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Location Platform Index 2023

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Omdia commissioned research, sponsored by HERE

Contents

Summary

Omdia's Location Platform Index provides an ongoing assessment and ranking of the major vendors in the location intelligence platform and services market, with particular reference to the mapping and navigation space. The index evaluates vendors on two main criteria: platform completeness and market reach. It considers a location platform's core capabilities along with value-added services (VAS), the supporting ecosystem, and business models. The index provides a detailed analysis of all the "leaders," an assessment of the top three vendors in the "challengers" segment, and recommendations to help vendors stay ahead of the game. The index is based on accomplishments in the assessment year (80% of the score) with a 20% weighting given to features that show significant progress or are under nondisclosure agreements.

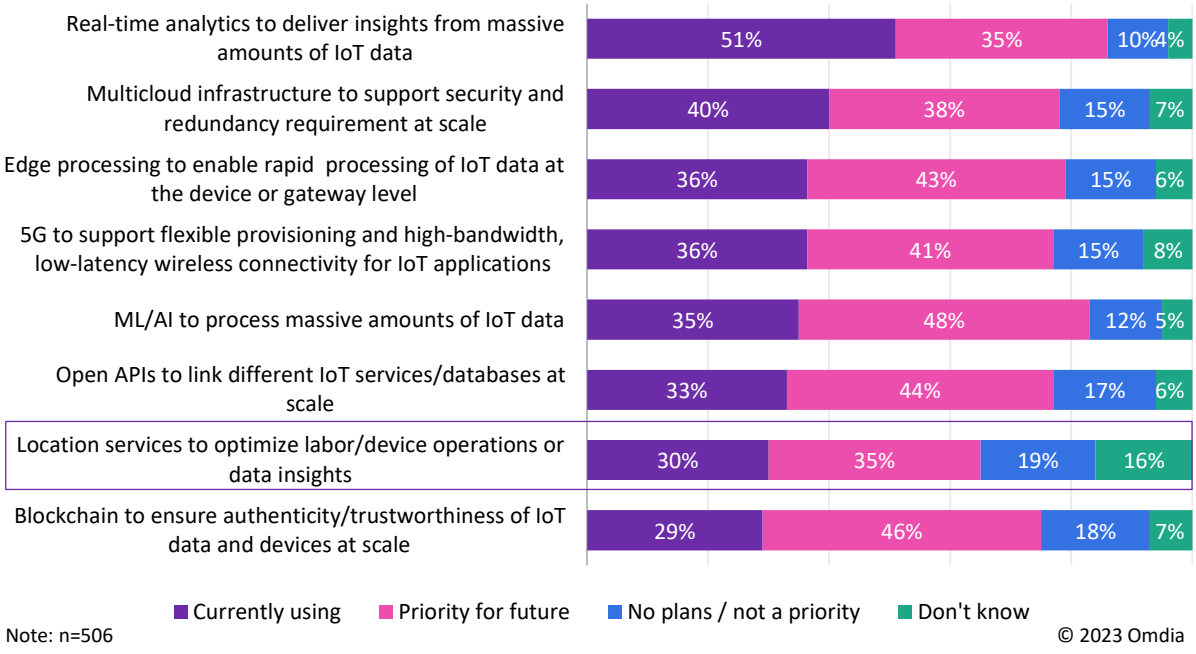
Omdia view

Key messages

Enterprises increasingly turn to location services to optimize labor/device operations or data insight

In 1Q23, Omdia conducted a nine-country survey of 506 enterprises deploying or in the process of rolling out Internet of Things (IoT) solutions. When asked if they were using or planned to use location services to optimize labor/device operations or data insights in their IoT deployments, 30% of enterprises said they are currently employing this intelligence, and 35% said these services were a priority for the future. Interestingly, 16% responded "I don't know." This is almost 3× the number of respondents that responded "I don't know" to other questions, suggesting that location-based service providers should work to educate enterprises better on how their services can improve operations.

Figure 1: Which services are part of your IoT deployment strategy?



Note: n=506

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Source: Omdia

5G is adding enhancements to locate devices both horizontally and vertically and with lower latency over the cellular network

The technology of 5G is evolving. While most devices rely on global navigation satellite systems such as GPS, supplementing this technology with 5G technology can result in greater accuracy, lower latency, wider availability, and better reliability. The 3GPP Release 16 began specifying positioning for 5G New Radio (NR). Higher carrier frequencies and utilization of massive antenna arrays allowed for greater accuracy in positioning, in some use cases less than 3 meters. The release also looked at achieving greater accuracy of indoor positioning. Included in Release 17 was the work item dubbed "Enhancement to the 5GC location services." The releases include more precise 5G NR positioning with centimeter-level location accuracy indoors and accuracy of within 5 meters outdoors. The location of the device is also determined by the vertical axis, so the height of the device can also be established. Use cases considered include smart factories and precise industrial equipment, wireless automotive charging, drone locations, and asset tracking.

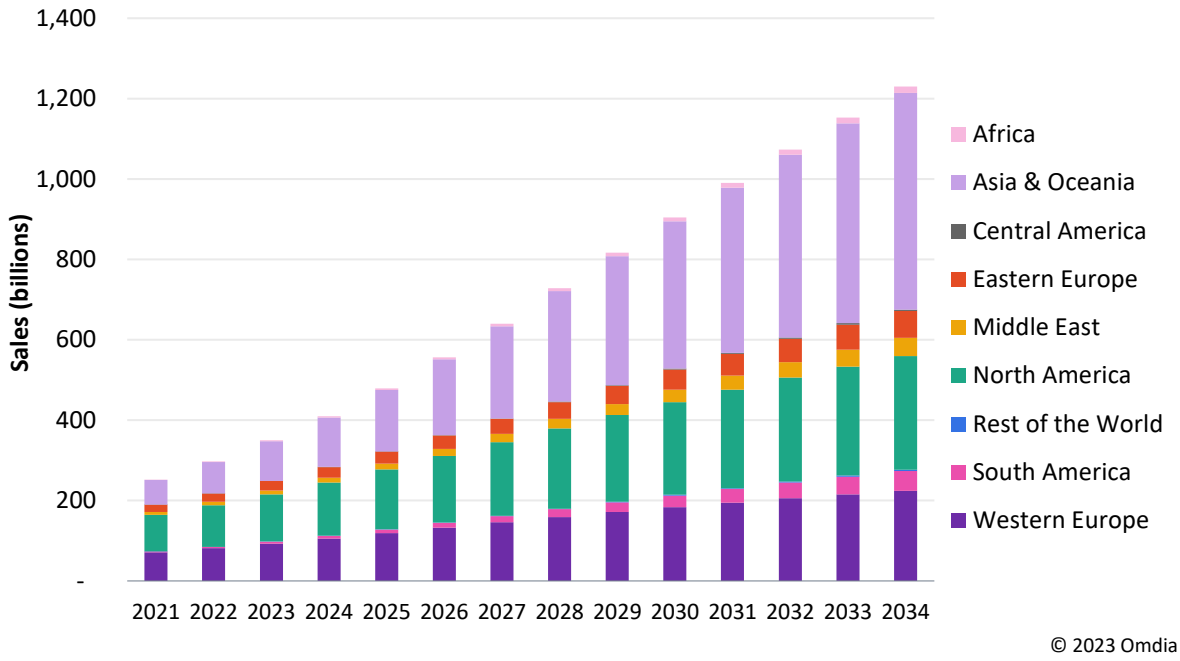
Now, 5G Red Cap can reach a precision of about 10 meters, and 5G Advanced will introduce enhanced positioning with sub-10cm accuracy consistently aimed at both indoor and outdoor use cases. It will also increase resilience of positioning and will not require GPS.

The total addressable market for vehicles, particularly electric vehicles, is expanding

These vehicles will all have mapping needs including locating and routing to electric-vehicle (EV) charging stations, and some may use location-based applications as one of their differentiators.

Wards Intelligence forecasts that sales of connected cars will grow from more than 46 million in 2021 to 106.8 million in 2034, a CAGR of 7%. The growth will be driven by emerging markets, particularly in Asia. China and India both represent massive consumer bases, but smaller markets such as Indonesia, Malayasia, Vietnam, and Cambodia are also driving growth.

Figure 2: Connected-car sales by region, 2021–34



Source: Wards Intelligence

A massive crop of new EV OEMs have sprung up, many based in China. Chinese players including BYD, MG (part of SAIC), Nio, Xpeng, and Zeekr (part of Geely) and Vietnam-based VinFast all have their eyes on expanding into Western markets. Just as the Japanese OEMs arrived in the 70s and 80s, and the Korean OEMs arrived in the 80s and 90s, these new Asian OEMs are ready to take on Western OEMs in their local markets. Both the Japanese and the Koreans first competed by offering low-cost but not well-appointed vehicles, but they soon began selling highly reliable vehicles and even offering their own luxury brands. Many expected these new EV players to follow a similar strategy. At the Shanghai International Automobile Industry Exhibition (Shanghai Auto Show) and International Motor Show Germany (Munich Auto Show), their vehicles were attractive and slick and demonstrated that these companies understand what a software-defined vehicle (SDV) should be.

A number of new Western OEMs are looking to replicate the success of Tesla. Like Tesla, many are first targeting specific niches within the luxury segment and are likely to then expand to larger segments. Players such as Faraday Futures, Fisker, Lucid Motors, and Rivian are all starting to deliver vehicles to consumers.

The market for battery-powered commercial vehicles and, eventually, autonomous commercial vehicles is also expanding

Commercial vehicles vary in classification (classification varies by region) and by the task they seek to perform. Whether they are large tractor trailers that move large pallets of goods across highways or smaller delivery vehicles used for last-mile delivery, vehicle needs vary as do their mapping needs.

The variation is increasing as commercial EVs come to market. German vehicle manufacturer Daimler AG has designed an 18-wheeler, the Freightliner eCascadia, that is available with a range of 155 (249km) or 220 miles. The company also offers a medium-duty truck, the Freightliner eM2, that is available with a range of 180 or 250 miles. Volvo introduced a line of commercially available electric trucks under the brand VNR Electric.

The market for autonomous vehicles, particularly robotaxis, is currently in turmoil; manufacturers must work to regain consumer trust

After an accident that involved but was not caused by a Cruise robotaxi, when a pedestrian was severely injured, Cruise failed to fully disclose details of the incident. As a result, the California Department of Transportation suspended Cruise's operations. Cruise was excoriated in the press, though often the headlines did not fully inform readers that the accident was initially caused by a human-driven vehicle. Nevertheless, public opinion, already distrustful of autonomous vehicles, became even less trusting.

Players across the autonomous vehicle value chain must work to regain trust and help create a better narrative for autonomous vehicles. Many players started focusing on the economics of autonomous driving, especially since many are losing hundreds of millions of dollars each quarter, and it seems that some are looking for returns before products have been completely vetted. Similarly, the decision of OEMs such as Tesla to eschew LiDAR and high-definition (HD) maps might prove foolhardy and ultimately impede the arrival of more autonomous vehicles. Chinese OEM XPeng still employs LiDAR, but it and some other Chinese OEMs are not employing HD maps. These decisions will cut costs but could ultimately hinder the evolution of autonomous vehicles and, more importantly, jeopardize the safety of people.

At the other end of the market are micromobility and delivery services that will also have mapping needs

However, these devices and services will not be able to support the cost of the robust and often HD maps that autonomous vehicles can absorb.

Electric bikes, scooters, and other shared devices are taking off, particularly in urban areas. These schemes often allow people to rent a device for shorter trips and are often seen as a means to unify a city's transportation infrastructure, allowing people using public transportation systems such as buses and subways to easily reach their final destination. Some city planners believe this is a way to reduce dependency on car ownership and thereby limit emissions and congestion. Similarly, services such as food and beverage delivery believe that these devices can transport products in busy cities more easily and efficiently than cars. The margins for these services are extremely thin; nonetheless, location service providers should develop strategies for servicing these emerging markets.

Overture Maps Foundation is emerging a major provider of maps

Founded in December 2022, the Overture Maps Foundation (OMF) is a project officially hosted by the Linux Foundation to develop interoperable map data. With key stakeholders from original members Amazon Web Services (AWS), Meta (formerly Facebook), Microsoft, and TomTom, OMF is a collaborative effort. Esri, Cyient, InfraMappa, Nomoko, Precisely, PTV Group, SafeGraph, Sanborn, and Sparkgeo were later added to the foundation. The OMF is open to new members and offers membership at four tiers. The most influential is a Steering membership, which requires a $3m

annual membership fee and an engineering contribution of 20 full-time engineers; participation also requires Silver membership in the Linux Foundation. The lowest tier is a free membership for qualified governmental and nonprofit organizations.

The goal of the foundation is to provide high-quality mapping and geolocation data for enterprises, including its members. In doing so, the foundation will help drive the creation of new mapping products. A secondary but unstated goal is to allow enterprises, including those in the foundation, an alternative to using the APIs of Google Maps or Apple Maps, which are more closed/restrictive ecosystems.

While there are similarities to OpenStreetMap (OSM), which provides free, crowdsourced, editable maps, OMF is more focused on maps data, and its contributors are arguably better vetted. OMF could be seen as complementary to OSM, because OMF combines OSM with other sources to create new open map datasets. The fact that companies that could easily be seen as rivals, such as AWS and Microsoft, are able to work together highlights the difficulty of maintaining a global, consistently updated, highly detailed map. Meta's interest likely stems from the use of maps not only to commercialize advertisements on its social networks but also for spatial data and real-world maps and images that will be used in the Metaverse. Attracting a diverse and robust set of contributors of data will allow maps to be created that span many different verticals and many different use cases.

Results overview

Omdia's Location Platform Index 2023

The consolidated results for the latest update of Omdia's Location Platform Index are shown in **Figure 3**. The index evaluates location platform vendors on two main criteria: the completeness of the platform and its market reach. Each component plays an equal role in determining a vendor's final rank. The index considers not only the core capabilities of a location and mapping platform but also associated services, data, and capabilities that the platform opens up to developers and the wider location community.

Figure 3: Consolidated vendor rankings

	Rank	Player	Score Nov. 2023	Score Nov. 2022	Score change
Leaders	1	HERE	8.09	7.88	+0.21
	2	Google	7.12	7.47	-0.35
	3	TomTom	6.84	6.76	+0.08
	4	Mapbox	5.74	6.03	-0.29
Challengers	5	Esri	5.15	5.15	+0.01
	6	Apple	5.09	5.04	+0.05
	7	Microsoft	4.96	4.71	+0.25

Source: Omdia

Reach and completeness

The index is based on two primary components of the location platform: reach and completeness.

Reach considers two main categories:

- **Users:** This considers the geographic markets covered by the platform; the scope of B2C, B2B2C, and B2B customers; auto OEM customers; and vertical industries served.
- **Ecosystem:** This looks at the industry partnerships, geographic partnerships, developer base, and the developer framework to assess how attractive the platform is to businesses.

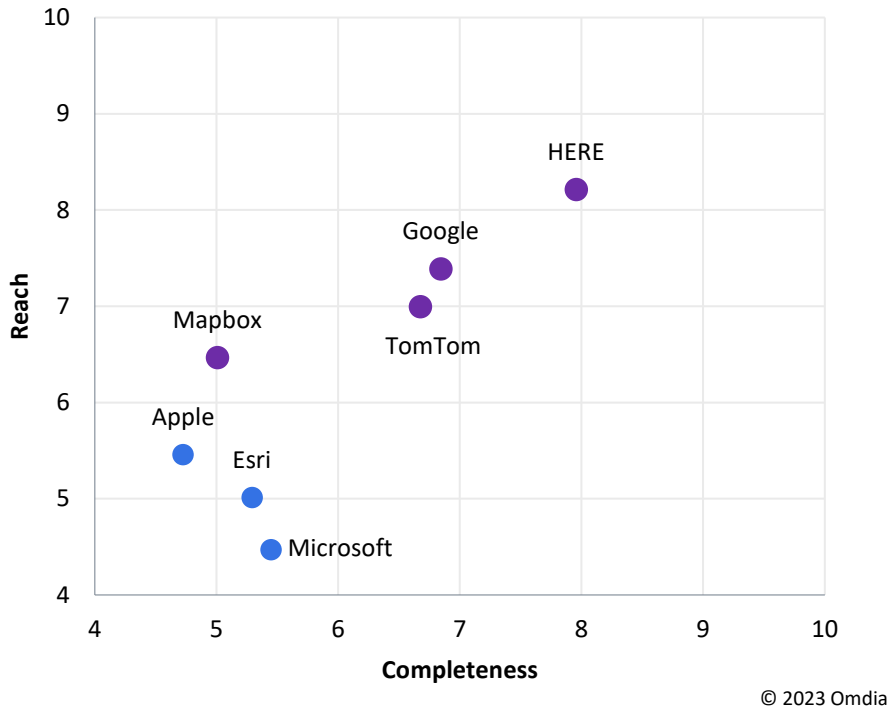
Completeness reflects four categories:

- **Core data:** This assesses core mapping data, data partnerships, data exchanges, and crowdsourcing capabilities.
- **Mapping and platform:** This analyzes the depth of map coverage, artificial intelligence (AI) capabilities, analytics, mapping capabilities, traffic information, and the ability to add further mapping capabilities.
- **Services:** This looks at a platform's service and feature elements, which are important and enhance the overall proposition. This category considers advanced driver assistance systems (ADAS) and automated driving capabilities, software capabilities, mobility services, and capability for increasing VAS (such as supporting new verticals, including IoT verticals and, to a lesser degree, the integration of voice assistants and digital payments).
- **Monetization:** This score assesses the ability of the platform to monetize the services and also takes into consideration the overall cost of implementation.

A more detailed summary of the reach and completeness parameters can be found in the ***Methodology*** section.

Figure 4 maps all the leaders and challengers included in the index based on their reach and completeness scores. Leaders (shown in purple) are those vendors with an overall score of 6 or above. They trend toward the top-right quadrant of the chart. Challengers (shown in blue) are vendors with an overall score of less than 6.

Figure 4: Reach and completeness of leaders and challengers



Source: Omdia

Leaders

HERE distances itself from the crowd

The leaders group contains four companies: HERE, Google, TomTom, and Mapbox. **Table 1** and **Figure 5** show their overall scores for reach and completeness and their scores against the four criteria for how completeness is measured: core data, mapping and platform capabilities, services supported by the platform, and strength of a vendor's monetization strategy. This version of the Location Platform Index also considers the platform's design elements; visualization abilities to integrate artificial intelligence; new segments expansion such as electric vehicles, routing, and charging; overall cost of implementation for the solutions; and security. HERE and Google have traditionally been leaders in this space. HERE saw its total score grow year over year from 7.88 in 2022 to 8.09 in 2023. Google is still in a strong position, especially with its reach in the consumer market and developer community. TomTom maintained its third position, closing the gap to the second spot as it makes progress toward its Orbis Maps taking an open source approach in mapmaking.

Table 1: Leaders scoreboard

	HERE	Google	TomTom	Mapbox
Total	**8.09**	**7.12**	**6.84**	**5.74**
Completeness	3.98	3.42	3.34	2.50
Reach	4.11	3.70	3.50	3.23
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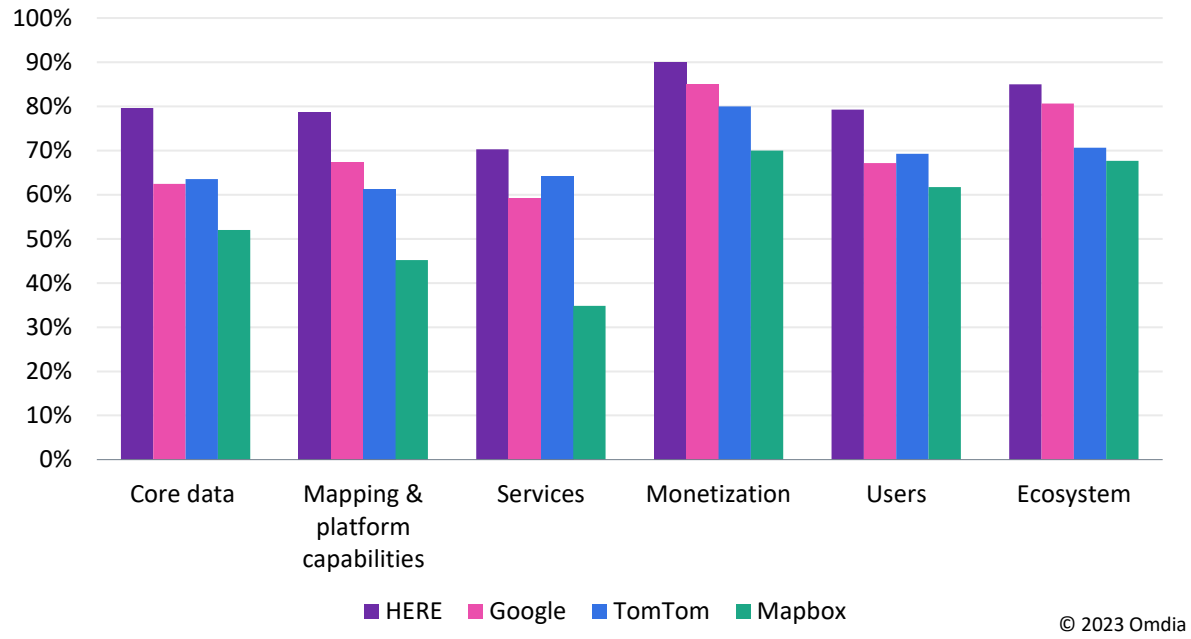
Source: Omdia

Figure 5: Leaders scoreboard



Source: Omdia

HERE

Assessment summary

HERE is the long-standing leader in the location platform ecosystem, and it continues to maintain its leadership with the innovations it brings to the industry. Retaining its leadership position, HERE extended its lead with an indexed score of 8.09. It strengthened its position in the ecosystem with continued momentum in probe data as it increased the number of basic probe points ingested daily from more than 23 billion to 33 billion over the past year.

The company also topped the security index (scored separately from 2023), demonstrating a strong commitment to security and privacy; it maintains certified information security and privacy management systems (ISMS and PIMS), including ISO 27001, ISO 27701, ISO 27017, ISO 27018, TISAX AL3, CSA Star Level 2 certifications, SOC 2 Type 2 attestation, and HiTrust for platform services and also maintains regulation compliance across numerous countries and states. HERE also conducts annual third-party penetration testing and aligns security controls with industry best practices and compliance standards such as OWASP, NIST, MITRE, and ISO.

HERE consistently performs scans for vulnerabilities, secrets, and dependencies to uphold security standards, putting it ahead of some of its competitors in the location ecosystem. HERE's vulnerability management and threat-hunting programs perform vulnerability scans for secrets, code, and

dependencies to continually monitor for relevant threats and issues that could compromise customer trust.

As EV adoption grows, location ecosystem providers are becoming central to delivering an improved experience for users. As the leader, HERE is investing in solving three key challenges: charging scarcity and ambiguity, route inefficiency, and range inaccuracy. HERE provides an API service with data on more than 1.2 million EV connectors, with information on location and real-time availability. In addition, HERE provides a predictive service based on machine learning (ML) to help users see the likelihood of a charger being available by the time they arrive for their charge.

HERE consistently empowers location intelligence for countless developers across leading third-party cloud ecosystems such as SAP, Microsoft Azure, Salesforce/Mulesoft, and AWS, both through the AWS Data Exchange and as the designated location data provider for Amazon Location Services. The HERE platform boasts more than 500,000 registered developers and more than 2.5 million indirect developers through HERE partners. Moreover, the company has established numerous agreements with prominent automotive firms to furnish US Society of Automotive Engineers (SAE) L2, L2+, and L3+ autonomous driving and ADAS services, securing a prominent position within the industry.

HERE is also utilizing AI and ML to enhance the precision and scope of its location data and technology, employing AI/ML techniques such as active learning and transfer learning. This involves leveraging various AI-driven processes including automotive sensor data automation, industrial street-level imagery automation, crowdsourced imagery, probe automation, and automatic extraction of map observables from aerial imagery. These initiatives underscore HERE’s commitment to pioneering geospatial AI research and revolutionizing mapping applications.

Figure 6: HERE SWOT analysis

Source: Omdia

Selected developments: Omdia's pick

HERE's mapping efforts have culminated in the release of its UniMap

UniMap is a highly automated, developer-friendly platform that will extend HERE's leadership in mapping and location-based services.

Even when the company was Navteq, HERE has always had strong credentials for creating and maintaining maps by compiling massive amounts of data, which now includes more than 40 million vehicles providing probe and sensor data. The company has also demonstrated a keen ability to not only survive but to adapt and flourish. UniMap demonstrates that the company is readily embracing the next major technological paradigm shift, AI. UniMap uses AI models to automate the processing of 500 million km of vehicle probe and sensor data every hour. The platform can ingest data from cameras, LiDARs, satellites, drones, and IoT devices and sensors, all of which are increasing

exponentially. Having a platform that uses AI to process all this data and can provide key insights on the positioning of road signs, speed limits, and other aspects of the physical environment is invaluable in keeping maps accurately updated. The introduction of AI will allow HERE's maps to scale its growth without compromising, and instead increasing, the level of detail they deliver. This is important, not only in helping OEMs create better ADAS and advance toward autonomous driving but also because there is a growing number and variety of companies with mapping and location-based service needs. A logging company looking to optimize its operations is going to have different needs from an automotive OEM and will also have different data types and sources. A commercial port is going to have different needs from a logging company. The UniMap platform provides enterprises with a rich, low-code tool kit that they can use to combine their own data with HERE's maps and data. The result is customized private maps with intelligent routing and search in addition to intelligence from which the company can optimize operations.

HERE is improving the user experience around EV routing and charging

EV routing and charging is a suboptimal experience for many users. HERE's coverage of EV charging points includes more than 1.2 million EV connectors across 102 countries (excluding China), with key details including connector type information. Where HERE is differentiating is by using ML to provide predictive guidance on EV charging-point availability and using this to inform EV routing. Predictions are made on an AI-based charging-point prediction service, which also considers variable factors such as traffic, weather, events, and other data from millions of HERE's data probes. By offering the service as an API, HERE can allow OEMs to better customize their drivers' user experience. Additionally, to gain better insight on EV charging, HERE has created an EV user group that comprises EV leaders from OEMs who discuss strategy and best practices around location-based products and applications for EVs. The insights gained from the EV user group help HERE develop and bring to market the next generation of location-based applications for EVs.

HERE powers Mercedes-Benz DRIVE PILOT, but Mercedes-Benz sends mixed messages

HERE scored a major win with Mercedes-Benz DRIVE PILOT, the first SAE level 3 conditionally autonomous driving system, which will debut in California and Nevada. Authorization for the system is pending in other states. The system will first debut on the MY2024 EQS Sedan and S-Class models. By the SAE's definition, the automated driving function takes over certain driving tasks, for example, in a traffic jam. The vehicle can take over driving tasks on suitable highways while it is traveling at less than 40mph (64kph). The system ensures that the vehicle travels at a safe speed, maintains a proper distance from other vehicles, and stays in its lane. However, a driver is still required. The driver must always take control of the vehicle when prompted to intervene by the vehicle. HERE's win is a testament to the strength of its HD Maps. The win will likely have a positive knock-on effect for HERE in winning other OEMs. In the past, some OEMs suggested they would skip SAE level 3 and prefer to focus on level 4 because level 3 presents the major dilemma of handing vehicle control off to the driver in certain scenarios. More recently, most OEMs have suggested they will be incorporating level 3 systems soon. Aside from Mercedes-Benz and the other German luxury OEMs (BMW, Audi), OEMs focused more on volume segments: for example, Ford, Hyundai, and Kia are all targeting incorporating level 3 systems in the next year or two. Omdia and its sister organization, Wards Intelligence, believe that more than 1 million vehicles with level 3 or higher will be sold in 2027.

The announcement of Mercedes-Benz DRIVE PILOT was a major win for HERE: in February 2023, Mercedes-Benz made a somewhat perplexing announcement that it would partner with Google for its next-generation infotainment system. Mercedes-Benz has an ownership stake in HERE. Arguably, part of the reason several OEMs and tier suppliers have purchased stakes in HERE is because there were concerns about Google's growing influence in automotive, including operating systems, maps, and autonomous driving. Mercedes-Benz's strategy with regard to its next-generation infotainment system is somewhat unconventional. It is not using Android Automotive OS but its in-house OS, Mercedes-Benz Operating System (MB.OS). Developing a robust and well-functioned OS is an arduous task that is rife with points of failure; Ford's history with MyFord Touch is a testament to the struggles OEMs have experienced in this area. Mercedes-Benz elected to use Google Maps for its navigation, places, real-time and predictive traffic information, automatic rerouting, and other features. Mercedes-Benz is also incorporating an app for YouTube, which is owned by Google. Using Google for navigation is not particularly surprising: Google Maps is a good product and perhaps offered favorable pricing to bring more of its features into the vehicle. Where the announcement becomes a bit concerning for HERE is Mercedes-Benz's intention to use it for some driver assistance features as well as for integration with Google Cloud and AI. Such a heavy migration to Google's suite of services might mean a departure from HERE's HD Maps and suggest that Google has found a way to assuage OEMs' fears about working with a partner they deem too ambitious.

Trust is a commodity of increasing value in the automotive industry, and HERE has earned it with OEMs and regulators

From emissions to safety, regulatory compliance is becoming increasingly complex for automotive OEMs. HERE has excelled at helping OEMs to comply with some of the most difficult and dynamic regulatory mandates facing the market. From July 2024, intelligent speed assistance (ISA) will become mandatory for all new cars sold in the EU. The mandate requires that OEMs fit their vehicles with a system that alerts the driver when they are exceeding the speed limit. Just cataloging speed limits is a massive endeavor. Maintaining accurate information and updating these databases is also an enormous task. Not all speed limits are posted, and many are defined by local regulations, for example, in areas that are considered to be densely populated. Speed limits often vary based on what the road is near (e.g., speed limits may be reduced in school zones). Speed limits can also vary according to the situation; for instance, construction work might required a slowing down during certain hours or on certain days. HERE approached the dilemma of capturing speed limits comprehensively and scientifically, combining camera and sensor data from vehicles, government sources, third-party data, and input from experts, consumers, and communities. These efforts resulted in the HERE ISA Map solution, which delivers location and speed information directly to driver assistance systems. The solution is overwhelmingly the market favorite, selected by more than 50 brands from 21 commercial and passenger vehicle makers. This is a testament to HERE's capabilities as a multimodal data company. Its success in Europe should have a positive knock-on effect for its ability to replicate the data in other geographies. Pivotal to its ability to deliver is not only a proven model for gathering data but also local expertise in languages and regulations. Although there are as yet no hard mandates in the US, Omdia believes that even in their absence, market demand will give rise to the need for similar data soon. Globally, HERE boasts more than 40 million connected vehicles providing real-time sensor and probe data, more than 75,000 monitored trucks, and more than 30 billion real-time data points ingested daily.

ISA regulations will be a nuisance to some drivers, and many will choose to simply ignore the alerts. Still, understanding the nuances of infrastructure including speed limits is foundational to ADAS systems and autonomous systems. HERE ISA Map not only helps drivers comply with the speed limit but also allows systems to adjust for what is to come in the future. Although cellular vehicle to anything (C-V2X) has been slow to materialize in both the US and Europe, this data could greatly enhance C-V2X communications, especially as wider-bandwidth channels such as LTE and 5G are used to supplement C-V2X:

- In April, the US Federal Communications Commission (FCC) announced it would allow initial deployments of the technology. Omdia expects to see deployments soon.

- Conversely, the New Car Assessment Programme (NCAP) in Europe, which was scheduled to require vehicles to have C-V2X by 2025, is now pushing back the requirement to 2029.

Understanding the difference between the posted speed limit and the speed at which vehicles are traveling provides valuable insight into traffic patterns. Traffic patterns are useful, not only to consumers planning trips, especially EV owners facing limited charging infrastructure, but also to commercial vehicles that have requirements around delivery times. Product deliveries often involve several legs, and properly understanding estimated times of arrival is important for managing the supply chain.

Google

Assessment summary

Google maintained its runner-up position with a score of 7.12 in the Location Platform Index, bolstering its Maps service with AI-powered enhancements and eco-friendly travel routes. The score for Google Maps slipped a little from last year's 7.47 as we expanded the scope of the index to measure new aspects such as private and IoT enterprise mapping, EV infrastructure support, use of AI, map design elements, and visualization. Google Maps still needs to do a lot of work to catch up with its rivals such as HERE in the enterprise space as they continue to innovate on private maps, location-based intelligence, and visualization. In the consumer space, Google Maps remains a behemoth that attracts more than 1 billion users, not only improving its functionality but also supporting Google's wider business strategies in search, advertising, and e-commerce.

Despite robust consumer usage and some automotive partnerships with notable firms including Ford, General Motors, and Tesla and some new names such as Porsche, Renault, and Mercedes-Benz, Google Maps still trails HERE in automotive industry engagement. Nonetheless, the widespread use of Google Maps on Android devices, including in-car systems via Android Auto, along with Waymo's strategic industry alliances, strengthens its position. Additionally, Google Maps is diversifying its offerings, incorporating solutions for the retail and financial sectors.

Google Maps is also ahead of many rivals in the industry in using AI to deliver advanced features. It is enhancing user experience with AI-driven updates, introducing "Immersive View" for a detailed preview of routes. This feature combines Street View and aerial imagery to visualize paths for various travel modes, incorporating environmental factors such as air quality and traffic levels.

Additionally, developers are empowered with new APIs for creating 3D and photorealistic mapping experiences. Google also improved its search function with image recognition for local discoveries. The navigation interface now better reflects real-world conditions, and EV drivers receive detailed charging-station data. The Places API advances with real-time information, broadening Google's commitment to accessibility and precision in location services.

Google's ownership of Waymo presents some unique advantages and disadvantages. Waymo is, in Omdia's opinion, the leader in autonomous driving. The company has taken a slow and measured approach to introducing robotaxis, and the Waymo Driver, its autonomous driving technology, has covered more than 20 million miles of roads. Google clearly has a lot of internal knowledge about what is needed to navigate a vehicle autonomously. Waymo is bolstered by the fact that Google likely has a higher tolerance for absorbing the losses of the subsidiary. Still, Google investment is not just for the sake of humanity: Google is expecting it can address a market that will eventually be massive. Questions remain as to how willing OEMs will be to employ the technology of a company that will ultimately be a competitor.

Figure 7: Google SWOT analysis

Strengths	Weaknesses
• More than 1 billion users, providing a massive data pool for real-time updates and insights • Seamless integration with other Google services, enhancing user experience and retention • Continuous improvements and feature releases, such as AI-powered enhancements and eco-friendly routes	• Fewer automotive sector partnerships than competitors such as HERE • Potential user privacy concerns and overreliance on advertising for revenue • Weaker ADAS support than industry rivals such as HERE and TomTom • China is a weak point because of lack of access
Opportunities	**Threats**
• Potential to expand into new verticals in enterprise • Leverage knowledge build with Waymo in autonomous-driving technology • Potential growth opportunity in automotive sector as Android Auto continues to gain traction	• Competition from rivals such as HERE that continue to ramp up developer framework and tools • Regulatory concerns and increasing global scrutiny on data privacy could affect operations • Heavy reliance on the Android platform for user acquisition and retention

Source: Omdia

Selected developments: Omdia's pick

Google is using AI to create an immersive experience for map users

Google Maps is redefining exploration and navigation with new AI-driven features. Immersive View for routes is a key update, providing a comprehensive preview of routes for different modes of travel. Utilizing AI, the feature integrates Street View and aerial images for a detailed representation of the world, offering insights into bike lanes, sidewalks, intersections, and parking. It also includes a time slider to display air quality and weather changes, plus traffic predictions based on historical trends. Initially, this will be available in several major cities worldwide.

On the developer side, the new Aerial View API allows integration of 3D bird's-eye views into apps, assisting users in making informed location-based decisions. Additionally, an experimental release of Photorealistic 3D Tiles gives access to high-resolution imagery from Google Earth for the creation of

branded immersive experiences such as virtual tours of landmarks. These advancements by Google Maps showcase the potential of AI in enhancing real-world interactions through digital mapping technologies.

Google Maps unveils AI-enhanced navigational revolution with advanced search

Google showcased a comprehensive update to Maps, infused with AI to streamline and enrich user interactions. Notably, the search function in Maps now utilizes advanced image recognition to display photos of specific items, aiding in the discovery of local offerings. This feature is being introduced in several countries with plans for broader expansion. Users seeking leisure activities can find organized search results for local attractions and save or navigate to them.

The navigation interface is becoming more intuitive, mirroring the real-world environment with detailed visual cues, including building representations and lane information. This is expected to roll out in multiple countries, enhancing the driving experience. In the US, maps will indicate high-occupancy vehicles (HOV) lane availability, while Europe sees an expansion of AI-powered speed limit data.

For the EV community, Google Maps will now provide comprehensive data on charging stations, such as charger compatibility, charging speed, and recent usage history. These features are designed to ensure compatibility and functionality, preventing trips to inoperative stations.

Further expanding its AI-driven capabilities, Google is introducing its Immersive View for Routes to additional cities, allowing users to preview their journeys. Similarly, the Lens in Maps feature is extending to more than 50 new cities, leveraging AI and augmented reality to assist in identifying nearby amenities and transit points.

Enhanced geospatial capabilities with Google's new Places API

Google has recently unveiled its new Places API, to give developers tools to convey location-based information to end users. This API integrates real-time data on EV charging stations, addressing a growing need as EV popularity surges. Users can now access up-to-the-minute details on charging-station availability, compatibility, and charging speeds, enabling them to plan their journeys with precision.

The Places API supports nearly 200 place types, such as coffee shops and hiking trails, providing more detailed information about each location. Developers can filter searches by these types to fine-tune the information presented to users, ensuring relevance and accuracy.

A significant inclusion in this update is detailed accessibility information. The Places API now delivers updated data on wheelchair-accessible features such as seating, restrooms, and parking, a continuation of Google's commitment to accessibility initiated with the wheelchair-accessible entrance field in 2022.

The search functionality has been notably enhanced with new ranking capabilities that highlight popular places in nearby searches. Additionally, the API now supports field masking, allowing developers to request only the necessary data, reducing the need for follow-up calls and streamlining the user experience.

Responding to developer feedback, Google has also revised the Places API pricing, enabling cost control by allowing data requests to be limited to what is necessary for the application. This tiered pricing model is augmented by modern security measures, including OAuth-based authentication backed by Google Cloud's service infrastructure, offering developers a secure and reliable platform. Google's new Places API represents a significant step forward in location services, providing developers with a comprehensive toolkit to create rich, dynamic user experiences. To facilitate adoption and integration, Google provides extensive documentation and support for developers keen on leveraging this advanced API in their products.

TomTom

Assessment summary

TomTom has successfully maintained its third position in the Location Platform Index, achieving an improved score of 6.84. The organization is currently transitioning toward a more open location platform, a strategic move marked by its efforts to collaborate with leading tech and automotive partners, the OMF, and OSM. This integration establishes a shared and open reference framework utilizing OSM and OMF resources. To provide customers with the best of open and proprietary data sources, TomTom has allocated significant resources to combine these datasets with more standardization and automation. TomTom also harnesses insights from both consumer and business-to-business interactions, including geocoding requests and conducting rigorous analysis of data. This approach ensures TomTom's offerings have comprehensive and accurate location-based solutions.

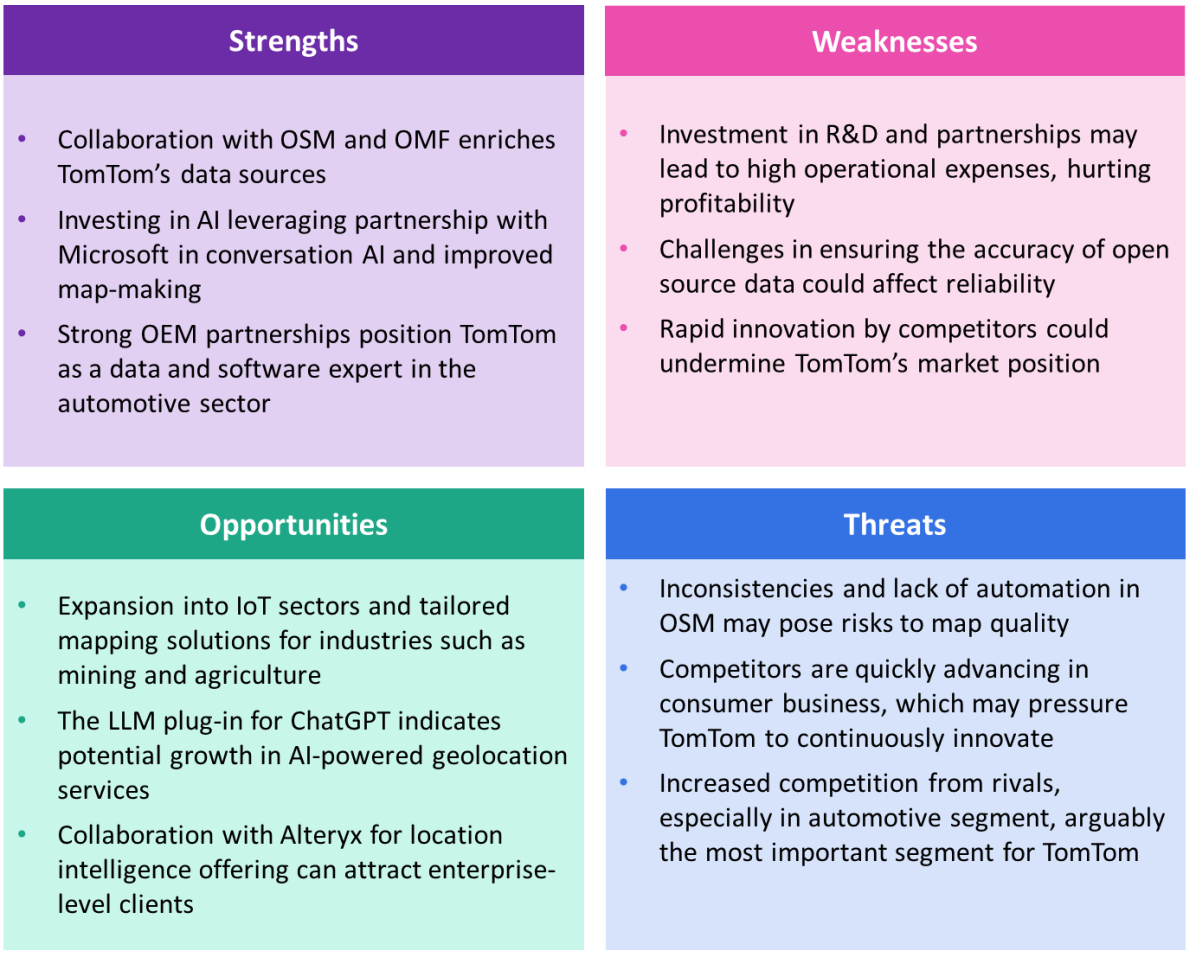
TomTom's new "Live Speed Restrictions" service enhances road safety by displaying dynamic speed limit information directly on a vehicle's dashboard, providing drivers with real-time updates that go beyond what onboard cameras and static maps can offer. This technology supports compliance with ISA legislation and the European NCAP protocol, aiming to improve road safety by increasing speed limit accuracy. The inclusion of Live Speed Restrictions in TomTom's ADAS suite positions the company as a unique provider capable of covering all categories scored by the Euro NCAP Safety Assist protocol.

TomTom has evolved its professional business-to-business developer ecosystem. Professional developers can efficiently and effectively build scalable applications with the support of updated information architecture of the documentation, a knowledge base with support materials, and a new dashboard with self-service access to usage analytics, queries per second (QPS) management, and support.

TomTom introduced a new map-style customization tool, Map Maker, available to all developers. It allows easy customization of map styles within minutes and offers the ability to quickly test and publish unique maps onto end-user applications.

TomTom also launched its plug-in for ChatGPT, which enables users to leverage its geolocation technology directly within the AI's interface. This integration allows GPT Plus subscribers to utilize features such as geocoding, map visualization, and routing for enhanced trip planning and discovery.

Figure 8: TomTom SWOT analysis



Source: Omdia

Selected developments: Omdia's picks

TomTom "supersourcing" data to strengthen its map infrastructure with partnerships and integrations

TomTom has made strides toward its strategic move to becoming a more open location platform, partnering with OSM and OMF to deliver deeper map capabilities through its integration of the open-source data. The company moved toward building capabilities within its newly announced TomTom Orbis Maps last year, leveraging the power of collaborative mapmaking by using certain map layers from OSM and OMF in addition to all the other sources that TomTom already uses to power its maps.

Though the integration of OSM data into TomTom maps is already implemented for major cities around the globe, TomTom aims to fully integrate with OSM to develop comprehensive maps suitable for enterprise use. OSM has experienced remarkable expansion through various

contributors, but it faces certain limitations, including inconsistent coverage, a lack of uniformity, and insufficient automation. TomTom possesses the capabilities to complement OSM by enhancing data verification processes to prevent the inclusion of inaccurate information or deliberate sabotage.

TomTom is also leveraging other sources to constantly improve its maps. One of the other key sources is sensor-derived observations (SDOs). Most new cars on the roads are equipped with multiple sensors that collect real-time data for driver safety and vehicle control; this data is then processed for a better user experience.

By leveraging OSM to craft high-quality maps for enterprises, TomTom is focusing on specific sectors such as fleet management, logistics, ride-hailing, and food delivery. Additionally, it is exploring emerging IoT sectors where there is a demand for tailored maps. Businesses within these areas frequently seek to streamline operations using autonomous guided vehicles (AGVs) and autonomous farming equipment.

TomTom's mapping strategy extends beyond its collaboration with OSM and the OMF. The company possesses valuable proprietary data, such as road curvatures and elevations, surpassing the depth of maps solely sourced from OSM. These robust maps are essential for advanced automotive systems such as ADAS and autonomous driving. TomTom's layered approach allows it to offer higher-grade maps to enterprises, ensuring detailed, updated maps and superior image rendering.

The integration of mapping capabilities with ADAS and digital cockpit systems presents an enticing prospect for TomTom. Establishing strong relationships with leading OEMs positions TomTom as a software and data expert in the evolving automotive industry. With vehicles increasingly reliant on software, TomTom's expertise is poised for greater demand. Its proficiency in user experience and visualization aligns with the growing demand for data relevant to EVs, aiding OEMs in enhancing the driving experience.

ADAS is increasingly important, but the challenge lies in delivering information without causing distraction. TomTom's success in integrating software across different vehicle systems illustrates its strategic advantage. TomTom's ambitious strategy holds lucrative potential, but some OEMs may be reluctant to share extensive consumer experience with a single supplier.

TomTom Orbis Maps taking shape after a year of announcements

TomTom is working on its ambitious goal to create smarter, more versatile maps under the Orbis Maps initiative. The focus extends to integrating various layers of data, rethinking the platform's utility for developers and customers, and addressing the extensive range of new location-based applications. The goal is to move from a singular map to a diverse set of maps, accommodating multiple customer needs. To achieve this, TomTom's platform blends open and proprietary data and aims to serve a broad market. The platform is being designed to address a wide array of demands such as two-wheeled transport, on-demand services, and location-based social media.

The data used to power Orbis Maps stems from multiple sources including vehicle data, open data sources, on-the-ground observations, and private data. The flexibility to merge various data sources while ensuring security is fundamental to the platform's design. The maps emphasize a high level of detail in features such as parkland, footpaths, and building locations, particularly beneficial for

applications such as logistics, ride-hailing, two-wheeled transport, and others. The platform's enhanced detail and flexibility in data blending are expected to reinforce TomTom's position in fast-growing markets at the same time as competitors in the market are rapidly bringing in innovation of their own.

TomTom is leveraging AI to further develop location-based solutions and enhance the efficiency of its mapmaking processes

TomTom collaborated with OpenAI's ChatGPT to introduce a plug-in that enhances geolocation services within the popular AI chatbot, offering navigational and exploration capabilities. TomTom recognized the potential of integrating its map data with ChatGPT to create a more advanced and location-aware tool. This resulted in the first-ever geolocation plug-in for ChatGPT, providing ChatGPT Plus subscribers with features such as map visualization, routing, and access to detailed geolocation information directly within the chat interface.

This integration leverages the strength of generative AI and geolocation, simplifying complex tasks such as trip planning and travel recommendations. Looking forward, TomTom remains committed to exploring new possibilities in the realm of generative AI, hinting at further advancements beyond the current browser-based form and aiming to redefine the ways people interact with location-based services.

TomTom's innovation extends to a partnership with Microsoft focusing on infusing conversational AI into its Digital Cockpit platform. This collaboration aims to solve key issues with current voice assistants, such as inconsistent driver understanding and limited capabilities. The AI assistant "Tommy" offers multilingual support for navigation, parking, and EV charging, utilizing the power of generative AI and geolocation to ease tasks such as trip planning.

Moreover, TomTom has been harnessing AI in mapmaking, developing tools for efficient processing of map updates and a traffic-sign classifier with a database of more than 1 million signs, leading to largely automated processes. Looking ahead, TomTom plans to further advance its use of generative and conversational AI, suggesting future developments in AI-enhanced location-based production processes.

TomTom expands strategic partnerships with leading tech companies Microsoft, Alteryx, and many more

TomTom has strategically partnered with industry leaders including Microsoft, StreetLight Data, PTV Group, Flow Labs, and Alteryx to enhance their location-based solutions. Collaborating with Microsoft, TomTom integrates its mapping and navigation capabilities into Microsoft platforms, providing a seamless and enriched location experience for users across various applications. Partnerships with StreetLight Data, PTV Group, and Flow Labs enable advanced route optimization, traffic management, and comprehensive insights for urban mobility planning. Finally, TomTom's partnership with Alteryx has expanded to integrate TomTom's Maps APIs into Alteryx's analytics tools, particularly its new offering, Location Intelligence. By combining these tools, Alteryx can offer more than 50 layers of cartographic data such as roads and parks, enabling advanced analysis techniques including geocoding and drivetime analysis and helping businesses to make more informed decisions.

Mapbox

Assessment summary

Mapbox has had a difficult 2023. It remains a leader in Omdia's Location Platform Index, but its position is eroding. The company overall score fell for the second year in a row, from 6.03 in 2022 to 5.74 in 2023, a 0.29 drop. Despite having extremely visually appealing map renderings and a compelling product demonstration with Garmin at CES 2023, Mapbox has struggled to win new commercial relationships that demonstrate its capabilities in action. The company has also struggled with organizational turnover and even lawsuits, which have likely hampered the execution of its vision. Strategically, the company has started to demonstrate how its maps can be used to address climate change and IoT needs, and it is even supporting network coverage maps through its work with T-Mobile. The company is taking steps in the right direction, but these efforts will take time to bear fruit. Ultimately, having some of most visually appealing maps is a difficult position to defend because visualization can to an extent be replicated; therefore, the company is adjusting its strategy, at the heart of which is incorporating AI with map and sensor data to create new and richer driving experiences including better EV driving experiences. This strategy is in line with what many location platform vendors have announced, but Mapbox will surely have its own vision. By securing a $280m Series E funding round led by Softbank, the company has gained time to see its vision take shape. Still, it will be under pressure to start executing on its strategy quickly: investors will want to see its balance sheet improve in the hope of an initial public offering. Often these pressures undermine a company's ability to execute its long-term strategy.

Figure 9: Mapbox SWOT analysis

Strengths	Weaknesses
• MapGPT introduces conversational AI, enabling OEMs to create more intuitive and action-oriented voice assistants for vehicles • Mapbox 3D Live Navigation offers visually stunning, comprehensive maps and detailed navigational experiences • Mapbox for EV offers end-to-end solutions with direct payment options	• Does not own or control most of core mapping data, unlike rivals • Mapbox for EV's support for specific charging-point operators may restrict user choices unless additional operators are added at customer request • Absence of direct-to-consumer service/app makes its brand less visible than rivals'
Opportunities	**Threats**
• MapGPT's potential to facilitate in-vehicle purchases and offer tailored recommendations could create new revenue streams for OEMs, including recurring revenue from infotainment and telematics plans • Mapbox 3D Live Navigation can be marketed as a luxury feature, allowing OEMs to reinforce high-end in-vehicle experiences	• In comparison with, for example, HERE it lacks strong partnerships and investors that could help make inroads with automotive vendors • Existing voice assistant technology providers such as Alexa and Siri pose a competitive challenge to MapGPT

Source: Omdia

Selected developments: Omdia's picks

MapGPT empowers OEMs with greater command over voice assistants

Since the mid-2000s, voice commands and voice recognition have been a feature in vehicles. Early integration allowed for better hands-free calling and inputting of addresses into navigation systems. Though technology has improved, and former leaders in the space such as Nuance Communications and VoiceBox Technologies have been pushed aside for more familiar voice assistants such as Alexa and Siri, there is still room for improvement. Mapbox recognized the need for improvement and in October 2023 launched MapGPT, a conversational AI service that gives OEMs greater control over their voice assistant and enables them to create voice assistants that can execute actions through casual conversation. MapGPT references the convenience and ease of use that many are familiar with from ChatGPT. In fact, when the system is online it is powered by GPT-3.5 and GPT-4, and when

offline MapGPT runs Tiny LLM on the vehicle's hardware. Depending on how the solution is customized by the OEM, the solution can reference the driver's location, destination, fuel status, and cabin temperature to help make better-informed and actionable suggestions to the driver in real time. Some of these actions could include rerouting the vehicle, reserving parking spots or restaurant tables, and even making purchases from the car. The facilitation of in-vehicle purchases has been something many OEMs have sought to achieve, particularly the purchase of infotainment and telematics plans that create recurring revenue. OEMs would likely also wish to create a convenient and possibly incentivized way for drivers to book and pay for services within their dealership network so they do not lose this recurring revenue to third-party service providers. As vehicles are increasingly software defined, a well-designed voice assistant could recommend features that can be delivered over the air based on the perceived needs of the driver at the time. Early iterations of MapGPT are unlikely to be this robust and will be limited by what can be delivered over the air.

Mapbox 3D Live Navigation is visually stunning and comprehensive

Combining data from millions of vehicles with aerial imagery, Mapbox 3D Map Live Navigation is beautifully rendered. The solution utilizes high-resolution geometry, images are rich with depth and texture, and even elements of weather and lighting can be seen. With Mapbox 3D Live Navigation, landmark buildings are visualized in 3D as are lane models. Weather alerts are integrated in the solution, and drivers can be alerted to changing weather conditions. These maps stand in contrast to the apps many use on smartphones. The product will help OEMs reinforce a luxury in-vehicle experience. Another aspect that will appeal to OEMs is the integration with vehicle sensors to determine the vehicle's precise location on multilane roads and augment navigation with hazard warnings from ADAS.

Integration of EV charging payments

Mapbox for EV is an end-to-end solution for EVs that unifies routing, charging stations, and payments offered to automotive OEMs and mobile app developers. Mapbox for EV uses Mapbox's EV routing algorithms to suggest the best charging station. The routing takes into account not only the vehicle's battery but also the distance to various charging stations and elements of the road topography that will affect the battery charge such as hills and ambient temperature. Drivers can personalize the app by adding their preferred charging-station networks. The solution includes real-time availability of charging, up-to-date charging-point pricing information, type of plugs supported, and charging speeds. Impressively, Mapbox has orchestrated the solution so the driver can pay for charging directly from their infotainment system or mobile app. Currently, Blink, ChargePoint, SemaConnect, Circuit Electrique, and Switch are supported, and additional charging-point operators can be added at the request of the customer.

Challengers

Esri remains ahead of the rest

The challenger group in Omdia's Location Platform Index comprises players that had a score of below 6 for completeness and market reach combined. These scores are still strong, and the assets and services of these companies are still relevant. This group includes three companies: Eris, Apple, and Microsoft. Challengers' scores are shown in **Table 2** and **Figure 10**.

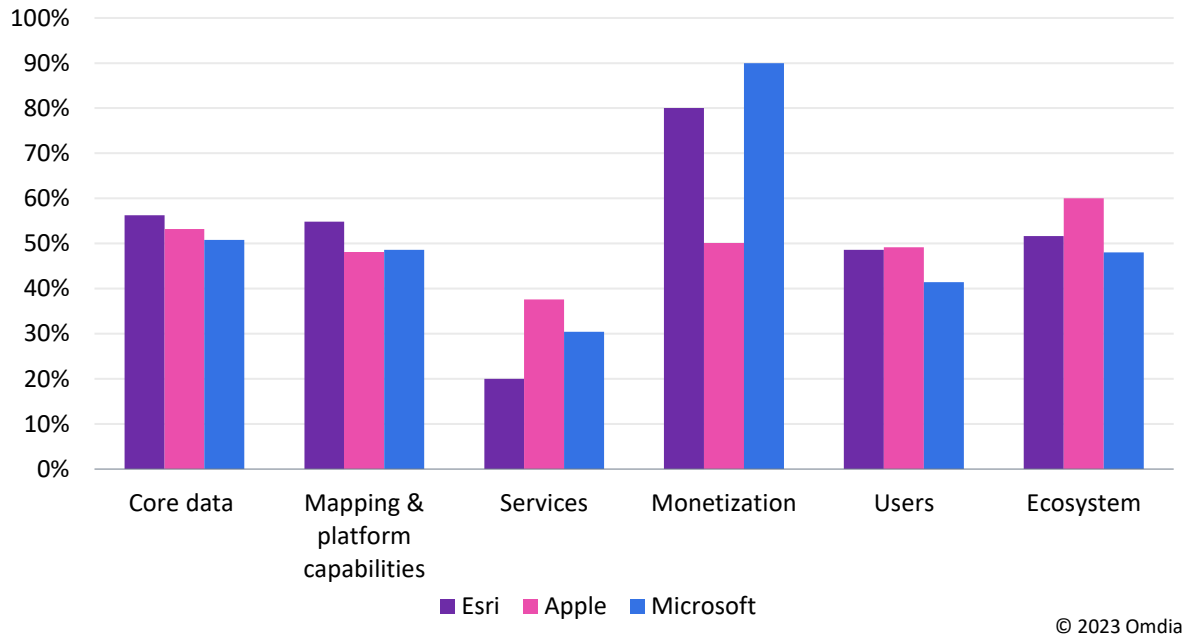
Esri has slowed in terms of score gains compared with last year, but the company is still a strong contender in enterprise and IoT space. Apple brought offline maps—a feature many rivals already provided—to the market, but its strength lies in UI/UX, which it leverages with its consumer-centric maps. Microsoft and Azure Maps had some interesting developments around indoor mapping but not enough to move the needle, although it is seeing growth thanks to the growth of the Azure cloud platform.

Table 2: Challengers scoreboard

	Esri	Apple	Microsoft
Total	**5.15**	**5.09**	**4.96**
Completeness	2.65	2.36	2.72
Reach	2.51	2.73	2.24
			© 2023 Omdia

Source: Omdia

Figure 10: Challengers scoreboard



Source: Omdia

Esri

Assessment summary

In Omdia's 2022 Location Platform Index, Esri was the strongest advancer. In the 2023 analysis, the company continued to make gains, albeit at a slower pace. This is not an indicator that the company is slowing down on innovation but instead that it is steadily building commercial relationships as these innovations come to fruition. With a total score of 5.15 and a score of 2.51 for reach and 2.65 for completeness, Esri is well positioned to address the growing need for mapping by IoT enterprises as well as governments and nonprofits. Esri is a privately held company with no outside investors; this has allowed it to eschew higher-margin verticals such as automotive and instead pursue a longer-term strategy. The company has executed on serving a wide variety of industries by helping to create better business intelligence. Esri continues to improve on the ease of use of its maps and to integrate with more data sources. Omdia expects the company to gain greater exposure in 2024 through the OMF.

Selected developments: Omdia's picks

By joining the OMF, Esri will help create a more sustainable world

On February 6, 2023, Esri joined the OMF, joining founding members AWS, Meta, Microsoft, and TomTom. With its membership, Esri will pull data from its Community Maps Program, which will be shared with the OMF community. Joining the foundation was not particularly surprising given that

Esri has long demonstrated a commitment to open data, particularly as it supports governments and nonprofits.

The company has been very clear that it believes in the power of maps to help balance economic, environmental, and social goals. Esri has pointed to the use of maps to help deliver humanitarian aid to Ukraine and help manage refugees during crises or how maps and data can guide more efficient food production, aid in flood/drought planning, help conserve wetlands, and even help understand the outbreak of viruses. The company points to the importance of the creation of a "geospatial infrastructure" and highlights the progress that Australia has made in creating a portal for all of its maps.

Commercial goals are important too: ArcGIS for Microsoft 365 brings location analytics to the masses

Microsoft 365 is unquestionably one of the most-used suites of business and communications tools. ArcGIS for Microsoft 365 allows users to implement spatial analytics with their daily workflow. ArcGIS can be integrated into Excel to create an interactive map that includes data and can be viewed without leaving Excel. With ArcGIS and SharePoint users can geotag and geosearch documents. ArcGIS for Power BI is a custom data visualization in Microsoft Power BI that allows users to bring mapping capabilities to their reports and dashboards. Another interesting feature is ArcGIS integration with Teams, which allows workers to remotely view and interact with maps and add maps to Teams channels. Users can interact with the chatbot to search for ArcGIS apps, data, and maps too. Prices in the Azure marketplace list the following license prices per year: Individual Contribute (one power user) $550; Small Team (one power user, 10 readers) $1,650; Medium Team (five power users, 50 readers) $8,250; and Large Team (10 power users, 100 readers) $16,500.

Esri already has commercial relationships with a number of enterprises including Pacific Gas and Electric (PG&E), the largest gas and electric service provider in the US, which services more than 16 million people across 70,000 square miles in California. The combination of its large and varied geographic footprint and the effects of climate change give rise to unique location-based service needs. PG&E has committed to net-zero emissions by 2040. The company is utilizing Esri data across many different business units, including integrating work orders with customized maps. The business and IT created a mobile application platform that supports functions for inspections and construction and provides offline maps to employees and contractors.

Another interesting example of a company using Esri data is Walgreens, which uses the data to optimize both retail and store locations. Additionally, the company measures the dispensing of flu antivirals against location data to create the Walgreen's Flu Index, which shows trends on flu outbreaks. The company provides the Walgreens Flu Index as an interactive tool that ranks the top markets and states for flu activity in the US. Users are able to search by market or state to see where their geographic area ranks for flu activity in any given week. The Index is often able to capture outbreaks faster than government sources.

Living Atlas of the World continues to grow

Comprising terabytes of data, ArcGIS' Living Atlas of the World is a growing collection of ready-to-use maps. It now consists of 3D base maps of the entire planet with complete layers that include buildings, terrains, layers for Open Street Maps, climate, and air quality. More specific layers for the

US have been added that include hydrology, Department of Transportation national addresses, and FCC broadcast data.

Apple

Assessment summary

With an overall score of 5.09, Apple remains a challenger but has made some improvements year over year. However, the incremental improvements Apple has been making to its maps are not enough for it to catch up with the leaders in this space. Apple's maps are cleaner and neater than many of its competitors', but they lack the detail and services offered by others. Apple has a massive customer base, and its maps are preinstalled on its devices. Maps are available in more than 200 countries and territories. Apple CarPlay is available in more than 800 models on the road. Despite this huge customer reach, iPhone owners often do not use Apple Maps exclusively, instead using other mapping apps such Google Maps or Waze. Apple has a potentially huge base of users to leverage to inform its maps, but its potential has not been realized.

Questions remain about Apple's strategy for its maps. Apple is largely a consumer company, and its maps are good enough for many consumer applications. However, with some strategic investment and shifts in focus it could perhaps tap into new revenue streams. Many OEMs love the Apple brand and the profile of its customers, who are often affluent and tech savvy. Both Ford and Porsche are supporting Apple Maps EV routing through CarPlay. Nonetheless, it seems unlikely that an OEM would turn to Apple Maps to support its own embedded navigation. With the rise of EVs, the industry is moving more rapidly to embedded navigation systems. There is constant speculation that Apple is planning to develop an EV, potentially with a high degree of autonomy. However, its maps as they currently exist are too inaccurate to be a key enabler. Apple is leaving money on the table by not investing more heavily in maps, but the marginal cost of securing this revenue is likely greater than the revenue opportunity itself.

Creating and maintaining high-quality maps that are suitable for applications such as ADAS is really expensive and difficult, and competition for OEM wins is intense. Perhaps there are logical layers or filters that Apple could offer users to address IoT and other markets; these would most likely apply to smaller enterprises because large and medium-sized enterprises would likely look to build their deployments on maps from a more proven provider.

Selected developments: Omdia's picks

Apple now offers offline maps, a major step, but this highlights how far Apple has lagged behind the leaders in this space

With the release of iOS 17, Apple provided a major update to its Apple Maps application. Offline maps allow the user to download designated areas from Apple Maps app onto their device so that these maps are accessible even when cellular service is unavailable. This can be particularly useful when the user is underground in a parking garage where service is often limited or when the user is concerned about data usage. This feature also fits nicely with Apple's transit maps, which users may want to access while underground in the subway. This was an important update to the app, but it is also an indicator that Apple may not be prioritizing mapping as highly as others. Given earlier

missteps with Apple Maps, perhaps the company is willing to be a later comer as long as the user experience lives up to the expectation of Apple device owners.

Apple is expanding its device ecosystem; this should demand better maps

Notably, the Apple watchOS 10 release features a newly designed hiking app that allows users to search for nearby trails and features in-depth trail information. As with the update on the iPhone, the user can download maps so they are available offline, particularly important in remote areas. The user has access to useful information such as trail length, elevation, difficulty ratings, and in some instances, photos of the trail.

Arguably Apple's most expected announcement of 2023 was the augmented-reality headset, the Apple Vision Pro. The headset can also be used as a full virtual-reality set. Given the $3,499 starting price the device appears to be better positioned for the enterprise market. But Apple's maps lack the details and flexibility that many enterprises will need. Though Apple has increasingly pushed into selling services Apple TV+, Apple Music, and storage plans through iCloud+, it still makes most of its profits through high margins on its devices. Perhaps Apple is willing to allow enterprises to bring maps created by third parties to the Vision Pro in order to drive sales of the device. This will open up potential new lines of revenue for other mapping vendors while allowing Apple to maintain fat margins on the hardware.

Microsoft

Assessment summary

Microsoft continued in third place in the Challengers segment with an improved score of 4.96 thanks to its work with AI integration in Azure Maps and security as it continues to invest heavily in R&D and cybersecurity. Microsoft's Azure Maps is emerging as a pivotal offering in conjunction with the expansion of its Azure cloud infrastructure. The suite of services provided by Azure Maps encompasses a broad spectrum of geospatial capabilities such as mapping, real-time traffic information, search functionality, precise geolocation data, and HD satellite and aerial visuals. Additionally, it offers meteorological data, topographic elevation details, comprehensive routing, geospatial computations, time zone differentiation, and robust data governance. Azure Maps is poised for significant growth, leveraging the robust momentum of Azure's cloud services, but lacks prospects in the automotive segment.

Selected developments: Omdia's pick

Azure Maps continues to grow on the back of Azure cloud platform

In recent years, Microsoft's Azure Maps has seen a period of relative calm. Leveraging the strength of its established reputation for innovation and the robust support from Microsoft's array of resources, Azure Maps is expanding through the vigorous growth of the Azure cloud platform. Microsoft stands at the forefront of cybersecurity, investing over $1bn each year and employing a workforce of more than 3,500 dedicated security professionals. The company also demonstrates strong capabilities in AI and ML. For companies engaged in IoT, many Azure offerings, including Azure IoT Edge, are becoming increasingly vital. Considering Microsoft's extensive partnerships with numerous Fortune 500 corporations, the modest development of Azure Maps in terms of service expansion is somewhat unexpected. However, the significant investment of time and money

required for map development and maintenance may lead Microsoft to prioritize other business opportunities.

Strengthening indoor mapping with Azure Maps Creator

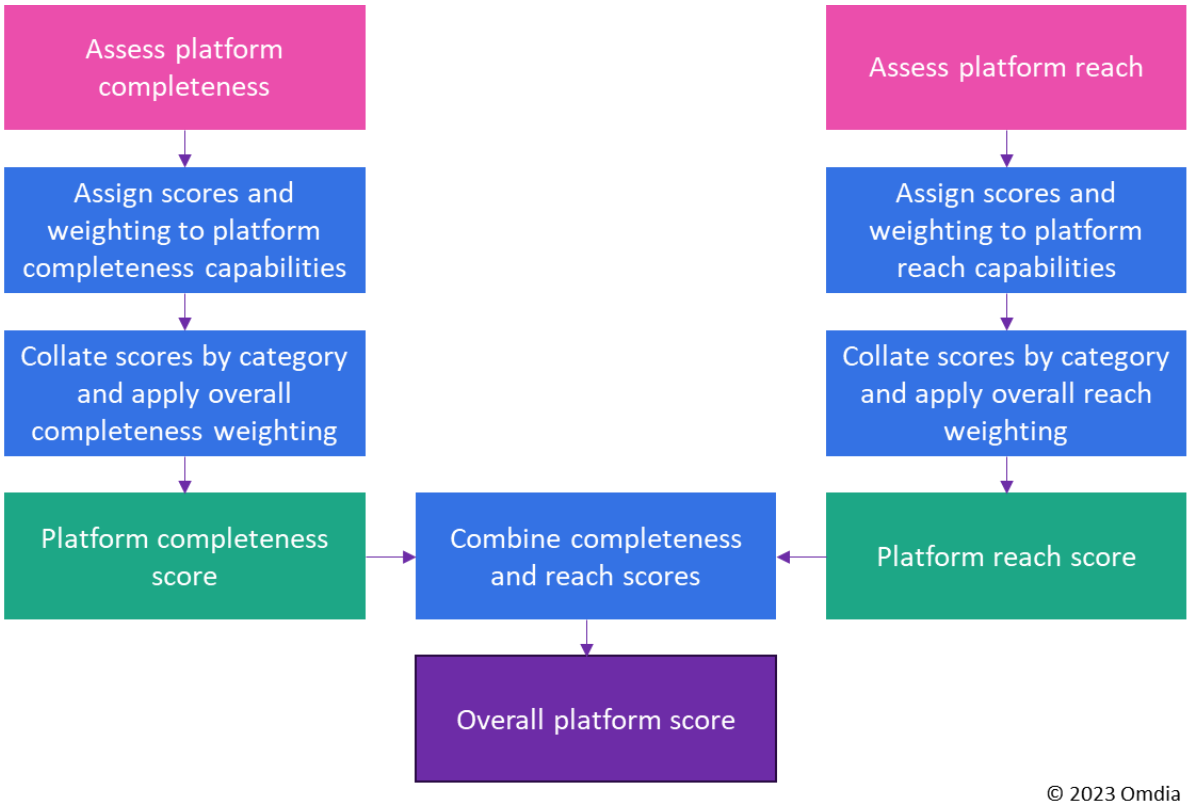
Azure Maps Creator is Microsoft's proprietary geospatial platform designed to extend location intelligence to indoor spaces. It facilitates the creation and rendering of maps based on indoor map data, integrated with outdoor maps, for web and mobile applications. Azure Maps Creator is part of the Azure Maps suite and is particularly adept at building comprehensive indoor mapping solutions that are customizable and interactive.

The platform supports the generation of indoor maps from CAD drawings or GeoJSON files, with the capability for custom styling to suit various business needs. A key feature of Azure Maps Creator is its wayfinding service, which guides users through indoor spaces by providing the shortest path between two points. This can be especially beneficial in complex facilities such as shopping malls, airports, or large office spaces.

Methodology

A summary of the methodology used for Omdia's Location Platform Index is shown in **Figure 11**. Omdia collects data for the index from a range of sources, including vendor briefings, product data, financial results, press releases, and related Omdia research and expertise.

Figure 11: Location Platform Index methodology



Source: Omdia

The location platform score, which is expressed as a number between 0 and 10, is a combined measure of the completeness of a vendor's location platform offering and the market reach of that platform.

Completeness includes a platform's core data, mapping functions, and services—provided directly or via partners. Completeness also considers a player's monetization strategy. A complete list of the

attributes included in the completeness parameter and a corresponding explanation/example is shown in **Table 3**. Each attribute is given a score of between 1 and 5 depending on a vendor's capabilities. Each attribute also carries a weighting, which, when combined with the actual score, creates the total completeness score.

Table 3: Location Platform Index completeness criteria

Core data	
Ownership of core mapping data	Does the company own the core maps data, and/or is a partner(s) core map used?
Data analytics	A vendor's capabilities in this area—tools, functionality, and other enhancements
Extent of data collaboration & partnerships	The number and nature of partnerships in place to enhance data capabilities, features, and functionality (excludes partnerships for access to core map data or technology partnerships)
Data exchange	The provision of own data exchange or participation in one
Crowdsourcing	The level of support for crowdsourcing capabilities
Data privacy	How effectively a vendor safeguards consumer and data sources and complies with relevant regulatory frameworks (e.g., the General Data Protection Regulation [GDPR] in the EU)
Security	What are the elements that make the platform secure, since location platforms are becoming essential to the growing automotive industry?
Design elements	How has the visualization of the maps evolved (e.g., buildings, road signs, lanes)?
Visualization	How does the map looks and feels to the users?
Additional capabilities	Any other core data capabilities or assets in this area
Mapping & platform capabilities	
Depth of map coverage	The depth and detail of map coverage (as opposed to markets) (e.g., miles of roads mapped)
Underlying AI capabilities	What AI technology and capabilities have been used to enhance the core platform?
Data used for training AI	What is the depth of data used for training the AI; is the training data internal, external, or hybrid?
EV infrastructure support	Does the platform support EVs, providing charging infrastructure information and range estimation based on road conditions?
EV route planning support	Does the platform support EV route planning? If so, is it customizable for individual models and range support?
Detail of traffic information	What level of traffic information does the platform have (e.g., support for real-time traffic updates, lane-level traffic information, or other features)?
Business listings/POI	The range and depth of POI information offered by the platform

HD mapping	Level of support for and capabilities in HD mapping
Indoor mapping	Level of support for indoor mapping capabilities
Aerial mapping	Support for aerial mapping capabilities
Support for voice commands	The extent to which a platform supports interactions with maps and related services via a voice interface/command
Map refresh	How often are the maps updated internally, and how comprehensive are these updates?
Over-the-air (OTA) VAS/firmware delivery	Solutions for OTA VAS and/or firmware delivery—the vendor's own or third party; note this goes beyond standard OTA core mapping refresh/updates
Additional capabilities	Any other mapping functions and capabilities
Value-added services	
ADAS	Functions/services based on advanced driver assistance systems
Automated driving	Capabilities, level of development, and support for automated driving
Mobility services	Integration with mobility services such as ride-sharing and public transport
Integration of payment/commerce services	Integration of payment services or related commerce, such as offers and promotions
Integration with digital assistants	Integration with AI assistants such as Alexa
Augmented reality	The provision of augmented-reality features and services as part of the mapping proposition
Location business intelligence	The provision of business intelligence tools that blend and analyze enterprise and geographic data to help organizations optimize insights and enhance performance
Customer support capabilities	What are the mechanisms to support clients and consumers facing issues with the platform?
Additional capabilities	Any other VAS to highlight
Monetization	
Business model	Business model(s)—does the vendor rely on licensing or have multiple revenue streams?
Cost of implementation	Does the company work with system integrators for implementation? What is the typical team size in terms of number of developers, consultants, product managers, and testers required to implement maps for new customers?

Source: Omdia

Reach is more narrowly focused than the platform completeness attributes. It takes into account the number of consumer and enterprise customers a vendor has, the size of the developer community that supports the platform, the developer framework offered to that community, the number of industries a vendor can address, and the number of auto OEMs that leverage the platform. A full list of the attributes included in the reach parameter and a corresponding explanation/example is shown in **Table 4**. The scoring system is based on the same principles as before.

Table 4: Location Platform Index reach criteria

Users	
Geographic markets	The number of countries where services are available
B2C consumer customers	The number of users of a consumer-facing service (if available)
B2B enterprise customers	The number of enterprise customers
Auto OEMs on the road	The number of auto OEM customers enabled by the mapping platform
Vertical industries served	Considers the number of industries served and the depth/expertise within them
Emerging markets	What are the emerging geographical markets for growth for the company?
Ecosystem	
Industry partnerships	Partnerships that give access to or enhance positioning in key industry verticals
Geographic partnerships	Partnerships designed to give access to new markets or to improve reach in an existing market
Number of active developers	Size of the vendor's developer network
Developer framework	Depth and breadth of developer frameworks (e.g., number and range of APIs, flexible pricing and business models, and developer tools and support)

Source: Omdia

Appendix

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Omdia consulting

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