OCTAVE

400 executives & senior leaders

1 key topic – digitalization

Accelerating the global energy transition with data

Power industry executives on the technologies meeting demands and mitigating risk

66%

of power industry organizations have increased the number of digital tools and data sources they use over the past 12 months

Data: The key to a faster energy transition

We spoke to

400

global C-suite executives and senior leaders across the manufacturing, power, oil and gas and chemicals industries.

The power sector is stepping into a new era. One filled with unmatched growth opportunities. Power organizations are investing in digital transformation to enhance efficiency and resilience across operations.

The result? They are better equipped to navigate the global energy transition, while mitigating risks and meeting complex regulatory requirements.

Real digital transformation requires fast, visualized data from across the business. The key to getting the right? Contextualized information needs to land in front of the right people at the right time.

AI impact

Connecting data in this way can enable AI-driven insights and predictive workflows across all operating areas. From aging grids to the latest renewable integrations.

This helps industry players to enhance asset reliability, eliminate downtime, execute projects faster and reduce cost overruns. Ultimately, maximizing the value of assets and enabling them to meet growing energy demands.

Integrated data puts leaders in control. That involves managing risk, navigating compliance and protecting reputation in a fast-changing world.

Data dilemmas

Diverse landscapes of systems and processes can lock data into silos. This impedes decision-making and leads to disruptive challenges.

Industry leaders are seeking answers through innovations that provide visibility through connected data. Yet many are still struggling to successfully integrate data tools that remove challenges and provide a competitive edge.

For this report, we surveyed global C-suite executives and senior leaders from large industrial businesses, including the power sector. This is a look into their biggest challenges and experiences of adopting data technologies to overcome them.

We hope you find the research and accompanying best-practice insights valuable to your organization's goals.

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Today's top challenges



Leaders at industrial businesses from across APAC, Europe, Latin America, the Middle East and North America were surveyed for this report. Their organizations have revenues of over $1 billion and more than 1000 employees.

Executives in the power sector confirmed in the survey that several key common challenges are holding their organizations back. All with implications for their ability to enhance efficiency and resilience, mitigate risk, adapt to the pace of change and deliver projects faster.

Time and budget pressures

For example, 67% of leaders from the power sector report a strong or severe impact from project milestones being missed. 67% say they are strongly or severely impacted by projects running over budget and 64% acknowledge impact from unplanned production downtime.

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All this lands at a time when demand is up, costs are rising and the pressure on revenue is growing. Exacerbated by an inability to scale assets to meet business demand. This is an issue that 68% of power industry leaders say has a strong or severe impact.

Compliance concerns

We are at a time of growing regulatory compliance requirements in the power sector. Safety concerns are identified as having a strong or severe detrimental impact on operations by 55% of the industry's executives. Meanwhile, cybersecurity concerns have a strong or severe impact on 61%.

The challenges identified by the survey participants will likely come as no surprise to fellow executives. Yet, the contributing factors behind them reveal the day-to-day reality facing power organizations. Especially as they strive to achieve their strategic objectives.

67%

of power sector executives acknowledge a strong or severe impact from projects running over budget.

61%

of the industry's executives say cybersecurity concerns are having a strong or severe detrimental impact on their business.

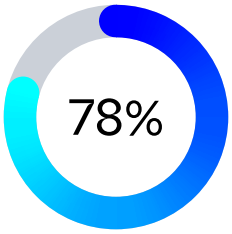
The factors behind the challenges



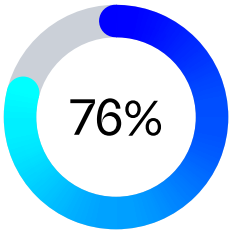
A major force behind these challenges is talent. 77% of power leaders say skills and knowledge gaps are having a strong or severe impact. 70% say retirements and departures are hitting operations at the same level. Capability is shrinking just as expectations rise.

Data issues compound the pressure. Power executives report severe or strong impacts from:

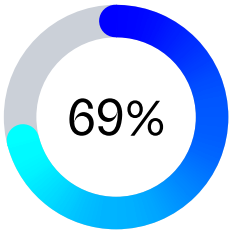
Poor data integration and/or connectivity



Delayed or out-of-date information



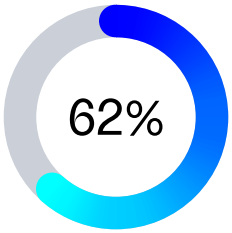
Incomplete or inaccurate information



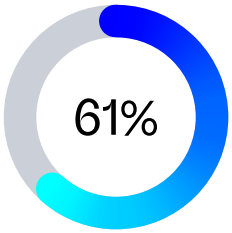
These gaps aren't accidental. They're the result of outdated systems and methodologies still in play across the sector. 74% of power executives say manual processes have a strong or severe impact on the challenges. 69% confirm the same level of impact from aging infrastructure and legacy systems.

Other contributors include:

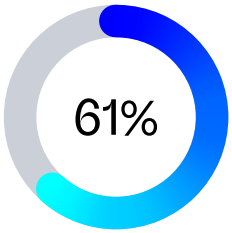
Increased maintenance costs



Asset unreliability



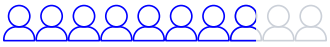
Lack of stakeholder alignment



In a sector under pressure to deliver flawless performance while controlling costs, these issues create real drag. They slow decisions, increase exposure and undermine resilience.

As we'll see next, data visualization tools are providing the answer, but there are key adoption challenges to overcome.

78%



of power sector executives say poor data integration/ connectivity is having a strong or severe impact with regard to their challenges.

74%



of executives in the industry say manual processes are having a strong or severe impact with regard to their business challenges.

Data visualization: The most adopted solutions

Sophisticated digital tools are increasing, counteracting challenges



Power sector organizations are responding to challenges by increasing technology investment. 66% of leaders surveyed agree with the statement: "My business has increased the number of digital tools and data sources over the past 12 months."

Tools to enhance visibility into assets and processes are being used a lot. The data indicates that, globally, digital twins are becoming widely used. A trend that is predicted to grow according to Hexagon's Digital Twin Report[1]. 80% of leaders say AI has made them more interested in digital twin technology.

Knowledge graphs and info maps are being used frequently or continuously by 65% of the oil and gas organizations questioned. Visualization dashboards by 73%. Digital thread technology is now being used to a high degree by 68%.

65%
use knowledge graphs and info maps frequently or continuously

68%
use digital thread technology frequently or continuously

73%
use visualization dashboards frequently or continuously

Yet, it's clear that varying approaches to data connectivity are being taken. This leads to diverse results. 67% of power businesses still rely on the continuous or frequent use of paper-based information. Other point solutions used include geospatial information (98%), 3D digital models (66%), point clouds (59%), 2D digital design (59%) and panoramics (58%).

Many teams still rely on manual steps and isolated tools. This creates a clear opportunity to raise data visibility and connectivity. Doing so strengthens efficiency, resilience, compliance and agility.

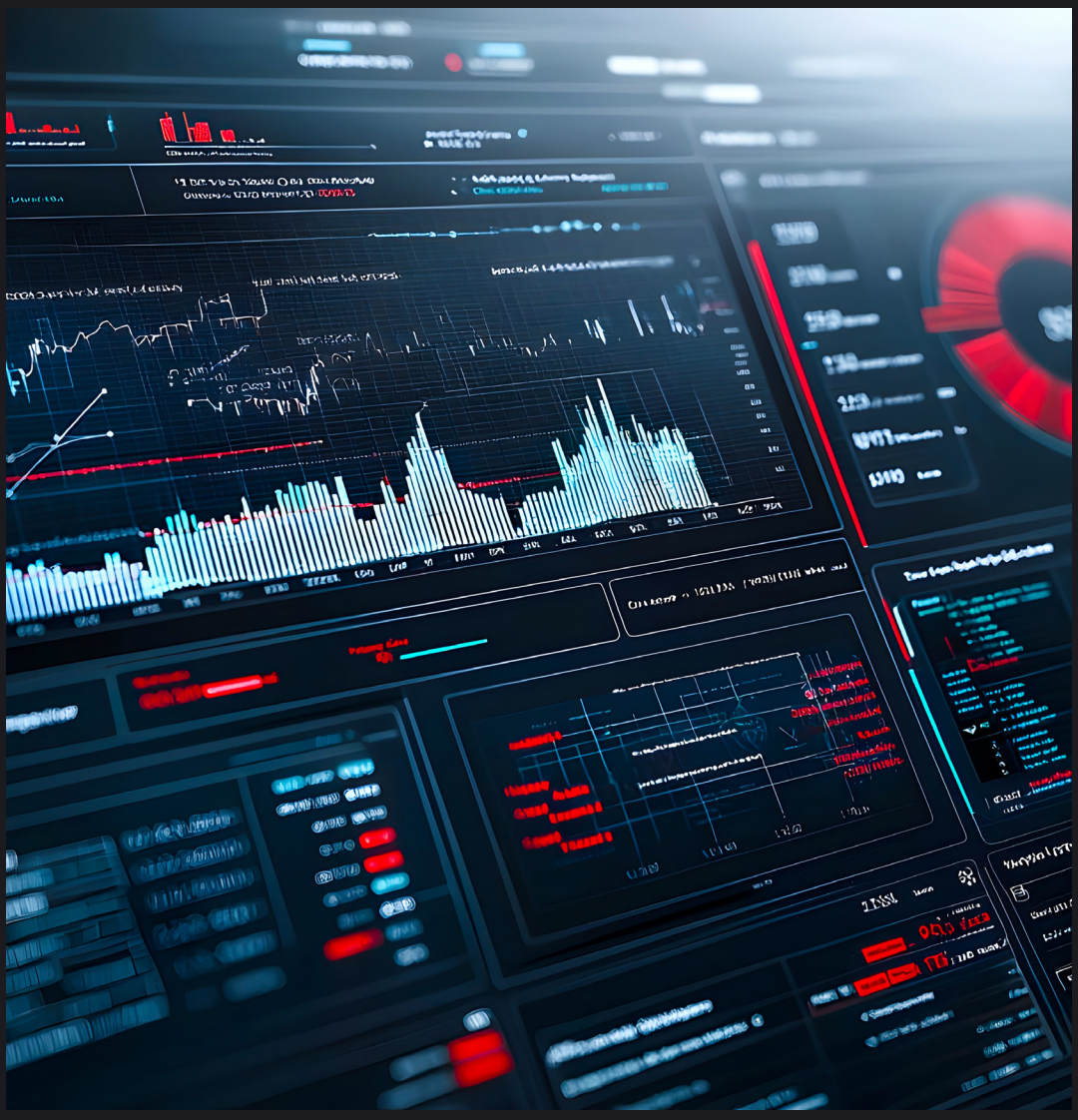
"My business has increased the number of digital tools and data sources over the past 12 months."

66% of power sector surveyed agree with this statement

[1] Hexagon's Digital Twin Report 2025. ©Hexagon AB

The investment/ value gap

Sophisticated digital tools are increasing, counteracting challenges



"Transformation efforts in our organization haven't yet returned."

55% **of power sector leaders agree with this statement**

The use of data visualization tools is widespread and expanding across industries. Yet the question remains - why are these digital investments not always alleviating challenges?

55% of the power industry leaders surveyed agree with the statement "transformation efforts in our organization haven't yet returned the expected value."

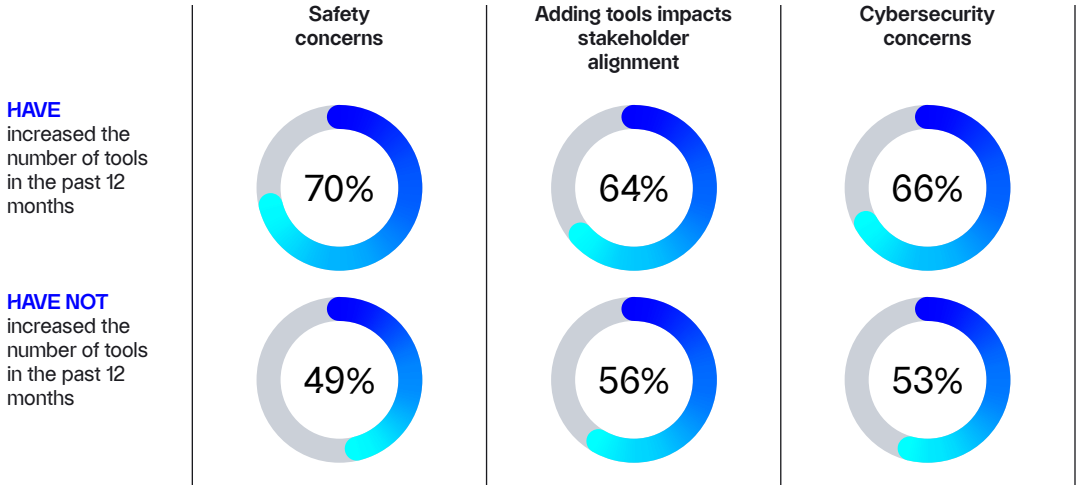
Providing more context on this lack of ROI, 53% agree with the statement "the lack of available data on asset performance is impacting the financial performance of the business," and 51% agree that "the tools and platforms used to visualize data lack connectivity to each other."

Strikingly, the increase in digital tool usage is actually creating more work for teams. This is negatively impacting responses to key business challenges. For example, 63% of those with more tools than a year ago agree that their team spends too much time manually creating reports and consolidating data points. They spend an average of 18.72 hours a week, equating to 117 working days a year.

Of those who have increased the number of digital tools in the past year, 75% report project milestones being missed as having a detrimental impact on their organization. This compares to 57% of those who have not increased the number of tools. 67% of those who have increased their tools cite projects running over budget as a challenge compared with 55% of those who haven't added more tools.

Safety and cybersecurity compliance implications

Cybersecurity is also impacted for those with increased digital tools. This will have implications for their ability to confidently comply with sector regulations.



Organizations need clear best practices. Without them, tools can't deliver their full value or address the problems they were meant to solve.

Solution in focus: The digital thread

End-to-end visibility for organizations that follow best practices





Digital thread technology connects data across all operations, assets and digital tools. In theory, this solution can solve all the issues discussed in this report. But here too, power industry organizations have been facing challenges with adoption.

Globally and sector-wide, 68% of executives confirm continuous or frequent use of digital thread technology at their organizations. 71% say that stakeholders have direct access to the data and systems they need. Compared with 57% for those who use it less frequently.

But what about those who say stakeholders still don't have direct access to the data and systems needed? For those organizations, why is the digital thread still not delivering on its promise? Where is the 'single pane of glass' where all operational and asset data?

IDC's three stages of digital thread maturity

In the 2025 IDC analyst brief, 'Unlocking industrial transformation with a unified digital thread from engineering to operations,[2]' IDC, in conjunction with Octave, observes that there are three stages of digital thread maturity, based on the solutions selected and methodology followed:

Low maturity

"Labor-intensive, ad hoc integrations of data and manual data transfers of external data are conducted. Often, this external data fails to be utilized, especially in the case of engineering and construction data. The electronic product code process creates value-rich documentation and data that provides a baseline ontology of an entire operational setting. However, at the handoff, this data set is often recreated nearly entirely from scratch by the owner operator."

Moderate maturity

"Some isolated data integration capabilities are executed with the help of IT staff by utilizing horizontal tools and practices. This works for some data and use cases, but often neglects the operations subject matter expertise necessary to contextualize data fully. Many organizations report years-long efforts to pipe operational data from many sources to an IT data lake only to find that combining the data in meaningful ways is severely limited because it lacks context and is not available in a timely manner."

Robust maturity

"Organizations develop a digital thread through a platform-based architecture that maintains data context within original applications while ensuring data access and continuity through engineering to operations and beyond. These organizations understand that data context is best preserved closest to the source and is ever changing."

[2] Unlocking Industrial Transformation with a Unified Digital Thread from Engineering to Operations, 2025 IDC Analyst Brief, sponsored by Octave, document no. US52853924, January 2025

Advancing digital thread maturity

Expert insights for leaders in the power sector



So, how can organizations amplify digital thread maturity and the data visibility needed for key business challenges?

Lawrence Benson, Vice president of portfolio strategy at Octave, has worked with organizations across industrial sectors to unleash maturity in this area. He offers these five pieces of advice:



Lawrence Benson
VP, portfolio strategy, Octave

1 Address legacy systems and manage change

"Closing digital maturity gaps isn't just about having data—it's about having the right people and connected systems to make that data reliable and accessible. That means best practices, skilled staff, solid integration tools and quality processes that ensure teams can actually trust and use the information." Part of what's holding organizations back from increasing their digital thread maturity is that this really is a large endeavor – so where do you start? As a priority, legacy systems need to be addressed because older software systems and processes don't provide the infrastructure for mature digital thread capabilities."

"And this needs to go hand in hand with change management. The IT team can be doing a fantastic job at maintaining existing infrastructure, but may not know the best route to creating the modern and robust digital backbone required for a digital thread. There will potentially be a lack of expertise in the business and those gaps need to be quickly identified."

2 Consider scalability

"What you need to avoid is investing in tools that will get you a little bit further, but then realizing a couple of years later that they are now not able to achieve what the business needs. Think long-term and focus on the ideal end state you'd like to achieve, then select solutions capable of scaling with you as your digital thread maturity grows.

"With that wider vision in place, identify the shorter-term easy wins along the journey and build momentum and excitement in the organization. When people see progress, it garners more enthusiasm for the next phase."

3 Use solutions that meet you where you are

"Wherever you are on your digital thread maturity journey, moving to the next phase requires partners and solutions that can meet you where you are and extend on that progress – rather than discounting the investments that have already been made. They should be able to assess how your available data can be connected to other systems, in a way that isn't just point-to-point – bringing things together in an intelligent way."

4 Take a platform approach

"A key way to build on what you have today and bring it all together is through the adoption of a platform-based architecture. This means that, instead of passing data from point solution to point solution, you have a connected 'single pane of glass' for data across all sources – so you can instantly access contextualized data from anywhere, analyze and share it. You want all your data to remain close to its sources, where it is authored, changed, kept accurate and up-to-date, and so on. But then you have your overarching platform that democratizes that data – making it instantly accessible to stakeholders from anywhere in the business."

5 When you reach robust maturity, exploit AI

"The most successful organizations have data they know they can rely on. It's from a trusted source, in a trusted location, it's comprehensive and up to date, and their digital thread makes it always available, from anywhere. Their next stage of maturity is exploiting AI. When the foundation is right, it's not a daunting task to layer on AI tools that enable the exponential acceleration of data analysis – identifying anomalies and root causes, and enabling fast decisions that improve all around operational efficiency."

"The most successful organizations have data they know they can rely on, from a trusted source, in a trusted location."

Lawrence Benson Vice president of portfolio strategy, Octave



Taking the next step

For leaders ready to sharpen performance, optimize yields, advance sustainability and stay ahead of rising compliance demands, the next step is simple. Get the visibility you have been missing.

Connect with the Octave team today and tap into the expertise built to turn complex operations into clear, actionable intelligence.

Contact us

About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property, and assets– for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency, and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.

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