Construction Disruption Radar

ISSUE #1

Tracking disruption signals in the construction industry

November 2021

The coronavirus crisis hit the construction sector hard, but also stimulated the transformation of the industry, the first edition of the Construction Disruption Radar of SEOPAN and Roland Berger has found. All indicators in the yearly report and survey suggest transformation is ongoing in the sector, despite the pandemic-induced downturn and disruptions along the whole value chain.

Overall, survey results show that leading Spanish construction players are undergoing a pragmatic transformation with focus on adapting to new regulatory and client requirements while increasing operational efficiency to improve their competitiveness. The monetization of new business models around these innovations is next step.

The survey results highlight a growing importance of sustainability and energy efficiency. In this respect, ~90% of respondents consider that sustainability and circular economy will deeply affect how the industry operates in the next 3 years. Improving operations, testing innovative construction techniques and the use of data also rank high in Spanish construction companies' transformation agenda.

In this booklet, we take a closer look at these figures and analyze key developments that underscore the profound change that the industry is living.

Cover photo: Orbon Alija/Getty Images

Context of this study

The construction industry plays a fundamental role in society constituting 7% of the world's working population and ~14% of global GDP. In Spain, the importance of the industry is also very relevant, accounting, in terms of gross value added, for around 6% of GDP in 2019 and 2020.

However, the industry continues suffering from endemic problems such as low level of standardization, geographical dispersion of construction sites, miscoordination along the value chain and low digitization, which has historically led to low productivity and consequent low profit margins. In Spain, for instance, EBITDA margins for top 5 construction companies stood at around 6% in 2019, with 1-2% profit margins on average.

In fact, low margins have historically prevented a big share of companies in the industry, also in Spain, to invest in transforming its operations and business models. Only top performers have managed to use scale at its advantage, investing in new technologies to increase productivity and re-positioning its business while defending the core.

COVID-19 shut down most of construction sites in 2020 and is hitting the construction, and adjacent sectors', supply chain in different manners that could result in lasting swifts in value.

But the pandemic has also accelerated change in the industry. Today, more than ever, innovating and increasing efficiency is a top priority in the CEO's agenda of construction companies.

In this sense, we think that the current context presents a unique opportunity to boost sector's potential for three reasons:

1. Infrastructure investment still needs to be substantially increased globally, and in Spain. For example, according to SEOPAN, investment requirements in Spain in water, environment, mobility and urban development are estimated at EUR 157 bn by 2030

2. Unprecedented public relief packages to fight COVID-19 and public investment programs are supporting a quick recovery of the economy, and subsequently, of the sector, that typically is high correlated to GDP

3. NGEU (Next Generation European Union) recovery funds will be a catalyst for the industry and for the entire economy. Spain will receive EUR 150 bn and construction sector will benefit from infrastructure investment, but also from a significant proportion of these funds allocated to modernization of Spanish key industries

Spanish leading constructors have been investing in transforming its operations since long. However, relevant challenges are still ahead, and determination and strategic vision will be key to succeed under tougher competitive conditions.

What is the Construction Disruption Radar?

The Construction Disruption Radar is an annual analysis of market trends related to disruption in the global construction industry. This edition is based on a survey of all SEOPAN members in Spain and other relevant construction companies. Our intention is to gradually incorporate other markets such as UK, Germany, France and US. The radar has 10 indicators of disruption with 4 levels of maturity each one and is structured around 3 dimensions.

The CDR aims to answer key questions such as: which factors are driving change in the industry; how do these factors evolve over time; and what can decision makers do to best manage disruption? Ultimately the CDR aims at helping construction management teams to understand main tendencies and disruptive practices in the industry and define their future strategy.
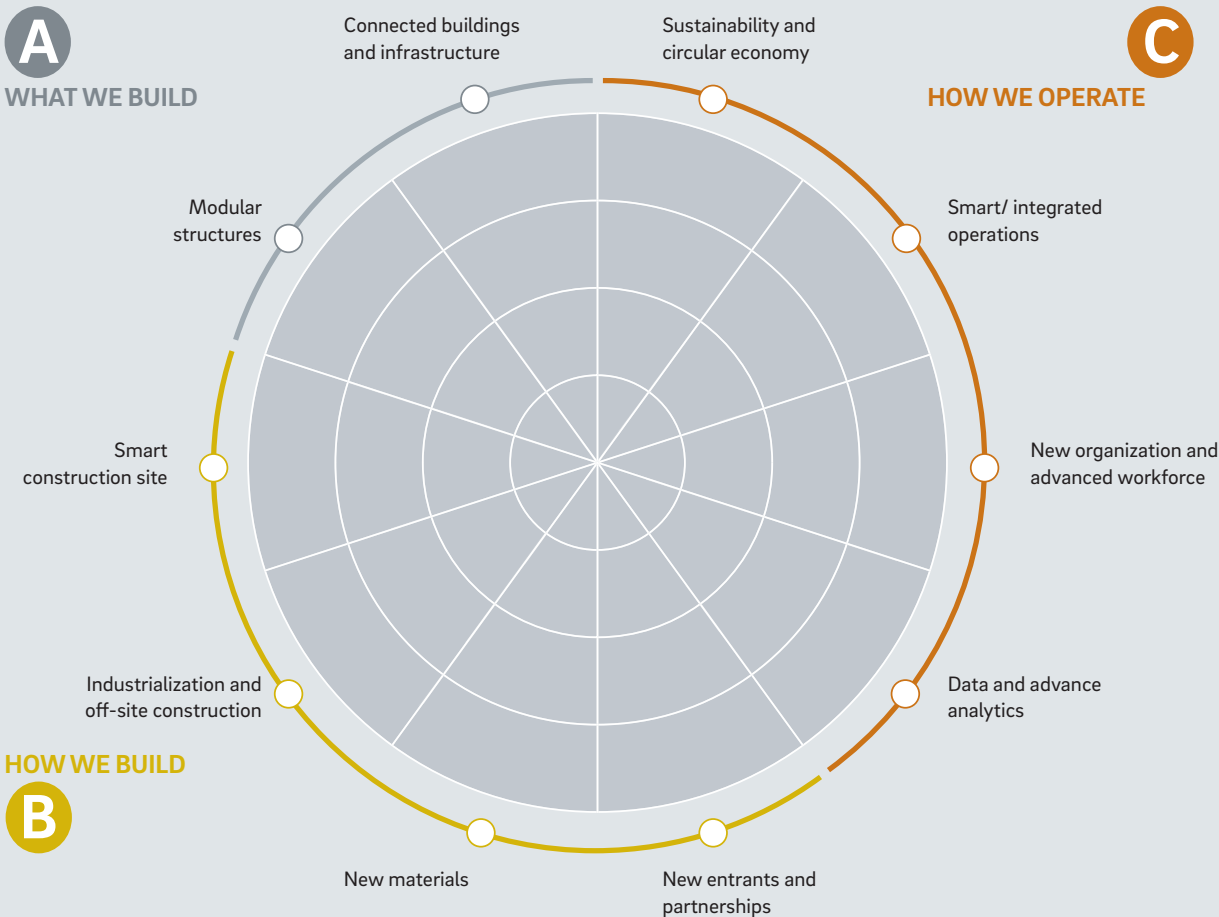

A WHAT WE BUILD — How is construction output changing?

Connected buildings and infrastructure — Construction of smart buildings and infrastructure by using new technologies

Modular structures — Construction of modular buildings or infrastructures

B HOW WE BUILD — Which innovations are impacting on-site activities?

Smart construction site — Use of new technologies and tools to improve operations in the job site

Industrialization and new production — Use of new methodologies to "industrialize" production

New materials — Use of new materials in the construction of buildings and infrastructure

New entrants and partnerships — Collaborations with new players in the industry to efficient operations

C HOW WE OPERATE — How are construction companies evolving their operational model?

Sustainability and circular economy — Impact of sustainability and circular economy on your operations/business

Smart/integrated operations — Innovations aiming at improving coordination along the entire value chain

New organization and advanced workforce — Changes in your organizational structure and workforce to adapt to new challenges

Data and advance analytics — Use of data in your benefit along your operations (e.g. tendering, construction)

Key report findings

Our first CDR, just after the outbreak of the pandemic, shows that the transformation of the industry is ongoing despite the crisis. Spanish leading companies are already developing new capabilities and testing them in specific projects as needed to adapt or respond to main industry disruptions.

Overall maturity level of participants (i.e. adaptation to disruption/ use of a certain innovation)
1= Limited experience, more traditional levers in place
2= Piloting in specific projects or areas of the company as needed
3= Global adoption across the company, monetizing still a challenge
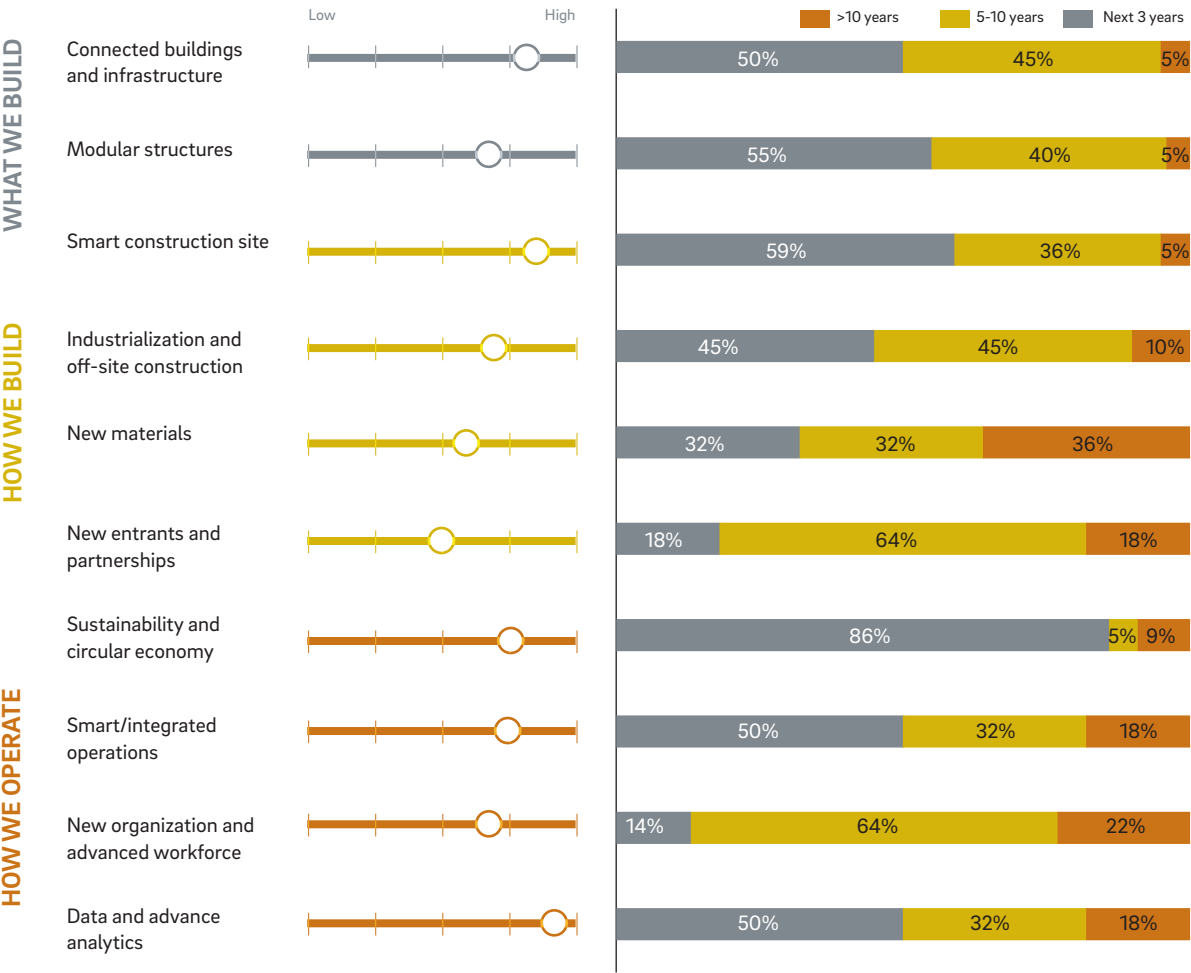4= Consistently profiting from this innovation along all operations/areas
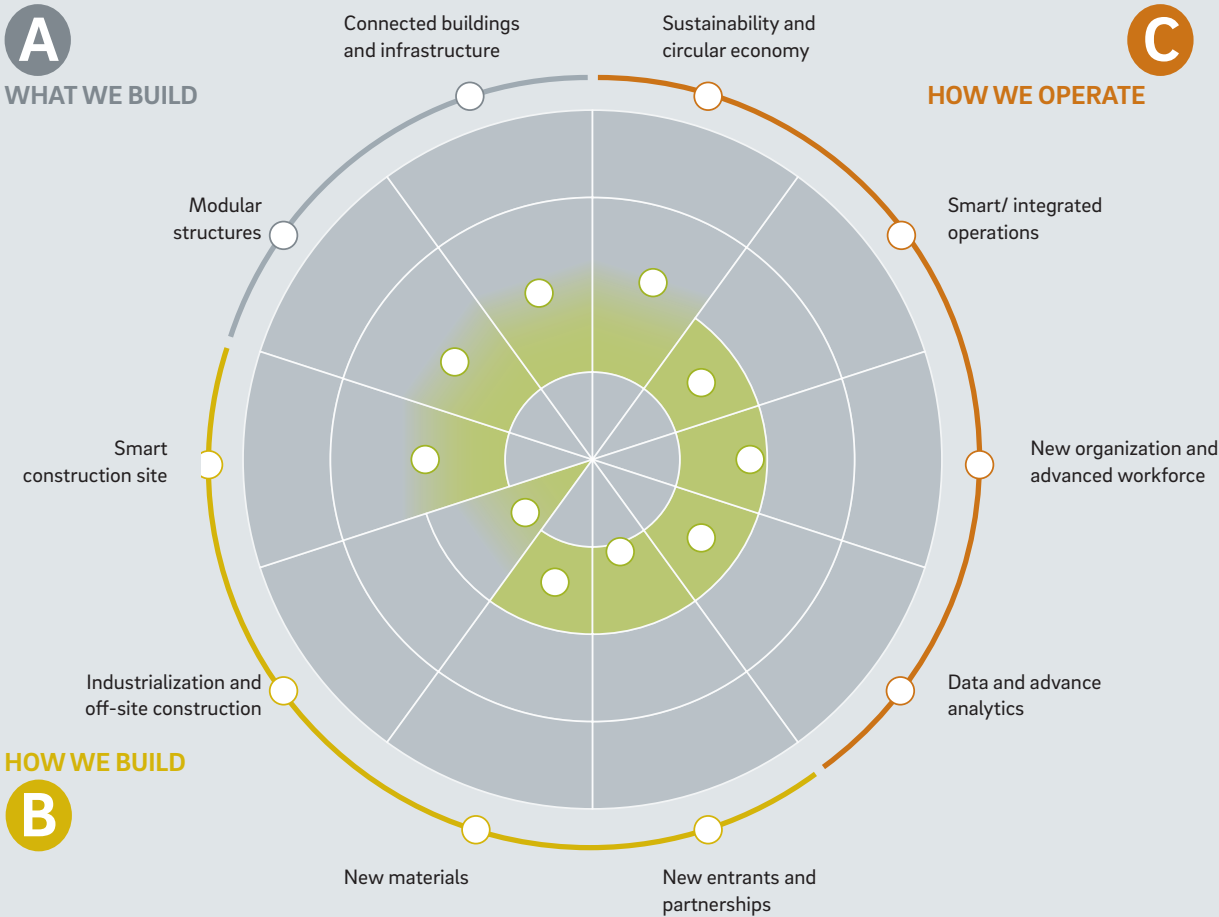
Top constructors in Spain rank sustainability and data analytics at the top of their list. Disruptions around the first one are expected to have high impact in the sector in the short term, with ~90% of respondents scoring it as very relevant for in the short term.

Leaders are working closely with their suppliers and other technological new players regarding innovative materials (e.g. green materials) and its impact on building techniques, but the effect is expected to be progressive over time.

Sustainability is expected to have high impact in the short term. Increasing efficiency in operations, new construction techniques and the rising importance of data also rank high on the "challenge" list

A
WHAT WE BUILD

Connected buildings and infrastructure
Modular structures
Smart construction site
Industrialization and off-site construction

HOW WE BUILD
B

New materials
New entrants and partnerships

Sustainability and circular economy
C
HOW WE OPERATE

Smart/ integrated operations
New organization and advanced workforce
Data and advance analytics

Q: Score the following disruptions according to expected impact in the construction industry

Q: Can you indicate when do you think these technologies will disrupt the industry?

	Low ——— High	>10 years	5-10 years	Next 3 years
WHAT WE BUILD				
Connected buildings and infrastructure		50%	45%	5%
Modular structures		55%	40%	5%
Smart construction site		59%	36%	5%
HOW WE BUILD				
Industrialization and off-site construction		45%	45%	10%
New materials		32%	32%	36%
New entrants and partnerships		18%	64%	18%
HOW WE OPERATE				
Sustainability and circular economy		86%	5%	9%
Smart/integrated operations		50%	32%	18%
New organization and advanced workforce		14%	64%	22%
Data and advance analytics		50%	32%	18%

Roland Berger / SEOPAN
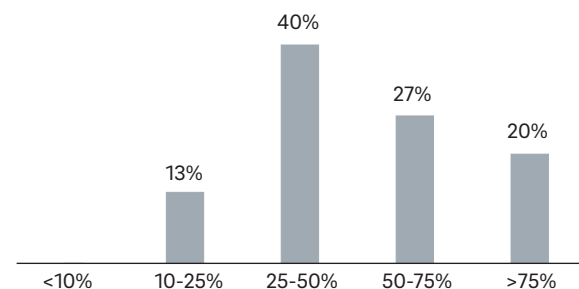
(A) What we build

CONNECTED BUILDINGS AND INFRASTRUCTURE

Smart functionalities are becoming a common feature in new builds and retrofits according to survey participants.

Among them, energy efficiency, safety and security, and maintenance optimizers are the most common used.
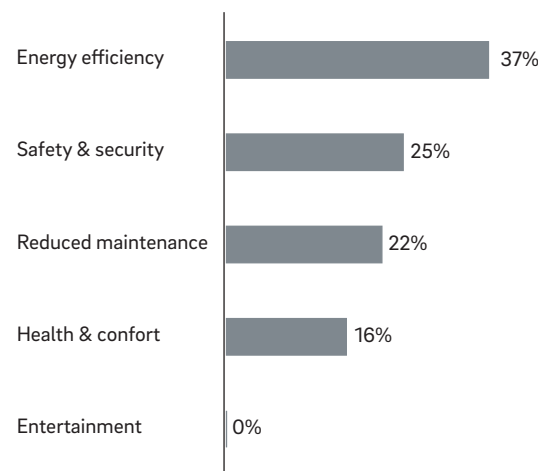
Q: What percentage of your new builds and building retrofits are incorporating connected functionalities?

Respondents, %

- <10%: 13%
- 10-25%: 40%
- 25-50%: 27%
- 50-75%: 20%

Q: What are the most common functionalities in the market?

Respondents, %

- Energy efficiency: 37%
- Safety & security: 25%
- Reduced maintenance: 22%
- Health & confort: 16%
- Entertainment: 0%

MODULAR STRUCTURES

Despite increasing relevance of new trends such as 3D printing and off-site construction, currently, less than 50% of new builds are designed and built modular first mainly due to lack of standardization. However, respondents acknowledge that modular will play a key role in decreasing construction costs.

Q: What percentage of new builds are designed and built modular-first?

Respondents, %

- <10%: 36%
- 10-25%: 45%
- 25-50%: 18%
- >50%: (—)
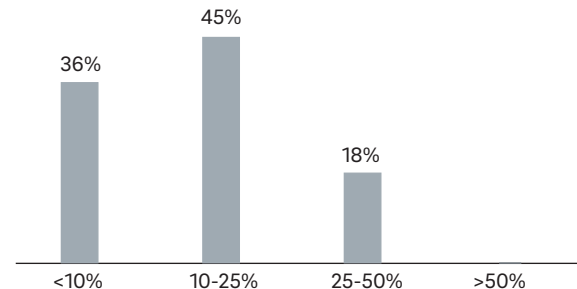
New regulation around energy efficiency and safety is expected to drive the adoption of smart functionalities in buildings.

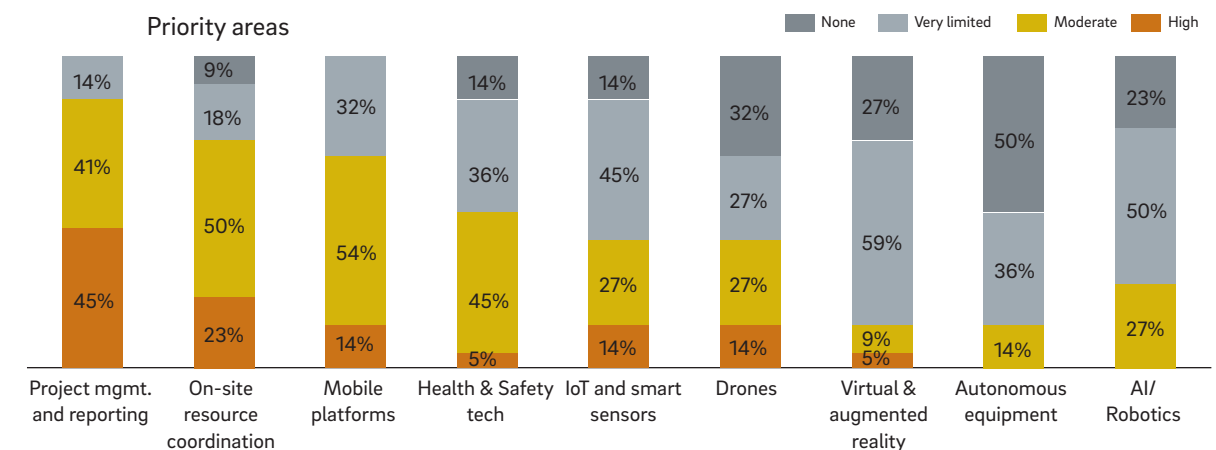**In civil works, maintenance and servicing efficiencies to foster penetration of IoT.**

(B) How we build it

INVESTMENT PRIORITIES

Improving project management and reporting and optimization of on-site resource planning are top investment areas followed by Health and Safety.

Despite the progress done in this area by some participants around specific use cases (e.g. tunnel machine), innovations such as autonomous equipment and robotization are not attracting so much investment now due to perceived low market readiness and to well-known industry-specific factors that still limit their adoption.

Q: How would you define your investment level in these technologies?

Priority areas

Legend: None | Very limited | Moderate | High

|	Project mgmt. and reporting	On-site resource coordination	Mobile platforms	Health & Safety tech	IoT and smart sensors	Drones	Virtual & augmented reality	Autonomous equipment	AI/ Robotics
None	—	9%	32%	14%	14%	32%	27%	50%	23%
Very limited	14%	18%	54%	36%	45%	27%	59%	36%	50%
Moderate	41%	50%	14%	45%	27%	27%	9%	14%	27%
High	45%	23%	5%	5%	14%	14%	5%	—	—

NEW MATERIALS

Short term priority is dealing with supply chain disruptions and soaring prices caused by Covid-19.

Sustainable, lightweight high strength and surface engineered materials expected to disrupt the market in the following years. Timber to benefit from sustainability targets.

Q: What are the main drivers of innovations?

Respondents, %

- Sustainability: 38%
- Cost efficiency: 27%
- Durability: 18%
- Quality: 15%
- Lean execution: 2%
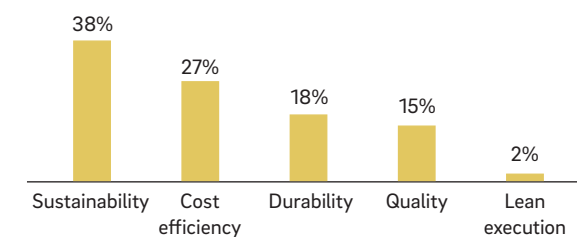
NEW ENTRANTS AND PARTNERS

Results show that the industry perceives new entrants as partners, and is exploring collaborations, specially in design & engineering.

Most innovative players are launching specific initiatives such as innovation hubs or start-up incubators to foster innovation.

Q: How do you perceive new entrants?

Respondents, %

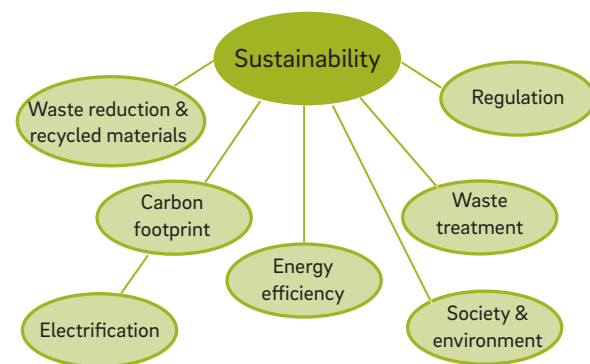**They will help us to improve our operations**   **91%**

C

How we operate

SUSTAINABILITY AND CIRCULAR ECONOMY

Sustainability and circular economy are among the most impactful trends according to respondents – 100% of them consider medium to high impact in their operations.

Waste reduction and management, recycling of materials and reduction of CO2 emissions are perceived as priority areas in the immediate term. In this sense, according to participants, stricter regulation and Public Administrations' requirements will trigger the adoption of sustainability criteria along the construction value chain.

Q: What are the top sustainability trends you see in your market?

Q: What percentage of public tenders would you say that incorporate sustainability criteria as a requirement?

Respondents, %

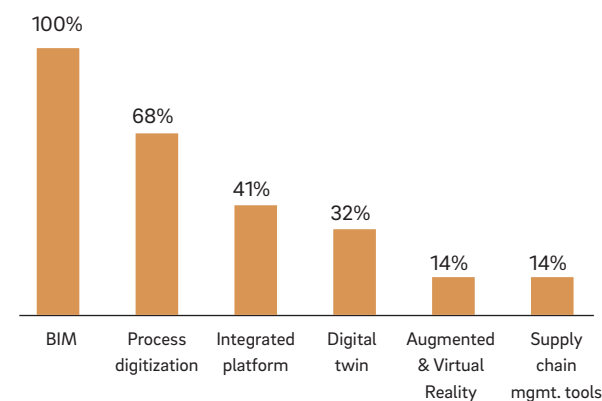| <5%	<25%	25-50%	>75%
9%	32%	36%	23%
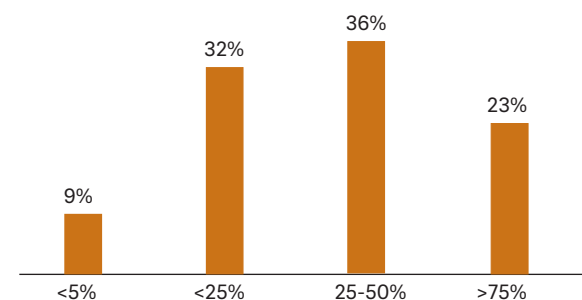
SMART/ INTEGRATED OPERATIONS

Speaking about digital transformation in the Spanish construction sector is speaking about BIM, with 100% penetration among survey participants as a structuring element to drive coordination specially during design and pre-build stages.

Respondents are automating back and middle office processes (e.g. providers qualification and bureaucracy management) with focus on increasing operations efficiency – On-site operations and digitization of supply chain remains a challenge due to high operational complexity and "uncontrolled" environments.

Q: Can you mark the three technologies that you are utilizing the most to increase integration of operations?

% of participants that cited the technology

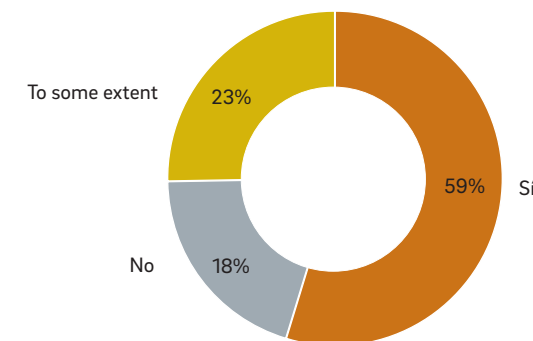| BIM	Process digitization	Integrated platform	Digital twin	Augmented & Virtual Reality	Supply chain mgmt. tools
100%	68%	41%	32%	14%	14%

NEW ORGANIZATION AND ADVANCED WORKFORCE

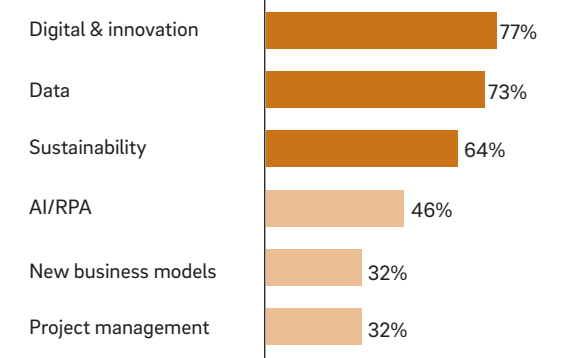Most of respondents have a transformation plan defined although results show improvement potential regarding concreteness.

Participants are strengthening Digital, Data and Sustainability areas in their organizations although shortage of skilled workforce is still impacting the sector.

Q: Does your company have a Global Transformation Plan in place?

Respondents, %

To some extent 23%
Sí 59%
No 18%

Q: What business functions or areas are being strengthened in your organization?

% of participants that cited the area/ function

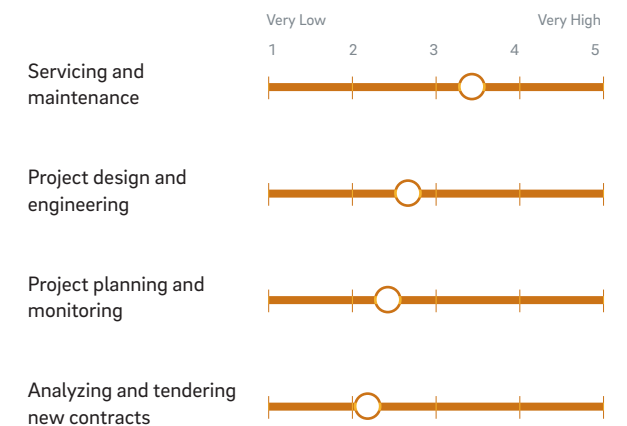| Digital & innovation	77%
Data	73%
Sustainability	64%
AI/RPA	46%
New business models	32%
Project management	32%

DATA AND ADVANCE ANALYTICS

The sector is starting to benefit from Data Analytics, mainly focusing on use cases regarding efficiency of servicing and maintenance. Respondents declare to be focusing efforts on systematic data gathering and structuring – exploitation to come

Q: What is the intensity of use of advanced analytics in the following activities? (1=Very low; 5=Very High)

Avg. results

Servicing and maintenance
Project design and engineering
Project planning and monitoring
Analyzing and tendering new contracts

Key take-aways of this edition

The first edition of SEOPAN and Roland Berger CDR has shown an overview of the most relevant trends in construction and their expected impact on the industry, identifying the key areas of action and defining an industry-transformation framework. Expert interviews and market analysis have identified industry's best practices and disruptive approaches along the whole value chain, offering a holistic view of next generation construction.

The broad industry has been progressively adopting some of these measures along recent years and are increasingly investing in innovation, with R&D&I expenditure raising more than other industries, with a 7.6% CAGR 2013-2019 in Europe. Specifically, in Spain the ratio R&D&I expenditure / revenue has increased in recent years for main construction companies.

However, innovation levels are still lower than in nearly any other industry and productivity remains below total market. In addition, Spain is behind neighboring countries in some innovation trends e.g. in industrialized building. This is also aggravated by the intrinsic characteristics of the sector (lack of standardization, decentralization of works, multiple stakeholders…).

The COVID-19 and the recent supply shortage crisis has brough to light some of these considerations, especially around digitalization and supply chain management.

But this need of adaptation is even going to increase in the next years. Players which does not adapt to new paradigms are in risk of losing market share or even disappearing.

Our report shows that leading construction companies in Spain are already undergoing a deep transformation of their operations and business models around 4 key innovation areas:

- Sustainability and circular economy
- Operations efficiency
- New construction solutions
- Robust organizations

This is particularly relevant since construction and infrastructure companies are expected to play a key role in the recovery of the economy and society in Spain, not only because of the execution of works, but also, for the direct and indirect benefits they produce for the Public Administration.

However, there are still challenges ahead and close Public-Private collaboration will be key for the transformation of the industry.

Next Generation EU recovery funds, expected to arrive from 2022 onwards, are a historical opportunity to drive structural change to Spanish industrial infrastructure, and to boost modernization and competitiveness of the construction sector.

Cover photo: JaCZhou/iStock

WE WELCOME YOUR QUESTIONS, COMMENTS AND SUGGESTIONS

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