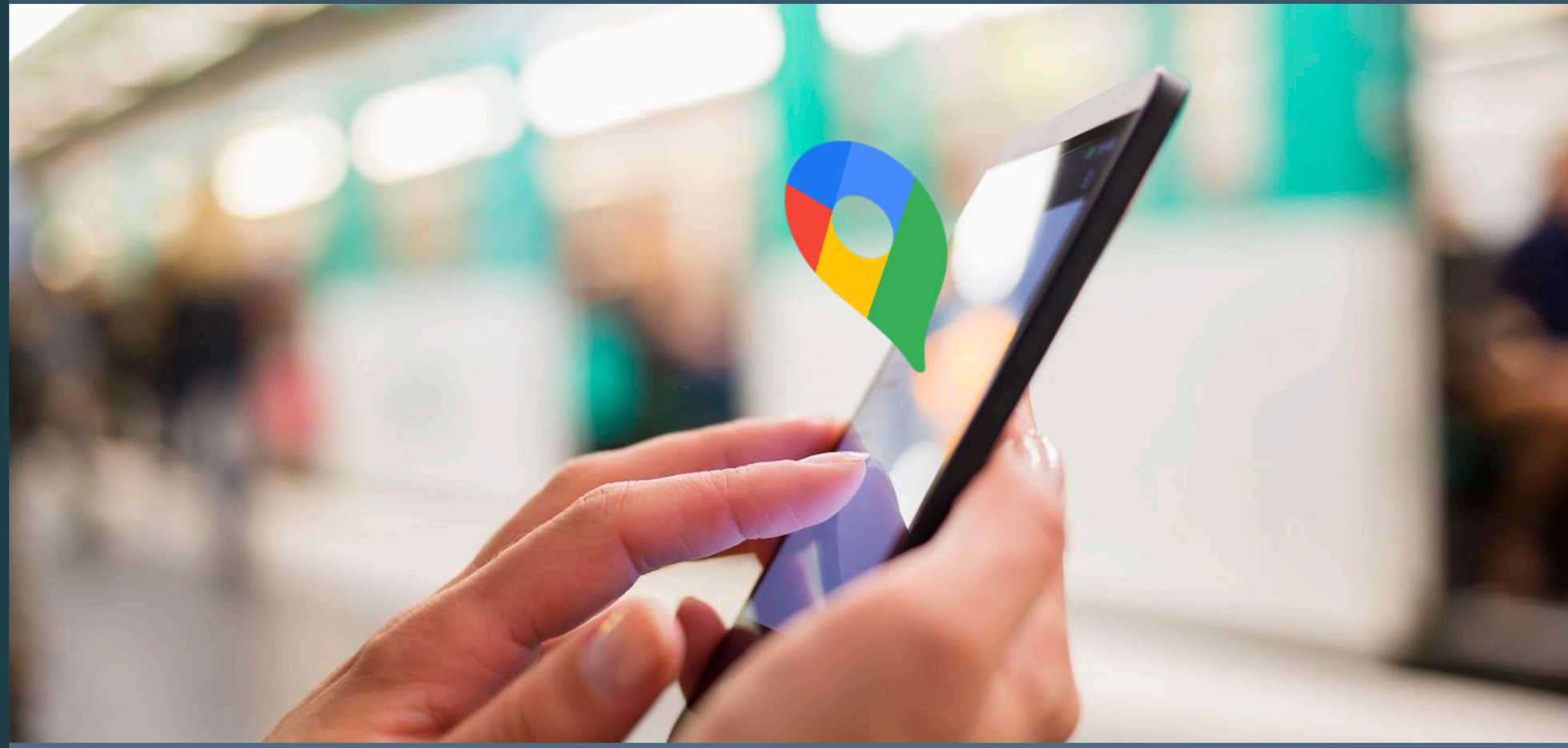
PTOLEMUS
Consulting Group

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 rumours of Google's death have been greatly exaggerated

As a former executive of TomTom, which almost died as a result of Google's move to free navigation on smartphones, I have been always been paying extreme attention to Google's steps in mobility.

Since the launch of Google Maps in 2005, Alphabet has made increasing inroads in the domain of mobility.

Its free, advertising-based model has *de facto* killed or forced the repositioning of many mobility stakeholders, from MiTac, Navigon, TomTom to HERE and many app developers from Maporama, MapQuest, NNG NavNGo to Telenav, Telmap, Sygic, ViaMichelin, etc. RIP.

Is it now the turn of MaaS platforms (CityMapper, Siemens, Whim…) and ticketing providers (Conduent, Cubic, etc.)?

In this research, we tracked Google's every move in urban transport and were impressed to see how close they are now to offer end-to-end multimodal mobility services to end-users.

I have often compared Google to the sea level. You can erect barriers but you cannot resist for a long time to rising water levels as it surrounds you. At some point you need to adapt… or die.

Despite the EU's Digital Markets Act, Google has the force of being present in virtually all smartphones in the world (save China) and is the default mapping, routing and navigation app for the planet.

Given that MaaS will come from smartphones and that Google Maps is free, nobody will be able to resist Google for long.

Thus despite its perceived lagging position in AI, Alphabet is ready to make the connection between the digital and the physical transportation world.

Do not believe my words, just read this report! And act fast!

Source: PTOLEMUS - Note: MaaS: Mobility-as-a-Service

We gave Google a chance to respond

Despite numerous attempts to talk to Google representatives, we were not able to obtain comments from the Alphabet Group for this investigation.

This behaviour, which contrasted with our previous relationships with the firm, indicates that the company prefers to remain silent on the topic of mobility.

For obvious regulatory reasons (cf the Digital Markets Act) but also because we believe it prefers to progress silently in this market to avoid attracting the attention of Public Transport Operators, Cities and ultimately regulators.

…

Source: PTOLEMUS - Note: MaaS: Mobility-as-a-Service

The first investigation of 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 urban mobility market**, based on:
  - **10** years of constant market surveillance
  - PTOLEMUS' mobility experience with nearly **200** consulting assignments across the transportation ecosystem
  - **8** months of research and analysis
  - Interviews with **22** transport stakeholders in Europe and North America
- **An in-depth analysis of Alphabet's successes in mobility to date**
- **An analysis of Google's partnerships and actions in urban mobility**
- **An assessment of Google's strategy and initiatives in the mobility field, including**
  - An analysis of its key mobility assets: Google Maps, Google Wallet, Waze and Waymo
  - A review on how Google Maps has integrated payments
  - An analysis of Google Maps' key sources of revenues
  - An assessment of how companies integrate and what are the benefits of Google Maps to the mobility partners programme
- **A detailed analysis of 4 strategy alternatives that Google could adopt to enter the urban mobility market, including booking and ticketing & payment for Mobility-as-a-Service (MaaS)**
- **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 urban mobility services market based on**
  - The 3 main evolution options we identified and their respective likelihood to transpire
  - A forecast until 2030 of Google's 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

Source: PTOLEMUS

Today, no mobility player offers Mobility-as-a-Service on a large scale but we believe Google will within the next 2 years

MaaS has not taken off...

- Alternatives to the use of private vehicles in urban areas are rapidly gaining traction due to increased traffic congestion and the need to reduce emissions and pollution in general
- Because it unifies all other modes of transport, **MaaS is seen as one of the most prominent alternatives and almost every big city has launched an initiative to make it happen**
- **Still, more than 7 years after the ITS World Congress in Bordeaux where the MaaS concept was invented, the market has not taken off**
  - To date, the supply remains limited as no player offers a fully integrated solution* across multiple regions and transport modes
  - Efforts remain regional depending on the structure of the transportation sector in each country / region / city
  - Due to the lack of multi-modal / multi-operator integration, the demand remains subdued, which makes the champions of the concept, e.g. Whim and CityMapper fragile
- **However, the technology has never been so mature for mobility to become cleaner, safer and more accessible**
  - Smartphones are becoming ubiquitous for mobile access to online platforms and now for payments in the physical world

... but this is largely a supply issue that Google could solve

  - Digital platforms - leveraging cloud computing and AI - are integrating connected transport modes to offer real-time advice on the best route to reach a destination
  - Emerging battery-powered micro-vehicles are becoming the preferred mobility mode for first/last mile and short trips, notably in urban areas
- So far, **Public Transport Operators (PTOs)**, supported by platform suppliers such as Siemens, have created the most relevant initiatives regarding multi-modal integration, but **lack international scalability and often offer a poor customer experience**
- There are many successful examples of mobility delivered as a service for a single transport mode
  - Players like Moovit, Uber and FreeNow have been able to create scalable international solutions but still struggle to integrate public transport
  - However, **we have not yet seen scalable MaaS platforms integrating public transportation with shared mobility in multiple countries**
- **Based on its continuous progress in the last 20 years, Google appears as the best positioned player to deliver such a proposition**

This report is the first one to analyse whether Google will take over the urban mobility market by delivering a mobility service globally

Source: PTOLEMUS - Note: * Integrating public transportation, shared mobility, ride hailing, taxis and car services like tolling and parking in a single app

In this report, we respond to 12 questions that are absolutely crucial to understand the future of Google in urban mobility

- Why is MaaS so relevant?
- How is MaaS built and delivered?
- What has Google achieved in mobility so far?
- What's Google's formula to thrive in mobility?
- What is Google's competitive advantage in MaaS?
- What are the most likely evolution scenarios of MaaS?
- How players should react to Google's actions?
- What are the most likely scenarios for Google to move ahead in mobility?
- What are Google's risks and opportunities of each alternative?
- When will Google's roll out its MaaS service?
- What are Google's incremental profits under 3 MaaS positioning options?
- What are Google's regulatory challenges?

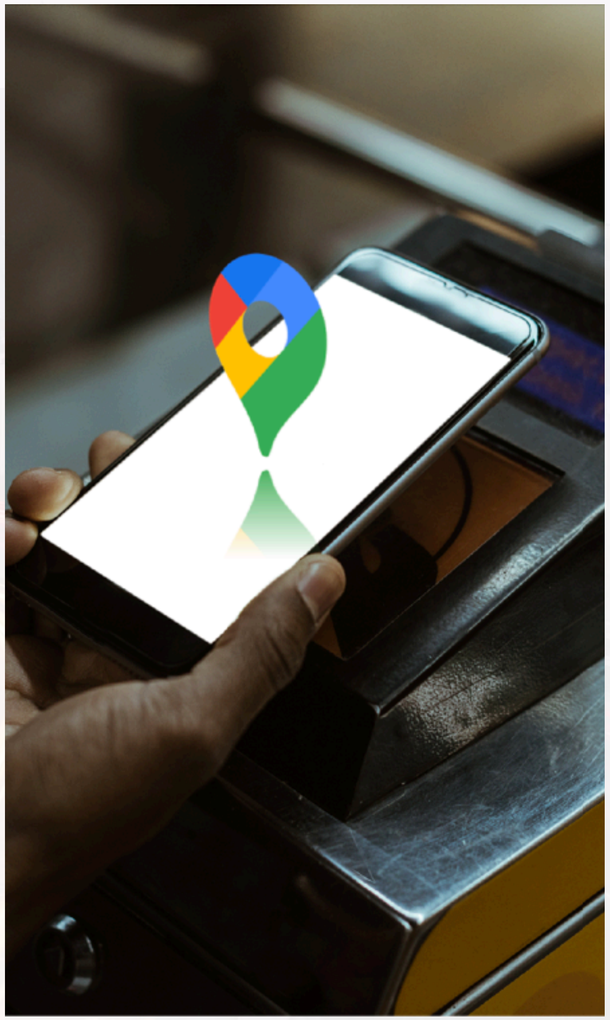
Source: PTOLEMUS - Note: MaaS: Mobility-as-a-Service

Google will dominate the city mobility market by integrating ticketing & payment, enabling the end-to-end mobility experience in 1 app

- **Google has become the number 1 digital mobility services providers in the world**
  - Google has built the number 1 franchise in digital mobility, Google Maps
  - It has *de facto* killed competition by offering its services for free and acquiring its most threatening competitor, Waze*
  - It has aggregated the largest static and dynamic data related to urban mobility and public transport
  - It has managed to make all largest mobility providers dependent on its APIs
  - It is gradually creating a natural duopoly (with Apple) in our cars through Android Auto and GAS

- **Fundamentally Google is one of the very few operators that has found a sustainable business model in digital urban mobility services**
  - Thanks to its advertising model and its APIs, Google has an economic model today
  - Given Alphabet's opaque financial statements, it is not possible to ascertain whether its mobility services are profitable
  - Thanks to the commission model on Google Pay, any transport payment will generate commissions for Google
  - In any case, Google has understood the vital importance of catching users / eyeballs to feed its advertising machine
  - Today none of Apple, Didi, Uber, Lyft, Moovit and Via / CityMapper is profitable in its urban mobility business
  - PTOs are operating under low or negative margins and are generally subsidised
  - Alibaba, with its Alipay unit, could have been a major contender but it is now split into 6 units
  - Today, Google Maps has the most comprehensive global app to commute in all transport modes

- **We expect Google to integrate booking, ticketing and payment for most transport modes in the next 3 years, initially in Europe and North America**
  - In European cities, it will focus on the integration of public transport and shared mobility
  - In North American cities, it will focus on car-related services including parking, tolls, etc.

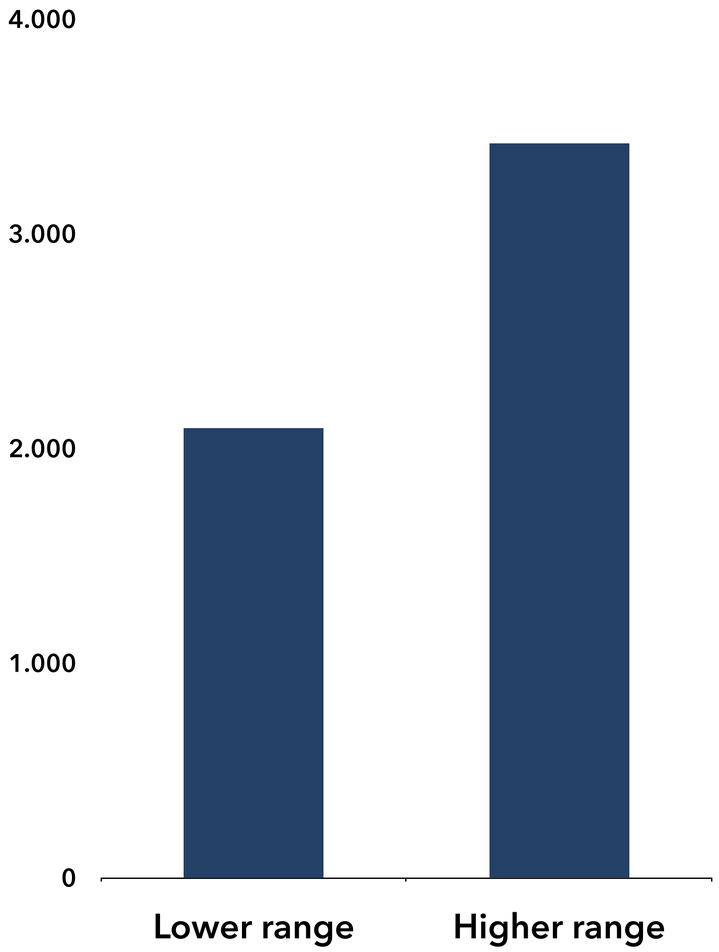


Source: PTOLEMUS - Note: *In a $1.3 billion bid against Facebook; GAS: Google Automotive Services - PTOs: Public Transport Operators

Moving into ticketing & payments represents for Google an additional EBITDA from now until 2030 of 2 to 3.4 billion

- **Google has already achieved what any mobility operator would love**
  - The largest customer base that actively uses the app to search for options to reach its destination
  - It has integrated real-time information on the most relevant mobility operators in almost all geographies
- By integrating ticketing & payment into Google Maps, Google would further develop its position in the urban mobility market
- We estimate that by integrating ticketing & payment, Google would generate an **accumulated EBITDA** from **€2 billion to over €3.4 billion between 2023 and 2030**
- It would generate direct revenues via commissions paid by users to PTOs or Mobility Service Providers when using transport modes in their respective areas
- The scale of the transport and mobility services industry is enormous
  - In Europe, it accounts for more than 5% of the total value added and represents approximately 10.5 million employments*
- Thanks to the fast adoption of mobile payments and the scalability of cloud-based processing platforms, **Google could benefit from high margins**
  - Through the cloud, Google can quickly deploy its services across multiple regions
  - With 1.6 billion mobile money accounts, mobile transactions represented $1.26 trillion in 2022**
- It would also generate indirect revenues through cross-selling (i.e. advertising), which is not included in this estimate
- Such movement will make Google a Gatekeeper in one more market, and thus it will **be subject to Digital Markets Act in the transport digital payments market**

Estimation of Google's potential accumulated EBITDA generated with MaaS ticketing & payment in Europe***
(2023-2030, € million)



Source: PTOLEMUS - Note: *Study on new mobility patterns in European Cities; **GSMA; ***does not include potential income from the transactions of car services such as parking, tolling, EV charging

With Google's silent integration, MaaS operators and PTOs will need to redefine their strategy and decide whether to cooperate or collide

- **Google integrating ticketing and payment will have an immense impact on the urban mobility market**:
  - MaaS operators such as Cogo, FREE NOW, Lyko, Moovit, Siemens, SkedGo, Skipr, Telepass, Uber, Vaigo, Via / Citymapper and Whim **will be heavily impacted** by Google's vertical integration in the MaaS market, losing market share to Google Maps and Google Pay
  - **Many users will switch from PTOs or mobility service providers apps to Google Maps** to plan and pay their trips
  - On the other hand, **on-demand mobility operators**, who focus on service provision, **will benefit** from the additional traffic generated to their platforms by Google Maps
  - EU institutions and national ministries of transport will be pressured by MaaS operators and PTOs to regulate the role of Google in the value chain

Player	Actions		
On demand mobility operators* must start surfing the wave	• Understand how to better rank in Google's map recommendations • Allocate budget for advertising in Google Maps • Strongly focus on operations efficiency • Develop robust analytics to determine how to better position fleet in the cities		
MaaS operators need to quickly start to either scale-up or specialise	• Find the right partners to scale up substantially and create a competing MaaS platform	or	• Specialise in operating specific mobility modes, no longer on building a MaaS platform • Specialise in niche MaaS markets such as Corporate MaaS or regions where Google will struggle to enter
PTOs can cooperate or collide	• Partner with Google to have 1 single app and integrate ticketing & payment APIs	or	• Create partnerships with other mapping (e.g. HERE, TomTom, OpenStreetMap) and MaaS (e.g. Cogo, Freenow, Moovit) platform providers to produce a competitive alternative • Partner with multiple PTOs from other regions to create a European mobility app
EU institutions and Transport Ministries have the power to make MaaS flourish	• Push towards a smartphone-based payments ecosystem • Regulate the payments ecosystem to avoid monopolies • Open the transport payments ecosystem, which will push players to specialise and compete in different steps of the value chain, improving mobility services for users		

Source: PTOLEMUS - Note: * Including shared mobility and micro-mobility, taxi, ride hailing and car sharing

This report is divided into 6 sections

NOT COMPLETE

GO TO TAB: PERSONALITIES on https://ptolemus-my.sharepoint.com/:x:/p/stvorogova/EcMHb4BbVvxLjhxFQz88MfABQl0OQ1VSQQGb30Pk2vGhfg

We would like to thank those organisations for sharing th knowledge and insights with us!

TIER

SIEMENS

universität wien

WhereIsMyTransport

avv Aachener Verkehrsverbund

MIVB STIB

transportapi

vaigo

Lyko

ENTUR

BEMOBILE a revolution in traffic

OCTO

voi.

Fluidtime

Source: PTOLEMUS

The report leverages PTOLEMUS' mobility experience and the expertise of 8 consultants and researchers of 7 nationalities (1/2)

Frederic Bruneteau

Managing Director

Alberto Lodieu

Senior Manager

Andrew Jackson

Research Director

Svetlana Tvorogova

Research Consultant

Experience

27 years

14 years

15 years

20 years

Biography

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 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.

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 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.

The report leverages PTOLEMUS' mobility experience and the expertise of 8 consultants and researchers of 7 nationalities (2/2)

Laura Pájaro

Research Analyst

Damien Orsoni

Business Analyst

Nan Chu

Research Analyst

Claudia Lozano

Senior Business Analyst

Experience

4 years

3 years

3 years

6 years

Biography

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.

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.

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.

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.

Google in MaaS

Report purchase options and pricing

PTOLEMUS Consulting Group

The report comes with a single, worldwide company licence

For more information about the report, email contact@ptolemus.com

*You can purchase the report by requesting an invoice or buy online** (Visa or MasterCard) on our website*

Licence type	Contents
Global licence covering all employees worldwide	• A 130-page investigation of the current and future Google's strategy in the urban mobility market • An in-depth analysis of Google's successes 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 • 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 - The 3 main evolution options we identified and their likelihood to happen - A forecast of Google's EBITDA generated by MaaS in Europe in the 3 main strategy alternatives
Price	**€995**

Note: Prices in Euros, excluding VAT (VAT only applicable to clients located in Belgium); *Conditions apply; **Online pricing might differ due to exchange rates

Changes made

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Published in April 2023

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Disclosure

The recommendations and opinions expressed in this abstract reflect PTOLEMUS' independent and objective views. However, PTOLEMUS cannot provide any guarantee as to the accuracy of the information provided or the reliability of its analyses and forecasts.

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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

PTOLEMUS Consulting Group

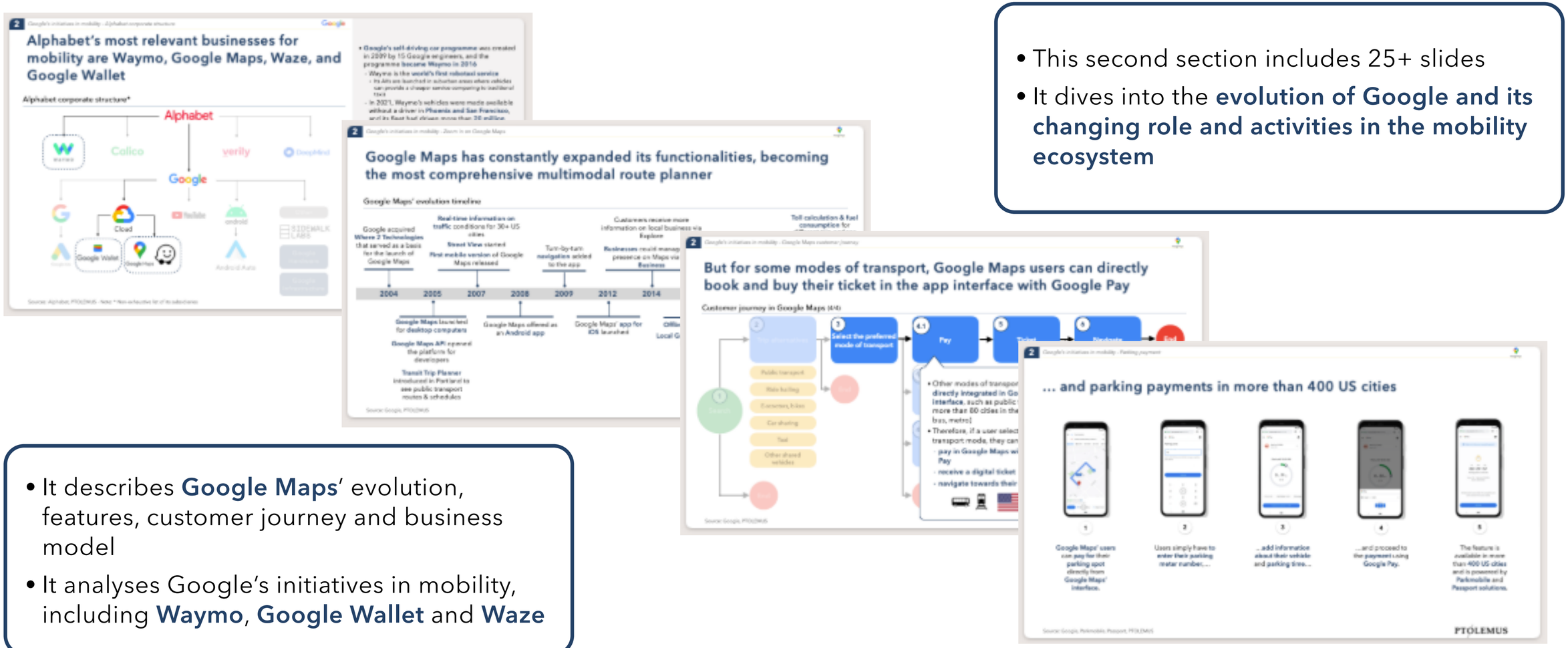
In section 1, we explain what MaaS is and the rationale for the report, including why we chose to focus on Google

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

- It describes Google's history and successes in mobility
- It analyses Alphabet's current capabilities and resources
- **It explains why we chose to analyse Google**

Source: PTOLEMUS

In section 2, we track and 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**

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

Source: PTOLEMUS

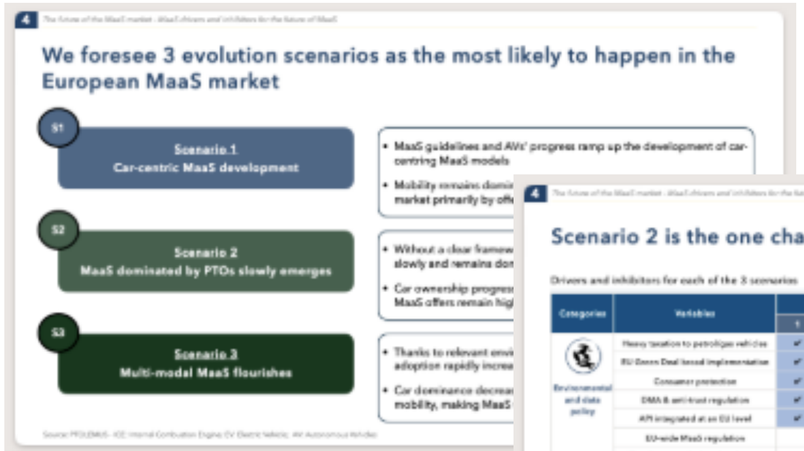
In section 3, we map Google's strategy in urban mobility

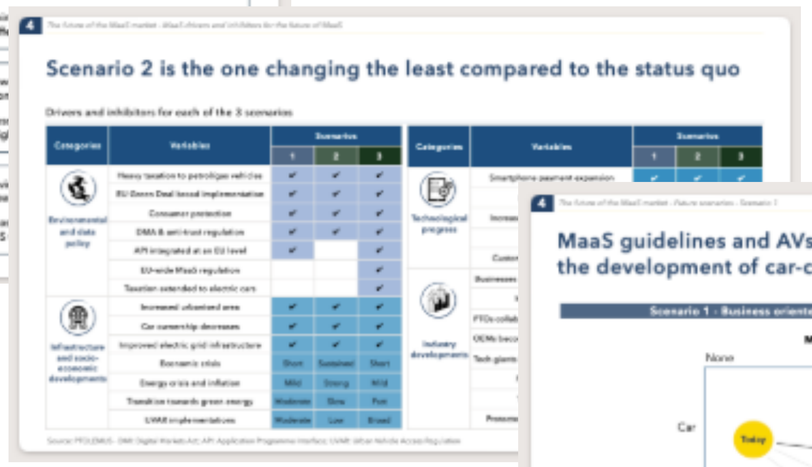
- This third section includes 20+ slides
- **It dives into Google's strategy in urban mobility**

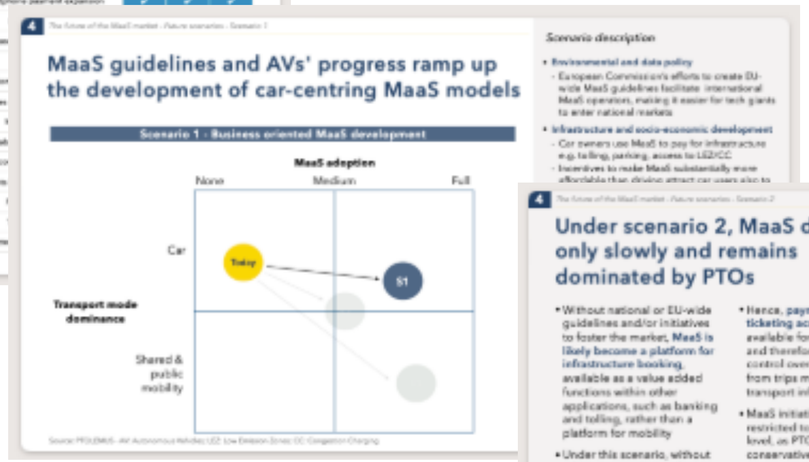
- It describes **Google's cross-selling & synergies, competition and corporate strategy in urban mobility**
- It describes relevant **EU-wide regulations** and **Google's relationship with EU institutions**

Source: PTOLEMUS

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





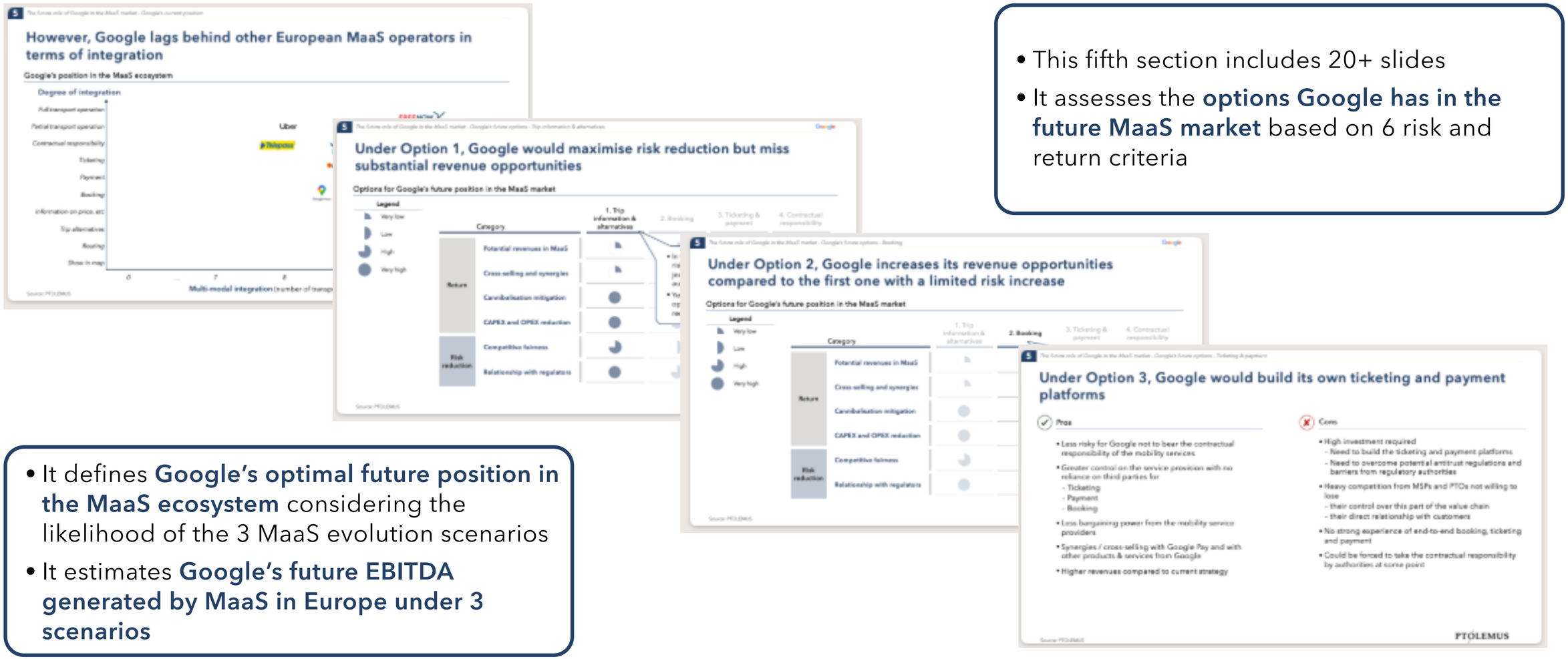


- This fourth section includes 15 slides
- **It uses the most important technological, market and regulation drivers and inhibitors to build future scenarios of MaaS**

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

Source: PTOLEMUS

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

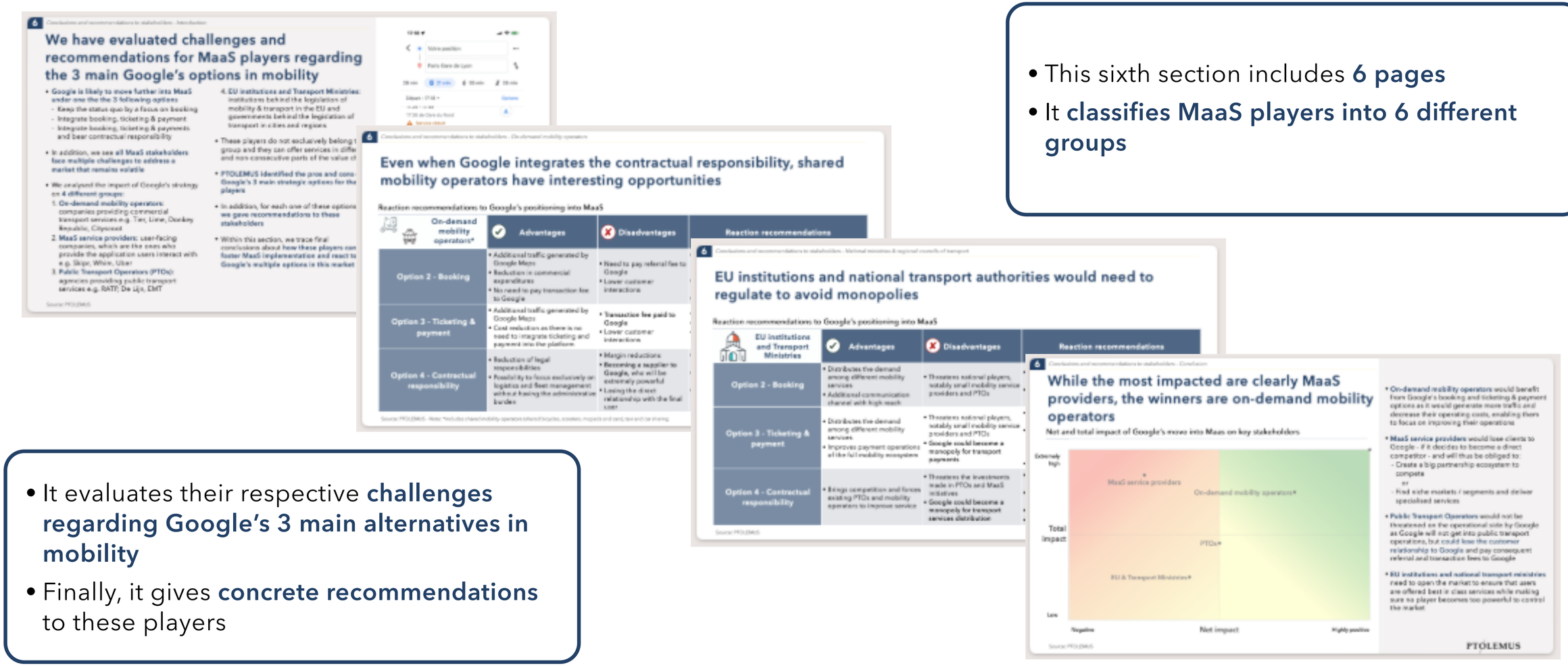


- This fifth section includes 20+ slides
- It assesses the **options Google has in the future MaaS market** based on 6 risk and return criteria

- It defines **Google's 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 3 scenarios**

Source: PTOLEMUS

In section 6, we provide our conclusions and recommendations to the key stakeholders of the MaaS ecosystem



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

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

Source: PTOLEMUS

Google in MaaS report

About PTOLEMUS

PTOLEMUS Consulting Group

PTOLEMUS is the first strategy consulting and research firm entirely focused on connected mobility and smart infrastructure

Strategy consulting services

Strategy definition	M&A advisory	Growth strategy
Innovation management	Partnership strategy	Procurement strategy

Market research services

Off-the-shelf reports	Subscription services	Custom market research

Fields of expertise

Autonomous Vehicles	Connected Vehicles	Connected Motor Insurance
Electric Vehicles	Electronic Toll Collection	Emergency Services
Fleet Telematics	Intelligent Transportation Systems	Location-based Services
Mobility Payments	Mobility-as-a-Service	Road Usage Charging

PTOLEMUS has completed nearly 200 consulting assignments, serving over 350 clients across the mobility ecosystem

DATA & ANALYTICS

AUTOMOTIVE

FINANCE

POSITIONING

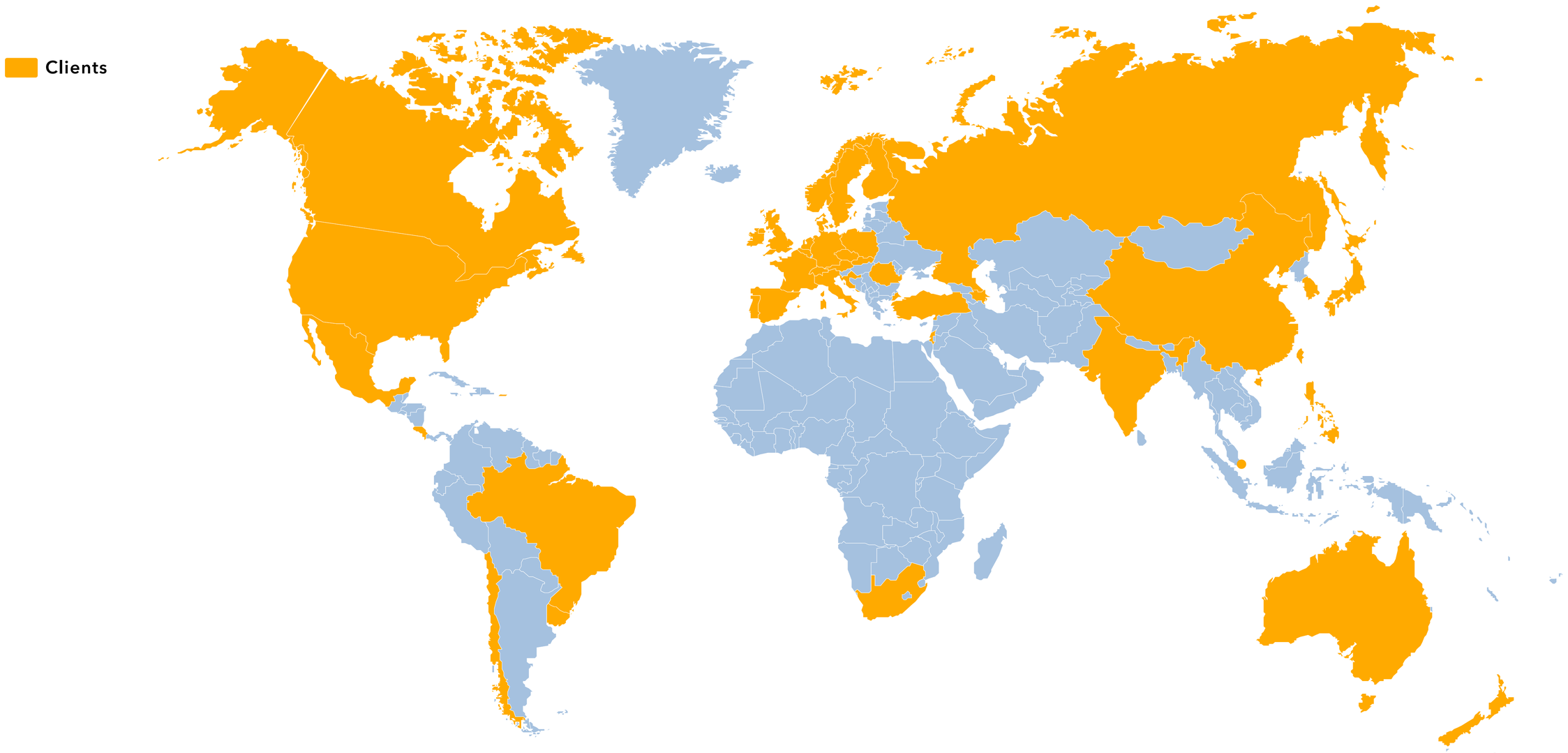
MOBILE TELECOMS

INSURANCE & ASSISTANCE

SMART CITY, ITS & FLEETS

TELEMATICS

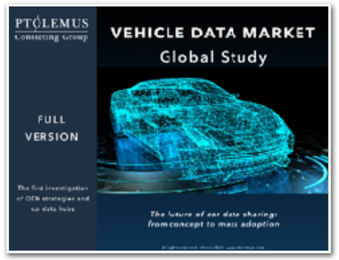
Our team of consultants, experts and analysts with 12 nationalities, serves our clients in 41 countries



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

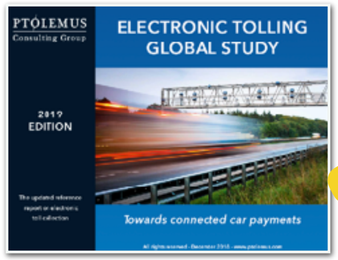
AUTONOMOUS DRIVING

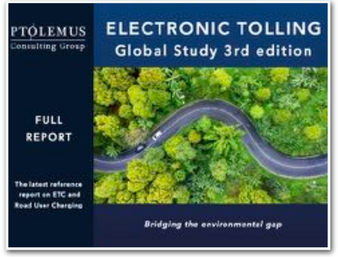
CONNECTED VEHICLE



ELECTRIFICATION

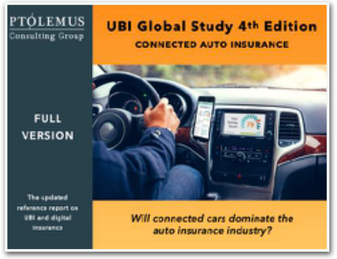
TOLLING & ROAD USAGE CHARGING



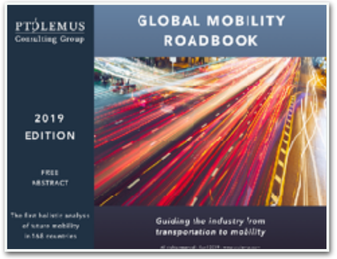


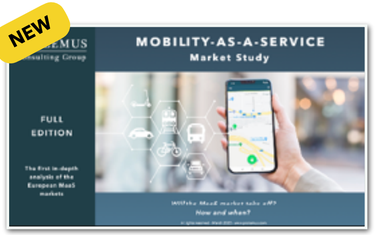
FLEET MANAGEMENT

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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