



MOBILITY 2040
THE QUEST FOR
SMART MOBILITY

A SMARTER FUTURE FOR MOBILITY

In 2016, Oliver Wyman conducted a detailed survey with global transportation industry executives and experts to gauge their views on the future of personal mobility, as detailed in our initial report, *Mobility 2040: Staying Ahead of Disruption*.

To update and focus the findings from that study on near-term implications, Oliver Wyman turned to travelers, surveying more than 7,500 consumers across diverse demographic and economic groups in five countries, across three continents – China, the United States, Germany, France, and Italy. *Mobility 2040: The Quest for Smart Mobility* expands our vision of how “smart” the future of mobility is likely to be – and how an increasingly mobile world is likely to evolve.

Smart mobility will be the enabler of the Mobility 2040 vision: It will be the on-demand driverless car that shows up at your door; the buses, trains, and planes that communicate in real time for seamless connections; and the city traffic grid that constantly updates as demand changes. Achieving such connected, flexible, and personalized transportation will require digital platforms with the power to connect people to all transport modes as well as related products and services.

Transport operators, digital giants, and innovative startups already find themselves in a race to establish first-mover advantage in smart mobility. The pressure will intensify as autonomous and artificial intelligence technologies have a more tangible impact on our daily lives. The time to develop smart mobility platforms and services is now; the challenge will be in achieving the breadth of services and depth of customer connection that can lead to sustainable smart mobility business models.

We hope that you find *Mobility 2040: The Quest for Smart Mobility* a thought-provoking read. We look forward to hearing your comments.

THE OLIVER WYMAN MOBILITY 2040: SMART MOBILITY TEAM

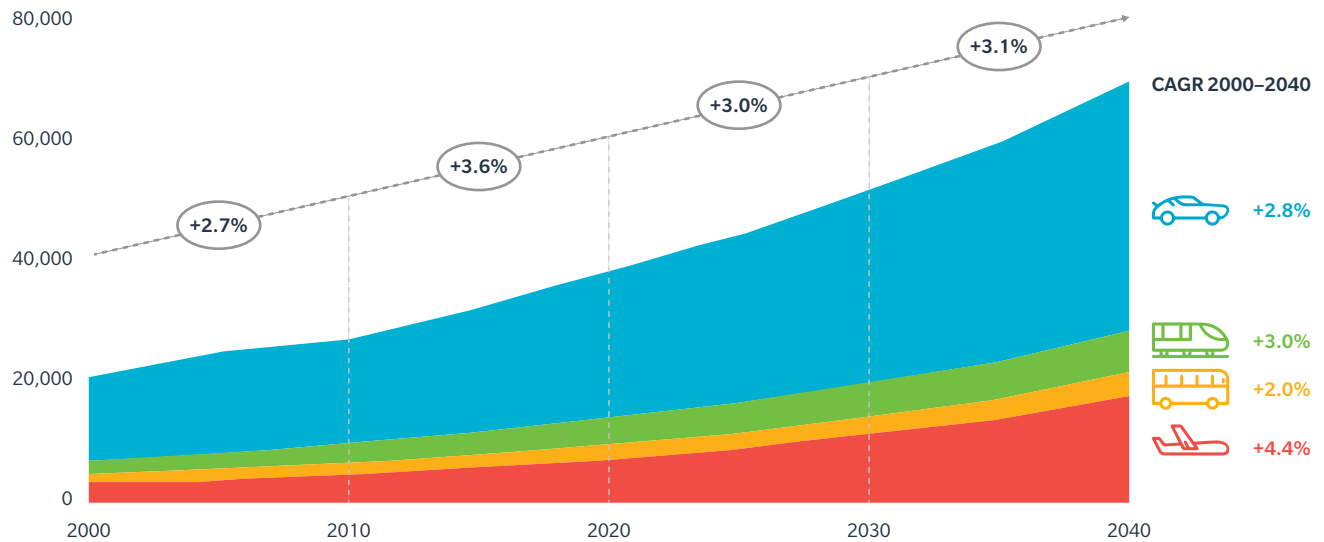
THE EVOLVING MOBILITY MARKET

Since 2000, all major modes of passenger travel have seen steady growth, due to the convergence of better travel infrastructure, broader travel options, and rising incomes, paired with more travel-oriented lifestyles in general. While automobiles will continue to be the mainstay of passenger travel, rail and air travel are projected to see faster growth than cars through 2040 (Exhibit 1).

Mobility itself is changing rapidly and continuously, which will translate into providers needing more dynamic service portfolios that are continuously

updated. Traveler preferences are moving toward a greater focus on personalized, flexible, end-to-end solutions. New technologies, including autonomous vehicles, e-mobility, smart city controls, and multimodal hubs will lead to new alternatives for both long-distance and nearby travel. The challenges these changes will entail are giving rise to a host of new mobility providers along the entire end-to-end travel experience. Mobility start-ups attracted over \$40 billion in investments between 2011 and 2016 alone, with the amount of investment roughly doubling year over year.

EXHIBIT 1: PASSENGER FLOWS WILL CONTINUE TO GROW STEADILY THROUGH 2040
BILLIONS OF PASSENGER-KILOMETERS; 10-YEAR CAGRS IN OVALS



Note: Based on data for 54 countries, covering all global regions. Projections including autonomous cars not available for all countries. CAGR = compound annual growth rate
Source: OECD, Oxford Economics, IATA WATS, ICCT, Oliver Wyman analysis

DECODING SMART MOBILITY

“Smart mobility,” that is, the increasing use of digital platforms to manage traveler journeys end-to-end, will reshape mobility ecosystems over the next 20 years. Examples of how this is already happening include mobile apps for ridesharing, one-click travel book-and-pay, real-time public transport data, and app-based city parking. In the future, smart mobility will enable seamless integration of transport modes, including on-demand and autonomous options, as well as ancillary services not traditionally part of the travel experience. As a result, the market share of innovative mobility services is projected to quintuple through 2040, while the share of private cars will shrink by roughly a quarter (Exhibit 2).

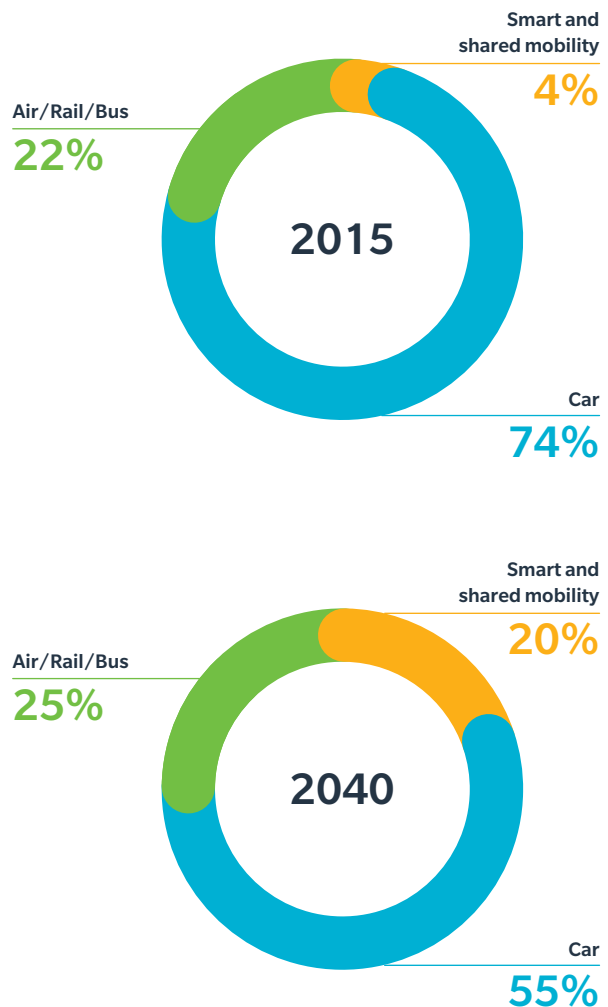
To gain a deeper understanding of these developments from a traveler perspective, Oliver Wyman surveyed 7,500 global consumers about smart mobility. We asked about multiple service dimensions to determine smart mobility attractiveness to different traveler groups, consumers’ willingness to pay, potential impacts on modal shifts, and perceptions of companies in the smart mobility space.

Learning the right lessons from this data is crucial for businesses now rushing to develop new mobility services. Many different types of companies are expected to enter the market for smart mobility in the short to mid-term, including legacy transportation companies, equipment manufacturers, digital giants, and technology startups. The rewards of unlocking smart mobility could be vast, as this market is expected to generate \$270 billion in revenues and profits of \$125 billion to \$150 billion by 2040.

Given the large base of interested parties, eventual shakeout and consolidation are likely, as has occurred in other digital ecosystems, such as search engines and social networks. This promises peril for some but opportunities for others to take a leadership role early on. Understanding customers’ wants and expectations will be crucial for companies seeking to build sustainable business models in this space.

EXHIBIT 2: SHARE OF PASSENGER TRANSPORT SPEND WILL INCREASE FOR INNOVATIVE SERVICES

RELATIVE CHANGE OF TOTAL MARKET IN PERCENT FOR REPRESENTATIVE COUNTRIES



Note: Includes China, USA, Germany, France, and Italy. “Shared mobility” refers to the sharing of previously individual mobility options, such as cars. “Smart mobility” refers to services that provide real-time, seamless travel data and options

Source: Oliver Wyman analysis

CHINA LEADS THE WAY

Comparing survey results by geography, China is the clear vanguard for smart mobility services. Chinese consumers are the most receptive to smart mobility service offerings, show the highest willingness to pay, and are the most interested in integrating these services into their daily lives.

Ninety-eight percent of Chinese respondents indicated that smart mobility services were important to them and that they were willing to switch modes for smart mobility offerings. In Germany – the laggard in this category – only 80 percent of respondents would consider switching their preferred travel mode.

In terms of willingness to pay, the gap between China and western countries is even more significant. Ninety-seven percent of Chinese respondent who are interested in smart mobility services also would be willing to pay for them. In the US, by comparison, 83 percent consider smart mobility services important and only 76 percent are willing to pay for them.

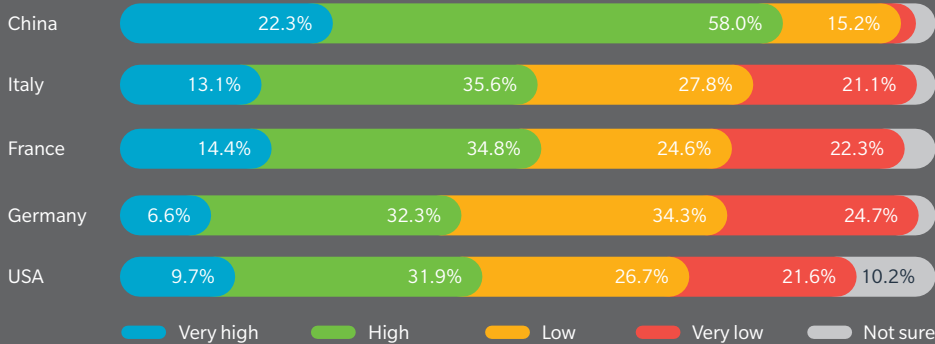
Chinese consumers consider digital giants the most capable of providing smart mobility services (38 percent of respondents), ahead of transport operators (25 percent), and start-ups (13 percent), particularly for safety; real-time, location-based information; work/education; and social networking. These strong expectations for digital giants are unique to China; elsewhere, less than 30 percent of respondents rated digital giants as most capable. Westerners tend to trust in their transport incumbents to provide core travel-related services.

Finally, as shown below, 80 percent of Chinese respondents signaled their willingness to share personal data (such as contact data, travel preferences, or credit card numbers) with service providers – twice as many as in the US and Germany.

CHINESE WILLINGNESS TO SHARE DATA OUTPACES THAT OF WESTERN CONSUMERS

ALL RESPONDENTS, FEEDBACK ON MULTIMODAL DOOR-TO-DOOR TRAVEL PLANNING SERVICES

Q: How willing would you be to share data with the service provider to use the service effectively?



Source: Oliver Wyman Mobility 2040: Smart Mobility survey

WHY SMART IS ATTRACTIVE

Sheer market size is not the only reason the smart mobility market is attractive; smart mobility will increasingly factor into the choices consumers make about how they travel. The growing importance of smart mobility offerings is expected to radically transform the current modal split among different transportation options. In this context, autonomous road transport will likely act as a catalyst, introducing smart mobility solutions to the mainstream and sustainably influencing customer behavior.

In the future, consumers will be much more willing to switch among different transportation options, depending on the service portfolio on offer. The result will be a constantly changing modal split, which in turn will require transport companies to develop more dynamic and personalized offerings – or risk being pushed out of the market. Swapping transport options on the fly will eventually become the norm,

once real-time data and on-demand services are widely established. Control of the smart mobility portals that enable seamless connection across modes could offer a key competitive edge.

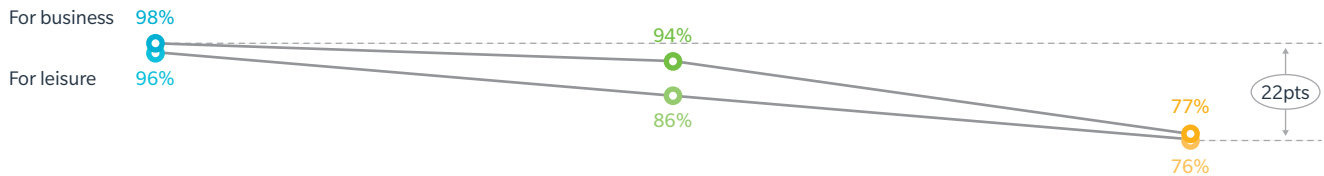
Our survey found that a clear majority of participants would consider changing their currently preferred mode of travel if an alternative offered smart mobility services. This is particularly true for young consumers (18-35): For instance, 96 percent and up would consider switching from cars to public transport for access to smart mobility (Exhibit 3).

With increasing age, the influence of smart mobility offerings on individual travel decisions declines, but even so, 84 percent of respondents over 65 identified smart mobility services as important, and three-quarters of seniors would change their preferred travel mode for access to smart mobility.

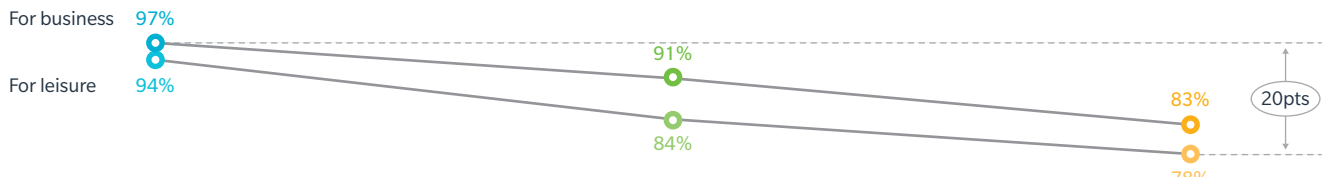
EXHIBIT 3: SMART MOBILITY HAS WIDE APPEAL

Q: Given the availability of smart mobility, would you consider switching your preferred travel mode?

Respondents that drive private cars



Respondents that use public transport



Source: Oliver Wyman Mobility 2040: Smart Mobility survey

THE RIGHT KIND OF SMART

To succeed in the market for smart mobility services, companies will need to position themselves quickly and develop offerings that incorporate not only short-term trends but a long-term market perspective. Three core aspects must be considered: First, there is the key question of whether and how much consumers are willing to pay for smart mobility services. Second, it will be critical to identify bundles of travel services that integrate the different parts of a journey to provide a door-to-door solution. Finally, as the market matures, consumers will want integrated solutions that combine travel services with ancillary service categories (Exhibit 4). Significant market potential on the one hand and a plethora of possible smart mobility services on the other emphasize the importance of the right service mix to maximize profitability.

Smart mobility platforms will enable the travel experience to be managed end-to-end, meaning that travelers will expect to plan all their travel and buy their tickets through one platform. These platforms will enable a range of travel services to be combined, such as multimodal travel planning, first- and last-mile services, real-time information, and convenience services. In addition, integrated smart mobility solutions that bundle insurance and financial services, e-commerce, or work and education services in one portfolio could have significant market potential.

Of the 7,500 consumers we surveyed, 84 percent indicated a general willingness to pay for smart mobility services, with some variation by age group: 89 percent of those under 35 would consider paying for smart mobility services, compared to 74 percent of those over 65. At the level of individual services, besides travel and travel-related services, respondents across geographies were particularly willing to pay for insurance/financial services and safety features (Exhibit 5). In addition, travel frequency and travel mode proved to be key drivers of willingness to pay: Around three-quarters of those who frequently travel by plane or long-distance bus would be willing to spend money on *all* smart mobility services.

In terms of how much participants would be willing to pay (Exhibit 6), short-distance travelers, such as

EXHIBIT 4: SURVEYED SMART MOBILITY SERVICE CATEGORIES



Financial/Insurance services

- Mobile insurance
- Mobile banking



Multimodal door-to-door travel planning

- Customized travel planning
- All-mode contactless payment



First- and last-mile

- Shared services
- Individual navigation, dynamic pathing



Safety

- In-app operator contact in case of issues
- Smart mobility surveillance



Real-time information and rerouting

- Real-time information on progress, traffic, delays
- Dynamic promotions (compensation for inconveniences)



E-commerce

- Online shopping with @home, @seat, or @station/airport delivery
- Automated orders based on shopping behavior



Convenience

- Preference-based, real-time seating
- Booking door-to-door porter/luggage handling



Work and education

- Reservation of on-board co-working places
- Platform for freelancers (remote workers)
- Educational services



Entertainment

- Content mix based on personal preferences, travel duration and destination
- Multiplayer gaming with other travelers



Location-based information

- Targeted information based on arrival location
- Sightseeing and shopping information



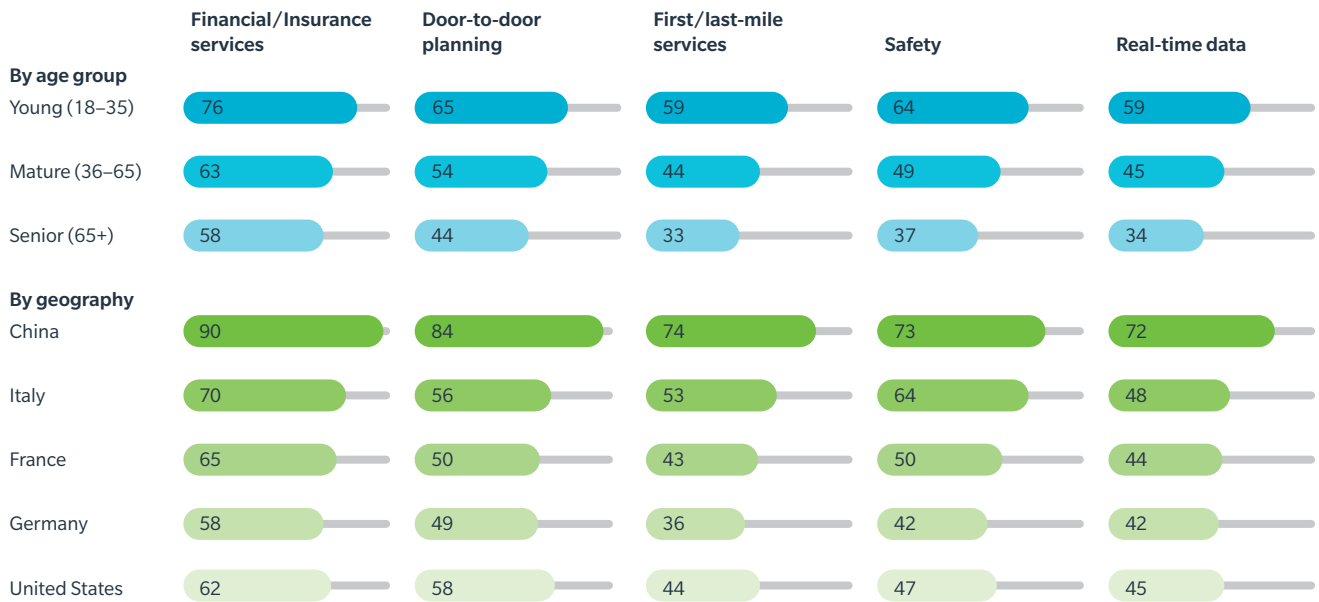
Social networking

- Traveler social network
- On-board people matching

Source: Oliver Wyman Mobility 2040: Smart Mobility survey

EXHIBIT 5: WILLINGNESS TO PAY: TOP FIVE SMART MOBILITY SERVICE CATEGORIES

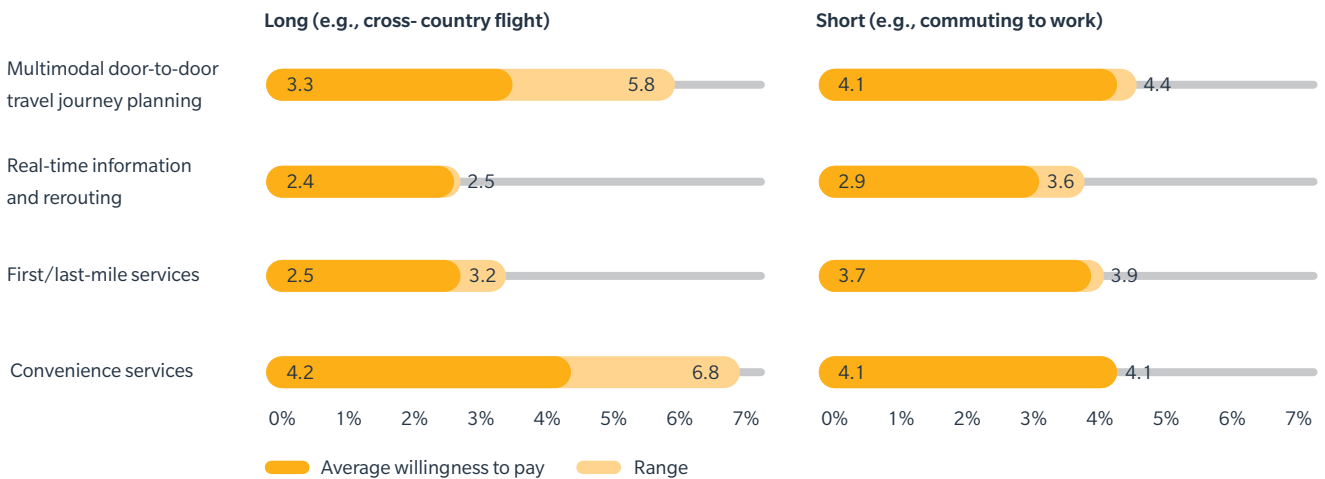
PERCENTAGE OF RESPONDENTS FOR EACH CATEGORY



Source: Oliver Wyman Mobility 2040: Smart Mobility survey

EXHIBIT 6: HOW MUCH CONSUMERS ARE WILLING TO PAY FOR SMART MOBILITY

EXAMPLE TRAVEL COORDINATION SERVICES, PERCENT INCREASE OVER TRAVEL COSTS



Source: Oliver Wyman Mobility 2040: Smart Mobility survey

commuters, might be willing to pay around 4-5 percent more per service on top of the monthly rate they pay for travel now (and somewhat more for entertainment and work/education services). Long-distance travelers might pay an average one-time fee of 2-6 percent per service on top of their ticket price, although acceptable fees could range as high as 7-9 percent each for specific financial/insurance and work/education products. These findings suggest substantial upselling potential for smart mobility services – if consumers can be convinced of their usefulness.

The success of an integrated solution will hinge on a provider's ability to quickly establish a broad customer base. One option for market entry might be to offer a free trial version that includes several

functionalities and services, giving the consumer a glimpse of the breadth of the smart mobility portfolio. For the full version that includes all functionalities and services, customers would pay a monthly flat rate. Between 50 and 75 percent of survey respondents in Europe/US and 85 percent in China indicated a willingness to purchase integrated mobility solutions for a flat rate.

Taking a long-term perspective, providers may look toward different approaches to ensure economic sustainability. Beyond a monthly flat rate for a service or platform access, providers could cross-sell services and products from third parties through the integrated platform or monetize the data and traffic that customers generate.



TOMORROW'S SMART LEADERS

Smart mobility has yet to find its Google, Amazon, or Netflix, but such convergence can be expected, given how digital platforms for news, shopping, and entertainment have coalesced around a few key providers. We asked consumers what type of company they thought would be best suited to provide smart mobility services: China, the US, and Italy favor digital giants, while France and Germany trust their transport incumbents. Innovative start-ups come in third in all countries surveyed, but should remain on the competitive radar.

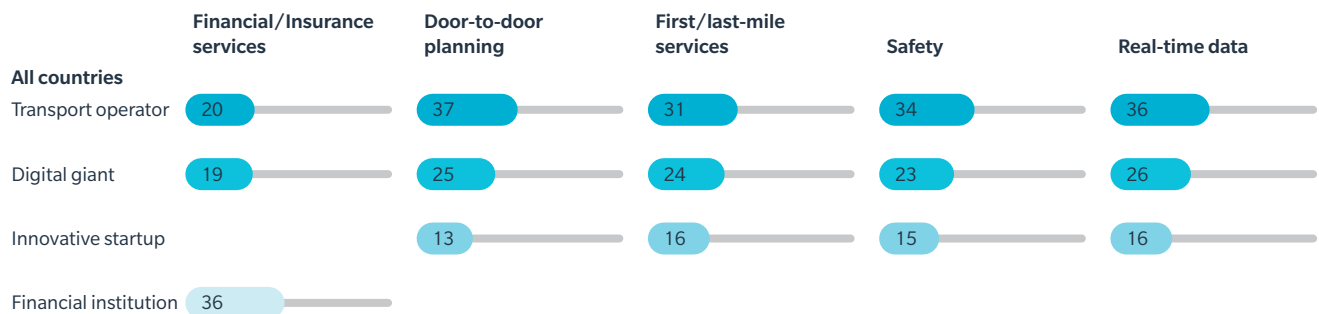
It's also important to note that even in countries where consumers trust their transport operators the most, an integrated view of digital giants plus innovative startups changes the competitive picture somewhat; that is, combining responses for these two brings digital industry level with transport operators. This

further illustrates the increasing pressure on legacy operators to act, even in stronghold countries.

Globally, survey respondents thought transport operators would be the most capable of providing the travel-related services for which they are willing to pay. Digital giants are seen as best suited to providing the ancillary services for which they would pay the highest prices.

For the top five smart mobility services for which most respondents are willing to pay, transport operators show a lead in consumer confidence, except for financial/insurance services, where traditional financial institutions have the edge (Exhibit 7). For services that may garner higher prices on the other hand, entertainment showed a bias toward digital giants and media providers, while consumers favor digital giants

EXHIBIT 7: MOST CAPABLE PROVIDERS FOR TOP PAID SERVICES
SHARE OF RESPONDENTS VOTING FOR A SPECIFIC SERVICE PROVIDER, ALL COUNTRIES



Source: Oliver Wyman Mobility 2040: Smart Mobility survey

and innovative startups for work/education services (Exhibit 8).

Consumer confidence will factor into whether digital platforms can gather the necessary customer data to build out services and for data monetization. Globally, slightly more than half of consumers are willing to share personal data, such as contact information and travel preferences, with service providers. This result, however, is strongly skewed toward China

(see sidebar), where most respondents signaled a willingness to share data. In Europe and the United States, there are increasing concerns about data privacy and security, exacerbated by recent data privacy incidents as well as numerous data breaches involving the private information of millions of users. To gain user trust, companies offering smart mobility platforms must reassure consumers that their private information is protected by strong safeguards, such as the EU's General Data Protection Regulation (GDPR).

EXHIBIT 8: WHO DO YOU THINK HAS THE BEST CAPABILITY TO PROVIDE CERTAIN SMART MOBILITY SERVICES?
ALL RESPONDENTS BY COUNTRY

	Global	Germany	France	USA	Italy	China
Financial/Insurance services						
Multimodal door-to-door travel planning						
First/last-mile services				?		
Safety				?		
Real-time information				?		
Entertainment				?		
Work and education			?	?		

Financial institutions
 Transport operators
 Digital giants
 Media providers
 Innovative startups
 Not sure

Source: Oliver Wyman Mobility 2040: Smart Mobility survey

UNLOCKING THE POTENTIAL OF SMART

Many consumers are ready and willing to embrace smart mobility, which could eventually lead to substantial transportation market size and profit pool growth. Incumbents are in a good position to grasp a large share of this additional value, given that consumers already see transport incumbents as potential providers of high-quality smart mobility services.

Unlocking the potential of smart mobility, however, will require its own set of skills:

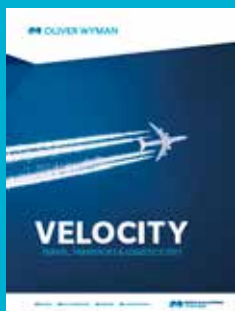
- A clear definition of strategic positioning in an increasingly dynamic market; ownership of the customer interface and breadth of products and services
- The technical capabilities to develop innovative smart mobility solutions and the work force to deliver in an agile and customer-centric manner
- A thorough understanding of the end-to-end customer journey. Identifying signature moments along the customer travel journey will be a vital part of increasing the attractiveness of smart mobility platforms.
- Access to and leverage of real-time data along the travel chain to provide individualized services and ensure monetization
- Openness to disruption and more frequent changes of business and operating models (including investments into and cooperation with technology-driven players)

Partnerships between transport operators and digital giants or innovative start-ups may offer a feasible way forward to build the digital capabilities necessary to realize a fully integrated solution. Smart mobility will be a fast-moving target and the window to capture customers' share of mind will be relatively short. Well before 2040, smart mobility will be fully integrated into most people's travel experiences, ready to power the next round of travel innovations.



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