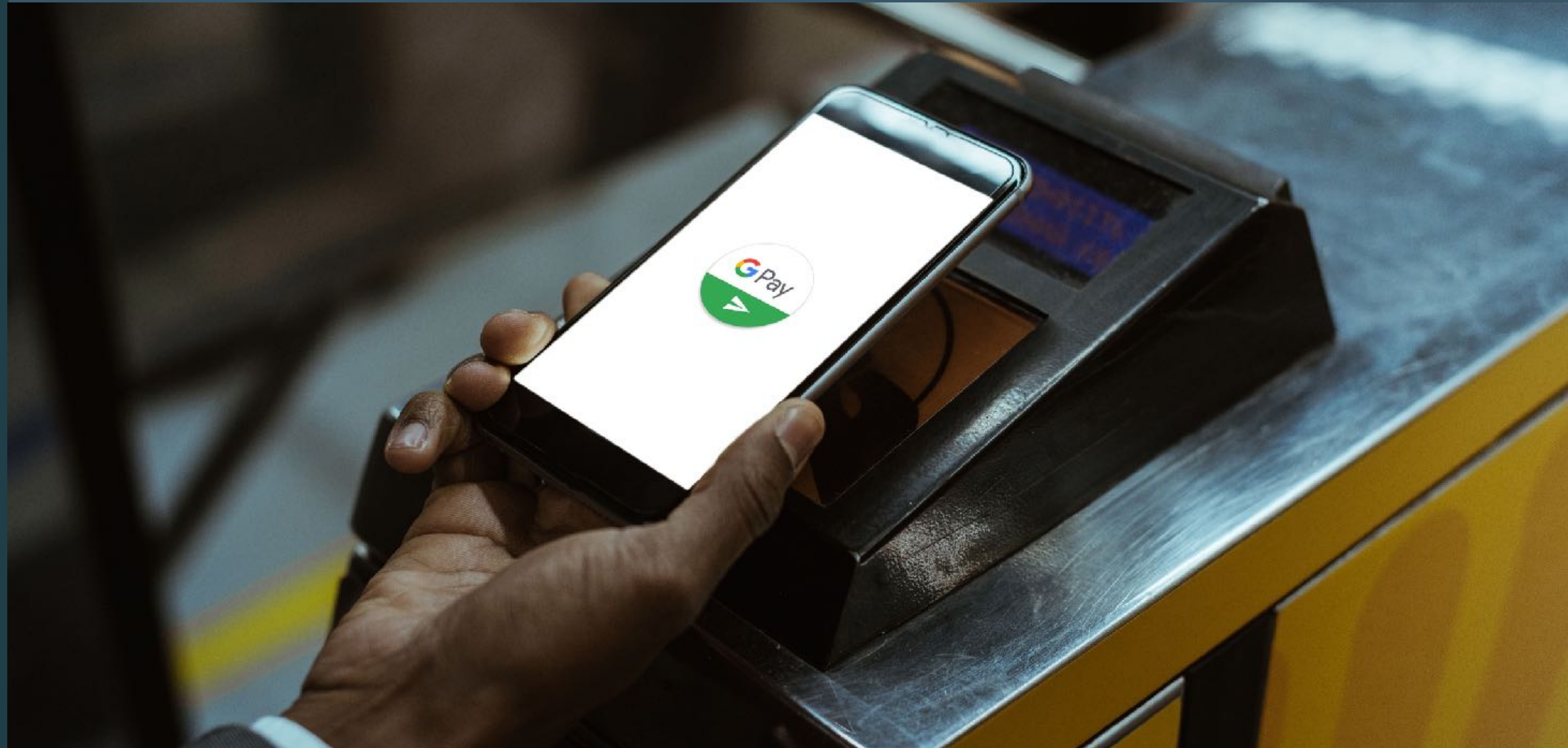


GOOGLE IN MAAAS

Report

**FREE
ABSTRACT**

The first holistic
analysis of Google's
future mobility
strategy



*From Google Maps to Google MaaS
Will Alphabet take over the MaaS market?*

This in-depth market analysis and sizing is the first decision-making tool for key stakeholders to design a successful MaaS strategy

- A **250+** page analysis of the current and future state of the MaaS market in Europe, with a focus on Google's strategy in MaaS, based on:
 - **10** years of constant market surveillance
 - PTOLEMUS mobility experience with over **350** client assignments across the mobility ecosystem
 - **6** months of research and analysis including interviews with key MaaS stakeholders
 - More than **200** figures presented in the report
 - More than **85** companies mentioned
- An examination of the regulatory, business and technological context behind MaaS
- A detailed assessment of the MaaS value-chain, including more than 14 company profiles and 7 MaaS use cases
- An analysis of Google's strategy and initiatives in the mobility field
- An evaluation of the future MaaS evolution scenarios, including customers' segments needs and future drivers of demand and supply
- A market sizing of the trips by transport modes in the major European countries, and the corresponding penetration of MaaS
- An assessment of the future role, position and strategy of Google in the MaaS market based on the 3 main scenarios we identified
- Short and long-terms recommendations to key industry stakeholders, including public authorities, Public Transport Operators (PTOs), Transport Service Provider (TSPs) and MaaS solution providers



*More than just market research.
In-depth strategic analysis and a complete tool to help your organization make the right decision in the MaaS market*

In this report, we respond to 10 questions that are absolutely crucial for the future of mobility



While there are several definition of MaaS, the basic elements remain the same

- Multiple definitions emphasise different aspects of Mobility-as-a-Service
- **Most of them share the same basic elements:**

“Mobility as a service (MaaS) is a type of service that, through a **joint digital channel, enables users to plan, book, and pay for multiple types of mobility services.**

The concept describes a **shift away from personally-owned modes of transportation and towards mobility provided as a service.**

This is enabled by **combining transportation services from public and private transportation providers** through a unified gateway that creates and manages the trip, which users can **pay for with a single account. Users can pay per trip or a monthly fee for a limited distance.**”



“MaaS is the **integration of various forms of transport services into a single mobility service, accessible on demand.**

For the user, MaaS offers added value through the use of a **single application** to provide access to mobility, with a **single payment channel** instead of multiple ticketing and payment operations.”



“MaaS **combines intelligent journey planning, seamless integration of ticketing and booking** as well as **big data analytics** combined in flexible and **secure MaaS apps.**

It can make it easy and convenient for all stakeholders to find their individual way through the mobility jungle and **empowers transformation of transport to efficient intermodal mobility** - for the benefit of travellers and operators alike.”

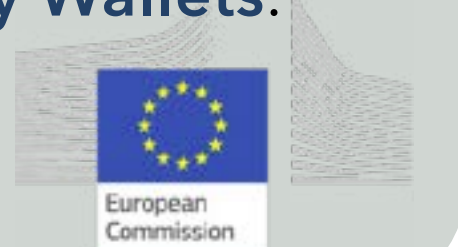


“MaaS is the **integration of, and access to, different transport services** (such as public transport, ride-sharing, car-sharing, bike-sharing, scooter-sharing, taxi, car rental, ride hailing and so on) **in one single digital mobility offer,** with active mobility and an efficient public transport system as its basis.”



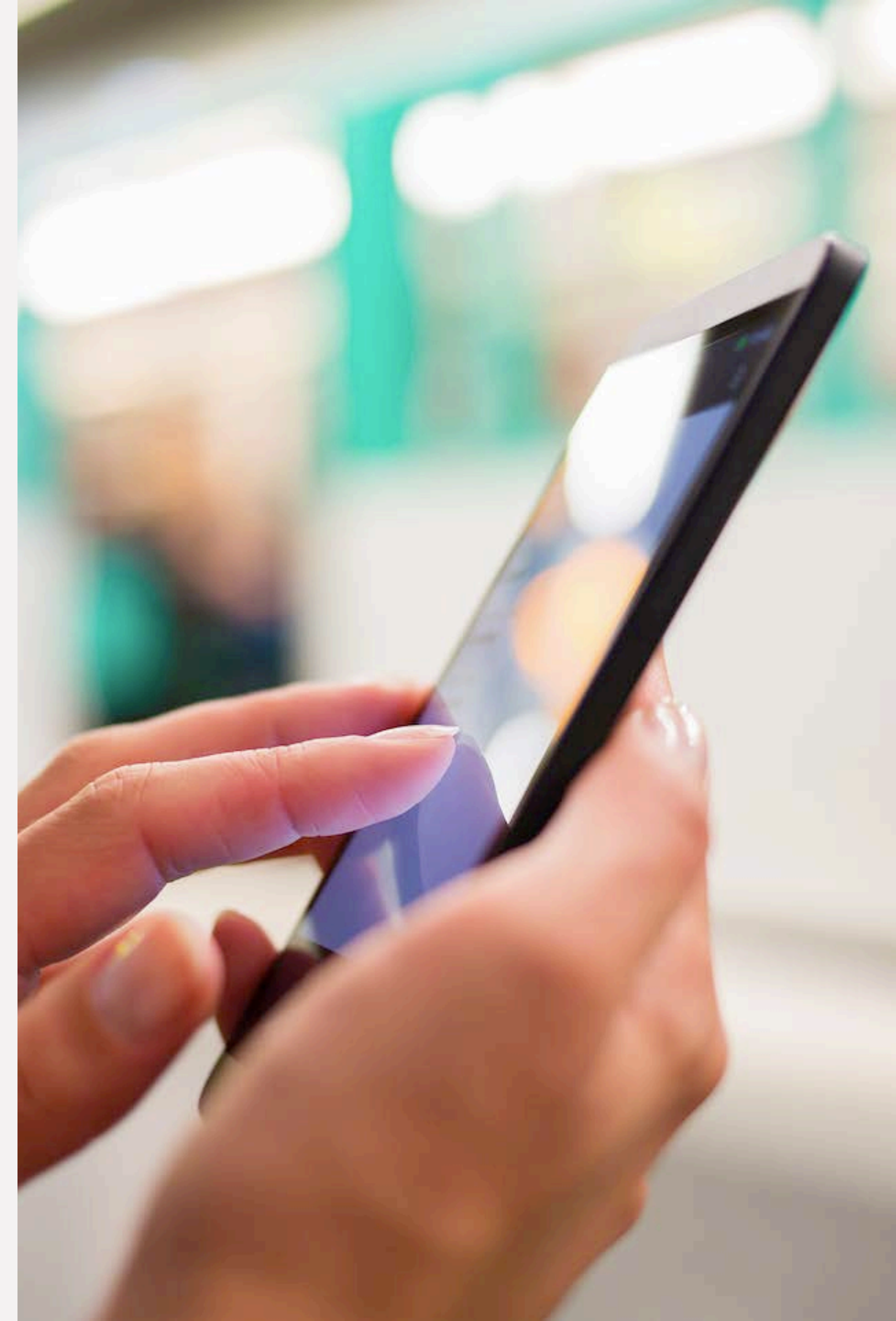
“MaaS apps can help with the **booking and payment of tickets for all mobility offers.** The more seamless we can make multimodal journeys, the more users will welcome and accept them.

In the future, both transport operators as well as passengers will have the possibility to use European Digital Identity Wallets.”



What is Mobility-as-a-Service (MaaS)?

- A service offered to travellers that enables access to a **seamless, unified, multi-modal transportation experience by combining routing information, booking, payment and ticketing from multiple transport operators**
- It can also integrate vehicle services such as tolling, parking, fuel & electric charging and repair
- It can be offered as a subscription or in a pay-per-use model **through a smartphone application**
- MaaS enables users to make **more sustainable choices**, shifting from private vehicles to public transport and **integrating the fragmented mobility market**



MaaS is developing in many cities, driven by 8 key factors

Driving factors of MaaS

Connected & trackable transportation

- **Cellular connectivity & geo-positioning** of bikes, cars, e-scooters, mopeds and public transportation vehicles
- **Real-time data from multiple modes of transportation**

Higher data storage & processing capacity

- Improvement of **cloud processing and computing power leading to faster data transmission**
- The decreasing **cost of cloud-based server storage**

Shared and open data transmission

- **Data and service integration**, shared by mobility players
- **Cities' smart mobility plans**, to provide **open APIs for data sharing processes**

Digital and smartphone payments

- Electronic payments becoming widely available
- **Contactless cards and smartphone payments ease the riders' journey**

Smartphone as a mobile access to online platforms

- **An integrated fare system and online payment via smartphones**
- Smartphones' **GNSS positioning capability**

Low-cost alternatives to ownership model

- Emergence of **on-demand mobility services**
- **Efficient integration of multiple transport modes**
- **No ownership cost for the user**

Emission and congestion regulations

- **Increasing restrictions for private cars in urban areas**
- **Congestion & pollution-related charging schemes** impose additional costs on car ownership

New generations moving away from cars

- The number of **young drivers with driver licence has significantly dropped globally**
- Younger generations living in urban areas are more likely to move in public transport and new shared transport modes

MaaS can lead to reduced emissions and congestion in urban areas

- **MaaS will integrate all transport modes, mobility services and technology developments, including:**

- Autonomous vehicles
- Electric vehicles
- Shared mobility
- Micro-mobility
- eVTOL
- Public transportation

- For **car owners**, it can **incorporate services such as:**

- Parking
- Tolling
- Charging infrastructure
- Fuel stations
- Access to other transport modes

- **The more mobility alternatives commuters have, the better their ride is as they:**

- **Reduce time spent**

- Avoid **disruptions such as strikes or congestion** by switching to other transport modes
- Avoid searching for parking
- Better time management thanks to routing prediction tools

- **Reduce cost,**

- Choose the most cost efficient mode
- Save on the cost of buying, insuring and maintaining a car

- **Increase comfort**

- Time to do other things than driving
- Combining mobility services smoothly
- Different transport modes to reduce time

- **Improve health by shifting to cycling or walking**

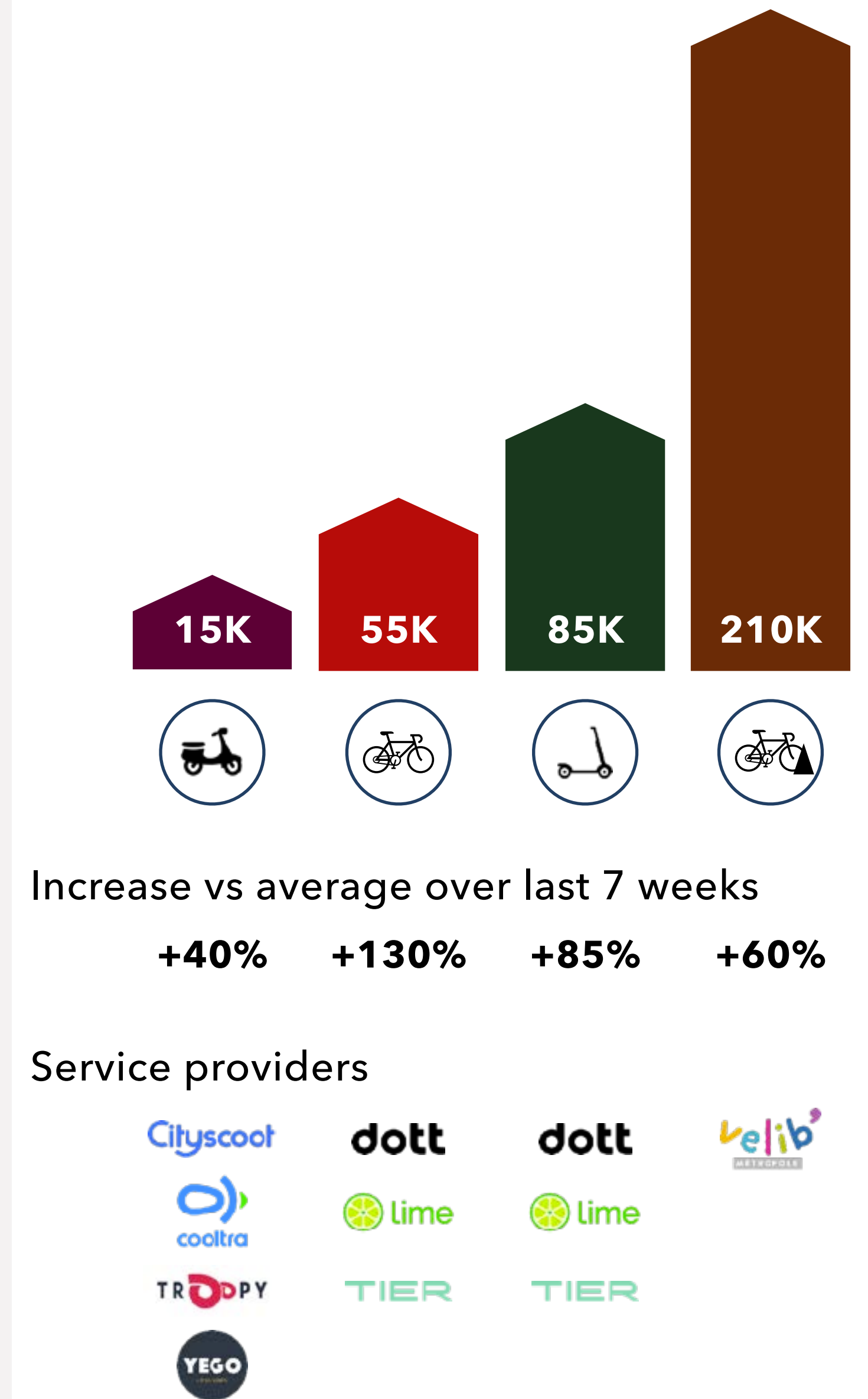
- MaaS allows commuters to plan, move using different transport modes and pay in a smooth manner

- All integrated into a single planning and payment platform
- Accessible through smartphones

- **A wide implementation of MaaS would solve most of today's biggest issues of urban mobility**

- Non-efficient use of transportation
- Congestion
- Emissions
- Lack of accessibility
- Lack of coverage
- Limited space and green areas

Utilisation of shared mobility during public transport strikes (Paris, 10th November 2022)



MaaS has the potential of becoming the equivalent of music and video streaming in mobility

- **MaaS shares key characteristics with video & music streaming services** as it is:
 - **On-demand**
 - **User-centric** (vs transport-centric)
 - **Based on real-time information**
 - **Comparing alternatives**
 - **Optimised according to users' preferences**
 - **Traceable and rechargeable**
 - **Delivered through a platform**
 - **Accessible with a click**
- Still, **MaaS faces several adoption barriers**, including:
 - The need to **insure the provision of the services** (i.e. maintaining the fleet of bikes or mopeds) and to **build a robust digital platform**
 - Multiple **developments need to happen to integrate tracking, routing, payment and ticketing into a single platform**
 - In most cities, the **incumbent public transport operators keep the transport service delivery closed to other private or public stakeholders**
- Service providers need to establish the following:
 - **Partnerships** for multi-modal integration and agreement on contractual responsibilities
 - **Rules for revenues distribution**
 - Agreements on the **rules to manage information rights and privacy**
 - Methods to protect the **security of digital transactions**
- Insurers need to develop relevant **policies for users and suppliers**
- Several **uncertainties** remain on MaaS' future development, including the following:
 - **The success of the subscription model**
 - **The pace of adoption**
 - **The winning model for each user segment**
 - **The dominant player(s)**
- Before we needed to own CDs and CD players; today music is all shared, in the cloud and accessible universally
- Once service providers fully replicate the end-to-end journey, **commuters will have access to all mobility services with a single click**

“ The true added value of MaaS is the strong integration of multiple apps into a single one: you know the options and you can pay for them directly.

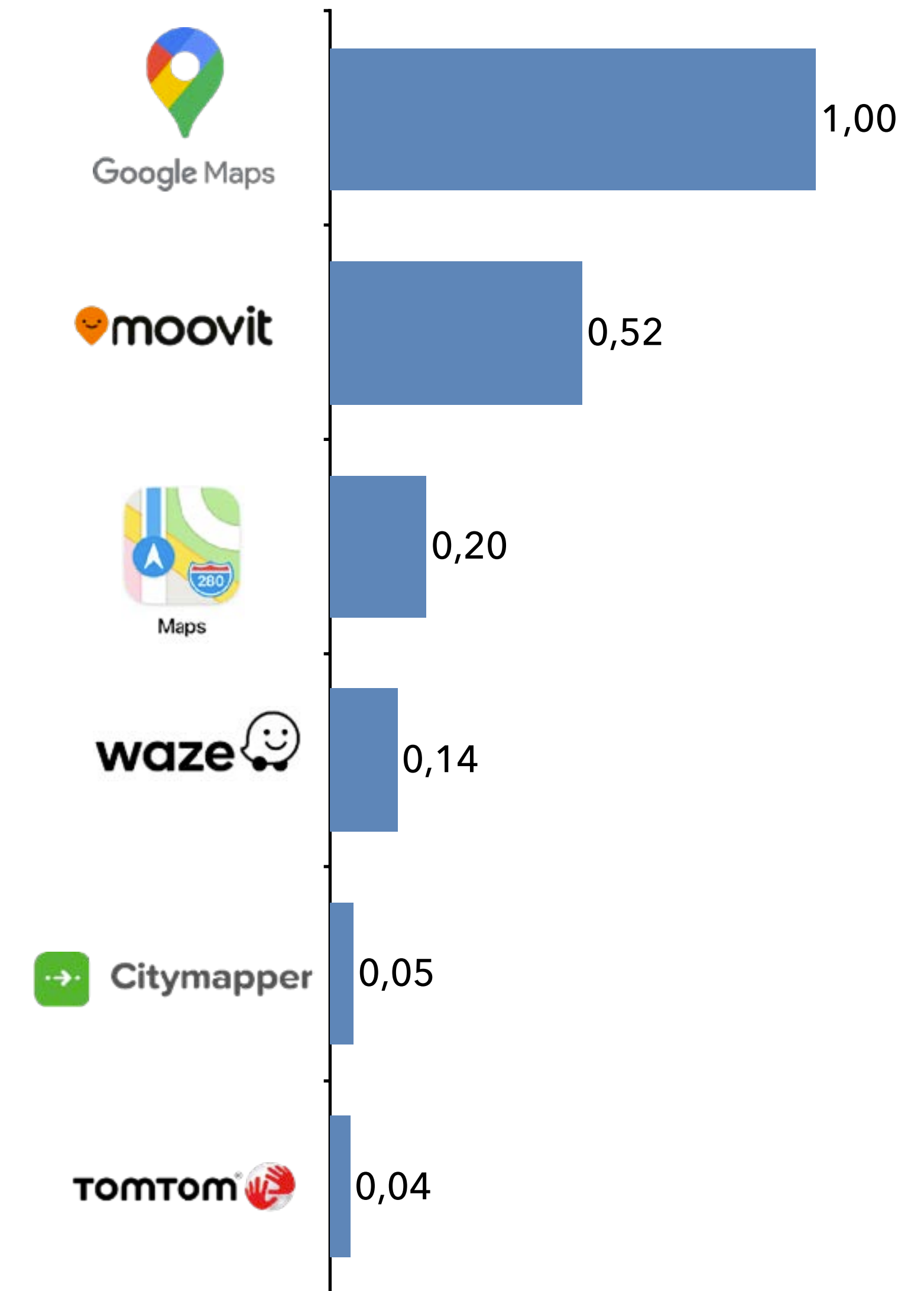
Thus it becomes much more than a map, it helps in promoting healthy mobility choices, it gently re-shapes the way cities look. ”



We chose to focus on Google due to its leadership in mobility but also because all of its services are free for travellers

- As it happened for Netflix in video and Spotify for music streaming, we expect the first player that shapes the concept to become the reference in the mobility ecosystem
- As the industry evolves, maybe more will do so, but one will disrupt the market and integrate a universal solution
- Google appears to us as the best positioned to do so
- Google search is the most used web service in the world by far
 - Google search + YouTube (part of Google's group) generated 13 times more visits than Facebook, the 3rd most visited web site
- Google Maps is the most popular tool for location-based search and it comes by default in Android phones, the leading smartphone operating system
 - It is the most advanced player with worldwide information and mobile mapping services for end users
 - It includes real time traffic information, crowded places updates, public and commercial transport availability and schedules
 - Google has already integrated with a very large number of transport service providers to collect data for its navigation and transit services
- Last but not least, all of Google services to consumers are free of charge and financed by advertising, making it disruptive
- With all these factors, we have a reason to ask: **how far Google's interests and presence in mobility could expand?**
 - Google is a powerful player, whose **steps have disrupted various industries, from phones** (cf Nokia) **to navigation** (cf TomTom) **and points of interest** (cf. Foursquare)
 - As its business model differs from traditional mobility services or technical solutions providers, would that result in the disruption of the mobility industry?

Number of users of mapping services (billion)



We have chosen to conduct this analysis with a European focus



We have chosen to focus the scope of this report in Europe for several reasons:

- Europe offers the **ideal conditions as a testbed for MaaS** because of its broad range of transport alternatives
 - Europe is the continent with the **highest rail density***
 - It has one of the **highest ratios of vehicles per capita**, resulting in large traffic jams in the urban areas
 - Leading micro-mobility providers such as TIER, LIME and Dott have their largest fleets in Europe
 - Compared to Q2 2021, in Q2 2022, **the shared mobility ridership increased by 48% in several western European countries****
- EU institutions actively promote a new approach towards urban mobility, based on access to **reliable public transport, widely supported by multi-modal travel**

- MaaS is among the solutions the European Commission has listed in its New Urban Mobility Framework
- Regulation, pilot projects, and research funding address the **transition to new forms of mobility around EU cities**
- Finally, the EU leads in the **proactive regulation against the dominance of tech giants in the digital domain:**
 - **Google's market dominance** is among the **primary targets** for the recently adopted **Digital Markets Act**
- For Google's strategy and initiatives analysis, we kept a global scope

While mobility differs in other continents, we believe that **most large cities**, whether in North America, Asia or other regions, **will need to consider MaaS to make mobility sustainable**

The report mentions 85+ companies and organisations, including...

Company	Type	Company	Type	Company	Type
9292	Public Transport Operators	Hacon	Mobility Service Providers	Sixt	Mobility Service Providers
EMT		Helbiz		Skipr	
RATP		Hochbahn		Skyss	
Rejseplanen		HTM		Telepass	
Renfe		Imbric		Tier	
VBB		INRIX		Tomtom	
Avocargo	Jelbi	Trafi		Mobility Service Providers	
BerlKönig	Karhoo	Travis			
Bip&Drive	Keolis	Troopy			
Bird	Kinto	Uber			
BlaBlaCar	Kolumbus	Vaigo			
Blue-bike	Lime	Velib			
Bolt	Lyft	Voi			
Breng	Lyko	Waze			
Brixlane	Mile	Wegfinder			
Cambio	Mobiflow	WeShare			
Citymapper	Mobileeee	Whim	TSP		
Cityscoot	mobilleo	WienMobil			
Cooltra	MOIA	Yego	Autonomous Vehicles		
Cozy car	Moovit	Octo			
Dott	Movitaxi	Waymo	Insurers		
DSB	Nabogo	Metromile			
Emmy	Poppy	Nationwide	Payment Service Providers		
Entur	Qbuzz	Logpay			
Fluidtime	Reby	BePark	Parking solutions		
Freenow	Ruter	Parkmobile			
Fynbus	ShareNow	Passport			
Gett	Siemens				
Google	Sigo				

The report is divided into 7 sections

1 Introduction	1	5 The future of the MaaS market	156
1. Definitions		1. 5 factors influencing transport choices	
2. Context		2. The perceived value of MaaS	
2 Understanding MaaS	21	3. MaaS divers and inhibitors	
1. The 5 levels of MaaS		4. Future MaaS scenarios	
2. MaaS business models		6 The future role of Google in the MaaS market	196
3. Dutch deployments		1. Google's current position	
3 Value chain and power players	61	2. Return and risk assessment	
1. MaaS value chain		2.1. Potential revenues	
2. Company profiles		2.2. Cross-selling and synergies	
3. Power players analysis		2.3. Competition	
4 Mapping Google's strategy in mobility	121	2.4. Regulation and relationship with the EU	
1. What has been Google doing so far?		2.5. Alignment with the corporate strategy	
2. Alphabet and Google		3. Google's future alternatives	
3. Zoom in to Google Maps		4. Google's future position in the MaaS ecosystem	
4. Waymo		7 Conclusions and recommendations for players	236
5. Google Wallet		1. Short and long-term goals, challenges and recommendations	
6. Waze		2. Conclusions	

In section 1, we analyse MaaS driving factors and the rationale for the report, including why we have selected to focus on Europe and Google

- This first section includes 20+ slides
- It defines MaaS and its key driving factors and the reasons we have selected Europe and Google in the scope of the report

1 Introduction - What is MaaS?

While there are several definitions of MaaS, the basic elements remain the same

- Multiple definitions emphasise different aspects of Mobility as a Service
- Most of them share the same basic elements:

"Mobility as a service (MaaS) is a type of service that, through a joint digital channel, enables users to plan, book, and pay for multiple types of mobility services."

The concept describes a shift away from personally-owned modes of transportation and towards mobility provided as a service.

This is enabled by combining transportation services from public and private transportation providers through a unified gateway that creates and manages the trip, which users can pay for with a single account. Users can pay per trip or a monthly fee for a limited distance."

"MaaS is the integration of various forms of transport services into a single mobility service, accessible on demand."

For the user, MaaS offers added value through the use of a single application to provide access to mobility, with a single payment channel instead of multiple ticketing and payment operations."

"MaaS combines intelligent journey planning, seamless integration of ticketing and booking as well as big data analytics, combined in flexible and secure MaaS. It can make it easy and convenient for stakeholders to find their individual way through the mobility jungle and improve intermodal mobility - for the benefit of travellers and operators alike."

"MaaS is the integration of, and access to, different transport services (such as public transport, ride-sharing, car-sharing, etc.) through a single digital channel."

Smartphones are the nexus between users and mobility service providers

Smartphone-based mobility service providers



Source: PTOLEMUS

Smartphone as a mobile access to online platforms

- An integrated fare system and online payment via smartphones
- Smartphones' GNSS positioning capability

• Smartphones act as portable access to mobility

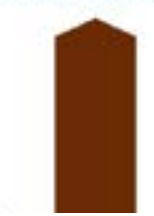
1 Introduction - Why is MaaS such a important mobility development?

MaaS can lead to reduced emissions and congestion in urban areas

- MaaS will integrate all transport modes, mobility services and technology developments, including:
 - Autonomous vehicles
 - Electric vehicles
 - Shared mobility
 - Micro-mobility
 - eVTOL
 - Public transportation
 - For car owners, it can incorporate services such as:
 - Parking
 - Tolling
 - Charging infrastructure
 - Fuel stations
 - Access to other transport modes
 - MaaS puts the commuter in the centre, not the vehicle
- The more mobility alternatives commuters have, the better their ride is as they:
 - Reduce time spent
 - Avoid disruptions such as strikes or congestion by switching to other transport modes
 - Avoid searching for parking
 - Better time management thanks to routing prediction tools
 - Reduce cost,
 - Choose the most cost efficient mode
 - Save on the cost of buying, leasing and maintaining a car
 - Increase comfort
 - Time to do other things than driving
 - Combining mobility services smoothly
 - Different transport modes to reduce time
 - Improve health by shifting to cycling or walking
 - MaaS allows commuters to plan, move using different transport modes and pay in a smooth manner
 - All integrated into planning and payment platform
 - Accessible through smartphones
 - A wide implementation of MaaS would solve today's biggest urban mobility issues:
 - Non-efficient use of transportation
 - Congestion
 - Emissions
 - Lack of accessibility
 - Lack of coverage
 - Limited space and areas

Source: PTOLEMUS - Eucap

Utilisation of shared mobility during public transport strikes (Paris, 10th November 2022)



We have chosen to start this analysis with a European focus



Source: PTOLEMUS - Note: *World Bank 2019; **Eucap European Shared Mobility Index

We have chosen to focus the scope of this report in Europe for several reasons:

- Europe offers the ideal conditions as a testbed for MaaS because of its broad range of transport alternatives
 - Europe is the continent with the highest rail density*
 - It has one of the highest ratios of vehicles per capita**
 - It is one of the regions with the most relevant on-demand and shared mobility developments in the last years
 - Leading micro-mobility providers such as TIER, LIME and Dott have their largest fleets in Europe
 - Compared to Q2 2021, in Q2 2022, the shared mobility ridership increased by 48% in several western European countries**
- EU institutions actively promote a new approach towards urban mobility, based on access to reliable public transport, widely supported by multi-modal travel

• MaaS is among the solutions the European Commission has listed in its New Urban Mobility Framework

• Regulation, pilot projects, and research funding address the transition to new forms of mobility around EU cities

• Finally, the EU leads in the proactive regulation against the dominance of tech giants in the digital domain:

- Google's market dominance is among the primary targets for the recently adopted Digital Markets Act

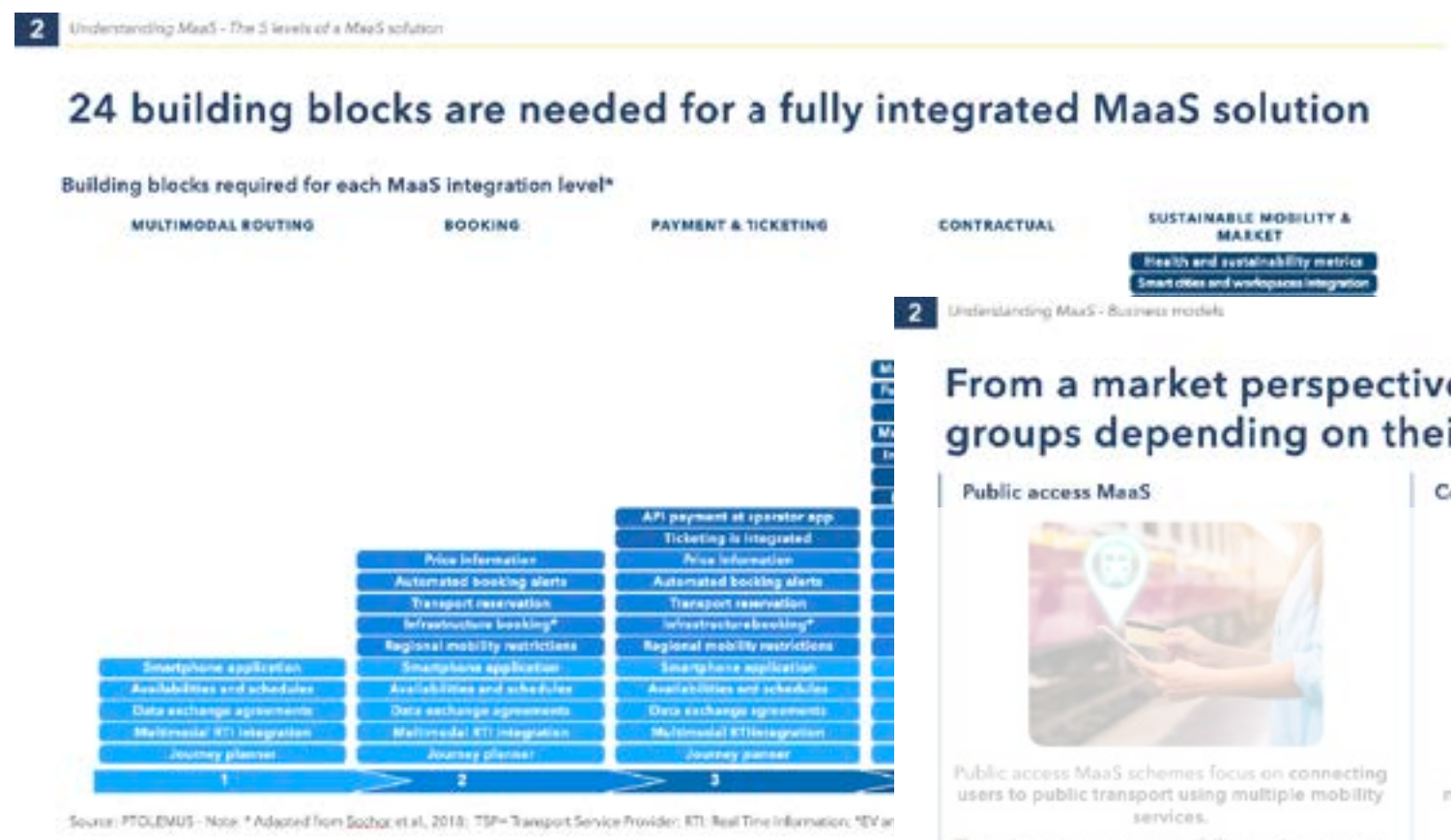
While mobility differs in other continents, we believe that most large cities, whether in North America, Asia or other regions, will need to consider MaaS to make mobility sustainable

PTOLEMUS 22

- We chose to focus on Europe for several reasons, including
 - The **broad range of transport alternatives** available in the European market
 - The **promotion of a new approach towards urban mobility** by EU institutions

In section 2, we analyse the MaaS building blocks, delivery models and the most successful European case studies

- This second section includes 40+ slides
- It dives into the **5 levels to climb to build a fully integrated MaaS service**, including the 24 key building blocks required for each MaaS integration level



2 Understanding MaaS - Comparing MaaS use cases

• OV-chipkaart and 9292 launched a MaaS initiative in the Netherlands to build a single public transport solution for the country

• Rejsekort and Rejseplan MaaS initiative in Denmark took over Google Maps in terms of users

While public transport is widely adopted, ride hailing, car pooling and car rental are not

Transport mode	OV-chipkaart	9292	Jelbi	ENTUR	Rejsekort	Rejseplan
Urban transit/Metro	✓	✓	✓	✓	✓	✓
Regional train	✓	✓	✓	✓	✓	✓
Urban bus/coach	✓	✓	✓	✓	✓	✓
Tram	✓	✓	✓	✓	✓	✓
e-Scooters	✓	✓	✓	✓	✓	✓
Bicycle	✓	✓	✓	✓	✓	✓
Regional bus/coach	✓	✓	✓	✓	✓	✓
Moped	✓	✓	✓	✓	✓	✓
Taxi	✓	✓	✓	✓	✓	✓
Car sharing	✓	✓	✓	✓	✓	✓
Infrastructure*	✓	✓	✓	✓	✓	✓
Ride hailing	✓	✓	✓	✓	✓	✓
Car pooling	✓	✓	✓	✓	✓	✓
Car rental	✓	✓	✓	✓	✓	✓

• All selected programmes follow a public access business model and thus they are all centred integrate public transport modes

• Thus, Public transportation is a standard choice for all these programmes

• Similar with micromobility, most players have been able to integrate e-scooters and e-bikes as micromobility service providers have open platforms and want to drive traffic into their network

• Ride hailing, Car pooling and Car rental remain unpopular services

• In most cases the objective of these programmes is to promote alternatives to cars

• Ride hailing in some of the regions is not legal

• This situation reflects the complexity to coordinate private and public entities into a single platform

• For public access schemes, that have as an objective to improve public transportation access and reduce car usage, MaaS suppliers should also include mobility schemes in MaaS platforms

• Car sharing can give the alternative to car owners to still have the possibility of use a car

• Enabling such services can improve the offer and move segments of users to public transportation that would not otherwise

PTOLEMUS 41

- It examines the **3 main MaaS business models**: Public access, Commercial and Corporate MaaS
- It presents **7 major MaaS initiatives in Europe** and includes a comparison of the transport services they offer

In section 3, we analyse the MaaS value chain, and profile and benchmark the key MaaS suppliers in Europe

3 Value chain and power players

The MaaS value chain has 10 steps, starting with vehicle manufacturing and infrastructure management



The European MaaS ecosystem is very fast and many companies are still finding its place on it



Thanks to its acquisitions, Siemens participates in a wide-range MaaS schemes across Europe

Company headline:

- Siemens Mobility and its subsidiaries offer full-scale digital MaaS solutions
 - Ranging from a comprehensive MaaS platform and apps to specific services such as ticketing, transport timetable and on-demand public transport
 - The company also provides solutions to support MaaS programmes, including data analysis and fleet management
- Siemens Mobility family has enlarged by acquiring industry leaders since 2017:
 - HaCon: journey planning and travel information
 - Bytemark and eoa: e-ticketing
 - PADAM Mobility: demand responsive transport
 - Spilte: Capacity optimization for rail and bus

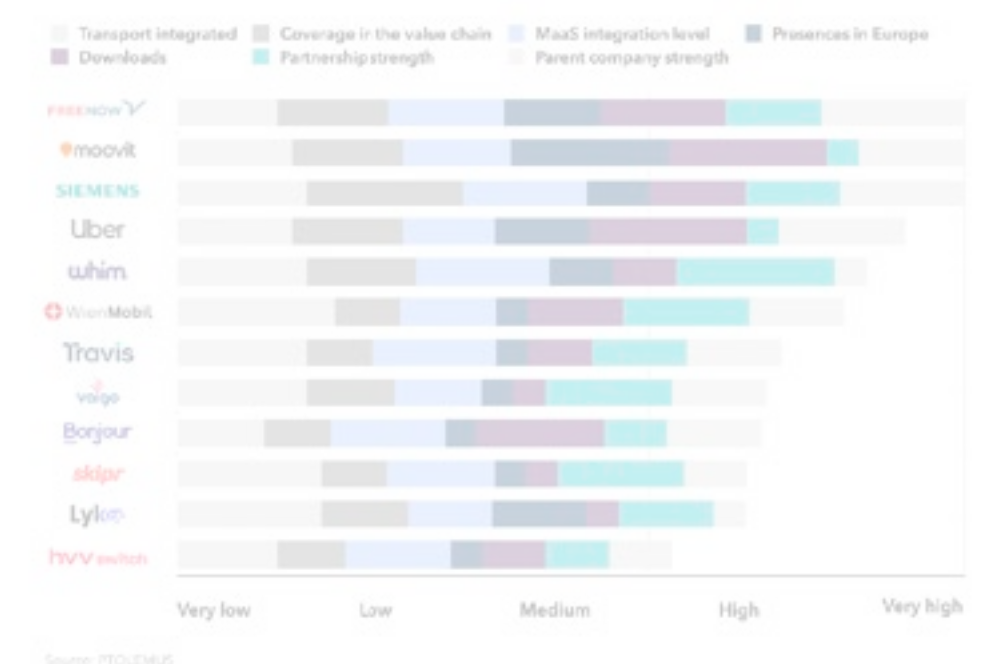
Mobility projects implemented*

Business model:

- Siemens Mobility and its subsidiaries can cover almost every step of the MaaS value chain
 - From building the MaaS platform and integrating different transport modes to app development and other customised MaaS services
- Siemens Mobility offers digital solutions a manufacturer of rail transport vehicles such as trams and metros
- The company serves
 - Countries and cities, by offering a customise platform or widening the integration of TSPs
 - Corporations
 - Customers to expand their service offerings
 - Solutions for their employees (corporate MaaS)

- This third section includes 60+ slides
- It dives into the **9 steps of the MaaS value chain** and positions the **leading players** in each of them

FREE NOW, Moovit and Siemens have the highest score when analysing them on multiple dimensions



- Transport integrated: transport modes integrated
- Coverage in the value chain: steps covered in the value chain
- MaaS integration level
- Presences in Europe
- Download: app downloads
- Partnership Strength: partnership depth
- Parent company strength: revenue of the parent company

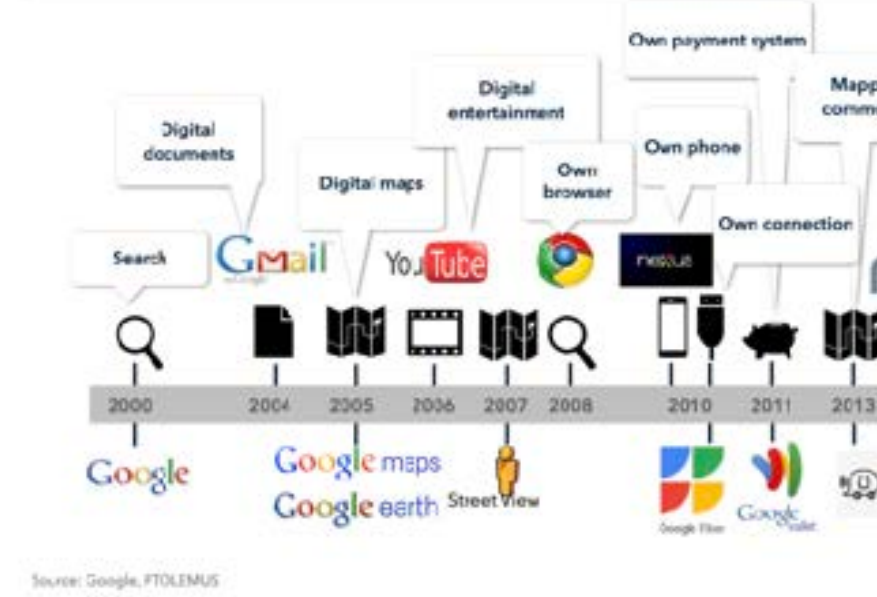
- It profiles the 12 leading MaaS suppliers in Europe
- It **compares them based on 7 criteria**, and shows the links they have with Google Maps

In section 4, we map Google's strategy in mobility

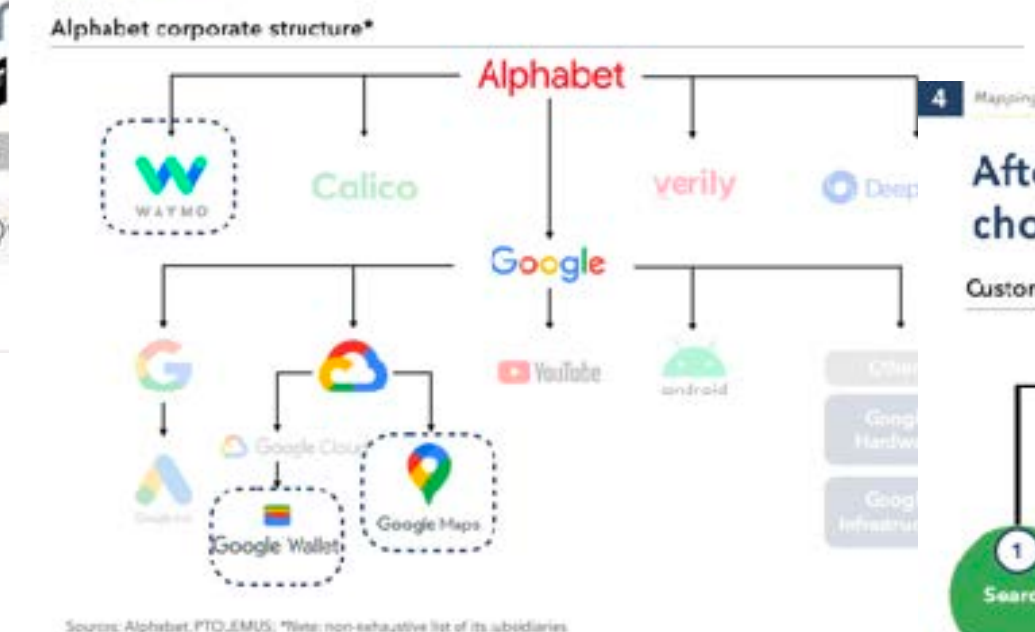
4 Mapping Google's strategy in mobility - What has been Google doing so far?

Google expanded its offer to a plethora of services reaching customers across many digital platforms

Google products' timeline



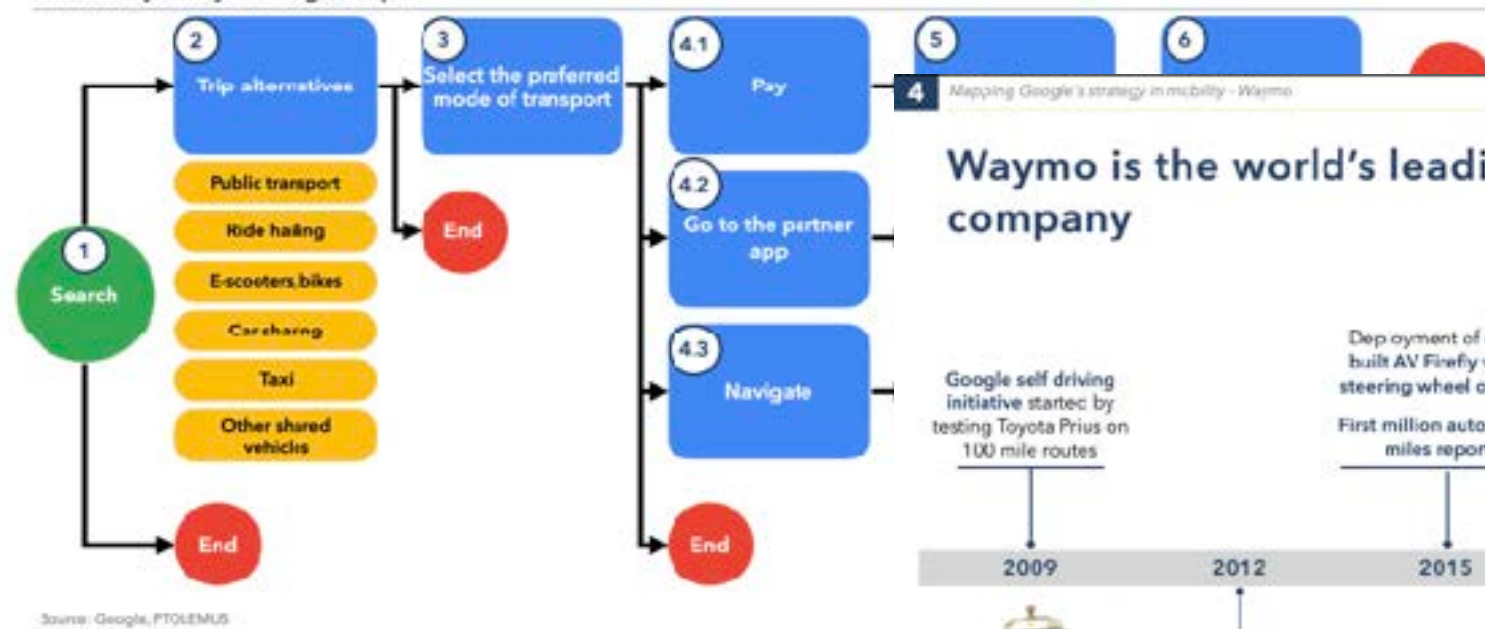
Alphabet's 3 most relevant businesses for mobility are Waymo, Google Maps and Google Wallet



Google self-driving car programme was created in 2009 with 15 Google engineers, and the programme became Waymo in 2016. Waymo is the world's first robotaxi service. Its AVs are launched in suburban areas where vehicles can provide a cheaper service compared to traditional taxis. In 2021, Waymo's vehicles were available in Phoenix and San Francisco, and its fleet had driven more than 28 million kilometres.

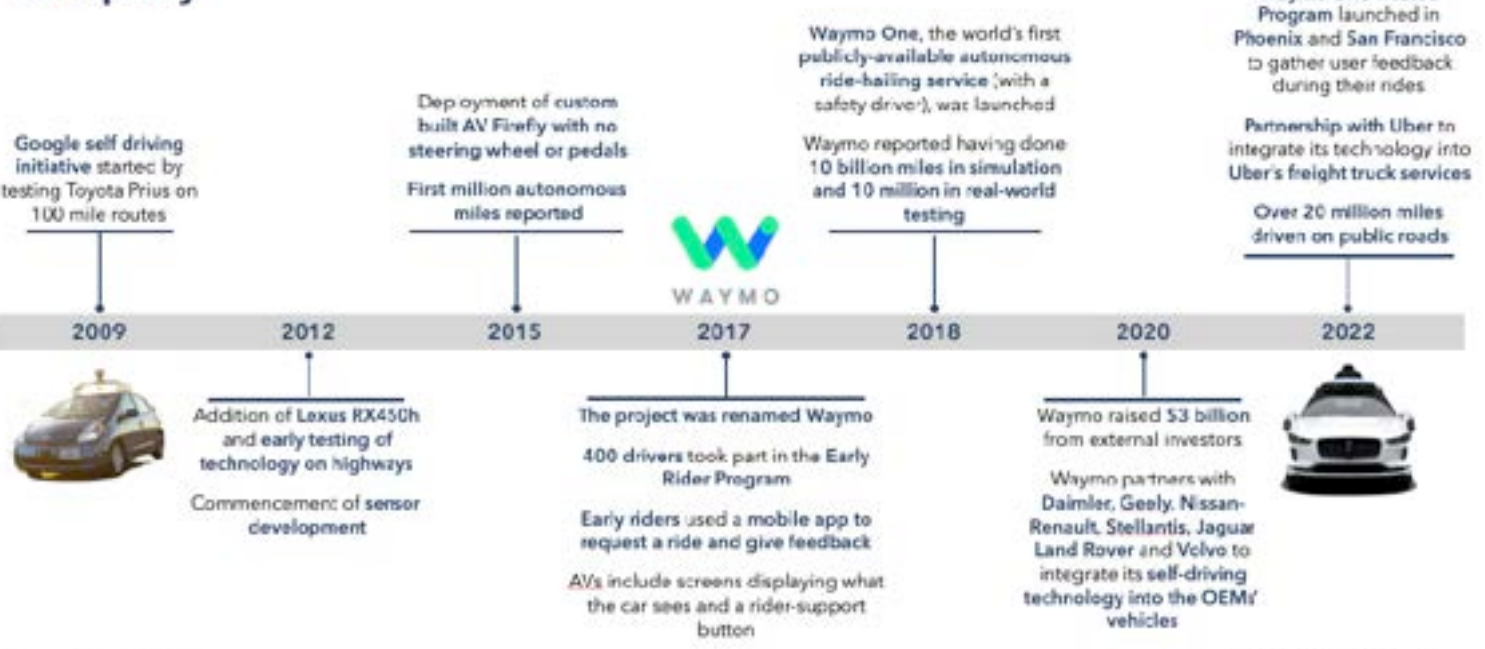
After selecting their preferred route, Google Maps users have the choice between paying a ticket, going to the partner app or navigating

Customer journey in Google Maps



- This fourth section includes 35+ slides
- It dives into the evolution of Google and its changing role and activities in the mobility ecosystem

Waymo is the world's leading autonomous driving technology company



- It describes **Google Maps'** evolution, features, customer journey and business model
- It analyses Google's other initiatives in mobility, including **Waymo, Google Wallet and Waze**

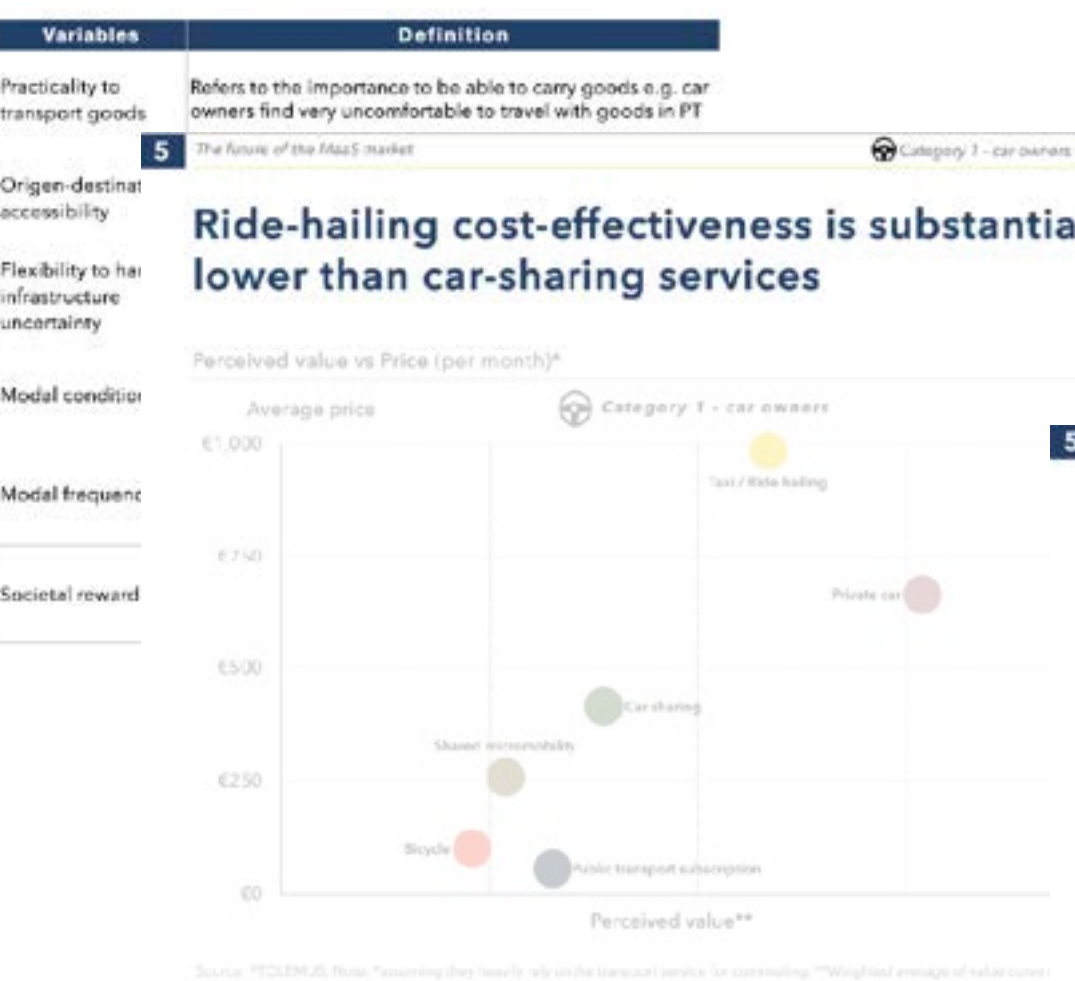
In section 5, we evaluate the customers' segments needs, future drivers of demand and supply, and MaaS evolution scenarios

5 The future of the MaaS market

We selected 12 key factors affecting travel choices of users

Variables	Definition
Weather comfort	Refers to how important the weather conditions are when choosing to travel in a transport service e.g. For car owners weather conditions are more important than PT users
Easiness to travel	Refers to how comfortable users are without previous knowledge of the transport services before taking it e.g. tourist feel more uncomfortable in PT if they do not know the system
Door-to-door time	Refers to how sensitive users are to the total time to reach a destination (including waiting times) e.g. car owners are particularly sensitive to PT delays and waits
Freedom to ride with people	Refers to how important is to be able to travel together with companion when choosing a transport mode e.g. tourists prefer to travel together
Driving pleasure	Refers to the pleasure of driving a vehicle e.g. e-scooters or e-bikes are considered fun to travel with
Utilise travel time	Refers to the value given to the ability to do other activities while travelling e.g. ride hailing users can focus on readings or work during their ride

Source: PTOLEMUS



Ride-hailing cost-effectiveness is substantially lower than car-sharing services

- Frequent drivers are less sensitive to price when the service chosen provides similar advantages than a private car.
- Although car-hailing is the most expensive mobility service, frequent drivers in the segment 1 perceive it more convenient than car-sharing
- Conscious drivers are more price sensitive, thus, they might be inclined to choose car-sharing
- Car-sharing is on average 3 times less expensive

5 Google in mobility - Future MaaS scenarios

Lack of agreement on European regulation of digital services and consumer rights lead to slower MaaS adoption

Regulation inhibitors impacting MaaS in Europe

Main inhibitors	Market impact
1 Digital Markets Act and Digital Market Services	<ul style="list-style-type: none"> The Digital Markets Act regulates market for consumers - i.e. prices, service quality, and small companies - i.e. terms and conditions of service The Digital Markets Services regulates digital commerce in the EU Both regulations will affect the entry of mobility platform providers and services they can integrate and offer in the EU
2 Anti-trust regulations	<ul style="list-style-type: none"> Anti-trust regulation impedes monopolistic behaviour in any sort of arrangement that plays against free-market and fair competition Largest platform providers for mobility, payment or information might find it difficult to enter the market
3 Consumer rights protection and data privacy	<ul style="list-style-type: none"> Different consumer rights directives and difficulty to comply with the obligations assigned to platform providers in order to offer the MaaS service Inconsistencies in data privacy legislation between EU countries bring obstacles for international mobility platforms to penetrate local MaaS market

Source: PTOLEMUS



We use the most important technological, market and regulative drivers and inhibitors to build future scenarios of MaaS

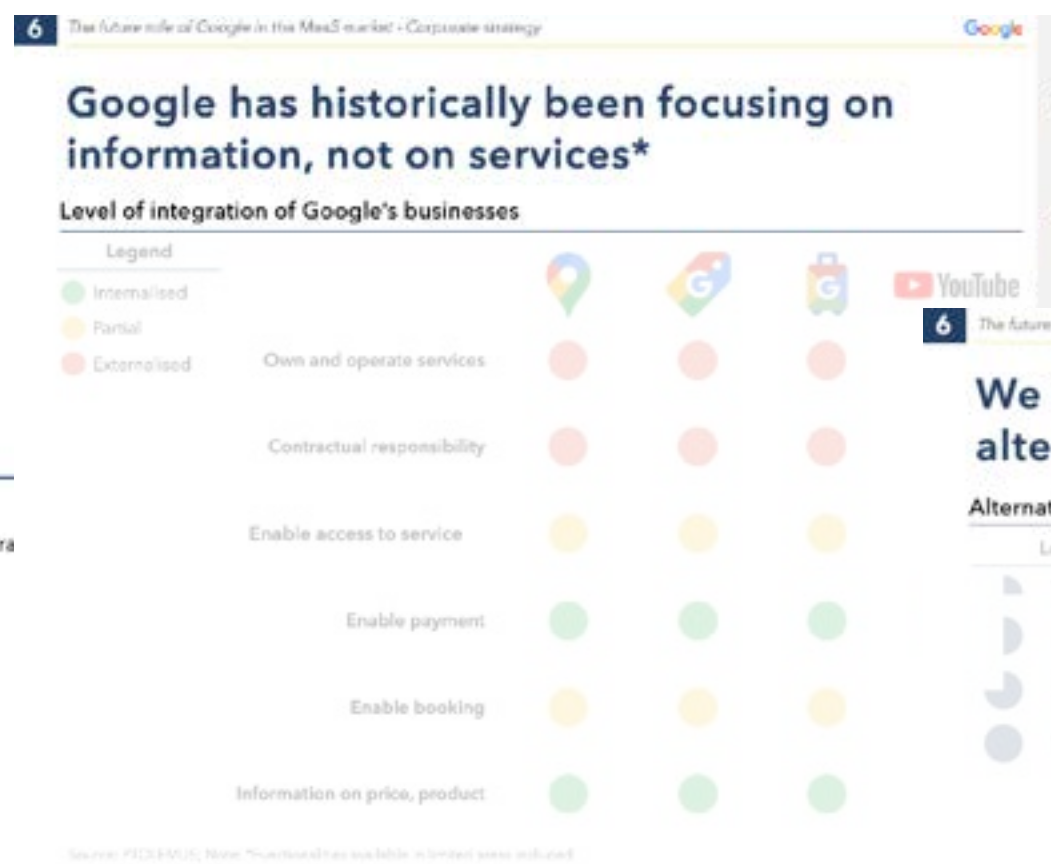
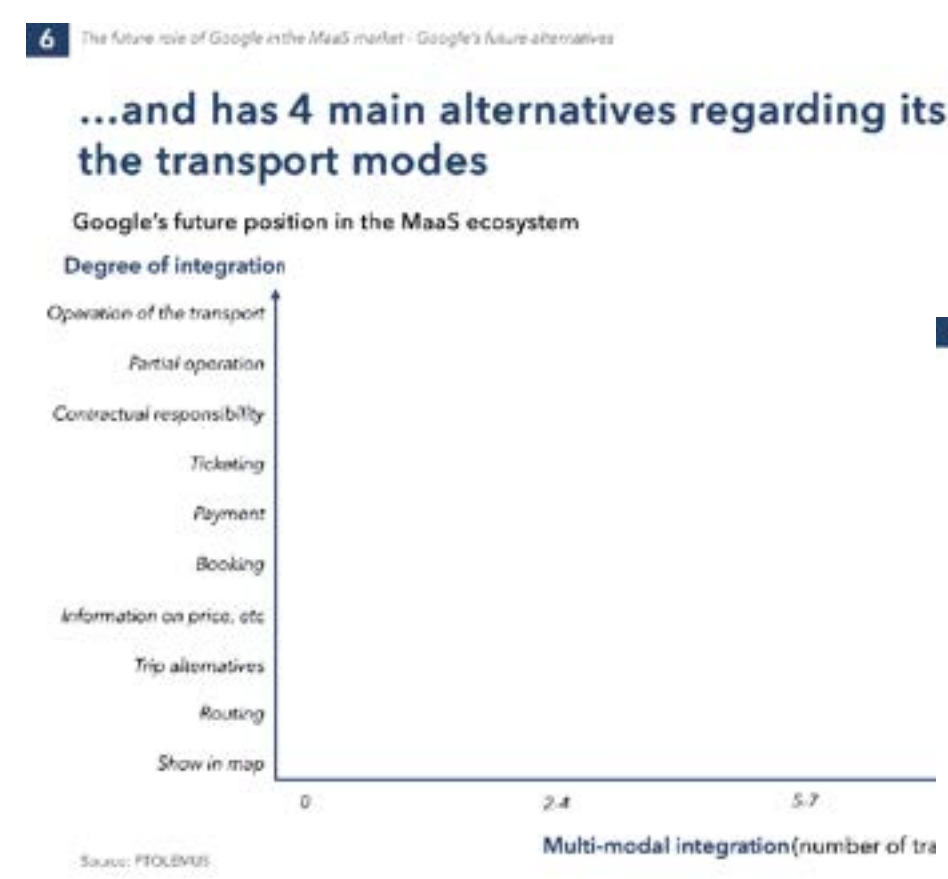
Category	Variable	S1	S2	S3
Environmental and data policy	Heavy taxation to petrol/gas vehicles	✓	✓	✓
	EU Green Deal based implementation	✓	✓	✓
	Consumer protection	✓	✓	✓
	Digital market acts and anti-trust regulation	✓	✓	✓
	API/CSV level integration	✓	✓	✓
Infrastructure and socio-economic developments	Clear MaaS regulation	✓	✓	✓
	Taxation extended to EV cars	✓	✓	✓
	Car ownership decreases	✓	✓	✓
	Improved electric infrastructure grid	✓	✓	✓
	Increased urban and area	✓	✓	✓
Infrastructure and socio-economic developments	Transition towards green energy	Moderate	Fair	Low
	MaaS awareness	Moderate	High	Low
	Energy crisis	Mild	Strong	Mild
	Economic crisis	Mild	Strong	Sustained
	MaaS learning curve	Mild	High	Low
Technological progress	Smartphone payment expansion	✓	✓	✓
	Expansion of EV	✓	✓	✓
	PTD increased data use, system efficiency	✓	✓	✓
	AI implemented	Mildly	Low	Low
	Customisable mobility services	Common	Common	Rare
Industry developments	Business models reduce CO2 emissions	✓	✓	✓
	Integrated mobility	✓	✓	✓
	Tech giant get more active in MaaS	✓	✓	✓
	ODMs get strongly involved in MaaS	✓	✓	✓
	PTD open systems	✓	✓	✓
Industry developments	High degree of regulations	✓	✓	✓
	PTD collaborate with data to build MaaS	Mild	Strong	✓
	TSP open systems	✓	✓	✓
	Protected market for small players	✓	✓	✓
	ODMs keep out from MaaS	✓	✓	✓
Industry developments	Large degree of regulations	✓	✓	✓
	Large degree of regulations	✓	✓	✓

Source: PTOLEMUS

- This fifth section includes 40+ slides
- It segments the MaaS market to understand which business modes could serve each category and analyses the perceived value and the price of mobility services for each category

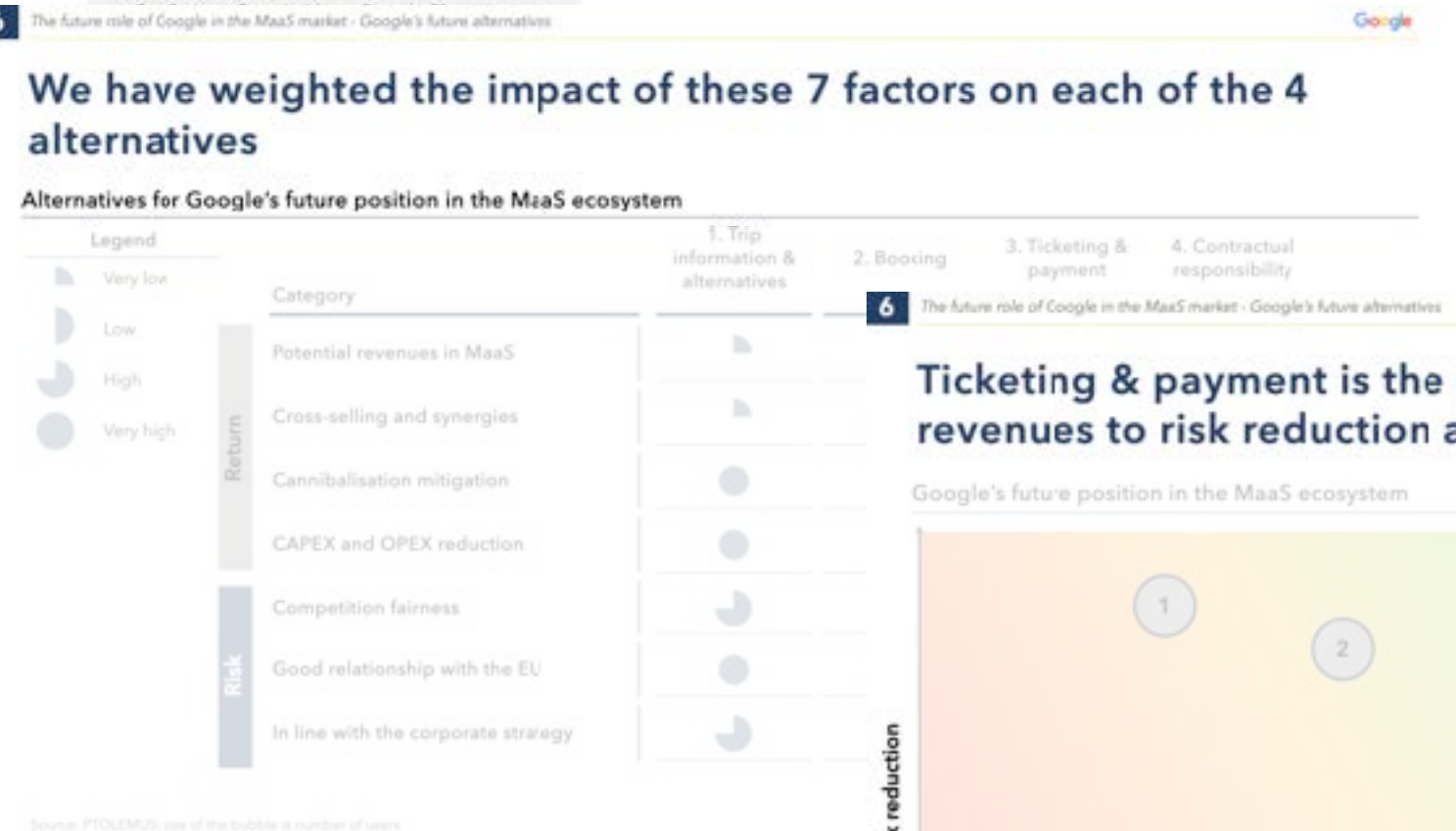
- It studies the regulation, market and technology drivers and inhibitors impacting MaaS in Europe
- It builds future scenarios of MaaS in Europe and assesses their respective likelihood

In section 6, we predict the future role of Google in the MaaS market



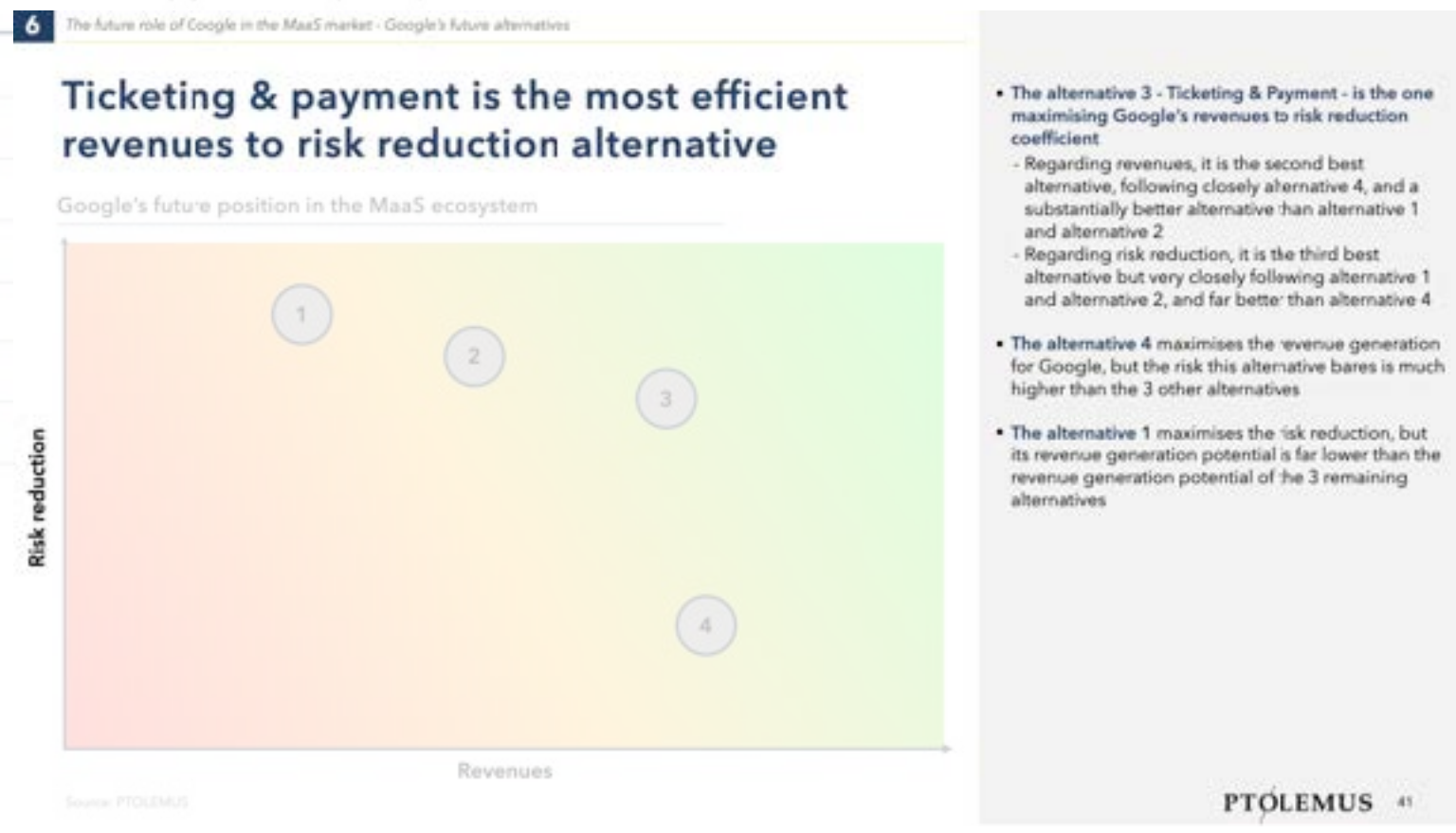
As we have seen, Google Maps has been historically focusing on providing route planning information, and on integrating as many transport modes as it could on its platform

Google Shopping, Google's e-commerce and price comparison website, is based on a pay-to-play model where businesses pay Google to list their product on the website



- This sixth section includes 40+ slides
- It assesses the **alternatives Google has in the future MaaS market** based on 7 risk and return categories, including potential revenues, competition and EU regulations

- It includes a **market sizing of the mobility market** and its main transport modes
- It defines **Google's most optimal future position in the MaaS ecosystem** considering the likelihood of the 3 MaaS evolution scenarios



- The alternative 3 - Ticketing & Payment - is the one maximising Google's revenues to risk reduction coefficient
 - Regarding revenues, it is the second best alternative, following closely alternative 4, and a substantially better alternative than alternative 1 and alternative 2
 - Regarding risk reduction, it is the third best alternative but very closely following alternative 1 and alternative 2, and far better than alternative 4
- The alternative 4 maximises the revenue generation for Google, but the risk this alternative bears is much higher than the 3 other alternatives
- The alternative 1 maximises the risk reduction, but its revenue generation potential is far lower than the revenue generation potential of the 3 remaining alternatives

PTOLEMUS 41

In section 7, we provide our conclusions and recommendations to the key MaaS players

- This seventh section includes 15+ pages
- It classifies MaaS players into 6 different groups

7 Conclusions and recommendations for players - Introduction

We have evaluated short and long-term challenges and recommendations for MaaS players

- Whilst more companies in the MaaS ecosystems keep entering and exiting cities around Europe, we see all players face multiple challenges in the short and long-term to address a market that remains volatile
- Based on the value chain in Section 3, we classified players of the ecosystem into 6 different groups:
 1. Transport Governance: governments behind the legislation of transport in cities and regions
 2. Citizens: people living in cities using transport services
 3. Back-end and systems players: companies building the back-end MaaS platform e.g. Lyko, Google Maps, City Mapper, and building the application e.g. Via, Whim
 4. MaaS providers: user-facing companies, which are the ones who provide the application users interact with e.g. Skipr, Uber, Whim
 5. Transport Service Providers (TSPs): companies providing commercial transport services e.g. Tier, Lime, Donkey Republic
- 6. Public Transport Operators (PTOs): agencies providing public transport services e.g. RATP, DcLijn, EMT
- These players do not exclusively belong to a group and they can offer services in different non-consecutive parts of the value chain
- Based on interviews and commercial transactions, PTOLEMUS identified some of their short-term goals
- In addition, for each one of these goals, we analysed their main challenges and gave recommendations to stakeholders
- With this section, we trace final conclusions on how players can foster MaaS implementation and how governments, TSPs and PTOs improve their services while securing operations

Source: PTOLEMUS

7 Conclusions and recommendations for players - National ministers & regional councils of transport

Governments should increase efforts to identify the right KPIs to measure the success of MaaS and shared mobility programmes

Goals	Challenges	Recommendations
<p>Short term Transport governance</p> <ul style="list-style-type: none"> • Unify the transport network • Maintain accessible pricing • Reduce number of accidents • Maintain and create infrastructure • Increase digitalisation of transport services • Decrease the friction to shift between transport services 	<ul style="list-style-type: none"> • Define the optimal allocation of resources to improve weaker parts of the transport network • Ensure new platforms can smoothly enter the market • Provide infrastructure and guidelines to increase safety levels for micromobility modes • Improve the distribution of floating vehicles in public spaces • Manage unexpected events caused by forces outside of the transport realm e.g. demographic trends inducing changes on mobility 	<ul style="list-style-type: none"> • Decreased quality of the service from TSPs and PTOs working in silos and unwilling to open their ticketing and payment systems to third parties • Develop infrastructure and regulation for emerging shared micromobility vehicles • Create a resilient economic structure to handle with inflation and energy crisis
<p>Long term Transport Service Providers</p> <ul style="list-style-type: none"> • Build a robust and sustainable business model • Ensure sustainability across their operations • Maximise user satisfaction • Improve people's life by providing best-in-class mobility • Become a prominent TSP in the region of operation 	<ul style="list-style-type: none"> • Identify a robust and sustainable business model • Create financial plans allowing them to incorporate new services to business lines • Remains competitive against PTOs, OEMs and mobility integrators expanding to share mobility and adding new services to their platforms • Lobby for regulations that allow expansion of commercial mobility • Secure carbon neutral cycle from manufacture to service provision 	<ul style="list-style-type: none"> • Identify which mobility initiatives offer the best trade-off for users • Use existing mobility data to address a dynamic offer of transport in • Establish loyalty from customers for current • Devise strategies to lead customer to explore new services within the brand

Source: PTOLEMUS Notes "State Of Interest"

7 Conclusions and recommendations for players - Transport service providers

In the long term, TSPs should push national and EU institutions to enforce strict car restriction regulations

Goals	Challenges	Recommendations
<p>Long term Transport Service Providers</p> <ul style="list-style-type: none"> • Build a robust and sustainable business model • Ensure sustainability across their operations • Maximise user satisfaction • Improve people's life by providing best-in-class mobility • Become a prominent TSP in the region of operation 	<ul style="list-style-type: none"> • Identify a robust and sustainable business model • Create financial plans allowing them to incorporate new services to business lines • Remains competitive against PTOs, OEMs and mobility integrators expanding to share mobility and adding new services to their platforms • Lobby for regulations that allow expansion of commercial mobility • Secure carbon neutral cycle from manufacture to service provision 	<ul style="list-style-type: none"> • Push national and EU institutions to enforce car restriction regulations • Identify those MaaS platform providers that will dominate the MaaS

7 Conclusions and recommendations for players - Introduction

A citizen-first approach to platform design and TSPs integration to PT network can help to move MaaS forward

- Our analysis shows that all players must comprehensively engage an citizen's research to understand people's choice of transport
 - From the research results, players can articulate a demand-based offer that relies on user segmentation to avoid underserving areas or increasing chaos in spaces where multiple transport modes co-exist
 - Engagement with users will help to build a more realistic business case for commercial providers, besides helping to establish a community for long-term engagement
 - A good way to engage with citizens is to create bottom-up approach to platform design
- For all players, it is key to understand their user cases to design the ecosystem of MaaS platforms
 - For this, multilevel and multi-stakeholder partnerships can help to strengthen relationship between commercial and public providers
- On one hand, governments and regulatory authorities should put more focus on choosing the right KPIs (e.g. improved accessibility to PTOs, increased last-mile connections, to streamline resources into achieving priority goals
- On the other hand, they cannot rely on one-sided measures (i.e. only integrating transport in digital platforms, but they need to offer visibility to TSPs through safe infrastructure
- Back-end and system players have clear opportunities for expansion
 - As front-end developers and back-end providers, they will need to navigate in the political and economic landscape of cities
 - In particular, changes of administration are a real challenge when providing services that include public transport or infrastructure
 - As shown in the chapter before, Google and other apps in the mapping and integration realm are likely to stay in the back-end (suppliers) instead of becoming an official city MaaS
 - Thus, smaller players in systems and back end need to focus on making conditions to compete against tech giants with international TSPs, and lobby for protection and funding in local ecosystem players
- PTOs are increasingly more open to collaborate with TSPs
 - Given that business models for shared micromobility providers are under construction, a fully two-ways cooperative model between commercial and public is not likely to materialise in the short term

Source: PTOLEMUS



PTOLEMUS 15

- It analyses their respective short and long-term goals, and their corresponding challenges
- Finally, it gives concrete recommendations to these players

The report comes with a single, worldwide company licence



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	Report ONLY	Additional workshop
Contents	<ul style="list-style-type: none"> • A 250+ page analysis of the relevance, evolution and main dynamics in the MaaS market • An examination of the value chain of the MaaS market and its main power players, with 12 company profiles and multiple use cases • A detailed assessment of Google's current position and strategy in the MaaS market • Conclusions and recommendations on Google's future alternatives and strategy 	<p>The full report presented to your board or strategy team</p> <p>Half-day workshop*</p>
Company-wide licence	3.995 €	5.995 €

Google in MaaS report

About PTOLEMUS



PTOLEMUS is the first strategy consulting and research firm entirely focused on geo-connected mobility and automation

Strategy consulting services

Strategy definition	M&A advisory	Procurement strategy
Partnership strategy	Business development	Market forecasting

Market research services

Off-the-shelf reports	Subscription services	Custom market research
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Fields of expertise

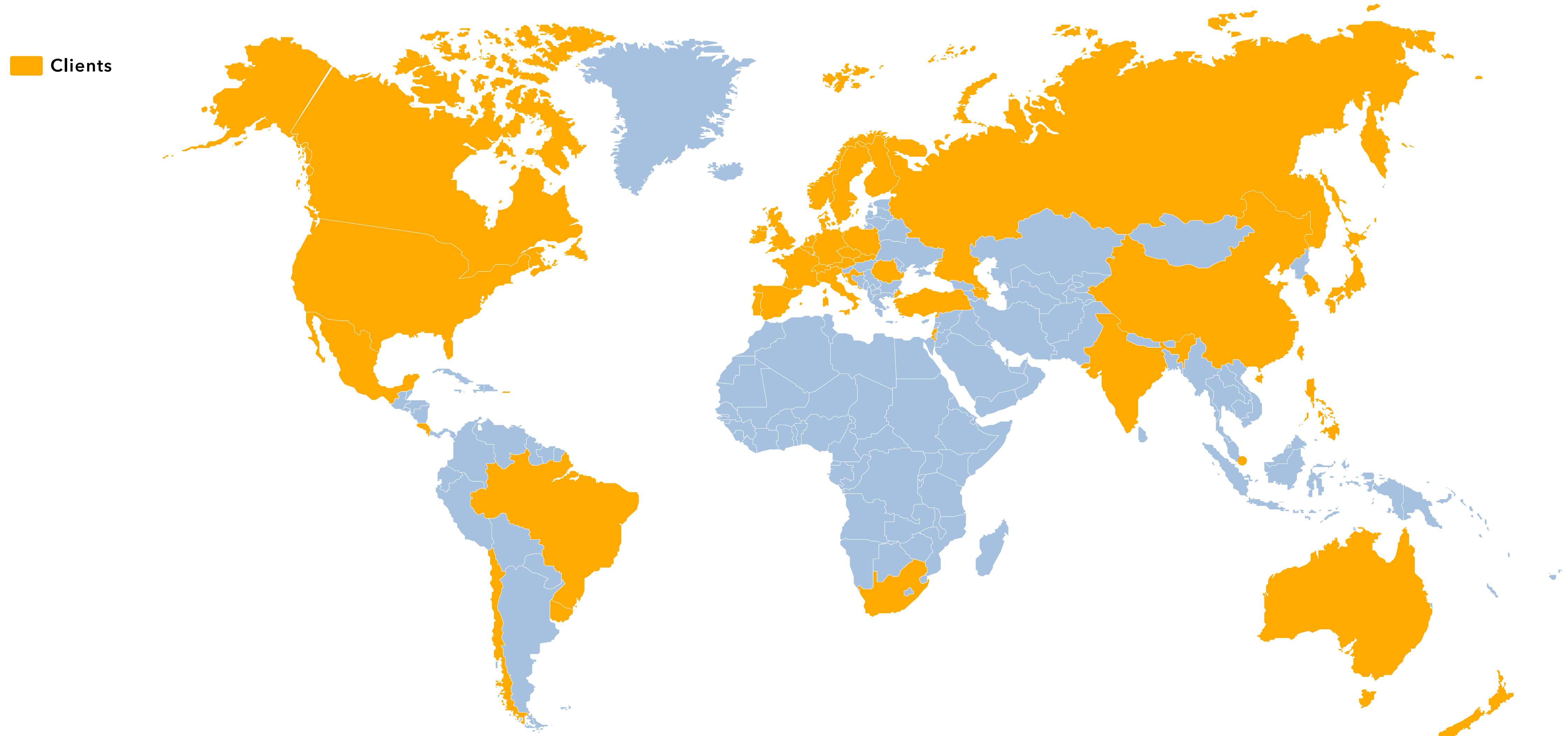
RUC and tolling	Motor insurance	Vehicle data and analytics
IoT & connectivity	Emergency services	Vehicle services
Mobility services	Vehicle automation	Electrification

We serve over 350 clients across the mobility ecosystem

Business area	Clients
Analytics, maps & apps providers	
Automotive OEMs & suppliers	
Banks & private equity investors	
Device & location suppliers	
Mobile telecom players	

Business area	Clients
Insurers, aggregators & assistance providers	
Tolling & ITS	
Telematics solution providers	

Our team of consultants, experts and analysts with 13 nationalities, serve our clients in 40 countries



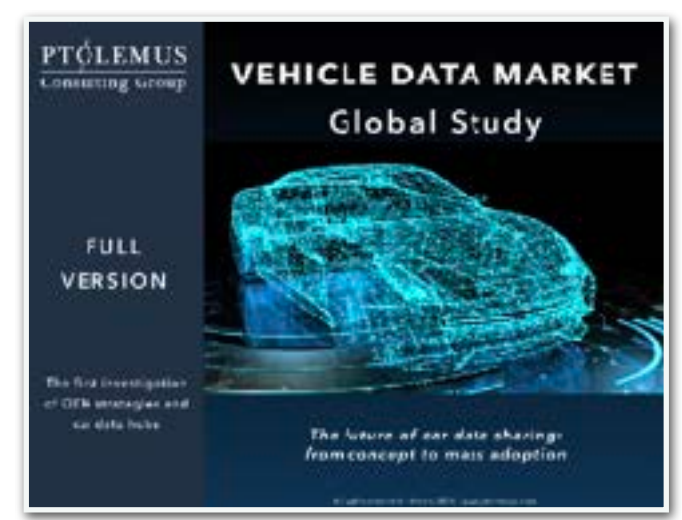
■ Clients

Thanks to its unique positioning and consulting activities, PTOLEMUS publishes landmark reports and market forecasts

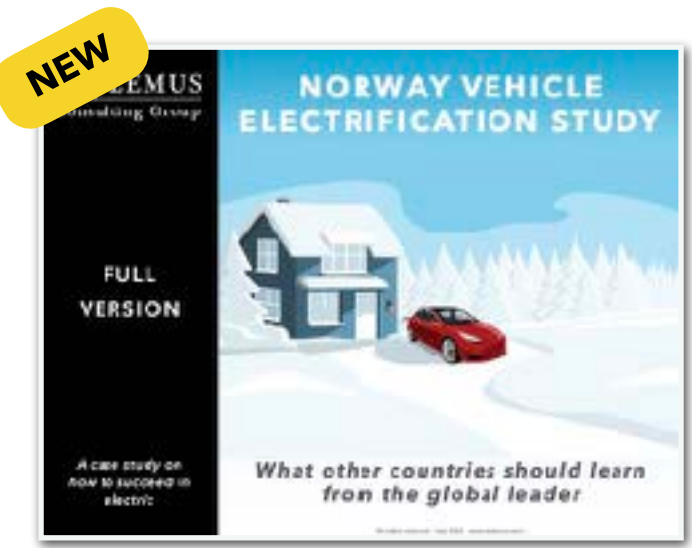
AUTONOMOUS DRIVING



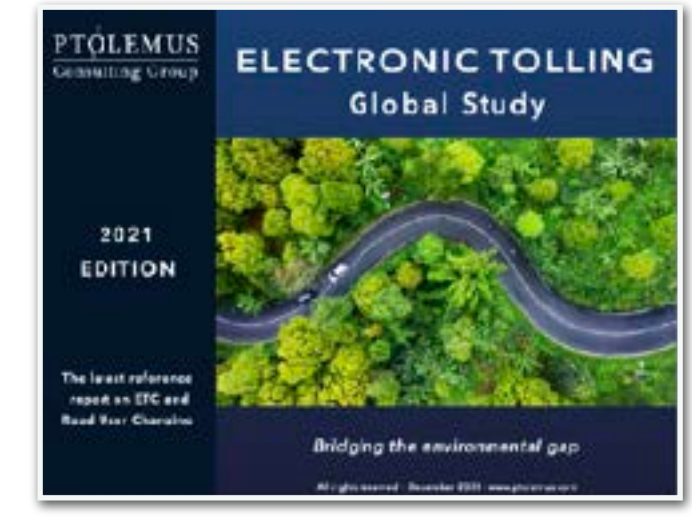
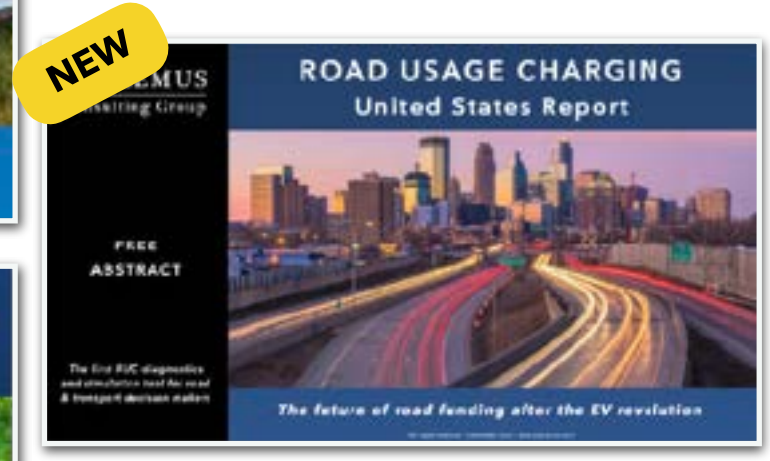
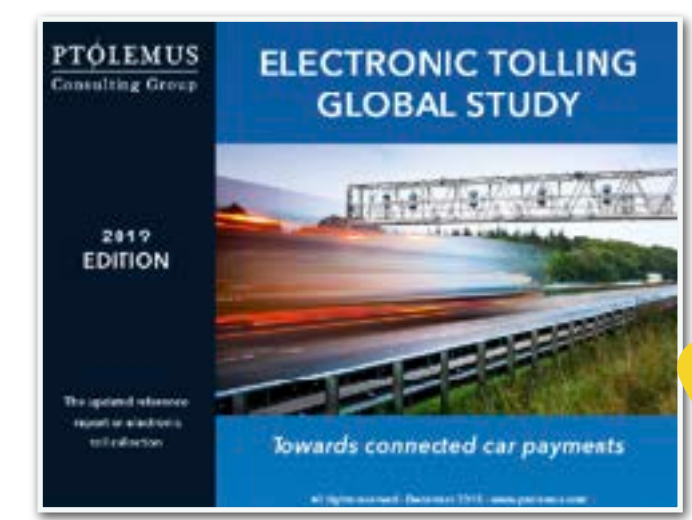
CONNECTED VEHICLE



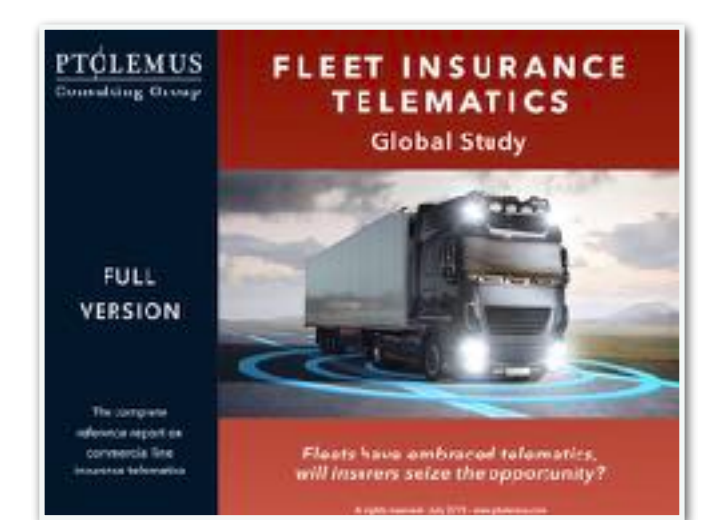
ELECTRIFICATION



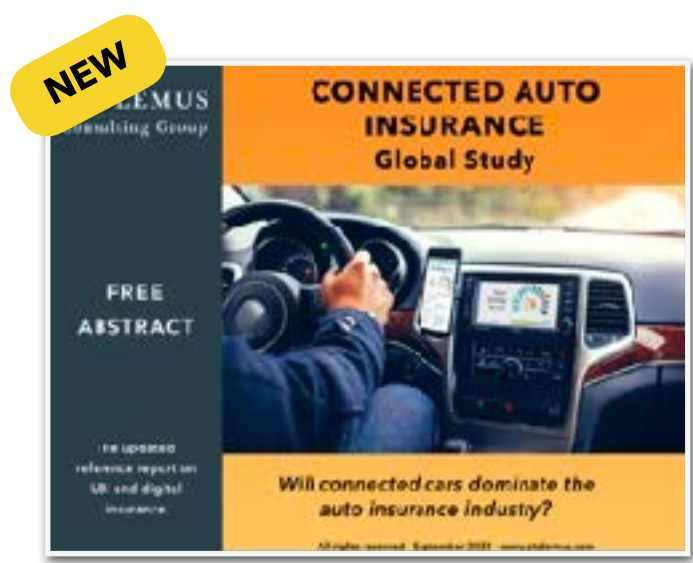
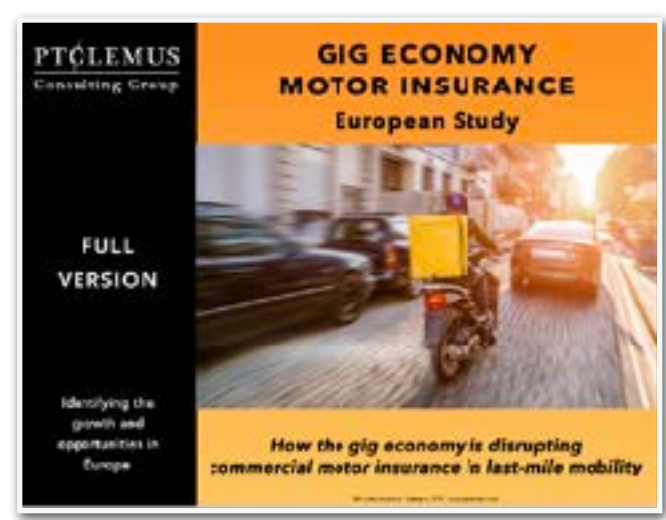
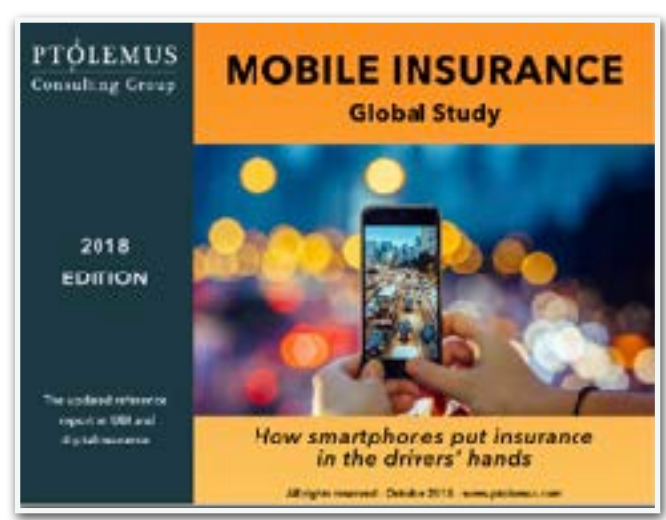
ELECTRONIC TOLLING and ROAD USAGE CHARGING



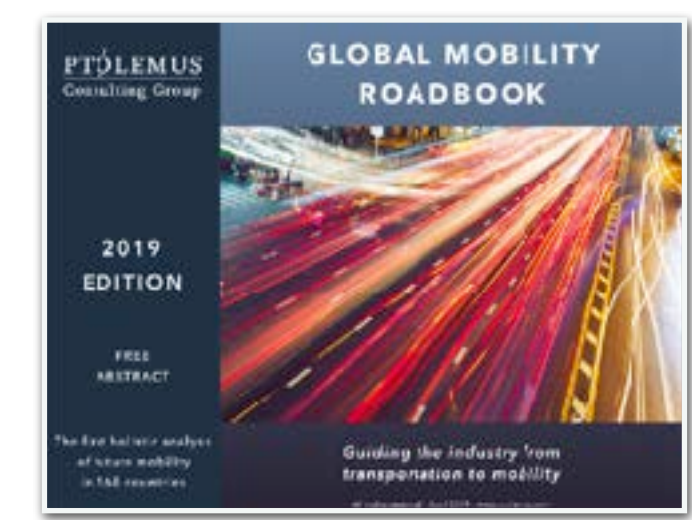
FLEET MANAGEMENT



INSURANCE



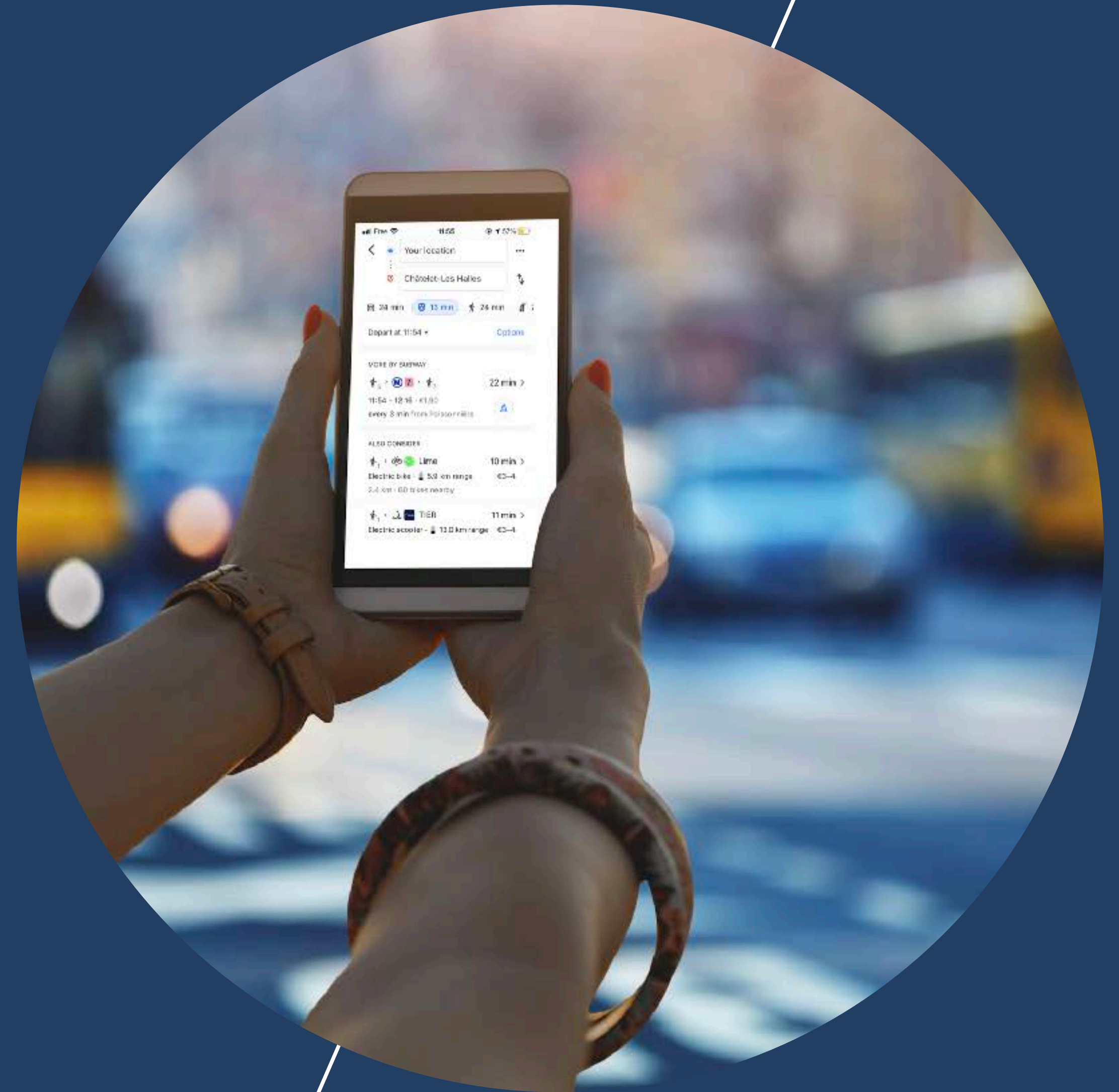
MOBILITY



Notes: 1. Most of our reports come with bottom-up market forecasts for 18 regions for 10-year timeframe, 2. To receive all our reports & other research, a subscription model exists

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