

## Innovation

# At the forefront of transformation

**For Ferrovial, innovation is a strategic priority and a mature discipline that is deeply rooted in its culture and processes and aimed at creating value for society.**

**F**errovial's innovation strategy is not only aimed at consolidating the strength and competitive advantages of its traditional business models but also at exploring new markets and technologies. Accordingly, the company coordinates a broad consolidated portfolio of projects focused on defined priority themes and that is appropriately proportioned between disruptive, strategic and incremental projects. In 2019, this portfolio included more than 100 projects under development that entailed an investment of approximately 45 million euros in R&D. This balanced strategic management of its innovation has made it possible to make the innovation objectives set out below tangible.

### DISRUPTIVE: ANTICIPATE THE FUTURE OF TRANSPORT

Ferrovial faces the constant development of the technological, socio-economic and environmental context of the infrastructure and mobility sectors through a proactive approach that allows it to anticipate and adapt dynamically to change. Through its "What if?" program it periodically analyzes plausible future scenarios to determine the key lines of action to respond to threats and take advantage of any opportunities that have been identified.

In addition, Ferrovial has the Venture Lab, its corporate launchpad of business models with a high uncertainty and disruptive capacity. This program allows Ferrovial to anticipate new markets and take advantage of incipient business opportunities that have great future potential. Some of the Ventures launched in recent years include the Wondo Mobility as a Service platform and KUIKO, the digital market of facility management services for SMEs and freelancers.

### STRATEGIC: INCREASING THE VALUE OF ASSETS

New technologies are enabling methods and tools to emerge that are able to profoundly transform all

stages of the infrastructure life cycle. In this context, Ferrovial undertakes both strategic intelligence projects to help its business units understand the impact of technology on infrastructure management as well as projects to generate additional added value in the promotion, design, construction, operation and maintenance of these assets. The first type include its studies on the impact of autonomous and connected cars, 5G technology and new means of payment. The second type include its projects with innovative technologies such as virtual or augmented reality, drones and artificial intelligence.

### INCREMENTAL: AT THE SERVICE OF BUSINESS UNITS

All of Ferrovial's exploration, ideation, experimentation and learning activity takes on a special practical sense when it is generated from a detailed knowledge of the specific objectives, needs and challenges of its business units. That is why a large proportion of its project portfolio is aimed at achieving short-term impact on its traditional business models through, for example, automation, digitization or data processing and analytics. Ferrovial's methodical and incremental innovation has allowed the company to consistently achieve improvements in profitability, sustainability and efficiency in its operations; increase the safety of users and employees and, ultimately, generate additional competitive advantages for its businesses



**CLICK**  
Innovation

INVESTMENT IN  
R&D (M€)

**45**

PROJECTS  
UNDERTAKEN IN 2019

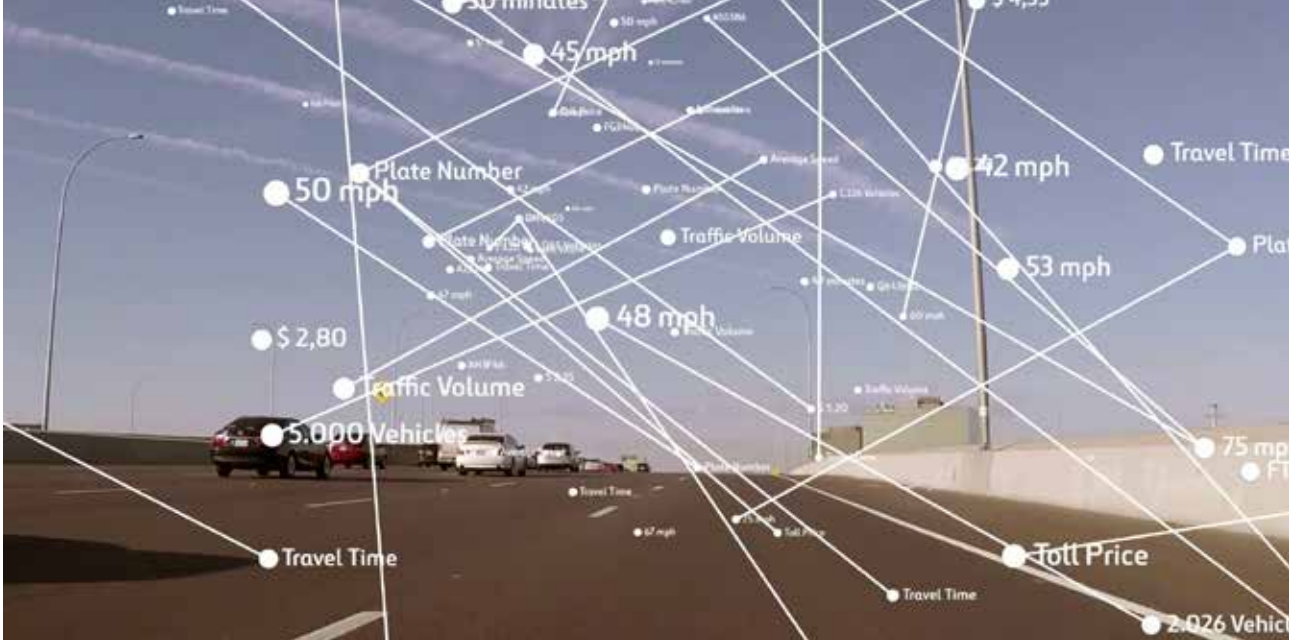
**+100**

PROJECTS  
WITH START-UPS

**32**

### SAFETY LAB – SAFE ROADS

Ferrovial has launched an innovation program focused on improving the safety of its employees and users of its infrastructure through the use of new technologies. The program, which consists of several initiatives, has focused its first project on improving road safety in the area of urban mobility. The initiative aims to reduce the number of accidents in the urban environment with the use of IoT, artificial intelligence and driving assistance technologies (ADAS). The system helps drivers prevent possible collisions while providing information on the risk points detected in the infrastructure. The Safety Lab has also launched projects in the field of construction and mobility.



### PROMOTING AN INNOVATIVE CULTURE

Ferrovial undertakes a wide range of technology and trend watch activities that are reflected in its monthly Innovation Insights newsletter, its Infobits reports on periodic trends and its White Papers, in which it discusses both the opportunities generated by the trends and the potential use cases for its business units. Ferrovial's internal knowledge ecosystem is completed with the Digital Hub, the Centers of Excellence in the areas of data and mobility and the multiple specialized technical offices of the different business units. These units function as nodes of the organization's network of experts centralizing knowledge, skills and experience and providing consulting and technical advice.

The insight, talent and knowledge of the immense innovation community disseminated throughout the organization are added to the analysis work and the initiative of these teams devoted entirely to innovation. Every two years the Zuritanken program captures the creative explosion of all company employees, prioritizing and providing resources to prototype ideas with the greatest potential. In addition, as far as innovative talent is concerned, Ferrovial has launched the Play the Future initiative to train its employees in digital skills and new technologies. The company also launched the Executive Forum, an annual meeting of executives to analyze emerging trends and define projects on topics such as mobility or data-based management.

### GROWING AN OPEN AND COLLABORATIVE ECOSYSTEM

Ferrovial Open Innovation teams work to expand and enhance the organization's network of collaborations and alliances in major global innovation centers such as Israel, the US, Finland and Singapore. This network includes public innovation agencies and programs such as H2020, the European Innovation Council, Innovate UK and the Climate-KIC and Digital-KIC communities of the European Institute of Innovation and Technology; research centers and universities such as the Massachusetts Institute of Technology and Stanford University and, of course, accelerators, incubators and startups. In particular, in 2019 Ferrovial had 11 collaboration agreements in place with universities and research centers and conducted 32 pilot projects with startups.

### SMART MANAGEMENT OF TRANSPORT ASSETS

The digital revolution is making the union between the physical and the digital world possible by enabling interaction between all the organizations involved in the life cycle of transport assets. Ferrovial has opted to adapt to this scenario by incorporating these methodologies on the day of its operations. To this end, the company has defined and developed a common framework for the integral implementation of these asset management tools within the group in a complementary way with the strategies of the different business units. The initiative contemplates the development and deployment of a digital platform that captures the information requirements between the stages of the life cycle of the assets, allowing a "digital fingerprint" to be generated collaboratively for them. All this will make it easier to manage, operate and maintain the company's infrastructure and detect opportunities for operational improvement through efficiency and process optimization.

### PLAY THE FUTURE

Two years ago Ferrovial launched the 'Play the Future' initiative, a learning platform for digital skills and knowledge for its employees with training itineraries in the area of drones, internet of things, 3D printing, big data and artificial intelligence, user experience, the future of mobility and digital competencies. In the first half of 2019, the initiative's online portal was launched and throughout the year more than 900 professionals signed up for different courses or initiatives. Also, in June a new edition of the Digital Day took place in the Ferrovial Digital Hub aimed at those employees who took the online Digital Competency course. During the event, participants from the various Ferrovial businesses had the opportunity to have an experience guided by the internal experts in the different topics. Additional courses in Agile, Cybersecurity, Future of Work and the Data Academy are underway.

## INNOVATION PROJECTS

### 1. MOBILITY



- **Mobility of the future:** strategic analysis in conjunction with MIT on the mobility of the future based on the performance of factors such as private-vehicle ownership, mobility patterns or the energy mix.
- **Autonomous Bus:** prototype of autonomous bus using artificial intelligence to transport passengers from airport parking to the terminal.
- **C-ROADS:** application of Cooperative Intelligent Transport Systems for vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) on roads.



### 2. DATA DRIVEN MANAGEMENT

- **Transforming Transport:** generation of advanced quantitative models to improve traffic management and mitigate toll roads congestion.
- **NLP:** tools for natural language processing (NLP) and analysis for categorizing and comparing legal documents.



### 4. SUSTAINABILITY

- **LAG bags reutilization:** initiative that incorporates a QR code into bags for liquids, aerosols and gels, incentivizing reuse of them and a reduction in the use of plastics.
- **Dugud:** Mobile app for rewarding citizens that deposit organic waste in waste containers, incentivizing recycling.

### 3. SAFETY

- **Safety Lab:** program for accelerating the use of new methodologies and technologies to reduce the number of accidents in infrastructures.
- **Autonomous ready:** incorporation of Advanced Driver Assistance Systems (ADAS) in the urban fleet to avoid collisions with pedestrians and cyclists.



### 5. DIGITIZATION

- **DIGITALIS:** creation of a blockchain platform for creating and checking unique digital identities for suppliers..
- **Pay with a smile:** application that uses visual-biometric-recognition technologies to allow users to make payments with their facial expression.



### 6. ENGINEERING

- **Horbran:** study on the viability of using recycled-polypropylene macro fibers to replace some of the steel bars in the reinforced concrete.
- **Drone inspection:** use of drones in inspection tasks for multiple types of infrastructure.