
Challenges and Strategies for Making Connected Services Profitable



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Abstract

1. With connected cars becoming more popular in the context of new car sales, it is becoming more important every day for automakers to discuss the profitability of their connected services. This is because not only do connected services play a decisive role in product competitiveness, but by virtue of offering broad and constant connectivity to various things, they also represent a trove of business possibilities and the potential to create new value not confined to the traditional activities of the industry.
2. Making connected services more profitable will require automakers to expand sales of their services. For services aimed at core end users, the key will be to develop services that deftly balance improving per-customer spending and maintaining/enhancing customer retention rates. In addition, in recent years we have begun to see more businesses being launched and expanded for services that are aimed at corporate customers involving the use of data as a new domain.
3. Meanwhile, the question of how to rapidly develop and launch new services while also reducing invested resources and costs is another crucial point of debate. Alliances intended to accelerate software and service development, prompted by the entry of IT giants into this field, are becoming increasingly important considerations. Further, it will become more essential for automakers to form new inter-company partnerships or transcend their internal boundaries involving particular brands, regions, or businesses and to adopt a common service infrastructure, and thereby reduce their costs.
4. We expect there are more than a few cases in which internal company frameworks are not enough to implement solutions to every challenge. In addition to having specialized organizations and securing talented personnel to demonstrate leadership in the connected field, companies must also keep a watchful eye on their KPI and internal structures that make it possible to hold smooth discussions with business partners and relevant departments. When it comes to improving the profitability of connected services, it will be essential to make integrated efforts toward finding solutions to challenges and creating frameworks for implementing them.

I. CONNECTED CAR SERVICES ARE SEEING WIDER USE

1. Connected Cars Coming to Market at a Faster Rate

In recent years, a great many vehicles featuring onboard communication equipment known as “connected cars” have been put on the market, and they have become a familiar part of our lives. Since as far back as 20 years ago or more, there have been cars capable of connecting to intelligent transportation systems (ITS) or the internet, yet automobile makers have recently been placing greater importance on connected cars, and are accelerating their studies and their actions toward making this technology profitable in concrete ways.

Connected cars first came to be seen as critically important in 2016, when Daimler AG’s CEO Dieter Zetsche rather famously advocated for CASE at the Paris Motor Show. CASE is an acronym for Connected, Autonomous, Shared & Services, Electric. Zetsche contended that the four themes involved in CASE would bear significantly on the future growth and survival of automakers, and stated that they would be central to the medium- and long-term strategies of Mercedes Benz. “Connected” was counted as one of the themes that will determine the future growth of the automotive industry. Since

then the word CASE has caught on, and along with it, automobile manufacturers have made even greater commitments to developing connected services. For instance, in June 2018 Toyota Motor announced that onboard communication equipment linked with its vehicle control network (CAN) would come standard in nearly all of its passenger vehicles.

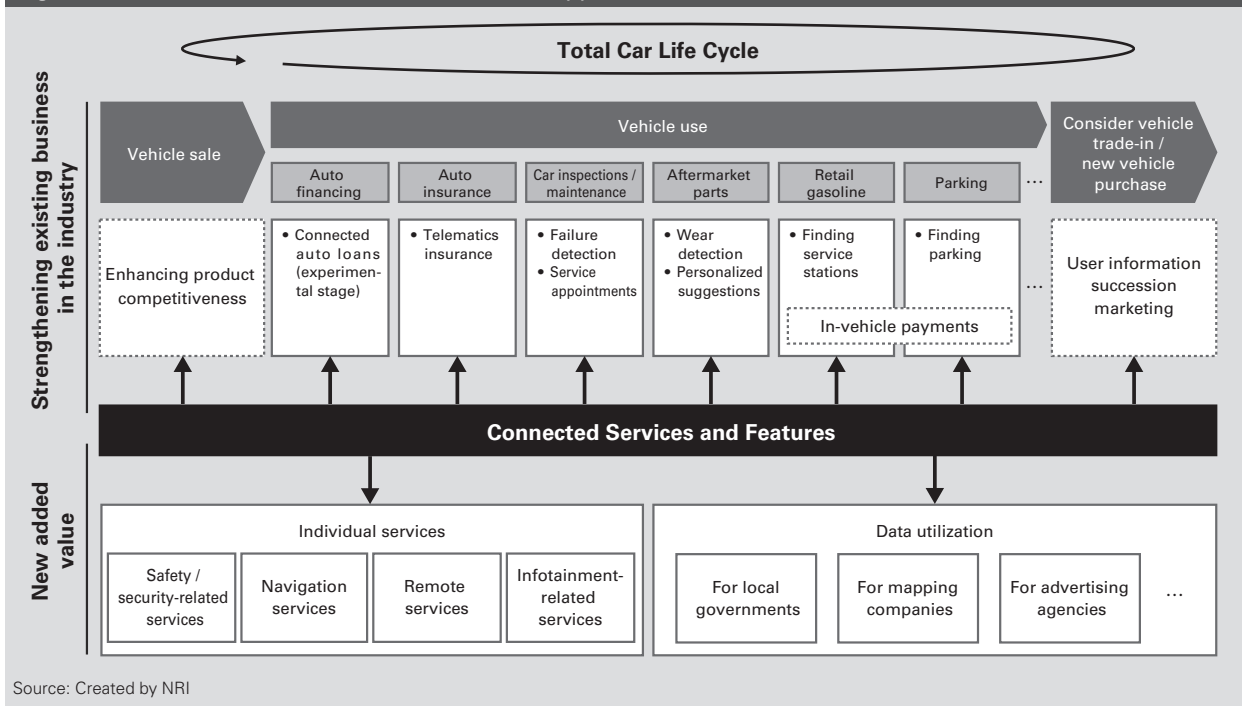
At present, it’s becoming the norm for many of the passenger vehicles sold in advanced nations to be connected cars, and automakers are having daily discussions on how to ensure that their services based on connected cars will be robust and profitable.

2. New Value Created by Connected Technology

In addition to the standardization of onboard communication equipment, the growing number of sensors in vehicles and the development of communications technology and infrastructure in advanced nations are also furthering the popularization of connected cars. Smartphones now enjoy widespread use, and their transformation into essential parts of our daily lives has had a massive impact. When it comes to how we use our cars, we have begun clamoring for in-vehicle environments that allow us to enjoy the latest features and services comfortably and conveniently, just as we do with smartphones.

As technology advances and our lives

Fig. 1: Overview of Connected Services Business Opportunities



continue to be transformed, beyond mere connectivity with conventional ITS and the internet, connected cars will make it possible for drivers, passengers, cars, traffic infrastructure, and automakers themselves to be connected widely and at all times, and this is a major point of change. As shown in fig. 1, not only are these developments enhancing the product appeal of the actual vehicles through the addition of specific connected features and strengthening existing businesses, they are also enabling automakers to consider novel business avenues that involve providing new connected services that capitalize on this widespread, constant connectivity and gathering and analyzing various related data. And in a more general sense, these

changes are allowing automakers to explore the business possibilities and the potential for creating new value in ways not confined to the traditional activities of their industry.

3. Challenges for Making Connected Services Profitable

As mentioned earlier, many of the passenger vehicles being sold in advanced nations are already being converted into connected cars, and the number of consumers and the size of the market looking for connected services are both expected to grow little by little. However, with connected services, there is a need to go beyond the mere assembly and sale of vehicles (which are the traditional pillars of

automakers' business), and to build a profitable business base covering the total life of a car, with the various needs of consumers as the starting point. And to bring these services to the market, automakers must do more than just develop new vehicles—they will need to rapidly develop services in the field of system software, something quite different from their conventional area of expertise, all while making sure to cover those various needs. Thus, we must recognize that there are currently few business models or real-world examples of what could be considered highly profitable connected services.

In this paper, we approach the challenges involved in making connected services more profitable from several perspectives, namely expanding the sales of these services, accelerating service development, and reducing the costs associated with their operation. We also suggest ways that companies can go about solving these challenges.

II. POINTS OF DISCUSSION REGARDING EXPANDING SALES OF CONNECTED SERVICES

1. The Start and Spread of Connected Services

Connected cars are vehicles that come equipped with internet-based communica-

tion features, and in a narrow sense, this means cars that have a telematic control unit (TCU) in which are incorporated a modem (a cellular module required for audio and data transmission) and a SIM card (per a connectivity contract with the telecommunications carrier). Back in 1996, US company General Motors (GM) began equipping its model-year 1997 Cadillac Deville, Seville, and Eldorado cars at the time of their sale with the industry's first-ever embedded connected features, providing this system and service under the name "OnStar".

Then in the latter half of the 2000s, the development of iOS along with Apple's iPhone and Google's Android OS led to the widespread use of smartphones, and this led to the arrival of connected cars in a broader sense which made it possible for smartphones to take over the communication features of TCUs. In some cases, USB dongles and other devices are used for tethering to perform communications.

Thus, services provided primarily for cars via internet communications that are established using onboard telecommunications devices, smartphones, and other external devices are known as "connected services".

The general types of connected services available comprise end user services, which many automakers are already practically implementing, and corporate services, for which efforts have been acceler-

ated in recent years. In this section, we discuss challenges and solution approaches for expanding the sales of these services in the future, with reference to characteristic examples of related efforts by automakers.

2. Examples of Efforts by Automakers to Expand Sales of Connected Services

The main connected services for end users include things like safety and security-related services (eCall, theft tracking and control features, etc.), navigation services, remote services (remote vehicle operation and confirmation, etc.), and infotainment-related services (including the use of AI-equipped voice recognition features or smartphone apps). Many of these connected services are multiple services packaged together, and are provided as a subscription (set fees charged as the price to be paid for a given use period), and companies offer monthly or yearly service charge options.

In a subscription-type business, acquiring new customers, increasing per-customer spending, and improving your customer loyalty rate are important parts of growing sales. In recent years, many automakers have been providing mostly safety and security-related features as part of free plans with no usage fees attached. In other words, many owners of connected cars are registered as new members of these

connected services at the time of their vehicle purchase. In order to expand sales of their connected services, companies therefore are focusing their energy on measures for improving per-customer spending and customer retention rates as the next step in “new customer acquisition”.

I. Tesla: Feature Enhancements as a Method of Introducing Fee-Based Services

A key element in raising per-customer spending is making appropriate feature enhancements that will encourage customers to transition to paid plans or accept higher pricing per customer. For instance, Tesla started putting a 17-inch large touch screen as a standard sales feature in its 2012 ModelS, and it has been providing connected services in all of its models and grades. Although Tesla’s connected services had all been provided essentially free of charge (including communication fees), in 2019 the company introduced its first fee-based plan, the “Premium Connectivity” plan (\$9.99 per month). While some basic features such as navigation can still be used for free, including communication fees, usage fees for highly functional maps and communication fees for services that handle large volumes of data in the form of video and audio are now paid by the customer.

If the policy of making these connected services fee-based had not involved deliv-

ering enhanced value, Tesla would presumably have aroused the ire of its customers. One notable characteristic when it rolled out this fee-based plan was that it made prioritized feature enhancements for its infotainment services. More specifically, Tesla offered various features that allowed customers to connect to their YouTube or Spotify accounts or to sing karaoke, for instance, at the same time that it rolled out its fee-based connected services plan. When it comes to features utilizing large-screen display audio, an area where Tesla's vehicles excel, one could say that by linking media and installing features that are popular in the market, Tesla has powerfully demonstrated the improved value of its connected services to its users, while also minimizing their resistance to paying more.

II. BMW: Reconsidering the Decision to Charge for Their Service (CarPlay)

Meanwhile, there is also the example of BMW, a company that has struggled in recent years to reprice some of its services. BMW provides remote services, infotainment-related services including voice recognition features, and other basic connected services within an annual subscription format. In addition, the company announced in July 2019 that it would be the first automaker to charge for the use of its integrated CarPlay fea-

ture (from Apple), thereby collecting an additional annual usage fee for that service. The number of CarPlay users continues to grow, mainly in Europe and the US, and it was thought that if BMW could collect subscription-style usage fees, it would go a long way to stabilizing BMW's revenue growth.

Yet in December of last year, BMW withdrew its subscription-style charges for the use of CarPlay. A BMW spokesperson commented that "BMW is always looking to satisfy our customers' needs and this policy change (the withdrawal of its subscription) is intended to provide BMW owners with a better ownership experience". Based on this comment, we can infer that the decision to charge a fee for the CarPlay service—which other automakers have been providing at no charge—provoked a more negative reaction than was expected.

Apple is the developer of the CarPlay service, with automakers merely providing the "venue" for the service to be used, namely the vehicle interior. The fact that BMW owners alone were charged for the service, when the actual content thereof was no different than that used with any other automaker, led customers to feel that they were being treated unfairly. Thus, raising per-customer spending by revising service prices has arguably become more difficult in the field of generic services, where it is challenging for auto-

makers to provide unique value.

III. GM: A Continuous Plan Revision Cycle for Gauging and Accommodating Customer Needs

In the provision of services using a subscription format, raising per-customer spending and customer satisfaction and in turn maintaining customer loyalty involves something of a trade-off, and connected services are no exception to this. Enhancing the appeal of your actual services in a way that meets your customers' needs and striking a proper balance between raising per-customer spending and retaining those customers are extremely important aspects of improving the profitability of your connected services. For ex-

ample, it is worth taking a look at the initiatives of GM, which has regularly revised the content and pricing of the connected services that it provides and has explored its customers' needs.

GM recently adopted a new pricing system for OnStar back in April 2018. As shown in fig. 1, the company altered its packaging for its connected services and added new features, transitioning from having a basic plan (5 years at no charge) + three types of paid plans (\$19.99/month to \$34.99/month) to having the basic plan (now 10 years at no charge) + five types of paid plans (\$14.99/month to \$59.99/month). More specifically, GM has created new higher-cost plans that include high-performance navigation and unlimit-

Table 1: Onstar (GM) - Latest Package Revisions for Connected Services

Old Package (April 2018 and earlier)					Latest Package (April 2018 onward)							
Plan name	Basic	Protection	Security	Guidance	Plan name	Connected Access	Remote Access	Unlimited Access	Safety & Security	Safety & Security + Remote Access	Safety & Security + Unlimited Access	
Fee	Monthly	5 years free	\$ 19.99	\$ 24.99	\$ 34.99	Monthly	10 years free	\$ 14.99	\$ 39.99	\$ 24.99	\$ 39.99	\$ 59.99
	Annual	5 years free	\$ 199.90	\$ 249.90	\$ 349.90	Annually	10 years free	\$ 149.90	—	\$ 249.90	\$ 349.90	—
Features	Remote operation	●	●	●	●	Remote operation	—	●	—	●	●	●
	Emergency response	—	●	●	●	Emergency response	—	—	—	●	●	●
	+ Stolen vehicle tracking feature	—	—	●	●	+ Stolen vehicle tracking feature	—	—	—	●	●	●
	High-performance navigation	—	—	—	●	High-performance navigation	—	—	●	●	●	●
New features	Unlimited communication data	—	—	—	●	Unlimited communication data	—	—	●	—	—	●
	Other(Key by Amazon, Marketplace, In-vehicle app, etc.)	—	—	—	—	●	●	●	●	●	●	●

Note: A hands-free calling feature was also provided in some of the old plans, but this is not available in the new plans (the current latest GM models do not offer this feature). In addition, the "At your service" feature which was provided free of charge in all of the old plans has been repackaged as part of the Marketplace feature.

Source) Compiled from publicly available data from General Motors (GM)

ed Wi-Fi communications. In addition, it has removed remote services (for remotely locking and unlocking doors, handling the engine, etc.)—which are some of the most frequently used connected features and give customers a sense of convenience every day—from its basic plan and incorporated them into its paid plans, this move presumably being a way of encouraging customers to switch from free services to fee-based services.

In recent years, GM has been revising its OnStar plans at the high frequency of every one or two years. In making these revisions, it considers usage data from customers and dealer feedback and spends a whole year identifying the features and services for which customers feel comfortable paying, and then reassesses its pricing strategy. The plan revisions—including the decision to charge for remote services described above—are also the result of GM having gauged its customers' daily needs and derived from them the kinds of pricing and packages that would yield ample profits as well as achieve customer satisfaction. The process entails making hypotheses about customer needs based on quantitative and qualitative data, adopting new pricing and packages with high frequency, and then checking on a daily basis how the services are being used to measure the effects. By continually running through the PDCA cycle for its plan revisions, GM has sought to flexibly and

appropriately accommodate its customers' needs and thereby make its connected service even more profitable.

IV. Audi: Maximizing Opportunities to Provide Services by “Adding on” Features Later and Adopting Multiple Pricing Structures

With companies adopting subscription formats in providing connected services in an effort to improve their profitability, Audi is one example of an automaker that is working to bring advanced marketing and sales concepts to life using new technologies. In addition to having various plans for its existing connected services (subscription format), Audi announced that for some of its models on sale in 2020, it would be adopting a “Function on Demand” (FoD) concept for specified features. With FoD, vehicle features are sold online using an Over the Air (OTA: a technology for adding/modifying automobile features using a wireless network) function, which enables customers to “add on” certain features even after they've purchased their vehicles. Further, customers can choose to pay the purchase price for each individual function “monthly”, “annually”, or “permanently”. By allowing a degree of freedom in the timing, combination, and pricing of these features, Audi has enabled its customers to customize services and features at any time according to their budgets and the types of fea-

tures they need. The features that can currently be purchased by FoD are certain infotainment features, high beam control, and the parking assist feature. Going forward, Audi is expected to expand the use of OTA updates for both its control and information systems, and there will conceivably be even more opportunities for FoD to be applied.

Whereas GM has been identifying its customers' needs based on customer data and regularly modifying the content of its plans in order to discover suitable pricing and packages, Audi has created a sales method that allows it to flexibly fit the needs of its customers in terms of their budgets and when to start service usage, and it has thereby found ways to avoid passing up opportunities to provide its services.

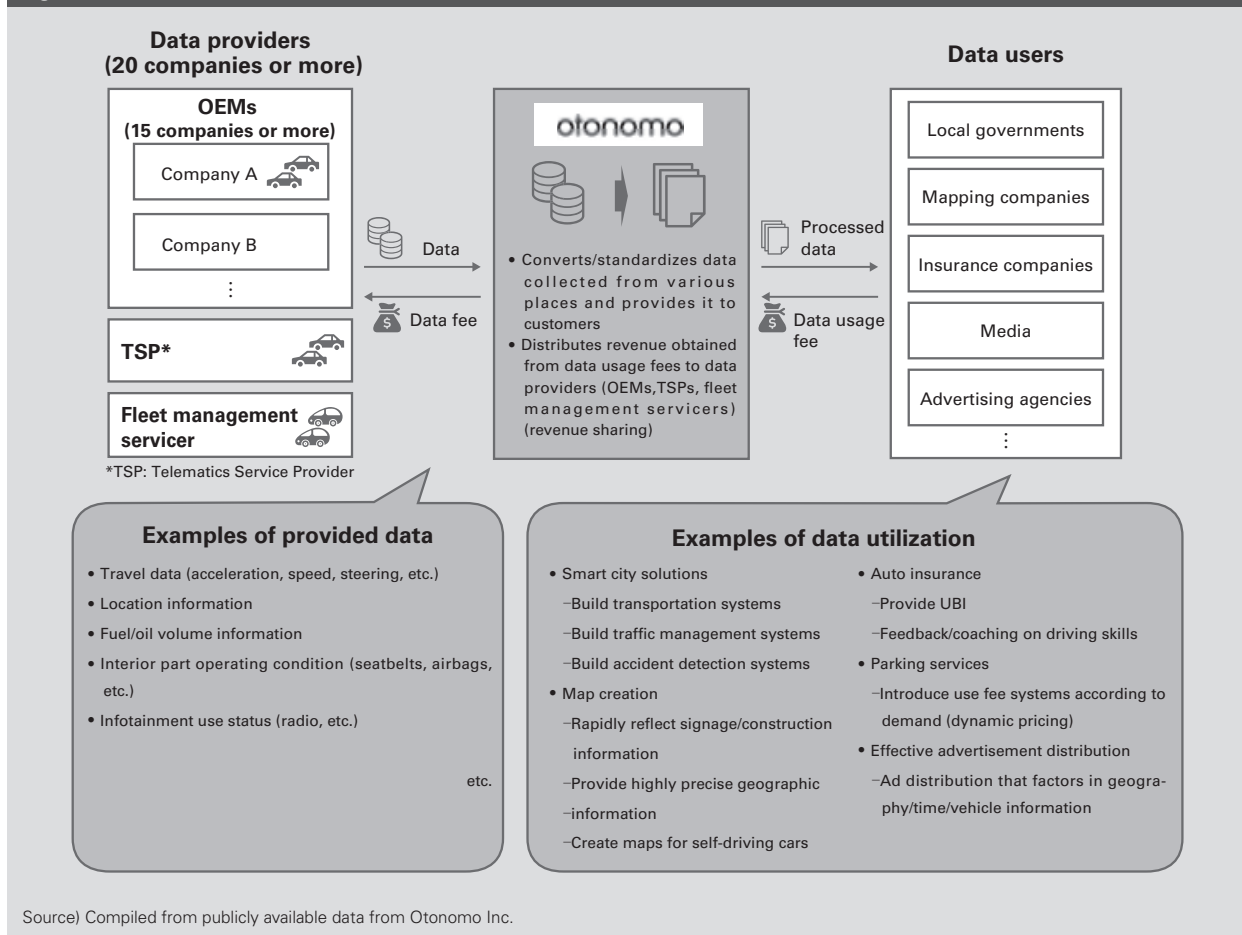
3. Creating New Businesses that Spread Beyond Industry Boundaries: Utilization of Automotive Data

As we described earlier, automakers have been adopting subscription formats in providing their connected services, applying their ingenuity to feature pricing and packaging. At the same time, they are also making efforts to raise their value through feature enhancements, and thus taking a trial-and-error approach to making this business more profitable. However, making TCUs with their communica-

tion functions and display audio devices serving as touchpoints be in-vehicle features will entail certain costs. And there is a growing possibility that with smartphone connections, some connected services will be switched from no-cost to low-cost. Many automakers are now focusing on developing and providing corporate-oriented services using the data that can be obtained from connected cars, in order to create new sources of profit for their connected business.

Among the data utilization services at companies, one initiative that has already been commercialized and has penetrated the market is the provision of travel data to non-life insurance companies. UBI (Usage Based Insurance), a system wherein auto insurance premiums are determined based on distance traveled and travel time etc., is being provided more broadly, most notably in the US, England, and Italy. Ever since UBI first appeared on the market, some non-life insurance companies have been calculating their premiums in consideration of their customers' travel data obtained using USB dongles or smartphones. However, the technical problem of low measurement accuracy has been a constraint on the growth of the UBI insurance market. Given that the spread of connected cars in recent years has made it possible to directly extract vehicle information such as CAN data from many cars, today's automakers are aiming to create rev-

Fig. 2: Otonomo's Business Model



enue by selling this data to non-life insurance companies. For instance, in Japan, Toyota has partnered with Aioi Nissay Dowa Insurance Company, and since 2018 it has been providing the nation's first-ever auto insurance that makes use of driving behavior data . More specifically, data pertaining to certain factors—namely distance traveled and driving speed, the frequency of sudden acceleration or braking, and steering stability—are looked at to determine whether a driver is driving safely, and safe drivers are rewarded with

reduced insurance premiums in recognition of their low risk. In addition to this, Japanese automakers like Nissan and Mitsubishi as well as Western manufacturers such as GM, Ford, Daimler, and BMW have been pushing for travel data to be utilized in the insurance field, and going forward it is possible that UBI could become more prevalent in places outside the West including Japan and the larger East Asian region.

Insurance companies are not the only ones to whom data from connected cars is

being provided. The Israeli startup Otonomo is a dedicated vehicle information platformer that obtains, manages, and sells data obtained from connected cars. Fig. 2 gives an overview of the company's business model. More specifically, Otonomo collects a wide range of information—including travel data, location information, and the use state of installed components such as seatbelts and airbags—from automakers, processes that information to make it readily usable for a specific purpose, and then sells it to municipalities, mapmaking firms, insurance companies, the media, advertising agencies, and other third parties. When this information is sold to a third party, Otonomo and the automaker will share the revenue, and thus they have created a win-win business model. A total of 20 companies or more (as of August 2019) including Daimler and other OEMs, telematics service providers, and fleet management servicers were providing information to Otonomo.

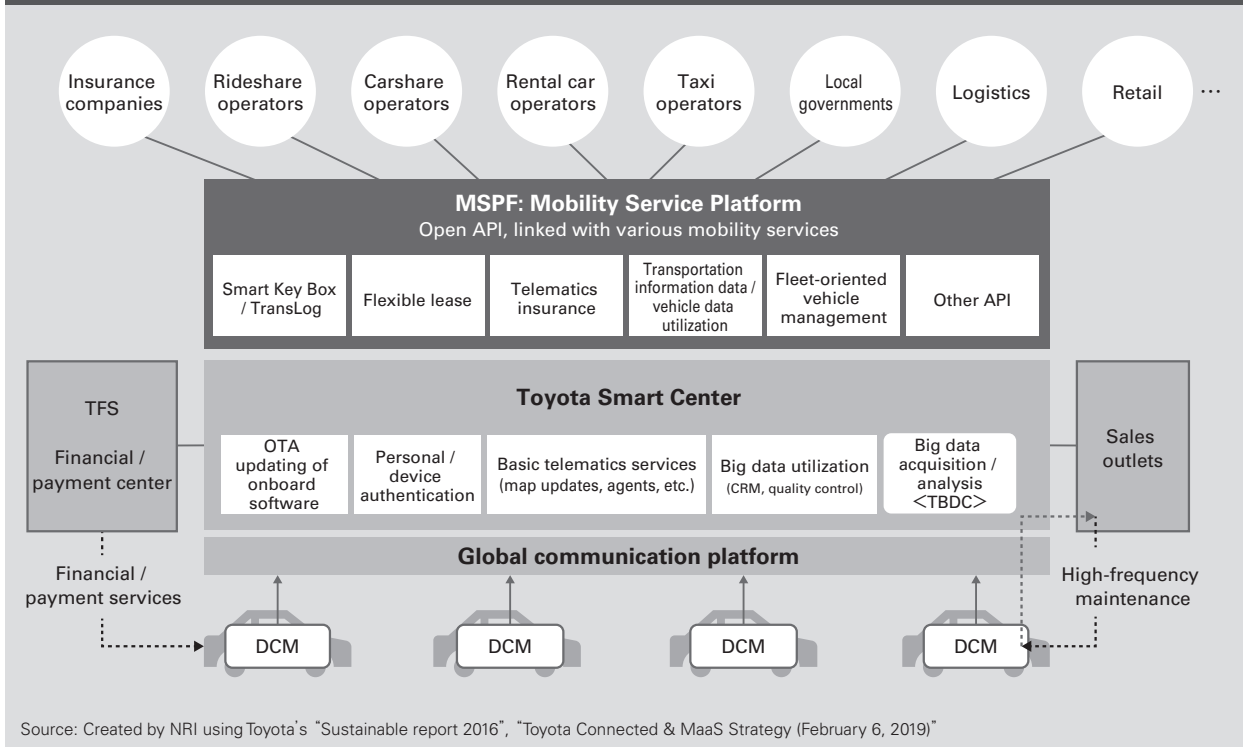
Further, another company that collects and even analyzes vehicle data called Wejo (in England) was being provided with vehicle information from 15 OEMs as of March 2019. This company gained notice in February 2019 when it received an investment from GM in the amount of \$25 million (by which GM acquired a 35% stake in Wejo). By entering into a strategic partnership with Wejo, GM will likely be

able to explore more effective methods of using the data obtained from GM Group vehicles.

It is worth noting that whereas the two companies mentioned above are selling vehicle data to external partners, Toyota Motor is engaged in producing its own data platform in-house. In 2016, Toyota came up with the concept of a Mobility Service Platform (MSPF). It has stated that it intends for all of its passenger vehicles sold in Japan, the US, and China to come standard with a Data Communication Module (DCM) by 2020. MSPF is a data platform for comprehensively managing the data obtained from connected cars, and the MSPF concept is regarded as the nucleus of the company's connected/MaaS strategy.

As shown in fig. 3, Toyota has said that in the future, the data aggregated by MSPF will be utilized in various settings, including by insurance companies and for rideshares, carshares, municipalities, logistics, and retail. In April 2020, the company announced that it had reached an agreement with NTT Data to engage in a capital tie-up for MSFP development and operation, and it could conceivably be aiming to realize and accelerate these activities even further.

Fig. 3: Toyota – Overview of MSPF



III. POINTS OF DISCUSSION REGARDING ACCELERATION OF SERVICE LAUNCHES/ COST CUTTING

1. The Increasing Development of Connected Services is Weighing on Automakers

From the viewpoint of making connected services more profitable, expanding service sales is a key point at issue, as described in the previous section. However, the question of how to rapidly develop appealing new services while also reducing the resources and costs to be invested will be another crucial point of debate. In

this section, we will outline the challenges that automakers are facing when it comes to connected services development (which differs significantly from traditional vehicle development), and the state of their efforts to address them.

The first such issue is accelerating their development speed. Up to now, automakers have typically proceeded by mass-producing vehicles and performing calibration development over increments of several years at a time before bringing them to market. However, with the pervasiveness of smartphones in our everyday lives, customers have come to see software services—such as feature improvements and additional new features delivered

through updates available every few weeks—as something to be taken for granted. Therefore, connected services also require the services to be developed and launched quickly, and demand that updates and new features be added very frequently as needed. The service development period is not over when the customer purchases a vehicle, and so automakers are having to rapidly reflect the various needs of their customers through feature enhancements and feature add-ons offered via software updates. Automakers thus have to apply a development cycle suited to the software service domain, and they will be compelled to boost their development speed even as their services become both more varied and more numerous.

The second issue is cutting the costs associated with the development and operation of connected services. As shown in Table 2, the main costs can be broadly categorized into the initial costs required for developing and launching services,

namely (1) development costs and (2) infrastructure building costs, and running costs needed for providing the services, such as (3) communications costs and (4) maintenance and operation costs/other costs.

(1) Development costs

This means the costs for developing connected services to be provided to customers and related on-board devices. Service development as the front end of the process constitutes a domain where automakers differentiate themselves. Accordingly, it is important for companies to look at things not only from the perspective of how they can carry out efficient development, but also from the standpoint of how they can shorten their development cycles and speed up their services launches, as cited in the first point above.

(2) Infrastructure building costs

Building system servers is a necessary

Development/operating costs categories	Challenges faced by OEMs	Examples of key initiatives
(1) Development costs	Making the development of connected services and of related on-board equipment more efficient	<ul style="list-style-type: none"> • Launching internal IT/software development organizations • Utilizing alliances with other companies
(2) Infrastructure costs	Economizing system and server costs for every region/brand	<ul style="list-style-type: none"> • Standardizing platforms within group / within partner companies
(3) Communications costs	Reducing the burden of communications costs from large-scale data communications	<ul style="list-style-type: none"> • Utilization of edge computing • Modification of fee design
(4) Maintenance costs/other	Setting areas not directly related to service competitiveness, reducing various types of costs	<ul style="list-style-type: none"> • Global resource sharing • Utilization of external SaaS services

part of infrastructure for providing customers with the services you have developed. Among automakers that have developed connected services for particular countries or regions or for particular brands, there are some that have created system servers on an individual basis. It is also vital to see this issue from the vantage point of achieving greater cost efficiency as the back-end aspect of the process.

(3) Communications costs

Once service development and infrastructure building have been completed, and customers begin to use the services, communications costs will arise roughly in proportion to the respective amounts of connected service usage. For services in particular that require the exchange of large volumes of data such as images or videos, it is conceivable that the costs to be borne will tend to go up. Automakers do not have much leeway for controlling these costs on their own, and they must find ways to cut costs through negotiations and cooperation with communications carriers.

(4) Maintenance and operation costs/other costs

The other major costs involved include system infrastructure maintenance and operation costs, costs for handling software bug fixes and feature updates, and

also things like call center operation costs which are essential in the service software domain, and advertising/promotional expenses.

2. Accelerating Development with a Focus on Launching Specialized Organizations and Making Alliances

I. VW: Aiming to shed its automaker skin and remake itself into a software company

With automakers everywhere discussing the first issue of accelerating development speed, one company that has pivoted in a big way toward producing its own connected services and related infrastructure in-house is Volkswagen (VW). In June 2019, VW established Car.Software as a new dedicated software organization, and announced that by 2025 it would raise the percentage of automobile-related software development done in-house from its current figure of less than 10% to 60% or higher. To achieve this goal, the company plans to have hired over 20,000 digital technology experts by the end of 2020 and more than 50,000 by 2025. This organization announced that it would be developing its own standard OS called “vw. os” equipped with the same basic features for the entire brand. In so doing, it will aim to unify the different systems having similar features (e.g. infotainment, navigation) that currently exist with the Group.

However, VW is also making use of alliances with outside partners as needed in pursuing this in-house development. The “Volkswagen Automotive Cloud”, VW’s cloud-based platform which was announced to be developed by Car.Software, will be powered by the “Azure” cloud service (from its strategic partner Microsoft) as its technological foundation. As is clear from the statement by VW CEO Herbert Diess that “We are transforming into a software-driven car company,” the service software domain will require different capabilities from those possessed by conventional automakers. VW’s policy—while relying principally on Car.Software—is to leverage alliances to rapidly gain the capabilities it currently lacks, and to accelerate its service launches and make development more efficient.

II. Alliances with newcomer IT giants/startups

The entry of IT giants whose main business lies in the software service domain is having a major impact on automakers. Google will be providing its “Google Automotive Service (GAS)” enabling the use of “Android Automotive OS”, Google Assistant, Google Play Store, and Google Maps. Table 3 shows the status of the alliances made in this domain by two IT giants which have been announced in recent years. Volvo announced that starting in 2020 it would be adopting Android Auto-

otive OS for its Polestar 2, which would be the industry’s first instance of Android Automotive OS/GAS as an onboard feature. Renault, Nissan, Mitsubishi, and GM also announced that beginning in 2021 they would be bringing Android Automotive OS to some of their vehicle models. Similarly, Amazon released “Alexa Auto SDK” in 2018, making it possible for its voice AI assistant “Alexa” to be incorporated in in-vehicle information devices. GM is also planning to introduce an automotive version of Alexa in the latter half of 2020.

The adoption of OS or AI assistants provided by such IT giants not only makes it possible for customers to experience in their vehicles the kinds of services they are already accustomed to using daily, but also greatly contributes to accelerating and improving efficiency of service launches for automakers. That said, however, for automakers there are also fears that the use of platforms provided by IT giants could constrain their ability to provide their own services, as well as concerns about the ownership of customer data, and it is assumed that these companies are having serious discussions about these topics.

In addition, we are seeing more and more startups on the scene boasting strengths in voice recognition or image recognition technology. For instance, in 2019, a spinoff from the Automotive De-

Table 3: Status of Major Alliances with Two Giant IT Companies in the Connected Field

Giant IT companies	Automakers	Alliance-related developments
Google	Volvo	<ul style="list-style-type: none"> • In 2017, announced alliance with Google in connected car technology development • Announced that starting in 2020, Polestar 2 would come equipped with Android Automotive OS
	Renault/Nissan/Mitsubishi	<ul style="list-style-type: none"> • In 2018, announced the signing of a technological alliance with Google, mainly consisting of adopting Android for onboard OS • Announced that starting in 2021, Android Automotive OS would be adopted for certain vehicle models
	GM	<ul style="list-style-type: none"> • Announced that starting in 2021, Android Automotive OS would be adopted for certain vehicle models
Amazon	GM	<ul style="list-style-type: none"> • Plans in 1H 2020 to adopt automotive version of Alexa for Chevrolet, Buick, GMC, and Cadillac

Source: Created by NRI based on news releases from Volvo, Renault/Nissan/Mitsubishi, and GM

partment of Nuance Communications called Cerence became involved in software development for next-gen automobiles using technologies such as voice recognition and line of sight/motion detection. Cerence has already partnered with multiple automakers including Toyota Motor, GM, Daimler, Audi, and has contributed to accelerating the development of their AI agents and other services. Meanwhile, one startup engaged in the development and operation of connected services making use of smartphones is Drivemode. Honda R&D, which had been conducting joint development with Drivemode since 2015, acquired the startup in 2019. This merits attention as a new trend for accelerating development by Honda R&D, which had never before engaged in M&A activities. These kinds of collaborations with startups entering the connected

services domain will be an important method for automakers to compete in the software services field.

3. Examples of Cost-Cutting Initiatives

With regard to the costs of developing and operating connected services, the second point of issue introduced here, companies are implementing a variety of initiatives to bring their costs down. When it comes to (1) the development costs for connected services, among the efforts to accelerate development centered on launching dedicated organizations and making alliances (largely introduced in the previous section), we can consider efficiency gains obtained through optimal resource allocation and utilization.

In an effort to cut (2) infrastructure construction costs for system servers etc., efforts are underway for building shared

platforms to be used among partner companies. . The Renault-Nissan-Mitsubishi alliance launched a service called “Alliance Intelligent Cloud”, which will function as a shared infrastructure for their connected services. The alliance’s aim in launching this cloud service is to allow data and services to be shared across regions and brands. Similarly, Subaru announced in 2019 that it would be sharing a connected car service platform with Toyota Motor in order to quickly rein in their next-gen technological development costs.

As discussed earlier, VW announced that its “Volkswagen Automotive Cloud” would be used in all VW Group vehicles. Christian Senger, the Member of the Board of Management of the Volkswagen Passenger Cars brand with responsibility for Digital Car & Services, has stated regarding this initiative that “We will develop software with uniform basic functions for all Group brands, which will allow us to drastically reduce complexity. In the medium term, we will benefit from the scale effects of our Group. This is especially meaningful in the software field and will lead to tremendous cost advantages”. It is conceivably possible that automakers will not only forge inter-company partnerships, but also consider optimizing their overall operations and reducing costs by sorting out the commonalities among the different domains, organizations, and businesses within their companies.

As for cutting (3) communications costs, we can see efforts being made to focus on the use of edge computing to perform data processing for vehicles, and to reduce the massive amount of data exchanged with the cloud. Toyota Motor created the “Automotive Edge Computing Consortium” in 2017 together with Intel and NTT. This consortium is now developing edge computing technology that will be necessary to distribute communications-related costs.

From the standpoint of reducing the communications costs borne by automakers, some companies are adopting policies for having their users pay some of the communications costs. With the “T-Connect Service” provided by Toyota Motor, there is something called the “T-Connect Standard/Entry Plan”, wherein the communications costs are borne by users who make use of their smartphones’ tethering or Wi-Fi functions. In addition, “Nissan-Connect” provided by Nissan employs NTT Docomo’s “Docomo in Car Connect”, with users being able to use Wi-Fi for a flat-rate charge upon signing a contract with NTT Docomo for that option.

Lastly, concerning (4) maintenance/operation costs and other costs, it will be important for companies to separate out the areas or operations that have little direct impact on the competitiveness of their services, and to continually look into improving efficiency by sharing resources

globally and leveraging SaaS services from outside sources.

IV. APPROACHES TO MAKING CONNECTED SERVICES PROFITABLE

In making connected services more profitable, the key is to strike a balance between raising per-customer spending and maintaining customer retention, while still fundamentally covering a variety of needs and providing appealing services. At the same time, it is also important to conduct development in a speedy and efficient manner to help achieve faster launches. Although we have yet to see examples where automakers have simultaneously fulfilled these needs and made their businesses more profitable, in terms of individual topics and challenges for the industry, we have presented some initiatives that arguably stand out as promising examples on their own. In closing, let us review the solution approaches to these different challenges, together with some considerations for their implementation.

1. Creating connected services that take root with vehicle users

We began this paper by summarizing the challenges involved in growing the sales of connected services which are mainly provided in a subscription format, and we have discussed some notable cases.

We have suggested that to maximize customer sales, automakers should offer multiple service packages and verify their customers' needs and pricing receptivity for individual services in the actual services, but even more importantly, they must also: (1) reflect those needs in new services and feature updates and regularly fine-tune their packages, enabling customers to purchase services or get updates as needed using OTA; and (2) provide services that allow customers to customize their features. Further, not only must services become more diversified and abundant, but they must also provide for a more seamless driving experience on the road, and thus produce an even better use environment. We must not forget that this last point is a vital prerequisite for achieving these two aims. Ensuring that the provision of subscription-based services subtly takes root in the minds of users as a "must-have" is directly linked to increasing service retention rate and maximizing sales.

We also wish to add finally that in order to establish users as paying members, it is important to consider (3) adopting original and unique service loyalty plans, which are strongly correlated with an automaker's brand, vehicle models, and assumed target usership. When it comes to the connected domain, we can expect that as cars become more "smartphone-oriented", the development of various services

will be carried out more quickly, ultimately making it more difficult with each passing year for automakers to set themselves apart. In addition to the viewpoints laid out in (1) and (2), we believe that by providing new opportunities for customer experience and satisfaction such as in (3), automakers can lock users in as paid members and thereby ensure that they continue to use these services in the medium- and long-term.

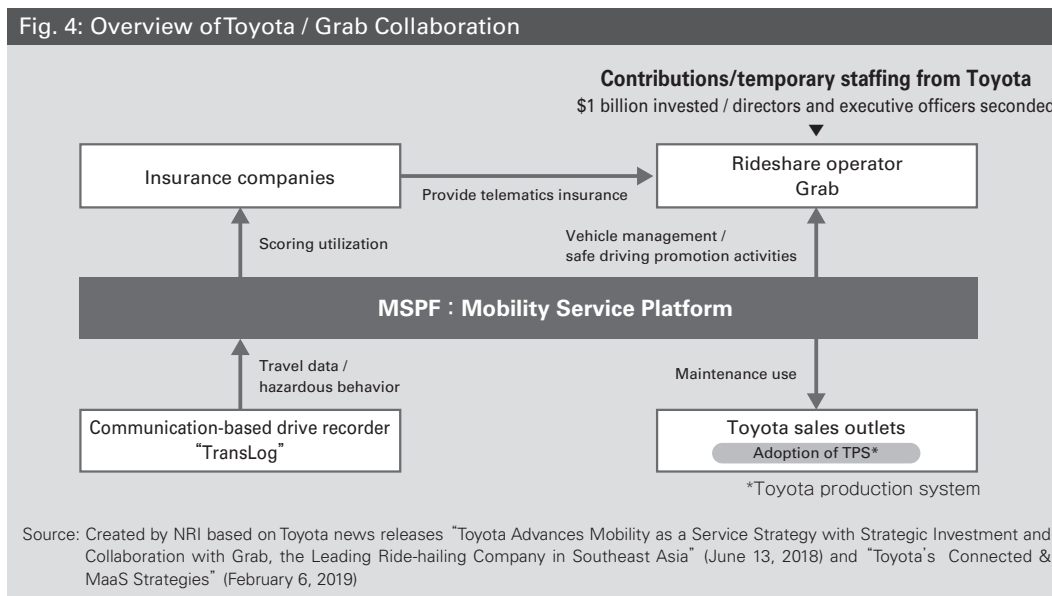
2. Evolving from a manufacturer to a service provider

It will also be important not only to enhance your services for end users, but to leverage the data you have obtained in the form of services that can be expanded to other businesses or provided to corporate customers, and thereby increase your profitability. As described earlier, this concept has already been put into motion via automotive data platformers and Toyota Motor's MSPF.

Of particular interest regarding Toyota Motor's activities is the fact that it is utilizing various alliances to secure data inflow and outflow at a rapid pace. In terms of data inflow, not only is Toyota making its own vehicle more connected, it is also allying itself with Mazda and Subaru as capital partners, and this should not be overlooked. For example, when Toyota strengthened its capital ties with Subaru last September, it mentioned the creation

of a shared service foundation for connected cars. For the moment we can expect that Toyota Motor is aiming to standardize the infrastructural elements involved, namely systems, servers, and call centers. Yet in the future, this could conceivably be expanded beyond Subaru to include vehicle user data possessed by various partners, or even service development alliances. And as for data outflow, as seen in fig. 3, Toyota Motor is aiming to actively leverage data not simply for the existing automotive industry, but also for the Maas (Mobility as a Service) domain in the form of ridesharing and carsharing, and even for other domains such as local government or retail. With ridesharing in particular, Toyota is making aggressive capital investments in leading third-party providers in various regions. The goals of its relationship and collaboration with the rideshare service provider Grab are illustrated in fig. 4. The objective here is not merely data provision, but to develop closer ties with the Group's surrounding ecosystem, by linking up with insurance services connected to MSPF, and by making maintenance at Toyota sales outlets more efficient. Further, Toyota Motor is aiming by the end of 2020 to have its vehicles account for 25% of Grab's rental cars in Southeast Asia, a move that is expected to lead to higher vehicle sales which are a pillar of its business. Thus, we believe that in the business utilization of

Fig. 4: Overview of Toyota / Grab Collaboration



data from connected cars, increasing profitability will depend not only on (1) increasing the volume of data acquired and widening the scope of service applicability, but also (2) looking more broadly at potential service partnerships and collaborations with data users and (3) building your own ecosystem within individual services.

With regard to (3) in particular, automakers must look beyond their own businesses and data utilization, and form close ties with the clients of their services. In addition to that, they also need to grasp what systems and data utilization methods are appropriate to their services, and have a detailed understanding of worksite operations. In businesses that rely on data utilization, companies should aim not simply to shift from being automakers to being merely data providers, but rather to

evolve into service providers that fully comprehend service management.

3. Building development systems and forging alliances for making cars more smartphone compatible

We also described how in addition to sales growth, it will be vital for automakers to aim to develop and launch connected services quickly while also reducing the resources and costs invested. When it comes to building a service development structure, there are presumably many aspects that all these companies are actively considering, but we believe that taking advantage of alliances is one essential element to this. VW did launch its own dedicated software development organization, yet even this much of an investment would surely be difficult for a company

that is not of a certain scale. VW has also announced plans to develop a proprietary OS and cloud service, but it has partnered with Microsoft to conduct joint development on the technological foundation. Some companies have very recently begun to stand out by announcing partnerships with IT giants such as Google and Amazon. The key to successfully accelerating your software development and launches lies in first identifying your particular service domains and the areas that an automaker must focus on, namely acquiring and accumulating customer data, and then (1) seeking out IT players and formulating alliance strategies that will enable you to pursue efficient development. And to achieve (1), negotiations with your collaborating partners will require you (2) to have an understanding of connected strategies and alliance strategies and assign organizations and personnel that can hold expert discussions. This is because it is not enough for automakers to simply take the initiative in negotiating with IT players as potential collaborators—the key is to conduct negotiations with a broader perspective and with overall optimization in mind. This is also a field where the number of developed services is anticipated to grow every year, and where technological innovations and the arrival of new IT players happen rapidly. This is not a matter of practically entrusting partnership negotiations to individual con-

nected development organizations or persons-in-charge. What is needed more than ever is a structure which—based on an awareness of connected/alliance strategies and future development plans—is suited to negotiating with IT players with a broad array of options.

Further, as automakers pursue initiatives toward building development structures that are tailored to their connected service launch speed, it is also essential to explore methods for cutting costs in order to effectively utilize limited resources. In particular, standardizing back-end systems, servers, and other infrastructure elements within a single company or within the group companies has become a conspicuous trend in the industry. Going forward, automakers will still need to strategically consider ways to balance accelerating their service launches with cost reductions.

4. Making connected services more profitable

As described above, we have shown that making your connected service more profitable requires persistent efforts to grow your sales, increase your development speed, and enhance your efficiency, among other things. However, every automaker has surely made some sort of efforts to address these challenges and find solutions, albeit with some differences in degree. We expect there must be more than a

few cases where a company's efforts have failed to produce good results because its internal structure for pursuing solutions to these challenges is deficient.

One aspect of the connected domain is that a variety of services and applications need to be planned, developed, and launched rapidly and frequently, and with smartphones in mind. Since the concrete development of services and apps will often be pursued in parallel with vehicle calibration development, we will see much more communication between connected services development and vehicle development. That said, we may expect gaps to emerge between the two areas, for instance in terms of expertise in these respective fields, or the assumed schedules or quality standards involved. The connected services business is also one in which fees are charged over the course of a use period beginning with the vehicle purchase, with updates and new feature additions being made subsequently. Business will not entail selling out inventory as it has up to now, and instead companies will collect money from their users over longer periods of time. Thus, we can assume that new considerations and adjustments will arise when it comes to setting appropriate targets and KPI, and even to building comprehensive sales strategies encompassing sales outlets, for instance.

Along with the attention being paid to the connected domain in recent years, we

have seen a conspicuous acceleration in the launching of dedicated connected organizations and business units, as well as in the recruitment of expert personnel in the system and software fields with a focus on inviting outside talent. In order to overcome the challenges discussed above, it will be important for these dedicated connected organizations, business units, and specialized personnel to demonstrate the leadership needed to properly involve people inside and outside the company. Beyond that, it will be crucial to take an integrated approach toward creating internal structures and setting KPI for smoothly pursuing in-house and external collaborations, and toward raising the awareness and expertise of relevant units and personnel.

Many of the passenger cars being sold in developed nations are already being transformed into connected cars, and going forward, we can expect this trend to accelerate even further in developing nations as well. A rise in the number of connected cars owned in various regions will lead in turn to more users of connected services. To put it another way, the connected services market is at a point where it has only just entered a growth phase. In order for companies to ensure reliable future profitability in a market with such growth potential, the key will be (based on reviews of past efforts) to continually implement and consider measures for

planning appealing services and for rapidly and efficiently developing and launching them.

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