

# **Telefonica Global Industrial IoT Services**



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#### **PRODUCT ASSESSMENT REPORT - GLOBAL INDUSTRIAL IOT SERVICES**

### **REPORT SUMMARY**

Telefonica's commitment to partnerships and investment in startups to spur innovation is a smart approach, and its tight integration of the IoT portfolio with AI, analytics, and security has proved to be compelling.

## SUMMARY



## WHAT'S NEW

- June 2021: At MWC, Telefonica highlighted new real-world IoT use case initiatives in tourism and manufacturing, both of which leverage its 5G, edge computing, and deep learning technology solutions,
- June 2021: Telefónica Tech Ventures participated in a seed investment round in Monogoto, which specializes in private LTE/5G IoT network management.
- May 2021: Telefónica Tech and Siemens are partnering on new combined solutions for smart buildings in Spain.
- **May 2021:** Telefónica Tech partnered with Microsoft to provide private 5G connectivity and on-premises edge computing for industrial customers.
- **March 2021:** Telefónica Tech partnered with Fibocom and aitos.io jointly to develop a 5G Blockchain IoT module to record information gathered by devices to blockchain networks.
- **December 2020:** Telefónica Tech expanded its partnership with Geprom Connecting Industries to strengthen, its capabilities in Connected Industry 4.0, integrating digital twin, predictive maintenance, and blockchain technology.

## **PRODUCT OVERVIEW**

Product Name	Telefonica IoT
Description	Telefónica has solid traction in IoT with over 10,000 enterprise customers and more than 26 million cellular IoT (i.e. 2G/3G/4G/5G/NB-IoT/LTE-M) connections (up 10 percent year-over-year). Including other connectivity technologies such as fixed line and satellite, the total is more than 35 million connections worldwide. It focuses on opportunities in its footprint, particularly within its key markets: Spain, Brazil, the UK (where it is merging O2 UK with Virgin Media in a 50:50 JV), and Germany. The operator has seven areas of focus: Connect, Reconnect (post-Covid), Optimise, Engage, Insight, Locate, and Secure. The IoT and big data organization has more than 500 people at a global scale for technical operations, product and strategy, and business development, with 200 dedicated to IoT. Telefónica offers value-added services such as managed connectivity, application dashboard development and data collection, IoT security, and can provide end-to-end integration in its target verticals: mobility (B2B solutions including fleet management, workforce management, and asset tracking), retail, Industry 4.0, utilities, smart cities, and energy.
Components	Telefónica operates an end-to-end framework to support its IoT customers. This framework has numerous components:
	Telefónica's 'IoT Path' consist of Collect (sensor/device installation), Connect (using NB-IoT, LTE, etc.), Process (data is processed by cloud-based platforms), and Analyse (data is manipulated to provide information to inform decision-making).
	Reconnect (Post Covid): offers a range of solutions that relate to the emerging post- Covid environment, including generic services like Adapting to new ways of working, and big data & IA assessment, as well as sector-specific offerings such as RFID for Retail, Smart Water Solutions, Fleet Optimise, and Mobility for Public Admin.
	Global Connectivity: Spain, Germany, the UK, Brazil, as core markets and eight more countries in Latin America plus global access through 700 roaming partners. This utilizes a range of network technologies including: cellular (2G/3G/4G/5G), Sigfox, satellite, and NB-IoT/LTE-M.

#### Components (cont.)

Kite platform- Global intelligent OSS/BSS platform that manages global connectivity on cellular (including NB-IoT and LTE-M networks), and SigFox, with device and SIM management, cloud integration (Microsoft and AWS), security and analytics, and device monitoring.

IoT Connect- Covering managed connectivity, IoT network and devices. Supported by Telefónica's own managed connectivity platform Kite; it also has a license for Cisco Jasper, used principally for MNC deals, and for Software AG/Cumulocity used in Spain. Telefónica also includes a wide range of programmable hardware components pre-integrated in its Kite platform to make it easy for industrial companies to deploy connected solutions. It also includes MovistarCar, which provides real-time information about vehicle functioning and usage.

End to End solutions: Retail, energy, fleet management, smart cities, utilities, and industry. Telefónica provides app enablement with third-party platform alliances including strong relationships with IBM, AWS, and Microsoft as well as strong players in the industrial environment like ASTI and Siemens (partnership with focus on industrial IOT security solutions).

Data Analytics: Telefónica acquired Synergic Partners in 2015, a big data consultancy, and launched LUCA (its Big Data unit for corporate customers) in 2016. Analytics has a strong relevance in all IoT products of Telefónica, and specific business models that leverage the power of data in IoT solutions is considered from the very early stages of product definition. With the creation of the new Telefónica Tech in November 2019, IoT and big data have merged into a single division.

- Innovation activities: Telefónica has a number of activities oriented to nurture innovation products, identify new business opportunities, and establish open collaborations with key players. Telefónica has OpenLabs called TheThinx in Madrid, Barcelona, and Mexico to test new IoT solutions as well as an Activation Program oriented to start-up acceleration in areas like IoT, BigData/AI, blockchain and their potential combinations. In parallel, Telefónica has internal innovation activities like one focused on drones, with specific use cases, including road safety and fire detection, other solutions combining LPWA connectivity to new sectors like sports, beauty or food control, plus blockchain and its application within other IoT solutions.
- Full range of professional services that include specialist presales and consulting units with a focus on designing solutions together with customers that quite often require development of tailor-made components, as well as testing/certification, and on-going operation and support. These professional services divisions include global product and business development units that stay aligned with the local teams in each specific country.

#### Components (cont.)

Packaged solutions include:

- **Connect:** comprises Things Ready Link to connect assets to corporate networks and enable near-real-time access; Things Ready Evolve for control and management of IoT lines and connectivity in real time; the Kite Platform (available via web portal of API) which is a Global intelligent OSS/BSS platform that manages global connectivity on cellular (including NB-IoT and LTE-M networks), and SigFox, with device and SIM management, cloud integration (Microsoft and AWS), security and analytics, and device monitoring; the Industry Ready wireless network which connects elements of assembly lines (available in a choice of three architectures); and LPWA, NB-IoT and LTE-M technologies for lower-power IoT solutions.
- **Optimise:** includes Fleet Optimise end-to-end fleet management in near-realtime, delivered via a small IoT device and a cloud-based platform for remote monitoring and analytics; Workforce Optimise which offers real-time location of field personnel and a planning tool for optimization; Energy Optimise offering remote and centralised management of high-energy consumption equipment (aircon, lighting, etc.); and Queue Optimise, providing queue management and booking services for retailers and other businesses.
- **Engage:** includes Spotsign, which enables retailers to broadcast communications using in-store screens; Spotlabel, a digital signage solution using in-store media; Spotmusic, offering music for stores; and Spotwifi, which offers retailers' customers free Wi-Fi in their stores alongside associated promotional activities.
- **Insight:** Energy Insight offers a way for customers to manage their energy usage in any building/location; and In-Store Insight, which offers statistical and aggregated data about customers and their in-store behavior.
- **Locate:** Things Ready Track is an IoT solution (equipment and connectivity) for vehicle location, cargo and driver security, fleet optimisation, insurance telematics using preconfigured equipment.
- Secure: Secure Credentials simplifies the management of IoT device credentials; IoT Threat Detection profiles IoT devices to detect anomalies in traffic, including automatic learning, heuristics and signatures; Secured by DNS network service to defend against malicious attacks on domain names/services; SandaS GRC, which integrates processes around Corporate Governance, Risk Management and Regulatory Compliance; Vamps, which identifies security threats and potential attack methods; Cyber Threats, protects against IoT hacking and prevents credit card data theft using holistic risk management; all products supported from 12 SOCs worldwide.

Within its Security portfolio for IoT, Telefónica lists Cyber Threats and Vamps in addition to Faast, which scans customer systems 24x7 with penetration testing; Security Monitoring, an end-to-end adaptive monitoring service; SaaS Encryption, which protects confidential customer information within SaaS provider clouds.

<ul> <li>Europcar</li> <li>Daimler</li> <li>Balfour Beatty</li> <li>C&amp;A</li> <li>Department of Energy &amp; Climate Change (UK Smart Metering Project)</li> <li>Dufry</li> <li>Nestlé</li> <li>Schindler</li> <li>SEAT</li> <li>Tesla</li> <li>Repsol</li> <li>Eletrobras</li> <li>Ferrovial</li> <li>Atlético de Madrid</li> <li>Movilpack</li> <li>Muving</li> <li>Transport for London</li> <li>Bankia</li> <li>ALD Automotive (with Geotab)</li> <li>Cortefiel</li> </ul>
<ul> <li>Vodafone Global Enterprise</li> <li>Verizon Enterprise Solutions</li> <li>Deutsche Telekom</li> <li>AT&amp;T</li> </ul>

• Orange Business Services

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## **ESSENTIAL ANALYSIS**

#### Strengths

- **Experience:** Telefónica has been in the IoT market for many years with hard-won knowhow on deploying large and small customer solutions. With many high-profile reference customers and more than 35 million IoT connections, Telefónica can offer new customers a substantial level of assurance.
- Al of Things: Having a single point of contact for IoT and AI is a differentiator. Having combined its big data/AI and IoT units, Telefonica offers an end to end value proposition from connectivity management to vertical applications to analytics solutions applying AI/ML and telco network insights to complement sensor-generated data, along with professional services for solution design and integration.
- Industry 4.0: Telefónica has experience in delivering complex deployments involving LTE and 5G private networks in manufacturing environments, leading to the GSMA naming it a leader in this space, and to Daimler awarding it the world's first 5G private network for automobile production in its smart factory. It also has deepening partnerships with specialists in the space, enabling it to supply more than connectivity to manufacturing and other industrial enterprises.

### **CURRENT PERSPECTIVE**

#### LEADER

Telefónica is a leader in the global IoT market, having committed itself to a tight integration of the IoT portfolio with AI, analytics and security, resulting in compelling, innovative capabilities and solutions.

The global organization has more than 500 staff focused on big data and IoT for technical operations, product and strategy, and business development, and has been building out its own R&D capabilities with centers in Chile, Mexico, Spain (two competence centers devoted to security), and the UK. Its IoT strategy covers several major B2B areas of focus: connectivity, fleet/asset tracking, retail solutions, Industry 4.0 (including manufacturing plants, mining, agriculture and ports/airports), utilities, energy, connected cars, and security (with ElevenPaths). Regularly adding new packaged solutions, it recently announced a new smart buildings offering in conjunction with Siemens.

#### Limitations

- **Closed Borders:** Telefónica has to compete against carriers with high visibility in IoT and with much larger footprints in Europe and globally as it increasingly focuses on four main target countries. It relies on reciprocal agreements, membership in the IoT World Alliance, and Telefonica group's own wholesale branch to extend network reach.
- Hyperscale Hype: Telefónica has maturing partnerships with Microsoft and Amazon, and more recently with Google, in areas like multicloud, MEC, private networks, and business apps. Whilst it is undoubtedly exploring collaboration with these leading IoT application enablement environments, nearly all of Telefonica's peers are doing the same.

IoT services extend beyond connectivity and pre-packaged solutions. Enterprise clients can access analytics services via the company's AI and big data solutions portfolio; its own and partner cloud services; and a range of security services covering both IoT-specific risks and wider vulnerabilities, through a dedicated IoT cybersecurity unit, its close ties with Nozomi Networks and Fortinet providing stronger solutions for securing OT environments especially, and via ElevenPaths, its in-house cybersecurity subsidiary. The Luca suite of Al offerings is conveniently delivered via a SaaS model using a no-code scheme for drag-and-drop ease of use. Telefónica also offers value-added services such as application enablement, dashboard development, data collection and analysis, and end-to-end integration for vertical solutions. Its Kite platform is a global intelligent OSS/BSS platform that manages global connectivity on cellular (including both LTE-M and NB-IoT networks) and SigFox, and provides ecosystem enablement and device and SIM management, cloud integration (via Microsoft and AWS), security and analytics, and device monitoring of IoT devices for different solutions. Telefonica is also offering private IoT networks with its LTE-E and 5G initiatives in which the customer manages its own dedicated spectrum. The ability to provide end-to-end operational capabilities means Telefonica can successfully implement digital projects in support of customers' transformation strategies, especially those interested in leveraging AI as part of their IoT solution. More than a third of customers need at least some help, especially with ideation and deployment during the early phase of projects. While some customers operate the Kite IoT connectivity management platform themselves, a few outsource its operation to Telefonica.

The company's verticalized IoT offerings are supported by a wide catalog of solutions which vary by region; in Latin America, for example, agriculture and mining are big growth markets. Smart city engagements are beginning to develop into opportunities for integration of multiple municipal apps into aggregated solutions. Retail is a particular priority area for Telefónica, reflecting the size of the industry in its various domestic markets. Off-the-shelf solutions managed by Telefónica's in-house retail services platform (Spotdyna) are accessible to the retail market, positioned as components of wider digital transformation.

Integrating IoT with other technologies to future proof enterprises is a growing proposition for Telefónica's existing customers. For example, SEAT has worked with Telefónica to use IoT to underpin the Spanish car maker's Industry 4.0 strategies. This includes providing a connected and autonomous car test bed over 5G and using blockchain and machinery sensor data for supply chain management.

For Daimler's Factory 56 in Germany, Telefónica edged out other vendors based on its experience and its ability in operations, configuration, and support. Telefónica is building its vertical Industry 4.0 unit by first leveraging its ability to deploy high performance private wireless (4G/5G) networks (along with edge computing capabilities enhanced by a new partnership with Microsoft Azure), having rolled out worldwide first deployments in flagship industrial customers. But the strategy is to build specific added value functionalities on top of such capabilities together with partners like ASTI and Geprom that bring specific know-how in the industrial space (including both robotics and OT systems), where digital factories are being realized by connecting thousands of elements in the manufacturing environment.

Telefonica has strong traction in IoT with a base of about 35 million IoT connections including more than 26.2 million cellular SIMs under management, distributed throughout Europe and Latin America, but also further afield (Telefonica can reach 200+ countries through 700+ roaming agreements). Between 20-30% of IoT revenues are derived from vertical solutions running on top of connectivity, with the average revenue per connection increasing over the last two years.

## **COMPETITIVE RECOMMENDATIONS**

#### PROVIDER

- Edge Ability: Telefónica's launch of multi-access edge computing services in several regions in Spain extend its VDC offering to local nodes, supporting low latency data processing capabilities with the performance of on-premises deployments and the economics of cloud computing. Telefónica should position itself as an Industry 4.0 leader in Spain against Vodafone and Orange, and highlight how its Google and Microsoft partnerships have helped it to innovate.
- **Security Differentiation:** Telefónica should continue to highlight the breadth of its security portfolio and note how they secure IoT end-to-end, beyond the capabilities of many competitors. This is key as security remains the primary obstacle to business deployment of IoT.
- Al and Analytics Wrap: Telefónica should continue to emphasize the differentiated value it can realize following the merging of its big data & IoT portfolio units. Telefónica's scope for delivering customized IoT solutions with enhanced data insights has increased since the formation of Telefónica Tech.

#### COMPETITORS

- **Footprint Limitations:** Other global operators should note that their owned footprint is larger in the U.S., Europe, and Asia-Pacific, pointing out that they can provide a better customer and network experience with their own opcos- and that they have been more consistent on regional target markets.
- Industrial Credentials: While Telefónica can point to a few notable manufacturing success stories, some competitors, like Deutsche Telekom draw on a longer heritage of integrating ICT solutions in the sector. DT can point to Telefónica's (and Orange's) reliance on partners to challenge its inherent strength in the vertical.
- **MEC Alliances:** Telefonica has been talking about MEC (mobile or multi-access edge computing) for years and has made significant progress in Spain, but competitors in its other regions may be better placed than Telefonica to deliver local or national MEC offerings.

#### BUYERS

- Security and Big Data: Enterprises that place high importance on security and big data/analytics should consider Telefónica as it offers strong integration of these capabilities with its IoT portfolio.
- Leverage Local: Whilst Telefónica does not have the largest global footprint, investment in its own networks means it offers robust connectivity in domestic markets. Its strong position in Spain, Germany, the UK, and Brazil will be particularly attractive to some buyers.

#### METRICS

## **VALUE-ADDED SERVICES**

Rating:	Leader
Consulting Services:	Advisory services within each target vertical; single point of support from advisors that are highly trained and available 24x7.
Pro Services:	Offers end-to-end integration of hardware, value-added services and operative processes (logistics, helpdesk, customer care) based on customer need, although the company also offers IoT bundles for smaller enterprises. Provides trouble-ticketing, customer care, provisioning and logistics with single point of support 24x7. End-to-end solutions in transport, utilities, energy efficiency, industrial, retail and smart city, among others. It is adding pro services and vertical specialists in each country and may also use local integration partners.
Security Services:	IoT security services cover the range of solutions designed to address the prevention, detection and response to IoT security vulnerabilities. New dedicated IoT cybersecurity unit is a good differentiator; in addition to the Eleven Paths subsidiary, the company can address both specific IoT challenges and security across legacy services. These include security audits prior to IoT deployments to discover potential vulnerabilities, IoT anti-virus, and new security solutions for connected OT systems and supply chains. Telefónica is also working closely with Subex on threat detection specifically for IoT, including devices like smart meters and consumer IoT devices
Data Analytics:	Telefónica helps customers capture the value of their internal and external data sources. Telefónica's big data unit, LUCA, is providing a range of IoT analysis services to clients, including LUCA Fleet (rental cars) and LUCA Store (in-store data analytics). Big data capabilities have been further augmented since the acquisition in 2015of Synergic Partners, a big data consultancy, and its total integration within Telefónica ecosystem from 2018. Several of Telefonica's major IoT focus areas (Smart Energy, Industry, and Smart Retail) are already taking advantage of new analytics capabilities and soon, all its primary IoT verticals will have analytics as part of their value proposition.

## **PLATFORMS**

**Rating:** 

Very Strong

Connectivity Platforms: Kite platform offers support for both local and global SIMs (marketed as Global SIM-Vivo, O2 and Movistar), as well as data caps and other device management capabilities. Features include automated provisioning, a web interface which offers device status visibility in real time as well as parameter supervision, presence status, multi-language support, SIM/device inventory, alarms, reports about supervised parameters, and location based on cell ID. The Cisco/Jasper Wireless Control Center is offered as an option. The company has also signed a collaborative partnership with Software AG, to get access to the Cumulocity platform in Spain for enterprises to manage IoT connections.

App Enablement Platforms:	Relationships with IBM, AWS, and Microsoft, whose cloud services and IoT platforms are integrated with Telefonica Kite platform, provide opportunities for customers to develop applications as well as for Telefonica to develop custom apps on their behalf.
Differentiators:	Multiple platform options. Own Kite platform connects especially well with Telefonica's OSS/BSS stack including billing. Cisco Jasper useful for MNC opportunities. Integration with AWS, Microsoft, and IBM strengthens app dev position.

# VERTICAL MARKETS

Rating:	Very Strong
Target Verticals:	Primary verticals include: smart mobility (for fleet management), smart cities, retail, Industry 4.0, energy, utilities and managed connectivity. After- market automotive solutions and car rental segment also seen as growth markets. End-to-end solutions in transport, utilities, energy management, industrial (including key sub-verticals like agriculture, mines and ports/ airports, as well as manufacturing), retail and smart city. Smart Energy including smart buildings (hotels, office building, banks, etc.) and includes data analytics. Smart retail, has also become a priority vertical for the company and has many reference customers, including the airport retailer Dufry.
Partnerships for Verticals:	Telefónica's approach to solutions depends on the vertical. It often partners with companies to build out more holistic IoT offerings such as Geotab for fleet management. In industrial environments, it can partner with Geprom and ASTI for end to end solutions. In other cases, Telefónica builds its own platforms often supported through acquisitions, including: SpotDyna for retail; Hydra for energy; and Thinking Cities for Smart City. Telefonica can integrate with other apps via APIs, create its own services using the FIWARE development platform or leverage the ecosystem including AWS and Microsoft, to tap into partner marketplaces.

# APP DEV

Rating:	Strong
App Dev Capabilities:	Telefonica can integrate with other apps via APIs, create its own services using the FIWARE development platform or leverage the ecosystem including AWS and Microsoft, to tap into partner marketplaces.

Application Examples:	Modular flexible solutions to fulfil Smart Utilities' requirements and specifications (both local and global) leveraging global assets in communications, network management, industry know-how, and partnering with top-industry players to shorten time-to-market and bring clients closer. Its proposal for Smart Utilities is based on its own experience analyzing the nature and scope of each project and adapting each solution to meet the complex requirements through a special project approach. Telefónica offers solutions that range from managed connectivity to end-to-end solutions. Diverse Smart Retail solutions from digital signage, to music at point of sale, to analysis of in-store statistical data about customers' behavior and site performance. Advisory services on how technology and digital products can improve the customer experience at the point of sale.
Developer Resources:	Partners with IoT platform vendors and cloud players. It can integrate with other apps via APIs, create its own services using the FIWARE development platform or leverage the ecosystem including AWS and Microsoft to tap into partners and marketplaces.

## PARTNERSHIPS

Rating:	Very Strong
Application Partners:	For application development, Telefónica's approach depends on the vertical. It often partners with companies such as Geotab, a leader in fleet management, and Siemens, for industrial solutions. In other cases (such as smart energy), Telefónica builds its own platforms. It can integrate with other apps via APIs, create its own services using the FIWARE development platform or leverage the ecosystem, in particular Microsoft, with whom it has recently extended its partnership to facilitate edge computing amongst other things, and AWS, to tap into partner marketplaces. Telefónica has partnered with Altiostar, Gigatera, Intel, Supermicro, and Xilink for the development and deployment of Open RAN for 4G and 5G networks.
Service Provider Partners:	Telefónica, via the IoT World Alliance reciprocal agreements, has access to numerous partners to enhance its footprints for global deals. Telefónica also has an alliance with China Unicom for expansion into Asia-Pacific. Telefónica has an IoT Partner Program in Europe and Latin America; it includes more than 1,700 partners and enhances go-to-market efforts with resellers that can bring its connectivity services into IoT deals. Alongside its own full network operations and extended international presence, Telefónica also has strategic alliances with Bouygues, China Unicom, Etlisalat, Megafon, MTN, O2 Czech Republic, Ooredoo, Singtel, Simmin, and Sunrise. Telefónica has a partnership with KT and China Unicom for Multi-Operator Multi-access Edge Computing to enhance global roaming and interconnect for 4G and 5G. It is also part of the Telco Edge Cloud GSMA initiative, which aims to develop an interoperable platform to make edge compute capabilities widely and easily available with participation of the key global Tier 1 telco players (China Unicom, Deutsche Telekom, EE, KDDI, Orange, Singtel, SK Telecom, and TIM).

## CONNECTIVITY

Rating:	Very Strong
Cellular Footprint:	GSM/GPRS/3G/LTE/LTE-A Coverage in Spain, UK, Germany, Brazil, Mexico, Colombia, Chile, Argentina, Peru, Venezuela, Ecuador, and Uruguay. 5G coverage of 80% of Spanish population at January 2021. Telefónica has deployed 5G networks in the UK (150 city coverage), Germany (15 city coverage at end 2020, with 30+ city coverage planned by end 2022), Brazil (eight city coverage), and Spain. It also claims 97% 4G coverage in Europe and 75% in Latin America (June 2020).
LPWAN Support:	Telefónica's approach is to support both NB-IoT and LTE-M. In the countries where it deploys licensed spectrum LPWA technologies, both are deployed, as each is suitable for different use cases (e.g., NB-IoT for metering, tracking, LTE-M for industry, manufacturing, ports). Telefónica's approach is to bet heavily in both options. The network is ready across Telefónica's footprint, but it is activated on a per demand basis. Currently Spain, Germany, Colombia, Argentina, and Brazil are activated for LTE-M and NB-IoT and more countries will be activated in the future.
Other Access Options:	Global wireline MPLS network in footprint, particularly supported by the company's global investment in fiber networks. Will provide Wi-Fi, satellite, and near-field networks if required (Bluetooth, RFID, Zigbee, etc.)

## TRACTION

Rating:	Strong
Number of Connections:	Telefónica has a base of about 36 million IoT connections including more than 26 million cellular SIMs under management. Connections are distributed mainly throughout Europe and Latin America and includes more than 1.5 million connected vehicles. Of those, fleet management accounts for over 400,000 vehicles. Telefonica's IoT connectivity can further reach 200+ countries through roaming agreements.
Named Customers:	ABB, ALD Automotive, Atlético de Madrid, Balfour Beatty, Bankia, C&A, Cities of Avila, Valencia, and Santander, Cobra, Cortefiel, Daimler, Department of Energy & Climate Change (UK Smart Metering Project), Dufry, Eletrobras, Endesa, EuropCar, Ferrovial, GEFCO, Iberdrola, Idrica, Inversis Banco, ISS, Movilpack, Muving, Nestlé, ONS, Repsol, Schindler, Sixt Leasing, SEAT, Tesla, Transport for London, and Vale S.A.