Digital Transformation in the Construction Industry:
Shaping the Future

January 2025

Introduction 01

Infrastructure plays a critical role in shaping economies and improving the quality of life across nations. As cities grow and the demand for infrastructure increases, the construction industry faces challenges in maintaining quality, managing costs, and ensuring sustainability. In this rapidly evolving landscape, the adoption of digital technologies has become a key driver for improving efficiency, reducing risks, and fostering sustainable development. The growth in the global infrastructure market directly influences the construction industry as the demand for new and upgraded infrastructure projects drives increased investment and development in the construction sector.

This article explores the global construction industry's current scenario, the role of digital transformation, and the barriers and opportunities to embracing digital solutions.
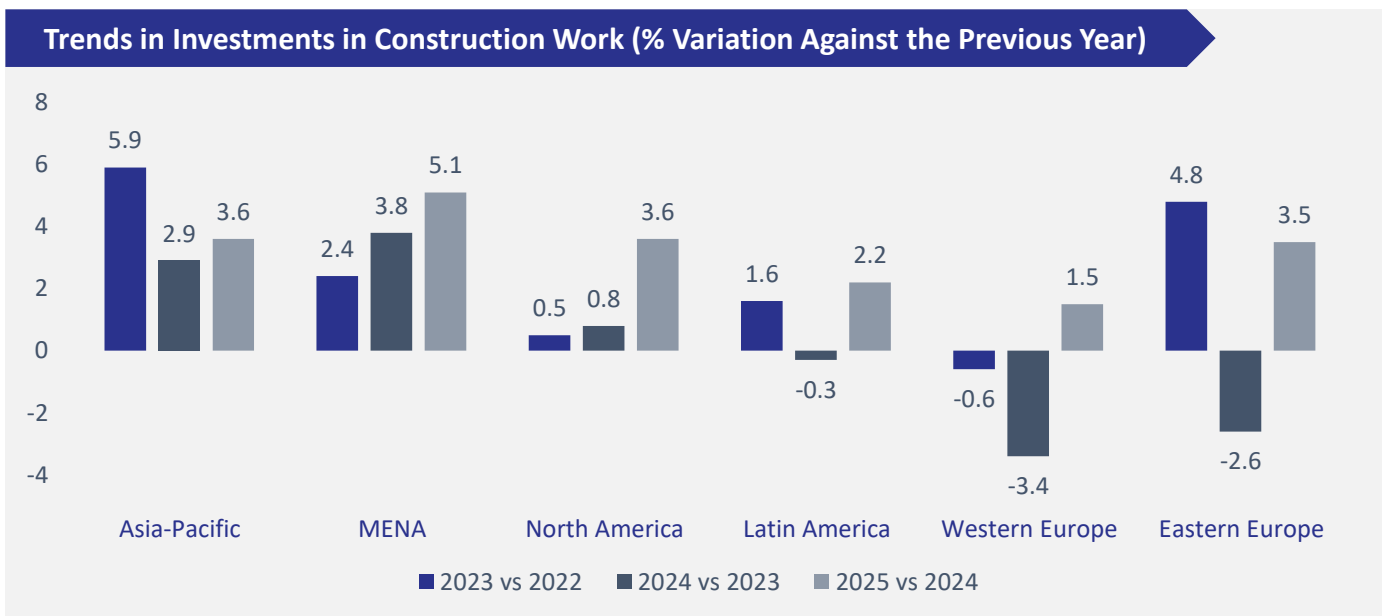
Current Scenario 02

2.1. Overview of the Global Construction Market

The global construction market is estimated to be USD 16.15 trillion in 2024, which is expected to reach USD 17.04 trillion in 2025, reflecting a 5.5% compound annual growth rate (CAGR).[1]

Looking ahead to 2025, the global construction market's economic landscape is expected to improve significantly, with an average annual investment growth projected at 3.3%, driven by a stronger 4% growth rate in emerging markets compared to 2.3% in developed regions, highlighting the ongoing infrastructure demands in developing economies and the focus on modernization and sustainability in more developed nations.[2]

Emerging markets, particularly in Asia-Pacific, are leading this growth, while advanced economies are experiencing slower recovery rates due to various economic pressures.

Trends in Investments in Construction Work (% Variation Against the Previous Year)

Region	Asia-Pacific	MENA	North America	Latin America	Western Europe	Eastern Europe
2023 vs 2022	5.9	2.4	0.5	1.6	-0.6	4.8
2024 vs 2023	2.9	3.8	0.8	-0.3	-3.4	-2.6
2025 vs 2024	3.6	5.1	3.6	2.2	1.5	3.5

Region	Market Value	Growth Rate
Asia-Pacific	Largest Globally	High Growth
North-America	Second Largest	Moderate Growth
Europe	Third Largest	Slow Recovery

https://www.thebusinessresearchcompany.com/report/construction-global-market-report[1]
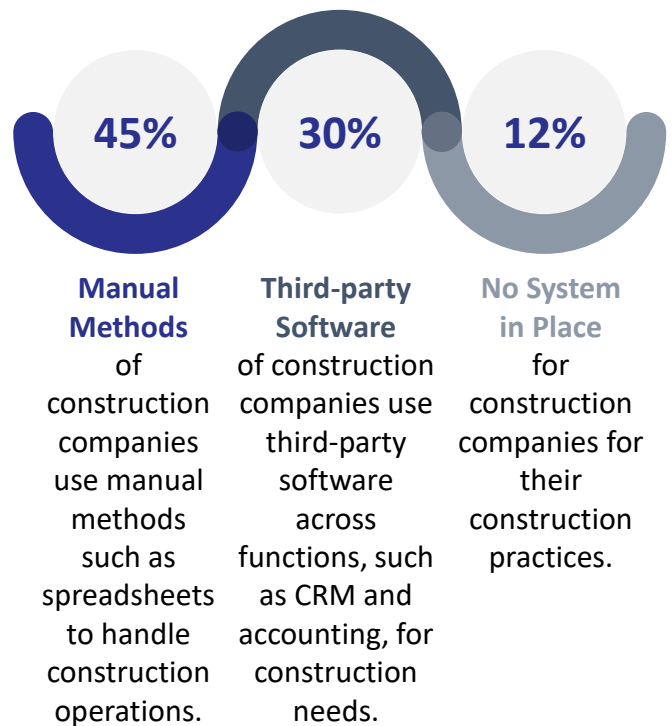https://www.mapei.com/it/en/realta-mapei/detail/infrastructures-driver-for-global-construction[2]

2.2. Current Digital Adoption Trends for Construction Assets

The construction industry has been slower to adopt technology, spending under 1% of revenue on IT historically, which is a third less than the averages seen in the automotive and aerospace industries.

The construction industry is experiencing a rapid acceleration in the adoption of software. The entrance of cutting-edge technologies such as artificial intelligence (AI), Building Information Modeling (BIM), Geographic Information Systems (GIS), and the Internet of Things (IoT) has caught the attention of construction companies to meet profitability, efficiency, and sustainability goals. Technology integration transforms how projects are planned, designed, and managed for better visualization, faster decision-making, and enhanced collaboration among project stakeholders.
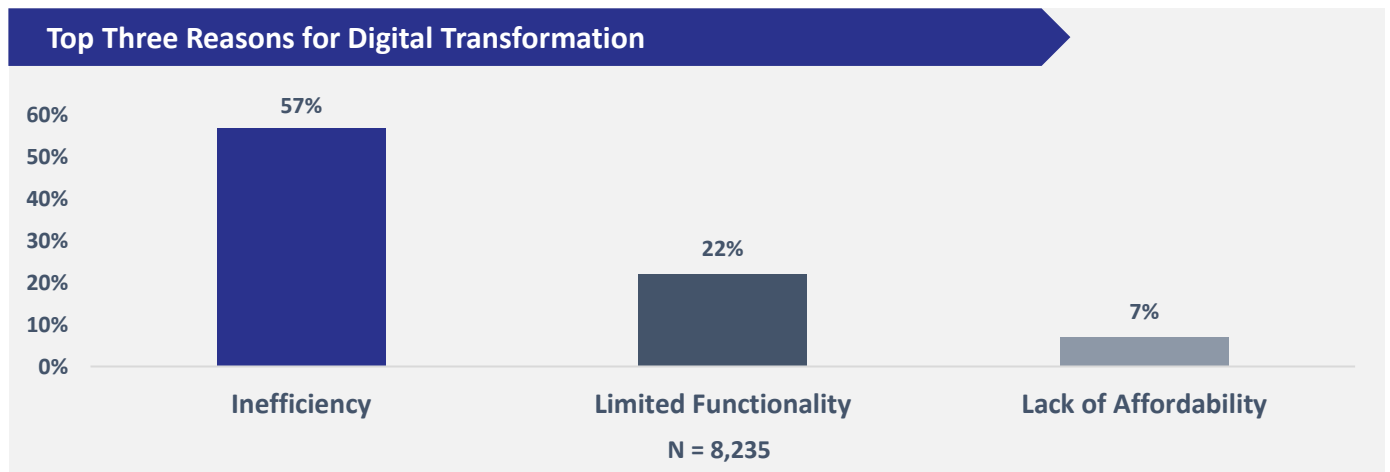
Additionally, smart infrastructure solutions such as advanced project management software and digitized workflows for monitoring the health of buildings, roads, bridges, etc. are increasingly being integrated to ensure proactive maintenance and improve asset lifecycle management.

Construction Companies' Current Methods to Handle Construction Operations

45%

Manual Methods
of construction companies use manual methods such as spreadsheets to handle construction operations.

30%

Third-party Software
of construction companies use third-party software across functions, such as CRM and accounting, for construction needs.

12%

No System in Place
for construction companies for their construction practices.

N = 7,580

The construction industry has historically been slower than other sectors in adopting digital technologies, but the urgency for digital transformation is increasing. Construction companies are transitioning to innovative digital platforms driven by inefficiency, limited functionality, and cost concerns. Manual processes and third-party solutions are resource-intensive, prone to errors, and costly. They cause delays and miscommunication and divert management's focus from strategic decision-making to administrative tasks. These tools often lack integrated features such as real-time data tracking and centralized documentation, which hampers accuracy and effective project management. While the initial investment in construction software may be higher, it can mitigate hidden long-term costs associated with inaccurate cost estimates, resource mismanagement, and the need for multiple third-party tools, ultimately delivering better value and operational efficiency.
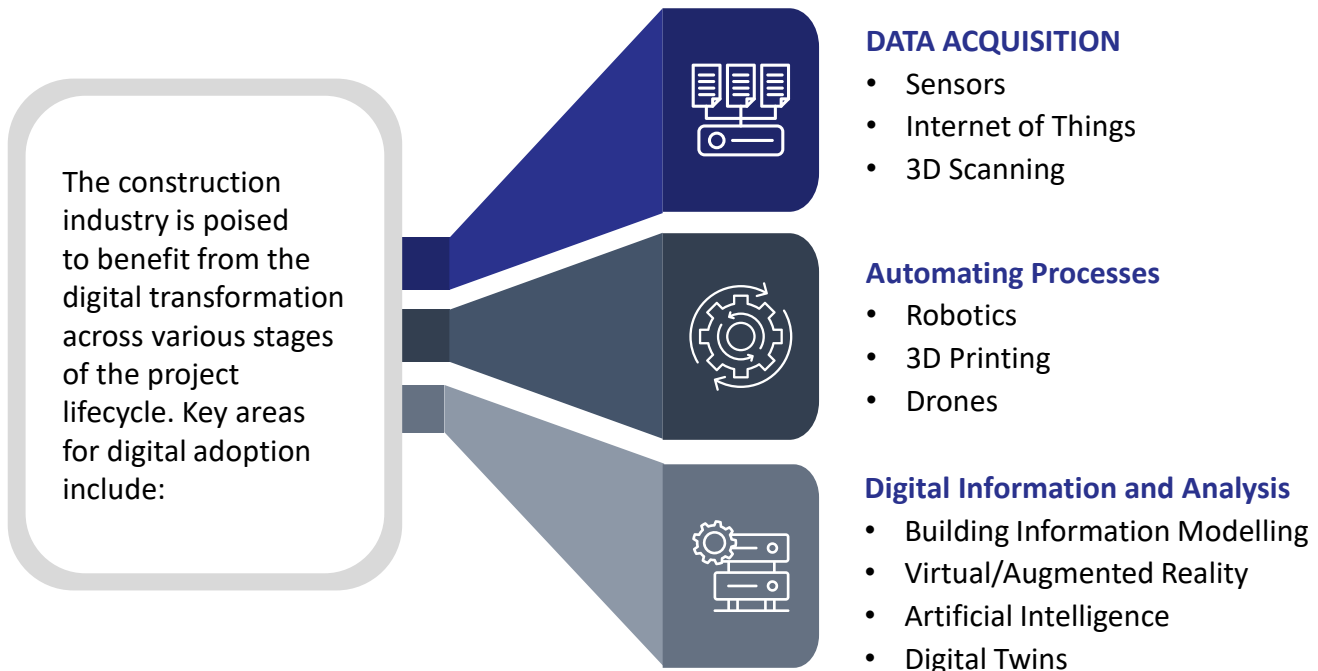
Top Three Reasons for Digital Transformation

Reason	Percentage
Inefficiency	57%
Limited Functionality	22%
Lack of Affordability	7%

N = 8,235

https://www.rics.org/content/dam/ricsglobal/documents/research/Digitalisation-in-construction-report-2024.pdf
https://www.gartner.com/en/digital-markets/insights/stand-out-in-your-category-with-construction-buyer-insights
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Embracing Digital Transformation 03

3.1. Areas of Digital Adoption

The construction industry is poised to benefit from the digital transformation across various stages of the project lifecycle. Key areas for digital adoption include:

DATA ACQUISITION
- Sensors
- Internet of Things
- 3D Scanning

Automating Processes
- Robotics
- 3D Printing
- Drones

Digital Information and Analysis
- Building Information Modelling
- Virtual/Augmented Reality
- Artificial Intelligence
- Digital Twins

3.2. Key Digital Initiatives

Several key digital initiatives are making waves in the global construction sector

Smart Cities

Governments worldwide are investing in smart city projects that leverage IoT, big data, and AI to enhance urban living. These projects include intelligent transportation systems, energy-efficient buildings, and connected infrastructure.

Sustainable Infrastructure

Green building technologies, such as energy-efficient designs and renewable materials, are becoming more widespread. Digital tools such as energy simulation software help architects and engineers design structures that are cost-effective and environmentally friendly.

Digital Twins

The use of digital twins' virtual replicas of physical assets allows construction professionals to monitor infrastructure performance in real time. This technology has gained traction in industries such as transportation, utilities, and industrial facilities.

Use Cases Where Advanced Technologies are Used

The St. Louis Art Museum: Implementing Building Information Modelling (BIM) allowed design teams to visualize the project from the outset, enhancing planning processes and enabling the identification of potential issues before they escalate into costly problems. The St. Louis Art Museum leveraged BIM during the design phase to identify potential conflicts, resulting in an estimated savings of USD 10 million in construction costs.

The Sutter Medical Center: The adoption of BIM fostered collaboration and communication among stakeholders, ensuring alignment and resulting in cost savings by minimizing delays and miscommunication. The Sutter Medical Center in California utilized BIM to manage the installation of MEP systems, leading to a 40% reduction in field-generated change orders and saving USD 9 million.

https://www.rics.org/content/dam/ricsglobal/documents/research/Digitalisation-in-construction-report-2024.pdf
https://www.howardhughes.com/wp-content/uploads/2024/04/7-Deloitte-Insights-2024-engineering-and-construction-industry-outlook.pdf
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3.3. Digitalization for Sustainable Construction Development

Sustainability is a key focus in the construction industry, and digital technologies play a significant role in achieving sustainable outcomes. By incorporating digital tools in the design, construction, and maintenance phases, the industry can reduce waste, optimize energy consumption, and make more informed decisions about resource usage. Additionally, the ability to simulate and test designs virtually helps minimize material wastage and energy inefficiency before physical construction begins. For instance, the Robertson Group deployed SmartWaste to automate waste data capture across its construction sites, streamlining the tracking of waste types and volumes, improving resource management, ensuring better compliance with environmental regulations, and ultimately enhancing reporting capabilities while reducing overall waste generated on projects.

Barriers in Digital Adoption 04

Barrier	Description	Impact
Cybersecurity Risks	The industry's reliance on connected devices, cloud storage, and real-time data sharing makes it vulnerable to data breaches, system disruptions, and malicious attacks.	Organizations must implement robust cybersecurity measures to comply with regulations and safeguard project data, which can be complex and resource-intensive.
Shortage of Skilled Labour	Many industry professionals lack the knowledge or expertise to use advanced digital tools effectively. Upskilling and reskilling the workforce is crucial for ensuring the successful implementation of digital technologies.	Lack of digital skills hampers the effective implementation of new technologies, leading to inefficiencies and increased project costs.
High Investment Costs	Small and medium-sized enterprises (SMEs) may struggle to justify the upfront costs of adopting digital solutions despite the cost savings and increased productivity.	High upfront expenditures on software, training, and infrastructure can limit firms' ability to adapt to new technologies, impacting overall competitiveness.
Resistance to Change	Employees accustomed to traditional methods may resist adopting new technologies, hindering transformation efforts.	Cultural resistance can slow down the transition process, necessitating comprehensive training and change management strategies to facilitate smoother adoption.
Interoperability of Existing Systems	Integration with existing systems can be complex and regulatory hurdles may impede innovation efforts.	Lack of standardization and proprietary systems with vendor lock-ins create interoperability issues, leading to delays and increased operational risks.

Way Forward 05

The global construction market is poised at a pivotal moment in its evolution, demanding a strategic and unified approach to address the challenges of efficiency, cost, sustainability, and environmental responsibility. As digital technologies emerge as critical enablers of transformation, the construction sector stands to harness immense potential for innovation and growth. However, to fully capitalize on this opportunity, a multifaceted approach encompassing technological adoption, workforce development, and collaborative governance will be necessary. The way forward must integrate these key areas to ensure that the construction industry meets future infrastructure demands, fostering long-term resilience and sustainability.

https://www.autodesk.com/blogs/construction/digital-skills-gap/
https://builtoffsite.com.au/news/state-of-digital-adoption-in-the-construction-industry-2024-challenges-and-opportunities-for-australia-identified/
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