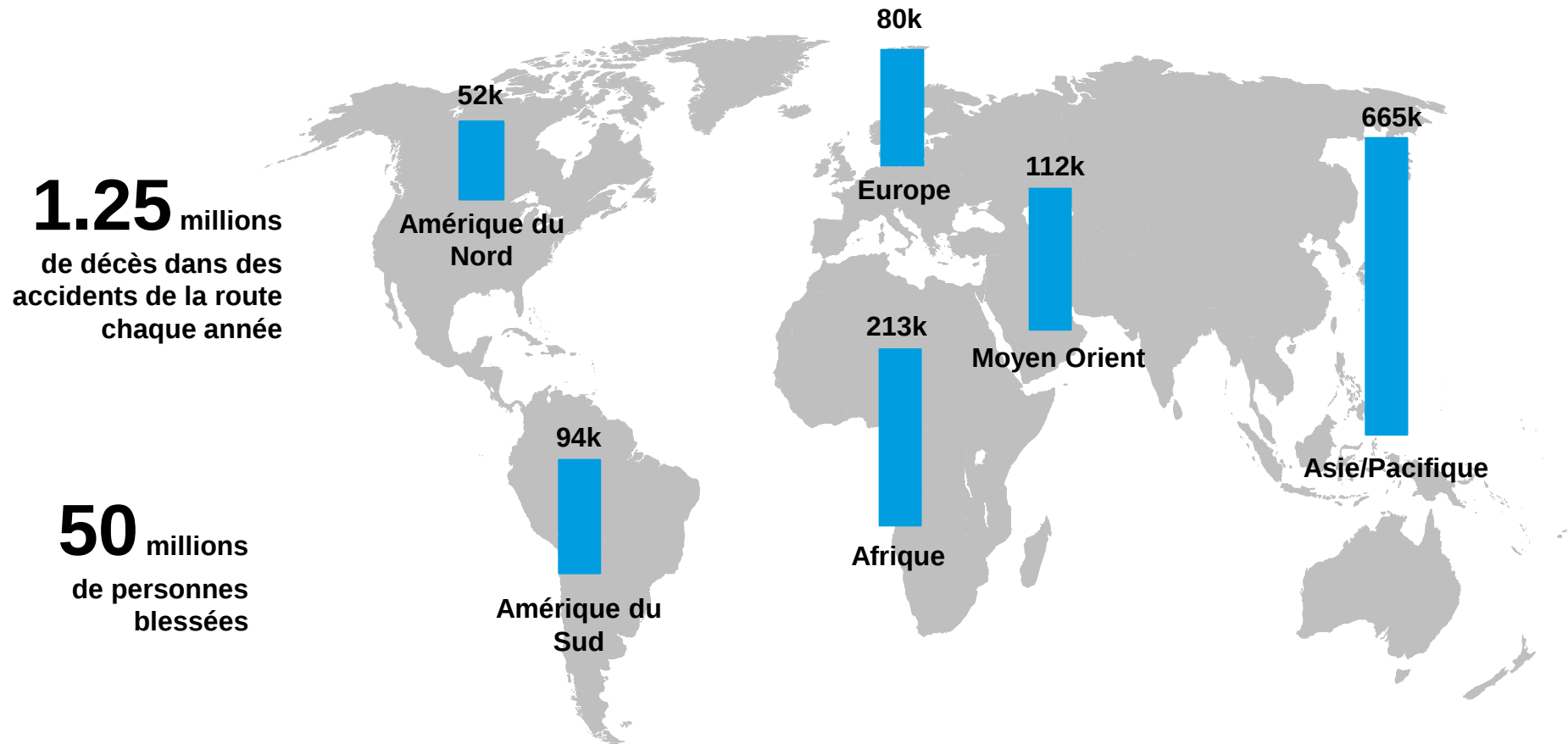
Le cas des Equipementiers Autos

Les « déplacements de valeur » peuvent justifier un re-rating

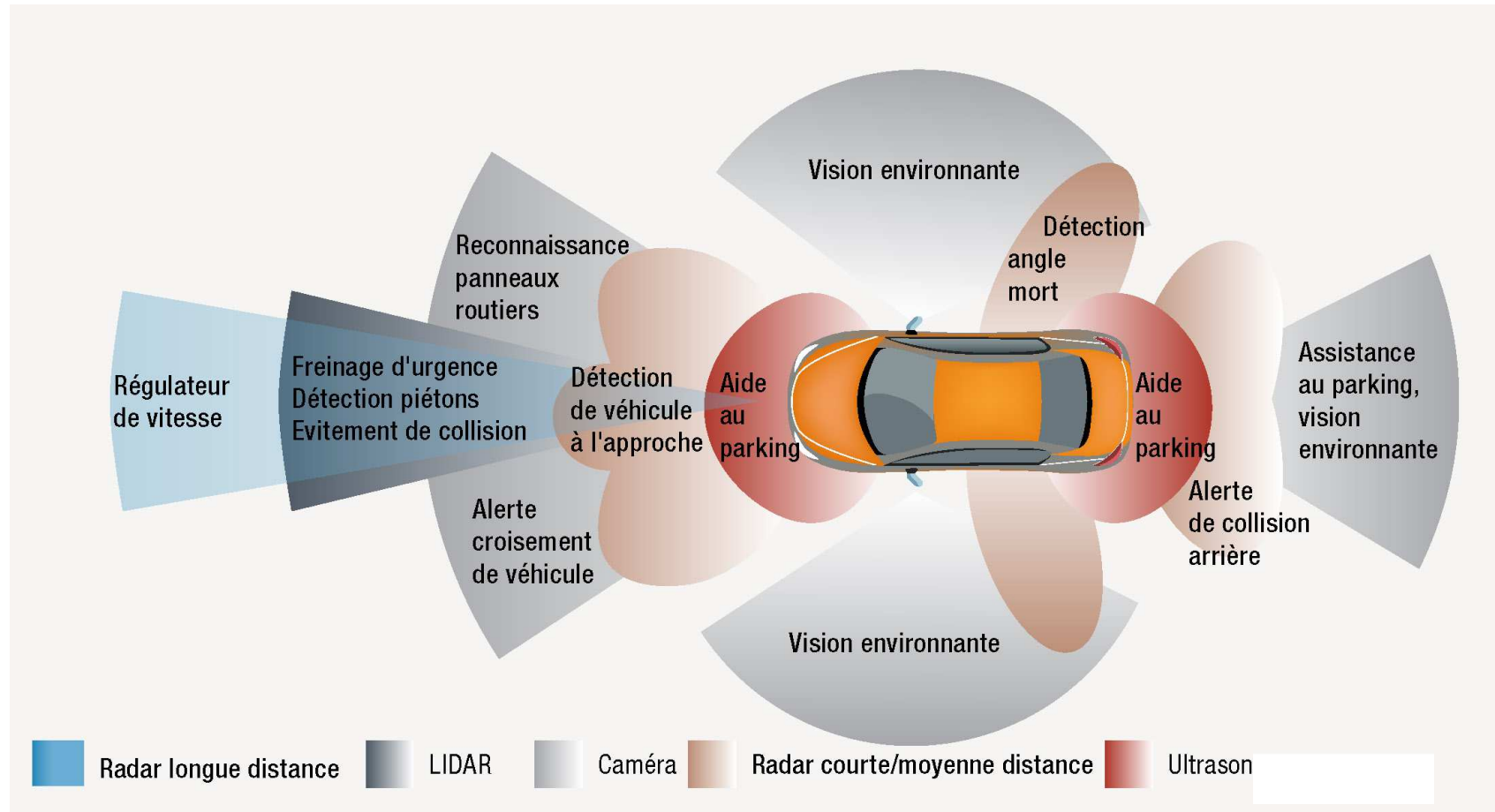
- L'industrie de l'équipement automobile s'est fortement revalorisée en bourse au cours des 5 dernières années, bénéficiant de :
 - Sa restructuration agressive en 2008-2009
 - La globalisation de son implantation industrielle
 - La tendance ininterrompue à l'outsourcing
 - Son exposition aux « macro trends » technologiques



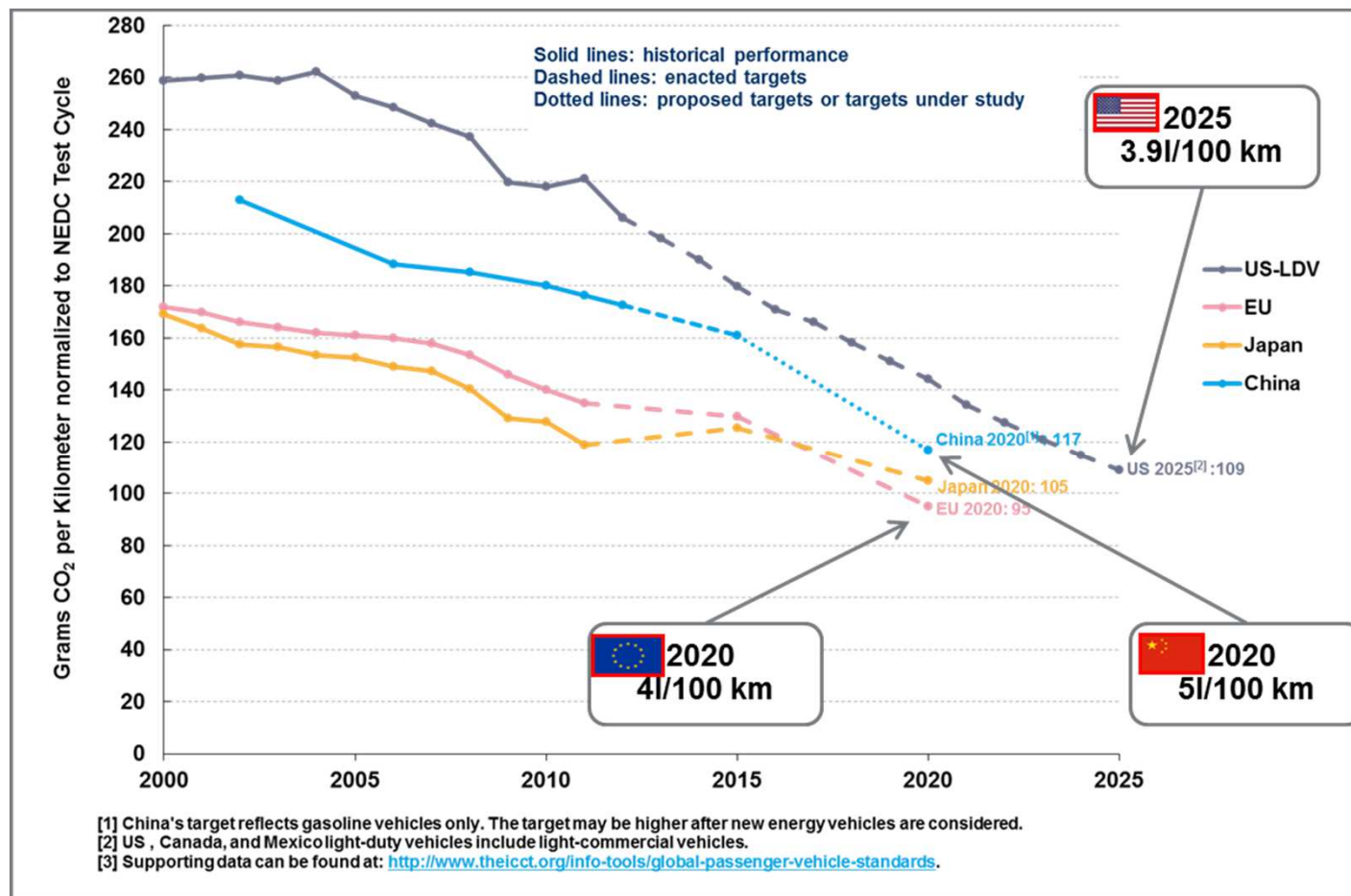
Macrotrend #1 – vers une mobilité plus sûre



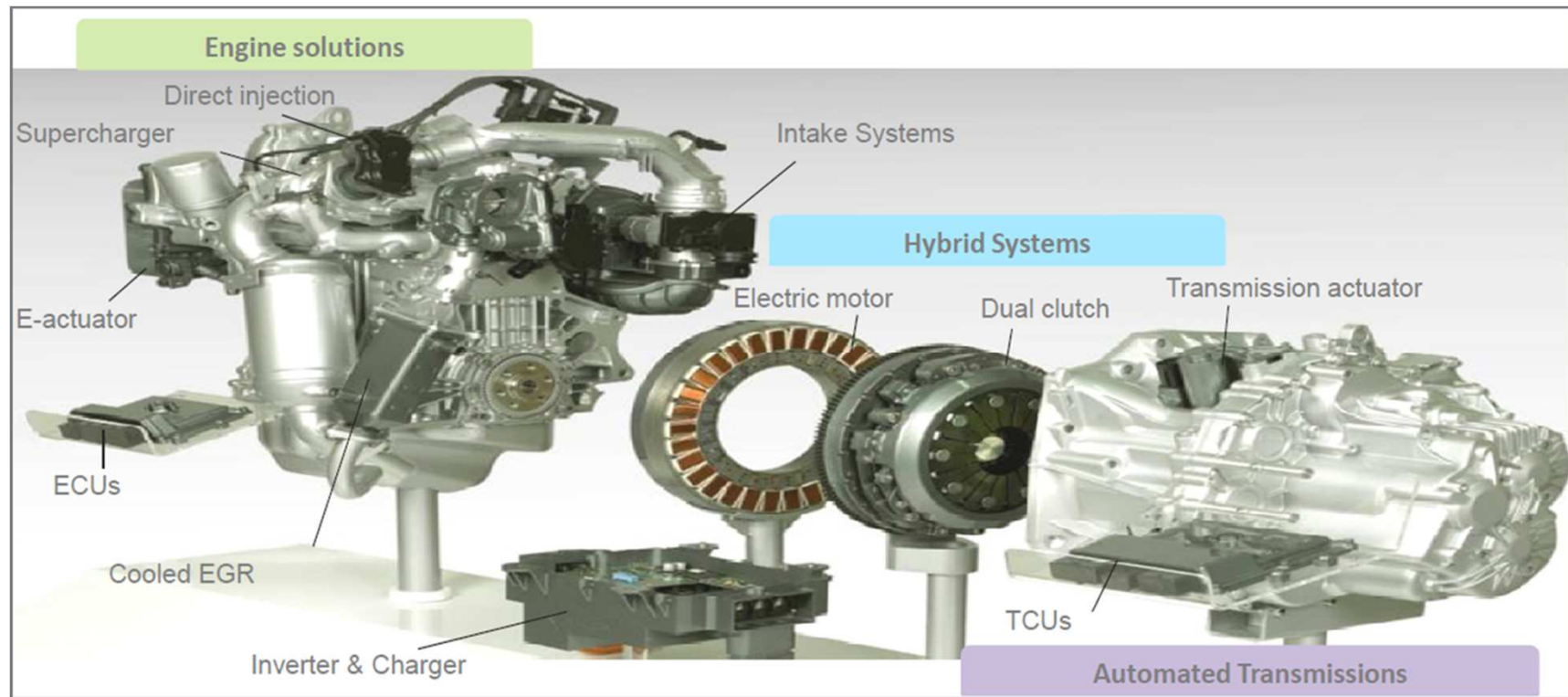
Développement des solutions de sécurité active



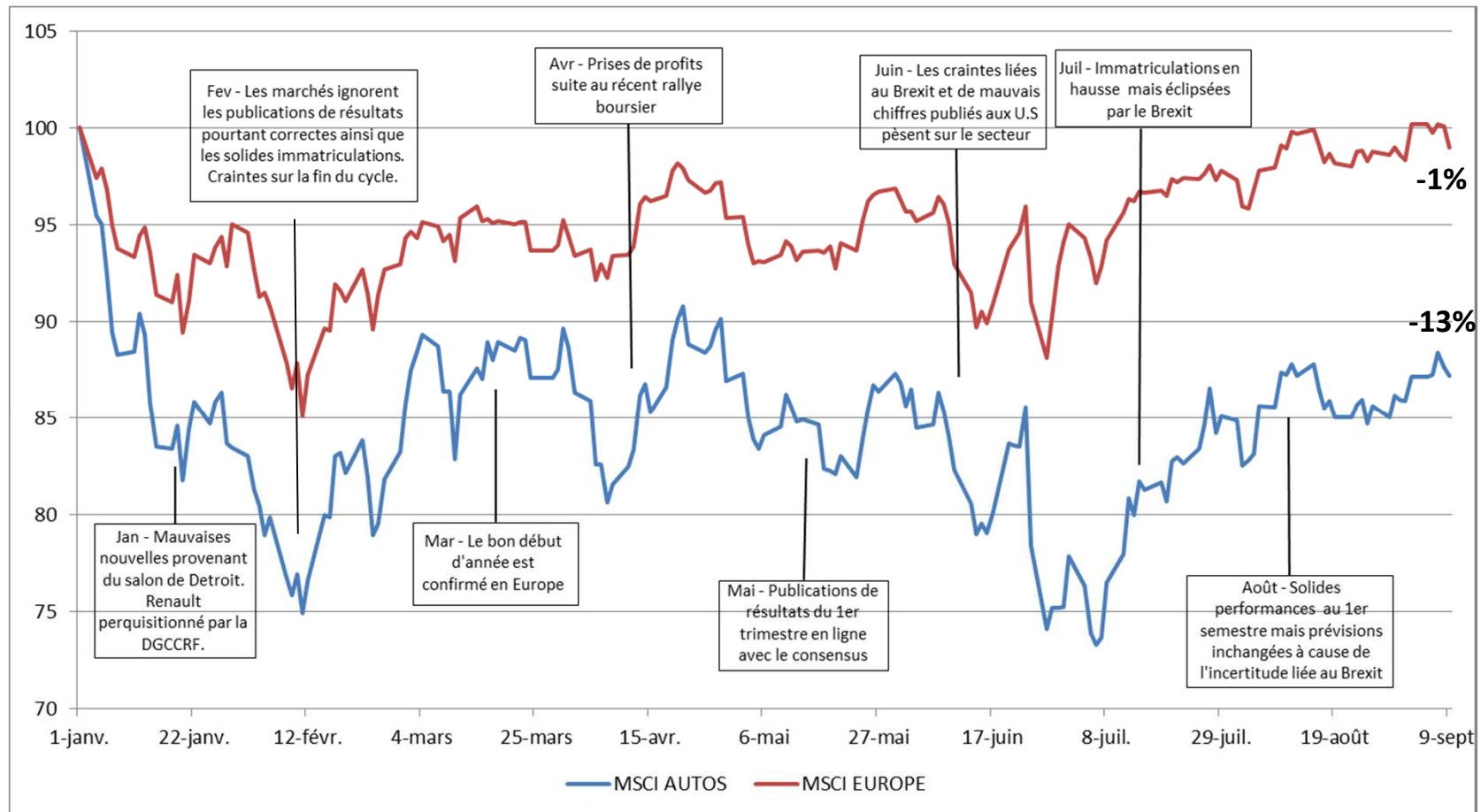
Macrotrend #2 – vers une mobilité plus propre



Développement des solutions de réduction des émissions



Expliquer la sous-performance du secteur auto en 2016

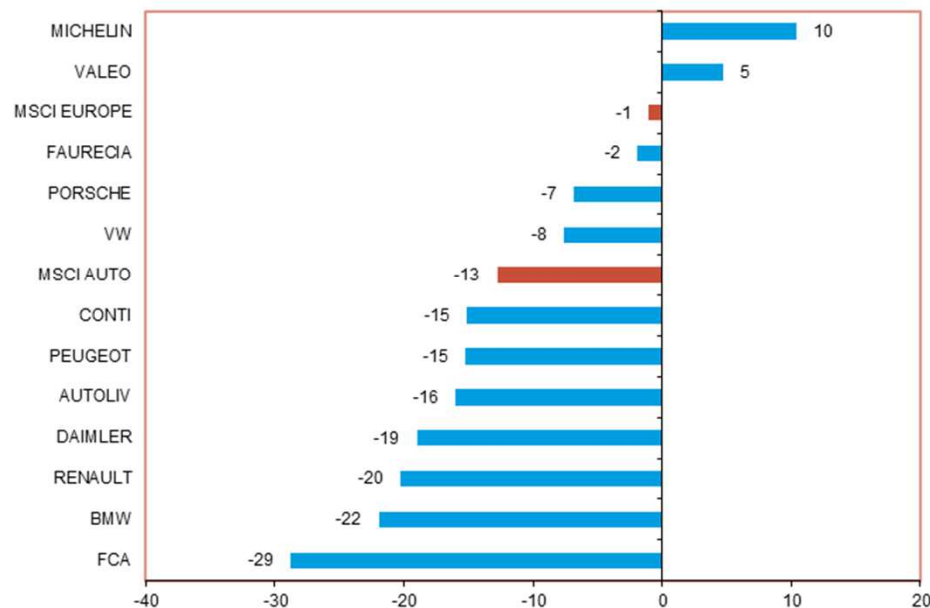


Constructeurs vs. équipementiers

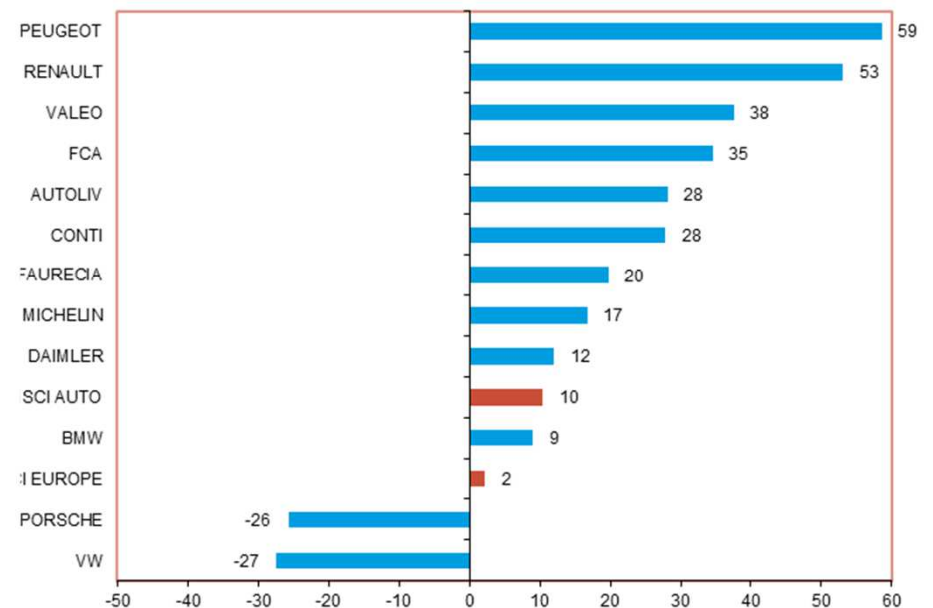
Sous-performance particulière des constructeurs automobiles

- Le MSCI Autos sous-performe largement le marché cette année
 - Gagnants 2016 : Michelin, Valeo / Perdants 2016 : FCA, BMW, Renault
 - Par sous-secteur: surperformance relative des pneumaticiens (-3%) et des équipementiers (-7%), sous-performance des constructeurs « premium » (-16%) et généralistes (-21%)

2016 YTD Absolute Performance (%)



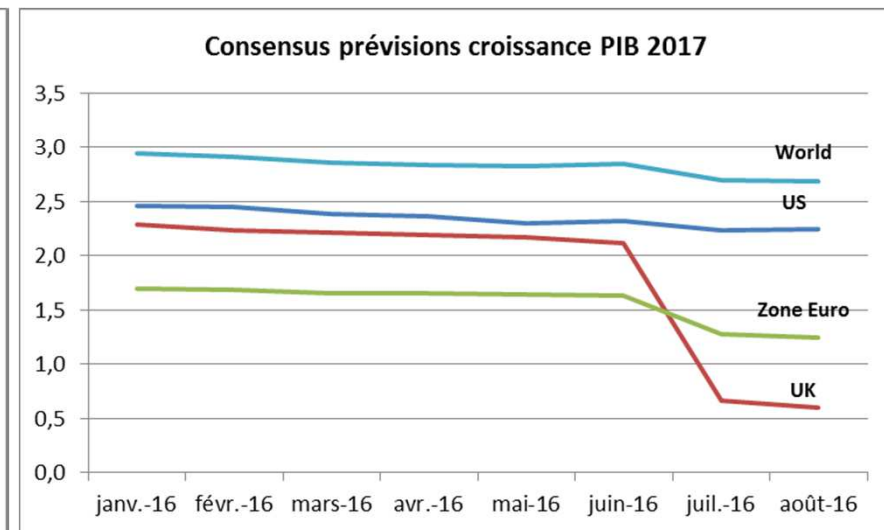
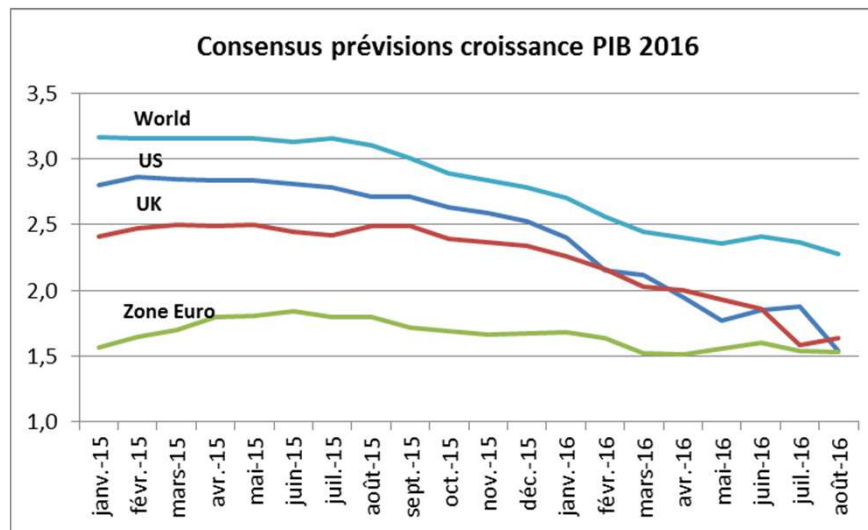
2015 Absolute Performance (%)



Une économie mondiale qui patine

Le contexte général n'est pas porteur pour un secteur aussi cyclique

- Prévisions de croissance du PIB revues en baisse tout au long de l'année

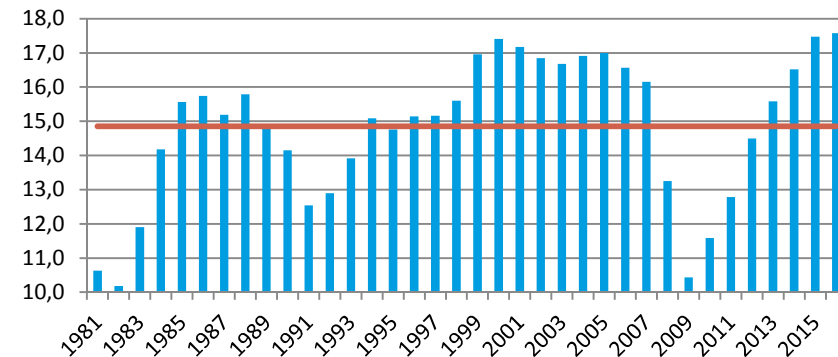


Un marché américain en risque

Le marché à son plus haut

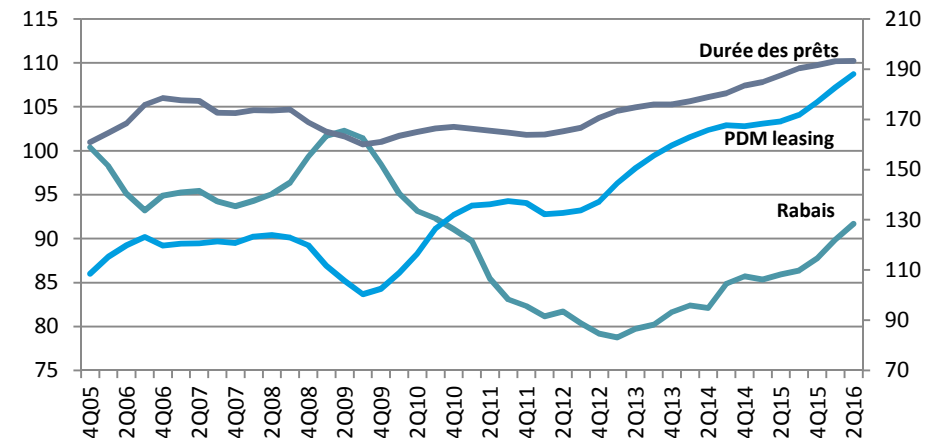
- Le marché américain à son plus haut historique

Ventes automobiles Etats-Unis (millions)



- Marché fortement tiré par le crédit mais les indicateurs se dégradent: rabais, allongement de la durée des prêts

PDM leasing vs. rabais, durée prêts

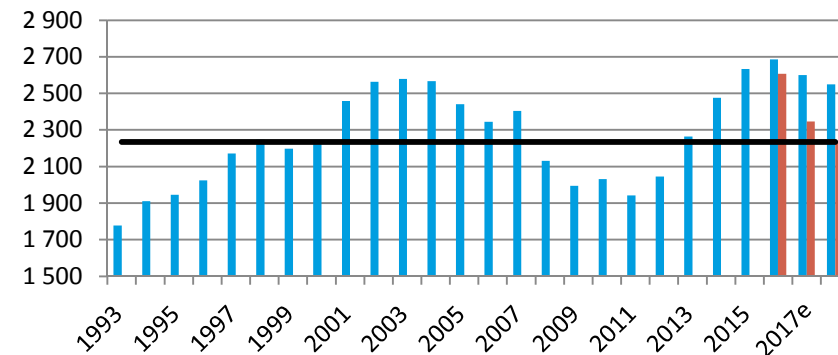


Le marché européen douché par le Brexit

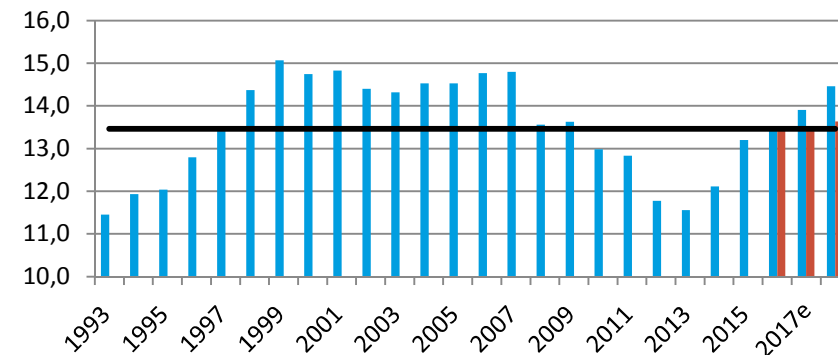
Retournement du marché britannique attendu

- LMC Automotive s'attend à une chute de 15% du marché britannique d'ici 2018. Cela représente une réduction de l'ordre de 400,000 unités en moins vis-à-vis de leur précédente estimation.
- Marché attendu en baisse de 1% en 2016, en baisse de 10% en 2017 et de nouveau en baisse de 5% en 2018.
- L'impact est sensible au niveau européen, avec une croissance revue en baisse de +3% à 0 en 2017, de +4% à +1% en 2018.

Ventes automobiles Royaume-Unis (milliers)



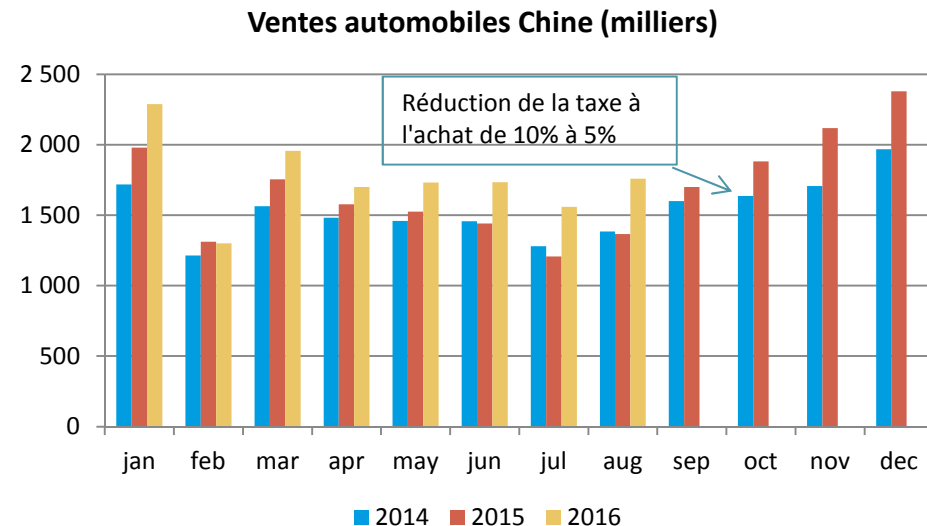
Ventes automobiles UE15+EFTA (millions)



La Chine sous perfusion

Fin / diminution attendue de l'aide gouvernementale chinoise

- Le 1^{er} octobre 2015, la Chine a réduit de moitié (de 10% à 5%) la taxe sur les achats de petites voitures particulières en vue de relancer les ventes dans le pays.
- Une telle baisse de la taxe sur les achats de voitures avait été mise en place en 2009 pour faire face à la crise financière mondiale. En 2010 la taxe avait été relevée à 7,5% avant d'être rétablie à son niveau initial en 2011.



Incertitudes moyen terme: réduction CO2 et conduite autonome

Difficile de quantifier les coûts technologiques/réglementaires futurs

■ Réglementation CO2

- L'affaire Volkswagen conduit à des incertitudes autour des futures motorisations
- Le test des émissions de polluants et CO2 se feront plus stricts et plus coûteux (entre 700 et 1000 Euros d'ici 2021)
- Quelle technologie offre les meilleures opportunités ? Le coût du diesel augmentant et les coûts liés à la batterie déclinant (vers 100\$/kWh d'ici 5-10 ans)

■ Conduite autonome et ADAS

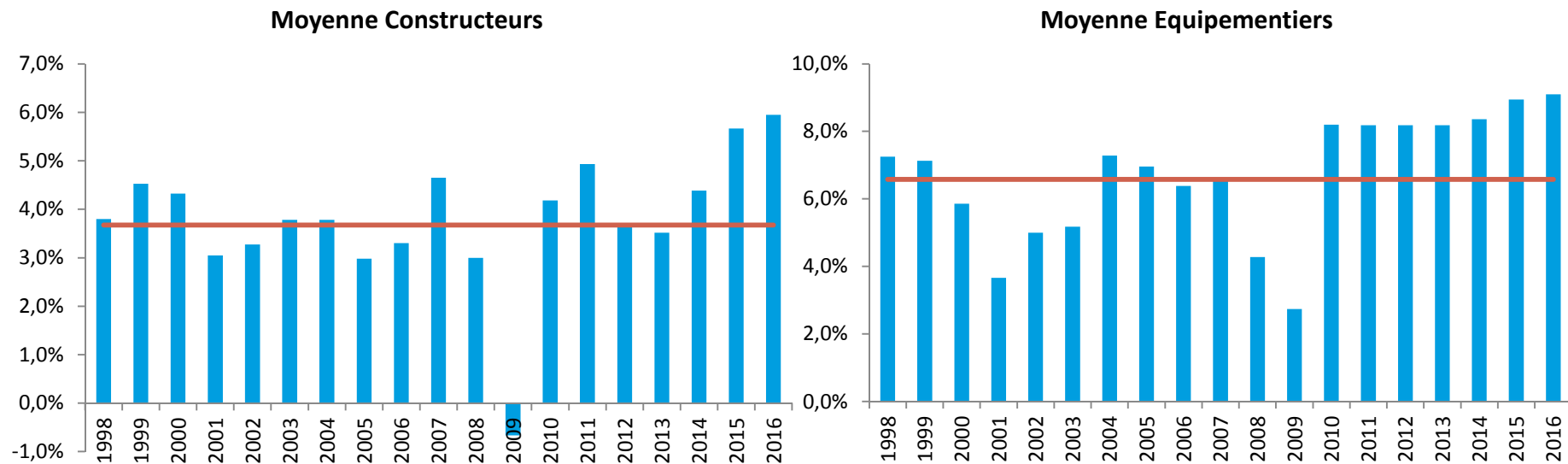
- Est-ce que la conduite autonome et la mobilité à la demande augmenteront la demande automobile (plus de km parcourus) ou bien l'inverse (plus de partage) ?
- McKinsey estime que d'ici 2030, environ 50% de tous les véhicules vendus dans le monde auront des capacités semi-autonomes et que 15% seront 100% autonomes. Le solde (35%) devrait avoir des systèmes d'aide à la conduite (comme le freinage automatique).
- Les coûts additionnels estimés: jusqu'à 4000 Euros

■ Dans quelle mesure le consommateur sera-t-il prêt à payer ?

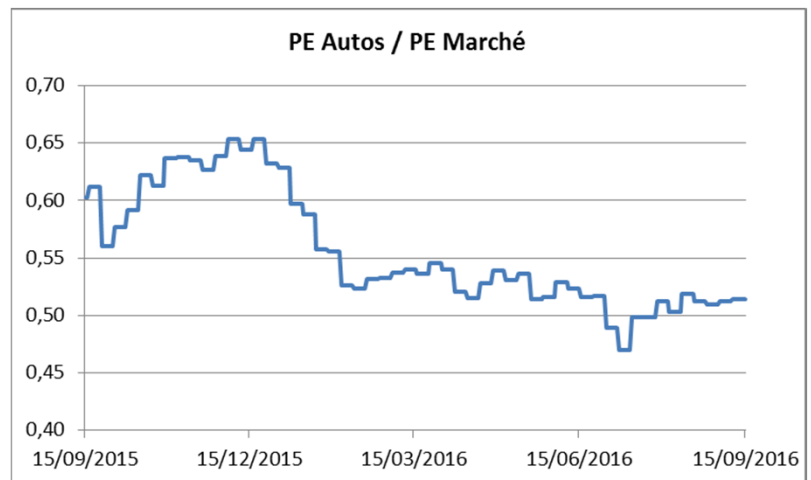
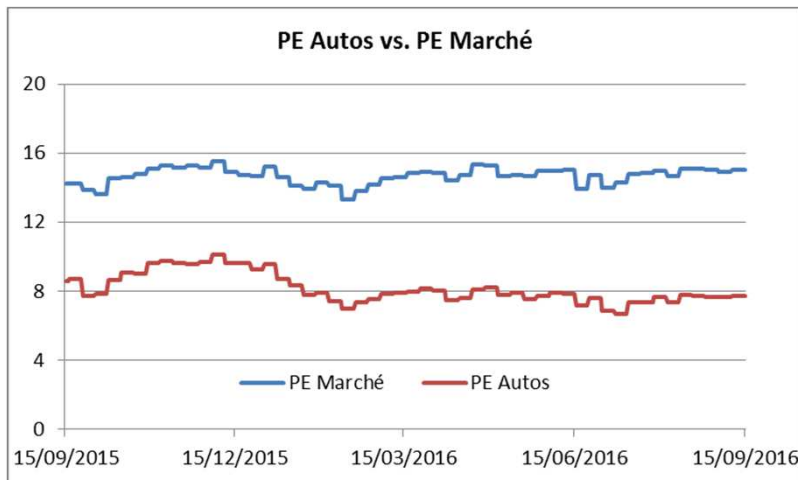
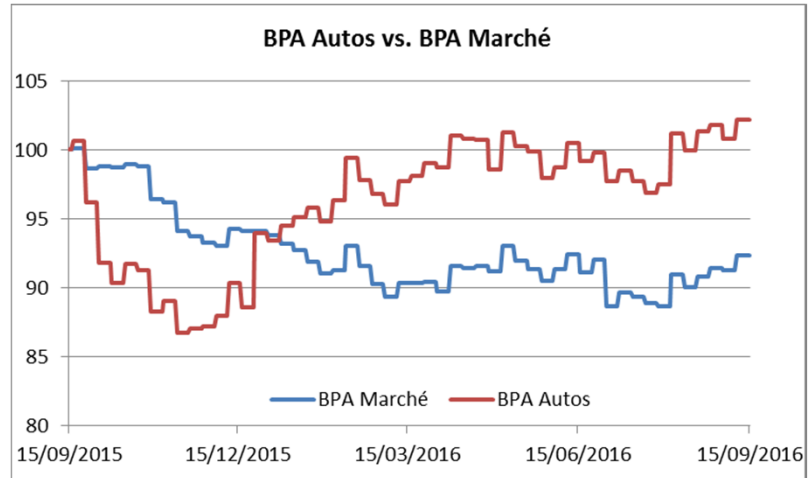
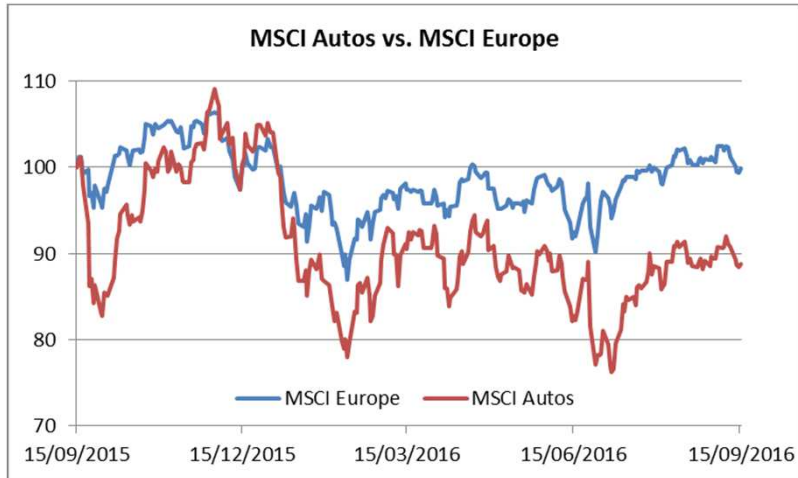
Les marges de l'industrie au plus haut

Des questions sur le caractère soutenable des marges

- Peugeot, Daimler, Valeo, Faurecia, Continental et Michelin sur des plus hauts historiques en 2015 ou 2016



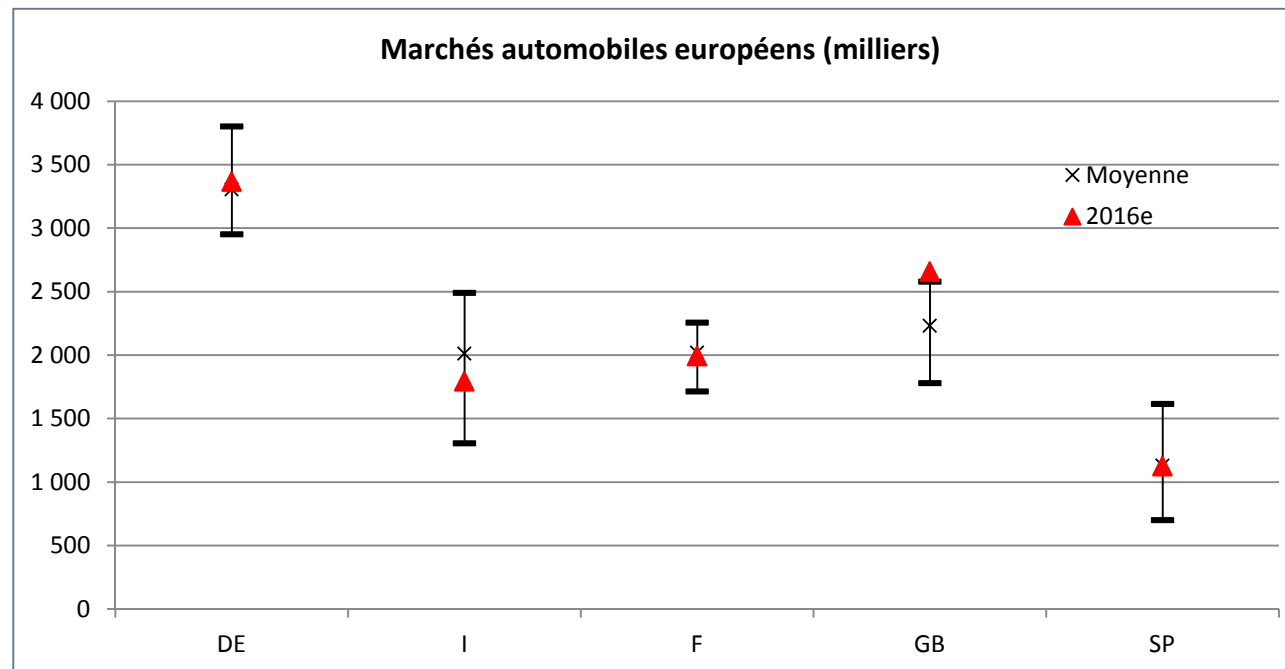
Mais un scénario négatif déjà anticipé



Une Europe pas encore à son plus haut niveau

Encore du potentiel en Europe

- L'Europe – pas (encore) de signes de ralentissement post-Brexit et des marchés encore loin de leurs meilleurs niveaux.
- Intervention de la BCE (QE) probablement prolongée au-delà de mars.

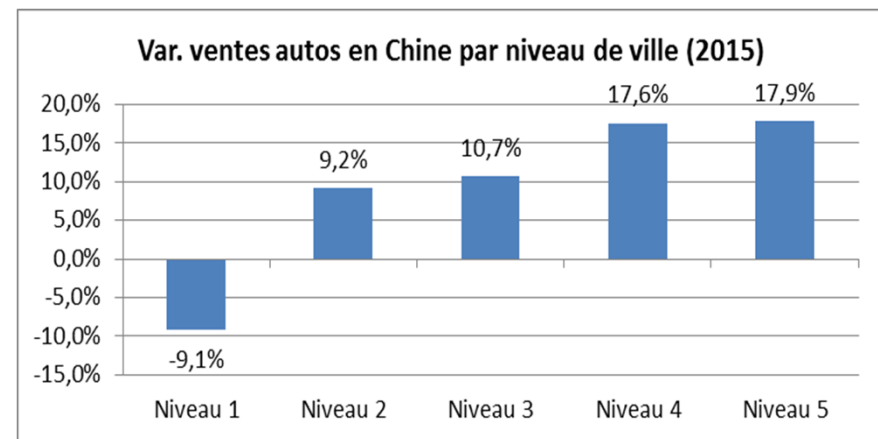


Et la Chine recèle encore un potentiel significatif

Optimisme sur la Chine

- Impact finalement gérable d'une hausse des taxes
 - En cas de retour de la taxe à son niveau initial, les constructeurs s'attendent à une croissance de l'ordre de 2-3%. Le scénario le plus probable reste une voie intermédiaire avec une taxe relevée à 7,5%.
- Le potentiel du marché chinois reste important avec des taux d'équipement faibles dans les villes de taille « moyenne ».

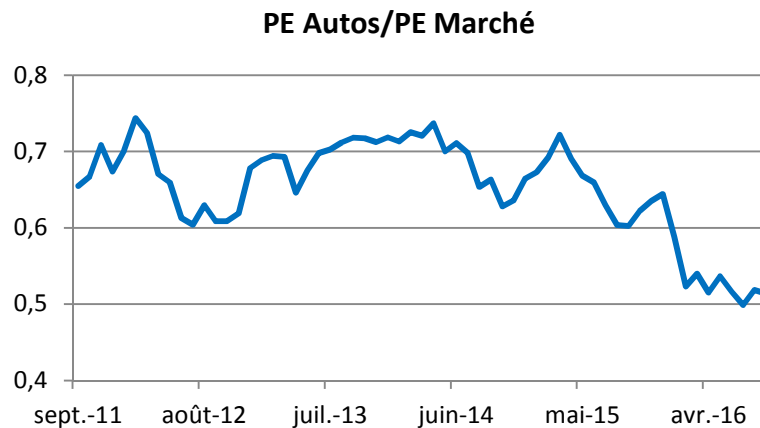
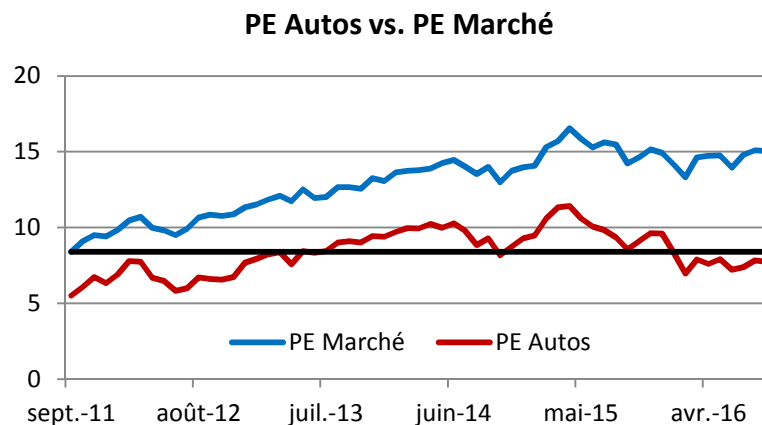
	Villes niveau 1	Villes niveau 2	Villes niveau 3	Villes niveau 4	Villes niveau 5+
Exemples	Beijing, Shanghai	Dalian, XI'an	Shantou, Hengshui	Guyuan, Yaan	Haubeu, Jinchang
Autos/1000 habitants	135	136	94	47	39
Nombre de villes	9	26	68	135	135
Nombre moyen d'habitants (m)	17.2	8.5	4.9	4.0	1.7



Conclusion: optimisme prudent à court terme

Prudence sur les Etats-Unis mais vision positive de l'Europe

- Marchés: phénomène de révisions des résultats à la baisse interrompu
 - Europe – un ralentissement de la croissance dans des proportions raisonnables
 - Chine – vers une croissance de 2-3% à minima l'an prochain
 - Etats-Unis – l'hypothèse d'un plateau
- Europe: niveau des marges historiquement élevé mais soutenable dans l'état
 - Industrie européenne restructurée depuis 2008
 - Problèmes de surcapacités résolus
 - Environnement prix considérablement assaini
- Valorisation historiquement basse





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Société Anonyme au capital de 596 262 615 euros - 437 574 452 RCS Paris





INSEAD – Club Auto

Value Creation in the Automotive Industry

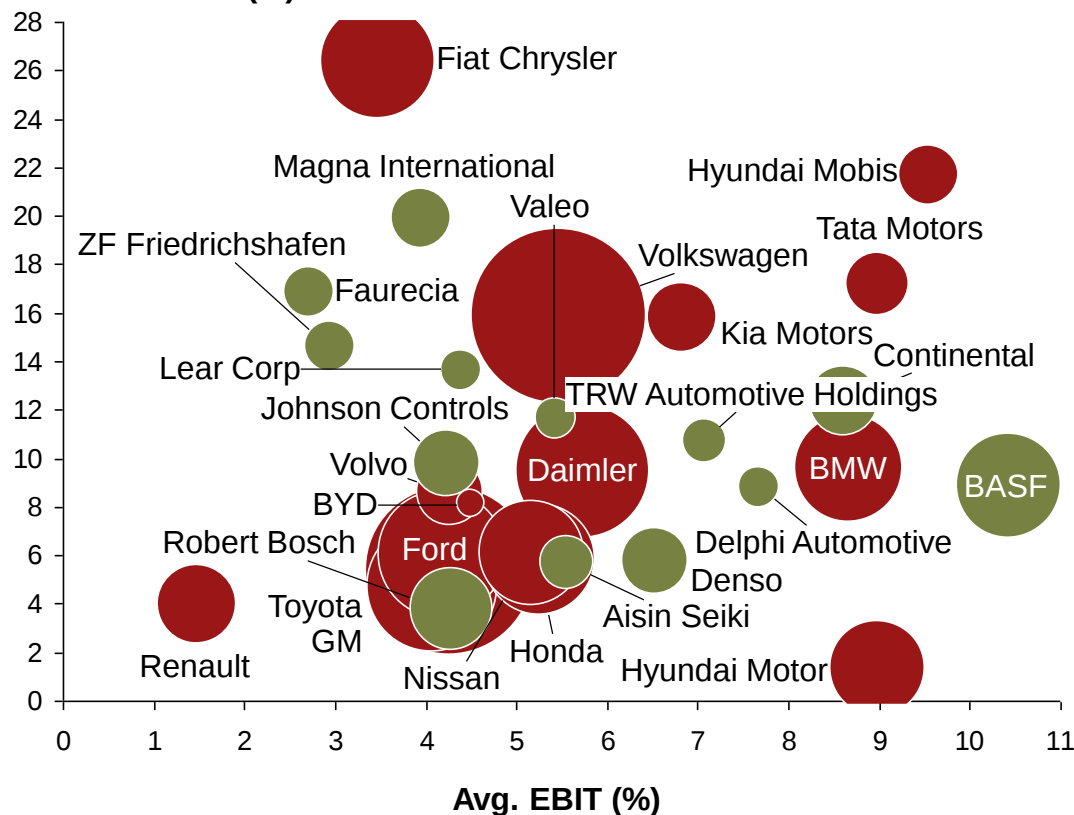
19 Septembre 2016

Rémi Cornubert

Revenues across the industry have increased in the last years while EBIT margin averages have surpassed 6% levels

Competitors analysis (2009-2013¹, USD, %)

Revenue CAGR (%)



Company

ROCE
(2013)

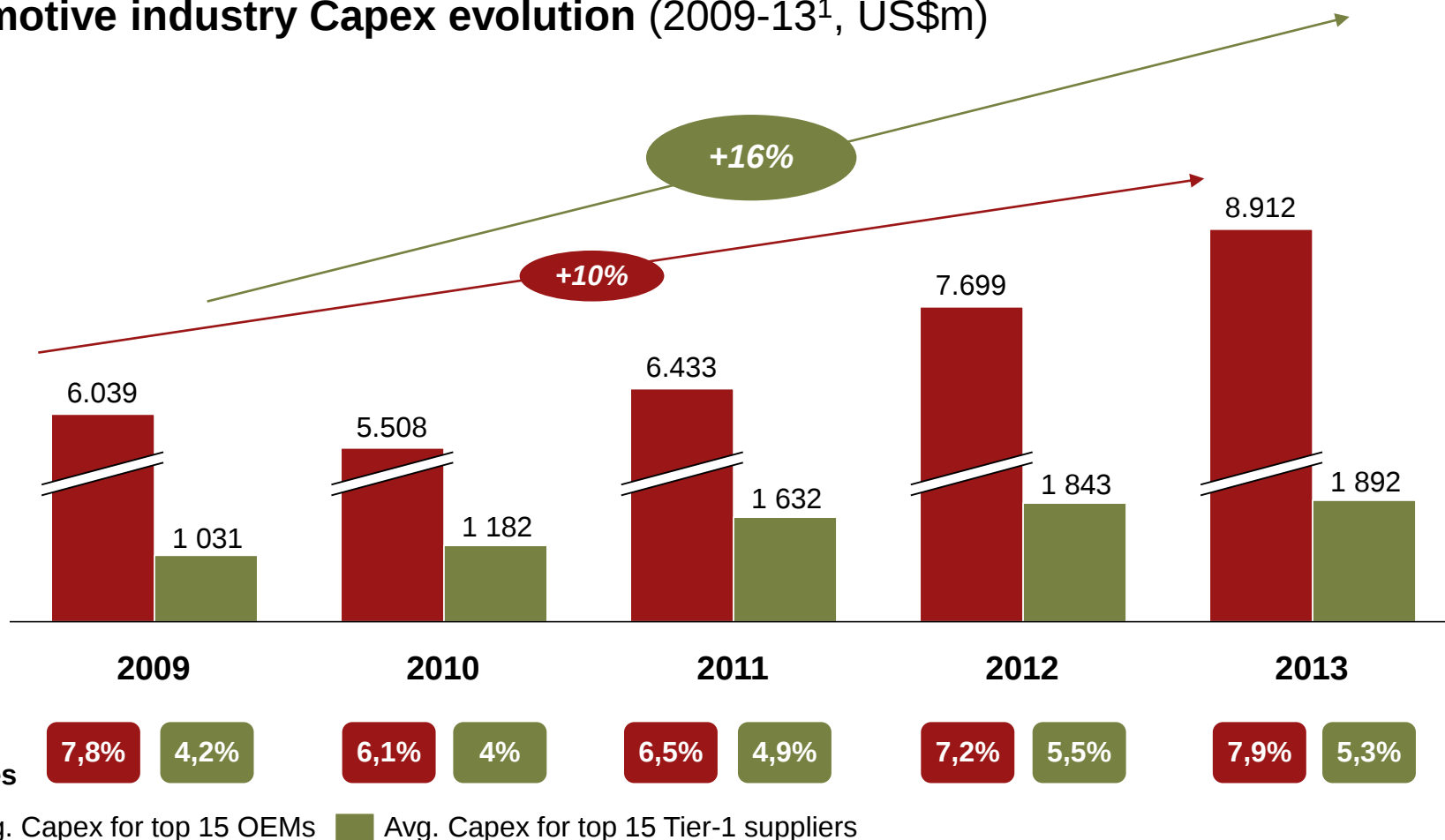
Change
(%)

Delphi Automotive	28,30%	5,10%
Tata Motors	21,00%	10,80%
Lear	20,10%	8,70%
TRW Automotive	17,40%	1,90%
Continental	17,10%	4,90%
Valeo	16,80%	9,70%
Magna	16,70%	20,00%
Denso	13,90%	19,20%
Kia Motors	13,30%	-16,00%
Faurecia	13,10%	6,70%
BASF	13,00%	3,80%
Hyundai Mobis	12,90%	-13,50%
Johnson Controls	12,70%	80,60%
Hyundai Motor	10,40%	-12,20%
Aisin Seiki	10,20%	0,10%
Ford	8,80%	-16,70%
BMW	8,60%	-7,80%
Toyota	8,40%	37,80%
ZF	7,80%	16,30%
GM	7,70%	7,40%
Nissan	7,50%	-0,50%
Fiat Chrysler	7,10%	-11,20%
Daimler	6,70%	-3,90%
Honda	6,70%	20,90%
Robert Bosch	5,60%	42,40%
Volkswagen	5,30%	1,60%
Volvo	4,60%	-48,00%
Renault	2,40%	53,60%
BYD	2,40%	162,60%

1. 2010-2014 for Asian companies due to different reporting calendar
Source: A.T. Kearney

OEMs can't cope with all technological opportunities and expect more investment in innovation and development from the Tier-1

Automotive industry Capex evolution (2009-13¹, US\$m)

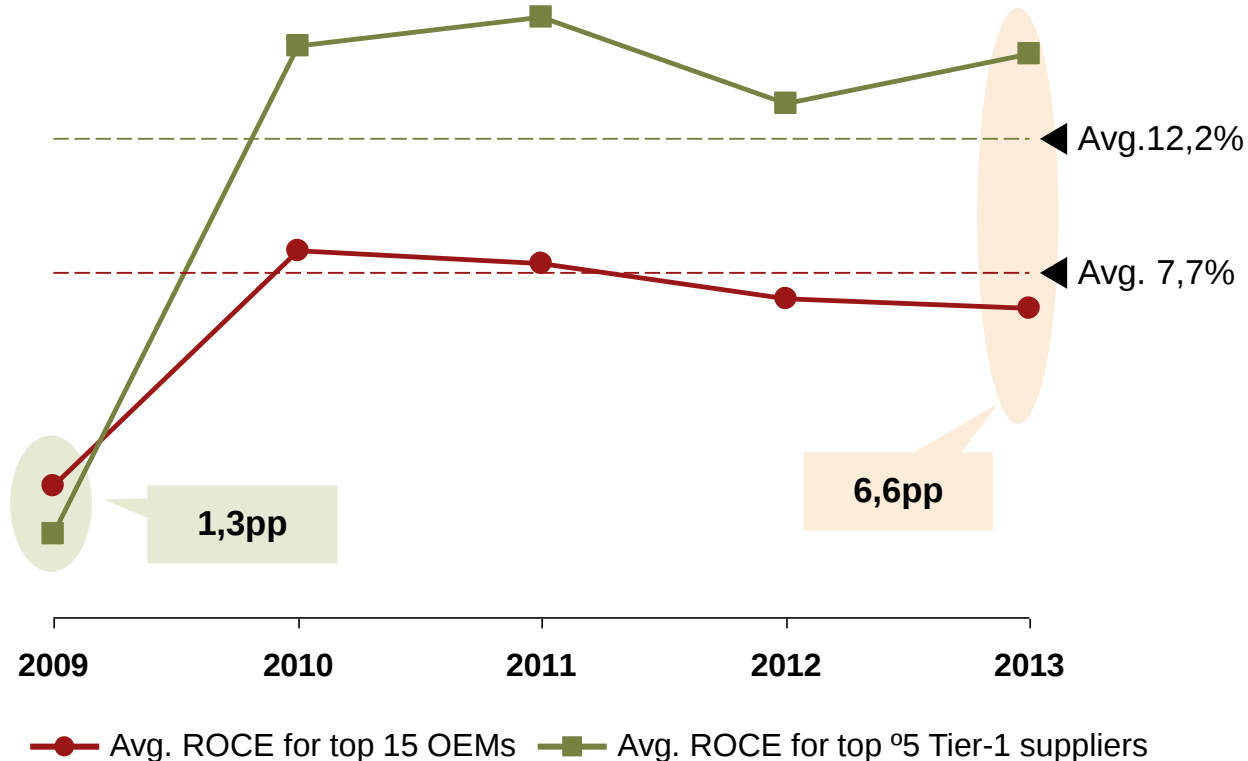


1. 2010-2014 for Asian companies due to different reporting calendar
Source: Capital IQ, A.T. Kearney

The balance between risk and return is becoming key for future success

- As OEMs try to recoup ROCE the Tier-1 need to make their choices :
 - Regions
 - Industry segments
 - Position in the value chain- module systems
 - Position in the technology landscape and functions
- Suppliers should expect next wave of aggressive cost reduction...more aggressive or collaborative?

ROCE (2009-13¹, %)

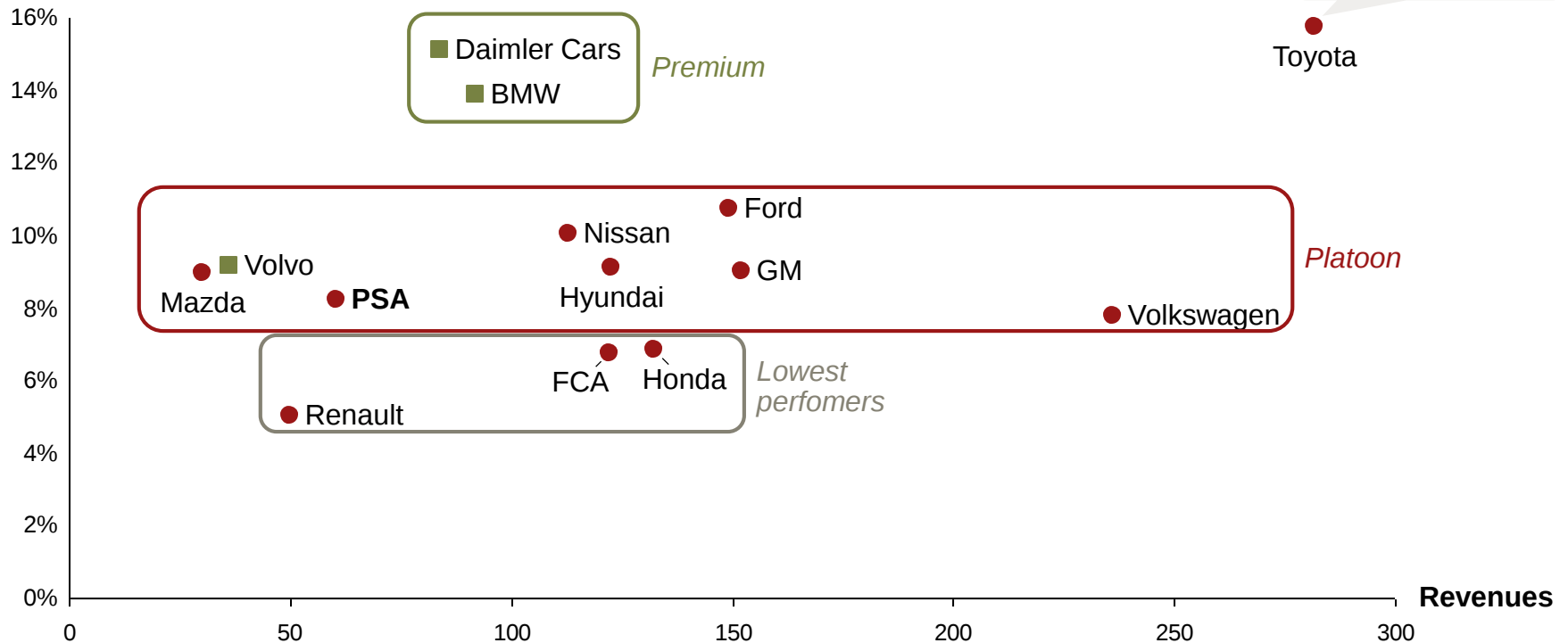


Until now there was no clear critical size obligation to be profitable in the automotive industry (1/2)

EBITDA margin vs Revenues of main OEMs

(2015, %, Bn\$)

EBITDA margin

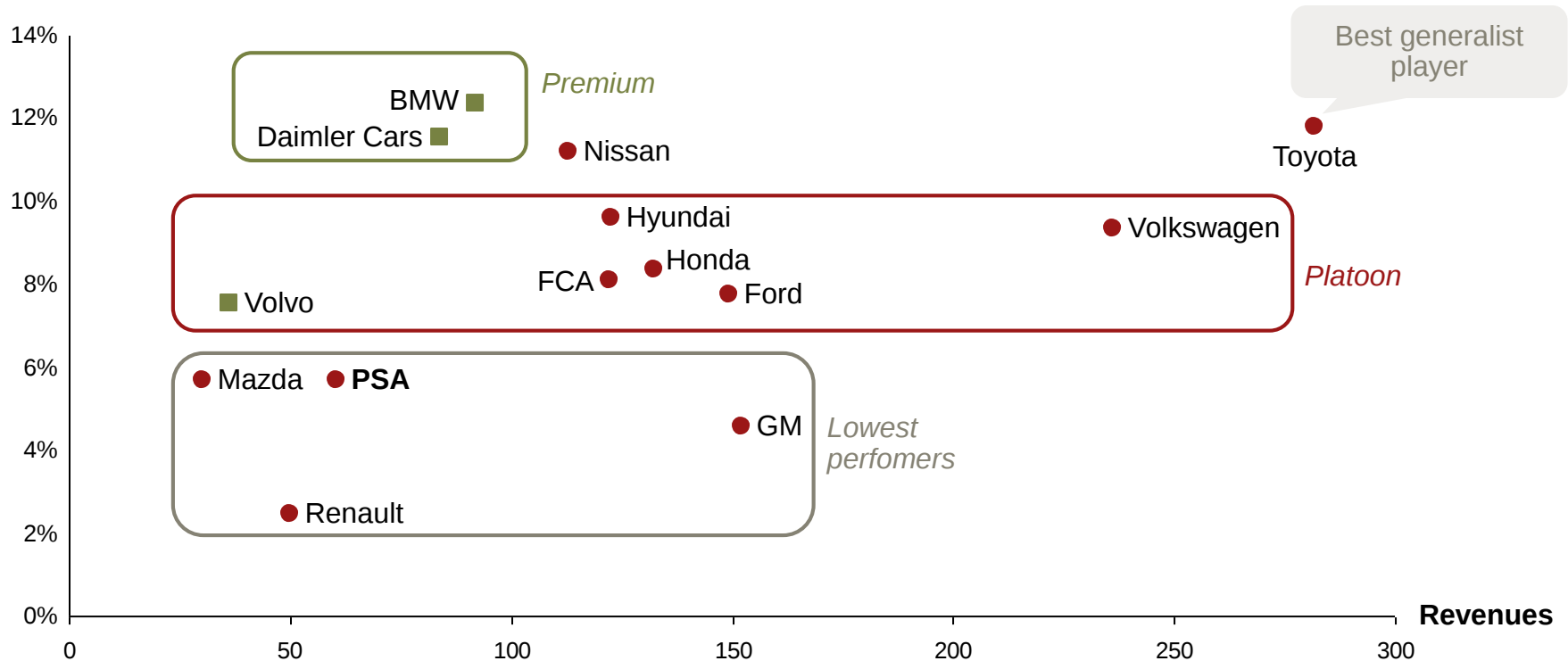


Until now there was no clear critical size obligation to be profitable in the automotive industry (2/2)

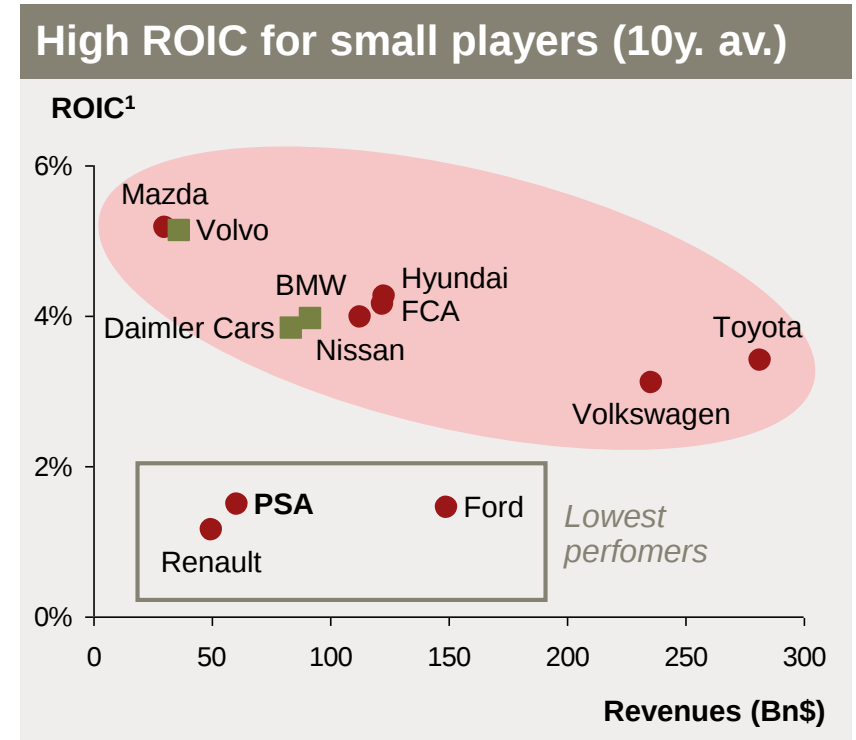
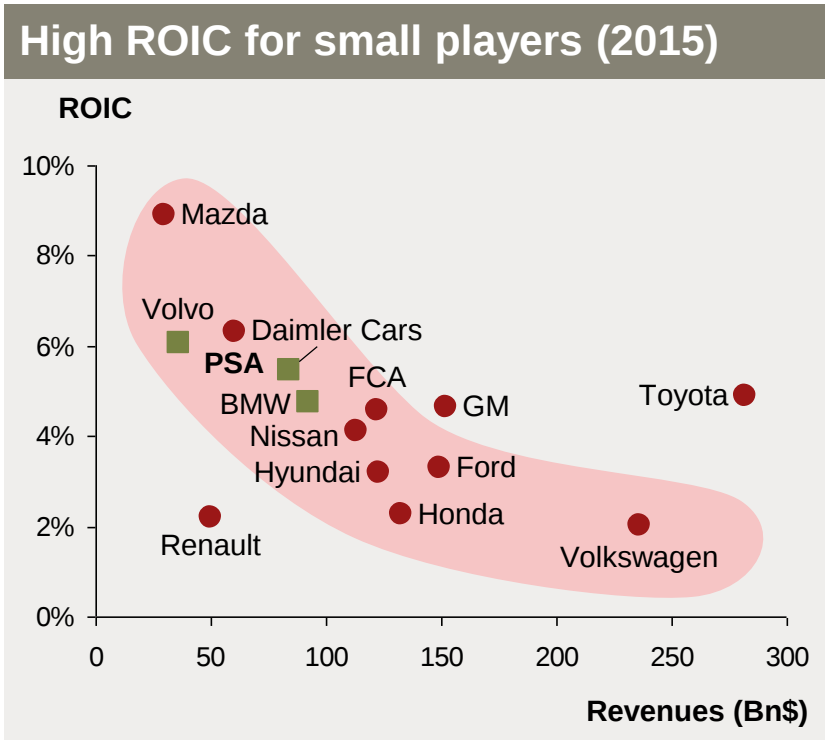
EBITDA margin vs Revenues of main OEMs

(2005-2015 average, %, Bn\$)

EBITDA margin



Small players could reach a good profitability thanks to targeted investments and operational excellence



Large players have lower ROIC on their additional projects

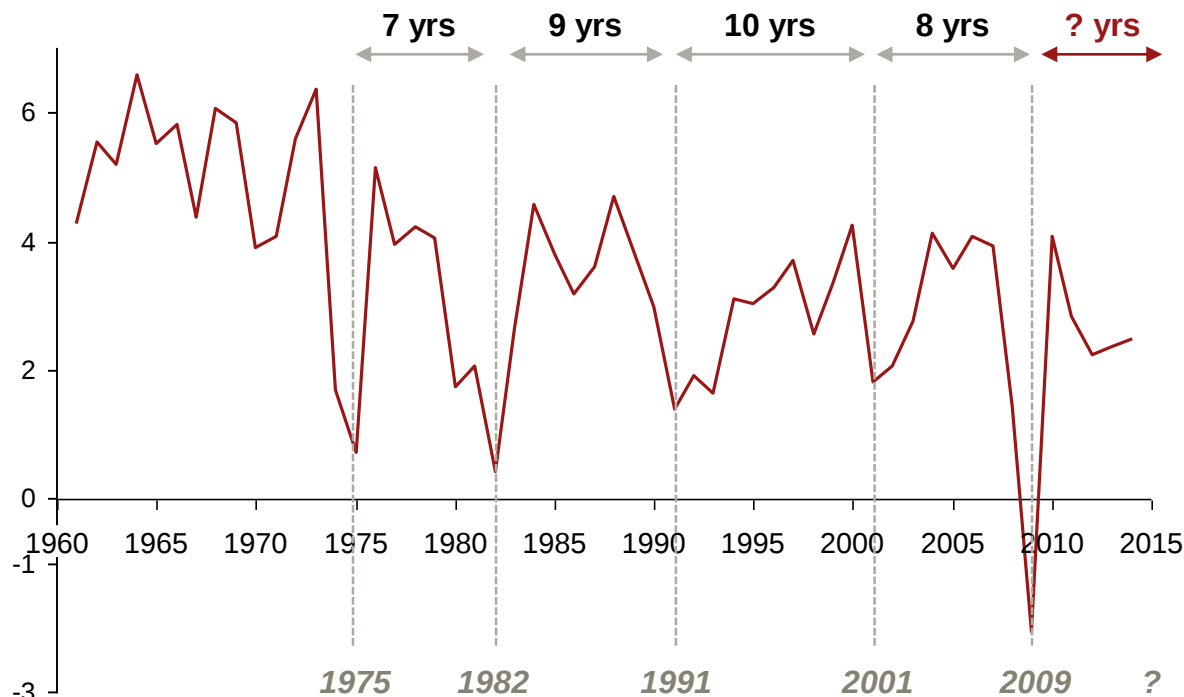
In the next decade, the industry will face 3 challenges on the markets, the R&D and CAPEX costs and the Business models

Horizon	Challenges	Impact	Description
1 Short-term	• Economic cycles arriving soon to a low point • Proliferation of local requirements for models	• Sales downturn • Complexity management	• Automotive markets very much linked to 7-10 years macroeconomic growth cycles • Economic cooldown expected in the next 3 years triggered with a domino effect by isolated events like the Brexit • Proliferation of body styles, powertrains and local regulations increasing the degree of complexity of the supply chain
2 Mid-term	• More stringent environmental regulation • No more ability to negotiate with EC	• Growing R&D & CAPEX costs	• CO2 and local pollutant regulation require the development of new powertrains and new technologies (catalysts, weight reduction, batteries, electrified powertrains...) • These developments generate high R&D and CAPEX costs that are hardly transferable to the client in the mainstream range
<i>Disruption</i>			
3 Long-term	• Reinventing mobility through the emergence of new mobility business models	• Business model	• Current mobility system not sustainable in the long-term • The relationship with a car is evolving as the world gets more digitalized & pressure from urban constraints • New players will impact the traditional industry with new know-hows • In the long run, the emergence of the autonomous car and of non-ownership usages of car threaten to deprive the OEMs from a large part of the mobility added value

① 7-10 years growth cycle law announces an imminent global economy cooldown to be prepared for

Evolution of worldwide GDP

GDP growth (annual %)



Comments

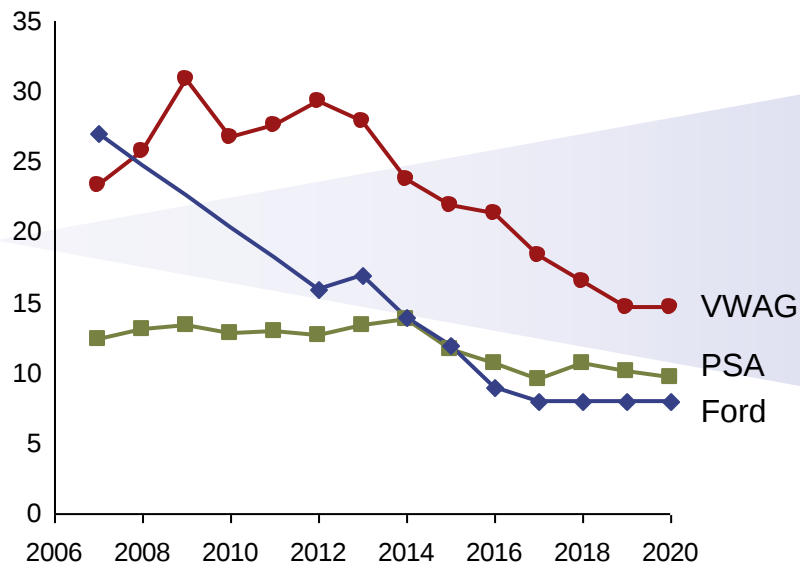
- In the past, every 7-10 years macroeconomic growth cycles
- High GDP growth during the last 7 years, a cool down of the world economy hence very likely in the next 3 years
- Automotive markets very linked to macroeconomic context could suffer by 2017 globally
- The Brexit or another isolated event could be the trigger of such a regression through a domino effect

A black swan like the BREXIT has the potential to cause a new economy crisis through a domino effect

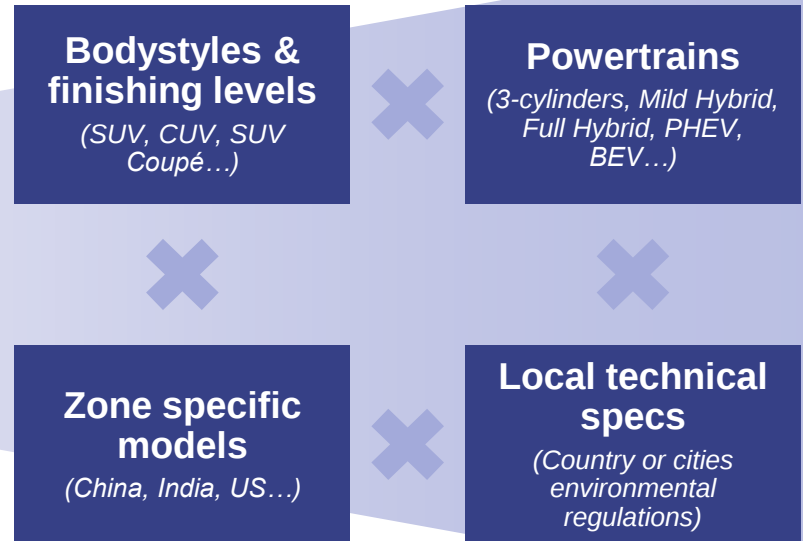
① The OEMs have to close a widening gap between components standardization, and proliferation of models to stick to a wide diversity of local customers and regulations

Consolidation of industrial platforms

Number of platforms



Proliferation of models specificities



This requires very efficient operations and well-coordinated local marketing teams

1 Proliferation of inconsistent local urban regulation will be a challenge for global OEMs

Market trend: Growing importance of cities

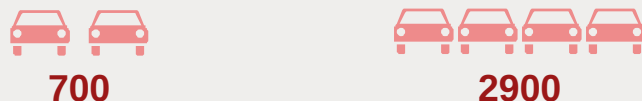
World population (bn)



Percentage of urban population



Global car fleet (Mn)



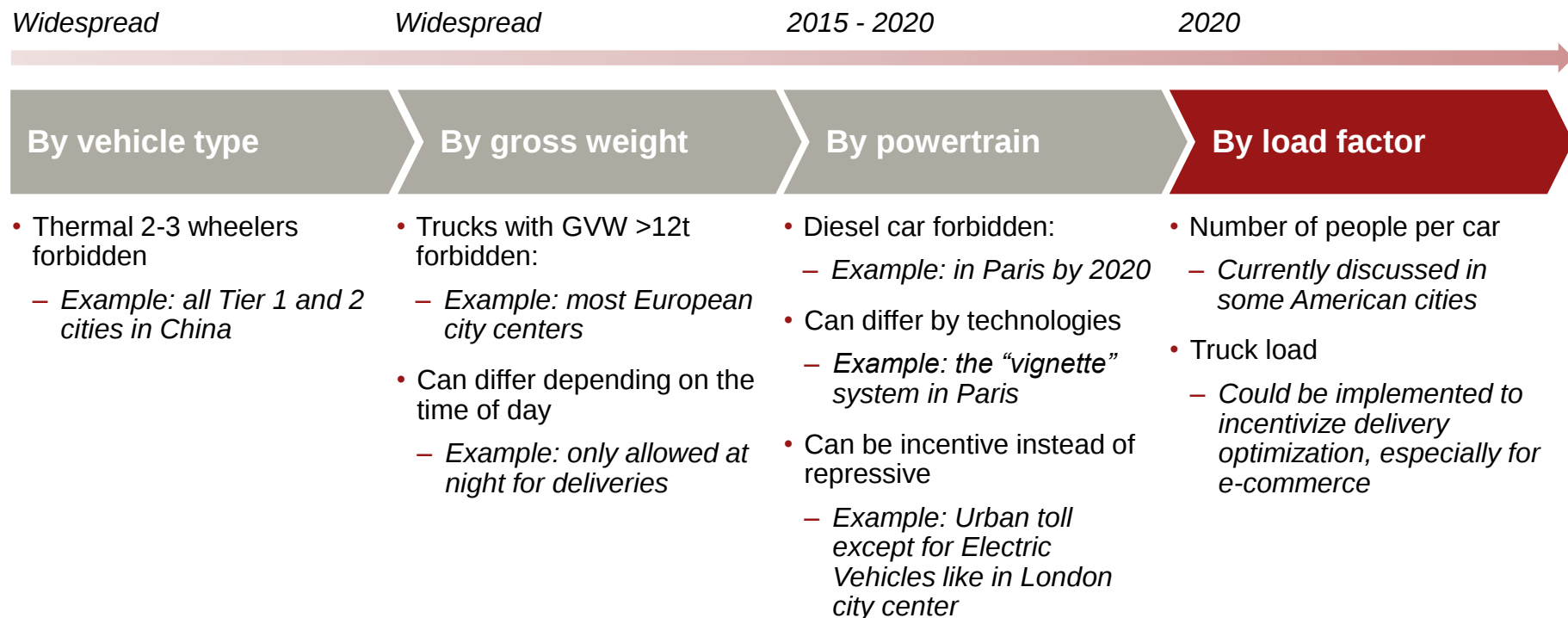
Growing number of different legislations to comply with

- **Cities** are more and more prone to introduce their **own legislation**, often stricter than the national legislation
 - > 6000 cities have signed up a voluntary commitment to go further and faster than EU regulation on climate targets
 - To date 230 European cities restricting access for polluting vehicles **in different ways**
 - By vehicle types (heavy vehicles, passenger cars, motorbikes)
 - By type of powertrains
 - By gross weight
 - By load factor (number of people per car & by freight load soon)

1 Soon, cities will impose regulations on load factors (minimum number of people per car, or truck load) calling for new models

Different discrimination factors for anti-pollution legislation in cities

Illustrative



EU - Number of passengers per car : 1,2 ; Average load factor of Trucks: ~40%

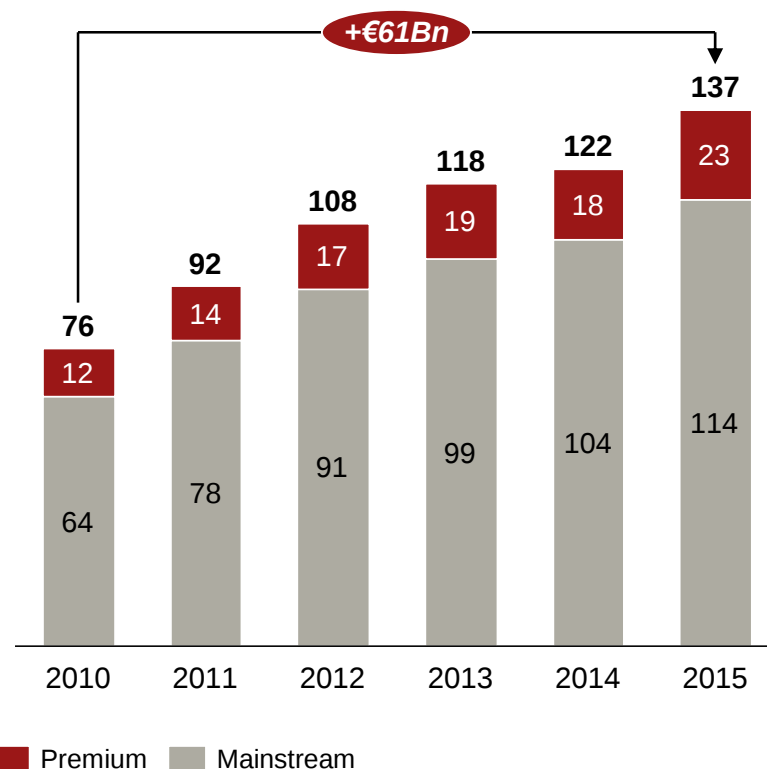
② Environmental regulation will generate growing R&D expenses & CAPEX in the mid-term, already doubled in 5 years

Environmental regulations

Main regulations

CO2	• The hardest part is ahead – Evolutions from ~200 to ~100g achieved from 2000 to 2020 required optimizing well-known powertrains – Going below 100g in Europe and 120g on larger segments in China or the US will require the massive deployment of electrified powertrains, and of radically different vehicle concepts – Transition to WLTP cycle will add up to the already high investment effort
Local pollution	• What return on investment from the development of Diesel depollution modules ? – Standards will become much more stringent with RDE regulations probably requiring costly double solutions like SCR/NOx traps – The high development costs of these technologies could not even be reimbursed by sales as markets progressively give up this technology because of its cost and reputation

CAPEX and R&D expenses of main OEMs¹ (€ Bn²)



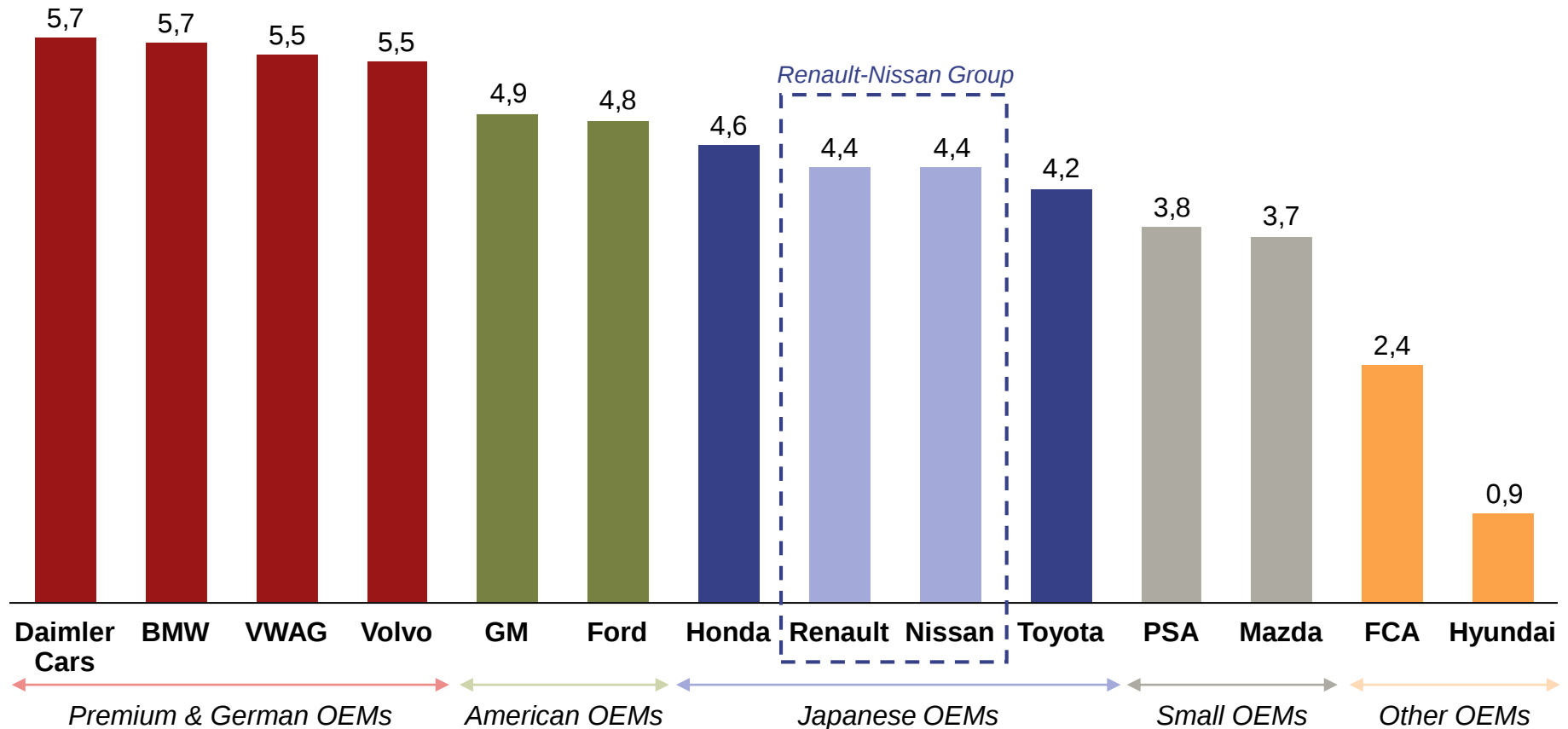
1. **Mainstream:** FCA, Ford, GM, Honda, Hyundai, Kia, Nissan, PSA, Renault, Toyota, VW; **Premium :** BMW Daimler Cars

2. Converted using 2010 exchange rates (average between January and December 2010)

Sources: annual reports, A.T. Kearney

② Premium and large OEMs have strongly invested in R&D whereas smaller OEMs are not at par with the benchmark

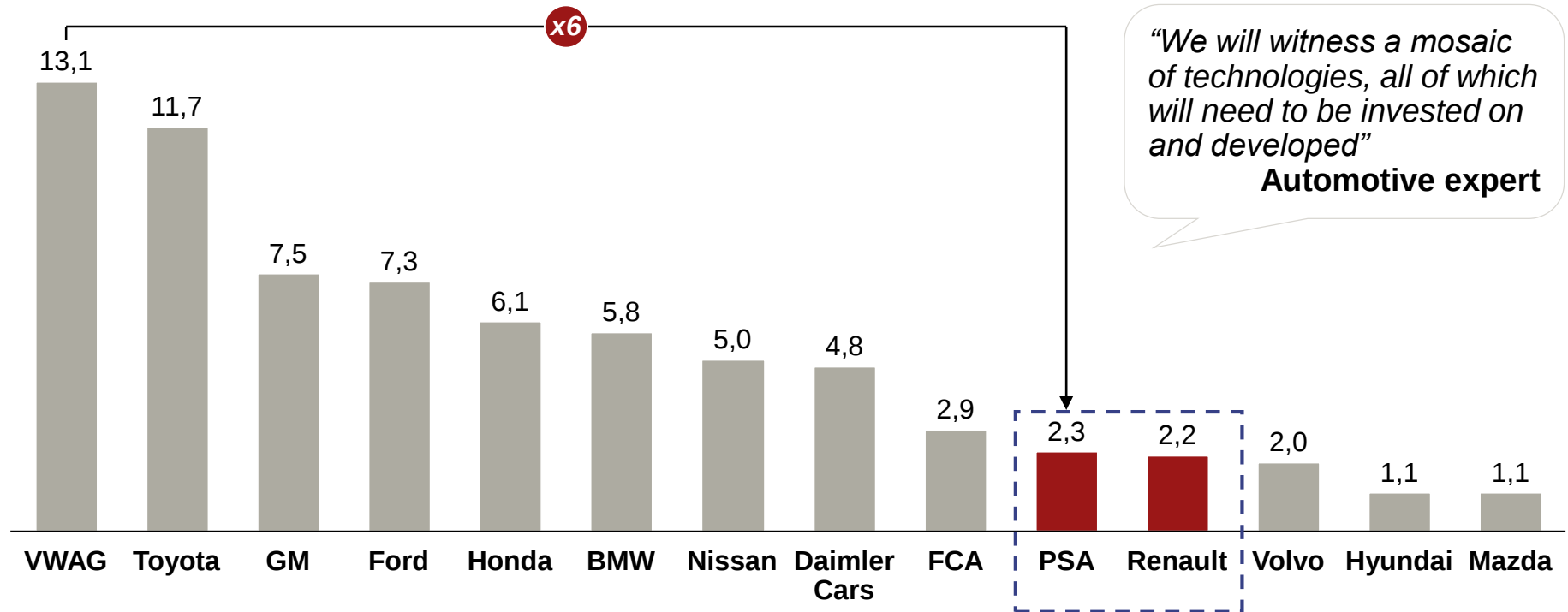
R&D expenses / Sales (%, average 2013-2015¹)



1. When available
Source: A.T. Kearney, Capital IQ, annual reports

② Absolute R&D spends are a measure of the technological options available to the OEM, facing the regulation uncertainty

R&D expenses (Bn\$, 2015¹)



Only very large (or premium) OEMs can support these costs and be ready for every technology

② Facing growing R&D costs, OEMs can invest if their size allows it, or rely on the technologies developed by suppliers

Example of batteries

Example

Context

- Electric Vehicles should take a more important share in the future
- Thermal engine production should decrease & it is very OEM integrated today
- Powertrain added value will be concentrated in the Battery & in Power Electronics

2 possible options for OEMs

Source the battery to large global battery suppliers (Panasonic, LG Chem...)

Ex: Tesla, GM...

- + Less CAPEX needed for engine plants (battery are purchased components)
- Loss of strategic added-value to a supplier

Develop battery know-how and production capacity internally

Ex: VWAG

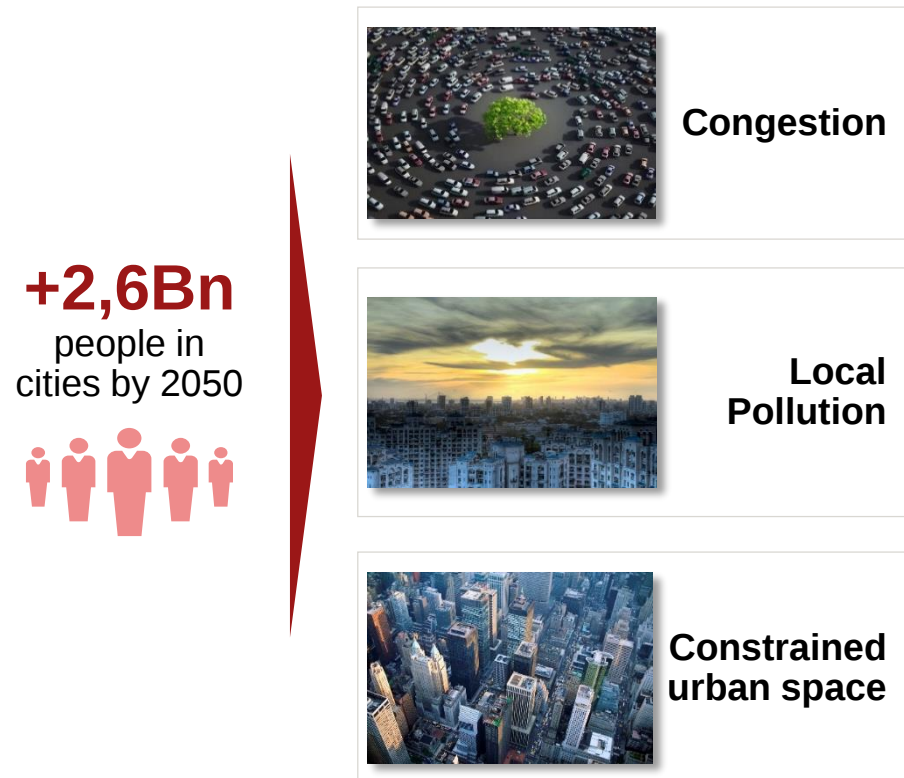
- + Control of the whole powertrain value kept internally
- Very high CAPEX
Ex: VW announced 10Bn€ battery plant in Germany

Hyundai maintains high volumes and high profitability despite very low R&D expenses as their R&D business model relies on their suppliers

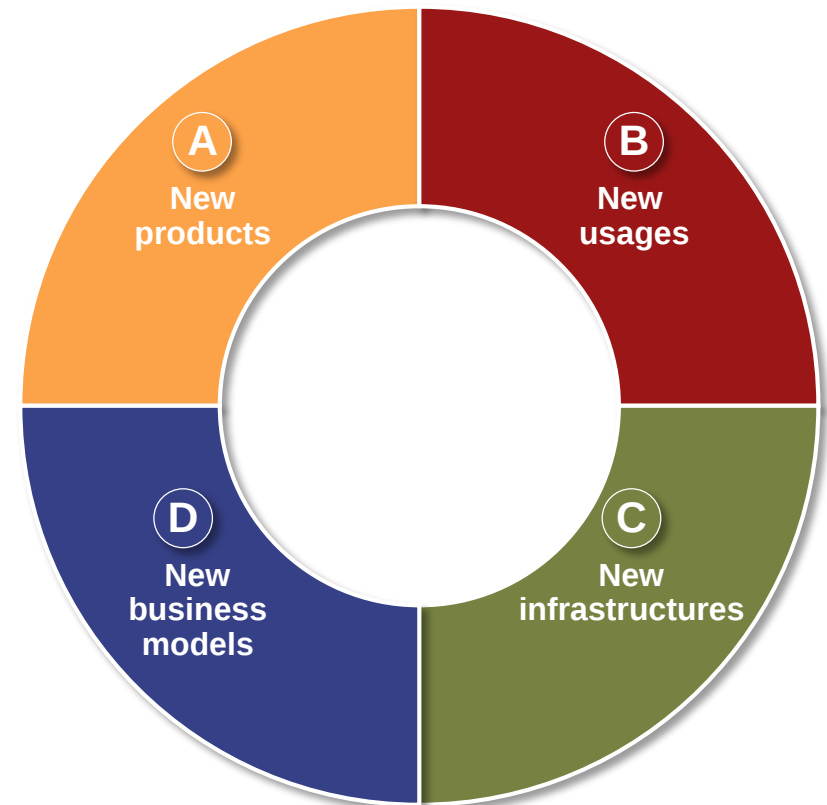
3 Under the urban constraint and enhanced by digital technology, mobility will undergo a revolution

The mobility revolution

Fundamental issues

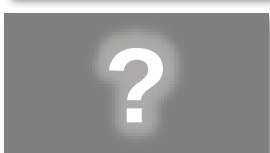


Need to reinvent the mobility system



3 A Autonomous Driving will trigger major changes with regard to vehicle concepts and R&D focus areas

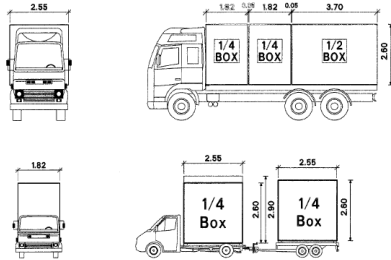
Interior concepts for autonomous vehicles

Changes in vehicle concepts	Design implications	
 Variable space concepts Fixed forward-orientation of seats becomes obsolete, passengers move freely inside	• Higher ceiling / vehicle height • Interior space maximization through short hood/rear overhang	Autonomous cars will be designed inside-out rather than outside-in
 Variable (luxury) seats Ultra-comfortable lounge-style seating or even fully flat bed-like position for maximum comfort	• Relative module value increase • 360° flexibility requires entirely new structural concepts	
 Detachable steering wheel Steering wheel can be either moved to each side or stowed/ released by request	• Space savings by steer-by-wire • Electronic redundancy and emergency override are critical	R&D focus and differentiation potential of innovations will be shifted more towards vehicle interior
 Decentralized Cockpit/HMI Driver-orientation will become obsolete, e.g. vehicle functions controlled anywhere by tablet	• Additional space in cockpit area • IT security of controls is critical	
 Completely new features e.g. display-less screens as projections on inner surfaces, holo screens, etc.	• Even higher space flexibility • Degrees of freedom for design • ...	

3 A Delivery vehicles design will be strongly impacted in terms of size, modularity, autonomous driving and powertrains

Different trends in delivery vehicles

New containers



- Small containers are containers that correspond to, at most, half of a 7,45m long standard swap body and are used in intermodal transport
- The EC proposed two **small containers** as alternative norms:
 - 1/4 swap body, with a length of 1,82m
 - 1/2 swap body, with a length of 3,70m
- These new containers could reduce vehicle size and weight in city centers

Autonomous driving



- **Autonomous delivery van** / transporter
- Wheel-hub e-motor on rear axis and electric range of about 100 km
- **DriveStick** control allows moving the car from the passenger seat
- Offers a “**Follow-Me**” feature that allows a delivery agent to move outside the car while the car follows

Smaller vehicles



CarGo delivery EV concept

- As the city center's access is more and more regulated, supplies of small retail business, offices, cafés and home-deliveries are carried without the use of trucks
- Thus, the utilization in city centers of ecofriendly means of transportation by Urban delivery providers is increasing: **bikes, cargo bicycles, ...**
- New **electrical small cargo vehicles** concepts are being developed to answer to the need of clean, flexible cargo vehicles in city centers

3 A Freight drones could enable more flexible goods transport for rural environment where flows cannot be aggregated

From delivery drones to freight drones



EU authorities seem to believe in the future of freight drones:

- EU Commission includes cargo drones flying at 4,000m in their vision of future sky transportation
- EU Commission expects a “swift development” of drones with a take-off mass above 150kg in the coming years

Current solutions

- Delivery drones are developed as a last-mile solution
- Existing projects: DHL, Amazon Prime Air, Google Wings,...

Current limits

- Aviation regulation
- Drone technology: limited delivery range due to battery capacity and weight

Incoming improvements

- EU Commission sets a Roadmap for the integration of civil drones into the European Aviation System
- Improvement in battery technologies. E.g. graphene batteries with an energy density 1.8 times higher than current lithium-ion batteries

Possible advantages

- Flexibility, convenience and speed
- Access to remote and dangerous areas

3 B Car as a fun object will continue to exist but additional usage possibilities will emerge

New evolving usages of time spent in cars

Cars getting increasingly autonomous making it possible for its users to use their time in the car differently	Home	• Package delivery into the trunk of the car • Hotel on the road : special configurations for overnight rides
	Office	• Video conference center • Integrated desk
	Leisure	• Premium entertainment subscriptions (e.g. video-on-demand) • Autonomous city tours (integration of autonomous driving and POIs)

Traditional car use : Car as a “fun object” that brings driving pleasure

3 C The market introduction of EV, Connected car & increased intermodality will require the current infrastructure to improve

Trend	Innovation	
Electric vehicle	Wireless charging infrastructure	Charge station with inductive loop etc. 
	Smart grid integration	Vehicles with flexible energy storage, feeders, power station (e.g. solar-powered vehicles) 
	Wireless charging lanes	Vehicle operation on inductive charging lanes, e.g. on highways, in city centers 
	Energy-autonomous roads	Vehicle operation on roads with autonomous local power supply (e.g. solar-powered) and electrical lanes (e.g. induction) 
Connected vehicle	Signaling	Equipment of streets, traffic lights, street signs, etc. with sensors for communication with cars 
	Intelligent traffic management	Management of traffic flows to avoid congestions thanks to sensors 
Intermodality	Extension of parking facilities	Extension of park facilities in particular at airport and train stations to simplify intermodality 
	Intermodal hubs	Large multimodal platforms facilitating mode change to provide seamless trips to customers 

3 D New Solutions and business models will emerge supported by new players

Illustrative

	Car sharing	Last-mile delivery	Autonomous driving
Level of development	- Industry players actively engaged in proprietary car sharing businesses – full in-house solutions (Daimler's car2go) – joint ventures (BMW & SIXT with driveNow!) – peer-to-peer programs for car owners looking to rent out their vehicles (GM's cooperation with RelayRides)	EV / connected car based on current models – Nissan e-NV200 – FedEx EV New body type & design – Adam Schacter : CarGo – Lit Motors' Kubo Cargo Scooter Disruptive delivery concept – IDEO Envisions	- UBER: ambition of autonomous taxis in the US in 3 yrs - Google: opening of R&D centre to build a fleet of 100 autonomous minivans with Fiat Chrysler - Samsung: investment of USD100M for R&D centre - GM & Toyota : Investment in their own driverless cars
Impact on OEMs	- Short term : opportunity to significantly capture and lock in market share, particularly in big cities - Long term : Risk of cannibalization of vehicle sales	Opportunity for OEMs : – Find "white spots" to maintain market share in view of new market entrants	Challenge – OEMs risk losing their client contact – OEMs should stay a high-value adding part in the value-chain

3 D Mobility services are a strategic growth area for Daimler

Mobility services provider: Daimler

DAIMLER

*"We regard ourselves not only as a vehicle manufacturer but also as a **provider of mobility solutions**"*
Dieter Zetsche 04/2014



Automobility	Other mobility	Holdings
Spectrum of automobility services  Car sharing (city) In D > 3,500 vehicles and > 230,000 users  Car rental for inter-city travel  Private P2P car sharing	Further services over and above automobility  P2P parking spot agency  Taxi booking 10 million users¹  Compare and buy the best connection	Mobility portfolio of strategic holdings  Limousine service  Long-distance bus  P2P ride sharing, sold to BlaBlaCar in April 15

In 2015 Co-investment with BMW and Audi in Here Maps, the former Nokia cartography system, with data collection from a fleet of 2M cars on the road

3 D BMW is gearing its strategy toward a sustainable concept for urban mobility with and without owning an automobile

Mobility services provider: BMW



*"Intelligent mobility services are a **central part of our strategy**"*
Norbert Reithofer 03/2015



Car sharing

DriveNow: >400,000 users and > 3,100 vehicles in 8 cities

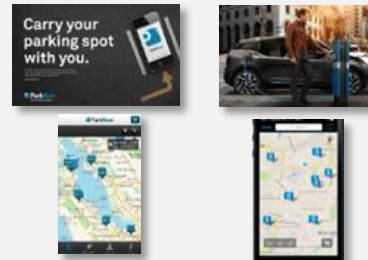
AlphaCity (corporate car sharing): >6,700 users in Germany



ParkNow, ChargeNow

ParkNow for finding and paying for parking spots

ChargeNow: >17,000 charging stations in 18 markets



Holdings

Summon (TNC) arranges taxis or drivers via an app

iVentures (venture capital) so far >1,000 start-ups screened, 100M\$ budget



Goal: Own development and piloting, but also promotion and integration of intelligent mobility services

3 D Ford is one the most advanced generalist OEM in terms of investment in digital technologies

Mobility services provider: Ford



"During the recent industry downturn Ford made two big bets, one on fuel economy and the other on technology, investing heavily at a time when many others were pulling back"
W. Clay Ford Jr, 2014



Connected car services

- **CDL Warrior**, a platform for the trucking industry
- **Pivotal**, a cloud computing platform to provide a base for connected car services (182.2M\$)
- **SPLT**, a social ride-sharing app designed to connect people around the world
- **WISE Systems**, provides real-time routing to help on-demand delivery companies
- **My Dealer Service**, empowers automotive service departments
- **Ansik**, an app to improve the process of automotive service
- **Classics & Exotics**, car enthusiasts can rent their own cars to prescreened candidates
- **Motoroso**, combines community and commerce for automotive enthusiasts

On-going process

- **Ford-Backed Techstars Mobility** 10 startup winners receiving funding (up to \$120,000) and business plan support to further develop innovative technologies and apps. One competition each year since 2015



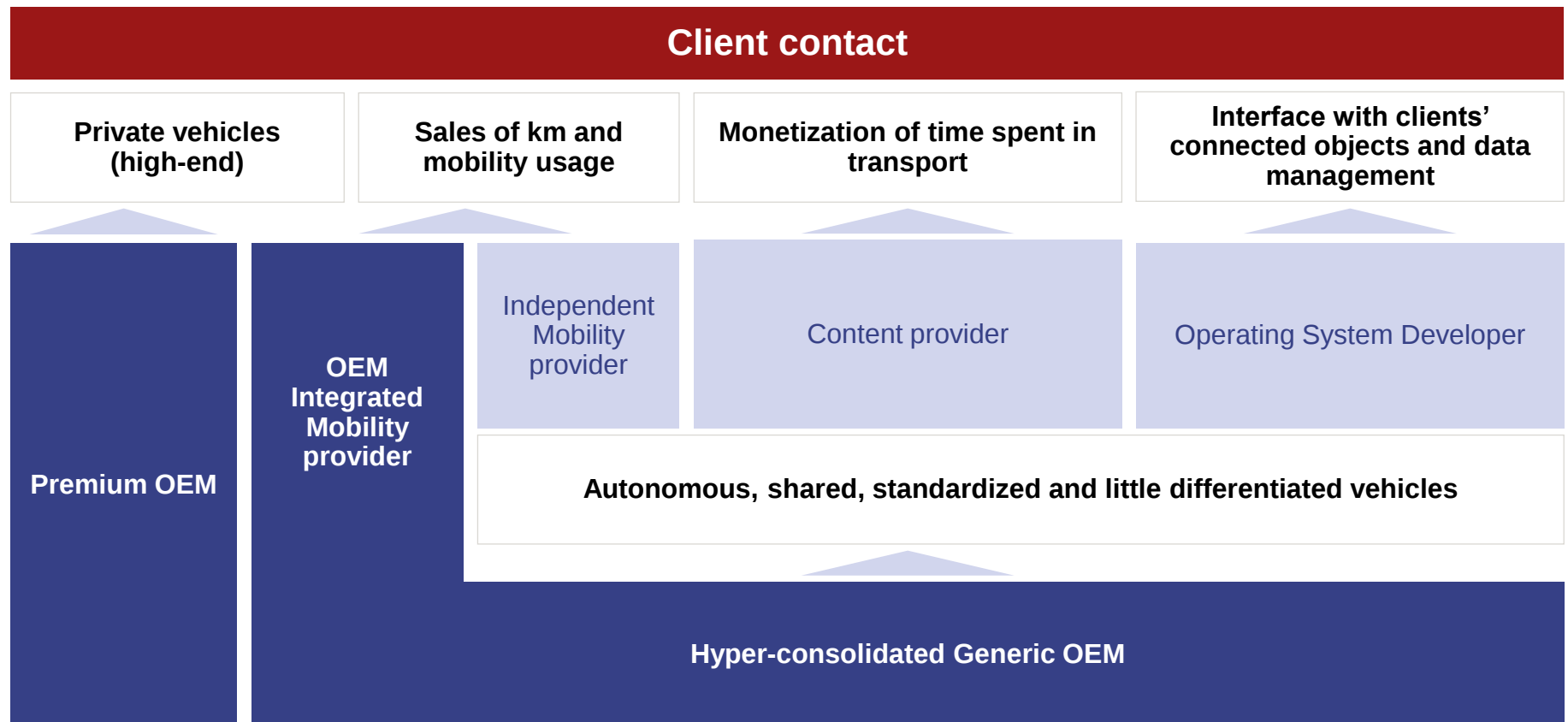
Powertrain technologies

- **Elegus Tech**: manufacturer of separators for batteries increasing energy density and cell life
- **Gear brake**: universal, easy-to-install automatic brake light module

Goal: test breakthrough transportation ideas to create better customer experiences, more flexible usership models and social collaboration that can reward customers.

3 D Will we witness a hyper-polarized industry, where only Premium OEM and a few integrated mobility providers will capture the client contact value?

Potential future



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