

# Exploring the Future of Industrial Asset Management



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AI or Real?



AI or Real?









other side  
of the story

# AI Generated

Is this photo of the arrest of former President Donald Trump, which got 6.4 million views, real, or has it been made by artificial intelligence?

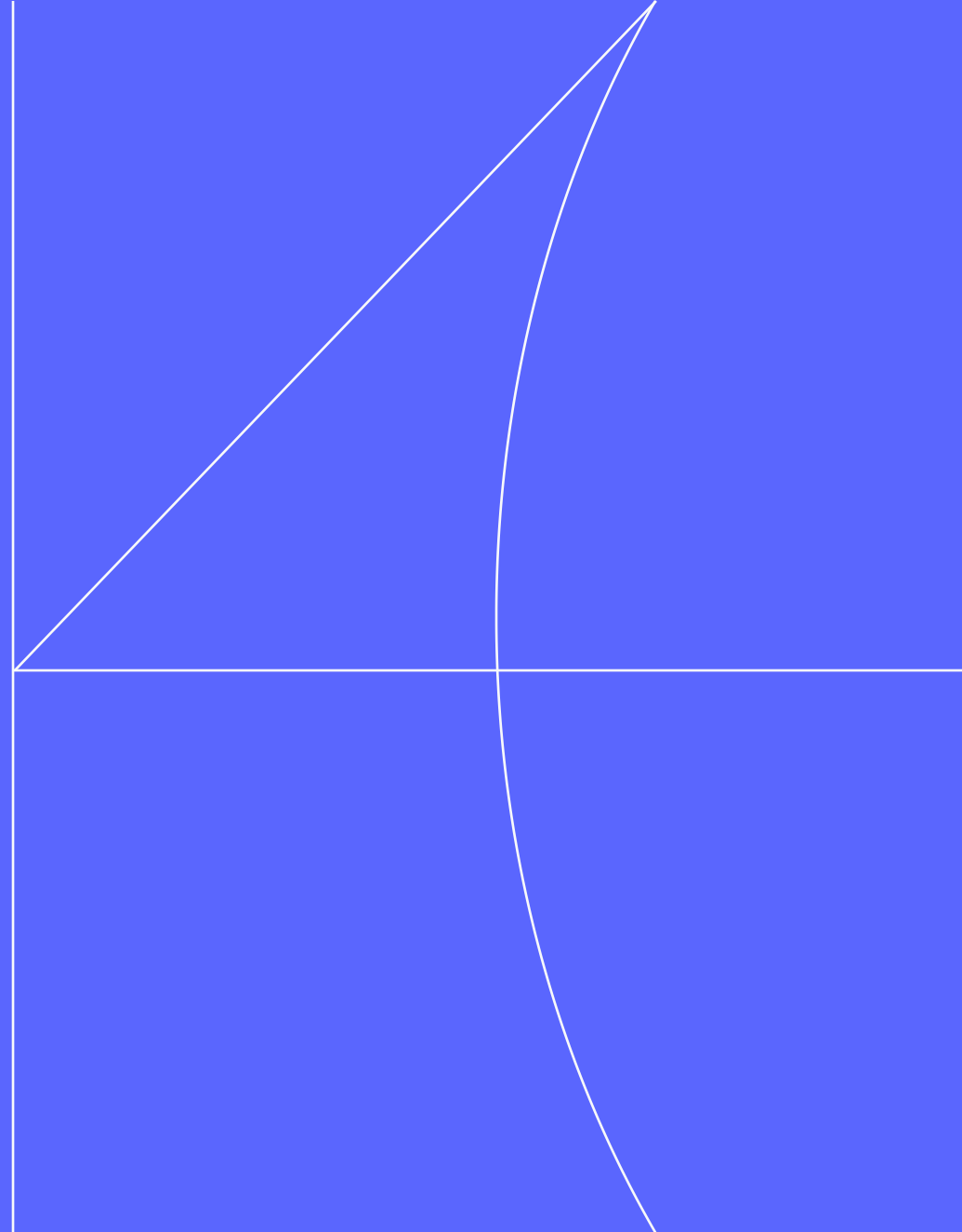


# AI or Real?



# Agenda :

- 1 **3 Megatrends Impacting Industry**
- 2 State of the Industrial Asset Performance & Maintenance Market
- 3 Future outlook and innovation



## Google/Alphabet, February

An important next step on our AI journey

## Salesforce Research, March

BLIP-2: Scalable Pre-training of Multimodal Foundation Models for the World's First Open-source Multimodal Chatbot

## Google DeepMind, May

Introducing PaLM 2

## Meta AI, July

Introducing Llama 2

## The Verge, August

Google, Amazon, Nvidia, and others put \$235 million into Hugging Face / AI model repository Hugging Face is now worth \$4.5 billion.

## EU Commission, December

Artificial Intelligence Act: deal on comprehensive rules for trustworthy AI

## Google DeepMind, December

Introducing Gemini: our largest and most capable AI model

## Microsoft Research, March

Sparks of Artificial General Intelligence: Early experiments with GPT-4

## Bloomberg, March

Introducing BloombergGPT, Bloomberg's 50-billion parameter large language model, purpose-built from scratch for finance

## BCG, May

Intel and BCG Announce Collaboration to Deliver Enterprise-Grade, Secure Generative AI

## Dubai TII, September

Spread Your Wings: Falcon 180B is here

## Mistral AI, September

Mistral 7B

## CMU, Princeton, December

Mamba: Linear-Time Sequence Modeling with Selective State Spaces

## Bloomberg, January

Microsoft Invests \$10 Billion in ChatGPT Maker OpenAI

## Future of Life Institute, March

Pause Giant AI Experiments: An Open Letter

## AWS, April

Announcing New Tools for Building with Generative AI on AWS

## KPMG, May

KPMG LLP and Microsoft Establish Industry-Leading Initiative to Scale Generative AI Across Audit, Tax and Advisory

## EY, September

EY announces launch of artificial intelligence platform EY.ai following US\$1.4b investment

## IBM, December

AI Alliance Launches as an International Community of Leading Technology Developers, Researchers, and Adopters Collaborating Together to Advance Open, Safe, Responsible AI

## Mistral AI, December 2023

Mixtral of experts

## Significant-Gravitas, April

Auto-GPT: An Autonomous GPT-4 Experiment

## Accenture, June

Accenture to Invest \$3 Billion in AI to Accelerate Clients' Reinvention

## C3 AI, September

First Domain-Specific Generative AI Solutions for Industries, Business Processes, and Enterprise Systems

## UK Government, November 2023

Nations and AI experts convene for day one of first global AI Safety Summit

## Meta AI, February

Introducing LLaMA: A foundational, 65-billion-parameter large language model

## New York Times, March

Why Pope Francis Is the Star of A.I.-Generated Photos

## Palantir, April

Bending Artificial Intelligence to Our Collective Will

## Apple, June

Deploying Transformers on the Apple Neural Engine

## xAI, November

The journey to Grok-1

## OpenAI, November

GPT-4 Turbo with 128K context and lower prices, the new Assistants API, GPT-4 Turbo with Vision, DALL-E 3 API, and more.

Mamba: Linear-Time Sequence Modeling with Selective State Spaces

## New York Times, December 2023

Mistral, French A.I. Start-Up, Is Valued at \$2 Billion in Funding Round





# Ten Ways In Which AI Will Enable Sustainable Manufacturing

1



ESG reporting.  
AI-driven tools can help firms accurately report on their ESG KPIs.

2



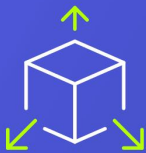
Scope 1, 2 and 3 emissions tracking and mitigation.  
AI helps with data streamlining, as well as with spotting anomalies for proactive emissions mitigation strategies.

3



Smart resource management.  
AI solutions are reshaping how manufacturers manage resources, particularly energy.

4



Quality and yield optimization.  
When fed with the correct quantity and quality of data, AI can deliver production, yield and quality optimization.

5



Predictive maintenance.  
Predictive maintenance solutions catch machine failures before they occur, minimizing downtime.

8

Sustainable product design.  
Generative design leverages AI to create optimal product blueprints, advancing sustainable product design.

9



Computer vision for quality, inspection and leak detection.  
AI allows for the exploitation of visual data, which is critical for the mitigation of time-sensitive issues such as leaks.



6

Inventory management for sustainable supply chain.  
With recent global events exacerbating supply chain issues, firms can use the forecasting capabilities of AI to optimize inventory.

7



Supply chain optimization.  
Verdantix forecasts spend on AI analytics for supply chain optimization to grow from \$172 million in 2023 to \$533 million in 2028.

10



Enhanced worker safety and productivity.  
Digitization, and opportunities offered by advanced analytics, are proving effective in enhancing worker safety.



Source: Market Insight: 10 Applications Of AI For Sustainable Manufacturing



## 1. This year set to be hottest ever recorded, say scientists

With average annual temperatures threatening the Paris Agreement's 1.5°C climate target, [2023 looks almost certain to become the hottest year on record, scientists say.](#)

Global average temperatures for January-October were the highest since records began.

## COP28: UN climate talks go big on ending fossil fuels

© 2 December 2023

## Climate change indicators reached record levels in 2023: WMO

## SEC adopts climate-related disclosure rules

Publication date: 07 Mar 2024

## Global health community calls for urgent action on climate and health at COP28

27 November 2023 | News release | Geneva | Reading time: 4 min (1113 words)

## COP28: Fifty oil and gas companies sign net zero, methane pledges

More than 500 companies have set net-zero targets through the SBTi's Corporate Net-Zero Standard.

## IEA supports faster industrial decarbonisation through new Climate Club

## Biden-Harris Administration Announces \$6 Billion to Transform America's Industrial Sector, Strengthen Domestic Manufacturing, and Slash Planet-warming Emissions

Department of Energy

MARCH 25, 2024

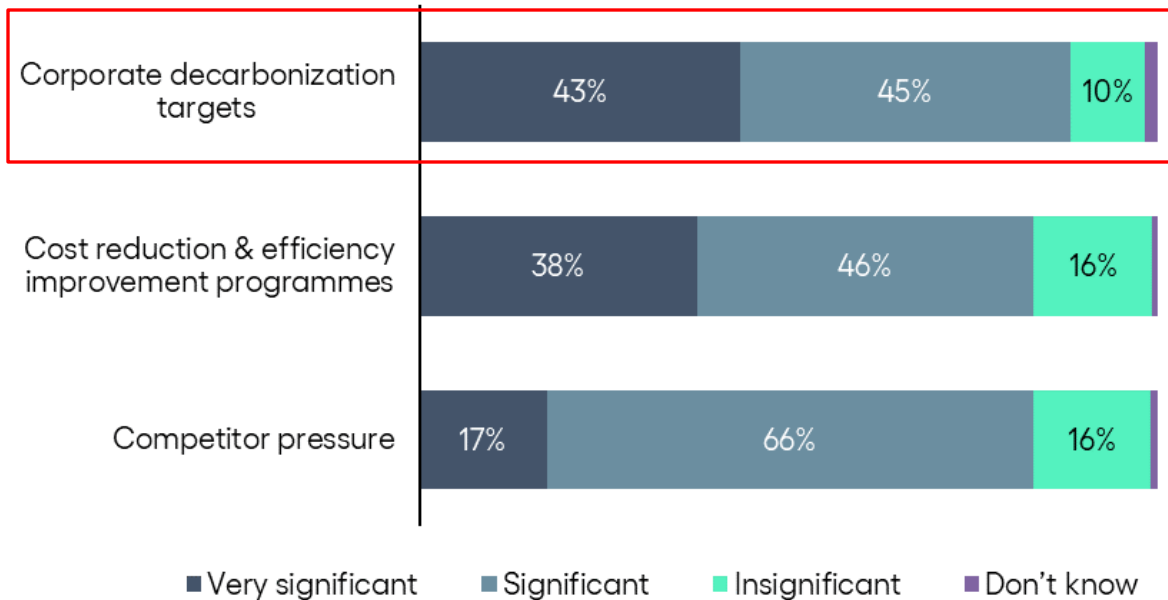
## Government Pressure Mounts for Industrial Decarbonization

By [Felicity Bradstock](#) - Nov 17, 2023, 6:00 PM CST

World added 50% more renewable capacity in 2023 than in 2022 and next 5 years will see fastest growth yet, but lack of financing for emerging and developing countries is key issue

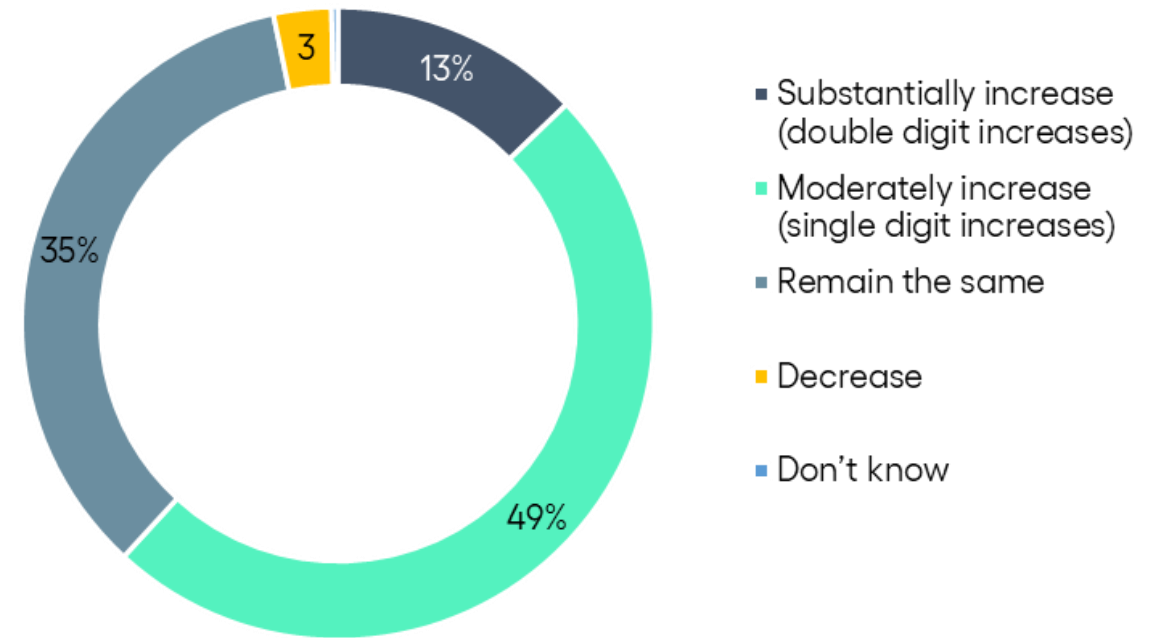
## Digital Transformation Drivers

How significant are the following factors in driving the digital transformation of your plant operations?



## Spend On Decarbonisation

How is your firm's spend on decarbonisation of plant operations expected to change in the next 12 months? ?





Industrial workforce presents a mixed bag of challenges and opportunities

1.4 million manufacturing jobs lost during COVID-19, leading to skill loss

2.1 million unfilled manufacturing jobs by 2030

Over 51% of manufacturing jobs are currently held by people between the ages of 45 to 65+ in the US

600,000+ unfilled manufacturing jobs across the US in 2024

Only two states have greatest interest in jobs than available roles

New gen workforce demanding greater flexibility, digitally-enabled environment & career progression

# Agenda :

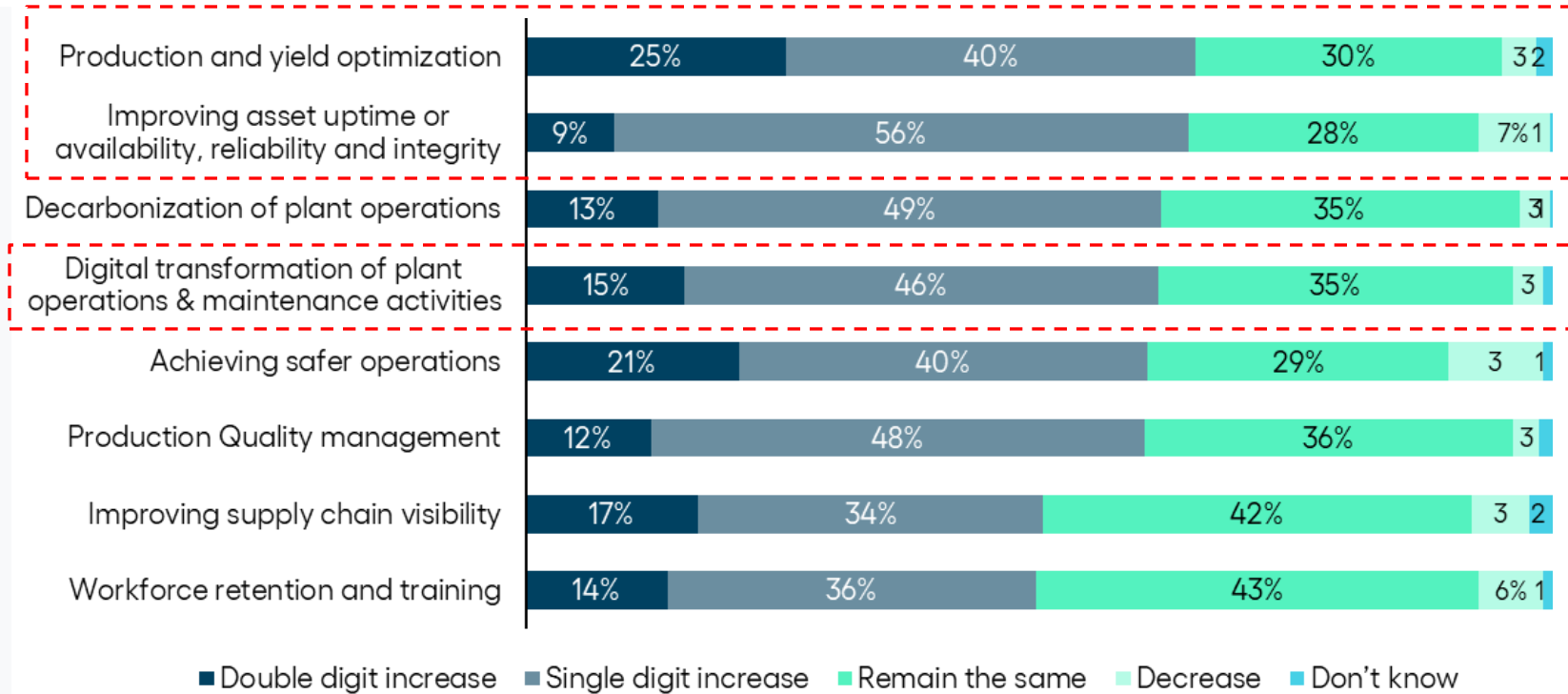
- 1 3 Megatrends Impacting Industry
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# Improving plant efficiency and performance using digital tools attracts spend

**How is your firm's spend on the following operational excellence initiatives expected to change in the next 12 months?**

Source: Verdantix Global Corporate Survey 2023: Operational Excellence Budgets, Priorities & Tech Preferences

N = 304





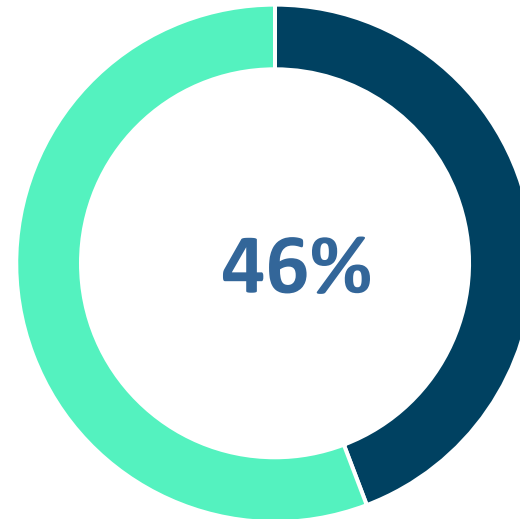
## Uptake of asset management solutions is strong

### What are your plans to invest in software for the following activities in the next 12 months??

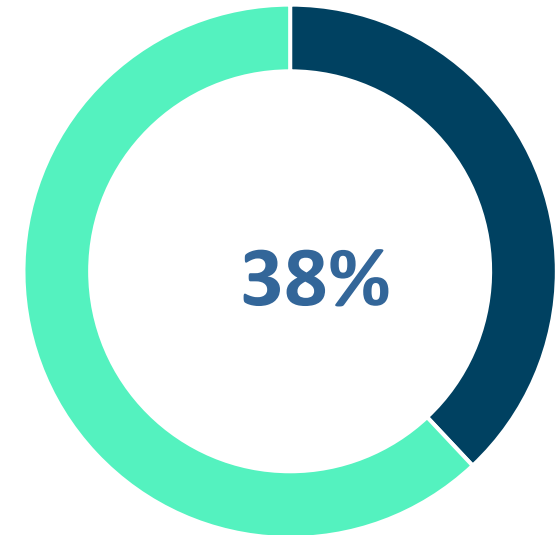
[% of respondents answering 'Have software, plan to invest further' & 'plan to invest for the first time']

Source: Verdantix Global Corporate Survey 2023: Operational Excellence Budgets, Priorities & Tech Preferences

N = 304



Asset maintenance planning, scheduling and work order management

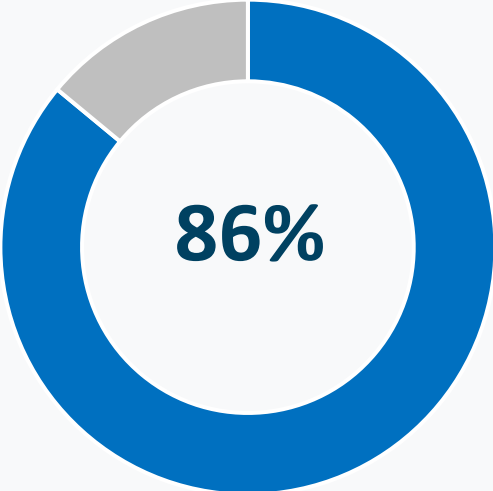


Asset condition monitoring

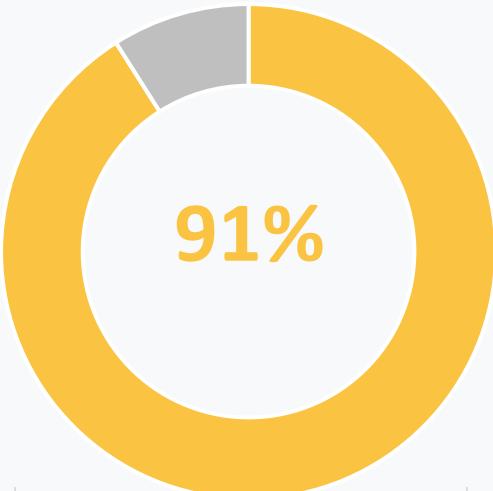
# Investment in industrial asset management software is led by cost reduction and high energy prices

How important will the following factors be in causing your firm to invest in software for industrial asset management over the next 2 years?

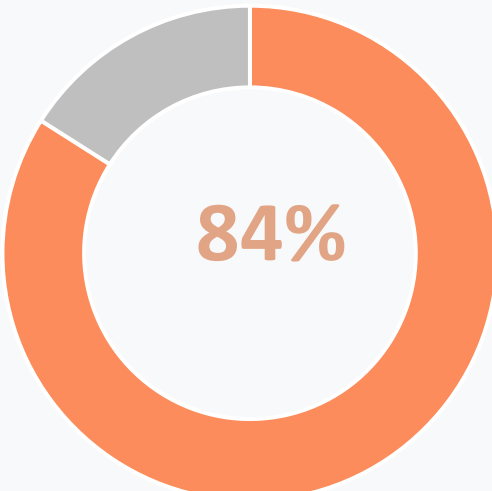
[% of respondents answering 'very important' or 'important']



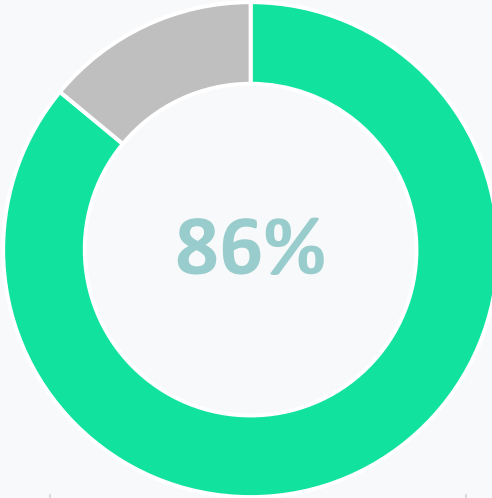
Reducing maintenance-related costs



Availability of new digital technology



Minimizing unplanned downtime



Tracking & reducing energy consumption

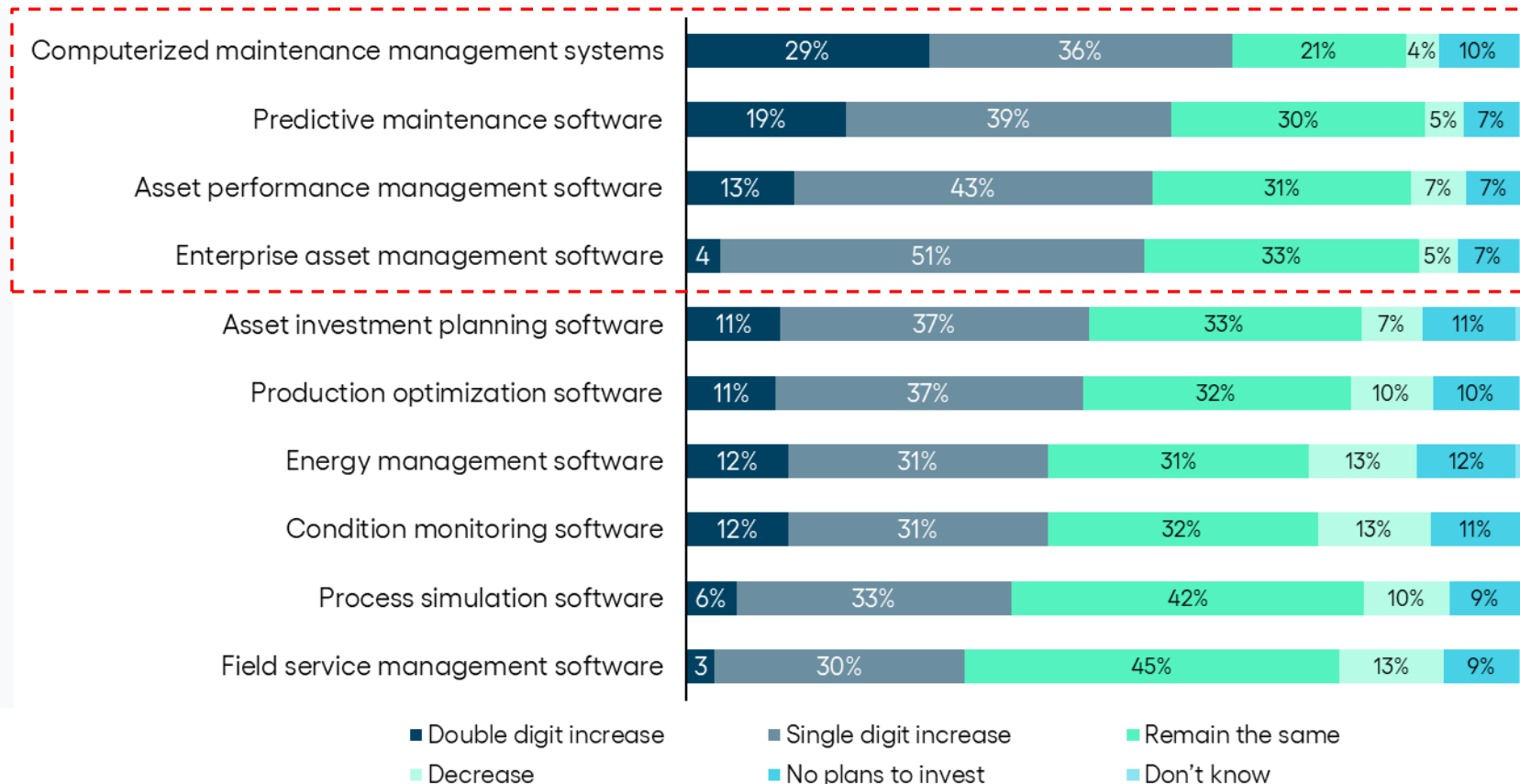
Source: Global Corporate Survey 2021/22: Operational Excellence Budgets, Priorities & Tech Preferences (N=301)

# CMMS, EAM and APM software will receive increased spend in 2024

## How will your investment in the following asset management software change in the next 12 months?

Source: Verdantix Global Corporate Survey 2023: Operational Excellence Budgets, Priorities & Tech Preferences

N = 304



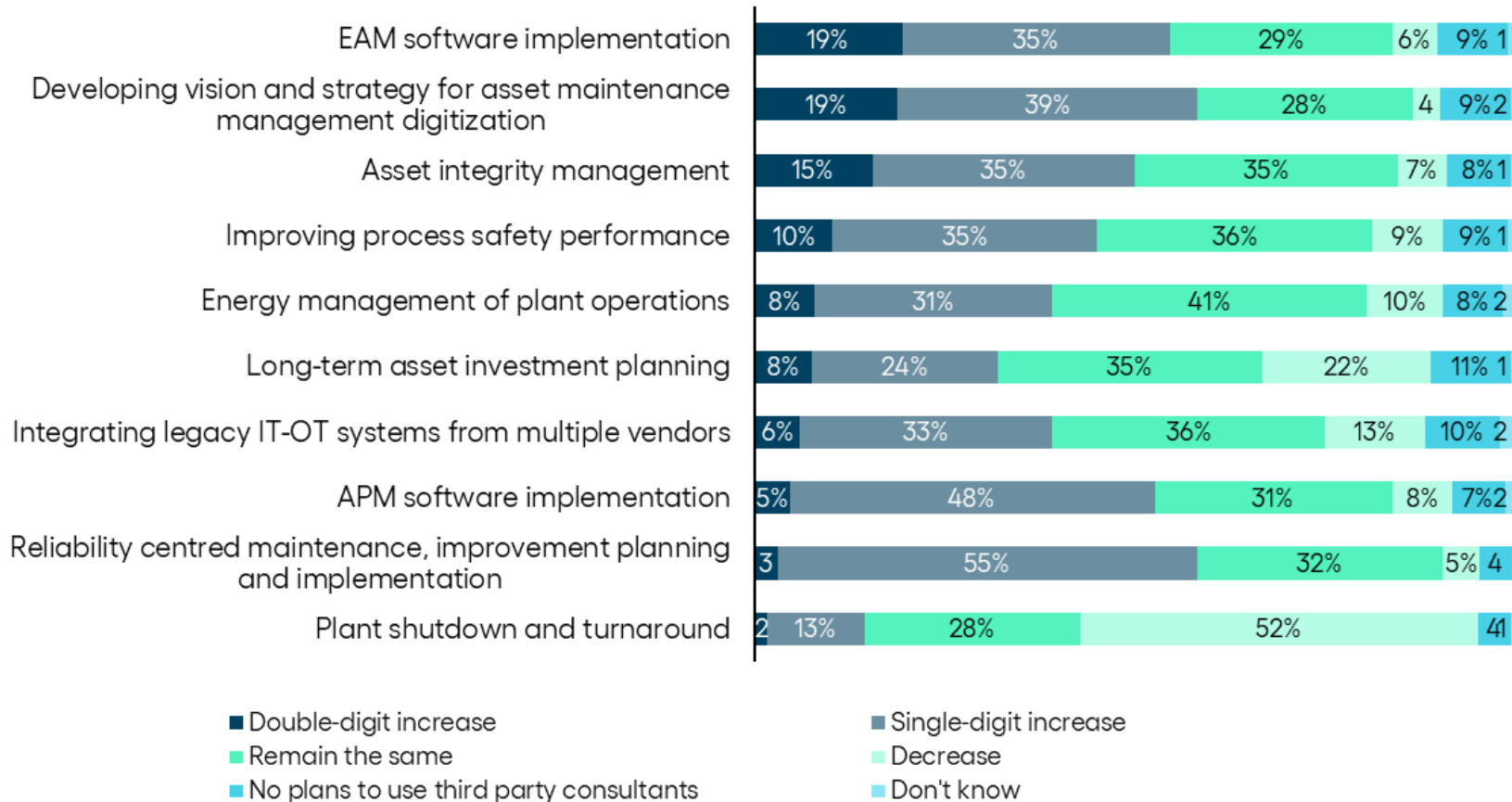


# Strong demand for asset management tech is evidenced by firms engaging consultants and system integrators for implementation

**In the next 12 months how do you expect your firm's budgets to change for asset management consultant projects in the following categories?**

Source: Verdantix Global Corporate Survey 2023: Operational Excellence Budgets, Priorities & Tech Preferences



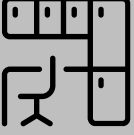


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# Innovation in the asset management market is focused on **five** key areas

		2010-2019	2020s & Beyond
1	 <b>Artificial Intelligence and GenAI</b>	Data capture and aggregation, static condition monitoring	Increasing use of predictive analytics. Use of GenAI for knowledge management and elevating UX
2	 <b>Integrations</b>	Integrations with IT & OT systems	Integrations with a wide variety of data from IIoT sensors, drones, wearables
3	 <b>Functionality breadth</b>	Asset management functionality typically siloed in specific system	Asset management applications covering safety, maintenance, performance & sustainability
4	 <b>Deployment options</b>	Preference for cloud deployment emerging. Majority still on-prem	Cloud deployment becoming the norm across most industries
5	 <b>Mobile applications</b>	Accessing software via web browser on mobile	Feature-rich and easily configurable native mobile apps





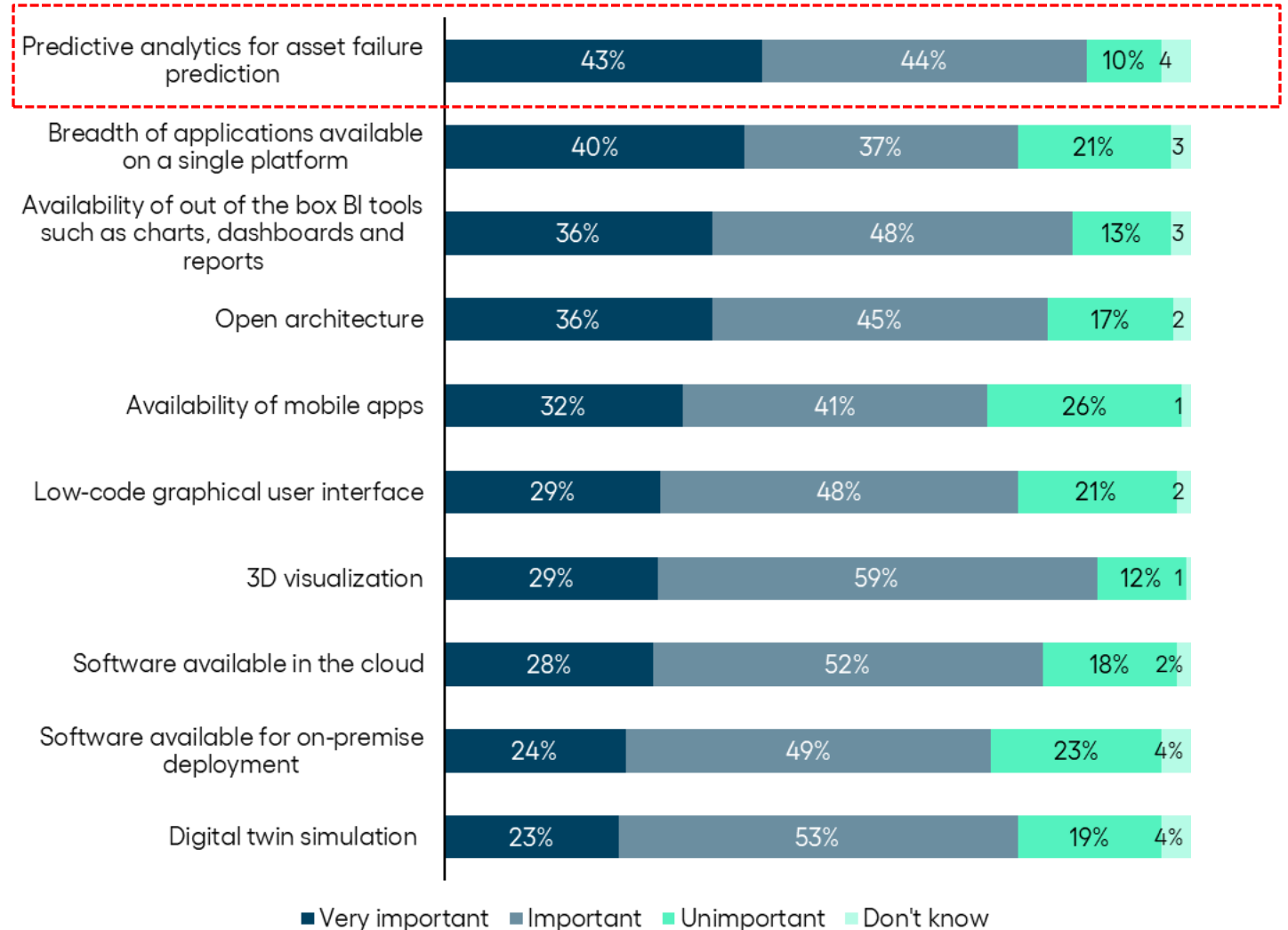
1

# Offering predictive analytics functionality is becoming a baseline for more and more asset management vendors

## How important are the following criteria when you evaluate software applications for industrial asset management?

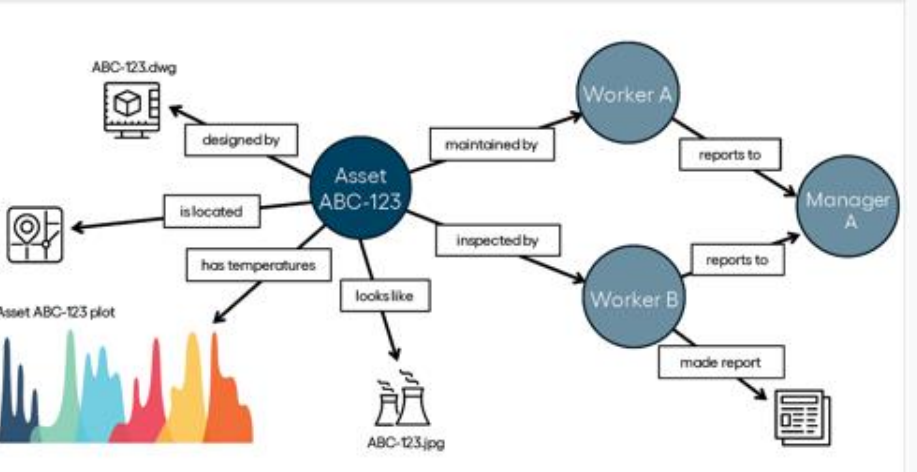
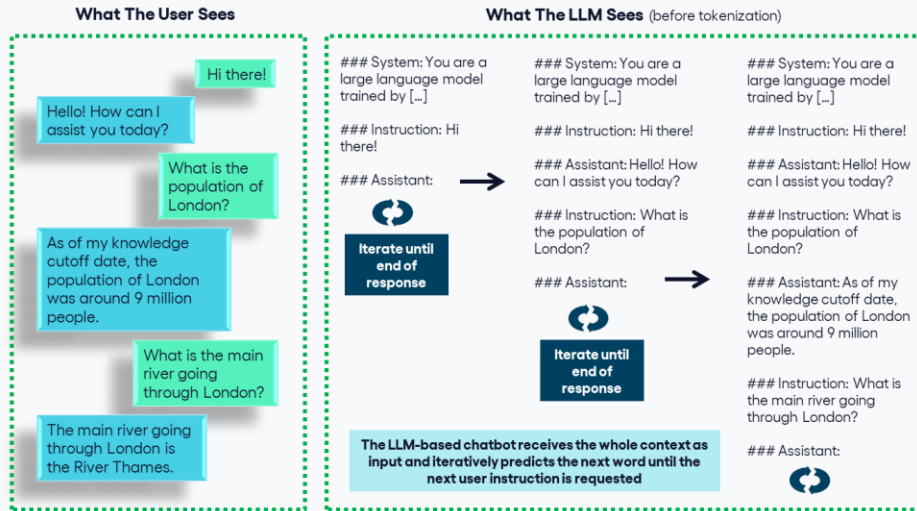
Source: Verdantix Global Corporate Survey 2022: Operational Excellence Budgets, Priorities & Tech Preferences

N = 301



# 1

## Asset management vendors elevate user experience and data management with GenAI



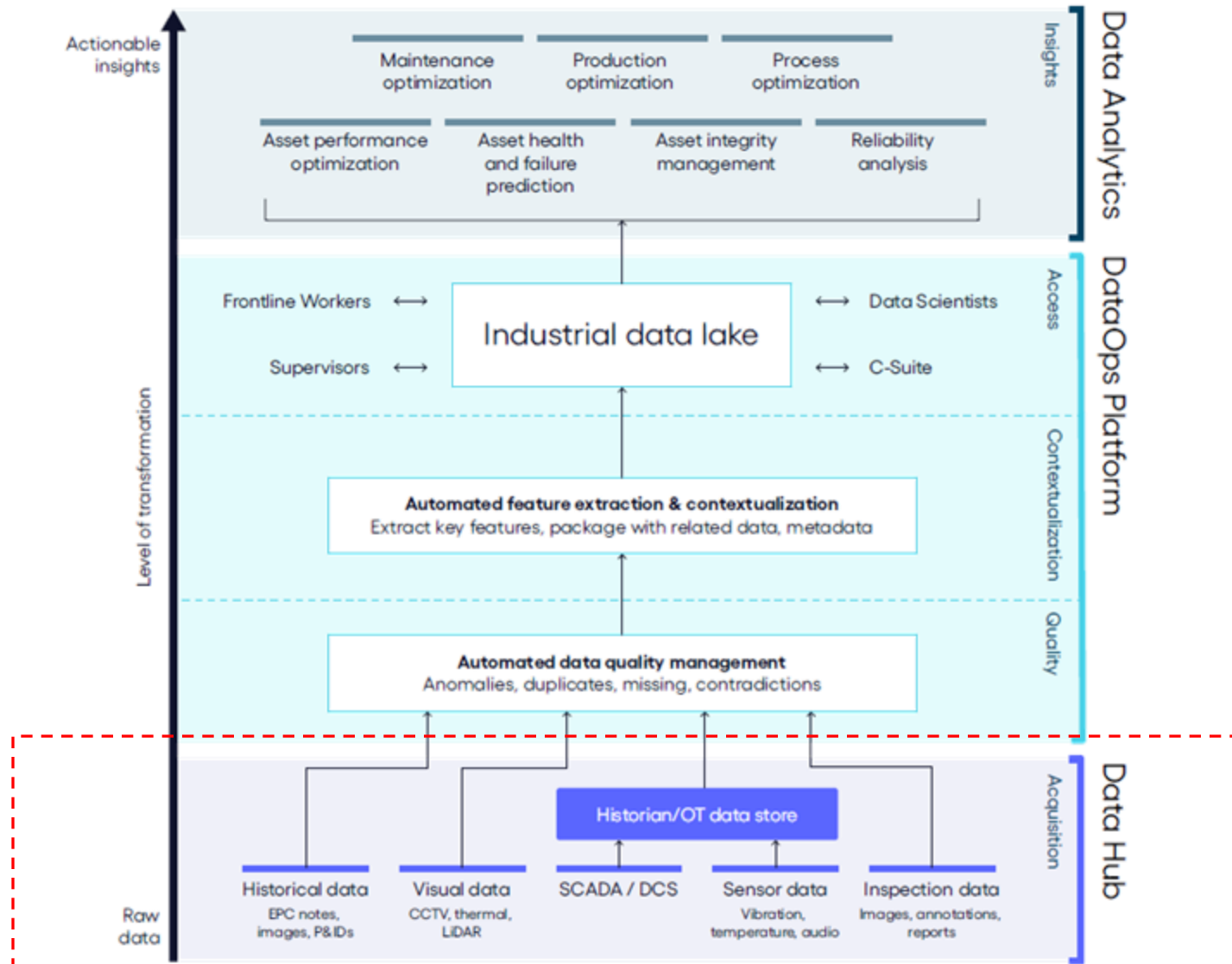
- 1 Extracting relevant critical information from vast data sets for concise insights
- 2 Eliminating repetitive administrative tasks through automation
- 3 Enabling more robust industrial data ingest, transformation and contextualization
- 4 Offering ops & maintenance workers a quick second opinion by acting as a reasoning engine
- 5 Automatically categorizing and prioritizing asset maintenance tasks
- 6 Facilitating fully hands-free operation with voice dictation for inspections and maintenance
- 7 Democratizing asset programmable logic controller (PLC) programming
- 8 Delivering a low-code, natural, conversational interface to the whole workforce.
- 9 Developing more advanced AI-based vision systems for production quality optimization
- 10 Providing richly visual 3D virtual environments for training

Source: Verdantix Market Insight: Ten Applications Of Large Language Models For Industry

Source: Verdantix experiments with ChatGPT-3.5 (OpenAI), Vicuna-13B (Meta AI/community)

2

Open architecture for integrations along with robust data management foundation improves the scalability and security of asset data flows



3

Vendors are increasingly offering a unified platform solution with strong integration capabilities addressing a wide range of use cases across safety, performance and sustainability

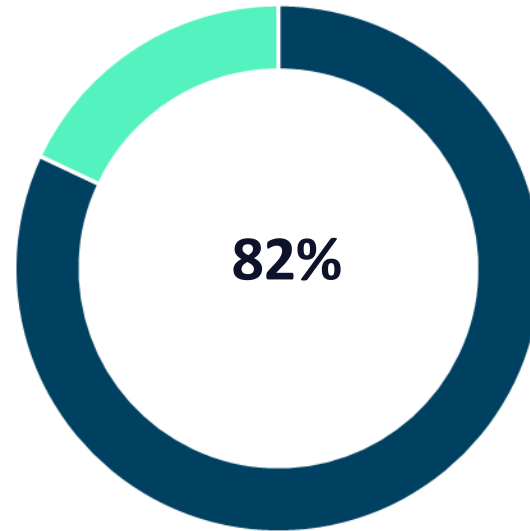
**How important are the following process safety management digitization goals for your firm over the next 12 months?**

[% of respondents answering 'Very important & important']

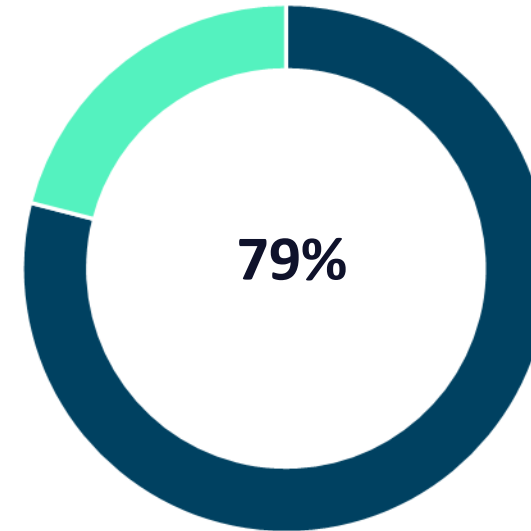
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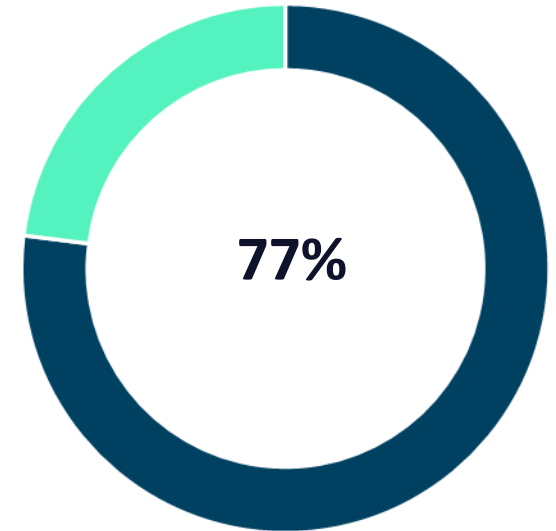
Bringing more real-time data on asset condition and worker safety for dynamic management of operational risks



Integrating varied types of data



Breadth of applications available on a single platform



## Asset management software providers expanding functionality for safety by joining asset, worker and process safety data



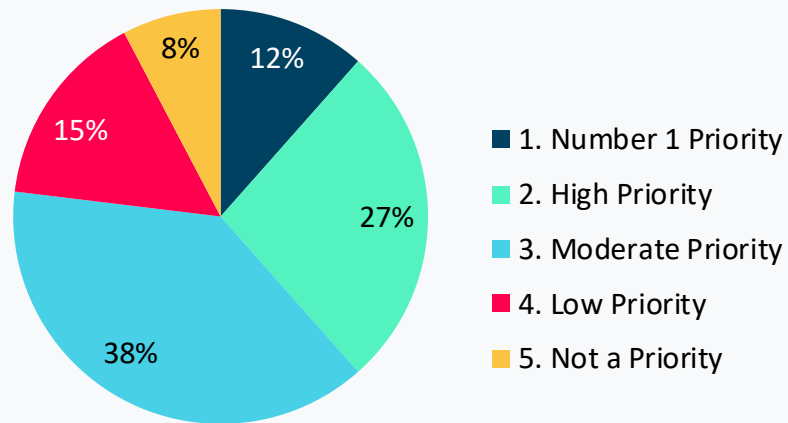
### Prometheus Group PSM Software Strengths

- Prometheus Group emerged as a leader in the GQ
- **Leading mobile capabilities**
- **3.0/3.0 score** for asset information and physical **process safety information management**
- **Strong risk management functionality** through its acquisition of RiskPoynt
- **Second highest scores for BI capabilities** in terms of charting and reporting as well as advanced visualisations



.....as well as for sustainability such as offering capabilities for energy management

To what extent is reducing energy consumption of industrial operations and processes a priority for your firm over the next 12 months?



**71%**

of respondents reported that energy management software was critical or helpful to achieving net-zero goals

**43%**

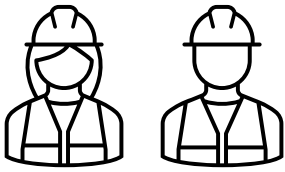
of respondents planned budget increases for energy management software in 2024

**38%**

of respondents had no commercial solution implemented for energy management

5

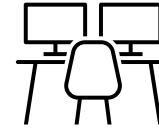
End users of asset management and process safety software prefer configurable, mobile ready, cloud-based solutions



Tech savvy newcomers to the industrial workforce are used to streamlined mobile experiences



88% of US population owns smartphone; 51% own a tablet



Frontline workers are mobile, and tracking information can be a challenge



# Questions

