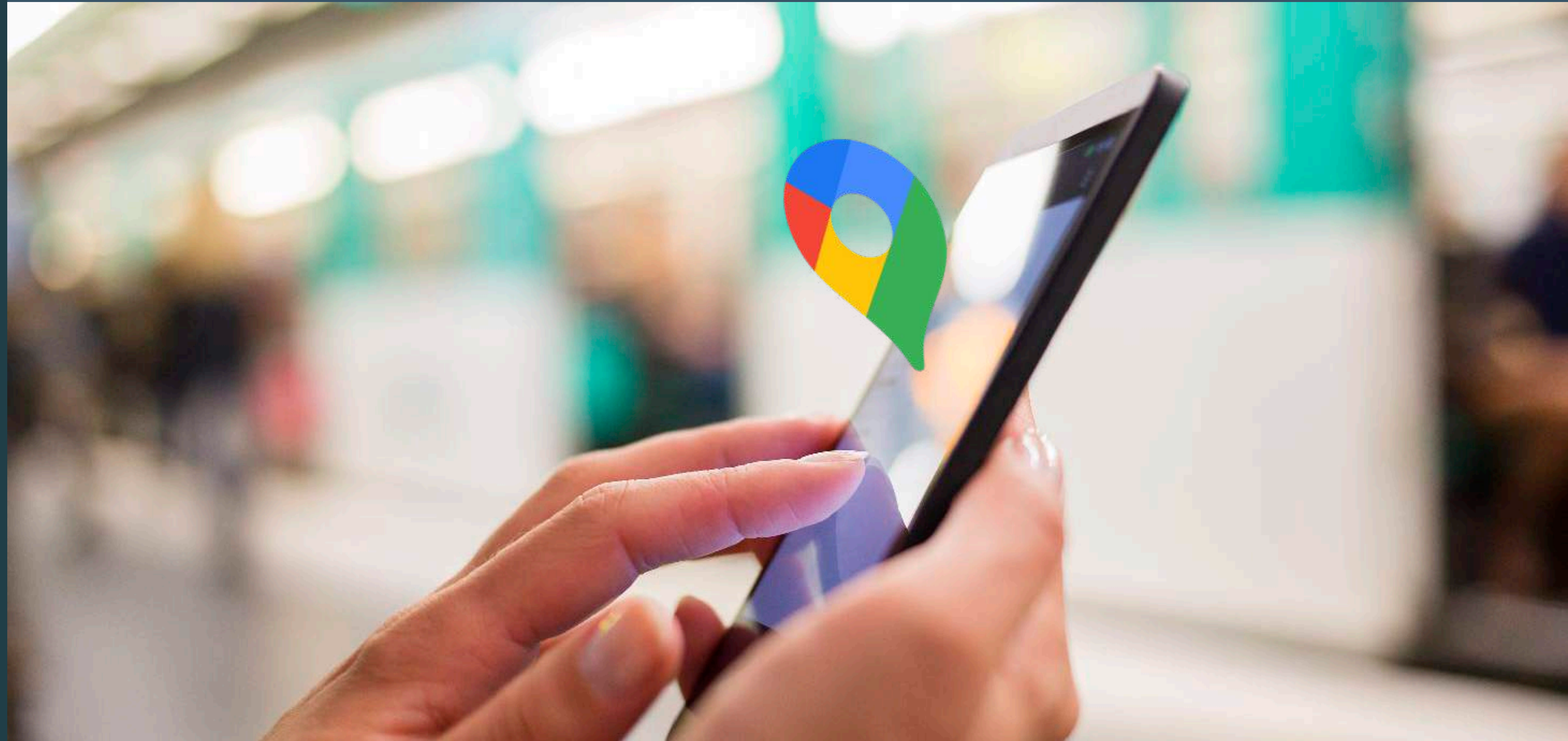


GOOGLE IN MOBILITY

Report

**FREE
ABSTRACT**

The first analysis
of Google's
future urban
mobility strategy



*From Google Maps to Google MaaS
Will Alphabet take over mobility?*

The first report analysing whether, how and when Google will take over the urban mobility market

- A **130+ page analysis of Google's current and future strategy in the MaaS market**, based on:
 - **10** years of constant market surveillance
 - PTOLEMUS mobility experience with nearly **200** consulting assignments across the mobility ecosystem
 - **8** months of research and analysis including interviews with more than **15** mobility stakeholders
- **An in-depth analysis of Google's success to date**
- **An analysis of Google's partnerships and actions in urban mobility**
- **An overview of Google's strategy and initiatives in the mobility field, including Google Maps, Google Wallet, Waze and Waymo**
- **A detailed analysis of 4 strategy alternatives that Google could adopt in MaaS, including booking and ticketing & payment**
- **An evaluation of the future MaaS evolution scenarios, including customer segment needs and future drivers of demand and supply**
- **An assessment of the future role, position and strategy of Google in the MaaS market based on**
 - The 3 main scenarios we identified and their respective likelihood to be enacted
 - A forecast of Google's revenues and EBITDA generated by MaaS in Europe in the 3 main strategy alternatives



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

In this report, we respond to 11 questions that are absolutely crucial to understand the future of Google in MaaS



While there are several definitions of MaaS, they all include the seamless integration of multiple transport modes

- Multiple definitions emphasise different aspects of Mobility-as-a-Service (MaaS)
- **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.”



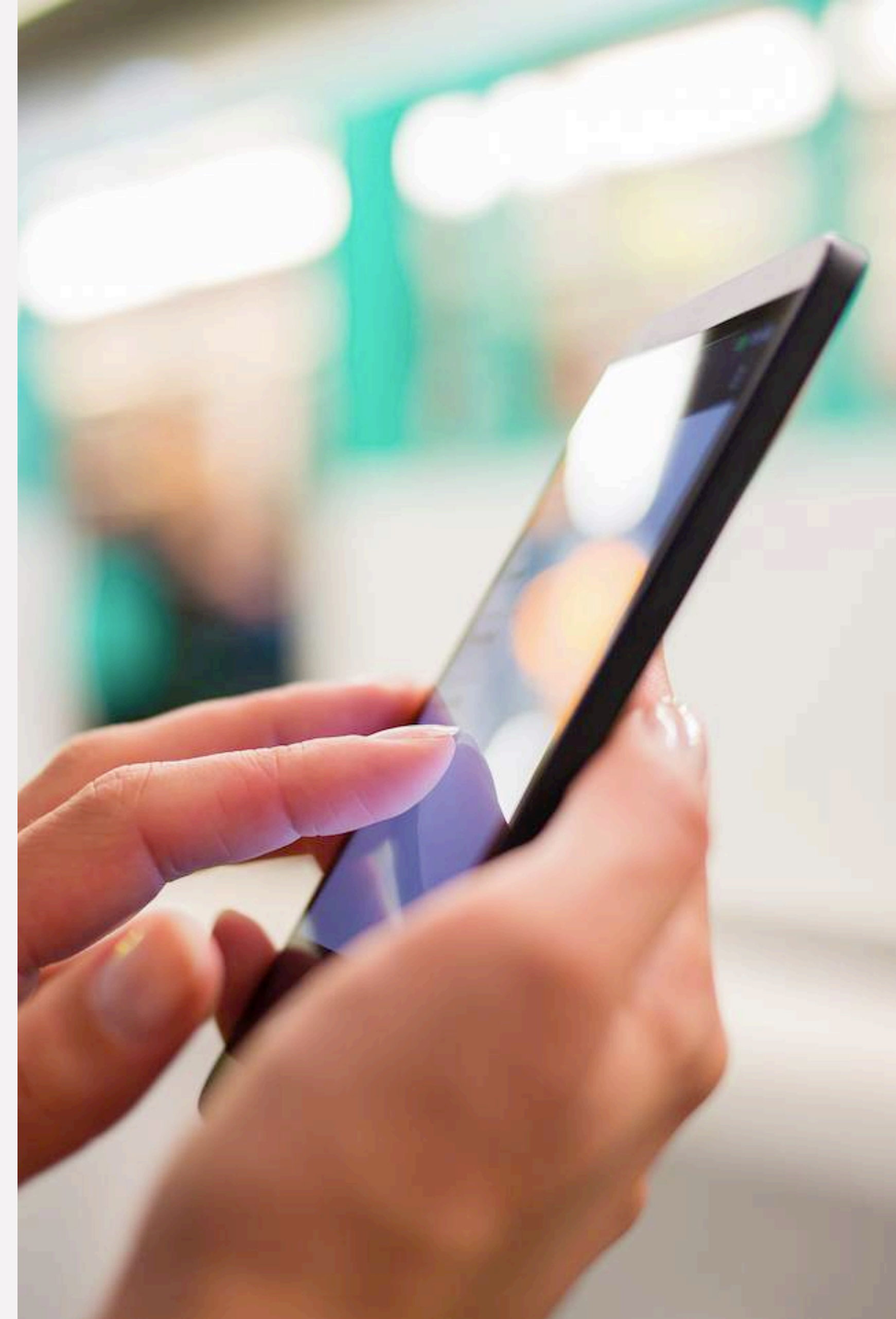
“MaaS apps can help with the **booking and payment of tickets for all mobility offers.** The more seamless we can make multimodal journeys, the more users will welcome and accept them.

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 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**
 - **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.

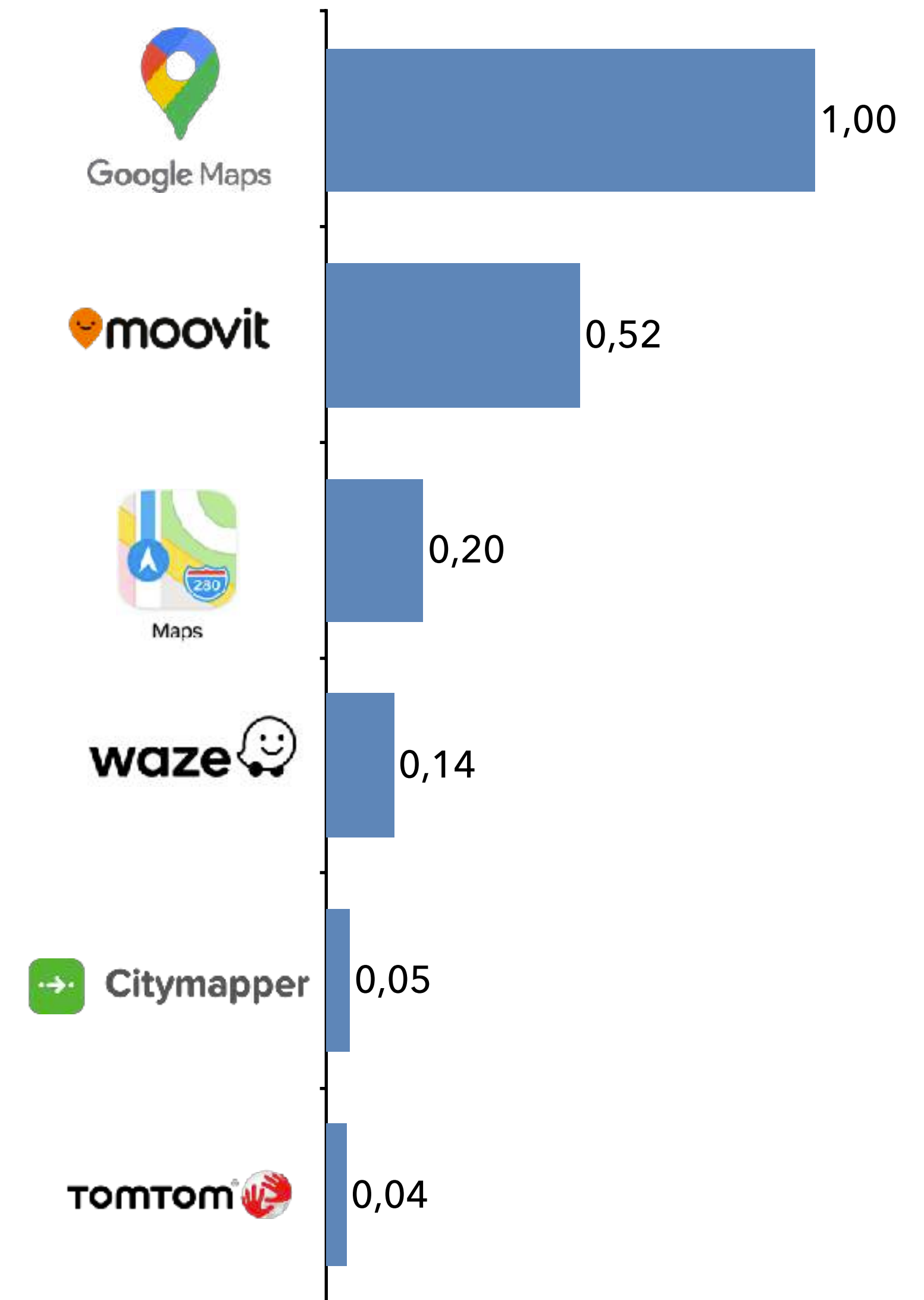
Thus it becomes much more than a map, it helps in promoting healthy mobility choices, it gently re-shapes the way cities look. ”



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 and YouTube combined generated 13 times more visits than Facebook, the 3rd most visited website
- 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)



This report is divided into 6 sections

1 Introduction

1. Definitions
2. Context
3. The 5 levels of MaaS

2 Google's initiatives in mobility

1. What has Google been doing so far?
2. Alphabet and Google
3. Zoom in to Google Maps
4. Waymo
5. Google Wallet
6. Waze

3 Mapping Google's strategy in urban mobility

1. Cross-selling & synergies
2. Competition in the mobility market
3. EU regulations
4. Alignment with the corporate strategy

4 The future of the MaaS market

1. MaaS drivers and inhibitors
2. Future MaaS scenarios

5 The future role of Google in the MaaS market

1. Google's current position
2. Return and risk assessment
 - 2.1. Potential revenues
 - 2.2. Cross-selling and synergies
 - 2.3. Competition
 - 2.4. Regulation and relationship with the EU
 - 2.5. Alignment with the corporate strategy
3. Google's future alternatives
4. Google's future position in the MaaS ecosystem

6 Conclusion and recommendations to stakeholders

The report leverages PTOLEMUS' mobility experience and the expertise of 8 consultants and researchers (1/2)



Frederic Bruneteau
Managing Director

Experience

27 years

The founder of PTOLEMUS, Frederic has accumulated 25 years of experience of the mobility and transport domain.

He has become **one of the world's foremost experts of connected mobility** and is interviewed on the subject by publications such as the *Financial Times*, *Forbes*, the *Wall Street Journal* and *The Economist*.

He has **led over 180 consulting projects and helped many world leaders define their strategy and implement it.**

Clients he has served include A-to-Be, Abertis Mobility Services, AGC Automotive, Allianz, Axxès, AXA, Baloise, Bombardier, BP, Bridgestone, HERE, the European Commission, Hitachi, Octo Telematics, Orange, Société Générale, ST Engineering, Telepass, TomTom, Toyota, Transurban, wejo and WEX.

Frederic supervised the research of the Mobility Platform Suppliers Handbook in 2018 and fully reviewed this report.



Alberto Lodieu
Senior Manager

14 years

Alberto has 14 years of experience in strategy consulting, and has participated to over 60 consulting assignments.

He has specialised in connected mobility, location-based services, electronic toll collection, road usage charging, autonomous vehicles, and usage-based insurance.

He has assisted 40+ organisations in defining their mobility strategies, launch new services, perform commercial due diligence

Alberto has been leading our work to build a global picture and forecast of mobility trends: new players, new vehicle types, new business models, smart city initiatives, etc.

Alberto is a regular speaker at mobility, location-based services and fleet conferences.

He led the research and writing of our landmark 750-page Global Mobility Roadbook (2019)

Alberto coordinated the research, writing and review of the report.



Andrew Jackson
Research Director

15 years

With a career in market research spanning 15 years, Andrew has over 11 years of experience working in the automotive and industrial sectors.

Andrew has led and participated in many automotive and telematics market research projects:

Provided forecasts for the growth of EVs in the UK, to a leading automotive media company;

Provided insights to a major telematics technology provider regarding the future of connected vehicles

Led the global research and created 5-year sales forecasts for a major geospatial data analysis company's go-to-market strategy;

Provided insight and analysis on the automotive aftermarket for some of Europe's key tier-1 suppliers.

As PTOLEMUS' Research Director, Andrew supervised and contributed to the research and writing of this report.



Svetlana Tvorogova
Research Consultant

20 years

Svetlana has gained experience with a very large set of organisation such as Arthur D. Little, Bamberg University (Germany), Erasmus University Rotterdam, the Higher School of Economics of Moscow, EuroWejo and the World Bank.

For more than 10 years, Svetlana taught at the Research University - Higher School of Economics (Moscow, Russia), which nominated her for the Nation's best lecturer, and at Bamberg University, Germany.

Some key projects Svetlana completed include:

Helped a vehicle data hub understand fleets' use of telematics and interest for vehicle data services in Europe and North America;

Helped a private equity firm evaluate the future demand from insurance companies for UBI solutions in Europe and North America;

Svetlana led the primary research, and participated to the writing and review of the report.

Biography

The report leverages PTOLEMUS' mobility experience and the expertise of 8 consultants and researchers (2/2)



Laura Pájaro
Research Analyst



Damien Orsoni
Business Analyst



Nan Chu
Research Analyst



Claudia Lozano
Senior Business Analyst

Experience

4 years

An architecture, transportation and mobility technologies enthusiast, Laura holds a master degree in Urbanism from the VUB and ULB, Brussels.

Since Laura joined PTOLEMUS she conducted first and secondary research on Mobility-as-a-Service and User-Based Insurance.

She participated fragmenting regional research reports and creating case studies.

Key projects she completed include:

Suggested possible functionalities and case uses for a master mobility centre operating in Flanders and Brussels, Belgium

Helped to understand the likelihood to choose specific tracking technologies for the implementation of RUC in Brussels

Revised business plan to consider opportunities to expand architectural services to the middle east market

Laura participated in the research, writing and review of the report.

3 years

A passionate of strategy consulting and new technologies, Damien Orsoni has studied in France, the Netherlands and Italy. Within PTOLEMUS he has developed an expertise on Usage-Based Insurance (UBI), Telematics and Connected Mobility.

Damien's most important consulting assignments include:

For a major US telecommunication operator, he helped defining its entry strategy into European and Asian emergency services markets,

For a major European assistance group, he designed their connected vehicles strategy, value proposition, MVP and implementation roadmap,

He participated in the research and writing of PTOLEMUS' Connected Auto Insurance Global Study, an in-depth analysis of the connected auto insurance industry, and contributed to the design of the 2020-2030 market forecast.

Damien participated in the research, writing and review of the report.

3 years

Before joining PTOLEMUS, Nan has worked in marketing research covering China & Europe, enabling stakeholders in industries such as ICT, logistics and biopharmaceutical, to identify, explore and leverage business opportunities.

Nan's recent projects include:

For a European telecoms company, he helped identify the top Chinese companies in the mobility business that require cellular connectivity.

For a human resources consulting firm in Europe, he helped organising a major advertising campaign targeted for Chinese speaking clients.

Within PTOLEMUS, Nan has contributed to our new Commercial Fleet Telematics Global Study.

Nan participated in the research and writing of the report.

6 years

A Toulouse Business School alumnus, Claudia worked at Accenture on strategy consulting assignments for the mobility sector:

For a multinational car manufacturer, she helped determining the User Recognition technologies to implement on the connected vehicle.

For several User Recognition technologies, Claudia performed benchmarking analysis including OEMs and OESs, identified relevant use-cases.

For a leading railway company, she supported the definition of a governance structure for the infrastructure projects.

Claudia has also worked on business transformation out of the mobility sector.

Claudia also acquired experience during her internship at IBM as a Junior Consultant on a business transformation project.

Claudia participated in the research and writing of the report.

Biography

Google in MaaS

Report purchase options and pricing



The report comes with a single, worldwide company licence



	Report ONLY
Contents	<ul style="list-style-type: none"> • A 130+ page analysis of the current and future Google's strategy in the MaaS market • An overview of Google's strategy and initiatives in the mobility field, including Google Maps, Google Wallet, Waze and Waymo • A detailed analysis of 4 strategy alternatives that Google could adopt in MaaS, including booking and ticketing & payment • An evaluation of the future MaaS evolution scenarios, including customers' segments needs and future drivers of demand and supply • An assessment of the future role, position and strategy of Google in the MaaS market based on <ul style="list-style-type: none"> - The 3 main scenarios we identified and their respective likelihood - A forecast of Google's revenues and EBITDA generated by MaaS in Europe in the 3 main strategy alternatives
Company-wide licence	995 €



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Published in March 2023

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The report is structured in 6 sections

1. Introduction
2. Google's initiatives in mobility
3. Mapping Google's strategy in urban mobility
4. The future of the MaaS market
5. The future role of Google in the MaaS market
6. Conclusion and recommendations to stakeholders



In section 1, we introduce MaaS and the rationale for the report, including why we have selected to focus on Google

- This first section includes 15+ slides
- It defines MaaS and describes its importance in the development of mobility

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:

"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 payment channel instead of multiple ticketing and payment operations."

"MaaS is the integration of, and access to, different transport services (such as public transport, ride-sharing, car-sharing, etc.) for the user."

"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 path through the mobility jungle and simplify transformation of transport to efficient intermodal mobility – for the benefit of travellers and operators alike."

A solution can be only considered MaaS if it combines multiple transport modes from TSPs

The 5 levels of integration for MaaS solution*

- The first step for a player to deliver a MaaS solution is to oversee a multimodal transportation experience by combining multiple operators i.e. PTOs with commercial (shared) mobility
- Ideally, this integration goes beyond the routing experience and create partnerships for data exchange that include multiple players in the value chain i.e. mapping providers
- MaaS in the first level of integration resembles well-known multimodal routing integrators e.g. City mapper, Google maps which case should build partnerships behind the scene to provide with accurate schedules of multiple TSPs
- As the level of integration increases, MaaS grows in complexity including features required to provide seamless user experience

Source: PTOLEMUS - Note: *Adapted from Ispat et al., 2019

1 Introduction - What has Google done so far?

Innovative and daring, Google has revolutionised the way we live our lives

- **GOOGLE** - /ˈɡɒɡl/ verb (used with object): Googled, Googling
- search for information about (someone or something) on the internet using the search engine Google
- Originally named after a googol, designating an extremely large number (10¹⁰⁰). Google became a nomination for the web search, dominating search queries globally for almost 20 years
- Uses appreciate Google's search algorithm, which processes around 8.5 billion searches per day globally
- Google's loyal customers (3.2 billion users for Google Chrome and 1 billion users for Google Maps in 2021) moved into the world of digital patterns
- Large investment in R&D ensures high quality and innovative focus of the company's services
- Google is able to launch initiatives globally, acquiring high visib user feedback
- Originally started with the internet search, the company has quickly expanded into other domains, where search algorithms are useful
- Users' individual search queries contribute to Google's constantly growing revenue streams, most of them generated through personalised advertising
- To maximise the pool of users in its reach, the company keeps generating new services that could attract large number of customers

Source: Oxford Languages, Business of Apps, Forbes, CMI, PTOLEMUS

Tech giants are very well positioned to launch a super mobility app, but Google is the best positioned to do so

What's required to build a universal MaaS platform?	What can Tech Giants** bring?	What makes Google the best positioned?
<ul style="list-style-type: none"> • Global reach • Multimodal transportation experience, combining routing information, booking, payment and ticketing • In some cases, able to provide car services such as no fee, parking, fuel & electric charging and repair • Seamless, unified inclusion of multiple transport operators • Relationships with local authorities and ministries of transport • Capabilities to deliver a robust on-platform application • Powerful customer engagement • Strong data exchange capabilities • Experience building platforms • Financial resources 	<ul style="list-style-type: none"> • While all tech giants have a global presence, not all have a global presence for mobility-related businesses • All have experience in payments, but not with complex operators • Only Apple, Google and Microsoft (in some specific cases) have experience with routing in mobility sectors • Those providing mobility apps have included car services, mobility electric charging stations, Apple Maps, Microsoft and Google maps • Only Google and Microsoft (in some specific cases) have experience with routing in mobility sectors • Not all companies have vast experience working with smartphones and developing OS or applications • Experience and touch points with mobility users • Only Apple and Google have data exchange capabilities • Amazon, Google and Huawei have the largest R&D budget 	<ul style="list-style-type: none"> • Google Maps is present in a most every country in the world • So far, only Google and Microsoft (in some specific cases) have an app that is doing so • Apple is investing in its maps applications, but it is still much less developed • Google Maps includes information for car services such as tolling streets and has integrated parking in the US • Google has integrated information for most transport operators globally for routing • In some cases for booking payments and ticketing, so far over 80 public transport companies • Already has established relationships with transport authorities for data exchange in several countries and cities • Google owns Android and has several successful apps, including Google Maps • Developed the two most visited websites, Google and YouTube • Google's reach lets it serve 4 and 4.5 billion people • Already exchanging data with multiple cities and transport operators through MaaS and Google Maps • 2 of the strongest mobility apps, Google Maps and Waze • The largest R&D budget (Amazon is 38 billion in 2021)

Source: PTOLEMUS, Strategy Analytics, The numbers of countries globally including car-sharing services, including Google, Apple, Microsoft, Amazon, Uber, Lyft, Didi, etc. ** Google, Microsoft, Apple, Facebook

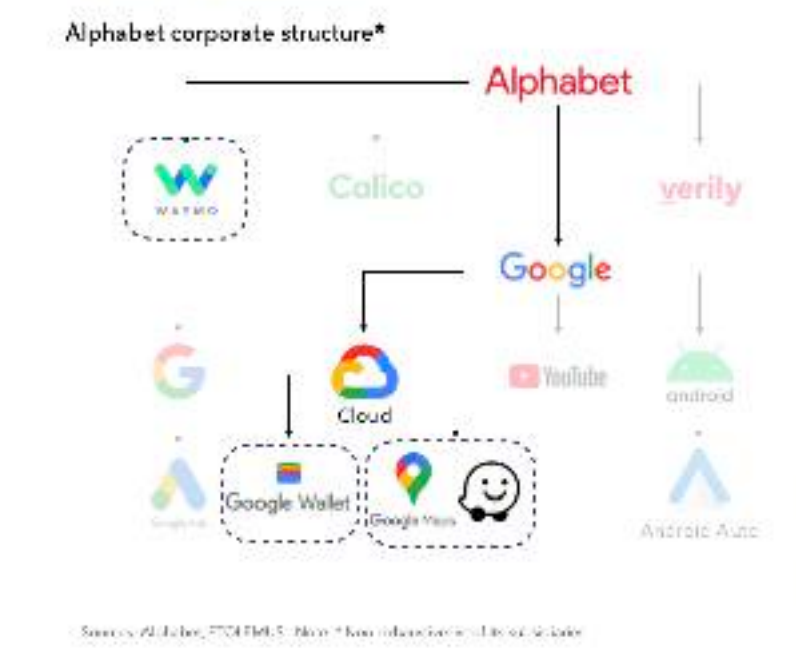
- We chose to focus on Google for several reasons, including
 - Google has integrated information for most transport operators globally for routing
 - Google owns Android and has several successful apps, including Google Maps

In section 2, we examine Google's initiatives in mobility

- This second section includes 25+ slides
- It dives into the evolution of Google and its changing role and activities in the mobility ecosystem

2 Google's initiatives in mobility - Alphabet corporate structure

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



• Google's self-driving car programme was created in 2009 by 18 Google engineers, and the programme became Waymo in 2016

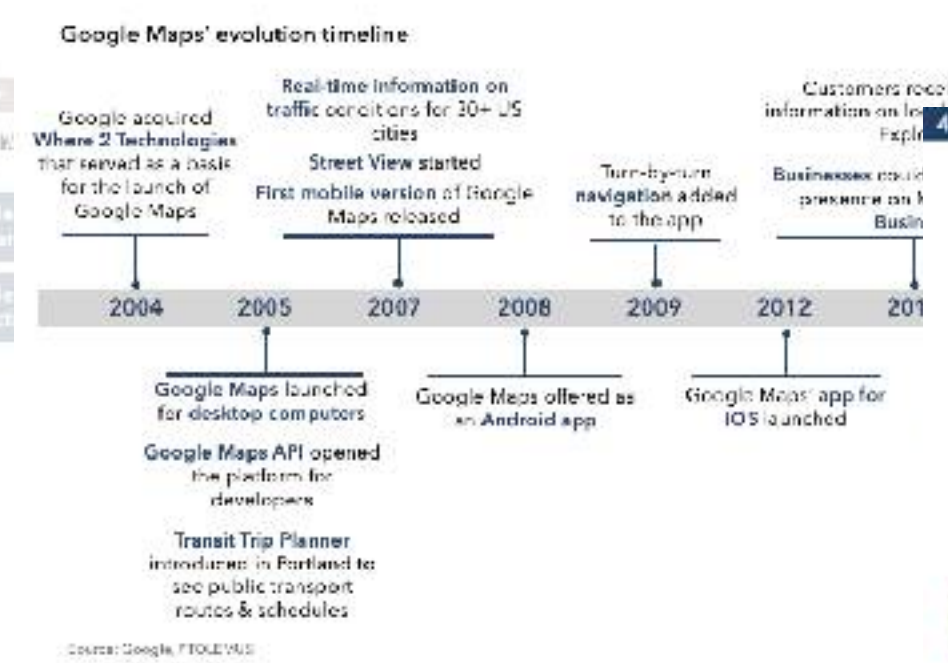
• Waymo is the world's first robotic service

• Its AYS are launched in suburban areas where vehicles can avoid a chaotic street competing to traditional laws

In 2021, Waymo's vehicles were made available without a driver in Phoenix and San Francisco, California

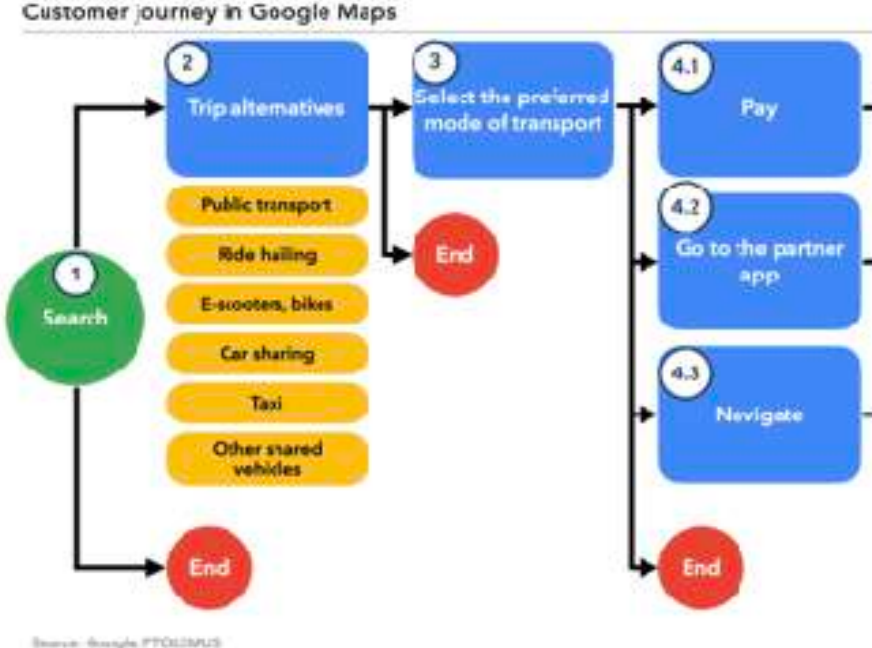
2 Google's initiatives in mobility - Journey to Google Maps

Google Maps has constantly expanded its functionalities, becoming the most comprehensive multimodal route planner

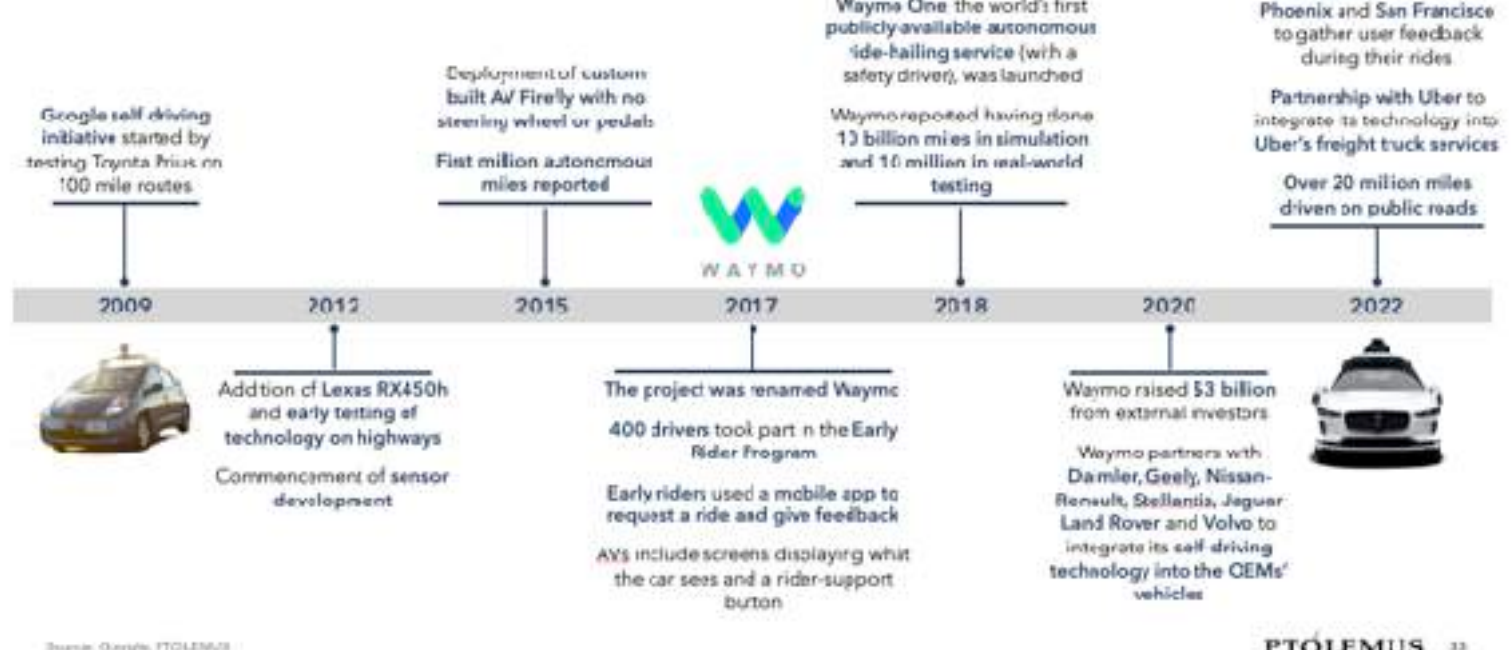


4 Mapping Google's strategy in mobility - Customer journey

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



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 3, we map Google's strategy in urban mobility

- This third section includes 20+ slides
- It dives into Google's strategy in urban mobility

3 Mapping Google's strategy in urban mobility - Cross-selling and synergies

For new navigation products, Google Maps experiments globally to maintain its leadership

Territories with the new functionalities for Routes API

- Google Maps is constantly experimenting to ensure its global leadership, launching new features and expanding them if successful
- Through Google Maps' routes API, businesses can access any toll fees from the selected cities to compute a route or a route matrix
- It takes into consideration any toll price of accounts or passes available to the driver and

3 Mapping Google's strategy in urban mobility - Competition

In 2020, Hamburger Hochbahn became the first PTO to be integrated in Google Maps

- Hamburger Hochbahn is a public company providing the vast majority of public transports in Hamburg, Germany
 - It operates the city's 4 subway lines, 123 bus lines and the harbor ferries.
- Then, the live switch app progressively integrated other transport modes
 - Car sharing in partnership with MOIA
 - Car rental in partnership with WeShare, Sixt share and NILES
 - E-scooters in partnership with TIER and Voi
- Contrarily to some other PTOs, Hamburger Hochbahn provides real-time information to Google allowing users to follow their bus or metro in real time on the map
- This partnership benefits both companies
 - Google Maps creates useful functions for the users with data from Hamburger Hochbahn (real-time vehicle location)
 - Hochbahn is integrated in Google Maps and can benefit from its large user base

Source: Google Maps, PTOLEMUS

“Google will legitimize its position if it can be recognized that it is also using its outstanding skills and unique information to make a difference in their lives and to do better in this world. Climate change is one of the greatest challenges and mobility has a decisive influence on it. Google Maps can make a significant contribution to this.”

3 Mapping Google's strategy in urban mobility - Competition

Still, in Europe, the antitrust regulation in competition acts too slowly for the digital age

European Commission and Google relationship timeline

- 2010: The European Commission started formal investigation on Google's search practices
- 2013: Google was accused of promoting its own products through its search engine
- 2015: The European Commission opened a formal investigation on Google's actions to maintain its dominant position in the mobile devices market
- 2016: Preliminary assessment of Google's advertising practices by the European Commission. This included the favourable treatment of links to Google's own specialised search services and the copying and use by Google of original content from third party web sites without consent
- 2016: The European Commission issued a statement of objections stating that there were no justifications for Google's restrictions on its online search advertising competitors (Microsoft, Yahoo)
- 2017: €2.42 billion fine imposed on Google for using its own price comparison to gain advantage in shopping services. Google appealed the decision

Source: PTOLEMUS

- It describes Google's cross-selling & synergies, competition and corporate strategy in urban mobility
- It describes relevant EU-wide regulations and Google's relationship with EU institutions

3 Mapping Google's strategy in urban mobility - Regulation and relationships with the EU

Google Flights became one of the leading flight booking search services worldwide...

- Google Flights was launched in 2011 as a new flight booking search service after the \$700 million acquisition of ITA Software Travel
- Since 2021, it is part of Google Travel
- Google's gigantic user base combined with its other products allowed Google Flights to become a leading player in the airline distribution industry
- Google Flights was displaying its own results first, then it promoted, and only then the organic search results, those that met a given search criteria
- Google Flights was also gradually integrated into the rest of Google's ecosystem such as Gmail, Google Search or Google Assistant
- In addition, Google Flights proposed innovative features to attract customer
 - Search for flights within a budget range and get proposed various destinations / flights
 - Show when is the best time (budget-wise) to go at a specific destination or when to book 12 months in advance
 - Calculate the climate impact of the flight
- This product gradually attracted users, and became in 2021 the second most searched flight booking search service worldwide
- Skyscanner is the main asset, while Expedia and Kayak have been leading players in the market since 2015
- In the last 12 months, Google Flights was the most searched in the US, Brazil, and South Africa

Source: Google Trends 2023, PTOLEMUS

In section 4, we build 3 main future MaaS evolution scenarios

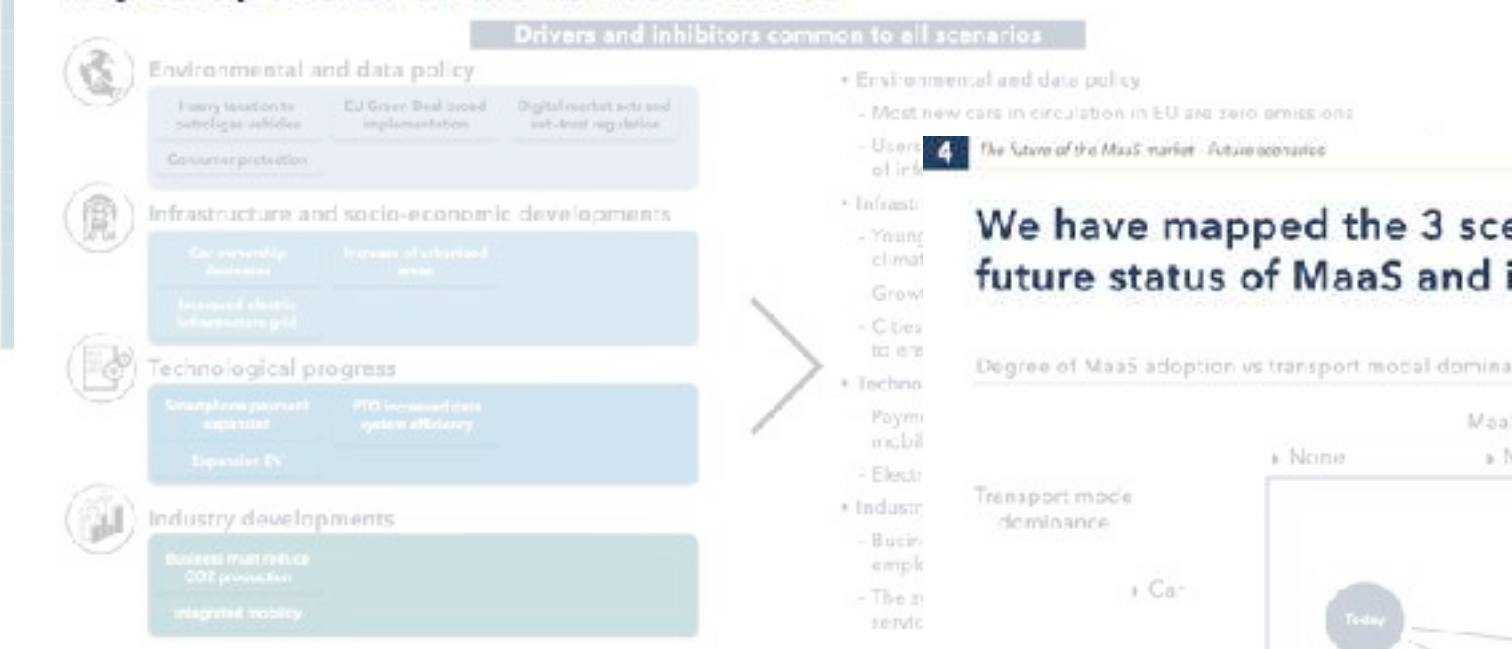
5 Google in mobility - Future MaaS scenarios

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 broad implementation	✓	✓	✓
	Consumer protection	✓	✓	✓
	Digital market acts and anti-trust regulation	✓	✓	✓
	API EU level integrated	✓	✓	✓
Infrastructure and socio-economic developments	Clear MaaS regulation	✓	✓	✓
	Taxation extended to CV cars	✓	✓	✓
	Car ownership decreases	✓	✓	✓
Infrastructure and socio-economic developments	Improved urban infrastructure	✓	✓	✓
	Increased urbanized area	✓	✓	✓
	Transition towards green energy	Moderate	Fast	Slow
	MaaS marketing	Moderate	High	Low
	Energetic	Moderate	Strong	Moderate
Infrastructure and socio-economic developments	Economic crisis	Short	Stabilized	
	MaaS learning curve	Moderate	High	Low
	Digital implementation	Slowly	Quickly	Slightly

4 The future of the MaaS market - MaaS drivers and inhibitors for the future of MaaS

Data regulations, decrease of car ownership and expansion of EVs are key components of the future of MaaS



4 We have mapped the 3 scenarios based on the future status of MaaS and its characteristics

Degree of MaaS adoption vs transport mode dominance



- This fourth section includes 15 slides
- It uses the most important technological, market and regulation drivers and inhibitors to build future scenarios of MaaS

4 MaaS will likely emerge in an open-market business environment, guided by regulation crafted individually by member-states

Low regulation for car usage, open data platforms and API alignment foster the entrance of financially robust companies to MaaS

- Car restriction regulations are limited to ICEVs, benefiting the connected and electric mobility market
- EU creates guidelines to integrate all mobility services through the same API and opens platforms with data about transport services (commercial and public) for all competitors
- Car users perceive high benefit on MaaS, given it integrates services that facilitate private mobility
- Under this scenario, players such as Uber or FreeNow will thrive

4 In scenario 1, mobility is still dominated by cars, MaaS penetrates the market offering services targeting private vehicle drivers

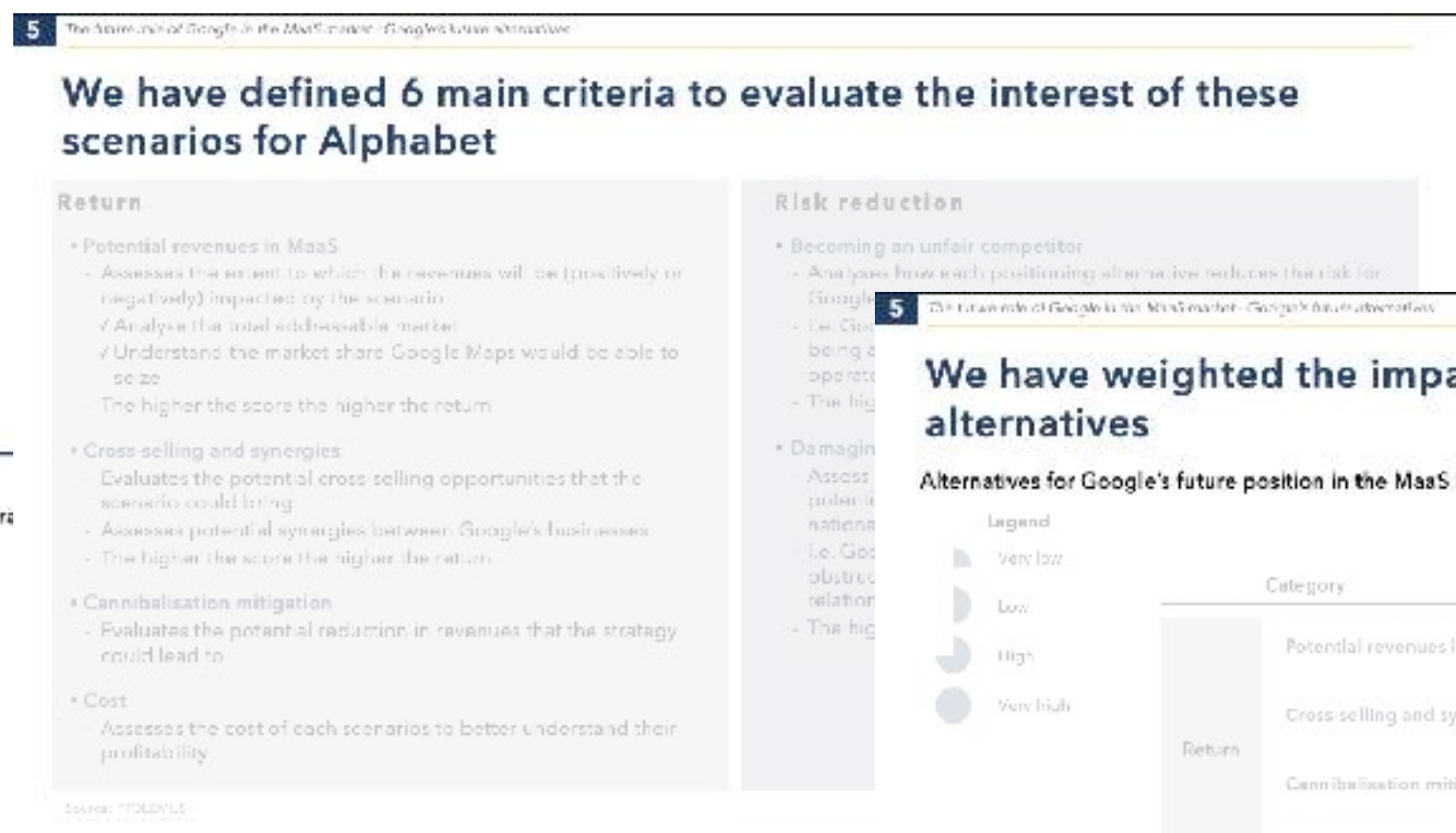
Players such as Uber and FreeNow benefit by offering MaaS schemes that facilitate navigating cities with driving restrictions

- Public authorities extensively regulate private car usage, both ICEV and EV, combined with measures to promote shared mobility
- Blueprint on EU level makes MaaS ubiquitous
- Stricter anti-trust regulation protect smaller players from multinational TSPs
- Heavy investment on public infrastructure e.g. cycling lanes, pedestrian areas, PT routes, increase the volumes of journeys for PTOs
- Under this scenario, players such as Google and CityMapper dominate the MaaS scenario

- It builds 3 future scenarios of MaaS in Europe
- It assesses their respective characteristics and likelihood

In section 5, we predict the future role of Google in the MaaS market

- This fifth section includes 20+ slides
- It assesses the **alternatives Google has in the future MaaS market** based on 6 risk and return categories



- It defines **Google's most optimal future position in the MaaS ecosystem** considering the likelihood of the 3 MaaS evolution scenarios
- It estimates **Google's future EBITDA generated by MaaS in Europe under the 3 scenarios**



In section 6, we provide our conclusions and recommendations to the key MaaS players

- This sixth section includes 8 pages
- It classifies MaaS players into 6 different groups

6 Conclusions and recommendations to stakeholders - Introduction

We have evaluated challenges and recommendations for MaaS players regarding the 3 main Google's alternatives in mobility

- Google is likely to move further into MaaS under one of the 3 following alternatives:
 - Booking
 - Ticketing & Payment
 - Contractual Responsibility
- In addition, we see all MaaS stakeholders face multiple challenges to address a market that remains volatile
- We classified players of the ecosystem into 6 different groups:
 1. Shared mobility operators: companies providing commercial transport services e.g. Uber, Lime, Donkey Republic
 2. MaaS platforms: user-facing companies, which are the ones who provide the application users interact with e.g. Skipr, Whim, Uber
 3. Taxi & ride-hailing service providers: user-facing companies, which are the ones who provide the application users interact with e.g. Free taxi, Sixt
 4. Public Transport Operators (PTOs), operators providing public transport services e.g. RATP, DASH, SNCF
 5. EU institutions: institutions behind legislation of mobility & transport
 6. Transport Governance: government, the legislation of transport in cities/regions
- These players do not exclusively belong to a group and they can offer services in different and non-comensurate parts of the value chain
- PTOLEMUS identified the pros and cons of Google's 3 main strategy alternatives players
- In addition, for each one of those alternatives we gave recommendations to these stakeholders
- With this section, we trace final conclusions about how these players can foster MaaS implementation and react to Google's alternatives in this market

Source: PTOLEMUS

6 Conclusions and recommendations to stakeholders - Taxi & ride-hailing service providers

Taxi & ride-hailing service providers have different answers depending on the alternative Google will pursue

Consequences and recommendations for taxi & ride-hailing service providers based on Google's 3 main alternatives

Taxi & ride-hailing service providers	Advantages	Disadvantages
Alternative 2 - Booking	Additional traffic generated by Google Maps towards taxi & ride-hailing platforms	Medium transaction for customer
Alternative 3 - Ticketing & payment	Additional traffic generated by Google Maps towards taxi & ride-hailing platforms	High transaction for customer
Alternative 4 - Contractual responsibility		Loss market of business survey

Source: PTOLEMUS

6 Conclusions and recommendations to stakeholders - Public transport operators

PTOs would be threatened by alternatives 2 and 3, but will keep their control over the operation of the service

Consequences and recommendations for PTOs based on Google's 3 main alternatives

Public Transport Operators	Advantages	Disadvantages
Alternative 2 - Booking	Additional traffic generated by Google Maps towards PTOs, cost reduction	Medium transaction for customer
Alternative 3 - Ticketing & payment	Additional traffic generated by Google Maps towards PTOs, cost reduction, enables to focus fully on operations	High transaction for customer
Alternative 4 - Contractual responsibility	n/a	

Source: PTOLEMUS

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 collaboratively engage on citizen's research to understand people's choice of transport
- From the research results, players can anticipate a demand-based offer that focuses on user engagement 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
- Final players: it is key to understand their user cases to collectively design the ecosystem of MaaS platforms
- For this, multi-level 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. increase accessibility to PTO, increase use with connections to free-time 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 integrate 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 this chapter before, using a mix of other apps in the mapping and integration realm are likely to stay in the back-end (supplier) instead of becoming an official city MaaS
 - The role of players in government back-end must focus on enabling capabilities to cooperate against their grants with international TSPs and ability for prediction and funding to local acquisition projects
- PTOs are increasingly more open to collaborations with TSPs
 - Even that business models for shared-mobility providers are under construction, a key business case could become commercial and public to not likely to materialise in the short term

Source: PTOLEMUS



PTOLEMUS 15

- It evaluates their respective challenges regarding Google's 3 main alternatives in mobility
- Finally, it gives concrete recommendations to these players

Google in MaaS report

About PTOLEMUS



PTOLEMUS is the first strategy consulting and research firm entirely focused on mobility and transportation

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

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

PTOLEMUS has completed nearly 200 consulting assignments and served over 350 clients across the mobility ecosystem

Analytics, maps & apps providers



Automotive OEMs & suppliers



Banks & private equity investors



Device & location suppliers



Mobile telecom operators



Insurers, aggregators & assistance providers



ITS, smart city and infrastructure solution providers



Telematics solution providers



Our team of consultants, experts and analysts with 12 nationalities, serve our clients in 41 countries

■ Clients

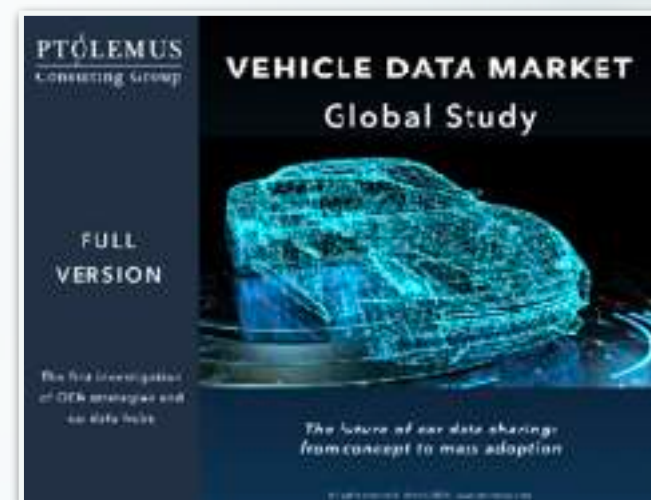


PTOLEMUS has published nearly 30 landmark reports and market forecasts on mobility markets

AUTONOMOUS DRIVING



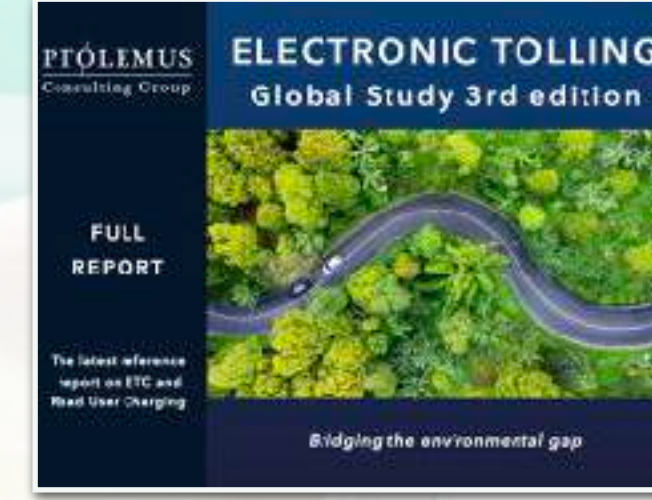
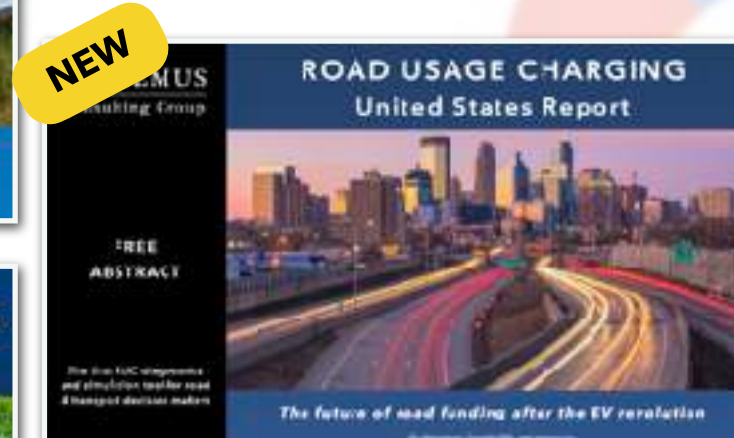
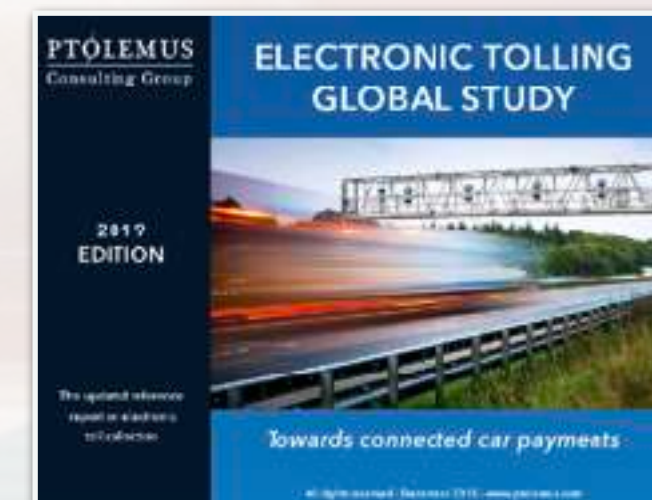
CONNECTED VEHICLE



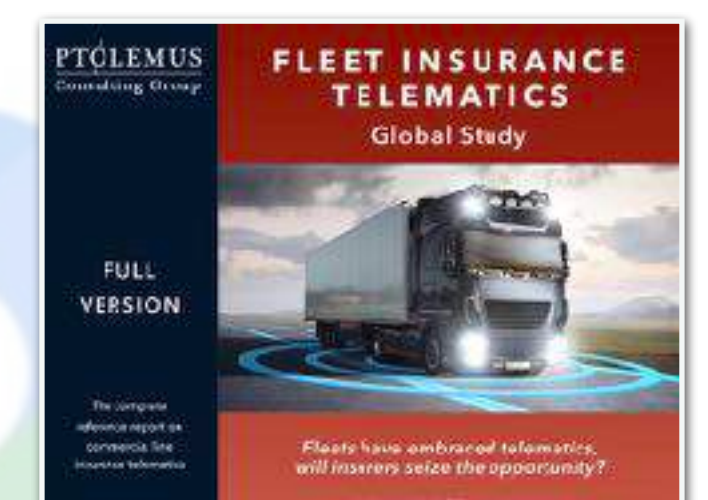
ELECTRIFICATION



ROAD INFRASTRUCTURE FUNDING



FLEET MANAGEMENT



INSURANCE



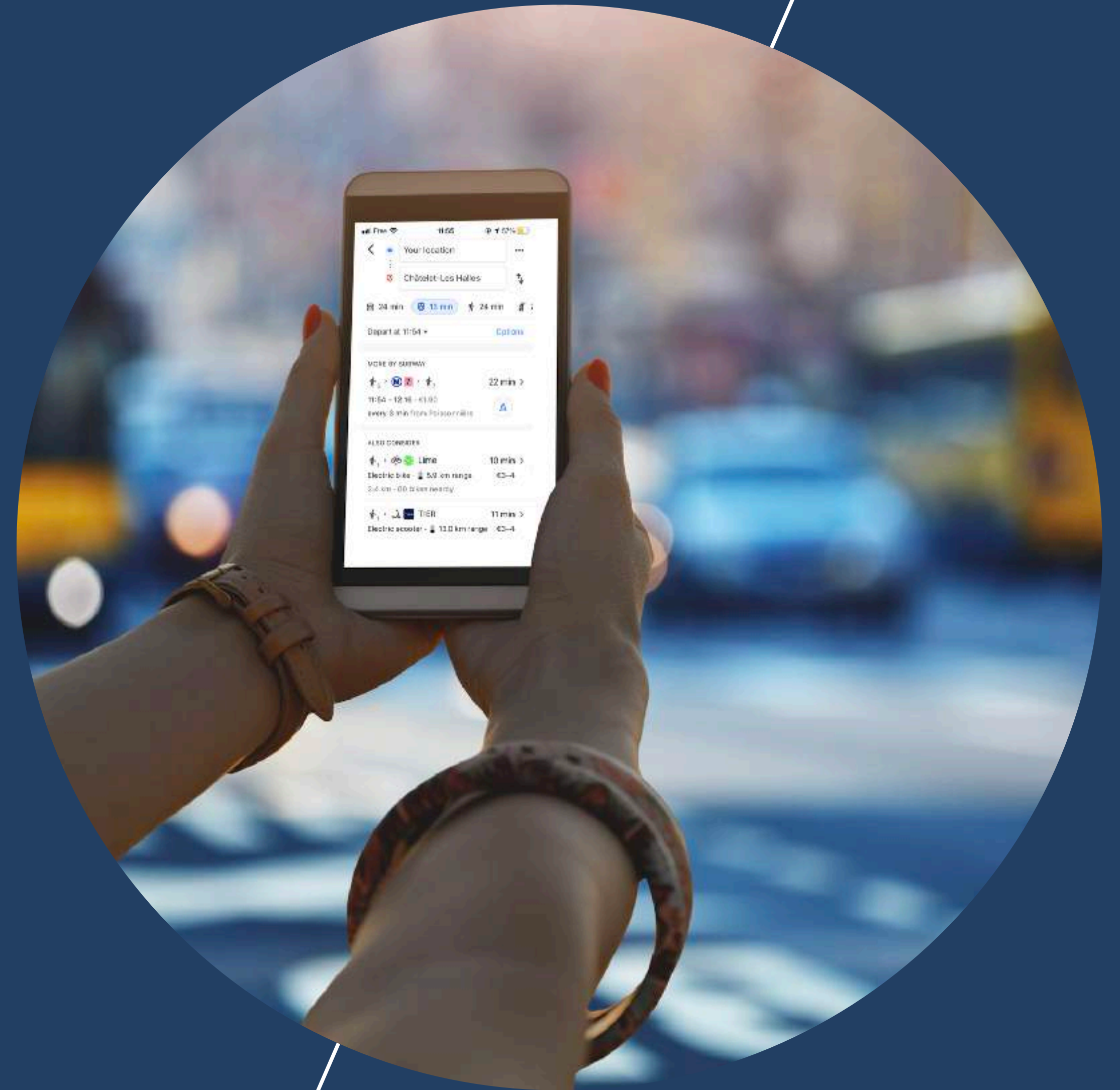
MOBILITY



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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