

MaaS (Mobility-as-a-Service): The Nature of MaaS

WHITE PAPER

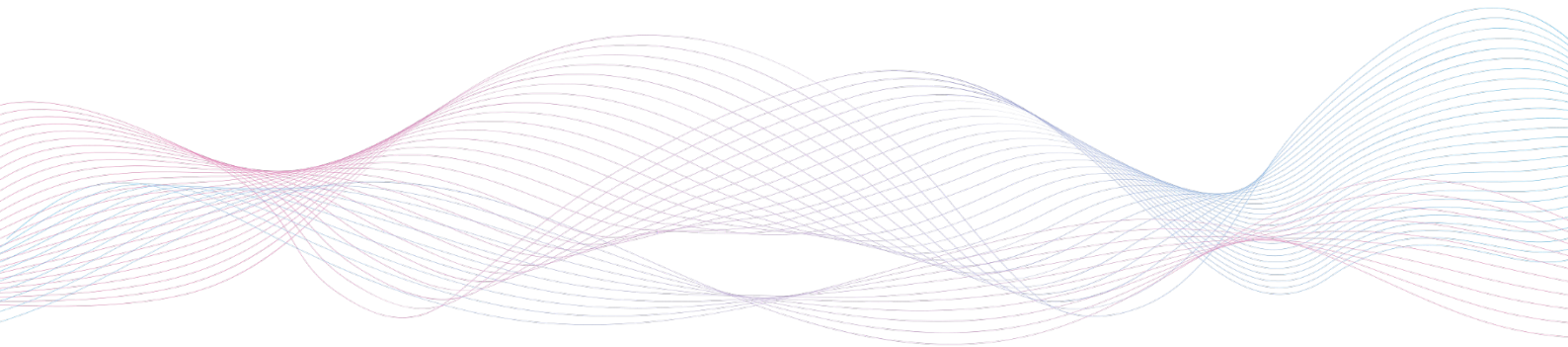


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Introduction: MaaS as a daily life

“One morning in 2030 ... May wants to go to her client directly today, so she wants to use her travel time as effectively as possible. While having breakfast, she opens the MaaS app on her smartphone, and makes a reservation with her ride hailing service. At 7:45 a.m., just before the car from the ride hailing service arrives in front of her house, she receives an arrival notice from her smartphone, and boards the car right at her front door. While in the car, she looks over reference materials for the meeting until it pulls up at the client's building, and she gets out of the car in front of the entrance. Since the fare payment is handled automatically, there's no need to fumble with cash. When the client meeting ends, it's noon exactly, and she decides to return to her company's office by bicycle to avoid the traffic congestion of the midday rush. She uses her MaaS app to request a ride hailing bicycle and finds the nearest one through GPS. On the way back to the office, she buys some street food, and has her meal in a public park. Riding a bicycle that's so easy to park is very low-stress. She parks the bike right in front of her office building and goes inside. Since it's a free-floating service, she can ride it and leave it wherever she wants. Having finished work at 6:00 p.m., May heads out for a dinner date with friends. It's at a restaurant that's some distance from the center of town, so she uses a car-sharing service. She opens her MaaS app to find available cars near her office. She uses an ID (digital key) sent to her smartphone to open and start the car, then departs for the restaurant. After enjoying delicious food and wine, she again opens her MaaS app and calls a taxi while paying the bill. After settling the bill and leaving the restaurant, the taxi is waiting outside, and she gets in and goes home. After arriving at home, she uses an MaaS app to book airline tickets for next week's business trip, as well as a taxi to the airport, then goes to sleep. All these reservations and payments can be handled by MaaS apps that combine mobility services including public transportation, ride hailing etc. under one platform which can be accessed via smartphone. This is how they support May's lifestyle with efficient, seamless transportation.”



Were you able to picture it? MaaS is made of transportation and shipment services that integrate information, reservations and payments in order to meet everyone's transport and shipping needs.¹ In effect, MaaS takes multiple “services” and provides them as a single “service”.² The day in May's life described above is one example that illustrates how MaaS

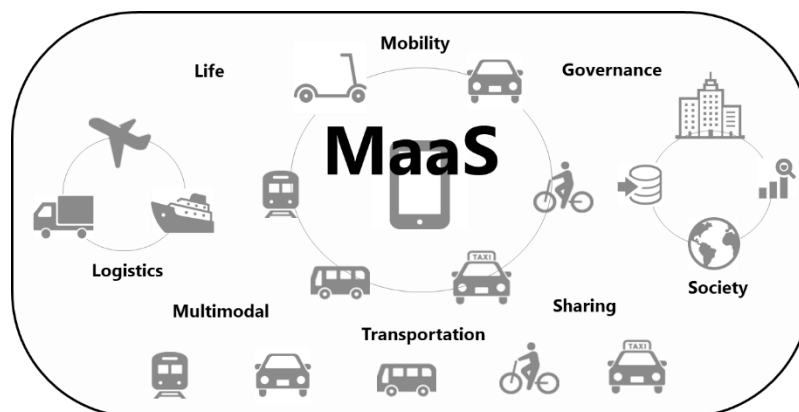
¹ Jana Sochor et al. (2017) “A Topological Approach to Mobility as a Service,” ICoMaaS 2017, from p. 190, (summary by ABeam Consulting).

² From Dec. 2018 TRANSUM panel discussion titled “The Revolution in Transportation and Mobility Services Originating in Japan: Taking on the MaaS Challenge,” Haruo Ishida, Prof. Emeritus, Tsukuba University

(Mobility as a Service) can affect people's movements and lifestyles. Up to now, people have been using trains, buses, taxis and bicycles as completely independent modes of transport. But when MaaS integrates these transportation services with information in one single app, it enables unified control over reservations and payments.

Expanding the scope of activities and experiences in which seamless mobility enables efficient use of time does more than make our lives more comfortable. The dispersal and streamlining of transportation methods is promising in terms of its potential to reduce CO₂ emissions, while assisting people stranded in remote regions and lacking mobility. And data on the movement of people and vehicles can be applied to traffic solutions such as relieving congestion. In addition, as a broad range of industries ranging from healthcare to long-term care and childcare along with the linkage between childcare and various commercial facilities, advances will be made in urban development and city planning.

MaaS is not only the simple connection of motor vehicles and railways, but also promoting last-mile³ solution like electric scooters. Moreover, connecting from human transportation connections to ships and airplanes. Obviously, transportation (distribution) of things are part of it [Illustration 1]. In cities including Los Angeles and Columbus in the United States and others, MaaS has been linked with municipal policies to promote these efforts.



[Illustration 1] A conceptual image of the MaaS world

This report includes considerations of MaaS trend including early development, distinctive characteristics, major players, case study and platform requirements. Furthermore, societal changes and essential preparation from this mobility service are also discussed in the paper.

³ The "last mile" here refers to the final leg in the trip of a person being transported or an item being distributed, from the point of departure from the last transport vehicle or distribution hub to the final destination.

Chapter 1: Facing the challenge of societal changes and issues brought by digitalization

◆ Social change

In September 2015, the United Nations published “Transforming Our World: 2030 Agenda for Sustainable Development.”⁴ Comprising of 17 sustainable development goals (SDGs), the agenda sets the elimination of economic disparities from the earth, including extreme poverty under the credo of “leaving no one behind”, as its goal. It advocates the crucial nature of the pursuit of economic, societal and environmental sustainability in resolving the problems and issues in all areas such as clothing, food and shelter, education, environment, healthcare, economy, etc. It is indispensable that not only emerging nations with poverty-stricken areas, but also newly developed nations and advanced industrial nations, all pull together to achieve these goals. The language and concept of SDGs began to serve as the guiding principles for these activities not just for the governments in each nation, but also for corporations, nonprofit organizations, schools and various other institutions.

In this way, the world has begun to make a conceptual shift toward seeking not just efficiency, but also sustainability and recycling economies. It is thus fair to say that we have entered into an era in which the coexistence of diverse value systems, expansion of choices, and the social uncertainty all require sustainability.

On top of this, digital technology has linked people together and brought on the utilization of vast volumes of data. According to the International Telecommunication Union (ITU), the Internet has been used by 51% of the world, and smartphone ownership rate, at 107%, has now exceeded one phone per person.⁵ Digital technology is more than merely a way to solve societal problems. Recognition of its role as a tool for the formation of new societies has risen from a merely a personal level to the national level. Thus, many countries have already pushed digital technology transformation into action, for example, Germany’s Industry 4.0, Japan Society 5.0, United States Industrial Internet, Digital Single Market in Europe, Estonia's e-Estonia, Made in China 2025, Thailand's Thailand 4.0 and Singapore's Smart Nation effort.

◆ The “customer-centric” shift from things to services

Until now, we have been surrounded by things of all manner and description. These have been developed by companies with a customer-centric focus. But the very meaning of “customer-centric” has already changed.

Let's look at the product development process to see how. Conventionally, product development has involved conducting market surveys at the product planning stage, then doing as much as possible to reflect customers’ thoughts and opinions in the design. It is prohibitively difficult, however, to incorporate 100% of customers’ thoughts and opinions in a product. So, the mainstream process consists of developing one that can satisfy as many people as possible. Given the impossibility of meeting all customer needs to perfect levels of satisfaction, companies have not sought to do so. Though they may have called it “customer-centric” product development, what they have done is to arrive at a compromise with the customer.

⁴ “Transforming Our World: 2030 Agenda for Sustainable Development,” published in September 2015 by the United Nations.

⁵ Excerpted from the International Telecommunication Union: “Global ICT Developments 2000-2018” (<https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>; last viewed on March 4, 2019).

Though it is fair to say that customers have been satisfied, it also seems true that the customer has been placed in a passive position.

The more recent developments of digitalization and pervasive smartphone use, however, have brought forth customer voices that have been hidden beneath the surface until now. The emergence of social networking services (SNS) like Twitter and Instagram have provided venues for the normalization of interactions in which a diverse population can critique things. Increasing numbers of people check reviews through SNS and elsewhere online when they make reservations at restaurants or hotels. And rating systems typically using numbers of stars have emerged. Other factors such as the evolution of IoT and the widespread use of service platforms have helped plunge us into an era in which customers who once had no choice but to be passive now make their own choices on things and services that are perfectly tailored to their needs.

Making one's own choices of things and services that are a 100% fit gives rise to consumer behavior that is different from that of a past characterized by the concept of normalized *ownership* of things. It is now possible instead to *use* the desired items when they are desired, in keeping with the circumstances of each individual lifestyle. It therefore becomes necessary to satisfy customers whose needs have shifted from *ownership* to *use*. This is the backdrop against which subscription services have come to prominence in recent years. It is likely that these services designed to satisfy customers whose needs have shifted from *ownership* to *use* will expand in the future, enabling consumers to, for example, listen to all the music they want when they want it, or to drive the car they want to drive when they want it.

In this way, the major movement that is being brought about worldwide by digital technology can do more than just contribute to solving societal problems. It has limitless potential in its application to achieving satisfaction among each individual customer. This wave of change has now begun to reach the field of mobility.

◆ **Society and mobility**

We see a variety of changes in mobility, including digitalization, the emergence of online platforms and the rise of subscription services. The creation of numerous services in the field of mobility has been particularly conspicuous in the past few years (Uber, DiDi, etc.). The term “Mobility as a Service” (MaaS) itself has come into common use, and these developments have attracted keen interest from industry, as well as the central government and local governments. Toyota and Odakyu Electric Railway Co. have announced business plans, the former for the e-Palette service, and the latter for MaaS services focusing on tourism and suburban needs. What, then, can be expected of MaaS?

One thing is the resolution of some of the issues confronting society. For instance, Japan faces an increasingly aged population and a problem with isolation in remote residential areas. Workforce and budgetary shortfalls have forced major cuts in public transportation service frequency, which has left many people with difficulties accessing the mobility they need to support day-to-day living. In areas such as these, mobility services using MaaS can increase the overall efficiency of service, bringing about major increases in the potential to create transportation opportunities. At the same time, it holds promise for solutions to problems inherent to cities, such as population growth, environmental issues (increasing CO₂ emissions), constant traffic congestion and noise, as well as chronic parking space shortages. Let's look at Finland, considered the birthplace of the concept of MaaS as a solution to traffic and urban issues.

◆ How Finland gave rise to MaaS

Situated in northern Europe, Finland has a population of 5.5 million. With 340,000 km² of territorial area, it is slightly smaller than Japan.⁶ National industries include traditional manufacturing of core products such as paper, pulp and lumber. But in recent years, Finland has also begun to focus efforts on the data communications industry. From the late 1990s through the 2000s, mobile phone company Nokia was a major driving factor behind Finnish economic growth. Finland has a rich natural environment, with forest covering 70% of its land area, and lakes another 10%. Since 1960, the number of motor vehicles has increased, reaching 3 million (passenger vehicles) in 2015, which has made growing CO₂ emissions an issue. The population is also aging. In 1990, 20% of the population was 60 or older, rising to 22% in 2017. The trend is expected to continue and ensuring mobility for elderly Finns has therefore become an issue.⁷

In an effort to resolve these issues, the government of Finland in 2009 announced two major policies: the “Long-Term Climate and Energy Policy,” a roadmap for environmental policies,⁸ and the intelligent transportation system (ITS) strategy “Finland’s Strategy for Intelligent Transport.”⁹ Aiming to achieve a sustainable society with low environmental impact, and to escape dependency on motor vehicles, they established the goal of realizing transport systems open to everyone [Illustration 2].

Environmental Policy Roadmap: Long-Term Climate and Energy Policy	
Outline	<ul style="list-style-type: none"> • Environmental roadmap through 2050 • Set the goal of reducing CO₂ emissions volume to 80% of 1990 level by 2050 • Mandate fulfillment of the (2015) Climate Change Act and monitoring of progress
ITS Strategy: Finland’s Strategy for Intelligent Transport	
Outline	<ul style="list-style-type: none"> • To maintain national health and prosperity, aim to achieve safe, secure day-to-day transportation and shipping for individuals, products and industry • Realization of a concrete intelligent transport system (ITS) to achieve environmental, societal and economic goals • Key categories: climate change, globalization, reduction in public investment through greater efficiency, technological development

[Illustration 2] The two policy efforts of the Finnish government

◆ Birth of the MaaS app ‘Whim’

Considering ITS to achieve environmental, societal and economic sustainability, the Finnish government implemented a wide range of mobility-related experimental trials involving collaboration between private industry, research institutions and local governments. Meanwhile, services using the Internet were promoted, resulting in availability of wide range of options on smartphones.

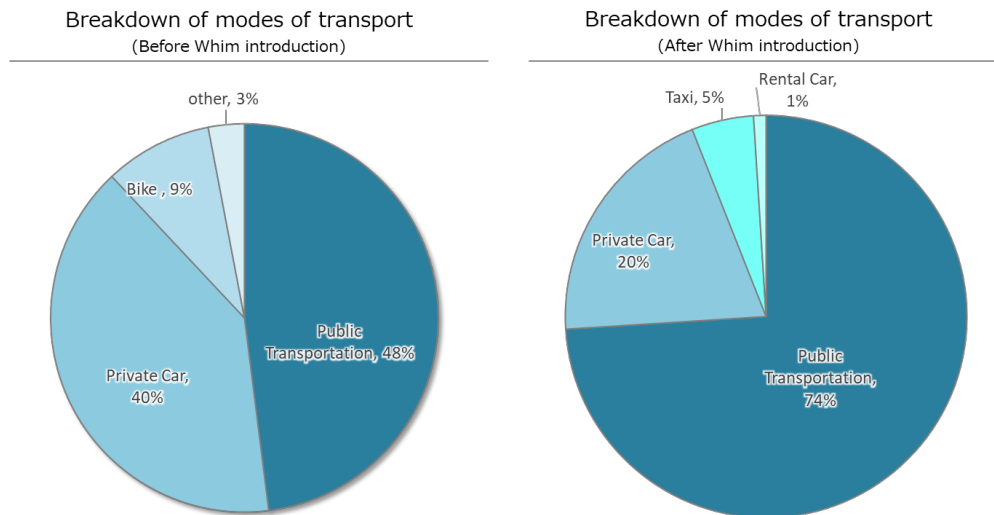
⁶Excerpted from: “Basic Data on Finland” (<https://www.mofa.go.jp/mofaj/area/finland/data.html>), Ministry of Foreign Affairs (most recently viewed on March 4, 2019).

⁷From a compilation by ABeam Consulting of content from a Dec. 2018 TRANSUM government lecture sponsored by Statistics Finland.

⁸From a summary by ABeam Consulting of a Finnish Ministry of Transport and Communications press release (<https://www.lvm.fi/en/home>).

⁹From a summary by ABeam Consulting of a Finnish Ministry of Transport and Communications press release (<https://www.lvm.fi/en/home>).

With technological advancements, the concept of MaaS was initiated in 2014 followed by the development of the “Whim” app in 2015 when services were offered in Helsinki (as described below). Whim greatly changes the conditional way of traveling. The statistic shows that passenger vehicle use has declined from 40% to 20%, while public transportation use has remarkably increased from 48% to 74%. This shows the dependency of commuters on various type of transportation [II [Illustration 3]].¹⁰



[Illustration 3] Changes in modes of transportation resulting from Whim use

All in all, MaaS holds great potential to solve the transportation problems that Japan and many countries are facing. However, from profit-driven business perspective, it is relatively clear that MaaS still far from turning a profit. For example, Uber and Lyft, which represent one kind of MaaS service, are not expected to be profitable in the near future. The CEO of MaaS Global explains the difficulties of its business model as: “MaaS is a secondary preference to vehicle ownership, and amid a diverse range of transportation modes available for use, it will not become profitable unless it is used in high volumes.” To understand why generating profit is very challenging, one must understand the current structure of MaaS.

¹⁰Compiled by ABeam Consulting from “Mobility as a Service-- The End of Car Ownership?” MaaS Global.

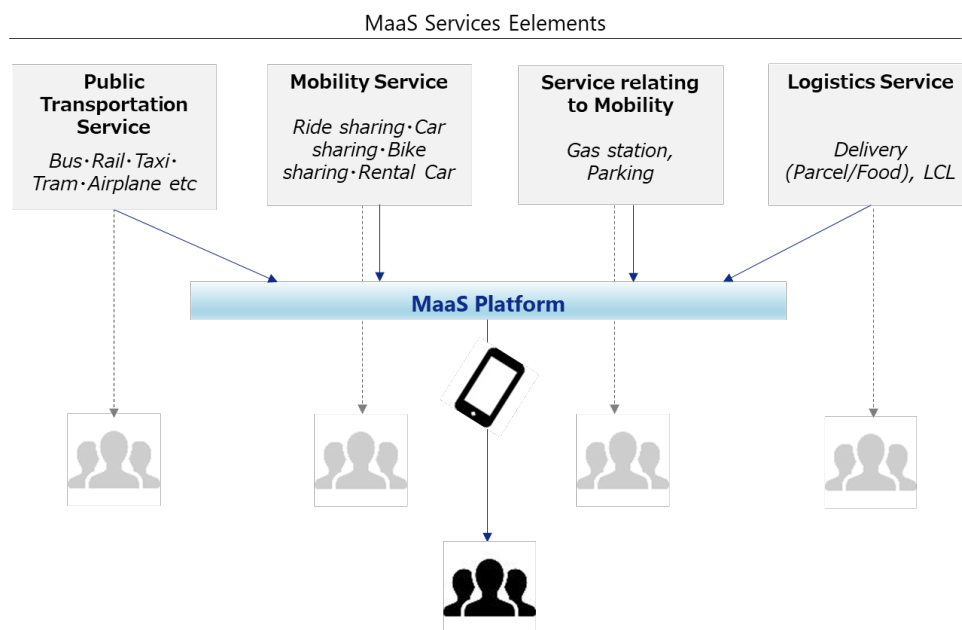
Chapter 2: MaaS

Recently, the word “MaaS” is becoming a trend and widespread in many contexts. This chapter discusses various aspects about MaaS, for example, elements of service, levels, players and structure. Concrete examples are also provided along with the explanation.

◆ Varied MaaS service elements

As mentioned in the introduction, MaaS includes not only transportation but also shipping services. Specifically, it includes long-standing public transportation services such as bus and taxi transport, as well as ride hailing and other newly created services. MaaS also connects other services relating to mobility such as parking and gasoline stations, as well as logistics services like door-to-door shipping and delivery [Illustration 4].

Previously, users use each service separately. What Whim did was to combine them all into one service made available on a MaaS platform.



[Illustration 4] A conceptual image of the MaaS world

With its pioneering presence as a MaaS service provider, Whim currently operates in four cities: Helsinki, Antwerp, Vienna and Birmingham. Through the Whim app, users can make transportation reservations and payments for combinations of public transport, taxis, car sharing and bicycle sharing. In addition to pay-as-you-go settlements, one of the distinctive characteristics of Whim is monthly subscription offering. [Illustration 5].¹¹

¹¹Compiled by ABeam Consulting from the Whim website.

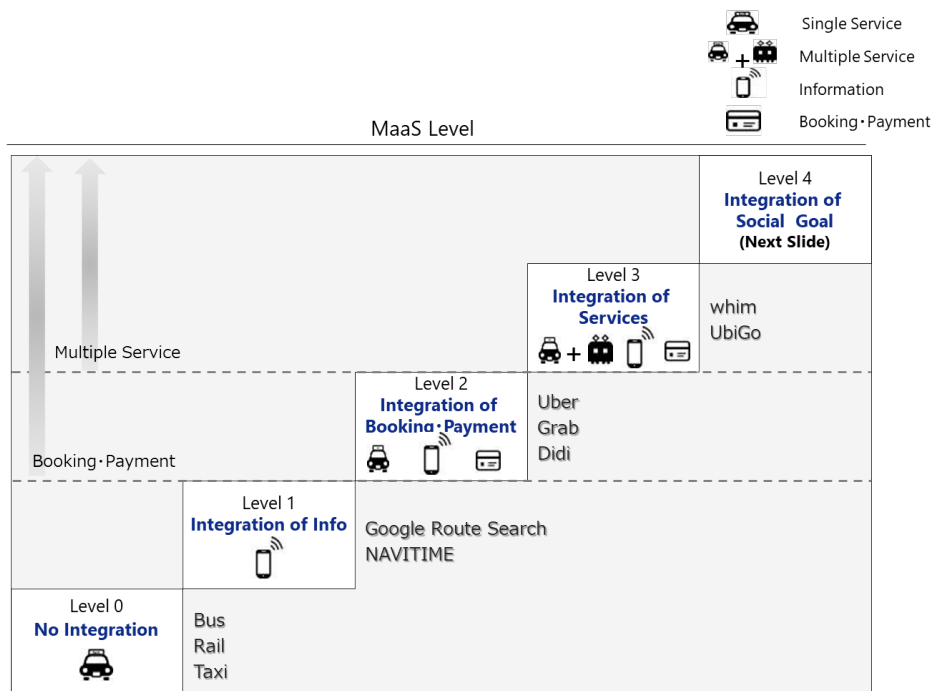
MaaS Level 0: No integration. This level refers to so-called conventional, individual transportation and mobility services like trains, buses and other services in which the passenger purchases a ticket for each mode of transport before boarding. MaaS Level 1: Information integration. This level refers to services in which information has been integrated. An example would be a Google Maps search, in which information from multiple transportation services is provided in a unified presentation. MaaS Level 2 and higher involve the integration of reservations and payments. At MaaS Level 2, a brand such as Uber or Grab provides one unified mobility service that incorporates not just directions information, but also reservation booking and payment settlement. At MaaS Level 3, the integration of services extends across multiple mobility services, providing an integrated set of directions, reservation and payment services. The current operation of Whim is under MaaS Level 3 which is the expanding level of many services.

Three packages				Package Detail	Whim to Go	Whim Urban	Whim Unlimited
Package Type	Monthly Fee	Mobility Frequency	Feature	Public Transportation	Pay Each Time	Unlimited	Unlimited
Whim to Go	0 € Each time	rare	Pay each time	Taxi Ride (within 5km)		10€ per ride	
Whim Urban	49 €	Normal	Limitation *Taxi within 5km	Rental Car		49€ per day	
Whim Unlimited	499 €	Frequent	w/o Limitation *Taxi within 5km	City Bike	N/A	Unlimited	
				On Demand	✓	✓	✓
				Cancel Anytime	✓	✓	✓

[Illustration 5] Whim service

◆ The 5 levels of MaaS

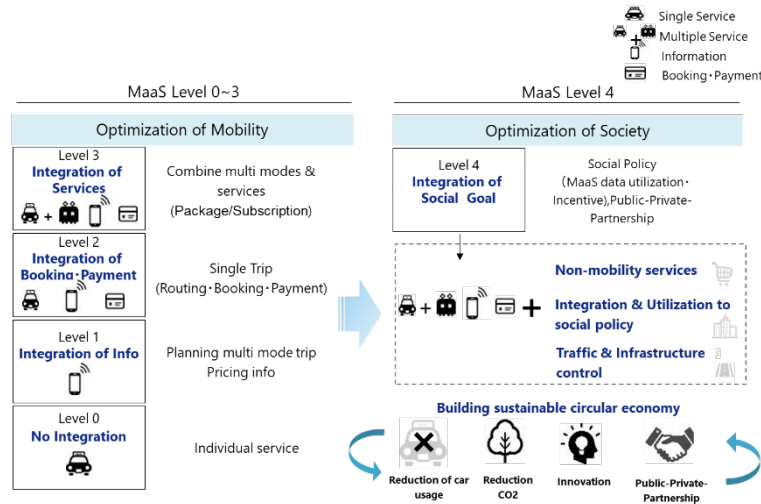
MaaS can be classified into five levels, from MaaS Level 0 to MaaS Level 4 [Illustration 6].¹²



[Illustration 6] Levels of MaaS

¹² Jana Sochor et al. (2017) "A Topological Approach to Mobility as a Service," ICoMaaS 2017, from pp. 187-208, (summary by ABeam Consulting).

At MaaS Level 4, consideration is given to harmonization of mobility services, and to overall societal optimization [Illustration 7].

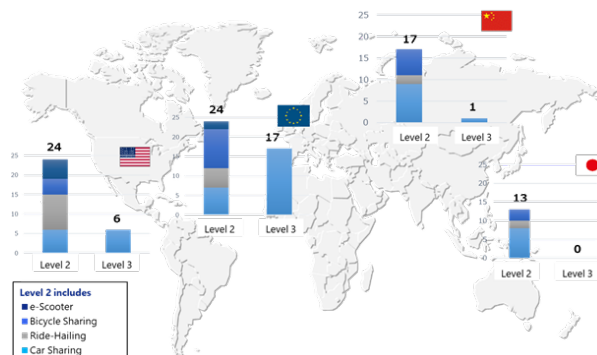


[Illustration 7] Societal optimization at MaaS Level 4

Specifically, in order to solve urban traffic jams and the lack of parking spaces, traffic congestion and the flow of people and things are controlled through MaaS. Furthermore, providing modes of transportation on demand in remote areas reduces the numbers of vehicles on the road. It may also ensure the efficiency of transportation methods used in remote areas. This pursuit of harmonization and optimization in an arena as broad as an entire society represents a profound contribution to the concept of the Smart City¹³.

◆ **MaaS players are increasing in number worldwide**

How many MaaS service providers exist in the market today? A look at MaaS Levels 2 and below show that as of January 2019, there were more than 100 MaaS service providers in Europe, the United States, China and Japan¹⁴. [Illustration 8].



[Illustration 8] The increase in MaaS service providers

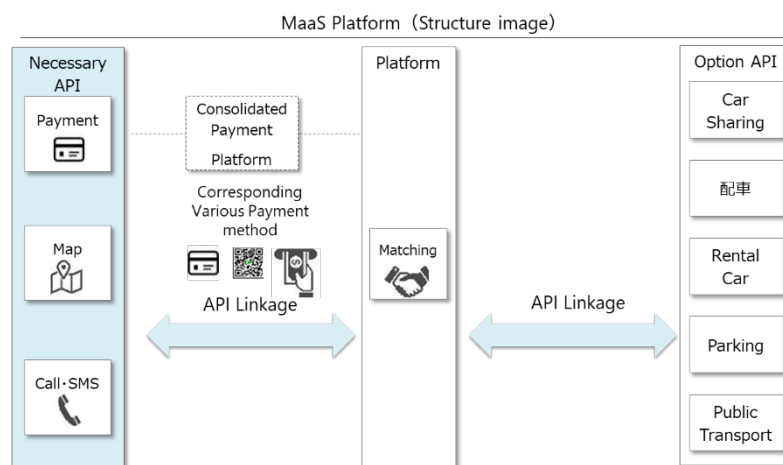
¹³No global definition but Ministry of Land, Infrastructure, Transport and Tourism in Japan defined “Smart City is a sustainable city by utilizing ICT and managed by new technologies.” (Report issued on Aug 2018 “Toward realization of Smart City”)

¹⁴From a Jan. 2019 study by Abeam Consulting, Covering Level 2 and 3 MaaS players in Europe, the United States, China and Japan. (Note: MaaS Level 2 industry players include those providing car sharing, ride hailing, bicycle sharing and e-scooter services)

As a worldwide trend, individual services that differ from each other are expanding, providing car sharing, ride hailing, bicycle sharing and e-scooter services. The simplicity of the MaaS platform structure is one of the factors behind the expansion of MaaS services.

◆ **The simple structure of the MaaS platform**

One of the reasons that MaaS providers are increasing rapidly is that the MaaS platform structure is technologically simple, with a platform-on-platform structure [Illustration 9].



[Illustration 9] MaaS platform structure (conceptual image)

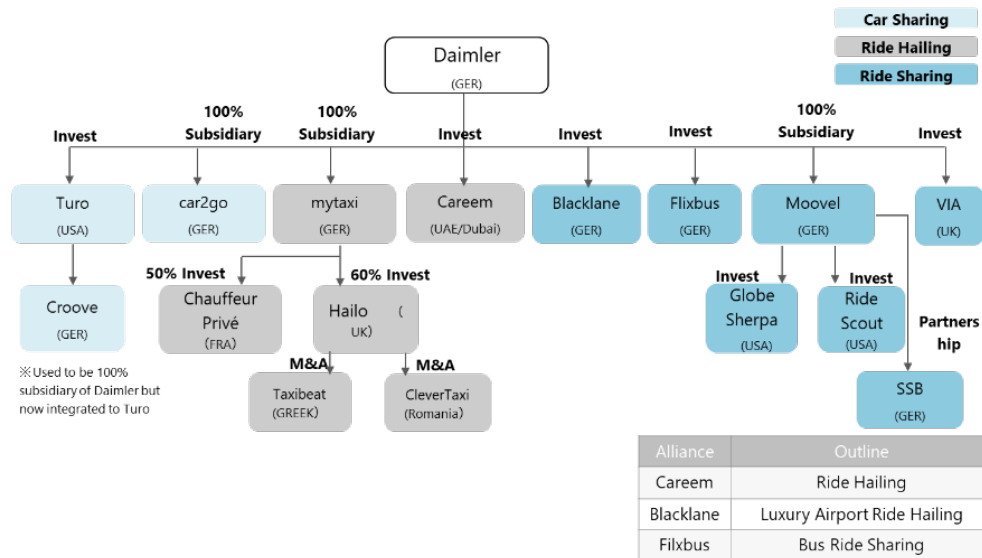
Uber is a good example of a MaaS Level 2 ride hailing service. The Uber platform was developed solely for customer and driver matching. Payments, location tracking and communication like SMS and calls are handled by links to existing applications (API). In cases where the aim is to offer multiple mobility services at MaaS Level 3, the service lineup can be expanded by linking together each mobility service, transportation company and application (API). Of course, in order to link up the systems, it is necessary for each service provider to make arrangements so that the platform itself can have a simple structure.

◆ **Moovel, which built a foundation for mobility services early on**

A look at MaaS Level 3 service providers makes clear the differences in degree of regional coverage. Their numbers are greatest in Europe, followed by the United States. In Japan and China, they cannot be said to have penetrated the market. Here we'll introduce the example of Moovel,¹⁵ which formed partnerships with local governments and service providers from early on, expanding its business from MaaS Level 2 to MaaS Level 3.

¹⁵Moovel is a MaaS service provider capitalized 100% by Daimler.

Moovel is a MaaS subsidiary of Daimler that currently provides services in some cities in Germany and the United States. But it did not aim to be a MaaS service provider from the outset. Daimler, which purchased it in 2016, has been engaged in the acquisition and integration of mobility service start-ups and service providers [Illustration 10].¹⁶



[Illustration 10] Mobility service M&A by Daimler

Moovel has also made progress in forming partnerships with local government administrations. In the U.S. city of Los Angeles, they provide the MaaS service FlexLA, known as SSB Flex in Stuttgart, Germany, and are strengthening ties with local public transportation authorities. In addition, they offer public transportation discounts within the MaaS service corresponding to degrees of atmospheric pollution, which helps provide a solution to the issue of urban air pollution. In this way, MaaS can function to provide services not just from an individual company, but in the context of an ecosystem that connects multiple companies and local governments, thereby helping to achieve the original goal of resolving issues that society faces.

◆ **MaaS service providers selected by local governments**

Numerous MaaS service providers will be entering the market in near future. In addition, a price war will inevitably occur among various players which may lead to quality reduction. Furthermore, ride hailing industry has been subject to frequent incidents of murder and sexual crimes.¹⁷ In the United States, China and elsewhere, this has brought tremendous attention to government, resulting in measures such as setting up regulations on eligibility requirements on ride hailing drivers.

In order for MaaS to become more appealing in both urban and city area, price is one of the crucial factor. Apply to various mode of transportation, price should be set in an accessible range.

¹⁶From an ABeam study produced in January 2019. From a study compiled by ABeam Consulting from company websites and news reports.

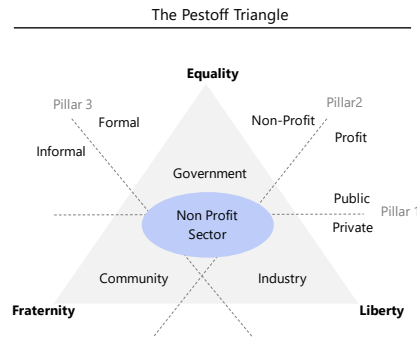
¹⁷From a study compiled by ABeam Consulting from various news reports.

To approach MaaS Level 4, government must step in to collaborate with MaaS providers in terms of regulations, policy and other support.

Column: MaaS and the nonprofit sector (NPS)-- are their roles similar?

What sort of image is evoked when the non-profit sector (NPS) is mentioned? The NPS sphere includes organizations that are an integral part of our day-to-day lives, such as schools, hospitals, long-term care facility operators, incorporated foundations and corporations, educational foundations, etc. Here we will introduce the Pestoff Triangle, a scheme defined in 1995 by Swedish scholar of policy and economics Victor A. Pestoff.

Pestoff classified the organization of societies into three categories: government, industry and the community. While organizations form government-industry, industry-community and other interorganizational partnerships as part of their day-to-day activities, there is a black space at the center of the triangle in which these types of organizations do not interact. The NPS is located in this blank space, defined as consisting of organizations that complement the insufficiencies and drawbacks of the three organization types in the field of coordination and cooperation.



When MaaS is considered in this context, it seems fair to say that the demands placed upon MaaS are similar to those placed on the NPS. MaaS fulfills the role of a link amongst local administrative bodies (government), mobility services (industry) and people (the community). It requires systems that are not solely profit-seeking, and which exert an influence on people and society with a scope that encompasses all, without regard to divisions between young and old, male and female, rich and poor, etc. In Finland, in fact, the point of departure for the emergence of MaaS included environmental problems (CO₂ reduction), traffic congestion and parking problems, so that it is anticipated to serve not just as a way of improving societal efficiency, but also as an advance in urban development and city planning.

The NPS generates a certain level of revenue. In the United States, it is about 5% of GDP, making it one of the industrial sectors that supports the U.S. economy. It is surprising to note that the average growth rate of the NPS-related portion of GDP in the United States is greater than the overall GDP growth rate. A breakdown of NPS-related GDP in the United States shows that 60% is in the medical/healthcare field, followed in proportion by education and research at 20%. Thus, the NPS supports fields that are critical to sustaining our lifestyles. The first letter in “MaaS” stands for “mobility”, which is essential to our lives and to expanding economic markets. It could be said that MaaS, like the NPS, is a field that cannot be sustained solely by seeking profit. MaaS service providers are required to serve mutually complementary roles in concert with all kinds of organizations in fields of coordination and cooperation.

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Chapter 3: MaaS--Resolving Social Issues Over Generating Profit

As noted up to this point, MaaS represents one measure for resolving social issues. It also forms a component of social infrastructure by playing an extremely critical role from the standpoint of forming sustainable societies with sustainable businesses. At this point, we would like to introduce three concrete examples illustrating how MaaS serves sustainable societies.

[Example 1] Daimler subsidiary Moovel works with the FASTLinkDTLA¹⁸ public transportation system in Los Angeles to initiate the FlexLA¹⁹ ride sharing trial

Moovel North America began as a ride sharing experimental trial in October 2018 with FASTLinkDTLA, a public transportation organization in Los Angeles. The service is concentrated in the evening hours, when the convenience of public transportation deteriorates. Users can access ride sharing through an app called “FlexLA”. The unique aspect of this ride sharing service is that it is provided its fixed rate is affordable by everyone. Wheelchair-accessible vehicles are also available, enabling the service to serve everyone in keeping with the overall MaaS concept. In adaptation to characteristics of the local community, the service is available in both English and Spanish. Providing mobility support services that are adapted in this way to local characteristics and standards of living will likely make a major contribution to the sustainability of the city.

[Example 2] In the U.S. city of Columbus, pregnant women can book hospital visit and ride hailing reservations²⁰ through an experimental²¹ service

From June through November 2019, the U.S. city of Columbus plans to provide ride hailing services for trips to the hospital to 500 women living in the city area with the highest infant mortality rate. The city is undertaking an effort called Smart Columbus to establish itself as a “Smart City.” The effort includes improvements in transportation systems aimed at enhancing healthcare and social welfare services for low-income residents, and at reducing economic disparities. Goals of the project include a 40% reduction in infant mortality by 2020, and a reduction in disparities in health. Columbus won the Smart City Challenge, a competition begun in 2015.

Columbus has unified its database from previous examination visits by pregnant women with that for shuttle rides to hospitals, enabling users to book medical exams and transportation using a single app. However, in response to complaints from some users that shuttle service was inconvenient, they are now planning to improve it by linking to Uber to provide mobility service through an experimental trial. This effort to reduce the infant mortality rate by connecting mobility and

¹⁸A non-profit transportation management organization, FASTLinkDTLA works to resolve transportation issues in downtown Los Angeles.

¹⁹ Compiled by ABeam Consulting from a Daimler press release.

²⁰Ride hailing is a private service, rather than Ride sharing service.

²¹Compiled by ABeam Consulting from “Smart City Challenge” by the city of Columbus, and various news reports.

healthcare to provide access to appropriate healthcare at the appropriate time is a true example of surpassing MaaS Level 3 with services that qualify it as Level 4. It is an excellent example of progress toward becoming a Smart City.

[Example 3] San Francisco's Car Free Living Program: housing with MaaS included²²

Located in San Francisco, Parkmerced LLC has introduced a MaaS subscription function to its rental homes. Residents are awarded \$100 in points, which can be applied toward the Uber Pool ride hailing service in combination with a public transportation IC card pass. Since Uber Pool is provided for a fixed monthly fee, it provides the benefit of lower cost compared to single time fee of ride hailing.

In addition to facing severe traffic congestion, lack of parking spaces and CO₂ emissions, San Francisco is also challenged by other societal issues, such as the high cost of living in the city, where average monthly residential rent is \$3,710,²³ and a heavy cost burden associated with vehicle ownership. The case of Parkmerced presents one example of sustainable community-building that is friendly both to residents and to society at large.

As the examples above show, services such as healthcare, housing and real estate in combination with MaaS, have the potential to promote the sustainable society. MaaS transcends the boundaries of mobility and shipping services and has the power to lead our lives and communities toward sustainability.

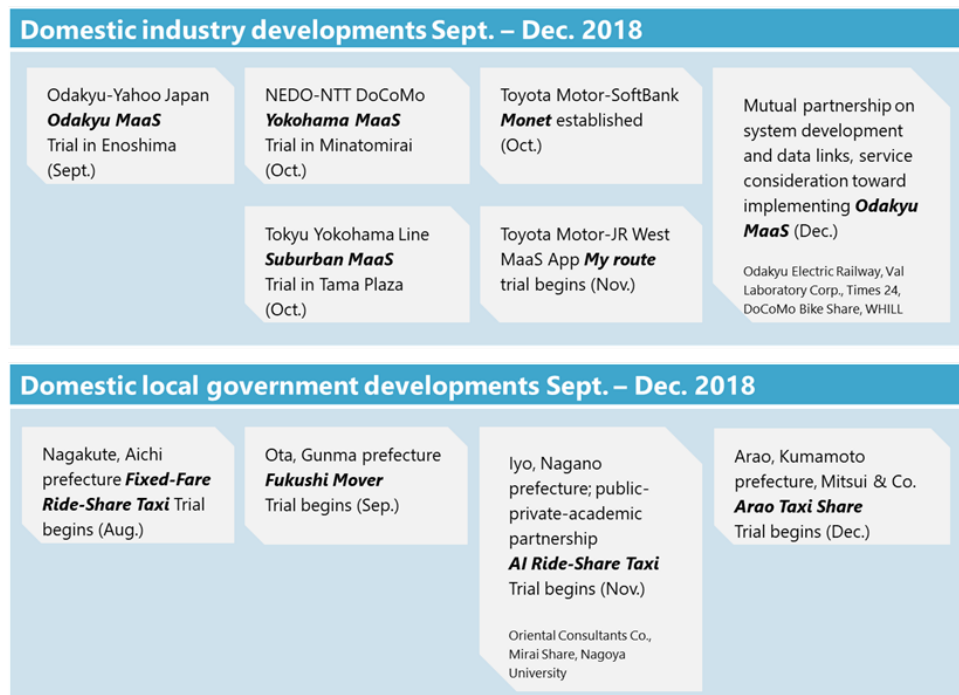
²²Compiled by ABeam Consulting from the Parkmerced website (<https://www.parkmerced.com/>).

²³Walletwyse LLC: "Global Rent Visualization 2019" (<https://www.walletwyse.com/>; last viewed on March 5, 2019).

Chapter 4: Changes and trends in the automotive industry

In Chapter 3, we noted that the contributions from MaaS service providers to society, and the impacts they exert, are greater than their profitability. However, revenue stream and business model enabling is essential to make them sustainable as services. Recently in Japan, the term “MaaS” has appeared scattered across the business plans of various companies. The trend began at CES²⁴ in the United States in January 2018, when Toyota announced its e-Palette concept.²⁵ The following summer, Odakyu Electric Railway Co. launched its tourism-oriented MaaS offering, Toyota partnered with SoftBank, and experimental service trials were carried out with various local governments. These developments were part of an overall trend toward a more active approach to MaaS implementation. [Illustration 11].

The trend is exemplified by many entries from companies other than automotive industry, such as railways, telecommunications providers and general trading firms. In this chapter, we will examine the changes occurring in the automotive industry, which has served as the foundation for the full-fledged formation of the MaaS world, and we also turn our attention to the trends that involve other industries.



[Illustration 11] One example of the most recent trend in Japan

²⁴The Consumer Electronics Show, an annual electronics device exhibition held every January in the United States.

²⁵Toyota announced that it is strengthening its mobility services with the e-Palette Concept MaaS using next-generation powertrain.

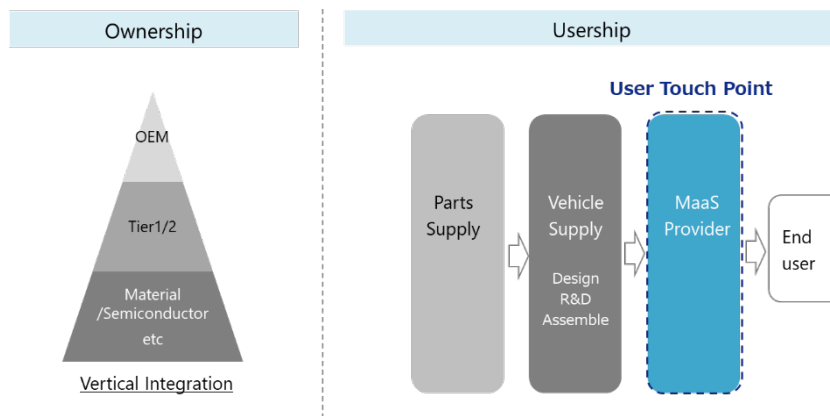
◆ **Changes occurring in the Automotive industry**

The automotive industry is currently facing four kinds of change at a level for which each may occur only once in a century: electrified powertrain, autonomous vehicle, “connected-car” functionality, and sharing services. Electrified powertrains help resolve environmental problems (cutting CO₂ emissions), autonomous vehicle improves safety, and the implementation of IoT enables cars to be connected with their external surroundings (other vehicles, infrastructure, businesses). This not only improves safety, but also provides services like subscriptions and insurance that meet vehicle users’ needs. In addition, if the emergence of sharing services can bring about the pervasive availability of MaaS that integrate all kinds of mobility services, then it can be expected to result in major changes not just to forms of vehicle ownership but to the very structure of the automotive industry.

◆ **Changes in the structure of the automotive industry: From ownership to sharing, from things to services**

To begin with, vehicles will be classified into those that are owned and those that are shared. It is likely that premium brands will remain as “owned cars,” while mass-produced brands will come to be regarded as “utility cars.” This trend is already under way, with subscription service car models forming a stable foundation for business, while in the United States and Europe, large, luxury-class pickup truck and SUV models have made major inroads into the Top 10 sales rankings of new vehicles.

As MaaS becomes more pervasive, MaaS service providers will become the closest contact point to the customer, which could bring major changes to the conventional engine vehicle industry pyramid structure and value chain. Up until now, this pyramid has feature finished vehicle manufacturers at the top, followed down the pyramid structure by Tier 1 suppliers, parts and materials manufacturers and retail dealerships, then insurers, parts distributors and repair services. Now, however, the likelihood is that a linear structure will emerge with the MaaS platform providers that create the services dominating [Illustration 12], while other positions occupied by MaaS service providers, vehicle manufacturers and engineering firms developing and supplying the vehicles, and vehicle parts and materials manufacturers, in a supply role.



[Illustration 12] A conceptual image of changes in automotive industry structure

Since shared vehicles are specialized for mobility, the functions, specifications and design characteristics required of them are simpler than and different from those of owned vehicles. Recently, Finnish automotive technology company Sensible 4 and Japanese retailer Muji announced their development of a completely autonomous ride sharing bus. This can be seen as a sign indicating the structural changes afoot in the automotive industry.

◆ **A stable business foundation through the subscription service model**

We also must not forget about the rapid expansion in the subscription services touched on in Chapter 1. Subscription services are those that are made available for a fixed monthly fee. They are undergoing rapid expansion in domains such as communications and entertainment. Some examples include Netflix, Hulu and other video distribution services, as well as wi-fi user packages. Recently, online English-language conversation learning services include all-you-can-speak availability for fixed subscription fees.

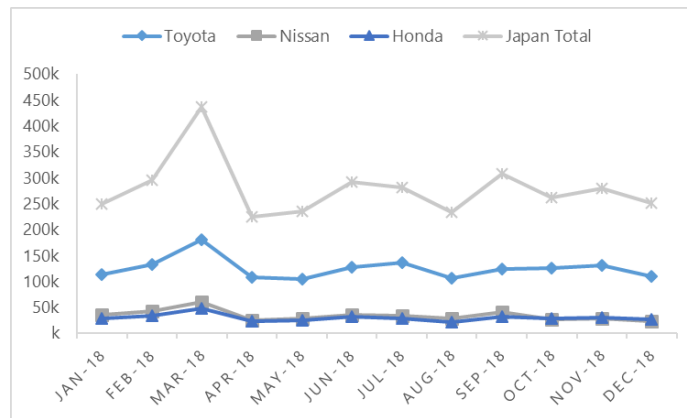
These subscription services have even spread to vehicle sales, where they are particularly active in Europe and the United States. Subscription services for Porsche and other luxury brands have begun in certain areas, and since 2018, more vehicle manufacturers have entered the business in an effort to catch up. Subscription services on offer include Ford's Canvas and Jeep Wave by Jeep. Start-up firms have also given rise to a succession of subscription services.

Like leasing, subscription services include peripherals like insurance and maintenance, but the most distinctive characteristic that they offer is the ability to change cars. Since users can select their desired cars based on means and personal disposition which yield a great deal of customer satisfaction. (There are, however, subscription models that do not allow for frequent vehicle switching.)

What value, then, do subscription services bring to the companies that offer them? They help build a business foundation through stable, regular revenue. Let's look at the example of the business vehicle manufacturers are in.

To begin with, the business model consists of manufacturing and selling vehicles involves an element of instability. Sales can fluctuate with the seasons, and with the popularity or unpopularity of the models introduced. Let's look at actual domestic sales figures for Japan²⁶ [Illustration 13]. This data shows new vehicle sales volume in 2018. There is a general tendency for the number of vehicles to increase in the March and September end-of-term months. The trend is particularly marked in March, the last month of Japan's fiscal year, when all vehicle makers show increases. A total of about 450,000 new vehicles were sold in Japan in March of 2018, followed by roughly half that number-- about 250,000-- in April.

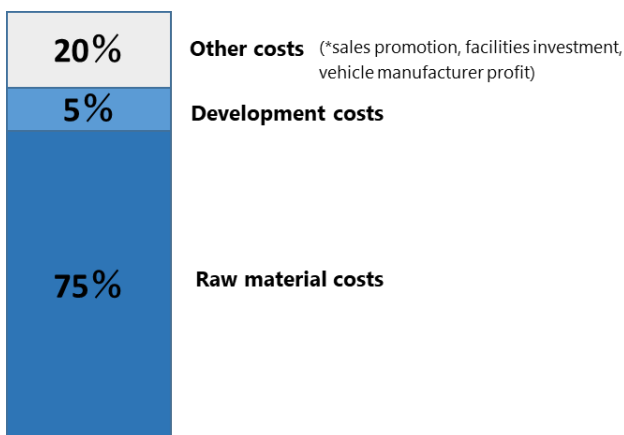
²⁶Compiled by ABeam Consulting from statistics at the Japan Automotive Manufacturers Association website.



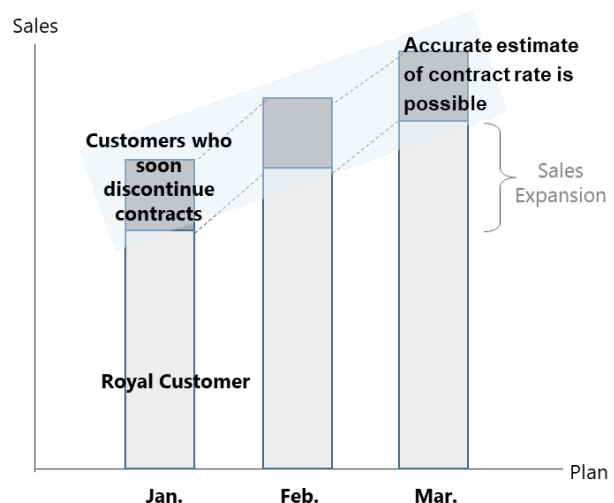
[Illustration 13] Domestic new car sales in Japan in 2018

A further breakdown of the automotive industry profit structure reveals that operational costs such as raw materials and parts purchases, as well as development costs, amounted for about 80% of revenue. Any profit, therefore, has to be generated from the remaining 20% after other costs are taken care of. This gives us an idea of how difficult the auto development, manufacturing and sales business is. [Illustration 14].²⁷

Subscription services use a business model in which vehicle users pay user fees to the vehicle manufacturer. Since automotive manufacturers attract loyal customers through their brands, they are able to estimate rates of contract cancellation with high accuracy. Subscription services are therefore stable in comparison to sales based on a business model that is at the mercy of seasonal factors and fluctuations in vehicle model popularity [Illustration 15].²⁸ Profits from subscription services are surely far easier to control than those from managing operations in which a 20% margin has to be controlled on a monthly, and even daily, basis.



[Illustration 14] Conceptual image of the cost structure for one automobile



[Illustration 15] Conceptual image of subscription sales

²⁷Compiled by ABeam Consulting from statistics at the Japan Automotive Manufacturers Association website.

²⁸Tien Tzuo et al., "Subscribed: Why the Subscription Model Will Be Your Company's Future - and What to Do About It" (Japanese-language edition published by Diamond, 2018; Compiled by ABeam Consulting from appendix).

Mercedes-Benz, Daimler's holding company, was the first to respond to these changes. Daimler has strategically deployed business operations in the field of vehicle sharing (i.e., sharing services and MaaS). Specifically, while continuing with sales of vehicles in the luxury market segment, they have introduced vehicles in the low-cost market segment for use with sharing and MaaS services. In this way, they have begun to build a framework enabling them to take the dominant position as they move into the shared-vehicle market. They have also announced that beginning in 2020, they will change their organizational structure from that of business units to a shareholding company structure. The current corporate structure comprises five business units, for passenger vehicles, vans, trucks, buses and financial services. These will be reorganized into three separate companies: Mercedes-Benz (for passenger vehicles), Daimler Truck (for commercial trucks) and Mobility (for services). Mercedes-Benz and Daimler Truck will continue with the conventional business of deriving profit from physical products, while Mobility will switch to a business model that seeks stable profit from subscription services. This is an indication that the conventional management indexes, based on whether or not items are sold, are already shifting to indices of how stable profit is.

◆ **New mass branding strategies-- will retail showrooms go extinct?**

Meanwhile, Japanese automotive manufacturers, whose strengths lie in mass branding, lack of dominance in the luxury and premium vehicle market segments. If they take the initiative in moving into sharing services, they risk cannibalizing their own vehicle sales (if a manufacturer promotes sharing services, some people will stop owning cars, which will hurt sales). This puts them in an extremely difficult position. These are the circumstances under which Toyota embarked on its shift from sales to services.

All Toyota dealer showrooms have begun to show signs of the move toward offering MaaS. In November 2018, Toyota announced that it was integrating its four sales firms to create mass-brand dealerships. They introduced experimental car sharing services using showrooms and parking lots, as well as the remobi²⁹ used car sales service available by smartphone.

For premium brands, meanwhile, Toyota has undertaken the Lexus New Takumi Project, a collaboration with providers of traditional Japanese craftsmanship, as well as an effort to re-recruit Lexus dealerships to expand sales channels. Thus, the overall move appears to consist of providing mobility services in the field of mass-market brands, while strengthening customer loyalty to premium brands by enhancing sales dealerships. Given these actions, it would not be surprising if, in the near future, Toyota were to adopt a sweeping new strategy in which sales business was pursued solely at its Lexus luxury-brand showrooms, while existing mass-brand dealerships were eliminated as sales showrooms and converted into specialty MaaS-related service shops. This may be happened in Tokyo, where public transportation is well developed and rendered even more convenient by MaaS, and particularly within the 23 wards of Metropolitan Tokyo.

◆ **The shift from 4P to 4C, and the birth of the 4S concept**

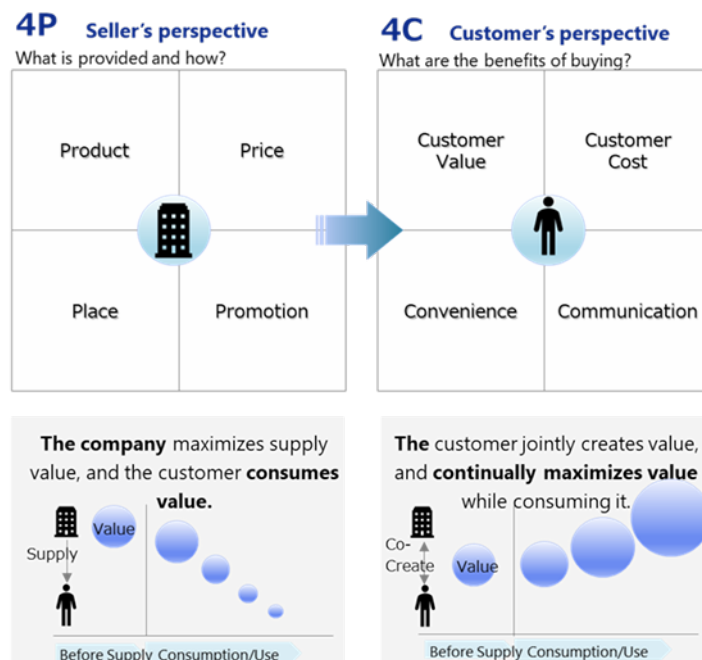
It is clear from the current changes in the automotive industry that our consumer behavior has begun to shift from *things* to *services*. In terms of the "marketing mix" explanatory model often used in discussions of marketing strategy,

²⁹A service begun as a joint trial by Ateam Inc. and Aichi Toyota. Service has begun in Aichi prefecture, with plans for future expansion. (<https://www.a-tm.co.jp/news/service-11652/>, last viewed on March 8, 2019)

this is a migration from 4P to 4C.

The term “4P” refers to marketing strategy as viewed from the perspective of enterprise and the seller. The four “P”s comprise product, price, place and promotion. Industry maximizes the merchandise value of products and services, while customers consume that value. Enterprise and sellers pursue marketing strategies in which they maximize merchandise value based on targets they themselves set. The four “C”s, meanwhile, represent benefits as perceived from the standpoint of the customer or buyer. They comprise customer value, cost, convenience and communication. According to this model, customers and companies co-create value, while customers consume that value, which is continually maximized by marketing strategy [Illustration 16]. Even though Japanese auto manufacturers have already internalized this 4C concept, they have not achieved 100% customer satisfaction levels. Moving forward, truly customer-centric 4C operations will be critical.

MaaS is a concept that fits well with 4C marketing strategy. For example, considering Whim, the MaaS Level 3 service, payment of a fixed monthly fee enables users to access public transportation, taxis, rental cars, car sharing and bicycle sharing, etc., all through their smartphones. In this way, it offers unlimited access to transportation other than cars. In Finland, since ownership of a car can be estimated to cost about €600 per month, and Whim costs €499 per month, making the shift from ownership to sharing has its appeal. It is a business model in which value increases as customer satisfaction rises.



[Illustration 16] The migration from 4P to 4C

In addition to improving customer satisfaction, the positive impact of service on society as a whole can also boost service value. Using modes of transportation other than cars helps limit climate change by reducing CO₂ emissions, while helping reduce the numbers of cars on the road. When city streets can be used for purposes other than motor vehicle traffic,

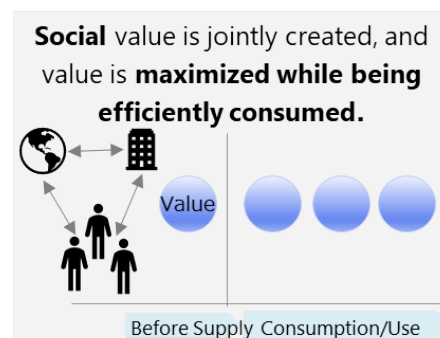
lifestyles and community life are enriched. Spaces that until then had been occupied by parking lots can be reborn as new residences or office spaces.

It could be said, therefore, that MaaS is a business model that adopts not just the customer's perspective, but that of the community. Here we refer to this societal viewpoint as "4S". The four "S"s comprise social value, social investment, social efficiency and social advocacy. From the societal perspective, consideration is given to things and services in terms of what kinds of contributions they can make to the community. This is a crucial perspective. MaaS is rooted in efforts to make mobility more efficient through the use of diverse modes of transportation that help reduce vehicle counts and CO₂ emissions. It truly is a business model that expresses the 4S concept [Illustration 17].

To further bolster this point, a recent consumer trend survey shows that more than 50% of consumers want to actively purchase products and services that contribute to society.³⁰ This indicates that the 4S concept has begun to be incorporated into the 4C value concept. According to the World Economic Forum's Millennium Survey, more than 70%³¹ of respondents said they "strongly agree" with the statement that humans are responsible for societal issues. Thus, the reasons behind consumer (customer) purchases, and the standards by which things and services are selected, have begun to gravitate toward contributions to society and to resolving societal issues. Although the trend has already come to be incorporated into various business strategies in the form of SDGs and CSR, these efforts have yet to reach the mature point of being uniformly reflected in actual services and products.

4S Societal perspective

How can one contribute to the community?



[Illustration 17] The birth of 4S

Meanwhile, when combining the 4C customer perspective with the 4S community perspective, it is difficult to achieve both at 100%, which may make the potential expansion of MaaS business opportunities seem limited. However, the sharing economy concept that represents the point of departure for MaaS can link 4C and 4S together, such that the two can coexist.

³⁰Daiwa Next Bank: "Survey on Societal Contributions 2018" (https://www.bankdaiwa.co.jp/column/articles/2018/social_contributions_report_2018.html); last viewed on February 23, 2019).

³¹World Economic Forum: "Global Shapers Survey 2017"

Through the sharing of unused assets (whether they can be made profitable or not), a sharing economy is a concept that is capable not only of improving efficiency and sustainability, but also of helping improve society.³² When MaaS is implemented as an alternative, people are able to select mobility services that are tailored to their own style of transportation, whether it is ride hailing or, subscription services or car sharing. On the other hand, the sharing and increased efficiency of sharing various assets helps form community with sustainability and less waste. In the future, mobility that adopts a 100% societal perspective will probably become a reality. In this way, it will be possible for 4C and 4S to coexist, rather than canceling each other out.

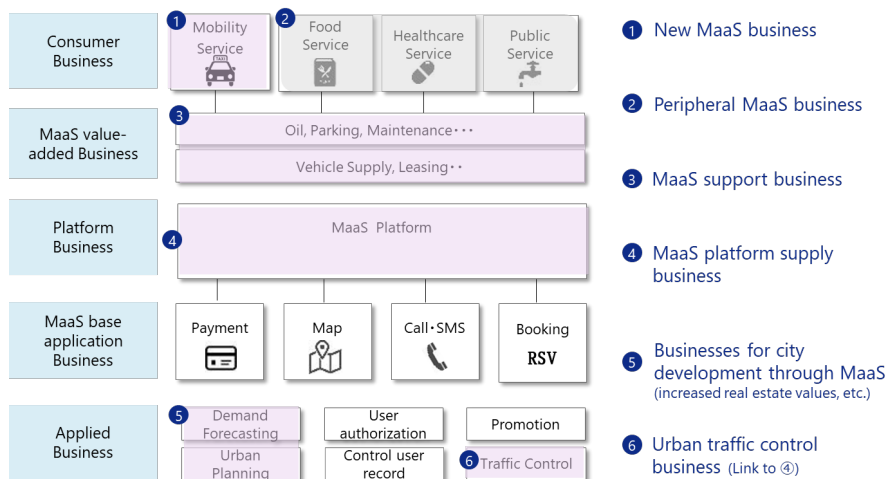
³²World Economic Forum: "What exactly is the sharing economy?"

Chapter 5: Recommendations for Japanese industry in pursuing MaaS as a business

As noted from various perspectives up to this point, MaaS and the four changes confronting the automotive industry make it abundantly clear that we have seen a transition from an era in which industry provided things to an era in which the emphasis is on services. In addition, the world of MaaS reaches beyond the corporate profit to the point of tackling the societal issues. It has become clear that MaaS is established on the basis of connections between all of the various stakeholders. When MaaS is viewed as a business within this kind of environment, where, then, are business opportunities to be found? And what kind of preparations are going to be required to enable Japanese companies to leverage those opportunities?

◆ MaaS Business opportunities

Until now, we have discussed the structure and difficulties of MaaS business. If we now consider an overview of MaaS business once again, we can see that it is composed of five broad domains. The first domain covers businesses that provide individual mobility services, such as ride hailing and car sharing (referred to here as consumer businesses). The second domain is the MaaS platform business, by which the consumer businesses are administered. The third domain consists of the leasing and maintenance operations, as well as other businesses that provide vehicles and otherwise support the MaaS business as a whole (referred to here as MaaS value-added businesses). The fourth domain is the MaaS infrastructure application business, which is connected to the MaaS platform business. The last, which will create MaaS Level 4, are demand forecasting, city planning, traffic volume control and other applied businesses become necessary [Illustration 18]. When we look at MaaS structurally, we see that MaaS business opportunities exist in these five domains.



[Illustration 18] The overall MaaS and business opportunities

Consumer business opportunities

Consumer businesses include the ride sharing and hailing services that are already taking off (①), and the peripheral MaaS services that are poised for expansion (②). While some difficulty accompanies attempts to make mobility services profitable in isolation, there is potential in linking them with services other than mobility. For example, combining mobility with services such as healthcare can potentially expand business potential by added value to mobility.

MaaS Business opportunities

MaaS added-value business primarily refers to services that support MaaS (③). For example, this category includes support services like vehicle supply, maintenance, fueling and parking provided to multiple mobility services at once. For a more concrete depiction, we can turn to the American Gold Rush.

The discovery of gold in California in 1848 is historically famous for having kicked off the Gold Rush, in which gold miners flocked to the region. The story of the Gold Rush includes lessons that apply to the MaaS business model.

The Gold Rush era is renowned not only for those who struck it rich by digging up gold, but also for the existence of those who acquired their fortunes through other means. These included fortune seekers who sold the shovels and buckets needed to dig for gold, those who sold work clothes (later known as Levi's), and those who exchanged gold for cash (later known as Wells Fargo). The theory is that those who, rather than digging for gold, provided the tools necessary to accomplish that goal managed to obtain continuous profit over time. When MaaS is substituted for the Gold Rush, the analogy suggests that providing the tools that make it possible to achieve MaaS presents opportunities for stable profit.

Platform opportunities

The platform business is one that controls various mobility services (④). Profitability may prove difficult solely with the matching function that is currently the main role of platforms. But new value-added platform functions together with existing platforms may present opportunities to establish profitability. Examples include algorithms for vehicle allocation optimization and dynamic pricing, or open data links between service providers and regions.

MaaS base app opportunities

Numerous entrants into the MaaS base app market have now made this a red-ocean market. In addition, mapping and communication apps are moving forward under de facto standards. As for payment-related applications, the e-commerce industry that has given rise to online payment services is also being used for MaaS. Opportunities for apps in this area are therefore not expected to be great.

Applied business opportunities

Considering the connections between urban issues and cities that have shifted to MaaS level 4, opportunities are thought to lie in business that apply basic functions, such as town development businesses that bundle MaaS with urban development (⑤) and urban traffic control businesses (⑥). City development businesses can help increase land and real estate values with services that stimulate town activity. This is why MaaS was incorporated into rents in San Francisco mentioned in the

Chapter 3. Urban traffic control businesses provide services that link MaaS platforms with city planning, vehicle demand forecasting and traffic volume control functions.

While it may be difficult to grasp the true picture of MaaS business when viewing it as an overall vague outline, the potential for expanded opportunities come into focus when it is broken down this way into several fields.

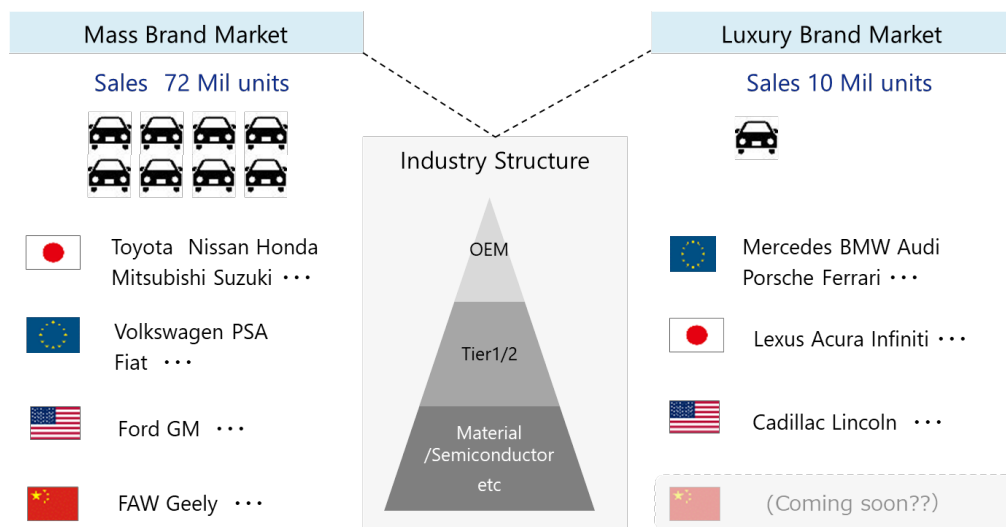
No	Business opportunity	Outline
①	New MaaS business	Providing new mobility services (ride sharing etc.)
②	Peripheral MaaS business	Providing non-transportation services associated with MaaS (retail sales, food & beverage, health, public services)
③	MaaS support businesses	Providing support services that apply to each of various mobility services (vehicle supply, leasing, fuel, etc.)
④	MaaS platform supply business	Providing vehicle allocation optimization engine, links between businesses, dynamic pricing and other services necessary to MaaS platform operation
⑤	Businesses for city development through MaaS	Providing services that promote city development, such as MaaS combinations that boost property values
⑥	Urban traffic control business	Providing services that help control traffic volumes, such as city planning and services, or vehicle demand forecasting linked to MaaS platforms

◆ Recommendations for Japanese industry

Considering the communities, industry structures and personal value systems that are changing gradually together with MaaS, we would like to propose future recommendations for the Japanese automotive industry from three perspectives.

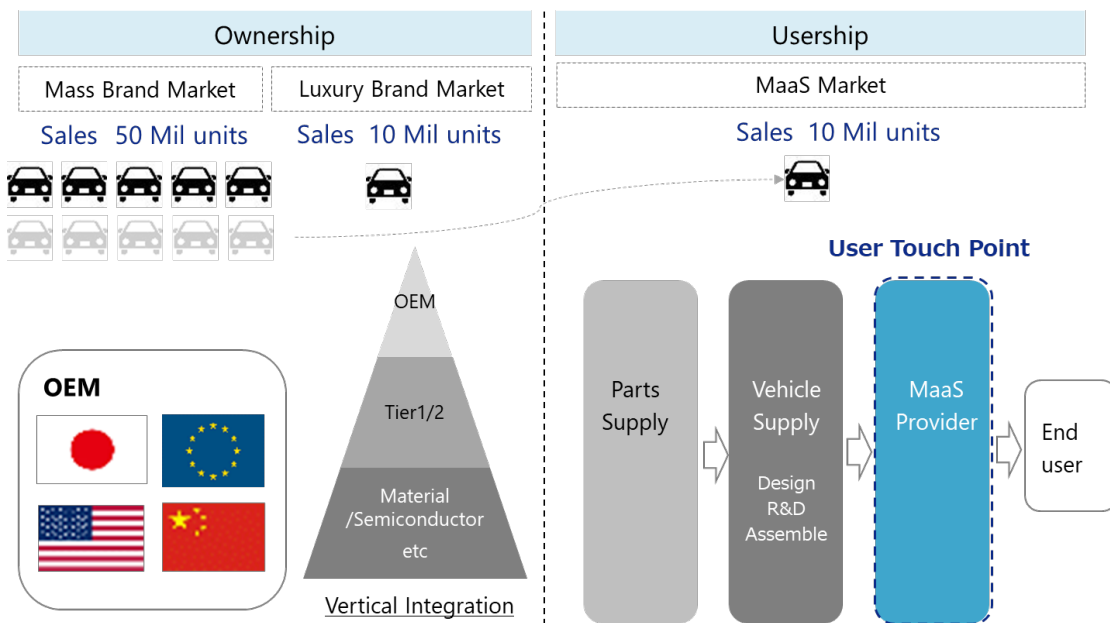
① The end of the automotive mass-brand sales business

The current automotive market can be broadly subdivided into the mass brand market and the luxury brand market. The mass brand market consists mainly of the market for the standard-sized cars that represent one of the characteristic strengths of Japanese vehicle manufacturers. The luxury brand market is dominated by the high-end vehicles that are among the strengths mainly of European carmakers. The current worldwide automotive sales volume of 72 million units, about 90% are in the mass brand market [Illustration 19].



[Illustration 19] The current automotive market

However, it is forecast that as the MaaS market takes shape in the near future, the component of the automotive market occupied by ownership will decrease and the vehicle use component will increase. This vehicle use market will be formed at the expense of the mass brand sales market. Assuming that around 2030, worldwide demand for motor vehicles will be for 110 million vehicles, it is forecast that the formation of a vehicle use market will drain demand away from a vehicle ownership market that once represented about 50 million vehicles. This shift will result in a vehicle use market of about 10 million vehicles. The cars that will be shifted out of the sales market will be mass brand market vehicles. At the same time, the luxury vehicle market will likely maintain its current volume, and may even expand, with the consumer reasoning being that if one is going to own a car, it might as well be one that makes ownership meaningful [Illustration 20].



[Illustration 20] The automotive market 2030

As the number of cars decreases, carmakers and parts suppliers will probably need to escape the conventional mode of business in which they only need to keep selling cars.

Vehicle manufacturers will be required to establish systems by which they can turn a profit with services. The subscription service-type business noted in the previous chapter is one example of this. It also seems likely that they will need to switch to luxury brands rather than bolstering their mass-market brands.

For parts suppliers, the end of the volume-based vehicle sales business is forecast to require more efficiency from development and production efforts, which should lead to progress in M&A and collaborative partnerships. It will also be crucial to make progress with wide-ranging systems that include changes in types of business, such as new business enterprises and new service offerings.

② The locally rooted global perspective

Although the market penetration of MaaS is a local development (i.e. proceeding through local government initiatives, etc.), when one considers the need for regional and international optimization, it becomes clear that interchangeability of platform functions and applications is also critical.

For example, when a user visits a different city or country, if the MaaS applications differ, it will be necessary to obtain the necessary apps and register for payment every time, and provide personal information as many times as required. If just a few apps can be used to access services in every city and country, it will not only be convenient for the individual user, but can also be used for efficient data management. This may not pose as an inconvenience within an island nation like Japan, but in regions like Europe, North America, the Middle East and Africa, travel to other countries is relatively simple. Where this is the case, providing services free from the concept of limitation to a home country enables users to access the same service even as they cross national borders. This is a prerequisite for becoming an international industry player of choice.

③ Escaping principled self-sufficiency to partner with global players

Until now, Japanese companies have adhered to the principle of self-sufficiency in creating various products and services. This reflects a culture worthy of respect, which has given rise to Japanese products and Japanese services of unparalleled quality.

In MaaS business operations, however, it is difficult for a company to go in alone and provide services. It is essential to form partnerships with diverse other players like local governments and companies, mobility service providers, etc. An open-data concept involving links to various API functions is also extremely crucial. With respect to data (information), for example, disclosure of public-sector information (open data) such as bus and train schedules, fares and bus stop locations is necessary. In order to eradicate each obstacle, a company must avoid generating the solution based on corporate profit. Instead, it is necessary to develop services in cooperation with other companies and organizations so user can have more options to select .

What is more, we would recommend looking beyond the domestic field to seek partnership candidates overseas as well, and engaging in openminded consideration of partnering with global players. In Israel and the United States, startups with MaaS-related technology are emerging almost on a daily basis. As noted in relation to ②, when MaaS is seen as a global business, deft usage of technologies that already exist and consideration of mutual win-win business models with overseas firms provide a shortcut to success.

Conclusion

Currently, the majority of MaaS operations hinge on mobility services. In the future, MaaS has the potential to contribute to major changes in our styles of working and living. Work-style changes will include time saved through more efficient commuting and transport efficiency, while lifestyle changes will extend to connectivity with commercial facilities, healthcare, long-term care and childrearing. In 2030, the scale of the mobility services segment of the MaaS market is estimated to reach about ¥9 trillion, with the potential to involve more than 420 cities.³³

In addition, as MaaS becomes more pervasive, the specifications for vehicles used in MaaS are expected to become simpler. This will result in a minimum of yearly design changes and eliminate reasons for auto manufacturers to undertake their own development efforts. Moving forward, it will be critical for the auto manufacturers and parts makers that have been in competition against each other to work together toward greater efficiency and optimization in fields where they can collaborate and cooperate. As stakeholders increase, the establishment of business models and monetization do not become easier. However, there is a stronger possibility of deriving services that are people-centric and which have high levels of added value. This is therefore a field with major potential.

Changes in the environment surrounding MaaS not only expand the MaaS universe, they provide a chance to take a fresh look at the overall picture of related companies and organizations. Achieving the goals of the United Nations “2030 Agenda for Sustainable Development” and of the “Society 5.0” policy initiative put forward by the Japanese government will require all of us to transform ourselves. If the MaaS universe is to be formed as an ecosystem, it will mean taking advantage of the strengths that businesses have demonstrated up to now, while also working to enable collaboration and cooperation with other businesses and organizations. This will most likely lead to sustainable business while also leading to the formation of sustainable society.



³³Forecast by ABeam Consulting.



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