

# Selected Impulses, Challenges and Expectations to the Future in the Automotive Industry

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## Abstract

This paper deals about the mapping of possibilities to future development of the worldwide automotive industry. It is focused on the analysis of different factors that represent main trends of progress and opportunities in transformation processes on a global scale. The article presented focuses on characterization of the selected trends in automotive business that supports growth for near future. The subject of the article covers the tendencies and impulses to the development of the automotive sector. The next part of this paper describes main expectations in the field of individual mobility and e-mobility. At the closing part of the paper is formulated the reflection that some trends considered as challenges may pose threats in terms of turbulent changes in the global automotive business. These risks, e.g. law, regulation, volatility in markets, competitors, etc., will do the most to influence automotive markets and drive corporate performance in near future.

**Keywords:** automotive industry, trends, driving forces, future challenges, impulses to progress

## Introduction

To prepare this article it was necessary to analyse relevant publications from reputable companies, mainly carried in an online version (e.g. from KPMG, Oliver Wyman, Roland Berger, Deloitte Touche, Ernst&Young, A.T. Kearney, J.D. Power, Capgemini, ACEA, EUCAR, etc.). Information about the development of the automotive industry, as well as strengths and weaknesses of the sector on the regional and international level are inadequately available. Our interpretations are based on the combined data set of many published reports. Some prognosis and forecasts for automotive industry are characterised by unprecedented uncertainty in post-crisis time.

Consumer demands and new regulations will heavily influence the development and marketability of innovations in the auto industry (Deloitte 2009). The

environmental issues, growing urbanization and changing customer behaviour are the key factors influencing the global automotive industry.

- Environmental issue: fuel efficiency and environmental friendliness rated as most important product issues (aspects: powertrain efficiency technology, ice downsizing, electromobility).
- Urbanization: the industry has to move from vehicle-oriented to human-oriented urban design and mobility concepts. Congestion and limited parking space are expected to be a major concern in megacities (aspects: lightweight materials, innovative urban car design concepts).
- Changing customer behaviour: the advanced world is moving from car “ownership” to car “usership” and customers expect the same services when in the car as they receive at home, in the office or on their smartphone, including music, telecommunications and internet access, as well as navigation system that integrates with broader traffic control systems to make their journey as efficient as possible (aspects: mobility services, connected car concepts, compatibility with personal electronic devices).

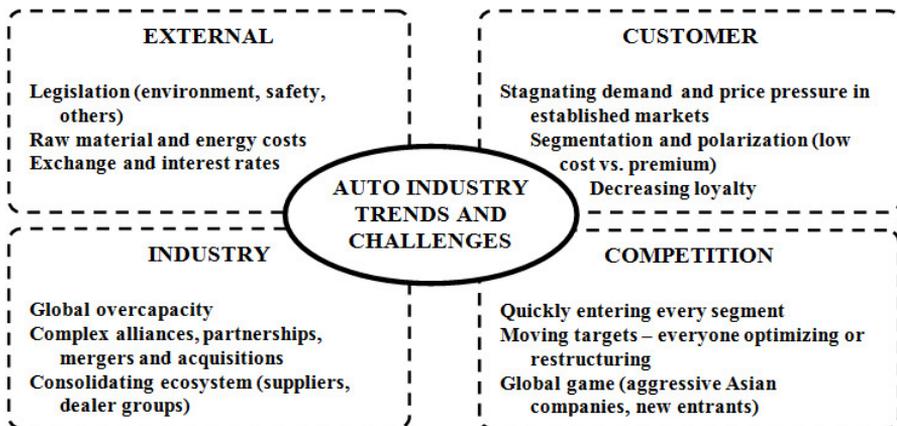
The most important driving forces of development and challenges in automotive for the following years are presented in this article.

### **Organizational and economic driving forces to progress**

The economic crisis in the automotive industry on last decades has acted as an accelerant, placing pressure on many OEM (original equipment manufacturer) companies and suppliers to change.

Global challenges focused on automotive sector presents scheme at fig. 1.

Fig. 1: Global challenges in the automotive industry



Source: authors adaptation according to Schwarz (2008)

Main characteristics that will influence the future automotive business development in the EU market are (KPMG 2012):

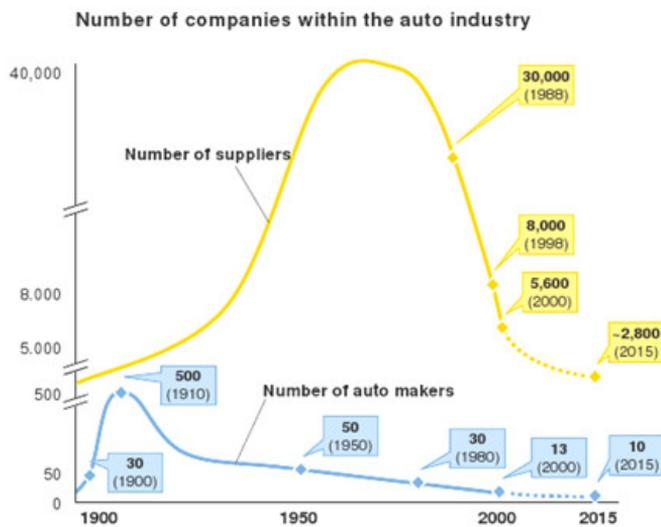
- Overcapacity will be a dominant issue in the years to come;
- Market entrance of Chinese and Indian automobile manufacturers will force consolidation process in the western automotive industry;
- All major premium brand OEMs have plans for significant expansion in China;
- Tier 1 suppliers will increasingly fall into the role of contract manufacturers;
- Alliances between manufacturers of premium and small cars are the new business model for excellent manufacturers (e.g. Daimler/ Renault);
- The role of the car is changing: a shift from status symbol to commodity;
- The future focus of automobile manufacturers will be on their positioning as a mobility provider;
- Electrification will change the structure of the automotive industry and the development of electro-mobility will lead to the market entrance of power supply companies;
- Standardized technology but with very unique applications will be the characteristics of the vehicle of the future;
- OEMs and suppliers have to face massive investments that arise from variety of new technologies.

Consolidation within the automotive industry is another significant momentum. Structural change will mean long-term consolidation. By 2015, the number of suppliers will drop by 50% to 2 800, and only 10 of the 12 independent automakers will remain really independent worldwide (Deloitte 2009). Within the European automotive industry there are only 6 OEMs left compared to more than 70 back in the '50s (Wyman 2007). Fig. 2 illustrates the brand consolidation process in automotive in Europe. Only companies with a strong international orientation survived independently.

The OEM has to shorten product life-cycles in order to react to individualistic and fast changing consumer demands with innovative products. "Time to market" is the issue that drives development for automotive manufacturers. The development time for a car will decrease further in the next few years, from 54 months in 2004 to 36 months in 2012 (EUCAR 2011). OEMs develop more and more niche models for special target groups. Innovations lay the path to sustainable growth and these are best achieved through partnership with other auto makers or by outsourcing. Outsourcing and transferring out of development and manufacturing activities are two of the key ways to master the complexity of automotive product development and production (Yatsen

Associates 2011). Partnerships and alliances between best in class in automotive and other related industries based on cross-sector cooperation are seen as an essential strategy to achieve further growth. Cooperation has progressively extended to most areas of the automotive business, including purchasing, R&D and collaborative engineering, manufacturing, product planning and human resources. Innovation and product quality offer the starting points for OEM's differentiation.

Fig. 2: Consolidation process in European car manufacturers



Source: Oliver Wyman (2007)

Flexibility and agility factors are considered as the new differentiator. Flexibility is reflected through capacity utilization. When demand falls, or shifts away from one market segment to another, the most flexible manufacturers will find a way to respond to that change without closing plants.

Saturated markets and overcapacity are putting intense cost pressure on auto-makers and suppliers. But the main catalyst for the increased global manufacturing capacity is the rapid rise in demand from emerging markets. Demand from India and China is expected to go up, driven by rising population, increasing per capita income, improving infrastructure. Auto-ownership penetration in these countries is much lower than in developed countries, indicating a huge potential – for example, as referred study KPMG (2012) the US has a large penetration of 765 vehicles per 1 000 people compared to just 40/1 000 in China and 11/1 000 in India. The automotive sector has seen incredible growth historically and is expected to reach 17.5 million units globally by 2020 (Rishi et al. 2008). This growth has been largely driven by Asia, especially India, with the exception of China. Companies such as GM, Bajaj, Nissan, and Renault are making substantial investments in the so-called “low cost car”

segment. This LCC segment has its share of concerns: very low margins, the need for an alternate distribution channel compared to conventional ones, and development of tailor-made marketing strategies according to country as well as for exporting to other potential regions such as the Middle East, Africa and various countries in emerging markets.

The automotive industry will likely see the most dramatic changes in customer buying preferences in its 100 year history (Bandivadekar et al. 2008). Profound in their nature and implications, these changes will play out differently according to the dichotomy between mature and emerging markets. Car-sharing and integrated mobility businesses will become more popular in developed economies. In the emerging markets, more people will be forced to buy cars simply for transportation.

Legislation, global changes, technology trends and uncertainty on the customer side redefine the automotive landscape. It can be emphasized by (KPMG 2012):

- Senior citizens play increasingly important role in mature markets;
- New mobility concepts mean “non-buyers”, instead car sharing and new rental formats;
- Emerging market buyers generate ultra low-cost cars (ULCCs) segment and this is the fastest growing segment, adding in 2020 13 million vehicles to the market and cannibalizing the “small” segment;
- Consumers marked “Generation X” ask for more tailored products even at higher price, they also professed interest in features that: reduce distractions (via hands-free calling and access to managed content); improve navigation (through GPS and traffic updates); enhance entertainment (with satellite radio, MP3 connections, and access to digital music);
- The current practice of developing unique luxury models for specific markets may no longer be economically feasible and the development and marketing of luxury models will need to use global platforms to reduce overall expenses and maximize platform volume.

The key to any lasting transformation in the automotive industry is the primary issue of skills and workforce flexibility (EUCAR 2011). Both OEMs and suppliers will have to plan for a future that requires ever more skilled workers from design to production. Having a high-skilled, flexible workforce is seen as one of the top drivers of future business success in automotive. Globalization presents another set of challenges related to human resources. A global workforce means different demographic profiles and different sets of expectations across geographies. Workforce planning will emphasize workforce training to enable a flexible, diverse, and global workforce to ensure that engineers and managers are equipped with emerging skills and to transition production workers into skilled trades' positions.

The automotive industry is a source of impulses for innovative technologies focused on reducing costs, increasing flexibility and assuring availability. Considering rising costs and competitive pressure in global markets, international automobile manufacturers must squeeze maximum efficiency out of their processes; not only in production, but also in the development stage. Production has to adjust faster and faster to new cars models and a large number of individual feature variants. The complexity is growing in production and logistics. Just-in-Sequence and Assembly to order principles are a further key issues of modern automotive production (IMAP Industrials 2010). To optimally fulfil individual customer wishes, the right component has to be ready for installation on the respective body at the right time and in the right place. Precise identification of each individual component in assembly lines is crucial. This logistical challenge can only be mastered with an appropriately dimensioned “manufacturing execution system” with advanced ITC tools support.

Understanding these mentioned elements – structure, customers, technology, and people – and how each will evolve over the next decade, is key for both OEMs and suppliers. The transformations implied will touch on every step of the complex business process involved in taking a car from “a designer’s imagination to a customer’s driveway”.

## Challenges of individual mobility

Governments are focusing on three areas to secure individual mobility: preservation of resources, environmental compatibility and safety. So OEMs will begin to build a cleaner, safer and more diverse range of vehicle.

The worldwide demand for alternative fuels has increased. The strong and lasting discussions around global warming and the significant price increase in energy, led to an increased public awareness and a change of attitude. This has set the basis for a general shift in mind-set towards environmental friendly vehicles. In this context, technology cannot bring solutions on its own. Policy makers must adopt a comprehensive strategy involving technologies as well as market incentives, infrastructure adjustments and changes in driving habits. Asian players and start-up companies are currently leading on electric vehicles and in addition, Asian suppliers control 90% of the Lithium-Ion battery market (Roland Berger 2012). USA and European OEMs are still in prototype and field difficult testing stages. Hybrid vehicles segments are the most attractive for growth, they are expected to witness strong growth supported by environmental legislations by various governments on the use of cleaner and fuel-efficient cars. The global market for hybrid vehicles is predicted to increase to more than 11 million a year by 2020 (Deloitte 2009). The number of models is expected to increase to 150 by 2014 and 200 by 2019.

In the future, individual mobility will be affect by four main directions (Beiker 2010):

1. Driver Assistance (Autonomous Driving) – Autonomous cars have been proposed since the early 1900s and seriously researched since the 1960s. Highly developed computing and sensing performance since the 1980s

has lead to automated highways and autonomous vehicles in research, and now a variety of driver assistance systems in production.

2. Alternative energy and electric mobility – Propelling vehicles with other forms than gasoline or diesel is not new, electric and even hybrid-electric have been researched for many decades. Recently, with concerns regarding oil depletion and global warming growing, alternative energies and electric vehicles are being reconsidered as automobiles.
3. Connectivity and communications – Vehicle-to-vehicle and vehicle-to-infrastructure communication have been researched since 2000. Wireless ubiquitous internet is available since the mid 2000s through cell phone technology, bandwidth increasing. The first mobility-specific applications have been available since the mid 2000s with manufacturer operated portals, for difficult business cases.
4. Mobile society (Mobility concepts) – Individual mobility is a basic human need, the automobile is today one of the most important means of transportation. Today's trends of mass-urbanization, environmental challenges, aging societies, changing values, economic burdens let societies reconsider the personal car as “the ultimate” solution.

The other point of view is the emergence of e-mobility. Plug-in-hybrids, semi-hybrids, full-electric vehicles, battery technologies and mobility concepts that impact consumer usage are only a few of the many developments resulting from the emergence of the electric engine. During the course of this evolution the automotive industry will face new technologies, new market participants in a new ecosystem, an uncertain future and the challenge to adapt to new conditions. Looking back, it is known that similar changes of this significance and complexity has resulted in strong economic growth, but at the same time has led to the disappearance of formerly successful companies.

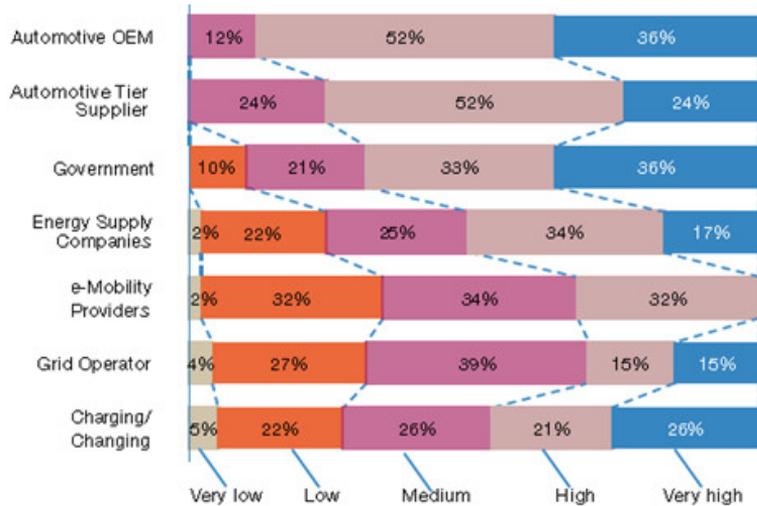
## **E-mobility**

E-mobility primarily involves the use of electric vehicles for different transportation needs and mobility concepts. In the broader sense the term is associated with the shift to a new network. This network consists of established players from the automotive industry and new players (such as e-mobility and IT providers, and battery charging/changing services) that are, in conjunction, shaping the industry with their different products and services (Witteveen and Verbeek 2011).

The Capgemini research (Capgemini 2012) makes it clear that e-mobility represents a fundamental technological change for the automotive industry. More than 80% of survey respondents agreed that the future of their industry lies in e-mobility, with the change expected to occur over the coming from 5 to 20 years. This wide time span appears realistic, as many technological and market-related questions remain unanswered today. The automotive industry was identified as the most influential driver in the e-mobility network, with

88% of survey respondents indicating that the influence of automotive OEMs would be high or very high, and 76% expecting the influence of automotive Tier 1 suppliers to be high/very high (see Fig. 3). As a result, recommendations tailored to this industry will be essential to the successful development of e-mobility.

Fig. 3: The influence of different players in the e-mobility network



Source: Capgemini (2012)

### Results of the automotive business environment analysis

These factors mentioned, considered as challenges for future development in automotive industry, might pose threats in terms of turbulent changes in the business environment (ERNST & YOUNG 2010). For example, globalisation gives OEMs the chance to expand to new markets, but also increases the threat of new entrants or increased competition in traditional markets. Reputable companies published prognosis and results of their scan of business risks for the automotive sector in global terms.

For instance, there are several potential barriers to further progress in the automotive industry (Rishi et al. 2008):

- The credit crunch and its aftershocks pose existential threats to leading automotive global firms.
- Environmental regulations and sustainability challenges continue to escalate, most dramatically in automotive sector.
- New competitors are emerging from distant geographies (e.g. European OEMs currently face an aggressive sales offensive by Korean OEM Hyundai).

- With the global economy slowing, cost containment is now crucial to survival in automotive sector.
- More and more of an automobile value is created by electronics – the balance of power between different manufacturers is shifting.
- New generation technologies challenge automotive companies to develop new competencies.
- Customer structures change, e.g. society is aging, the income structures are polarizing, and the number of female customers as important purchase decision makers is increasing.
- Consolidation in retail and the dominance of multi-brand operations will spread.

Many strategic uncertainties arise from such risks, which can be driven by broader environmental and industry changes, and have the power to threaten or invalidate the current model of a business in automotive (Schwarz 2008). Inability to innovate is considered as a key difficulty: developing a culture of innovation and increasing the pace of product development is crucial for automotive “best in class” OEMs (Kováč 2012).

## **Conclusion**

The following challenges in the automotive industry were mentioned: economic downturn, overcapacity, climate change, demographic change, people’s mobility, de-location of activities, “death” of the combustion engine, greener propulsion systems, internationalisation of the entire value chain, newly emerging areas like Africa, Asia, new in-sourcing strategies of OEMs, concepts of car networking and connectivity to infrastructure, re-skilling: from manual labour to service, ageing workforce (particularly in German regions). These diverse trends influence vehicle manufacturers, suppliers and dealers on multiple fronts.

E-mobility will be the most important technological development in the automotive industry in recent years. Automotive companies must recognize that e-mobility will change the entire industry in its most basic aspects and that, sooner or later, they will need to give up their current positions, roles and products. As the technology gradually finds its way into mass production and reaches a state of consumer readiness, automotive companies need to decide which direction they want to pursue and move their company to the e-mobility model. Companies that fail to adapt to the new requirements will lose their dominant market position and will play only a minor role in the e-mobility network.

In view of the fact that innovation requires the ability to recombine heterogeneous technical, disciplinary, and professional stocks of knowledge, networked forms of cooperation are playing an increasingly important role.

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## Vybrané podněty, výzvy a perspektivy budoucího rozvoje automobilového průmyslu

Příspěvek je věnován popisu problematiky budoucího vývoje automobilového průmyslu. Je zaměřen na analýzu různých faktorů, které představují hlavní směry rozvoje a příležitosti ke transformačnímu procesu tohoto sektoru v globálních podmínkách. Článek se zabývá charakteristikou vybraných trendů v oblasti automobilové výroby, které způsobují její koncepční změnu a dle prognóz expertů růst v blízké budoucnosti. Obsah článku se vztahuje na konkretizaci tendencí a impulsů ve vývoji automobilového průmyslu. V další sekci příspěvku jsou popsány hlavní očekávání v iniciativách rozvoje principů individuální mobility a e- mobility. V závěru analýzy je poznamenán fakt, že deklarované výzvy mohou být současně vnímány taky jako hrozby a rizika v podmínkách turbulentních změn na globálních trzích sektoru automobilové výroby.

**Klíčová slova:** automobilový průmysl, trendy, hnací síly, výzvy budoucího rozvoje, stimuly pro změny

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