Harnessing AI to Create Intelligent, Productive Operations

in the Construction & Engineering Industry

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Contents

Improving productivity, profitability and control.

The two biggest challenges facing the construction and engineering industry today are **how to improve productivity** and **increase project margins.**

If we are to attack these challenges head-on, then there is a need for the industry to change the way it works and manages data. Industrial AI plays a major role in achieving both goals, with the primary objective being to gain better control of the business.

Can AI solve our business needs and challenges today, or is it just hype? The answer is a resounding yes. AI can be leveraged to overcome safety concerns, ensure environmental impact compliance, tap the right skilled workers, and reduce project cost and delivery overruns.

This eBook will provide helpful insights into embarking on a business value-focused digital transformation journey towards adopting AI. It will explore **practical AI applications in construction and engineering operations**, and explain the tangible benefits including improved efficiency and increased accuracy of budgeting and finances. It also explores the role of Industrial AI in a construction company's digital strategy and shares best practices for creating trusted, consistent, and centralized data as the foundation for embracing innovation.

AI Adoption in Construction and Engineering

Artificial Intelligence (AI) promises to revolutionize the way your organization can plan, operate, execute, and optimize business. Across this sector, interest in AI capabilities is clear – and growing.

In a recent global survey of 825 construction and engineering business leaders commissioned by IFS, these adoption drivers and metrics for AI and digital transformation were uncovered.

39%

of leaders named AI, machine learning and virtual chatbots as the most-wanted technologies[1]

54%

of construction and engineering projects fail to meet their projected margin[1]

60%

of construction and engineering companies plan to adopt a new ERP solution as the foundation for technology adoption in the next 1 – 2 years[1]

63%

of organizations plan to use conversational AI for learning and over 50% planned to pilot cases during 2023.[4]

60% - 80%

reduction in cost and effort

due to the digitalization of engineering drawings and diagrams using Gen AI [2]

A new competitive landscape. An opportunity to transform with AI.

With fragile and ever-diminishing margins thanks to increased competition, technology adoption holds the key. As a precursor, to take full advantage of AI, the adoption of a **robust digital strategy that can deliver accurate, reliable data** is essential.

One of the two biggest missteps to achieving digital transformation KPIs is an inability to **operationalize data and technology** for **more effective decision-making** as well as **completion of projects on time and within budgets**[3].

On average, organizations are using nine software systems on a regular basis. Nearly 30% of companies use 13 or more systems regularly[1]. Accurate, integrated information is everything. With a single source of the truth enterprise-wide, such as data shared by ERP solutions like IFS Cloud, your organization can **move towards repeatable business processes**, comparing projects consistently to drive best practice and improved performance.

IFS Global Research Study Insight:

92% of capital projects do not meet their commitments, according to Accenture[5]. IFS research found that over 2 in 5 construction and engineering projects overrun their budgets and schedules.

Overcoming the skills gap, attracting the next generation.

The construction industry is facing a persistent skills gap that hinders its ability to adopt AI and automation.

80% of construction firms struggle to find qualified hourly craft workers, leading to higher costs and project delays.[5]

As the workforce ages, the sector encounters a growing skills shortage affecting both labor and equipment operators. To address this, companies need to enhance the productivity of their existing staff and streamline the training of new employees, with digital technology and AI offering potential solutions.

Offering modern technology that is designed for better UX/UI (user experience and user interface), goes a long way in attracting and retaining younger workers. In a generation that grew up with smartphones, the idea of regressing in terms of technology maturity prevents more skilled workers from entering the industry. Digital ERP platforms that offer user-friendly mobile apps also help accelerate the learning curve of new employees, improving their effectiveness and quality of work.

IFS Global Research Study Insight:

The #2 top long-term goal of construction and engineering businesses is “Attracting and training the next generation of skilled workers”

Defining Artificial Intelligence solutions

Consumer AI vs. Industrial AI

AI is a tool that mimics human cognitive functions such as pattern recognition, problem-solving, and learning. Industrial AI is increasingly vital for industries facing operational challenges, as it automates and optimizes processes. Unlike general consumer AI applications, Industrial AI is designed for precision, reliability, and mission-critical operations, transforming sectors like construction and engineering, where there's no room for error.

Consumer AI

Consumer AI is widely accessible and can address highly specific use cases.[3]

Language mastery across context, sentiment, emotion, grammar, syntax, etc.

AI autonomously generates actions or content.

IFS Cloud’s Embedded AI Use Cases

Forecasting & Simulation

Using historical data to find patterns and enable simulation of future project outcomes.

- Improve cost control & cash flow forecasting.
- Dynamically identify risks & opportunities.
- Intelligent project forecast adjustments.

Optimization

Take inputs such as goals, constraints, jobs, and resources to optimize outcomes.

- Improve cost control & cash flow forecasting.
- Dynamic work package scheduling.
- Constraint based resource allocation.

Anomaly Detection

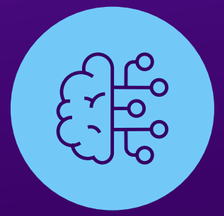
Automatically identify anomolies through thresholds, business logic and real-time data.

- Identify project exceptions.
- Identify and prevent data accuracy issues.
- Responsive & immediate risk mitigation.

Recommendation

Provide users with the insight they need and recommend corrective actions.

- Suggest monthly forecast exception actions.
- Guided data entry with recommendation.
- Project bid and no bid assistance.



Contextual Knowledge

Analyze large volumes of data to deliver to users in a simple way.

- Project performance insights.
- Explainable costs and intelligent drill down.
- Unstructured data knowledge retrieval.

Content Generation

Generate content throughout the project to support predictive budgeting and forecasting.

- Predictive budgeting and forecasting.
- Generate project lessons learnt.
- Auto-generate project performance reporting.

Industrial AI use cases: where to apply, and why?

AI adds tangible value where business processes are predictable and repetitive. Examples include operation, service and maintenance for assets and equipment; supply chain; HR processes; and administration for materials, purchases and expenses.

Many AI use cases are enabled within IFS Cloud, including:

Work Execution Scheduling and Optimization - Scheduling repair, maintenance and installation work is a complex and constantly-changing task. All the resources required must be synchronized, including labor, equipment, materials and subcontractors. Factors such as unpredictable travel times, traffic and weather conditions also play a role.

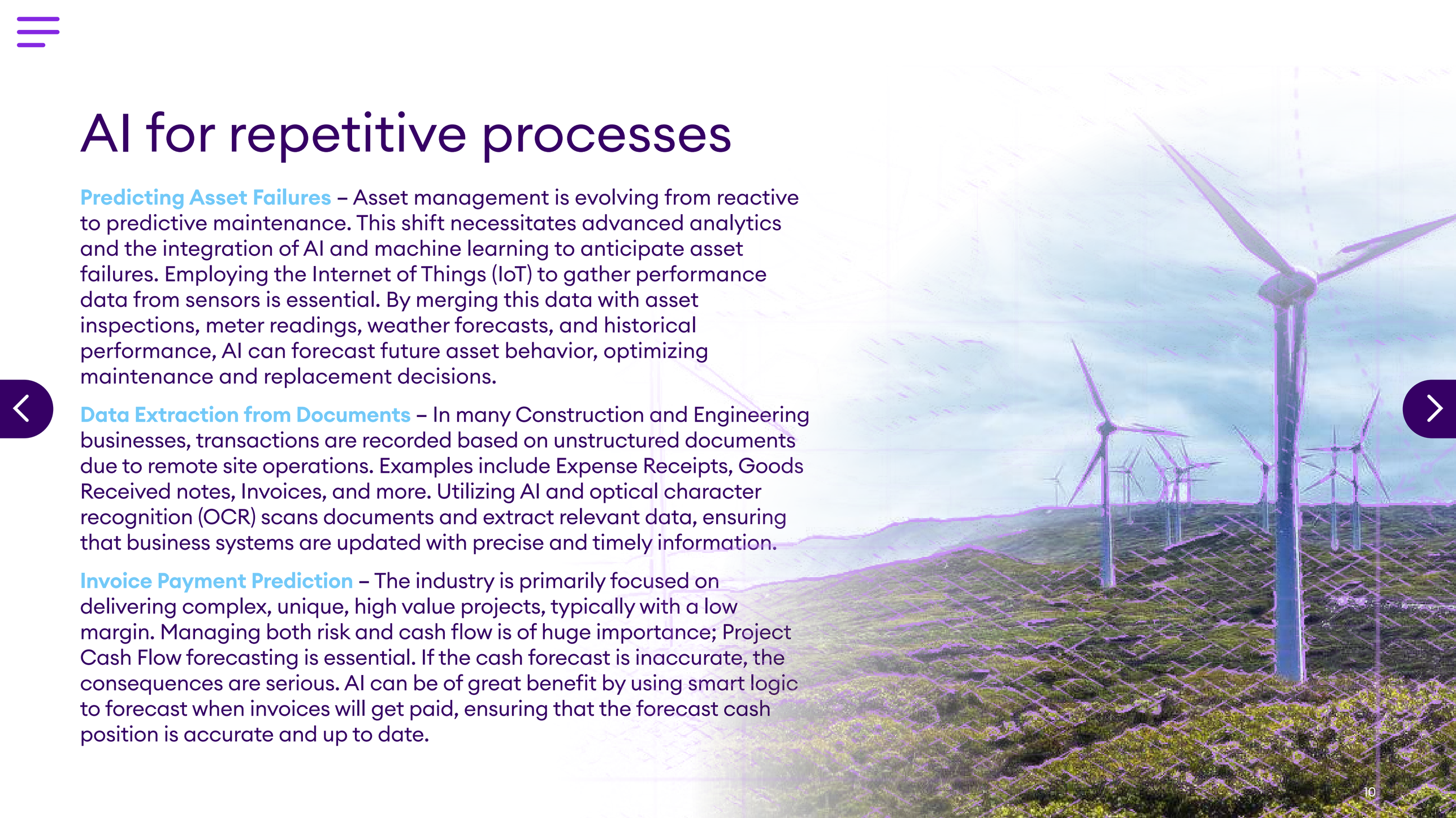
AI can model thousands of possible scenarios and optimize the schedule for the best result. Using IFS Planning and Scheduling Optimization, companies can achieve exceptional results, backed by a full audit trail explaining how and why decisions were made by the software.

AI for repetitive processes

Predicting Asset Failures – Asset management is evolving from reactive to predictive maintenance. This shift necessitates advanced analytics and the integration of AI and machine learning to anticipate asset failures. Employing the Internet of Things (IoT) to gather performance data from sensors is essential. By merging this data with asset inspections, meter readings, weather forecasts, and historical performance, AI can forecast future asset behavior, optimizing maintenance and replacement decisions.

Data Extraction from Documents – In many Construction and Engineering businesses, transactions are recorded based on unstructured documents due to remote site operations. Examples include Expense Receipts, Goods Received notes, Invoices, and more. Utilizing AI and optical character recognition (OCR) scans documents and extract relevant data, ensuring that business systems are updated with precise and timely information.

Invoice Payment Prediction – The industry is primarily focused on delivering complex, unique, high value projects, typically with a low margin. Managing both risk and cash flow is of huge importance; Project Cash Flow forecasting is essential. If the cash forecast is inaccurate, the consequences are serious. AI can be of great benefit by using smart logic to forecast when invoices will get paid, ensuring that the forecast cash position is accurate and up to date.



AI for: project-centric processes

Leveraging AI for project-centric processes is more challenging. Projects are always different in scope, and annual volumes in the sector are typically low. However, there are scenarios where AI could play a vital role. Two examples include **Project Financial Forecasting** and **Project Anomaly Detection**.

Project Financial Control is the most important process to ensure that budgeted project margins are realized. This is much more than accounting; it is being able to forecast where, financially, the project will stand on completion and taking corrective actions as soon as possible to mitigate risks.

Projects often span years, and change is the norm (variations in scope, design, prices, people, suppliers, weather, taxation, legislation etc. are constant). In most companies, Excel spreadsheets are still the main software tools used to manage project forecasting. **This is a high-risk approach: data is generally inaccurate, takes too long to produce and is open to user manipulation**. This means management cannot have confidence in project forecasts and are running their business blindfolded.

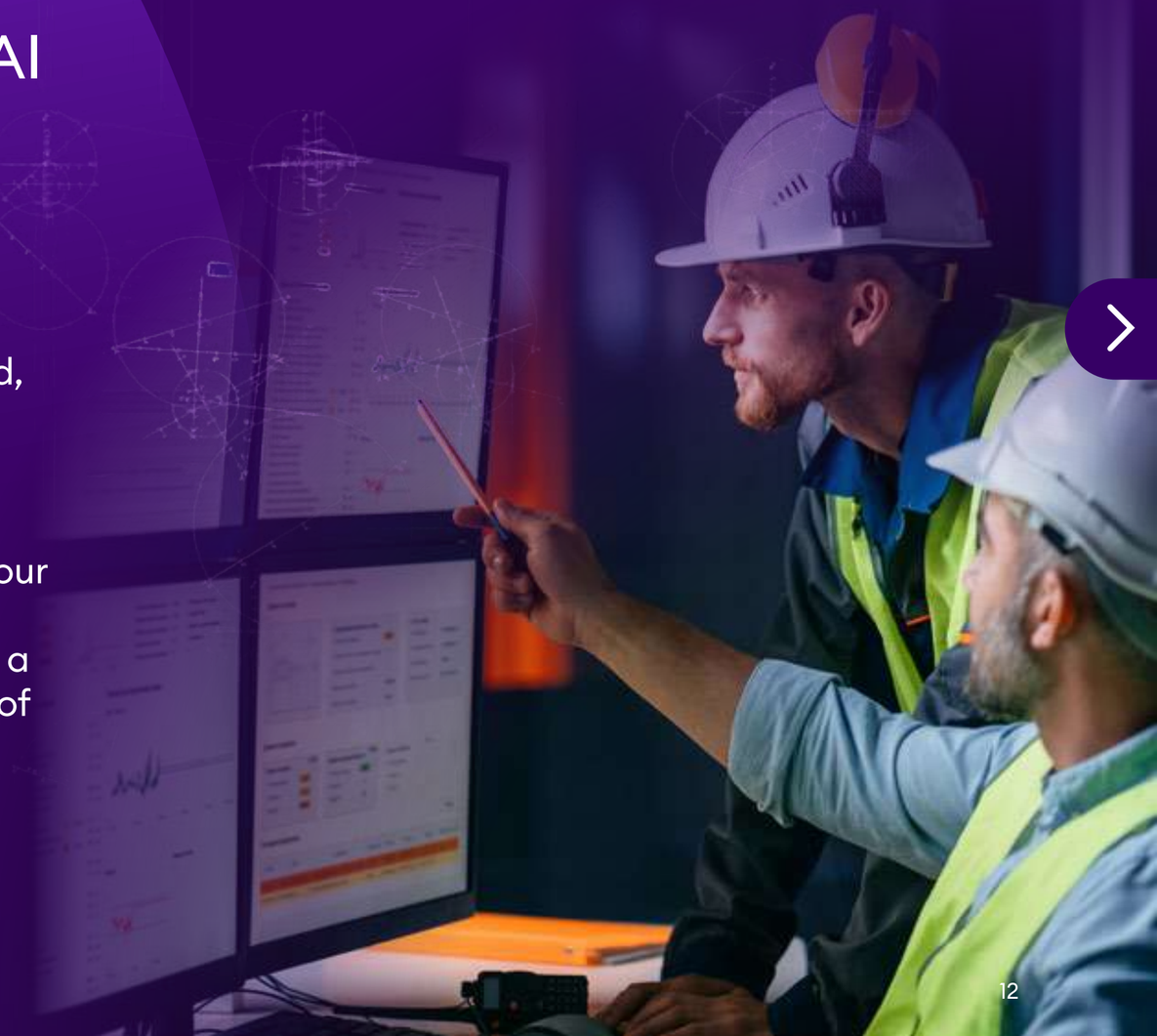
AI adoption: a critical foundation for business transformation

Start your journey to harnessing Industrial AI with IFS today. Visit **IFS.com/ai**

The rapid advancement of **Artificial Intelligence** offers new potential to further **drive value and efficiencies** across the **project lifecycle**.

When you're preparing your organization for success in 2025 and beyond, how can you craft initiatives that move the needle in terms of digital transformation and profitable, sustainable business growth?

IFS provides you with expert guidance and advice on how to use AI and automation technology to improve your projects. You can benefit from our tested IFS.ai applications and embedded innovations without having to hire technical teams or conduct costly proof-of-concepts. IFS Cloud has a dedicated R&D team that explores and evaluates AI use cases for each of our focus industries, saving you time and money.



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1 “Construction and Engineering Global Research Study”. Commissioned by IFS, conducted by Censuswide Research, 2024.

2 “BUILDING MORE VALUE WITH CAPITAL PROJECTS”. Accenture, 2020.

3 “Capital Projects & Generative AI. HOW TO DRIVE HIGHER RETURNS THROUGH DATA-DRIVEN DIGITIZATION” Accenture, November, 2024.

4 “CXO Pulse Survey”, conducted by Accenture Research, February 2023.

5. “EIGHTY PERCENT OF CONTRACTORS REPORT DIFFICULTY FINDING QUALIFIED CRAFT WORKERS TO HIRE AS ASSOCIATION CALLS FOR MEASURES TO REBUILD WORKFORCE.” Associated General Contractors of America (AGC) and Autodesk, August 2018.

About IFS

Visit IFS.com

IFS develops and delivers cloud enterprise software for companies around the world who manufacture and distribute goods, build, and maintain assets, and manage service-focused operations. Within our single platform, our industry specific products are innately connected to a single data model and use embedded digital innovation so that our customers can be their best when it really matters to their customers - at the Moment of Service.

The industry expertise of our people and of our growing ecosystem, together with a commitment to deliver value at every single step, has made IFS a recognized leader and the most recommended supplier in our sector. Our team of over 6,000 employees every day live our values of agility, trustworthiness, and collaboration in how we support our 6,500+ customers. Learn more about how our enterprise software solutions can help your business today at **ifs.com**.

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