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cutting through complexity

Metalsmith or Grid Master:

The automotive industry at the crossroads of a highly digitalized age

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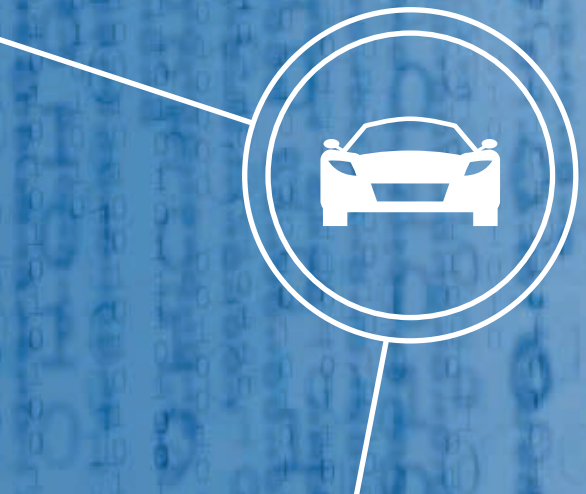
ABOUT THIS STUDY

This study is the result of intensive, insightful workshops and interviews, with leading professionals from the international automotive industry and participants from related industries.

We would like to thank all the participants who have shared their valuable thoughts and ideas with us over the past year.

We would like to acknowledge Moritz Pawelke, Global Automotive Executive, KPMG International, for his commitment to produce this study. We would also like to thank Aline Dodd and the entire KPMG Automotive sector team in Germany.



FOREWORD

METALSMITH OR GRID MASTER: THE AUTOMOTIVE INDUSTRY AT THE CROSSROADS OF A HIGHLY DIGITALIZED AGE

Dear readers,

Following decades of highly predictable success with a largely unchanged business model, the automotive industry is almost unique in terms of the significant paradigm shift it now faces. More accurately, it is facing a new, ubiquitously mobile and connected age in which various megatrends will have a significant influence on the future of mobility and in which the existing automotive business model will face strong pressure from all sides.

The aging society in industrialized nations, rising urbanization and the growing regulatory pressure for greater environmental compatibility and sustainability have already led to major and very fundamental changes in the products of traditional automakers.

The days when a vehicle was just a means of transportation are long gone. However, automakers are still largely underestimating one fact in particular: in the future, the car itself will no longer be the sole focus. The focus is shifting increasingly to the customer data that can be harnessed to generate entirely new and scalable revenue streams. After all, the ubiquitously connected car is a gigantic data-generating machine.

High-tech companies like Apple and Google are already showing what technology and digitalization can offer with mature innovations in every area of our lives, including in and around the automobile. As such, traditional automakers would be well advised to examine their future business model sooner rather than later in order to combat the so called “clock-speed-dilemma”. This means having to manage separate production cycles that operate at different paces: the IT hardware and software development cycle and the traditional auto manufacturer's innovation cycle. Only if they work out how to best synchronize their speed of innovation to the digitalized world, will they be able to keep pace with, or even surpass, those competitors that will no longer be strangers to the industry in future.

Today’s customers are ubiquitously connected and already possess a wide range of mobile technologies such as smartphones and tablets. They are the focus to a far greater extent than previously, and their purchase and usage decisions will increasingly depend on the overall package offered to them.

This gives rise to the question of how automakers can enthuse customers to use their own product features, software solutions and services – particularly when leading software providers are already using the knowledge they have gained to better cater to their customers. If original equipment manufacturers (OEMs) fail to make effective use of customer data generated by connected cars, the valuable revenue streams throughout the entire customer lifecycle could be out of their reach.

Automakers are at an important crossroads:

Do they want to be "mere" metalsmiths, leaving the field to

innovative players to compete for data at the customer interface, and hence becoming suppliers of vehicles (mobile data rooms) for Apple or Google?

Or will they be able to evolve into Grid Masters? This means they would need to expand their business model beyond creating vehicles, to, creating customized vehicle-independent product features and services, throughout the customers' entire lifecycle.

There is no doubt that there are exciting times ahead. In this spirit, I hope you enjoy reading this study and I look forward to the interesting discussions it will generate.

Dieter Becker
Global, EMA and
German Head of Automotive
KPMG International

CORE HYPOTHESES AT A GLANCE

1.

The days of the traditional purchase decision are numbered

In the age of ubiquitous connectivity, the days of the traditional purchase decision and the predictable customer journey with a strong product and technology focus are numbered. OEMs' future business models will have to reflect the lives of their customers, looking to optimize time, cost and quality of life in real-time based on situation and application.

2.

Connectivity is paving the way for new business models

Ubiquitous connectivity is paving the way for new business models. In future, it will allow all companies to engage in direct customer relationships with virtually everyone, everywhere – including inside the car. Today's manufacturers need to leave behind a past that is product and hardware-driven and evolve into customer and service-oriented Grid Masters. Only those automakers that succeed in supporting customers with customized, vehicle-dependent and vehicle-independent products and services throughout their entire lifecycle will be able to defend the customer interface against the influx of third party.

3.

The Internet of Things alone is no silver bullet

It is not the Internet of Things that will be the key to successful future business models, but rather the Internet of Behavior. In the future, the car will be just another hardware device in an ecosystem of connected mobile and immobile data rooms. By contrast, behavioral data in the Internet of Behavior will enable the generation of scalable, sustainable revenue streams.

4.

Data is the fuel for future business models

The intelligent connection of vehicle and customer data is the driver of future business models. The car's interaction with people and the environment make it a gigantic data-generating engine. However, tomorrow's customers will be increasingly aware of the value of their data and will not be willing to provide it to third parties without receiving an incentive or reward.

Release-ability is the key to success for connected cars

The product development cycle of a ubiquitously connected car requires release-ability. The integration of additional service-oriented functionalities will succeed only if manufacturers ensure release-ability in certain parts of their development process. Accordingly, flexible, decoupled research and development (R&D) processes and freeze periods between vehicle-dependent and vehicle-independent hardware and software features are essential – and the key to ensuring a quick response to future customer expectations.

6.

5.

OEM-captive connectivity solutions are a premium feature

Not all today's automakers will have the ability to develop into customer and service-oriented Grid Masters. Premium manufacturers are at an advantage in the competition for vehicle and customer data, thanks to the trust enjoyed by strong brands. By contrast, manufacturers from the mass-market and low-price segments may be forced to surrender the customer interface to new competitors from the information and communication technology industry.

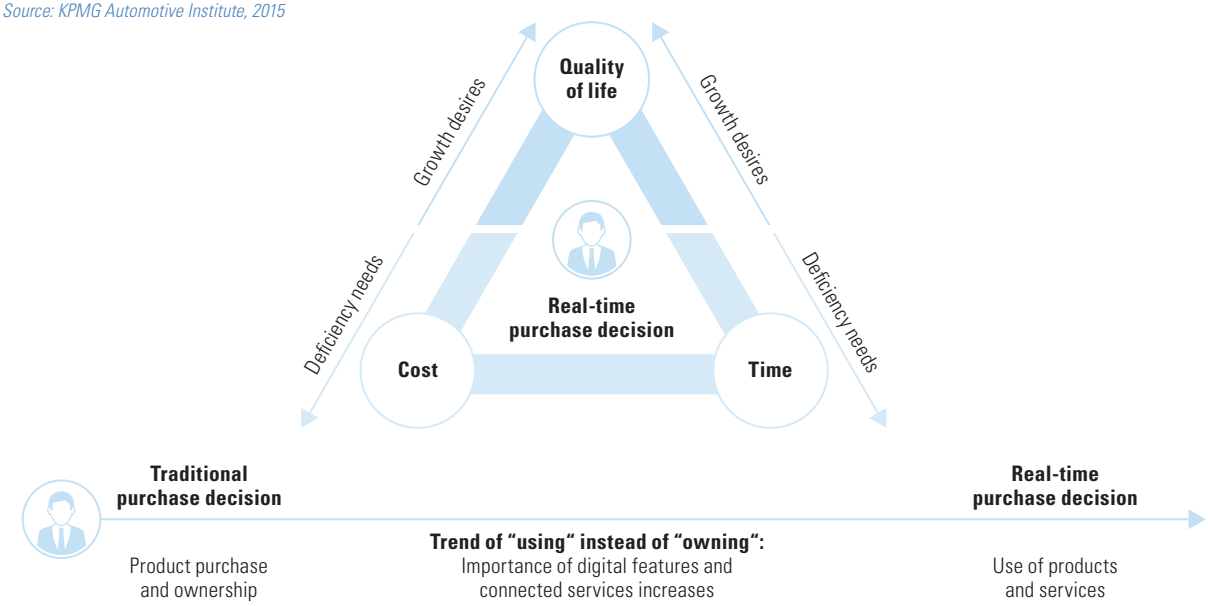
THE DAYS OF THE TRADITIONAL PURCHASE DECISION WITH A STRONG PRODUCT AND TECHNOLOGY FOCUS ARE NUMBERED

In the era of ubiquitous connectivity, the days of the traditional purchase decision and the predictable customer journey with a strong product and technology focus are numbered: OEMs' future business models will have to far more accurately reflect the lives of their customers, who are looking to optimize their time, cost and quality of life in real-time and depending on situation and application.

Imagine a person in his mid-thirties, married, with a successful career, living in the modern urban environment of a big city. Waking up every morning already involves his smartphone – preferably not at a specific time, but because his rapid eye movement (REM) cycles are being recorded by a fitness strap. His first action is to take his phone out of flight mode and enter the connected world. The radio automatically fires up a playlist to fit his mood. The skip button of the smartwatch on his wrist means he wastes no time listening to songs he does not like. Instead of having to navigate to the main news pages, they appear as small pop-ups directly on each of the digital devices in his apartment based on his search and communication history. His daily companion optimizes everything that can save him money, helps him use his time more efficiently and improve his quality of life. Based on his calendar entries, his smartwatch vibrates to let him know that he needs to start driving five minutes from now if he wants to get to work on time. Having made a detailed calculation of his total cost of ownership, however, he has not actually owned a car for some time. His digital assistant knows there are various car-sharing services in the immediate surroundings but based on the latest traffic data, it suggests he takes the underground instead. He has an important appointment and time is of the essence, so he chooses the right mode of transport to get from A to B based on the specifics of his situation. He also has time to shop while on the train, since his digital assistant has also popped up a reminder that his favorite shoe brand is available from an online outlet store today.

Influencing factors of a real-time purchase decision

Source: KPMG Automotive Institute, 2015



Just a few years ago, this person in their mid-thirties would have been the ideal customer for an automaker. But where can automakers and their traditional business models generate sustainable revenue from the everyday life of today's customers as described above?
The troubling answer is that the opportunities may be few and far between.

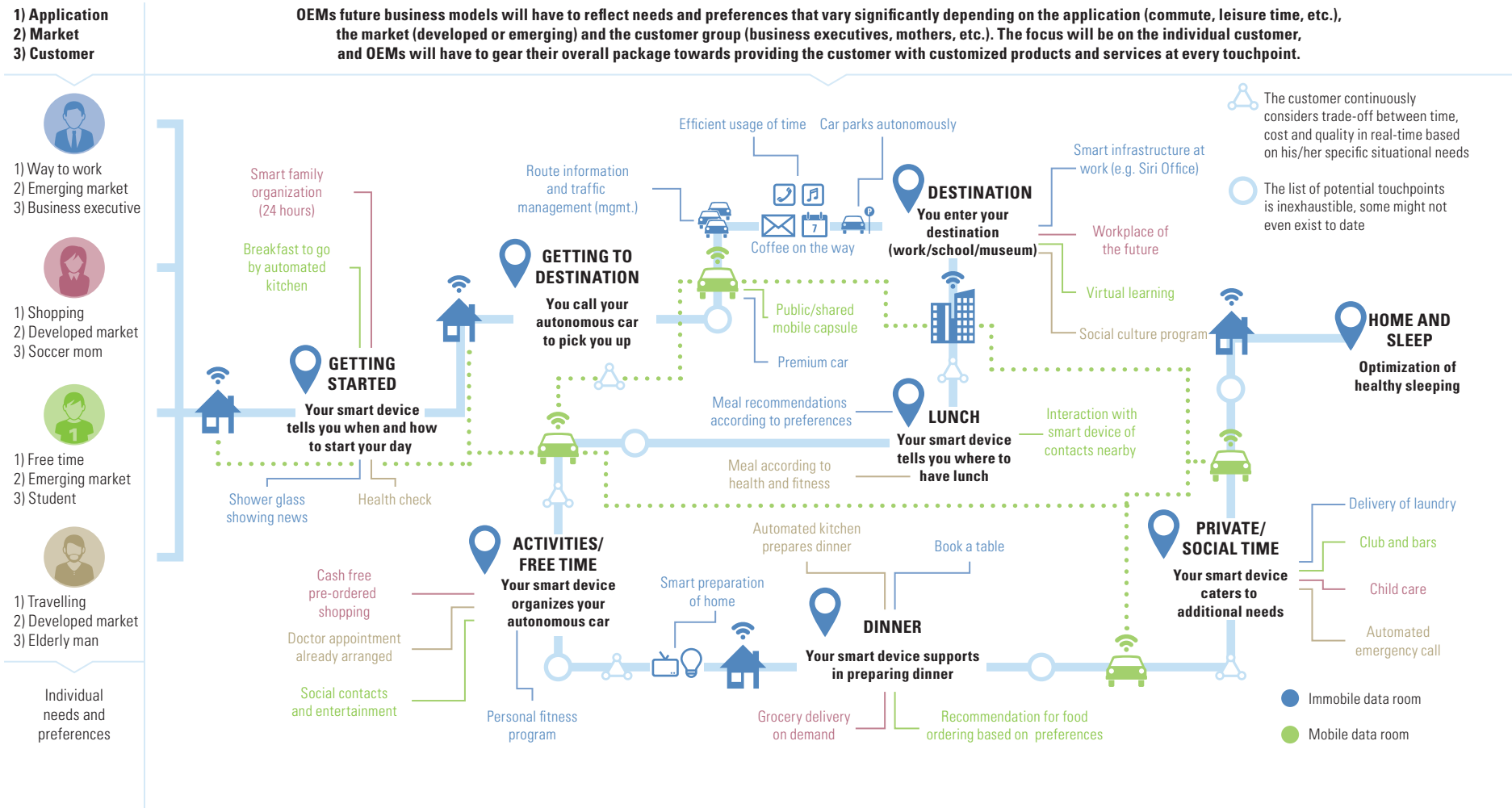
A distant scenario of no concern to the automotive industry just yet?

Quite the opposite – this is already the day-to-day reality of many potential customers and this scenario could have occurred yesterday.

A DAY IN THE LIFE OF A FULLY CONNECTED CUSTOMER IS DRIVEN BY OPTIMIZING TIME, COST AND QUALITY OF LIFE IN REAL-TIME

A day in the life of a fully connected customer

Source: KPMG Automotive Institute, 2015



CONNECTIVITY IS PAVING THE WAY FOR NEW BUSINESS MODELS – BUT IT ALSO ALLOWS THIRD PARTIES TO HAVE A DIRECT CUSTOMER RELATIONSHIP AROUND MOBILITY

Ubiquitous connectivity is paving the way for new business models for more than just automakers. In future, connectivity will allow all companies to have a direct customer relationship in the car and in the area of mobility generally.

The best example is the taxi service Uber, which has become extremely popular in a number of countries. The business model of the chauffeur service is based on direct customer relationships using a smartphone app. With its app, Uber has advanced the process of consolidation in a service that used to be offered on a decentralized basis, typically by a number of disorganized individual companies.

The "uberization" of the customer interface:

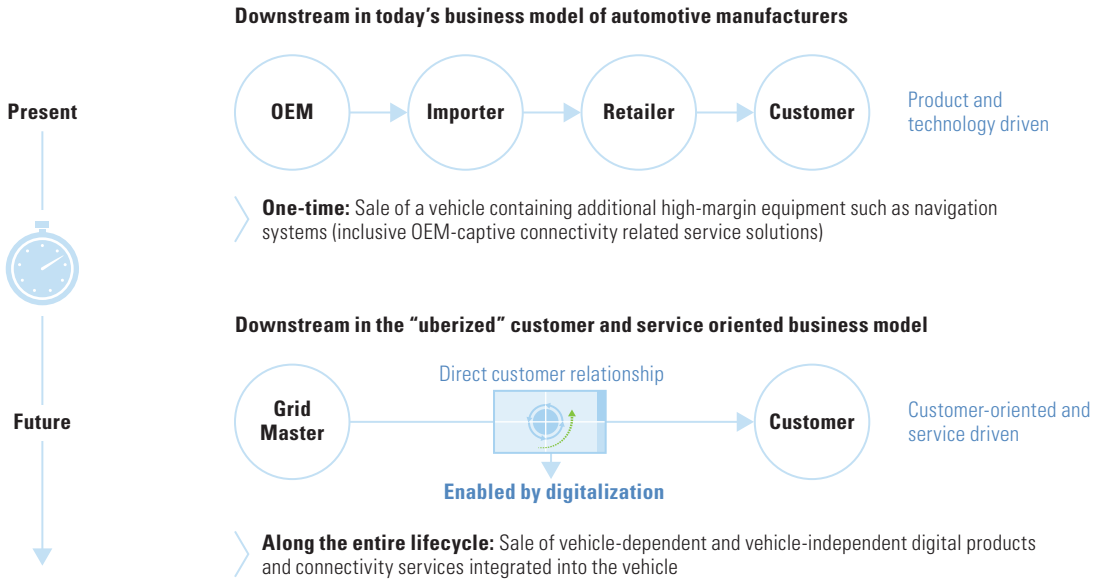
Customers of tomorrow will, at the downstream meaning at the customer interface, only accept one central partner who can provide solutions that meet their expectations in terms of cost, time and quality of life in real-time and based on situation and application.

In simple terms, the prevailing downstream business model among automakers is based on selling vehicles with additional high-margin special features and equipment. Customer relationships are usually managed by physical dealerships that are organized relatively independently. The revenue from the sale of a new vehicle is generated on a one-off basis at a specific point in time, and the purchase decision has a strong product and technology focus. Throughout the vehicle lifecycle, additional revenue that is truly vehicle-related, is generated mainly from aftersales and service. In today's business models, additional revenue from services going above and beyond the vehicle itself is offered solely via OEM-captive financial services providers. In future, being a good upstream manager, will not be enough for automakers seeking to capitalize on the valuable vehicle and customer data that is generated in the vehicle. Instead, the future business model will need to be substantially more customer and service-oriented.

This means that automakers who wish to establish themselves as Grid Masters will have to consolidate or "uberize" a wide range of downstream channels, to offer customers the right customized product or service in all areas of their life. If they fail to do this, someone else will come along and take over the role of Grid Master in the medium-term.

Change in customer relationship in the business model of an automotive manufacturer

Source: KPMG Automotive Institute, 2015



TO BE A GRID MASTER, OEMs WILL NEED TO CONTROL BOTH UPSTREAM AND DOWNSTREAM ELEMENTS IN ONE CENTRAL BUSINESS MODEL

In summary, this means that automakers will find themselves at an important crossroads in the coming years:

- Will they decide to be "mere" metalsmiths, leaving innovative players from Silicon Valley to compete for data at the customer interface?
- Or will they decide to evolve into Grid Masters themselves, expanding their business model beyond simply creating outstanding vehicles to accompanying their customers with customized, vehicle-dependent and vehicle-independent product features and services throughout their entire lifecycle, 24 hours a day?

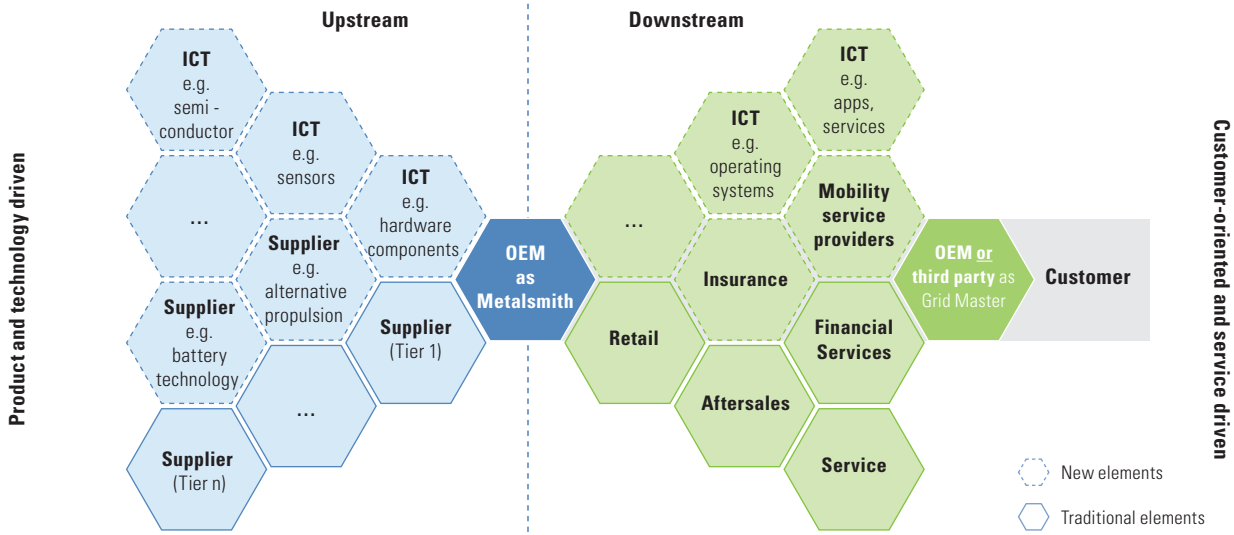
Why the metalsmith tag is not inherently negative:

The car is and remains undoubtedly the world's most complex industrial product. Over the past decades, automakers have impressively demonstrated their ability to successfully control the upstream as a central interface, despite growing complexity and the need to integrate new elements. To a large extent, the same applies to the traditional elements of the downstream such as dealerships, aftersales and service.

Accordingly, the positive aspect of the metalsmith tag is that automakers will continue to be able to harness their core product and technological competencies as a competitive advantage in the future. This is particularly true for OEMs with less strong brands and lower potential for customer retention. For these OEMs, the possibility of establishing themselves as a supplier providing outstanding vehicles – mobile data rooms – for high-tech companies like Apple or Google is a promising avenue, as these high-tech companies may have no long-term interest in the risky and capital-intensive process of automotive production and in selling the product, even in the future.

The redefined automotive value chain

Source: KPMG Automotive Institute, 2015



ICT = Information, Communication & Technology

What makes a Grid Master successful?

Automakers will need to intelligently connect the traditional and new elements of the upstream and the downstream in order to develop into Grid Masters. Only those automakers that succeed in establishing themselves as the preferred data hub for customers in future, will be able to hold firm as Grid Masters in the face of an influx of third parties.

THE INTERNET OF THINGS ALONE WILL NOT BE ENOUGH TO KEEP PACE WITH NEW COMPETITORS FROM SILICON VALLEY AT THE CUSTOMER INTERFACE

Looking at the most successful business models of the recent past, there is good reason to think that – contrary to the suggestion that still frequently does the rounds – it is not the Internet of Things that will be the key to success for future automotive business models, but rather the Internet of Behavior. Logically, a car that operates solely within the Internet of Things could become just another commoditized hardware device within the total ecosystem of connected mobile and immobile data rooms in future. By contrast, behavioral vehicle and customer data from the Internet of Behavior will enable the generation of scalable, sustainable revenue streams. But the question that arises today when it comes to the car is: for whom?

At present, automakers' activities in the area of vehicle connectivity are still concentrated mainly in the bottom left-hand quadrant of the connectivity matrix shown on page 11. The features they offer are largely vehicle-related, and involve mostly optimizations to vehicle safety and efficiency functions. This means they can be developed and marketed effectively within the current business model. However, the sustainability of the resulting revenue streams is likely to be moderate. Safety and efficiency functions based on the Internet of Things could soon become a commodity, meaning customers are no longer willing to pay the necessary price premium for them. There is even a possibility that revenue streams from OEMs' traditional business models could be cannibalized. Intelligent driver assistance systems to self-driving cars, will ultimately lead to vehicle parts experiencing less wear and tear, and hence longer service intervals and declining revenue from high-margin original spare parts across the vehicle lifecycle.

In contrast, activities in the bottom right-hand quadrant of the matrix in the field of predictive product analytics are set to be more lucrative. For example, product development costs can be optimized through intelligent Car-2-OEM communication. The connected vehicle could monitor every time the tailgate is opened and closed throughout the entire vehicle lifecycle and feed this information back to the OEM. This could lead to a considerable reduction in the development and production costs for a tailgate that is designed to be opened and closed 20,000 times, but that is actually only opened an average of 5,000 times over the entire product lifecycle.

In order to keep pace with or even surpass competitors from Silicon Valley in the long-term, particularly in downstream areas, vehicle OEMs will also need to gear their business models towards vehicle-independent, customer behavior-oriented services. Only if OEMs possess data on their behavior can they provide customers with support that is tailored to their needs in every aspect of their everyday life and at every touchpoint throughout the customer journey. This is what customers are used to in non-automotive environments, so it stands to reason that they will demand the same level of service when they are in their car – particularly if autonomous driving turns the valuable journey time from A to B into effective working, communication, or shopping time.

However, the core competencies for product features and services aimed at this kind of mobility are currently far away from the business model operated by vehicle manufacturers today.

LARGELY BEHAVIOR-RELATED DATA OF THE INTERNET OF BEHAVIOR WILL ENABLE THE GENERATION OF SCALABLE, SUSTAINABLE REVENUE STREAMS

In the upper right-hand quadrant of the connectivity matrix, which is home to predictive customer analytics, growing connectivity is accompanied by the greatest revenue potential for future business models, in the area of mobility.

» **Location-based cross-selling:** The intelligent use of location-based information and the right combination of cooperation partners could lead to the creation of interesting incentive systems for customers, allowing them to perform additional tasks while travelling from A to B, for example.

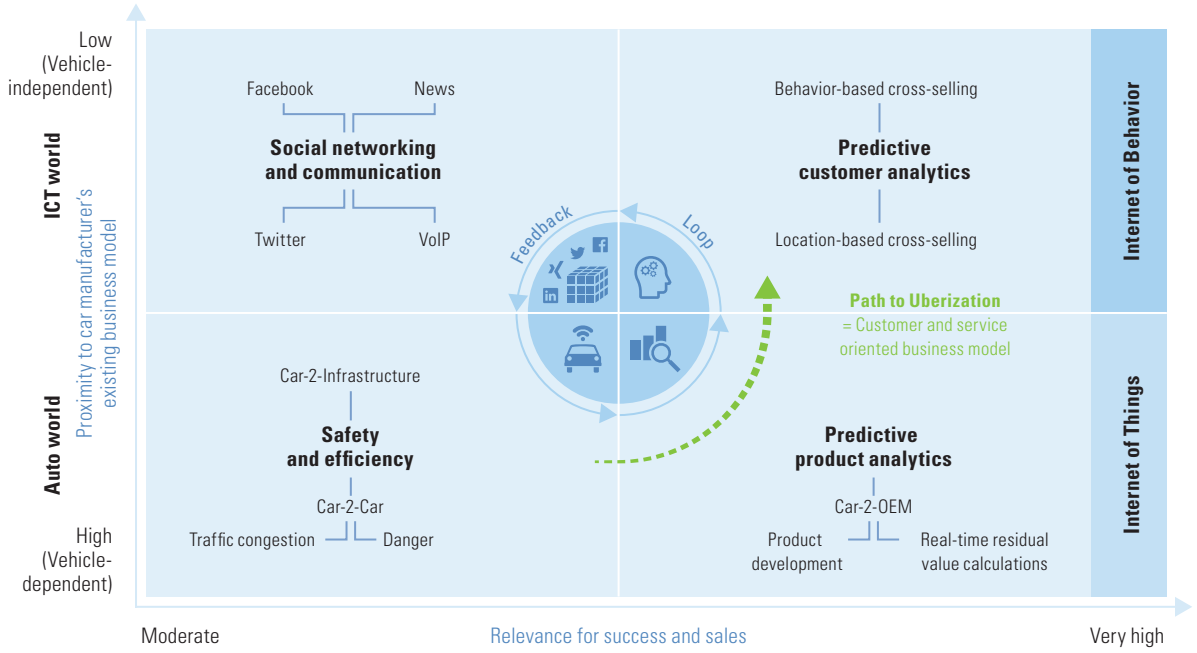
» **Behavior-based cross-selling:** Taking this principle one step further, knowledge of the behavior of vehicle users at specific times of the day or week could lead to the creation of incentive systems that combine vehicle and customer data intelligently to enable customized services.

By shaping these services, valuable vehicle and customer data can be combined innovatively, to generate entirely new revenue streams that go far beyond mere vehicle sales and servicing. In addition, these virtual services are scalable and involve relatively low investment costs and capital tie-up. However, this is also precisely what makes them so attractive for third parties from outside the industry.

Last, but not least, social networking and communication (upper left-hand quadrant) also naturally plays a role in the life of the connected customer. Although this area is not significant in terms of the revenue impact for information and communication technology (ICT) companies or automakers, the direct customer feedback from the various social media sources can be harnessed as part of the continuous optimization of products, product features and services (see page 12).

Connectivity matrix

Source: KPMG's Global Automotive Executive Survey 2015



UNDERSTANDING THE CUSTOMER BETTER WITH DATA ANALYTICS TOOLS

KPMG INSIGHT FROM JOHN LEECH –
AUTOMOTIVE COUNTRY LEADER, UNITED KINGDOM

Automotive manufacturers are increasingly using data analytics tools to better understand their customers. Using digital media listening tools and algorithms gives sales and marketing departments' insights into consumers' views on products, marketing and service. This data is being used to adapt live marketing campaigns to real-time feedback, respond quickly to negative media comments and improve the service offered by individual dealers to customers.

Over the next few years this unstructured data will be blended with existing corporate structured data to identify warranty issues earlier, identify improper or fraudulent behavior by employees or trading partners and involve the public more in vehicle and service design.

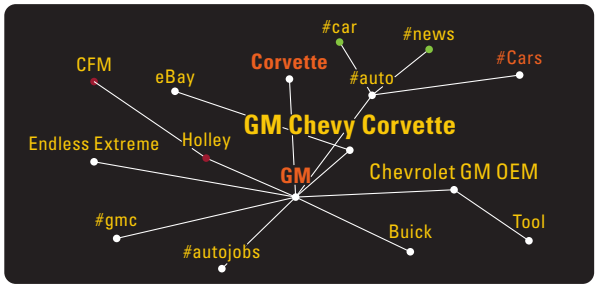
KPMG Capital has invested in Bottlenose, a solution that delivers these benefits. This solution analyzes digital TV, radio, websites and social media for pre-defined search terms and provides maps of the volume, sentiment and qualitative feedback in real-time. Our consultants combine this data with other corporate data to bring wide-ranging business benefits from consumer insight. For example, at one automotive manufacturer we used this technology to reduce the average time it takes to find the root cause of warranty issues by 80 percent. At another, we orchestrated a comprehensive response to negative criticism about a new TV advertising campaign within eight minutes of its first showing.

There is no doubt that customer analytics will enable all parts of an OEM to hear the voice of the customer more clearly.

John Leech
Automotive Country Leader
United Kingdom
Partner, KPMG in the UK

bottlenose

Business Intelligence for Stream Data



Bottlenose analyzes 72 billion data records daily

- Brand reputation
- Competitive intelligence
- Crisis response
- Psychographic research
- Market research
- National security
- Consumer insights
- Product innovation
- Advertising and content optimization

Source: Bottlenose (www.bottlenose.com)

HOW CAPTIVES CAN SUPPORT THE NEW BUSINESS MODEL OF OEMs

KPMG INSIGHT FROM ULRICH BERGMANN AND SANDRA SPECKBACHER – GLOBAL AUTOMOTIVE FINANCIAL SERVICES LEADERS

Captive finance companies (Captives) are no longer sole financing partners to their customers and simple sales motors for their OEMs. Things have changed and they will continue to change at a fast pace.

Captives will become indispensable companions for all OEM endeavors, claiming their stake in an ever-growing automotive financial services market spanning the automotive product lifecycle, both upstream and downstream. Captives will complement and upgrade OEMs' products with their services and insight into the customer.

Financial stability and independence will be of utmost importance if Captives are to live up to these new requirements. Involvement with external risk bearers will slow down efforts to become a frontrunner in captive finance. Banking licenses will become the new norm and pay-off as they facilitate refinancing and investment endeavors.

By offering deposit business to their customers, Captives may diversify their refinancing structure taking regional requirements into account. In a worst-case scenario, a banking license (European Union (EU)-bound) allows access to European Central Bank funding. Depending on financial performance, Captives could contribute to more favorable external ratings for their OEMs, which will satisfy their shareholders.

Securing access to new economy endeavors via venture capital or collaboration with start-ups and Financial Technology (FinTech) companies is a key aspiration in this highly digitalized sector, because technology helps complement and elevate the built-in hardware and facilitates implementation of new digital services via apps, such as wireless payment.

Equipped with sufficient financial strength, Captives can spread their wings to extend market share. Captives may play an active role in securing timely delivery streams of suppliers towards OEMs and contributing towards the financial independence of their OEMs by providing easy access credit lines. However, the starting point for Captives has changed. Where once their role was to provide financial services products at the point of sale at the dealer, now the extended opportunity grid makes customers the primary focus.

How well do OEMs and Captives know their customers? Not only today, but their customers in 10, 15, 20 years' time? If they don't they should get to know them, because both now and in the future close-knit OEMs and Captives will have the opportunity to capitalize on the competitive advantage and unique selling proposition that arises from them working as one, to become a one-stop-shop with highly digitalized, speedy processes and customer knowledge. Captives collect and manage customer data through their sales and communication channels, which is no longer exclusively at the point of sale of a dealer's brick-and-mortar location. Providing online platforms and services to retrieve information and perform one-stop-shopping for financial services products is becoming more valuable to customers.

Effectively managing customer data, including big data, is a key success factor as it translates into new services, tailored products and customer groups throughout the automotive value grid. This has a stabilizing effect on OEM operations, even in saturated markets and in an evolving market environment characterized by shorter product lifecycles, fierce global competition and increasing demand for mobility services, such as the trend towards vehicle usage rather than ownership.

Tailored financial services products will lead to higher-value vehicle purchases or leases. By collaborating, OEMs and Captives can capitalize on a variety of car rental models – including new medium-term rentals, corporate car-sharing and fleet business as well as multi-modal transport usage where different vehicles or brands are used at one or more stages in a journey. E-Mobility financial services products such as battery lease are other potential revenue streams. Meanwhile, complementary services such as mobile and wireless payment and after-sales-services help maximize the added value of a Captive.

Captives enable one-stop-shopping throughout a product's lifecycle. Through efficient interaction upstream and downstream and by effectively converting their customer knowledge, Captives continue to create significant up- and cross-selling potentials, increasing their value proposition for OEMs.

Ulrich Bergmann
Global Automotive Financial Services Leader
Partner, KPMG in Germany

Sandra Speckbacher
Global Automotive Financial Services Co-Leader
Director, KPMG in Germany

HOW IMPORTANT DO AUTOMAKERS PERCEIVE DATA TO BE, WITH REGARDS TO THE FUTURE BUSINESS MODEL AND HOW DO THEY ASSESS THEIR ABILITY TO DEAL WITH DATA TODAY?

KPMG INSIGHT FROM MORITZ PAWELKE – AUTOMOTIVE NEXTGEN ANALYTICS LEADER

Data is undoubtedly one of the most important pillars in establishing innovative business models. This is confirmed by the auto industry professionals who responded to our KPMG survey "Mit Daten Werte schaffen" (Turning Data into Value), KPMG & Bitkom Research 2015.

Most of them seem to have been aware of the value of data for some time. However, they are lagging behind in terms of implementation, with only 18 percent of automakers agreeing that they have concrete strategies in place to effectively use their data. In future, it will be essential for automakers to intelligently combine vehicle and environment-related upstream data generated by the car, with customer-related downstream data generated by the drivers themselves (see page 16).

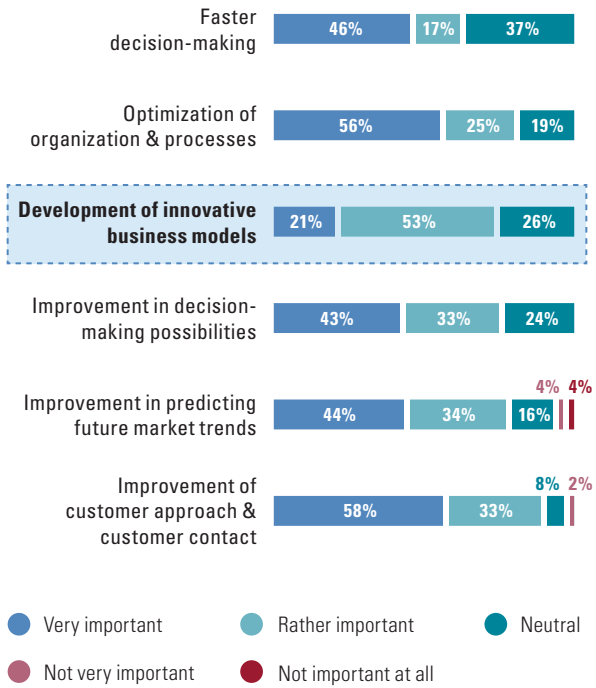
This will require a fundamental adaptation and change in the way automakers see themselves and shape their culture. For a long time, technical engineering alone was the way to ensure success. Informational engineering, i.e. the systematic utilization of state-of-the-art business analytics tools and methods to meet the challenges of the connected age, needs to become just as firmly enshrined within the corporate culture of the future.

Moritz Pawelke
Global, EMA and German Executive for Automotive
KPMG International

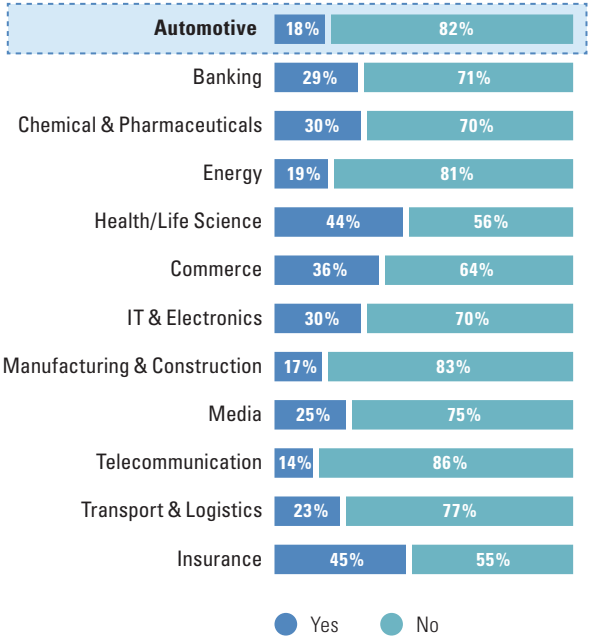
Creating value with data 2015 | Focus Automotive

Source: Study "Mit Daten Werte schaffen" (Turning Data into Value), KPMG & Bitkom Research 2015

How important are the following goals when using data analyses in your company?



Has your company already developed a strategy for the realization of big data measures?



DATA SECURITY AS COMPETITIVE ADVANTAGE AND CORE COMPETENCE IN FUTURE

KPMG INSIGHT FROM UWE BERND-STRIEBECK – AUTOMOTIVE CYBER SECURITY LEADER

In the digital age, every medium to large enterprise is now collecting, sharing or evaluating large quantities of data in even larger varieties. Over the last few years, many security-related incidents have shown that while digitalization processes open up new business models and opportunities, cyber security needs to be integrated right from the start into any new strategy or concept.

This dogma will hold as well for the digitalization of automotive transport, influencing both the design of new vehicles (meaning the decision of which data to provide digitally and who to provide it to), and the concept of service integration (meaning essentially which services can be provided locally, without the need to share data with components outside the vehicle or with third parties). We need to distinguish between two kinds of data. On the one hand, vehicles already consume and produce relevant vehicular data (i.e. speed, fuel consumption, shifting, brakes), and use this data to control the car. Securing this data is crucial, as inadequate security could have severe implications, leading in the worst case to loss of life. It needs to be ensured that such data is available at all times, that it is completely accurate (imagine if a driver's command to brake is misinterpreted), and that it is confidential. Confidentiality can in a first step, consist of concepts where dedicated control information networks and policies do not provide this data to other components than necessary car controls. On the other hand, modern cars generate a lot of new information, such as driving behavior and which music is listened to while driving, up to navigational profiles of specific drivers. All of this information can be used by in-car applications to assist the driver (e.g. by selecting appropriate music or proposing navigation targets), but it can also be used commercially in many ways. Car insurers may want to charge you according to your driving behavior in the future or applications may highlight tailored shopping opportunities near your target location. In our experience, such services can only function well and are only accepted by customers in the long-term, if the security of all data (i.e. customer data and control information) is considered appropriately and in every development phase. Security must not be thought of as a mere add-on, but rather as an essential building block of future automotive concepts.

Uwe Bernd-Striebeck
Automotive Cyber Security Leader
Partner, KPMG in Germany

THE INTELLIGENT CONNECTION OF VEHICLE, ENVIRONMENTAL AND CUSTOMER-RELATED DATA IS THE FUEL FOR FUTURE AUTOMOTIVE BUSINESS MODELS

As mentioned on pages 10 and 11, vehicle data is not the only key to ensuring successful future business models for automakers. A car becomes a gigantic data-generating machine only in conjunction with its occupants, their behavior and social environment and its own physical surroundings. The first step is to draw a distinction between upstream and downstream data and clarify who will ultimately be the owner of the data.

Upstream data originates from the car and is generated directly or through the car's movement and interaction with other vehicles (Car-2-Car) and the infrastructure (Car-2-Infrastructure) via a number of different sensors, imaging procedures such as video cameras and digital network technologies.

Downstream data consists primarily of vehicle-independent data generated by the occupants of the vehicle during the journey, as well as information from customers' everyday life that finds its way into the vehicle. The former may take the form of detailed information on the day-to-day life of the driver and any passengers (e.g. navigation destinations, calendar entries, communication activity), while the latter may include tastes in music, favorite movies, or online shopping preferences, for example.

Who has the data monopoly for the upstream and the downstream?

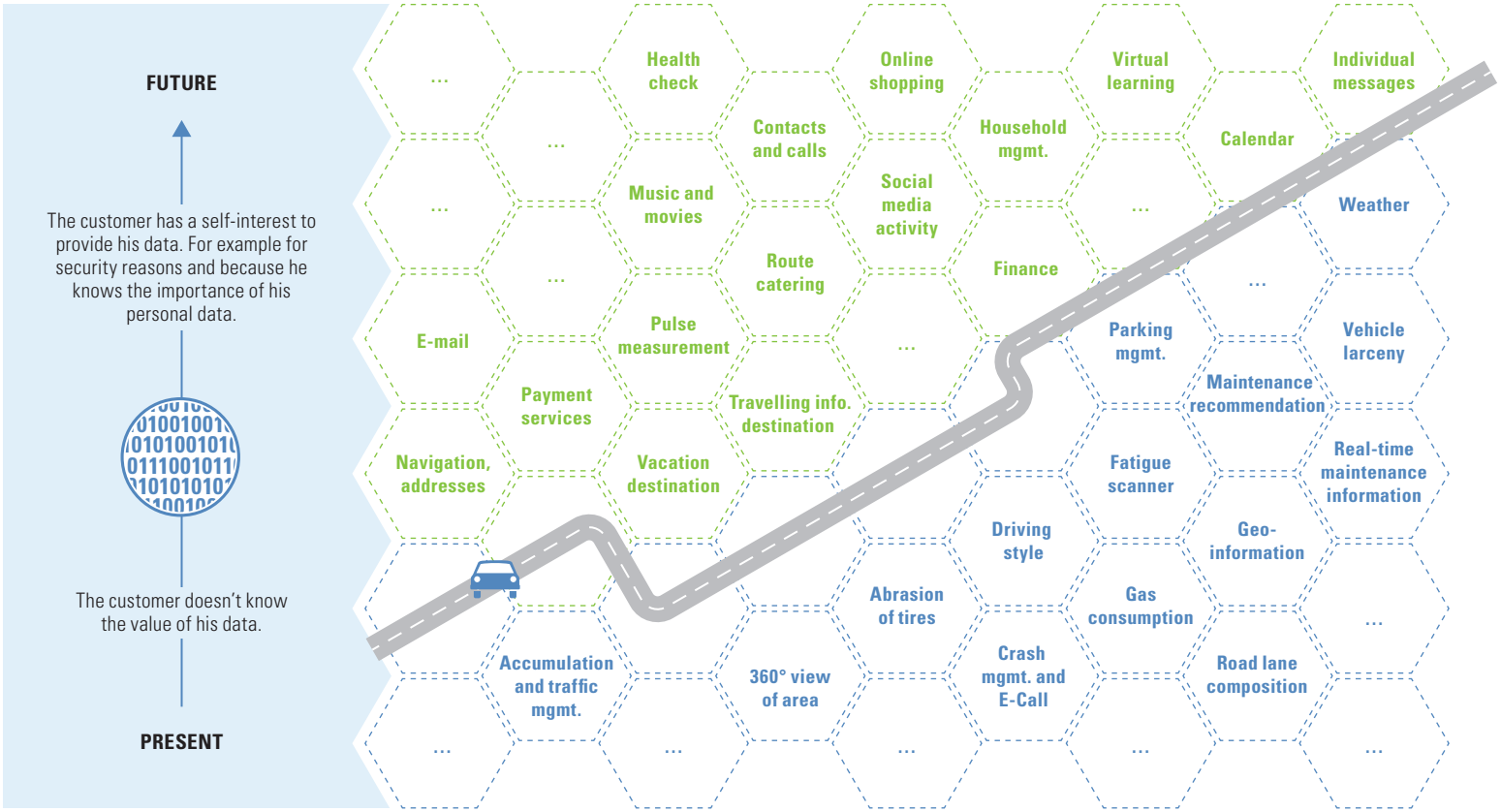
From today's perspective, the question of who ultimately has the right to convert the data trail generated by the car and its occupants into useful business models should already be the most hotly discussed topic today. Is the data generated in and around a car while driving, the sole property of the customer who drives the car? Does data belong to the automakers building the car? Or to third parties who are just as keen to stake their claim via apps and virtual services in the car?

The customer alone decides who uses his data trail

In the vast majority of cases, customers are not yet aware of how valuable their data is. Quite the opposite is true for resourceful high-tech companies. With increased connectivity and the coming age of technologically savvy digital natives in the decades ahead, however, it can be assumed that there will be a growing number of consumers who are not willing to surrender their data to third parties without incentive or reward.

The vehicle and its data track

Source: KPMG Automotive Institute, 2015



A DATA-BASED GRID MASTER BUSINESS MODEL REQUIRES A STRONG BRAND AND HIGH POTENTIAL FOR CUSTOMER RETENTION

Having said that, the extent to which customers are willing to make their data available to third parties will continue to depend on cultural aspects and various customer groups in the future. Customers in European markets, and Germany in particular, are expected to have a different relationship to their data than less data-sensitive customers in countries such as the USA or China. The same applies to owners of premium or luxury vehicles, whose wealth and corresponding social status might mean they have a different attitude towards surrendering their personal data than the owners of low-price or mass-market vehicles.

Premium manufacturers therefore have a clear competitive advantage

Given that customers are becoming increasingly aware of the value of their own data, this could be the catalyst for premium manufacturers in particular to implement data-based Grid Master business models. This will give them an advantage over the competition for vehicle and customer data thanks to the trust enjoyed by their strong brands.

As they compete with third parties from outside the industry, premium automakers will benefit from the fact that their customers place greater trust in them to manage their personal data than internet and technology companies. Or, to summarize one customer's sentiments: a company that has been keeping me alive for many years with active and passive safety and driver assistance systems can also be trusted when it comes to data security. Premium manufacturers from Germany, in particular, could have an additional advantage over other competitors on account of the country's particularly strict regulations on data security, which usually tend to be seen as a disadvantage.

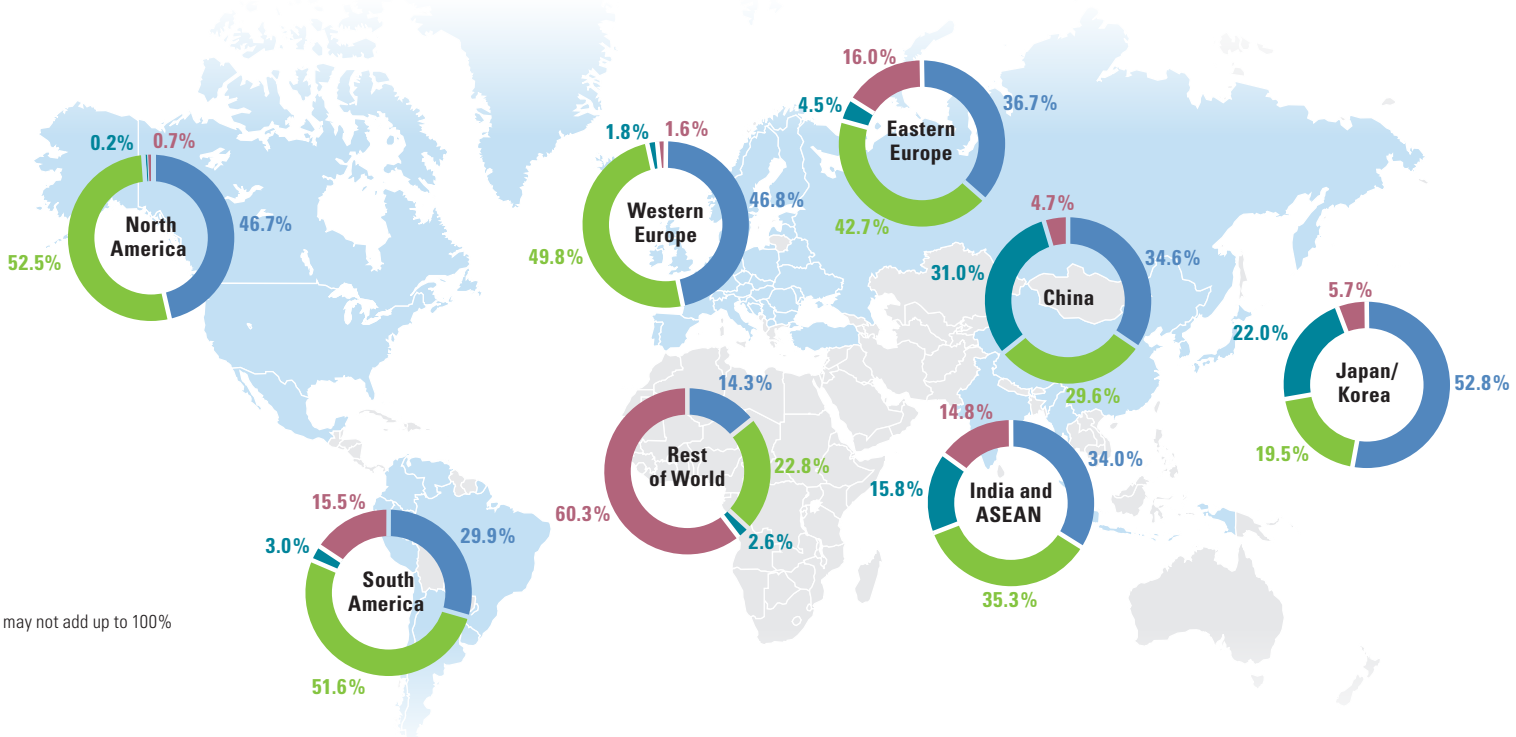
Logically, manufacturers from the mass-market and low-price segments may be forced to surrender the customer interface to new competitors from the information and communication technology industry, and concentrate on a product and technology-oriented business model.

What the upcoming changes could mean in quantitative terms

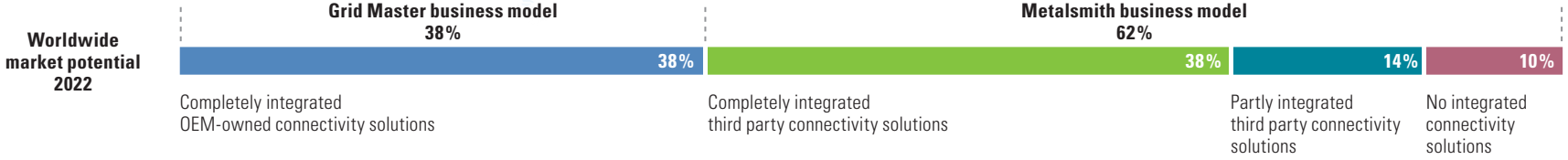
Our market forecast on the connectivity of new vehicles in 2022 shows that the market potential for OEM-captive connectivity solutions (i.e. the Grid Master model), could account for less than 40 percent of the global new car market in 2022. Only North America, Western Europe, Japan and Korea are expected to see higher regional market shares on account of the maturity of their respective markets. However, according to our estimates, 52 percent of new cars will be fitted with fully or partially integrated solutions from third party providers following the metalsmith business model.

Degree of connectivity of new vehicles in 2022

Source: KPMG Automotive Institute, 2015, LMC Automotive



Please note: Figures may not add up to 100% due to rounding



HOW MIGHT A BUSINESS MODEL BUILT AROUND CUSTOMER BEHAVIOR AND SERVICE LOOK FOR AUTOMAKERS OF THE FUTURE?

To evolve into becoming the Grid Master, in the medium to long-term automakers will have to develop into being trusted, virtual data marketplaces, that all interested companies can approach to collect vehicle and customer data.

The first prerequisite for this scenario is for customers to take the motto "My car, my data" and add their consent with the words: "and I am confident that my data is in the best possible hands with my preferred automaker".

From the current perspective, the greatest challenge will be to establish an intelligent and, in particular, highly intuitive incentive system that persuades customers to give the OEM exclusive access to their data trail as the central partner at the outset, rather than handing it over to any and all third parties more or less free of charge. Undoubtedly, cultural-and-maturity-related market differences need to be taken into account when designing the specific details of the incentive system (see page 18 and following).

Automakers will succeed in establishing such systems only if they supplement their strong brand and high potential for customer retention by laying the foundations for two core competencies over the coming years:

Firstly, they will have to use **informational engineering** to intelligently combine the various upstream and downstream data streams generated in the vehicle so that the resulting benefits for the customer constitute a unique selling point compared with third parties (see page 14).

Secondly, they will have to focus on **data security** as a core competency in future, if they wish to establish themselves as the preferred Grid Master at the customer interface with a data-based business model in the face of competition from third parties (see page 15).

Providing these basic criteria are met, the following visionary business model would be conceivable in future: an automaker could enter into contracts with its customers (B2C) and at the same time with selected brand and customer-specific cooperation partners (B2B) in order to allow it to offer both mobility and vehicle-independent products and services in the form of a bonus and incentive system as a central partner or Grid Master (see illustration on page 23).

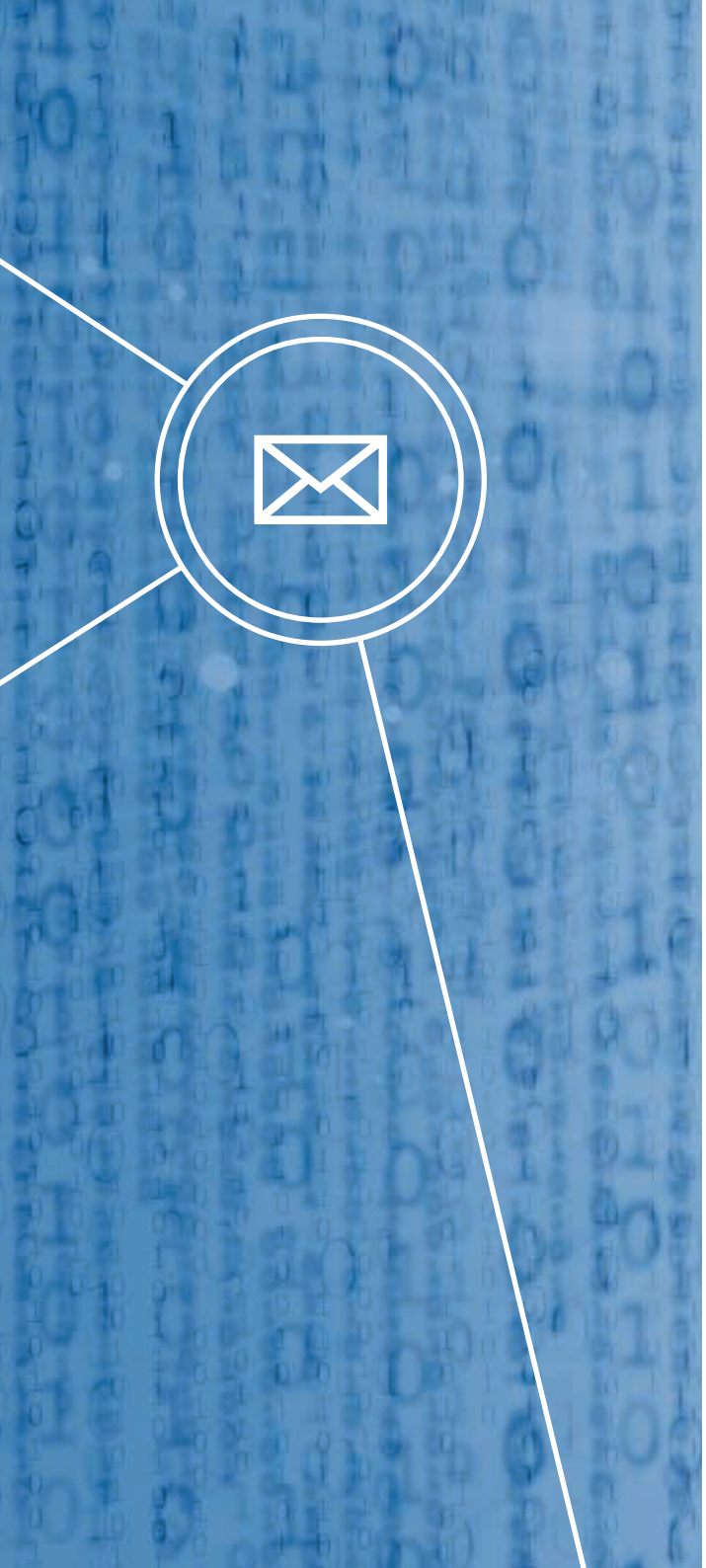
This future business model is already being foreshadowed by some car-sharing providers. As part of a location-based cooperation with supermarkets, car-sharing customers in major German cities are already being informed when they are within a certain radius of a partner supermarket. The prospect of free parking and instant discounts on shopping are used to entice them into satisfying their additional consumer needs while travelling from A to B in a time and cost-efficient manner.

This is just one simple, scalable example of a typical win-win situation for the retailer and the automaker. The retailer obtains high-quality customer contacts, while the automaker can open up new customer-behavior and location-related revenue streams by using and connecting data streams intelligently – even outside the vehicle.

Customer value and quality will be key factors for success

This means that the customer value, resulting from the vehicle, customer and environmental data streams, is crucial and builds the foundation to this new business model. Thanks to their position, OEMs have a unique ability to generate high-quality leads[1] by intelligently combining upstream and downstream data.

[1] In marketing, a lead is a party with a qualified interest in a company, product, or service who voluntarily provides their data in order to establish a continued dialogue and whose customer profile means they are highly likely to buy the products and services offered to them.



VISIONARY GRID MASTER BUSINESS MODEL

DRIVING A CAR BUT SOMEBODY ELSE PAYS THE BILL?

For potential cooperation partners, the equation is simple and effective: customers of premium or luxury automakers are highly likely to be the same people who fulfill their consumer needs at luxury boutiques, organic grocery stores, or gourmet restaurants. The motto is: "If you drive an expensive car, there is every likelihood you will also be interested in other luxury items and exclusive services."

However, there still needs to be a persuasive argument for the customer in order for the incentive system to function within the triangular relationship between the customer, the Grid Master OEM and the respective cooperation partner.

Why would the customer prefer the Grid Master OEM over third parties?

One key factor for the customer is undoubtedly the attractiveness of the overall portfolio of potential – and preferably exclusive – cooperation partners that ideally meet their individual needs. But an attractive portfolio is also something that third parties can offer. As such, the more persuasive argument in the model as illustrated is the prospect of a continuous reduction in the total cost of ownership (TCO) for car owners or the total cost of usage (TCU) for lessees and car-sharers by taking advantage of the offers provided by the selected cooperation partners.

Driving while somebody else pays the bill

Overall, if the conditions were met then a functioning triangular relationship would emerge. In its capacity as Grid Master, the OEM would initially provide the customer with a car or any kind of mobility solution under the terms of a B2C contract. In exchange, the customer would voluntarily and exclusively provide the Grid Master with data generated in his vehicle, by himself and his environment. With the help of cooperation partners, the Grid Master would then use this data to offer attractive, customized additional products or services based on the Internet of Behavior (see page 11).

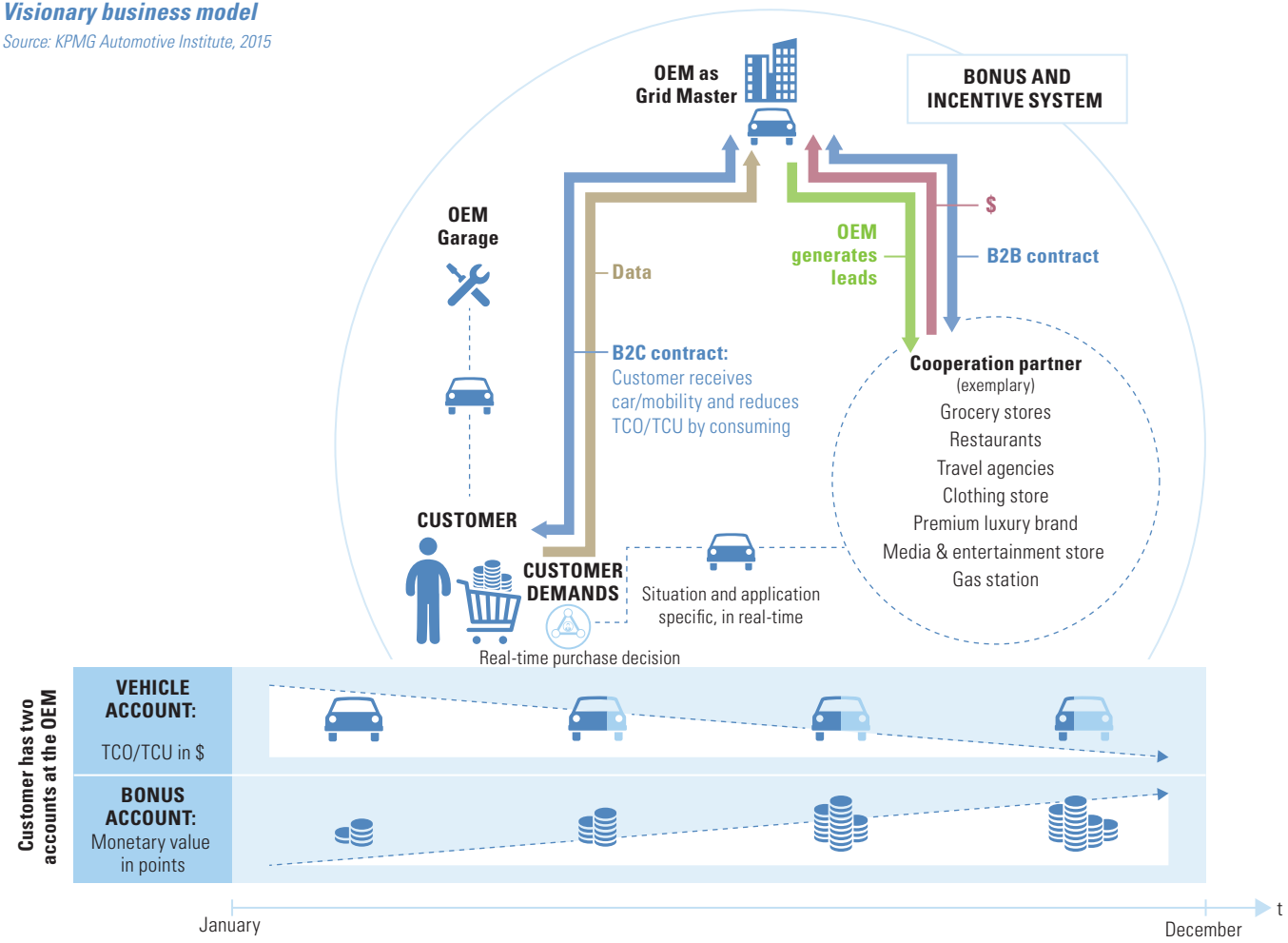
The benefit for the cooperation partners lies in the generation of high-quality leads, for which the partners are willing to pay the OEM a portion of the revenue earned as a result under the terms of a B2B partnership agreement, thereby indirectly taking over the cost of the customer's vehicle or mobility solution.

In turn, the Grid Master would manage a vehicle account and a bonus account for the customer, providing an incentive for him to keep the cost of his personal mobility as low as possible by adhering to the simple principle of buying from exclusive partners to receive bonuses.

A brave new (auto) world? Only the next few years will tell.

Visionary business model

Source: KPMG Automotive Institute, 2015



B2B partnership agreement based on customer value in $-worth of:

- Lead
- Opportunity
- Acquisition

Development of incentive mechanisms:

- Customer and market specific
- Situation and application related

B2C contract: Kick back as credit of end customer:

- Incentive to steer personal data via the OEM, to minimize the price for mobility

Own car/Leasing contract/ Car-sharing model

RELEASE-ABILITY IS THE KEY TO SUCCESS FOR AUTOMAKERS

KPMG INSIGHT FROM DIETER BECKER –
GLOBAL, EMA AND GERMAN HEAD OF AUTOMOTIVE

The automotive industry will never be the same again. Even the product development process of the connected car will have to change fundamentally. The integration of additional service-oriented functionalities that support customers throughout the vehicle lifecycle will succeed only if manufacturers ensure that certain parts of their development process are release-able (i.e. modular and updateable). Accordingly, flexible, decoupled R&D processes and freeze periods between vehicle-dependent and vehicle-independent hardware and software features are essential – and the key to ensuring a quick response to future customer expectations.

It is clear that simply installing core functionalities including permanently integrated, high-margin special equipment such as navigation systems, based solely on safety and efficiency functions from the Internet of Things will not be enough. To generate sustainable revenue at the customer interface in future, additional functionalities that enable the driver and all other occupants to use their travel time from A to B efficiently will be absolutely essential.

More specifically, release-ability means that the future development process of a connected vehicle will have to be broken down into three parts. Firstly, there will need to be a separate development process for the traditional vehicle hardware (body, chassis, design, etc.) that most closely resembles the current product development process in terms of both timeframe and organization.

The development process for the integration of ICT hardware at the human-machine interface (network technology, displays, etc.) will need to be separate and with shorter freeze periods. The cornerstone of this process is the modular structure of all the components used, which can be exchanged and added flexibly. Whereas the modular concept in traditional vehicle production is aimed solely at optimizing costs for the manufacturer, the modular principle for ICT hardware is aimed solely at optimizing the customer's needs.

In the same vein, the development of software features for additional functionalities must be separated from these two processes. In the connected world, updateability means more than just an occasional update at the dealership whenever a vehicle is taken in for servicing. The initial attempts by the automotive industry to introduce over-the-air (OTA) update solutions are a step in the right direction. In any case, it is essential that updates are communicated to the vehicle permanently and immediately on request, otherwise the customer will be lost to third parties at that important and vital in-car interface.

All in all, this undoubtedly requires a shift in the mindset for today's automakers. Entrenched committee processes and freeze periods will have to be called into question. Similarly, requirement specifications that are set in stone at an early stage, often years before the actual start of production (SOP), will have to be broken down in line with the three-part approach detailed above if companies are to enjoy success in a connected world where customer requirements change in real-time.

If this paradigm shift takes place, I have no doubt that the automakers of the future will be able to not only provide excellent products and technologies, but also act as the ideal companion for their customers throughout the entire lifecycle.

Dieter Becker
Global, EMA and German Head of Automotive
KPMG International

Uber-features that create value in the vehicle

Source: KPMG Automotive Institute, 2015

Increasing importance of release-ability in the vehicle

CORE-FEATURES (Permanently integrated functionalities in the car)	**UBER-FEATURES** (Functionalities that allow drivers to use their driving time more efficiently)						
Example **Infotainment**	**High-resolution surface with additional features** (To manage the interface of single modules)						
4 groups of main functionalities: » Entertainment (radio, audio-CD, DVD, audio, video and TV) » Communication (telephone and directory) » Navigation (traffic guidance and information) » Additional options (multi media interface, air conditioning)	**Vehicle** » Road conditions » Temperature » Service and repair » Vehicle usage	**Travel** » Traffic jams, route planner » Hotel vendor » Online check-in	**Healthcare** » Health check » Pulse monitor	**Billing systems** » Payment system » Purchase history » Payment at petrol station	**Energy/home** » Remote control of home automation	**Office and information** » Mail » Calendar » Video calls » News	**…** The list of potential uber-features is inexhaustible, some might not yet even exist
	Sender of data						
	Vehicle	**Customer/Driver**					
» The sole installation of core features will not generate sustainable revenues in the future. » Core features include integrated functionalities within the vehicle that do not accompany customers throughout the entire customer lifecycle.	**Proprietary System** (pool of information, eg. for driver profiles)	» Customer can add individual packages through modular system » Customer experience can be enhanced throughout the entire customer lifecycle by offering individual services in other areas of the customer's life.					
	Receiver of data						
	» Manufacturer » Mapping- services » Traffic, tourist offices etc.	» OEM » Insurance companies or doctors		» Banks and companies that offer payment systems » Travel companies			

Present — **Internet of Things** — **Internet of Behavior** — **Future**

GLOBAL AUTOMOTIVE THOUGHT LEADERSHIP

Global Automotive Executive Survey (January 2015)

Now in its 16th consecutive year, KPMG International's latest Global Automotive Executive Survey of 200 automotive executives reports that short-term market issues once again take precedence over strategic innovations. For further information please see www.kpmg.com/GAES2015 and the interactive Tableau Online Version!

Connected and Autonomous Vehicles – The UK Economic Opportunity (March 2015)

This report examines how these innovative vehicles will transform the UK economy – expanding our industrial base, improving safety and congestion, driving up productivity and freeing up space usually devoted to vehicles in our urban areas.

The Clockspeed Dilemma (November 2015)

Last year's groundbreaking paper Me, My Car, My Life described a convergence of consumer and automotive technologies. This year, we examine how the automotive industry must innovate in response to these transformations. We're riding a wave of fantastic innovation that is moving faster and faster. Who will be among the next generation of leading companies?

Global Automotive Executive Survey (January 2016)

For the 2016 annual survey, almost 800 automotive executives will share their insights and outlook on the future of the automotive industry, including major business model disruption. Look forward to this year's new feature: 2,000 consumers tell us their needs and expectations for future mobility.

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