

Location Platform Index: Mapping and Navigation, 1H18

Key vendor rankings and market trends

Publication Date: 20 Aug 2018 | Product code: CES006-000033

Eden Zoller



Summary

In brief

Ovum's 1H18 Location Platform Index is a tool that assesses and ranks the major vendors in the location platform market, with particular reference to the mapping and navigation space. The index evaluates vendors on two main criteria: the completeness of their platform and their platform's market reach. It considers the core capabilities of a location platform along with the information that the platform opens to developers and the wider location community. The index provides an overview of the market and assesses the strengths and weaknesses of each player. It also highlights the key trends in the mapping space that vendors must keep up with if they want to stay ahead of the game.

Ovum view

- **Indoor mapping is becoming as important as outdoor mapping** . Indoor mapping covers a wide range of potential use cases in the consumer, enterprise, and wider IoT domains. Indoor mapping technology can help guide and track consumers at indoor venues from shopping malls to stadiums. IoT use cases include tracking assets (e.g. equipment in a factory or hospital); providing parking assistance to driverless cars; and guiding drones delivering packages.
- **Advanced mapping is critical for autonomous driving, and autonomous driving data is key to map enhancement**. Highly automated driving (HAD) and HD and 3D maps help advanced driver assistant systems (ADAS) and driverless vehicles to operate. And the data surfaced by autonomous driving solutions is valuable for enhancing map accuracy. Mapping vendors involved in autonomous driving, via their own solutions or partnerships, can benefit from this virtuous circle.
- **Aerial mapping is taking off**. There is a growing need for aerial maps as drones gain traction in both private and commercial scenarios. As drone usage increases so will the challenges of managing drone traffic in low-altitude airspace. There will also be a need to coordinate drones with automated ground vehicles to ensure safety and efficiency.
- **AI assistants will be an important interface for connected car location services** . AI assistants (e.g. Apple Siri, Google Assistant) will take center stage in orchestrating voice-activated, personalized digital services in connected vehicles and they will be the key interface for mapping and navigation. The importance of digital assistants will grow as their AI capabilities increase. AI assistants today do not understand cars or the nature of driving, but this will change with advances in AI.
- **We are seeing the rise of the data marketplace** . The huge growth in, and demand for, location and mapping data will see the rise of data marketplaces, where stakeholders can exchange and monetize location-centric data assets. However, for players to become stakeholders, they will need considerable resources, a robust and proven location and mapping platform, and advanced analytics back-up.
- **Mobility services have evolved from standalone apps to integrated solutions** . The evolution of mobility services from standalone applications to integrated solutions is leading to the development of mobility-as-a-service (MaaS) propositions. These aim to provide

personalized, real-time, and integrated mobility services and support a wide range of mobility scenarios and multimode transport in a joined-up fashion. This is a tall order that should not be underestimated.

Key messages

- **HERE topples Google to take first place** .HERE has always scored well on the completeness of its offering, leading on this front for some time. Where it traditionally lagged Google was on the reach of its platform, but this has been steadily improving thanks to the wide range of verticals its platform addresses. An important factor in HERE topping the leader board has been its strong focus on the developer community: in 1H18 it carried out major overhauls of its developer program and associated API pricing policy, which have been well received.
- **Google Maps's new API pricing model could backfire – to the benefit of rivals**. The new Google Maps platform announced in 1H18 is a major overhaul and has some positive elements, such as tighter integration with the Google Cloud Platform. In parallel with this, Google has changed the pricing policy for its Maps APIs. The new pricing plan will prove more expensive for some developers – to a high degree in certain scenarios. This has upset many developers and could drive them to rival players, particularly HERE, Mapbox, and OSMF.
- **A bold move from Apple will take time to feed through** .Apple's decision to generate its own map data is significant, as to date it has been the only player among the leaders that does not have its own mapping data. The Apple Maps reboot will not be available until later this year with the release of iOS 12, so it does not affect Apple's score in this update of the index. It will take time for Apple to gather a complete, deep data set across geographies. Apple will also need to ensure it keeps data fresh and supports the latest capabilities and innovations.
- **There is movement in the challenger segment, notably from Mapbox** . In this iteration of the index, ESRI and Mapbox have improved their scores, putting more distance between themselves and other players in challenger segment. Mapbox has made particularly strong progress, improving its score from 4.93 to 5.51 (placing it on the cusp of the leader segment). The other challengers' scores are the same as before.
- **Players in the follower category are becoming commoditized** . CloudMade has fallen off the index in this update, largely because of its very niche focus. The remaining vendors in the follower category have similar strengths in terms of the mapping data they have access to and the APIs they enable. They must differentiate if they are to grow or they risk falling off the index too.

Recommendations for vendors

- **Become a maestro of big data orchestration**. To become mapping leaders, vendors must be able to source, aggregate, and manage multiple data streams. Relying solely on sensor data or a few additional data sets will not cut it in the longer term. Vendors should invest in capabilities that improve their data orchestration abilities (notably machine learning) and form partnerships that give access to new types of data.
- **Aim for accurate and fresh mapping data**. A key quality of standout maps is coverage in terms of geography and detail. But as top players improve coverage and gain parity with each

other, the locus of differentiation and competition is shifting toward map accuracy and freshness. To stay ahead, vendors need to invest in capabilities that maintain and update maps automatically.

- **Formulate a long-term aerial mapping and drone strategy.** Drone capabilities for mapping and location vendors are important in the long term, even if there may not be significant revenues in the short term. Vendors need to plan early how they can maximize drone data for their platforms and work out how their platform or data can support drones.
- **Invest in your developer community.** Given the right support, developers can be a source of mapping innovation and, as a result, differentiation. Motivated developers can also become platform evangelists, which has obvious benefits for the platform owner in question. Vendors need to invest in the developer onboarding process to make it simpler, faster, and more transparent. They must offer easy access to a range of high-quality APIs.
- **Embrace the power of crowdsourcing.** Crowdsourcing can be a highly effective way to improve the accuracy and quality of maps. Communities can provide valuable information about local businesses and other places of interest in their area. Crowdsourcing is particularly valuable in emerging markets, where mapping providers can often face "last-mile" challenges in getting accurate data for addresses and other highly specific local information points. Communities can also share feedback and suggestions and provide a channel for Q&A about local business.
- **See vertical expertise as a source of strength and differentiation.** Location and mapping data is essential to certain industry verticals (e.g. autonomous driving, smart cities, transportation, and logistics) and a key enabler for many others (e.g. digital advertising, sport and fitness, supply chain management, government and public sector, asset tracking, retail, travel and hospitality, real estate, and media and entertainment). Specialization in industry verticals can help vendors differentiate, and for certain players in the index – such as Garmin – this is their primary focus. More broad-based location and mapping vendors are looking to strengthen their hand in key verticals too, as evidenced by HERE.

Results summary

Ovum's Location Platform Index, 1H18

The results for Ovum's 1H18 Location Platform Index are shown in Figure 1. The index evaluates location platform vendors on two main criteria: the completeness of their platform and its market reach. Both components play an equal role in determining the final rank of the vendor. The index considers not only the core capabilities of a location platform but also the information that the platform opens up to developers and the wider location community. It provides an overview of the market and assesses the relative strengths and weaknesses of each player.

Figure 1: Ovum's Location Platform Index, 1H18: player ranking

	Rank	Player	Current score	Previous score	Score change
Leaders	1	HERE	9.33	9.03	0.30
	2	Google Maps	9.32	9.42	-0.10
	3	TomTom	7.33	7.33	0.00
	4	Apple Maps	5.87	5.87	0.00
Challengers	5	ESRI	5.64	5.46	0.18
	6	Mapbox	5.51	4.93	0.58
	7	Comtech	5.13	5.13	0.00
	8	Telenav	4.68	4.68	0.00
	9	OSMF	3.93	3.93	0.00
	10	Garmin	3.62	3.62	0.00
Followers	11	Magellan	3.09	3.09	0.00
	12	Bing (Microsoft)	3.01	3.01	0.00
	13	MapQuest (AOL)	2.84	2.64	0.20
	14	AND	2.75	2.09	0.66

Source: Ovum

Reach and completeness

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

- **Reach** takes into account users of consumer-facing services and also enterprise customers. It considers the size of the developer community that supports the platform, the number of industries the vendor can cater to, and the number of automotive OEMs integrated into the platform. The scoring reflects the extent of a player's market reach based on these factors.
- **Completeness** describes the mapping, technology, and content assets that a player either possesses or partners for. It also takes into account monetization strategy and the ability to incorporate new technologies such as AI. The scoring reflects the extent of a player's capabilities based on these attributes. The parameter measures mapping functions and map strength, value-added services (VAS), monetization potential, data analytics capabilities, and extent of collaboration.

Leaders

Figure 2 maps all the players in the index based on their reach and completeness scores. Leaders (shown in gray) are those players with an overall score of 5.7 and above. They are positioned in the top-right quadrant of the chart. Taken as a group HERE, Google, TomTom, and Apple stand out for their dynamic service portfolio, focus on growing customers in both the consumer and enterprise domains, and efforts to build on their core map service.

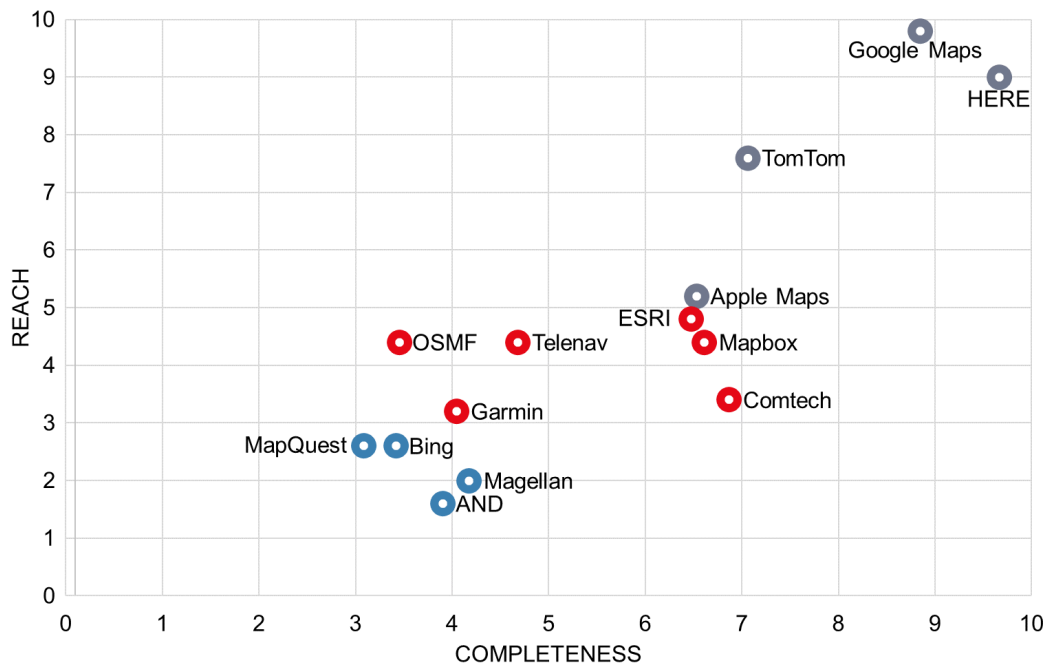
Challengers

Challengers (shown in red) are players with an overall score between 3.5 and 5.7. Over the past 18 months, the top-ranked vendors in the challenger segment have become more diversified, where previously they had similar levels of platform completeness and reach. Competition among the top challengers is intensifying as they try to break loose from the pack and climb into the leader category.

Followers

Followers (shown in blue) are grouped in the lower-left quadrant and have a total score of less than 3.5. Vendors in this category are now similar in terms of reach and completeness. Followers need to innovate faster, which in turn will help grow user numbers and enable them to move up the categories. Failing to act will weaken their position.

Figure 2: Reach vs. completeness

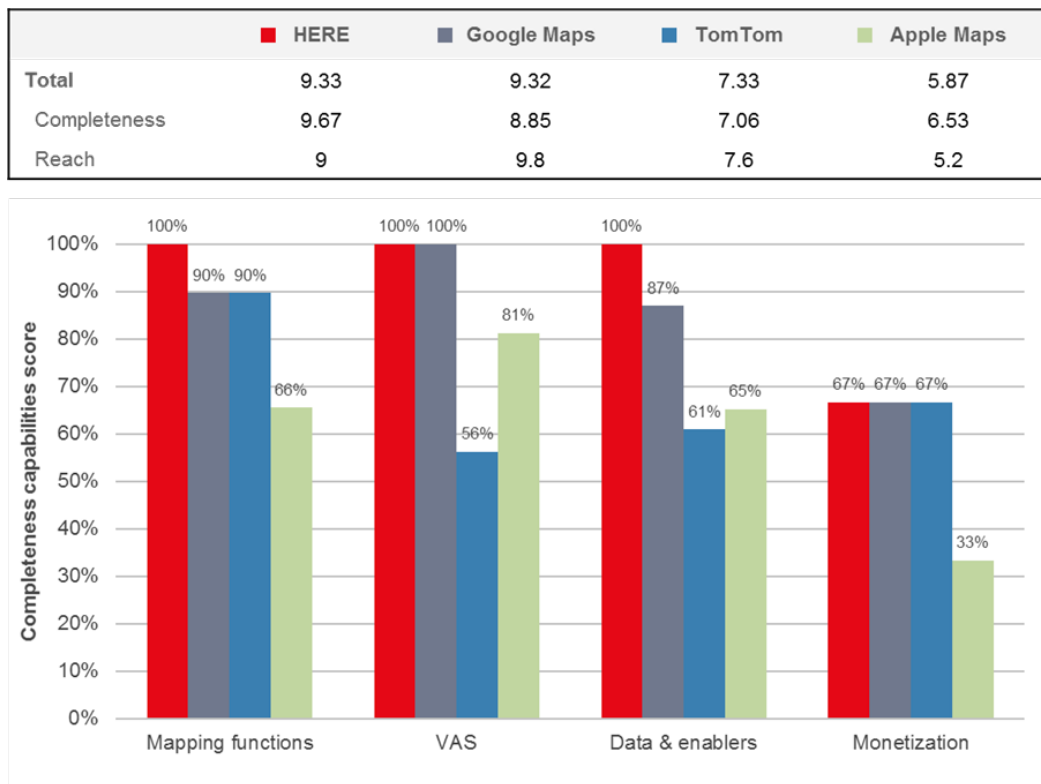


Source: Ovum

In-depth results

Leaders

The leader group consists of four companies: HERE, Google, TomTom, and Apple Maps. Figure 3 shows their overall score for reach and completeness as well as their scores against the four criteria for how completeness is measured: core mapping functions, VAS supported by the platform, closely linked data and enablers (e.g. APIs, analytics capabilities, data sharing), and strength of monetization strategy. Three of the four companies – Google, HERE, and TomTom – are major mapping data providers. HERE and Google have been in the leader segment for the past six years and competition between them remains intense. After steadily closing ranks on Google, in this iteration of the index HERE has beaten Google to take the top spot. TomTom and Apple's rankings are the same as in the last index, and there is no change in their scores. The first half 2018 saw Apple announce that it will build its own mapping data, but this does not affect Apple's positioning in this update of the index and is unlikely to for some time.

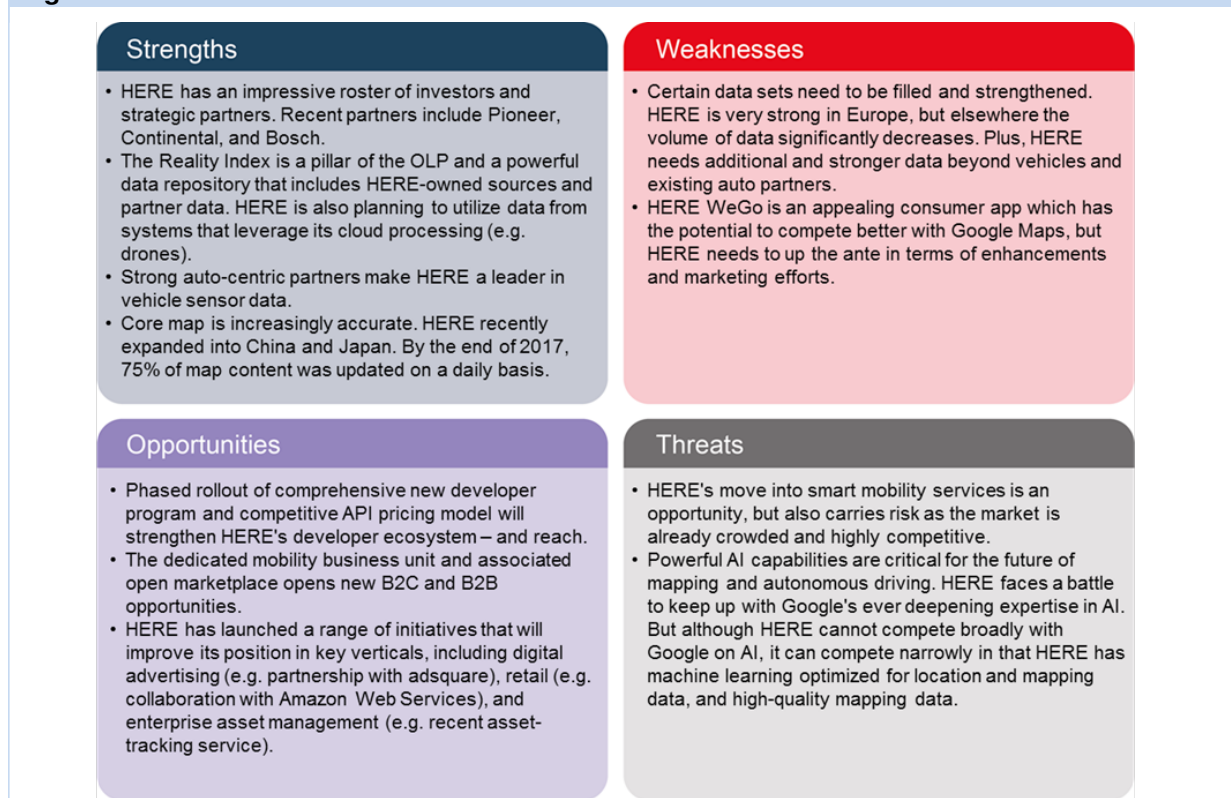
Figure 3: Leaders' scoreboard

Source: Ovum

HERE: 1H18 highlights and developments to watch

HERE's reach is ratcheting up

A summary of HERE's SWOT analysis is shown in Figure 5. HERE is now the highest-ranking vendor in the index with an overall score of 9.33. It has long been the top vendor for completeness and in this iteration of the index, it has closed the gap with Google for reach, which is why it has been able to pull ahead overall.

Figure 4: HERE SWOT

Source: Ovum

HERE's reach is accelerating to the point where it is snapping at Google's heels. There are a number of factors driving this. HERE's Open Location Platform (OLP) is a compelling proposition that will help the company attract new partners while providing a strong foundation on which to build services. OLP version 1.5 went live in 1H18 and some of the advances from the previous beta version (1.0) include the addition of live weather and real-time traffic data and improved location enrichment libraries.

HERE has an improved developer focus and has partnerships with some of the biggest cloud marketplaces, notably Amazon Web Services (AWS). The company says that around 2 million developers have leveraged HERE location services on AWS. HERE's new developer hub and pricing model will help it gain further traction with developers, particularly given the dissatisfaction with the controversial new pricing policy for Google Maps.

HERE now covers a diverse range of industry verticals: automotive, transport and logistics, public sector and infrastructure, media, insurance, electronics, telco and utilities, retail, healthcare, real estate, and consumer. Its direct consumer product reach is not as deep as that of Apple or Google, but it is gaining ground. Consumer offerings include the HERE WeGo app for Android and iOS and the here.com web-based proposition. HERE has close to 8 million monthly active users across the three major platforms (Android, iOS, and Web).

There is no doubt that HERE is the leading mapping and location vendor in the automotive industry. In 2017, the cumulative number of vehicles sold worldwide with HERE maps on board surpassed 100 million. According to the company, four out of five in-car navigation systems in Europe and North America use HERE maps.

HERE goes all out in rallying developers

XYZ developer platform

HERE has completely overhauled its developer framework, with a new cloud location platform designed to make it easier for organizations and end users to create maps. It sounds like a simple objective, but a lot of work has gone into achieving this. HERE has placed a strong emphasis on openness and interoperability: open source software and standards, support for multiple mapping data sources, a transparent features road map, and the freedom to select developer tools. XYZ is also designed to be highly responsive, with any data changes reflected in real time.

XYZ is available in three versions tailored to the needs of different developer segments, which is a good move as one size does not fit all in the mapping developer community. The simplest iteration is XYZ Studio for hobbyists, startups, SMEs, NGOs, and similar. Studio does not require coding and provides templates and guidelines for quick map styling. The next iteration is XYZ Hub, the core offering, which has additional capabilities including open, standards-based APIs that interoperate with OSS. The third iteration is Hub Pro, designed for enterprises with professional-grade and SLA-supported services, and large-scale processing (among other features). XYZ is being rolled out in stages, starting with a beta launch for XYZ Studio and XYZ Hub in 2Q18, with Hub Pro following in 2019. HERE is staggering releases because it wants to ensure it builds in solid feedback cycles. This will help it end up with the best possible developer framework based on what users want and need most.

New mapping API pricing model

The other big change to HERE's developer program is a new pricing plan which appears more developer friendly and competitive than the new Google Maps model. This should play to HERE's advantage and bring long-term benefits to HERE's reach. Before the overhaul, HERE had multiple pricing plans which could be confusing. It has scrapped these in preference for two core plans: Freemium and Professional. The Freemium model is designed to lower price barriers for developers by providing free access to 250,000 transactions per month, 5,000 software development kit (SDK) active users, and 250 managed assets per month. Once developers cross the 250,000-transaction threshold, they are charged \$1 per additional 1,000 transactions, regardless of the mapping APIs being called on (except for those relating to electronic horizons). The Professional plan costs \$449 per month. It represents a discounted plan for developers likely to make less than 1 million API calls per month – anything above this will require developers to arrange individual price plans with HERE.

Upping the ante with HD mapping

During 1H18, HERE announced initiatives that will bring long-term benefits to its work in HD mapping. In April 2018, it opened a new R&D facility in Boulder, Colorado, which will focus on autonomous driving and HD maps. In May 2018, HERE teamed up with its regional partners NavInfo (China), Pioneer (Japan), and SK Telecom (South Korea) to form the OneMap Alliance. The alliance, which is open to additional members, aims to create a global, standardized HD map offering, which will be aligned with the specification developed for HERE's HD Live Map. The aim is to provide auto OEMs with an easy access source for harmonized, scalable HD maps.

By the end of 2018, the HD Live Map will cover more than 1 million kilometers of road across North America and Europe, providing information on configurations and markings, speed limits, and shoulders, as well as on roadside objects and obstacles via vehicle localization. More than 20 auto OEMs are using HERE's HD Live Map in their autonomous driving R&D. In 2H18, HERE announced

its first commercial agreements for the HD Live Map via shareholders Daimler and BMW Group. Daimler will use the HD Live Map in future Mercedes-Benz models while BMW is planning to feature the HD Live Map in BMW models from 2020 onward.

Doubling down on indoor mapping

In 1Q18, HERE has ramped up its indoor mapping efforts via acquisitions and strategic partnerships. This is a significant development, as indoor mapping is becoming an important attribute of comprehensive map coverage. Increased indoor mapping capabilities will put HERE in a strong position to exploit a wide range of potential use cases, in the consumer, enterprise, and wider IoT domains. In March 2018, HERE completed the acquisition of Micello, a US firm with a specialist platform for creating, editing, and publishing indoor maps. In February 2018, HERE signed a preliminary agreement to collaborate on autonomous indoor 3D mapping technology with NAVER LABS, the ambient intelligence arm of South Korea's leading internet company NAVER Corporation. HERE's other indoor mapping partners include Motorola Solutions, Actility, and Decawave. HERE has partnered with Motorola Solutions to equip public safety responders with detailed venue maps for enhanced situational awareness. Decawave and HERE are planning to work on an out-of-the-box real-time and energy-efficient tracking solution. This will be based on ultra-wideband (UWB) positioning technology and reveal the 3D positioning of objects and people down to 10 centimeters in indoor environments. Actility is a specialist in LoRaWAN connectivity solutions and has a low-power location solution that combines GPS, A-GPS, and Wi-Fi positioning.

HERE launches OTA Connect

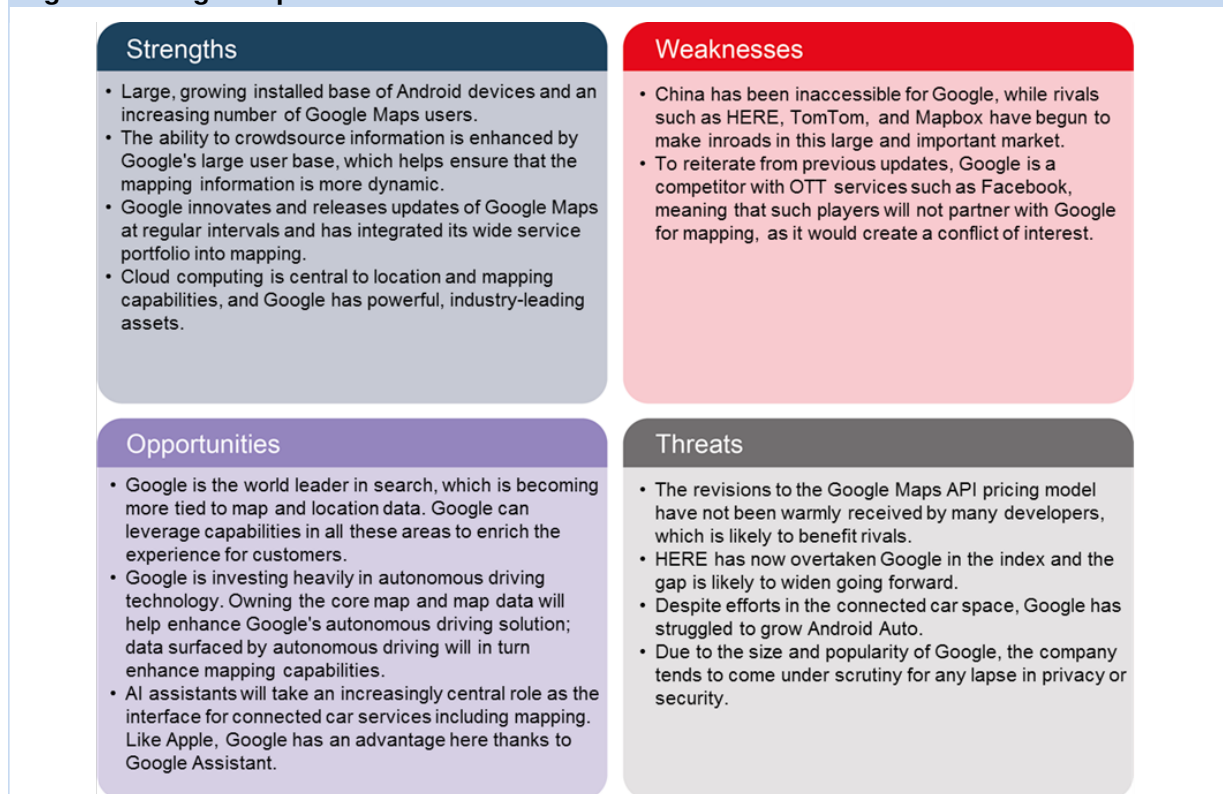
In the last iteration of the index, we drew attention to HERE's acquisition of Advanced Telematics Systems (ATS), which is the foundation for the new HERE OTA Connect service launched in May 2018. Over-the-air (OTA) solutions are useful to auto OEMs because they represent a fast, cost-effective way to remotely update software and firmware, and OTA Connect can provide potential new revenue streams by enabling customers to buy new services OTA. Software updates will become even more important in the context of semi and fully autonomous software-defined vehicles, where security will be paramount. HERE OTA uses Uptane, a security framework backed by the US Department of Homeland Security. Uptane is designed specifically for software that runs on connected and autonomous cars. OTA Connect is currently available as a standalone product but will eventually be integrated into HERE's suite of automotive software and platform services, which will help make the solution available for non-automotive use cases.

Google: 1H18 highlights and developments to watch

Google's large active user base is still one of its greatest strengths

A summary of Google Maps's SWOT analysis is shown in Figure 5. Google lost its top slot in the rankings to HERE and has seen its overall score slide from 9.42 to 9.32.

A large part of Google's leading position is due to its extensive consumer reach and large active developer base, which is hard for other vendors in the index to beat. Google Maps has more than 1 billion users and the potential for a much greater number given the size of the global installed base for Android devices. Ovum predicts that this will rise from 3.68 billion in 2018 to 4.75 billion by 2022. The total global installed base for all smartphones will hit 5.52 billion by 2022, which puts the scale of Android smartphones into perspective.

Figure 5: Google Maps SWOT

Source: Ovum

The impact of the Google Maps Platform

The biggest development for Google Maps in 1H18 – and indeed for some time – was the announcement of the new Google Maps Platform in May. This major overhaul to the structure and pricing model of Google Maps has some far-reaching implications, and not all of them are positive from a developer perspective.

Streamlined API structure and tighter integration with Google Cloud Platform

Google has grouped its 18 mapping and location-related APIs into three core products. The new API structure aims to make it easier for developers and other third parties to access APIs, explore new features, and integrate them with their services.

- **Maps APIs:** Customized dynamic maps, Street View, and 360-degree views.
- **Routes APIs:** Directions and traffic.
- **Places APIs:** Location names, addresses, reviews, and so on.

Google Maps Platform will be more tightly integrated with Google Cloud Platform (GCP) services and tools, which is a positive development. GCP offers good levels of capacity, reliability, and performance, and integration with it should make it easier for developers to scale as a solution or application grows. Developers and third parties will be able to manage the Google Maps Platform from the Google Cloud Console, which is used for other GCP services. This will make it easier for developers to manage and track projects, monitor APIs, and access billing reports, among other things. Integration with GCP also gives developers free access to GCP customer support. Google is no doubt hoping that developers will discover other GCP products.

New pricing model is causing controversy

The introduction of the Google Maps Platform has been accompanied by a new pricing model for Maps APIs. Google has merged the previous Standard and Premium pricing plans into a single monthly pay-as-you-go model for core API products. Under the new pricing plan, developers will only pay only for the services they use each month with no annual fees, upfront commitments, termination fees, or usage limits. Google is also throwing in free customer support, and developers will receive the first \$200 of monthly API calls for free. Eligible not-for-profit organizations, crisis response organizations, news media companies, and some startups will be able to apply for extra free Maps credits.

The new model is in line with many cloud computing providers and looks good on the surface, but in reality it is confusing, hard to navigate, and will certainly make budgeting hard until developers have come to grips with it. The freemium pricing model will prove more expensive for some developers, and to a high degree in certain scenarios and for certain APIs. The free \$200-per-month cap is probably fine for more basic mapping applications, but not a big bonus for more complex solutions where costs can mount up under the new model. Although some applications that previously required a license will now be free, others that offered a daily bucket of free credits will be more expensive. The old Premium plan gave customers up to 100,000 free web service calls per day. The old Standard plan provided up to 25,000 map loads per day with no charge, as well as several free web service calls.

To access APIs, developers will need to have valid API keys and a billing account with GCP, even if they are sure usage will fall within the free \$200 monthly credit. This does not sound too onerous but has upset some developers and could inconvenience those with a wide range of APIs.

Disgruntled developers might look elsewhere

There is a very real danger for Google in that developers unhappy with the new pricing structure might look for alternative location and mapping platforms. The most likely beneficiaries from this situation will be immediate rivals such as HERE and Mapbox. Open source platforms such as OpenStreetMap might also benefit, as although they lack the depth of data and range of functionality offered by the likes of HERE, they are completely free. OpenStreetMap can support highly customized experiences thanks to the variety of JavaScript libraries available.

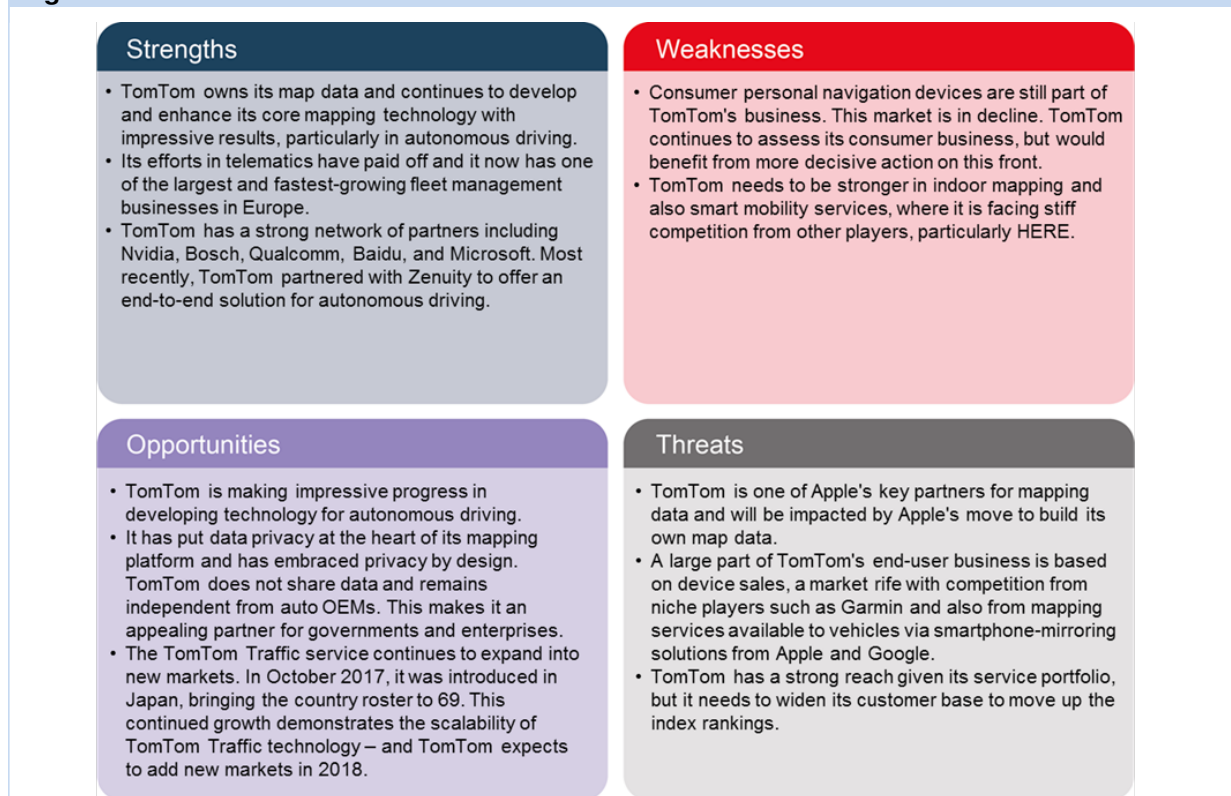
Improvements to Google Maps consumer app continue

Google has a solid track record of making continual – albeit not always radical – improvements to the Google Maps application. This contrasts with Apple's more stop-start approach to Apple Maps enhancements. Recent developments announced at the Google I/O developer conference include machine learning–driven personalization features. For example, Google is leveraging machine learning to predict places users might like, based on knowledge of the user and local places of interest.

TomTom: 1H18 highlights and developments to watch

TomTom's strong efforts in telematics continue

A summary of TomTom's SWOT analysis is shown in Figure 6. TomTom's score remains stable (7.33) in this iteration of the index, keeping it in third place and ahead of Apple.

Figure 6: TomTom SWOT

Source: Ovum

TomTom now has the largest and fastest-growing fleet management business in Europe. At the end of 2Q18, TomTom had more than 848,000 fleet management and connected car subscribers, an increase of 11% year on year. The business is providing additional benefits in the form of extensive vehicle-related data and opportunities for aftermarket connected car services.

TomTom is continuing to improve WEBFLEET: in February 2018, it launched a redesigned version of the software-as-a-service (SaaS), cloud-based fleet management platform. New features include a more intuitive user interface with advanced customization capabilities; for example, WEBFLEET maps and reports can be more deeply customized to suit individual preferences. Another new feature allows specified route planning to be better managed by using a wider range of criteria. This is particularly useful for industries where drivers are required to follow predefined routes, such as waste management and disposal. The core platform architecture has been enhanced to enable faster development and deployment of core features and partner applications. Alongside the revamped platform, the company has also released a new range of TomTom Pro driver terminals.

TomTom's telematics business includes connected cars, and in 1Q18 the company announced that from November 2018 Hyundai and from 2019 Kia will include TomTom's on-street and off-street parking information, electrical vehicle services, and fuel prices as part of their connected car services. In 1Q18, TomTom also launched its electrical vehicle service in North America.

Ramping up efforts in core mapping and autonomous driving

TomTom has a transactional mapmaking platform and data fusion technology which allow it to shorten the map and traffic production cycle considerably. As a result, TomTom has been able to increase the

frequency of its map releases, from quarterly to weekly and, recently, daily. This is critical for demanding location-based applications, such as mobility services and autonomous driving.

Apple's decision to build its own maps might affect TomTom. TomTom is currently one of the key data partners for Apple Maps. In the short term, Apple will likely continue to rely on TomTom mapping data, but this will inevitably decline over time as Apple builds up its own capabilities.

TomTom is advancing its autonomous driving opportunity via a growing network of partners and strategic acquisitions. Key partners include Chinese search giant Baidu and Nvidia, a leader in AI visual computing (among other things). In February 2018, TomTom announced a collaboration with Elektrobit. The two companies will create a demonstrator, evaluation, and development platform for electronic horizon functionalities for driver assistance and autonomous vehicles. The joint project combines TomTom AutoStream and EB robins Predictor.

TomTom is not as advanced as HERE or Google in HD mapping but is making good progress, with more than 380,000km of roads mapped to the requirements of autonomous driving in mainland Japan, the US, and Western Europe. TomTom has been collecting data through its RoadDNA technology, one of the core elements to HD mapping. This will allow autonomous vehicles to become aware of their environment, location, and path on the road. In late 2018 or 2019, TomTom expects a yet-to-be-specified truck manufacturer to start using elements of its HD maps in motor management applications – including those that automatically adjust speed for road curves or climbs.

Consumer business slide continues

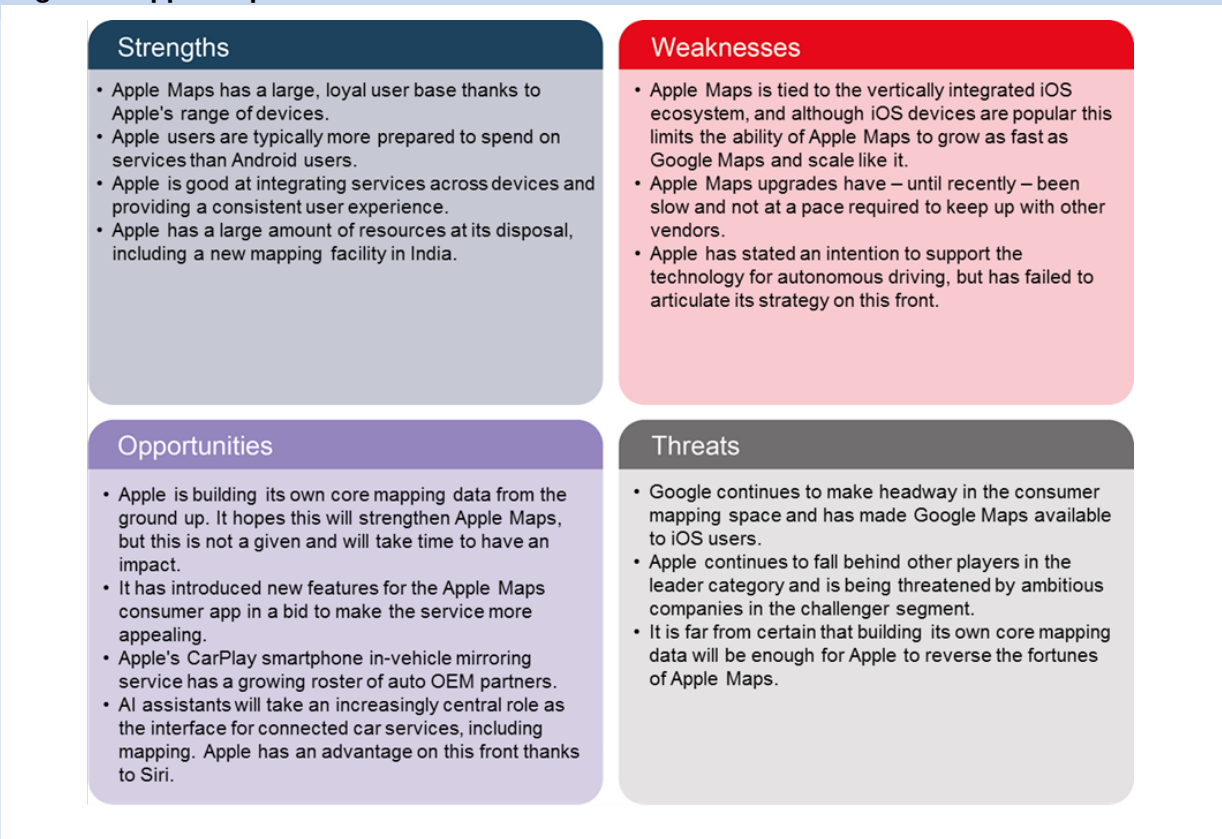
TomTom's consumer business, driven by personal navigation devices (PNDs), continues to decline, as does the wider PND market. In 2Q18, TomTom reported that revenues from its consumer business decreased by 24% in the quarter and 25% in the first half. For full-2018, TomTom expects the decline to be around 30%. There have been reports that TomTom might divest its consumer operations, but the vendor has not confirmed this and may want to hold onto the business as it is still a cash generator.

Apple Maps: 1H18 highlights and developments to watch

Incremental improvements have not yet moved the needle

A summary of Apple's SWOT analysis is shown in Figure 7. Apple Maps's score remains unchanged (5.87) in this iteration of the index and is still the lowest in the leader category.

The last significant enhancement for Apple Maps was in September 2017 – as covered in the 2H17 iteration of the index. Many of the new features were already offered by Google Maps and standalone GPS devices, although in some cases the Apple equivalents were arguably better. The bottom line is that while welcome, the enhancements have yet to significantly move the needle for Apple Maps or improve its positioning in the index.

Figure 7: Apple Maps SWOT

Source: Ovum

Strategy U-turn: Apple is building its own mapping data from the ground up

It has been clear for some time that Apple needs to take more drastic action to improve Apple Maps given the increasingly competitive nature of the mapping and navigation market. It seems that Apple has taken this on board with the announcement that it has been secretly building its own mapping data which will enable it to reboot Apple Maps. The data is being gathered by Apple's own fleet of sensor-equipped vehicles and from anonymous iPhone users that consent to share it. Alongside this, Apple is gathering new high-resolution satellite data to layer with the drive data and iPhone data.

Tapping into real-time data from iPhones could prove compelling. Ovum forecasts that the global installed base of iPhones will reach 609.8 million by the end of 2018 and rise to 729.3 million by the close of 2022. This is a substantial user base, albeit not as large as that for Android smartphones. Leveraging iPhone data hinges on users' willingness to share their location, and this is by no means a given as location data can be deemed highly sensitive by consumers. Apple is at pains to stress privacy is paramount in the data gathered from consumers' iPhones. The data is anonymized, and only random points of a user's journey are collected. Rotating identifiers, rather than personal information, are assigned to any data or requests sent to Apple.

A significant move with long-term implications

Apple's decision to generate its own mapping data is very significant, as to date it has been the only player among the leaders not to have its own mapping data, relying instead on a mash-up of data from TomTom, OpenStreetMap, and other location data brokers. Apple now sees total reliance on third-party data as a weakness of Apple Maps (although at this point it looks like the partnership with

TomTom is still in place). Apple's decision not to own core mapping data has always seemed surprising, as one of the company's guiding principles is to own and control everything as far as possible. There are no precise details yet on the exact enhancements this overhaul this will enable, which is understandable.

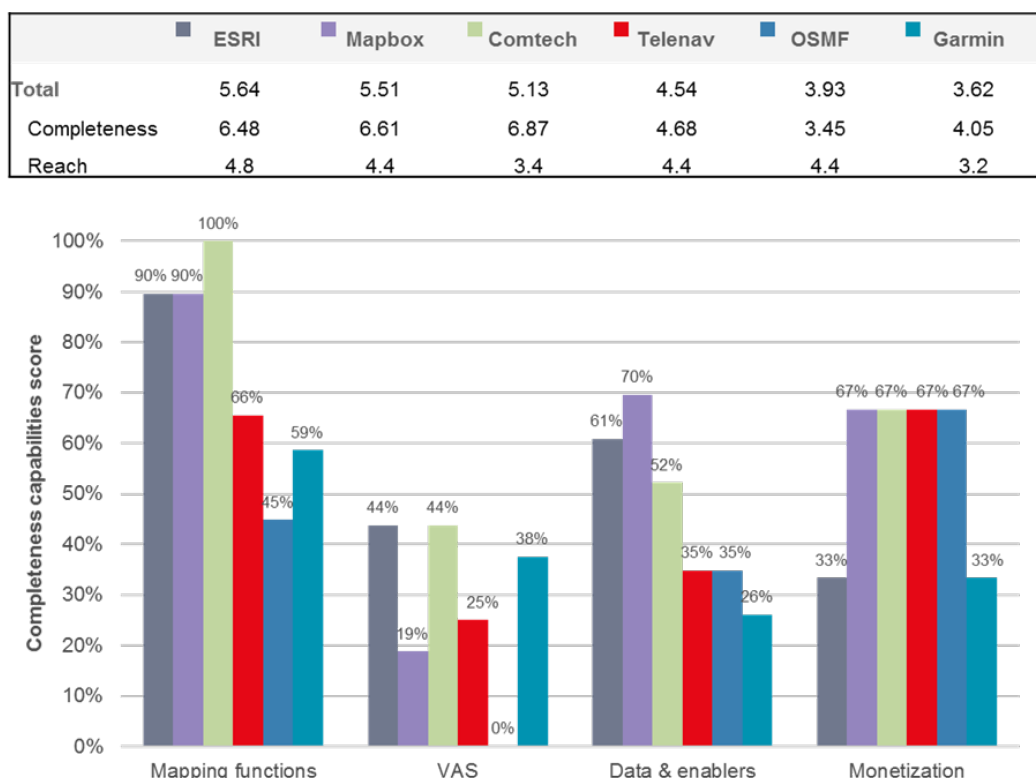
Whether Apple Maps's positioning improves remains to be seen

The Apple Maps reboot will not be available until later this year with the release of iOS 12; therefore it does not affect Apple's score or ranking in this version of the index and may not do so until 2019. It will take time for Apple to gather a complete deep data set across geographies, and improvements to Apple Maps are more likely to be an iterative process rather than a "big bang." Gathering mapping data is only the start. The project will require long-term commitment and investment to keep the data fresh and to ensure that it supports the latest capabilities and innovations. Whether Apple's own mapping data will be enough to reboot Apple Maps so that it competes better with HERE and Google remains to be seen.

Challengers

The next group in Ovum's index is made up of players that scored more than 3.5 but less than 5.7 when scores for completeness and market reach were combined. This group consists of six companies: ESRI, Mapbox, Comtech, Telenav, OpenStreetMap Foundation (OSMF), and Garmin. The scores for the challengers are shown in Figure 8.

Figure 8: Challengers' scoreboard



Source: Ovum

Top four challengers: 1H18 highlights and developments to watch

ESRI

ESRI's flagship product, ArcGIS, a specialist analytics and mapping tool, has been on the market since 1999. Given its highly specialized product, ESRI works closely with vendors that might be considered competitors. ESRI is the GIS market leader with customers in more than 30 industries across the globe.

The vendor has a strong base of enterprise clients and a strong developer community which contribute to its high score. It offers several pricing plans to suit a range of developers, including an option that enables access to basic developer tools at no cost. This is important in attracting developers to the platform, allowing them to trial the system at no cost while giving ESRI an upsell opportunity for the paid-for plans. ESRI continues to innovate by adding e-commerce services and analytics to its platform.

Indoor mapping, data collaboration, and cloud partners add to the ArcGIS proposition

In July 2018, ESRI announced a deal with Waze to provide Waze live alert data in ArcGIS to members of the Waze Connected Citizens Program, a data-sharing program of publicly available information on traffic and road conditions. This will allow local governments to respond to incidents more quickly and allow planners to analyze pinch points in greater detail. For instance, in Cobb County, Georgia, a trialist of the service was able to use the Waze data in the ArcGIS platform to find the common factor behind a sequence of automobile accidents.

Also announced in July 2018 was a new indoor mapping feature for ArcGIS that will facilitate interactive mapping for places such as airports, hotels, and event venues. The system can be linked with key-card data and room sensors to give building managers and event planners real-time data on their buildings. Indoor mapping could eventually enable navigation apps to direct users to an office inside a large campus rather than simply to the campus or building entrance.

Since June 2018, ArcGIS has been integrated into SAP HANA spatial services to enable businesses to create location bases and location-aware apps more quickly. SAP HANA is built on the SAP Cloud Platform. Another cloud integration was announced in April 2018 with ESRI entering a collaborative agreement with Alibaba Cloud to enable both companies to deliver ESRI technology on the Alibaba Cloud to customers.

Comtech

Comtech offers a number of location services, including navigation and mapping, indoor networking solutions, asset location, and mobile location services. It has a strong presence in China and 85 other countries.

Comtech has not announced any improvements since the last update of the index but continues to build its customer base, particularly in the automotive industry. Comtech is well placed in the autonomous driving market and has provided its first OEM with HD maps. Comtech's navigation and mapping solutions are enabled with enhanced search which can auto-suggest and offer premium content such as local movie listings, gas prices, and events details.

Comtech's Location Studio offers a range of map-based services and is quick to adapt to new technologies such as voice interfaces. The product is cloud ready and the company has around 1,000 active developers but can reach more than 100,000 developers via links to Arm Mbed, Samsung Artik, and IBM BlueMix platforms. Developers can access a consistent set of APIs and SDKs across all three map selections offered by Comtech. Location Studio can be used across a number of verticals, including automotive, fleet management, and insurance.

Given the completeness of its product, Comtech is well placed for the future if it continues to grow its reach.

Mapbox

Mapbox has moved up the rankings since the previous index, having continued to strengthen its product offering and expand its reach. It has a number of high-profile users in diverse industries including The Weather Channel, Lonely Planet, Snapchat, Strava, Financial Times, The Guardian, Microsoft, and the FCC. These customers have put Mapbox's technology into the hands of 300 million people every month.

Mapbox is primarily built on AWS and therefore is a cloud provider of location services and APIs. Mapbox has a longstanding commitment to the open source community and currently has more than 660 public code repositories on GitHub. Mapbox continues to be one of the most flexible platforms in the market, with open source libraries to help developers and other partners customize map interfaces and attributes to a high degree. Mapbox, like Telenav, works with OSMF data and in turn contributes back to the OSMF map to ensure it remains up to date.

Mapbox is keen to support its developer community

Mapbox has a good-sized developer community of more than 70,000 developers that build apps with Mapbox every month and more than 1.1 million registered developers. Mapbox's service pricing is clear and it offers some free usage in its pay-as-you-go price plan to encourage developers to explore its tools. Mobile apps sold through an app store need not have a commercial license, which makes it easy for developers to get started with the service. Mapbox focuses on developer tools, and its main business is licensing these tools rather than offering its own consumer apps.

At Mapbox's Locate event in May 2018, Mapbox announced two augmented reality (AR) SDKs. The React Native SDK will enable developers to build cross-platform AR apps more quickly as it allows development on both iOS and Android simultaneously. The SceneKit SDK, meanwhile, enables developers to add 3D terrain to iOS apps easily and without unduly increasing the size of the apps. The SceneKit SDK is integrated with Apple's ARKit. These two SDKs will enable Mapbox's development community to quickly and easily roll out all kinds of location-based AR games and experiences.

In May 2018, Mapbox also announced a partnership with Arm and the upcoming Vision SDK to allow developers to create a heads-up-display experience within navigation apps by using the phone's camera as another sensor input to the navigation system. The partnership with Arm will help Mapbox keep the power requirements of the Vision SDK low, and with Arm processors in billions of phones around the world, this partnership could prove important.

Telenav

Telenav has established a niche within the US automotive industry and has already partnered with a number of car manufacturers, including Ford, GM, and Toyota. Its embedded navigation within Ford

and Cadillac cars has been well received by the market, with the Ford SYNC 3 software rated as the best overall navigation system by J.D. Power. Recently, Telenav's agreement with Ford for SYNC 3 was extended to 2020 for all current geographies. According to Telenav's 3Q18 financial results, there are more than 8 million connected cars currently on the road that have Telenav's location-based services platform, with 1.4 million deployed in the first three months of the 2019 calendar year.

Telenav looks to develop its machine-learning mapmaking platform

In July 2018, Telenav announced that its embedded navigation system is part of the Uconnect platform featured in the 2018 Jeep Grand Commander which has been launched for the Chinese market. Its embedded navigation will also appear in the Jeep Cherokee and the Jeep Compass when they are launched in China in 2018. This is a further push into the Chinese market for Telenav which has its main presence in the US and lacks a global presence.

In May 2018, Thinknear, Telenav's advertising division, announced the launch of GeoLink, a self-service mobile advertising platform that uses the company's location-targeting and campaign optimization technologies.

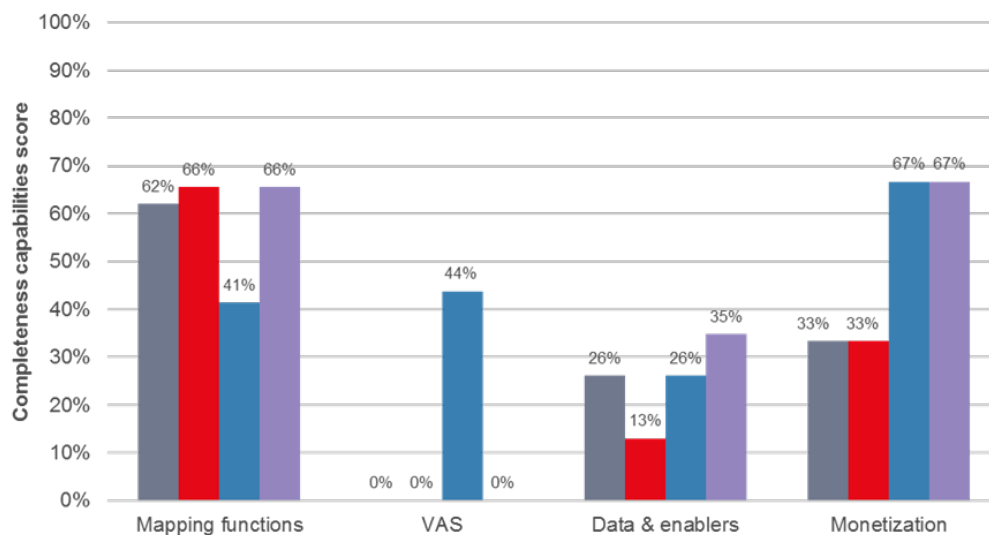
Unlike some of the other challenger companies profiled, Telenav does not have a developer program; it is primarily a B2B company, with its APIs and SDKs available to customers to support deployments. But in May 2018, Telenav announced a \$10,000 prize to encourage developer contributions to its open source mapmaking platform, specifically a machine-learning algorithm for recognizing different road elements such as traffic lights and improving the image sets for training the machine-learning algorithm. The winning contribution will be used to improve OpenStreetMap.

Followers

The next group in Ovum's 2H18 Location Platform Index is made up of players that scored below 3.5 when the scores for completeness and market reach were combined. This group consists of four companies: Magellan, Bing (Microsoft), MapQuest, and Automotive Navigation Data (AND). Their scores are shown in Figure 9. The players in the follower category need to address more verticals across auto, enterprise, government, and consumer. This will enable them to open up their revenue channels and capitalize on their portfolios to the fullest. They should also consider incorporating new technologies such as AI cloud computing to enable them to find innovative uses for their platform.

Figure 9: Followers' scoreboard

	■ Magellan	■ Bing	■ MapQuest	■ AND
Total	3.09	3.01	2.84	2.75
Completeness	4.18	3.42	3.08	3.90
Reach	2	2.6	2.6	1.6



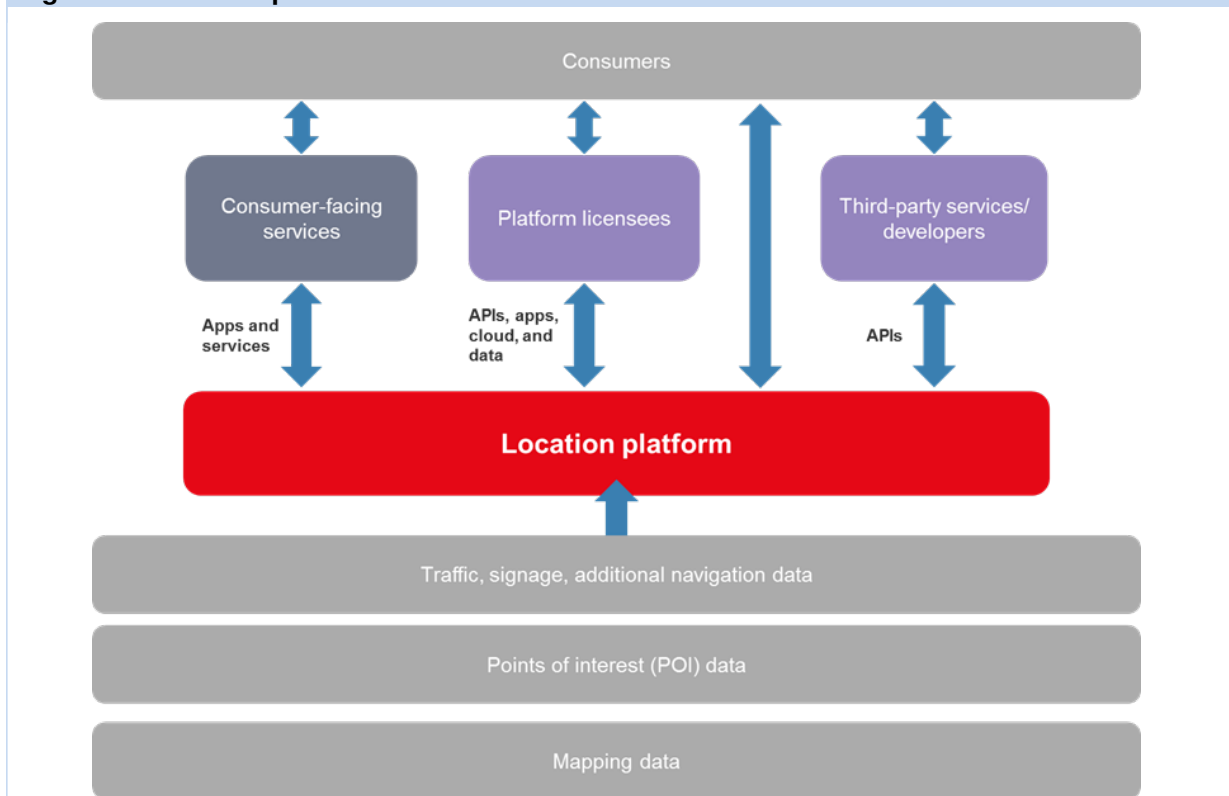
Source: Ovum

Appendix

Key changes to the index

The main dimensions of the index – reach and completeness – are still the cornerstones upon which the index is built.

The definition of a location platform remains unchanged, and Ovum still focuses on players that have strong mapping services powered by the cloud. Ovum's understanding of a location platform is depicted in Figure 10.

Figure 10: Location platform structure

Source: Ovum

Methodology

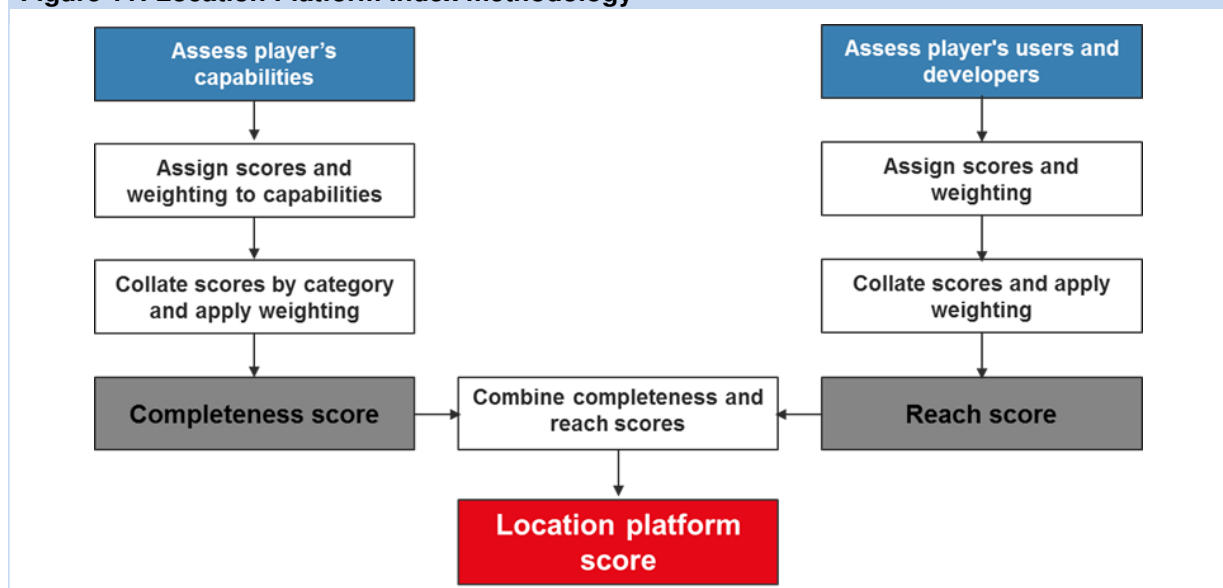
The location platform score, which is expressed as a number from zero to 10, is a combined measure of the completeness of a player's offering and the player's market reach.

Completeness is a measure of the technology and content assets that a player either possesses or partners for. This includes its end-user applications and third-party enablers. The completeness parameter also takes into account a location platform provider's monetization strategy in terms of the revenue streams in place and the business models utilized. The player is assessed on a range of criteria for each of these assets. The scores are then weighted to provide a total completeness score.

Market reach is a measure of the influence that a player has over end users (consumers and enterprises) and developers. Players are scored based on the number of users of their applications and services, the number of users of third-party applications and services built using their platforms, and the size of their developer communities. The total market reach score is calculated as a weighted combination of the scores from these three categories.

Data for the index is collected from a range of sources, including vendor briefings, product data, financial results, press releases, and related Ovum reports.

The index does not assess the quality of a service or assign a score to the user or developer experience. The quality of a service is assumed to be implicitly represented by its popularity, which is quantified in the market reach score. In addition to providing an overview of the location platform market, the index can be used to assess and select providers of location services.

Figure 11: Location Platform Index methodology

Source: Ovum

Objectives and definitions

- Ovum's *Location Platform Index: Mapping and Navigation, 2H18* is a tool to assess and rank the major players in the location platform market. The index evaluates vendors on two main criteria: the completeness of their platform and its market reach. Both components play an equal role in determining the final rank of the vendor.
- A location platform is a technology platform that integrates various location-based data sources and provides this data and related services to end users, licensees, and third-party developers.
- By adopting a platform approach, providers of mapping data and location-based services can benefit by expanding their user base while also opening new revenue streams through third-party services. However, it is not essential for location platform providers to own core mapping data or all of the associated points of interest (POI) data. This is because the core value of a platform comes from bringing together and blending multiple data sources and presenting them in a user-friendly way.
- **Reach:** An expression, as a percentage, of the number of users of a player's applications and services; the number of users of second- and third-party applications and services built using a platform; and the size of the developer community.
- **Completeness:** An expression, as a percentage, of a player's capabilities in end-user applications and features as well as third-party features and information enablers.
- **Enablers:** An expression, as a percentage, of a player's capabilities in providing its location platform to third parties via APIs.

Further reading

Location Platform Index: Mapping and Navigation, 2H17, CES006-000012(March 2018)

Location Platform Index: Mapping and Navigation, 2H16, TE0003-001029 (May 2017)

Location Platform Index: Mapping and Navigation, 1H16, TE0003-000970 (October 2016)

Location Platform Index: Mapping and Navigation, 2H 2015, TE0003-000901 (February 2016)

Location-Based Services: Moving Beyond Mapping to Encompass the Digital World, TE0003-000862 (August 2015)

Location Services: HERE is looking to be the go-to provider for advanced mapping, TE0003-000813 (December 2014)

Location-Based M-commerce: Trends, Opportunities, and Challenges, TE0003-000766 (July 2014)

Author

Eden Zoller, Principal Analyst, Consumer Services

eden.zoller@ovum.com

Charlotte Palfrey, Senior Analyst, Communications and Social

charlotte.palfrey@ovum.com

Ovum Consulting

We hope that this analysis will help you make informed and imaginative business decisions. If you have further requirements, Ovum's consulting team may be able to help you. For more information about Ovum's consulting capabilities, please contact us directly at consulting@ovum.com.

Copyright notice and disclaimer

The contents of this product are protected by international copyright laws, database rights and other intellectual property rights. The owner of these rights is Informa Telecoms and Media Limited, our affiliates or other third party licensors. All product and company names and logos contained within or appearing on this product are the trademarks, service marks or trading names of their respective owners, including Informa Telecoms and Media Limited. This product may not be copied, reproduced, distributed or transmitted in any form or by any means without the prior permission of Informa Telecoms and Media Limited.

Whilst reasonable efforts have been made to ensure that the information and content of this product was correct as at the date of first publication, neither Informa Telecoms and Media Limited nor any person engaged or employed by Informa Telecoms and Media Limited accepts any liability for any errors, omissions or other inaccuracies. Readers should independently verify any facts and figures as no liability can be accepted in this regard – readers assume full responsibility and risk accordingly for their use of such information and content.

Any views and/or opinions expressed in this product by individual authors or contributors are their personal views and/or opinions and do not necessarily reflect the views and/or opinions of Informa Telecoms and Media Limited.

CONTACT US

ovum.informa.com

askananalyst@ovum.com

INTERNATIONAL OFFICES

Beijing

Dubai

Hong Kong

Hyderabad

Johannesburg

London

Melbourne

New York

San Francisco

Sao Paulo

Tokyo

