



White Paper

Shifting gears – New opportunities for automotive companies to unlock value

How automotive companies can create value in uncertain times

Christian Koehler

Management summary

Automotive companies face an unprecedented set of challenges. These include business challenges from new transport paradigms and globalization which are compounded by technological challenges such as autonomous and connected vehicles with drastically reduced emissions. Carlos Ghosn said at the opening of this year's New York International Auto Show: "I expect the global auto industry to see more changes in the next five years than it has in the last twenty". He continued by saying: "For those open to new ideas and new ways of doing things, the opportunities for our industry to grow and better serve society's needs has never been greater."

Automotive companies should embrace change and branch out now to unlock new value in three areas:

- » New ways to do business (new carmaking)
- » Adjusting vehicles to new requirements (new cars)
- » Offering new services that consumer's value (new business).

A proactive stance will enable automotive OEMs and suppliers to increase profits and reduce risk in today's challenging times. It will furthermore enable them to stay in the lead of a change process that sees the entrance of new players from outside the automotive industry.

We estimate that unlocking value in these three areas offers the potential to double EBIT margins. This will require combining customer understanding, technological know-how, and decision rights in an organizational model that ensures quick execution. Perseverance will be needed if setbacks occur. The profit potential is however large enough to justify the effort and, to close with Carlos Ghosn: "This is not a time for the conservative or cautious".

Today's automotive business

Facing unprecedented challenges, automotive companies should look for new sources of value creation

The automotive industry in 2016 faces a set of unprecedented challenges. These emerge from new legislations, new customer demands but also from new competitors from outside the automotive industry. Digitalization is at the heart of potential 'disruptions' that change what vehicles of the future will look like. These changes unfold with rapid speed, and it is entirely unclear, how the future of today's car companies looks like.

For this study, we suggest to focus on two major business issues:

- » New transport paradigms, driven by digitalization
- » Globalization

Moreover, three technology trends provide major disruptions of the conventional business model (see Exhibit 1). These are:

- » Autonomous driving
- » Connectivity
- » Emissions-reduced or -free powertrains

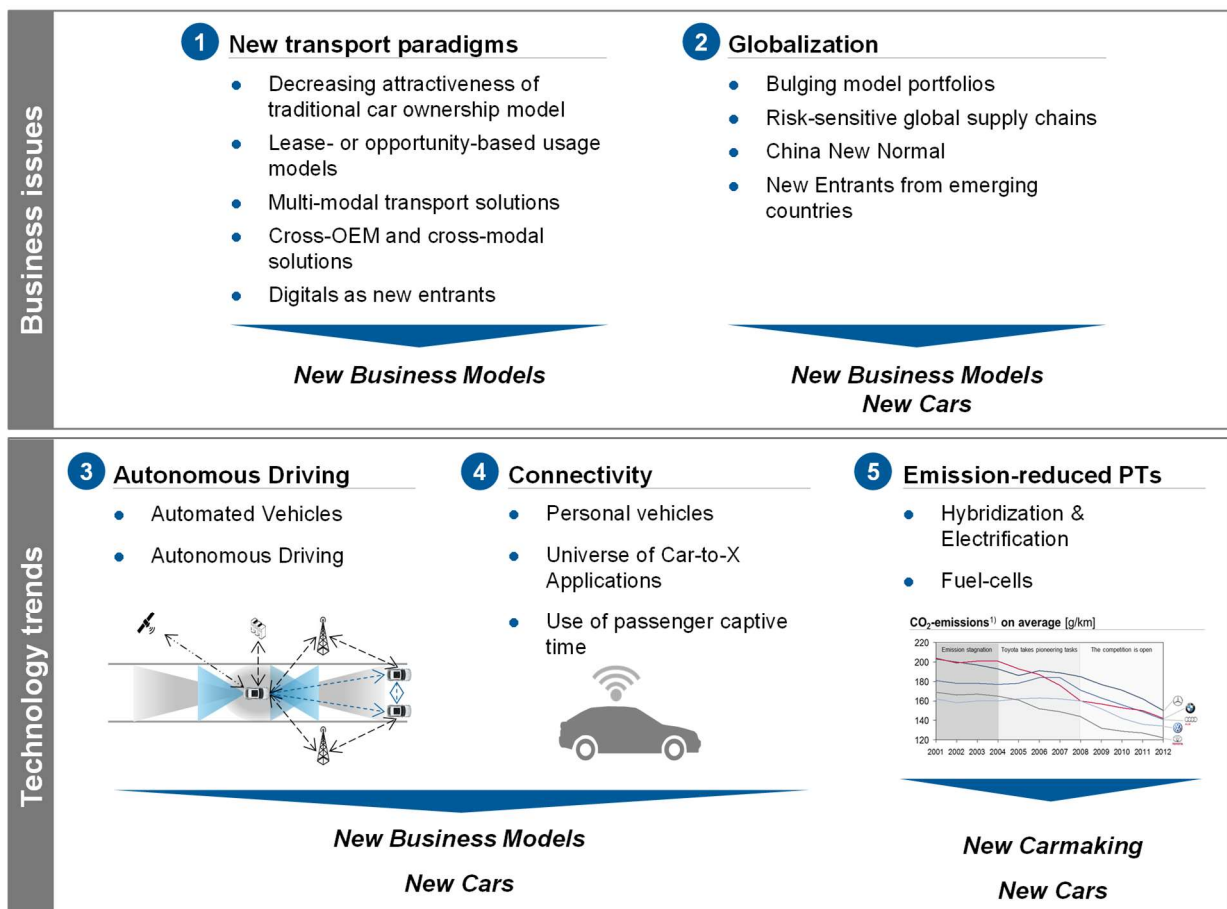


Exhibit 1: Business challenges are compounded by technological changes (Source: Strategy Engineers)

It seems unlikely that following proven paths from the past will enable automotive companies to create substantial value in front of these challenges. Digitalization alone requires a complete overhaul of traditional engineering structures, processes and roles to enable head-to-head competition with new entrants from the digital business arena. Automotive companies should therefore be looking for new sources of value creation to tackle these challenges head-on.

Digitalization will impact company structures, processes and roles

We suggest starting the process with a thorough and honest analyses of the challenges, and what they mean. European automotive companies should therefore be looking for new sources of value creation to overcome these challenges.

Recognizing today's challenges

New transport paradigm

- » **New ownership models** - The “individual transport” business model is increasingly challenged. People living in cities require mobility, not cars. Younger people prefer mobile phones and tablets instead of cars as status symbols. This trend is already eminent in very developed markets like Japan. Ever new electronic solutions to squeeze more vehicles on the same congested roads will not be the answer while the revenue and profit streams from “mobility solutions” are tiny, and heavily competed from companies outside traditional carmaking like Didi or Uber.
- » **Multi-modal transport solution** – Cars will become more and more embedded into transport solutions that offer constant and immediate mobility which is available at a tap on your smartphone. This includes public transport, bicycles, light commercial vehicles and various types of passenger vehicles. Mobile applications will allow choosing vehicles depending on time, duration, and transport requirements.
- » **Digitals as new entrants** – Apple, Baidu, Google, Huawei and others are planning to enter the automotive arena. They perceive vehicles as a hardware platform for potential customization through software – like smartphones. Automotive companies will have to live with these new competitors, and think hard about leading-edge offerings that win customers over. Some will also give in and adopt to the new software platforms that the Digitals offer.

People want mobility, not necessarily cars

Globalization

- » **Increasing model portfolios** – Most OEMs use platform and “shelf” strategies to increase model proliferation while maintaining some level of modularization. The key question however remains what the customers really want and value. In a global portfolio, these questions become very complex as e.g. customers in China value different body styles than European or North American customers. China for example negatively impacts global business cases for cabriolets or sport coupes with its strong preference for SUVs.
- » **Uncertain supply chains** – Interruptions of global supply chains through natural disasters, weather events or political unrest are increasingly common; political instability may change business conditions in Asian or Middle Eastern countries over night while protective legislations in places like India or China will continue to favour local manufacturers.

Platforms reach their limits when desired body types are different

- » **China New Normal** – The slowing down of the China automotive market growth is bad news for global automotive companies. China used to be one of the major profit drivers of global (premium) companies. This is going to go away and is replaced by more normal market conditions.
- » **New entrants** – New entrants from China and India pose a veritable threat to established players. Using inherent scale and factor cost advantages, companies like Greatwall and Geely will enter the European markets and increase price pressure for the incumbents.
- » **Complex global organizations** – Since automotive is inherently a global business, decisions need to be made in regionally distributed and diversified organizations. Many OEMs struggle to devote sufficient attention to emerging market needs, and to allocate decision rights in a way that allows the local organizations to act swiftly if required. The times of all-important global headquarters is waning.

Autonomous driving

Automated vehicles will become standard

- » **Automated vehicles** – Automation of passenger cars and commercial vehicles offers the promise of completely safe and stress-free driving. Driver assistance systems for specific use cases like highway driving, stop-and-go or valet parking will become standard in future vehicles.
- » **Autonomous vehicles** – Self driving vehicles could emerge as fleets of taxis or ‘pods’ which will offer cheap, on-demand mobility in cities (see multi modal transport above). Reportedly, Uber is in talks with Daimler to provide a fleet of self-driving S-classes that will enable offering limousine services without the chauffeur.

Connectivity

Connectivity enables more personalization and functionality

- » **Personal vehicles** – Connected vehicles will become much more personalized than today’s cars. They will become extensions of our personalities like smartphones. Interiors, Human-Machine-Interfaces and Electronics will play a key role in enabling this. Software will be at the heart of the customization capabilities that these vehicles will have to offer.
- » **Car-to-X Applications** – Connected vehicles communicate with the environment in at least 15 common ways which are entry points for hardware, software and service businesses. These range from car-to-car to car-to-PC applications, and will revolutionize the way we use and interact with vehicles. Car-to-surrounding and car-to-infrastructure applications are expected to offer the greatest revenue potential. Automated driving is part of the former while the latter will for example include intermodal route planning. Car-to-X will also capitalize on data collected by the car as facilitator for “big data”-businesses.
- » **Use of captive time** – Autonomous vehicles allow to use the “captive” time for other things. Companies will fight for customer interfaces in connected vehicles and offer a myriad of applications to passengers. They will facilitate a “mobile living room and office” and apply in-car connections to maximize customer contact points (screens/ displays, apps, etc.) as well as use in-car connections as sales channel (services, products, content).

Emission-reduced or emission-free powertrains

- » **Stricter emission standards** – After voluntary measures to reduce CO₂ emissions proved virtually meaningless, the EU parliament has stipulated a 130 g CO₂/km limit for average corporate fleets from 2015. OEMs are now facing the choice to make very sizeable investments in technologies allowing them to meet the targets, or paying hefty fines. China has recently announced new emission regulations which will combine worst case scenarios for lowest gaseous emissions and particulate number thresholds. With the required investments per OEMs easily amounting to €500 million p.a. from 2015, the financial burden is substantial. To make matters worse, regulators have become much more sensitive to the differences between tested and real life fuel economies, and will require improved test cycles and verification in real driving conditions. Most OEMs will hence need to develop multiple greener powertrain technologies which will help them to close gaps to these standards.
- » **Electrification** – Hybrid powertrains and electric vehicles will become mandatory to achieve emission and fuel economy fleet standards. Currently, electrification of fleets is hampered by high costs for batteries, lack of charging infrastructure and range limitations. Once the cost and range issues can be overcome and electric vehicles achieve ranges above 300km at cost parity with conventionally-powered mid-sized cars, sales will increase dramatically. With the current improvements in battery energy density and cost, this inflection point is probably only 3 to 4 years away.

Simultaneous development of greener conventional, hybrid and electric powertrains is needed to cope with stricter emission regulations

Coping with these new challenges will require unlocking value from non-traditional sources, and in non-traditional areas. Automotive companies need to find untapped opportunities to increase profit, mitigate risks and convince consumers of their new vehicles.

Sources for unlocking new value

There are three major sources for OEMs and suppliers to tap into new sources of value: new businesses, new cars, and new carmaking (see Exhibit 2).

New businesses

- » **Mobility vs. vehicles** – Offering mobility concepts to individual customers instead of vehicles may offer an opportunity to keep the current industry paradigm alive for some time longer. Providing small fleets between 300 and 1000 vehicles per city in hire, car sharing or other business models will however be insufficient to sustain carmaking companies in their current form and scale.
- » **Connected cars** – Today's vehicle users want to use their computers, smartphones, and music players while driving the vehicles. Most OEMs are desperately trying to own the user interface as a means to add value to the consumer and benefit from it. Others simply offer cooperations like Renault with TomTom that work well, and relent on a business stream where they are unable to add value. OEMs need to define among which of the multitude of potential connected businesses from navigation, vehicle services, infotainment and mobility services they want to play.
- » **Vehicle energy storage** – Vehicles with electrified powertrains and larger batteries offer the opportunity to submit stored energy to the electricity grid while

charging. They could be used to balance oscillating load on the grid. Vehicle battery systems will have to be used to generate additional revenue streams.

- » **Rolling sensors** – Modern connected cars are equipped with a multitude of sensors which allow them to communicate with the driver and each other. They can also be used for example to gather environmental data or create high-quality digital maps.

New businesses	New cars	New carmaking
<ul style="list-style-type: none"> • Mobility vs. vehicles – Offering mobility concepts to individual customers instead of vehicles • Connected cars – Adding value from a multitude of potential connected businesses from navigation, vehicle services, infotainment etc. • Vehicle energy storage – Feed stored energy from vehicles with electrified powertrains and larger batteries to the electricity grid while charging • Rolling sensors – Use vehicle sensors to gather environmental or mapping data 	<ul style="list-style-type: none"> • Accelerated product cycles – Shortening model renewal cycles from 4 to 2 years for facelifts • “Eastern” cars – Offering dedicated models to Chinese markets • Greener, lighter cars – Saving weights in vehicle architectures to improve fuel economy • Mission-specific vehicles – Designing cars for specific mission segments like “inner city”, “vacation”, “work” etc. • iCars – Levering the increasing importance of software in new cars 	<ul style="list-style-type: none"> • Advanced Supplier Co-operation – Understanding the performance-cost trade-offs jointly with suppliers • Reduced Resource Consumption – improving efficiency of operations • Modular Part Systems – Balancing manufacturing / supplier scale with flexibility and model variety • Globalized Operations and Decision Making – Allocating headcounts to meet (developing) market requirements • Increased Planning/Engineering/Purchasing efficiency – Embedding Engineering in product planning and procurement

Exhibit 2: Sources for unlocking new value (Source: Strategy Engineers)

New cars

- » **Accelerated product cycles** – With a completely new model development, an OEM typically bets the future of the whole company spending €500 to 1000 million of investments. In order to mitigate the risk of failure, more successful model variants need to be derived from one platform. Since many developing markets equate model newness with attractiveness, typical model renewal cycles need to be shortened from 4 years to 2 years for facelifts.
- » **“Eastern” cars** – With sales volumes in China skyrocketing, many companies have passed the threshold that would justify dedicated models for the local markets. This makes even more sense since consumer tastes in China are very specific, and different, and require dedicated models. Obviously, local modifications would need to be managed in line with overall scale and standardization targets which could be maintained on a component and module level.
- » **Greener, lighter cars** – In Europe, car weights have more than doubled in average to accommodate more features and offer passenger comfort. This development is detrimental to fuel economy requirements and requires weight savings in many vehicle areas which are quite costly. New approaches are required to rethink vehicle architectures to save weight.

Model renewal cycles need to be shortened from 4 to 2 years

- » **Mission-specific vehicles** – In line with offering mobility instead of vehicles, it may be time to challenge the assumption, that every car needs to transport four passengers, offer luggage space and be able to travel 700 kilometres with one tank. There are emerging opportunities for cars designed for specific mission segments like "inner city", "weekend", "vacation", "work", "house movement" etc.
- » **iCars** – "If Bill Gates would design a car ..." goes an old-business school thought piece half-jokingly describing the role of software and the arising issues and challenges with the increasing amount of car electronics. There may be an opportunity to rethink the user interface emulating the Apple business model which gives users (passengers) much greater choice to personalize the product (vehicle) through apps (What is the equivalent for a vehicle?). As discussed for connected cars, the challenge for the OEMs is to justify why they can do this better than Digitals.

Vehicle architectures need to be rethought – What do customers really need?

New carmaking

- » **Advanced supplier cooperation** – Many cost reduction opportunities are missed through adversarial supplier relationships and ineffective purchasing strategies. Value can be created through understanding the performance-cost trade-offs jointly with suppliers and through thorough cost understanding.
- » **Reduced resource consumption** – Carbon now has a price. Energy, water and waste disposal are becoming more expensive and this is just the start. There are huge quantifiable benefits which can be gained from cleaner, more efficient, less consuming operations.
- » **Modular part systems** – Scale needs to be achieved on a component level in order to balance manufacturing/supplier scale with flexibility and model variety. VW seems to be leading in that respect while premium companies can "afford" lower scale through the branding premium. Low performance and high performance variants are required for most vehicle systems for different segments and vehicle types.
- » **Globalized operations and decision making** – As a crude yardstick, head-count allocation across the globe should reflect sales per (developing) markets. This is however not the case for most OEMs. OEMs and suppliers still try to make decisions for fast developing markets in their headquarters, missing out on important opportunities which require greater speed and flexibility.
- » **Increased Planning/Engineering/Purchasing efficiency** – the need to develop at least four powertrain technologies (gasoline, diesel, hybrid, electric) in parallel poses a major burden for every engineering organization. Multiplied with the increasing number of body styles and niche models, efficiency needs to be dramatically increased.

Strategy finding

Exploiting these three new sources of value will require every automotive company to find out how it wants to operate internally, and with consumers and suppliers. Strategy finding starts with thorough analyses of today's issues, continues with a clear strategy definition describing which value sources to focus on, and leads into a coherent set of actions that unlock the new value sources.

OEMs must untighten themselves from their old mentality and rethink their business

Since many of the new value sources are in non-traditional areas or require the company to adjust its business model, it will not be possible to go after them with the traditional “business case” mentality which relies on short-term amortization. It may be difficult for many companies to exploit these opportunities without partnering. In fact, we see an increase in alliances between automotive companies, but also between automotive companies and outside players like e.g. Daimler and Google.

Automotive OEMs are complex, capital-intensive organizations that span multiple continents, functions and product groups. For them to discover new value sources, establish the required funding and execute them within acceptable risk, a set of capabilities is required:

- » **Customer understanding** – OEMs own the vehicle real-estate and should be in the best position to determine what consumers value while driving. OEMs must organize themselves in a way that ensures strong customer orientation across sales, product planning and engineering.
- » **Technical know-how** – is required to identify what is possible, and mitigate the risks of introducing the new systems in the already very complex vehicle architectures. For electronic solutions for example, thorough and reliable validation procedures are mandatory.
- » **Commercial decision rights** – Discovering and managing new business models requires commercial decision rights at suitable levels in the organization. Most likely, the trade-off between vehicle program business case and functional budgets needs to be managed.
- » **Organizational development** – Nurturing new talent and fostering new business development will require an embedded skill to drive the organization forward towards excellence.
- » **Perseverance** – will be required to pull through when inevitable setbacks occur.

Exhibit 3 shows a suggestion on how to take stock of the current status and embark on unlocking the new value sources.

Step 1 is the preparation phase. It will require the company's top management to engage in a set of structured workshops to define new value creation areas in which it wants to excel. This will usually require taking stock of current status and improvement potentials. In this step, the governance principles have to be set, as well as the KPIs against which success will be measured. The new value business case framework will determine how commercial, technical and strategic cases will be measured and evaluated. Step 1 closes with an action plan that identifies new value opportunities in new carmaking (step 2), new cars (step 3) and new businesses (step 4).

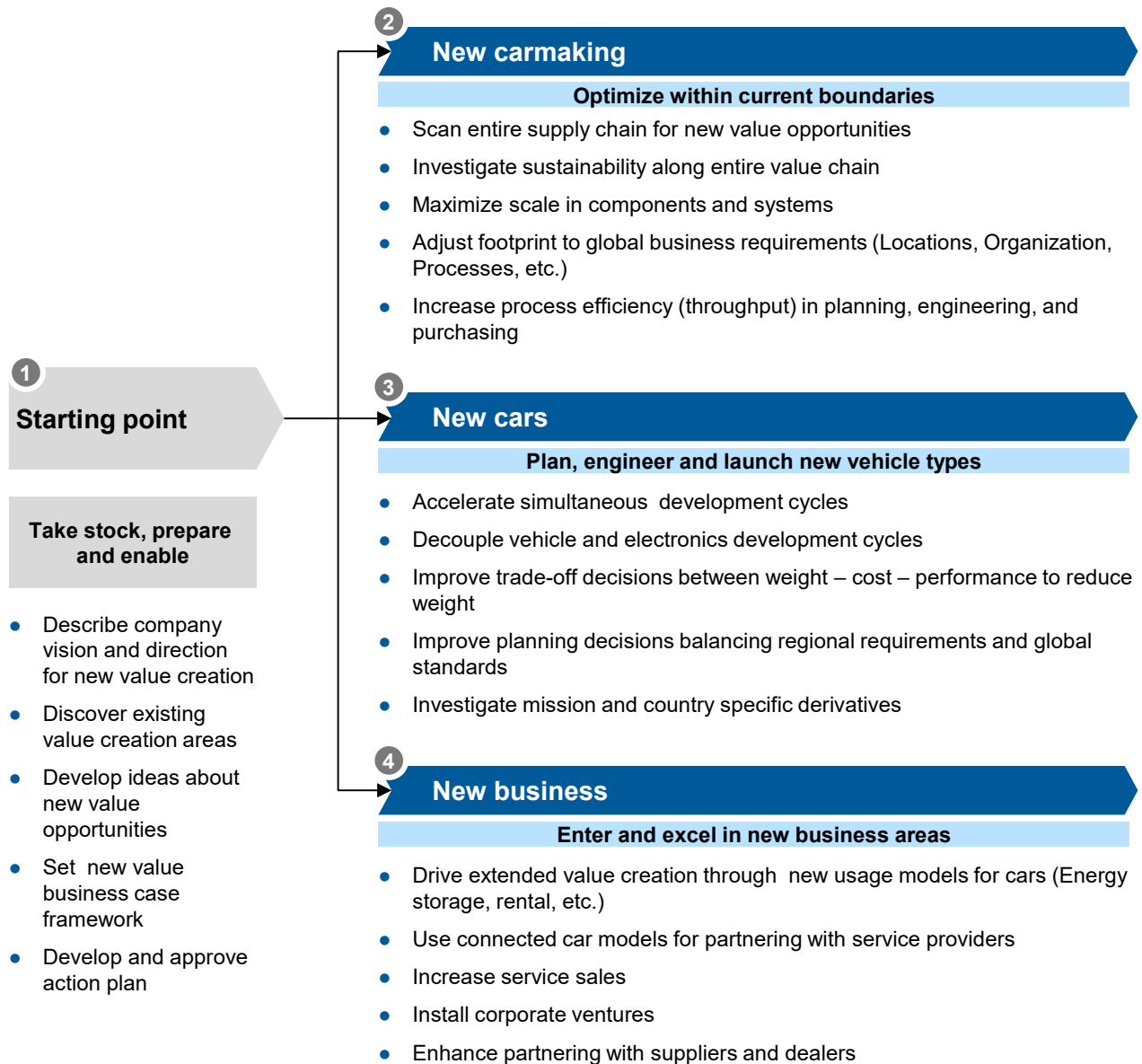


Exhibit 3: Approach to unlock new value sources (Source: Strategy Engineers)

Steps 2, 3 and 4 focus on new carmaking, new cars and new business, and can be carried out sequentially or in parallel, depending on the structure of the action plan.

Step 2 activities, i.e. activities which focus on new carmaking, can normally be carried out within the current business boundaries. They will hence be relatively easy to implement and should bear sizable improvement opportunities. These will be important to build momentum for the new value initiative. It is imperative to capture new value opportunities early to establish credibility.

Step 3 with activities on new cars goes further in requiring the organization to re-think its products. New value opportunities through new cars will take longer to deploy based on the prolonged development and launch cycles of the industry.

Step 4 activities with a focus on new businesses create value through partnerships and alliances with various partners outside the current boundaries. These can include suppliers, competitors, government, other industry players and shareholders. Autonomous vehicles for example will foster alliances between existing automotive companies and “digitals” in completely new ways. It may be required to install a corporate venture mechanism to fund some of these opportunities.

Step 3 and 4 activities are best started in parallel to step 2 based on their long lead times.

Conclusion

Applying all three value creation levers can unlock tremendous value opportunities. For an archetypical automotive company, material costs amount to around 60% with additional manufacturing costs of 15%. With the discussed opportunities in “new carmaking” and “new cars”, we estimate that material and conversion costs can be lowered by a combined 6%.

Typical R&D costs are estimated at 4,5%. Moving towards a broader portfolio of new vehicles will however increase required R&D spending by at least 1.5%.

Warranties should decline based on electrical powertrains which require less care and have less failures in the field.

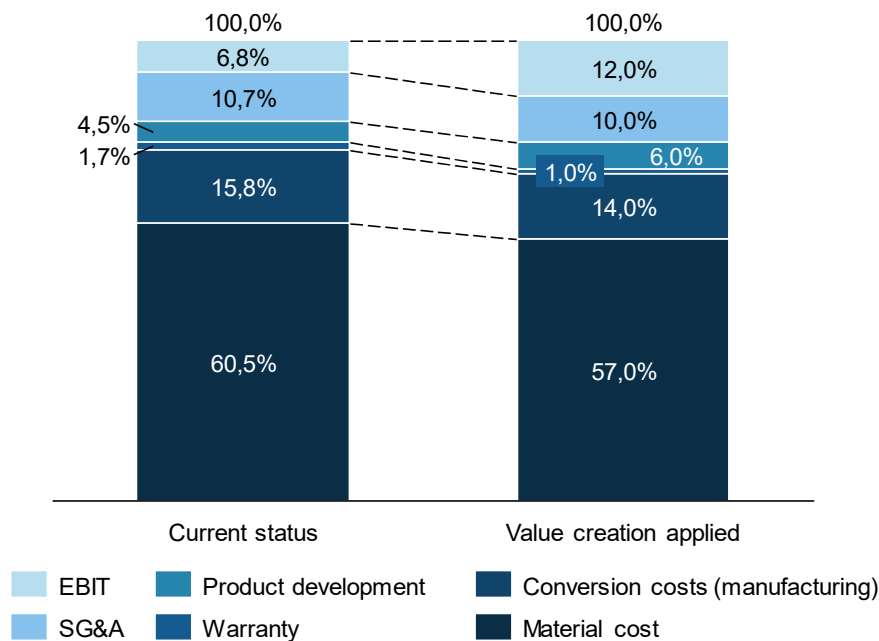


Exhibit 4: Potential value creation with the outlined approach (Source: Strategy Engineers)

Combined with slightly lower general and administration costs, the overall EBIT margin nearly doubles and is estimated to reach approx. 12%. New businesses offer further profit potential through higher-margins activities with reduced capital intensity.

The author

Christian Koehler

Christian Koehler is a partner with Strategy Engineers and has more than 20 years of experience as management consultant and in the automotive industry. He is focused on product and technology strategies, product development and Asian markets in the automotive, heavy truck and supplier industry.

E-mail: cjk@strategyengineers.com



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Strategy Engineers GmbH & Co. KG

Tel.: +49 89 4161 7235
Fax: +49 89 4161 7237
www.strategyengineers.com
info@strategyengineers.com

Munich

Seidlstr. 18
80335 Munich
Germany

Shanghai

#327 Rong Qiao Road
201206 Shanghai
China

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