



European Construction Sector Observatory

# Digitalisation in the construction sector

Analytical Report

April 2021

# Executive Summary

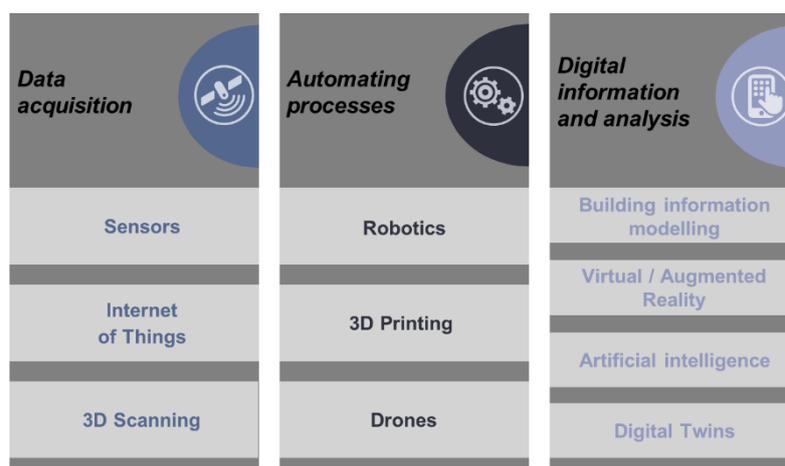
**This Analytical Report is part of the European Construction Sector Observatory (ECSO) project. It aims to describe the state of play of digitalisation in the EU construction sector and identify some of its main drivers and challenges. In doing so, the report provides information, evidence and lessons learnt aiming to support a wide range of stakeholders, including policymakers, who wish to support the integration of digital technologies in the construction sector.**

Though transforming, the construction sector is one of the least digitalised sectors in the economy. At the same time, the integration of digital technologies is often viewed as a key element to tackle some of the main challenges it is faced with, such as labour shortage, competitiveness, resource and energy efficiency, and productivity.

## State of play of digitalisation in the construction sector

**This Report presents the state of play of the most relevant digital technologies in the construction sector.** Very different levels of maturity and adoption were identified, both among EU Member States, among different technologies and even among different phases of the same construction process. Nonetheless, what has clearly emerged is that the EU construction sector is making progress in the uptake of digital technologies.

**The market analysis showed that among data acquisition technologies, sensors are the technology with the highest level of market maturity and technological readiness;** however, significant margins of improvement are present when it comes to their integration in existing buildings. 3D scanning is being increasingly used, while the Internet of things (IoT) is not yet widely adopted, although it is developing rapidly.



**Automating processes in the construction sector refer to the use of robots, 3D printing and drones to automate specific tasks in the construction sector.** These technologies differ significantly in terms of development. Drones are being increasingly used, notably through the development and improvement of the sensors that they are equipped with, while robots and 3D printing are still at the development phase and utilised only for very specific and limited tasks. The low market readiness of automating technologies reflects also the fact that the construction and maintenance phases of the value chain have more limited traction when it comes to digitalisation.

### *The EU construction sector is making progress in the uptake of digital technologies*

**Last, the effective use of digital data represents the future of the digitalisation of the construction sector.** In fact, data analysis is needed to give a meaning to all the data gathered and deliver tangible improvements and benefits. However, as the technologies and innovations in this category are deeply connected to the maturity of the data acquisition and automation technologies, their status varies significantly from one to the other. Building Information Modelling (BIM) is more and more utilised in the construction sector; however, it is often limited to the design phase of (large) projects. Virtual and Augmented reality and Artificial Intelligence are still at development stages and cannot yet be considered as market ready. Digital Twins are for the moment limited to a few pilot projects, but the majority of public and private stakeholders consulted agrees that they have high potential for the future.

## Digitalisation policies and initiatives in the EU

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### **There is strong interest among policymakers to support the digitalisation of the construction sector.**

In the majority of EU Member States – 16 out of 27 – there are in place policies covering or specifically targeting the digitalisation of the construction sector. Policy measures in support of digitalisation are often accompanied by financial support in the form of grants, loans or equity, but also by technical assistance, such as for digital construction platforms. Digital construction platforms are a successful example of public policy analysed. These platforms are virtual or physical spaces gathering private and public stakeholders to support the integration of digital technologies. While platforms do not always generate strong traction, they enable collaborations, synergies and knowledge sharing within the construction sector and between the public and the private sector.

### **Many national governments have in place BIM requirements in their public procurement processes.**

Feedback from both the industry and public sector actors consulted for this report indicates that this is particularly beneficial for fostering the digitalisation of the construction sector. However, in developing such requirements, public sector actors also need to i) build their BIM related capacities; ii) balance their focus between low price and high quality; iii) and make sure that all types of companies (small and large) can leverage on these opportunities to digitalise.

### **National and local governments also facilitate the uptake of digital technologies in the construction sector by providing e-services,**

such as by issuing building permits and keeping the repository of building data and geospatial information (cadastre). These provide crucial information and data and could facilitate the uptake of digital technologies. In this regard, an increasing number of EU Member States have adopted digital building permits systems, digital logbooks, and registries of properties. Their level of sophistication is evolving as well, with e.g. the inclusion of Geographic Information System (GIS) and 3D models for digital registry of properties. Overall, with the recent development at the EU level – in terms of policies, support measures, funding, etc. - it can be expected that national governments will be incentivised to do more to support to the digitalisation of their construction sector. This will be crucial for supporting the transformation of the sector and its growth, but also to reach climate and sustainability related objectives.

## Drivers and challenges of digitalisation in the construction sector

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### Drivers

**Both policy and market drivers play a key role in the digitalisation of the construction sector. The European Commission has put in place ambitious policies to support the uptake of digital technologies within the EU.** The Renovation Wave aims to at least double renovation rates across the EU in the next ten years; the Directive on the Energy Performance of Buildings also promotes smart technologies; and the European Green Deal dedicates a specific attention to the circularity of the construction sector. These policies are coupled with funding such as the Horizon Europe and Digital Europe programmes, the Recovery and Resilience Facility, and InvestEU.

*The Renovation Wave aims to at least double renovation rates across the EU in the next ten years*

**The main market drivers are companies' needs to improve productivity and cut costs, and market demand in the uptake of digital technologies,** which push construction tech companies to innovate.

### Challenges

**The analysis concluded that the cost of equipment and software, lack of skilled workforce, and lack of awareness and understanding of digital technologies are the three main factors hindering the faster and broader digitalisation of the European construction sector.** That being said, significant variations are present across MS, technologies, and actors. For instance, the cost of equipment was assessed as an important limiting factor for 3D printing and robotics, but a secondary issue for the adoption of sensors. On the other hand, the lack of skilled workforce particularly affects the adoption of Artificial Intelligence and Virtual and Augmented Reality, and limits the use of sensors only to a lesser extent.

## Conclusions and lessons learnt

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**There is a consensus that digitalisation is both inevitable and pivotal for the competitiveness and sustainability of the European construction sector.** Despite the lack of data relating to the level of digitalisation of the construction sector across the EU-27, a number of technologies are at a mature stage of development and have been adopted and mainstreamed by an increasing number of companies in the sector.

**Policy initiatives can have a strong impact in fostering the adoption of digital technologies.** Although this Report analysed digital technologies individually, it recognised the **high level of interconnection** among them. Hence, the maturity and adoption rate of an individual digital technology is partially linked to the development of other technologies, and this should be taken into consideration when developing public policies.

*Digitalisation is both inevitable and pivotal for the competitiveness and sustainability of the of the European construction sector*

As such, policymakers should adopt a holistic approach that takes into consideration the links and dependencies between different technologies, the national context and market structure for the sector. Stakeholders consulted for this study also confirmed the important role of EU-level measures pointing to the specific need for **three kinds of intervention: regulations, awareness raising campaigns, and financial support to construction companies.**

- 1** **An EU-level regulatory framework such as the one envisaged for the creation of the Single Market for Data was identified as of prime importance** for ensuring better data quality and data management, and for addressing challenges around intellectual property rights, cybersecurity, and data ownership.
- 2** **The EU can play a key role in raising awareness of digital technologies – especially to construction SMEs, which are often unaware and/or not convinced of their benefits.** SMEs need to be aware of financing opportunities, and the application process should also be tailored to their capacities and available resources.
- 3** **The EU should increase financial support to companies, and especially SMEs, to invest in digital technologies.** The new MFF places significant focus on the digital transformation. It includes Horizon Europe (budget of EUR 95.5 billion) and Digital Europe (EUR 7.5 billion) to support investments in digitalisation-related infrastructure, the deployment of digital technologies, and research and innovation.

**EU policy should ideally focus on the planning, design, construction and operation and maintenance phases of the sector in order to effectively support its digitalisation.** The other phases, i.e. renovation, demolition and recycling are less relevant entry points for most digital technologies and their digitalisation will come once the other construction phases are more digitalised. At the same time, in the long term it will be important for policy makers to ensure digitalisation of all phases in line with established circular construction policy objectives and their importance for renovation policy goals.

**Developing and implementing a policy intervention in the construction sector is a highly complex exercise, that needs to be thought in a holistic manner – not only from a sectoral, but rather from a systemic perspective (i.e. including horizontal policies).** In addition, if such an intervention ultimately aims to have an impact on the sector and its actors, it is key to identify where the interests of the private and public sector best align. An EU policy intervention could thus start by supporting the digitalisation of the first phases (i.e. the design and construction phases) of the construction value chains, where the private sector demonstrates most interest for digital technologies. Importantly, any policy interventions developed should be flexible to reflect the dynamics observed in the development and interest in different technologies, whose relevance can shift quickly. Last, it is important to note that any EU policy intervention should be evidence-based and backed by sufficient data (qualitative and quantitative) on the digitalisation of the construction sector. This report is a first move towards that direction, and future studies can build on it to delve into specific issues and topics.

*The private sector demonstrates interest for EU policy intervention in the initial phases of the value chain*