

## EXECUTIVE SUMMARY

### INFRADINAMICA

The provision of infrastructure services faces significant challenges. It is estimated that by 2050, more than twice as many people will live in urban areas (6.7 billion) than in rural areas (3.1 billion)<sup>1</sup>. Migration rates to cities from the countryside represent a growing pressure on the demand for services in cities<sup>2</sup>. To cope with ever increasing demands, infrastructure must be flexible so that it is able to expand and physically adapt to the future requirements of public services, and it must respond to the dynamics of day-to-day life, ensuring reliability and making efficient use of resources.

It is widely recognized that the construction industry does poorly completing projects on time, on budget, and to specifications. Large projects across asset classes typically take 20% longer to finish than scheduled and are up to 80% over budget. Transport projects are not the exception and cost overruns are a recurrent issue. Nine out of ten transport projects have, on average, 28% cost overruns; financial returns for contractors are often relatively low and volatile<sup>3</sup>. Productivity in construction industry has grown a meagre 6% since 1945 compared to those in agriculture or manufacturing. A wide range of factors explain poor productivity and cost outcomes. The limited digitalization of project management in the construction industry, together with information asymmetries between the different actors involved in a project, and the possible disagreements that may arise between design and implementation, translate into longer than necessary times to completion and to cost overruns. The way in which projects have historically been managed has not allowed for beneficial collaboration between the different actors involved and has not stimulated transparency in the processes.

To overcome these challenges, the IADB is pursuing the development of a digital platform called INFRADINAMICA, which will offer solutions that enhance supervision of construction projects to ensure better adherence to the contract requirements for quality, budget, time and scope.

The platform combines data from two technologies: (i) drones; and (iii) crowdsourcing, to achieve efficient, remote, frequent and dynamic infrastructure project supervision.

The main functions of INFRADINAMICA are:

- Prioritize the main construction activities during the execution phase that are critical for the successful implementation of the project.
- Define a milestone linked with a red flag system to early identify and mitigate.
- Develop and identify performance indicators for the main construction activities.

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<sup>1</sup> Our World in Data, 2018.

<sup>2</sup> Energy demand in the region is expected to grow by more than 91% by 2040. Energy Needs for Latin America and the Caribbean in 2040, IDB 2016.

<sup>3</sup> Imagining Construction's Digital Future, a report by McKinsey.

Our proposed solution gathers information on civil work projects (key activities of the work, quantities and execution dates), drone images to visualize the progress, and dynamic reports from all actors involved (citizens, builders, Government, IADB, among others)). During the execution of the work, the firm managing the supervision of the project updates the information within the platform according to the progress achieved, obtaining indicators for timely decision making. Drone images, taken on different dates, also allow for a visualization of the development. Finally, the feedback from users (crowdsourcing) allow for project appropriation by the community, and a dynamic and timely management of incidents during the execution of the civil works.

INFRADINAMICA has already been proved as a successful project management tool in the La Paz- El Alto interurban highway construction project, one of the most significant new transportation projects in Bolivia. The INFRADINAMICA platform was chosen as the means to coordinate changes in the design, to ensure a technically high-level of supervision, and to establish close monitoring of progress. In this case, the initial extent of the proposal was to upgrade 30% of the road, however, within one year of the commencement of the project the rest of the highway had deteriorated to such a level that the decision was made to expand the project to encompass 100% of the road. Consequently, the need to establish a mechanism that could coordinate changes in the design, ensure technically adequate supervision, and establish close monitoring of the work was urgently required.

The construction project was inaugurated in 2019 and use of the new platform in the successful construction project has assisted the project to achieve its goals. The benefits arising from the successful project include lower travel times for users of the new service, with travel time reductions of up to 30% for travel during peak hours. The decrease in travel times for an average of 40,000 vehicles per day, and the implementation of specific infrastructure improvements for road safety, have been major factors in reducing accident levels.

During the construction of the El Alto highway, the *Asociación Boliviana de Carreteras (ABC)* and the Contractor faced some major technical challenges. Prior to the use of INFRADINAMICA, the challenges would typically have been associated with cost overruns and time delays. The challenges included:

- Technical and construction difficulties related to the use of new materials and technologies, such as the use of rigid pavement, which is appropriate given the topographic and climatic complexities of La Paz.
- Complex traffic management during the construction phase of the project, typically leading to a high number of car crashes.
- Significant time pressures arising from regular liaison between bus transport unions, ABC and the Contractor
- The relocation of two major cultural and ceremonial sites the "*Waka katari*" and the "*Mama koa*".

#### INFRADINAMICA (results)

- Reduction by over 50% of typical project costs overruns (as expected for Bolivia).
- A higher degree of control of the project, plus better interaction of all the actors involved.

- Greater transparency in the execution of the infrastructure project.
- Enabled an increase in the operational effectiveness of project planning, based on real time models and reliable information.
- Identified risk at early stages.

A positive and measurable impact on road safety has been experienced by users of the completed project. Users are benefiting from lower road crash rates. Better communication, enabled by the platform, allowed the implementation of road safety management plans during the construction phase. This included training and workshops in nearby schools and colleges, and information stands in some local neighborhoods. In addition, local schools have become involved by planting trees near the project.

The construction industry is ripe for disruption. According to Mckinsey, by digitizing construction \$1.6 trillion additional value could be added through higher productivity, in the process meeting half the world's infrastructure demands. INFRADINAMICA is a clear example of how to innovate in the infrastructure sector. We want to scale the platform and implement it in other projects that the Bank is developing in the Latin America and the Caribbean region. We also see a great opportunity through INFRADINAMICA for executing agencies and the construction sector in the region to follow the commitment to involve technology in the construction process and for all decision makers and citizens to actively participate.

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