FUJITSU

Mapping the future

The role of enterprise visualization in Sustainable Manufacturing

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The complexity of modern manufacturing operations

Today's manufacturing decision makers find themselves at the forefront of a multifaceted challenge: navigating not only operational and regulatory challenges but also adapting to rapidly changing customer needs and shifts in demand, all while harnessing the potential of rapid technological advancements. The integration of legacy systems and the management of an expanding network of interconnected machines, devices, systems, and processes create an environment where an avalanche of data has become the cost of doing business.

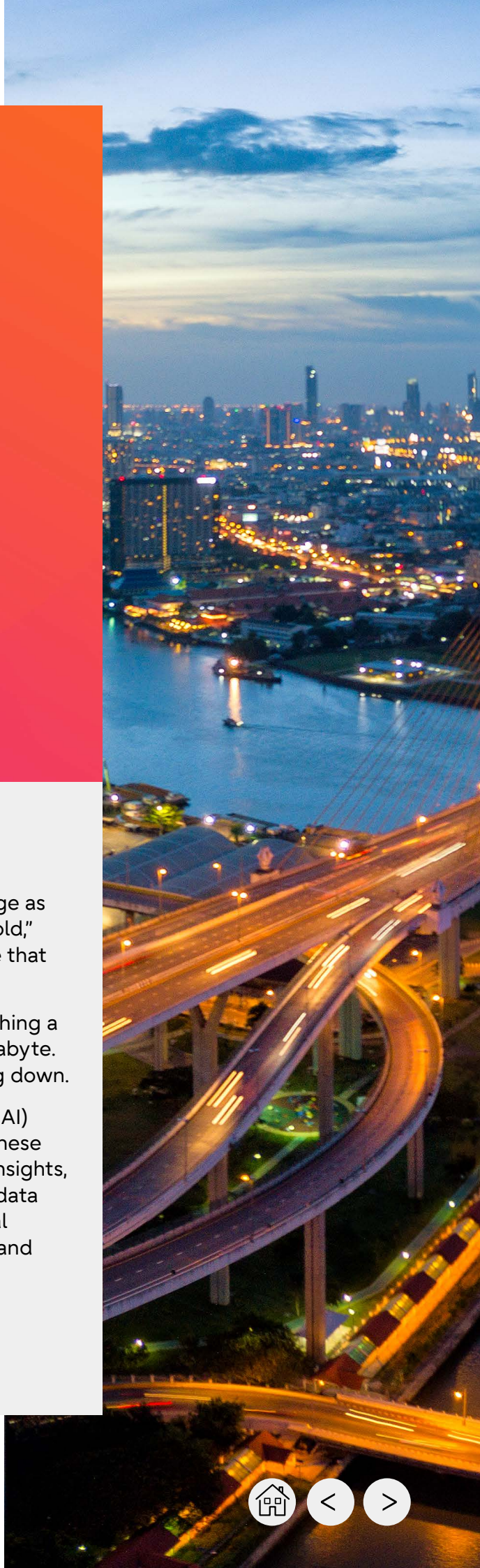
Amidst this deluge of information, the ability to visualize and interpret vast data streams emerges as a crucial factor for success. Manufacturers grapple with the task of not only understanding the data but also leveraging it to drive efficiencies and glean valuable insights. The high demand for tools that facilitate this process is evident, as organizations seek to extract meaningful inferences from the intricate web of information encompassing their operations.

In this era of relentless change, characterized by evolving market demands, consumer preferences, sustainability requirements, and regulatory shifts, the focus must encompass more than just data collection. Effective data governance is crucial to ensure that only pertinent data are considered for visualization. The key lies in pinpointing the most relevant data and leveraging it to drive not only actionable insights for informed decision making but also to enhance process execution and innovation across siloed IT, Operational Technology (OT), and Enterprise Technology (ET) organizations and systems.

This whitepaper seeks to address the pressing need for senior leaders and executives to strategically navigate this landscape. By doing so, organizations can position themselves to stay agile and responsive in the face of continued volatility.

The rise of data-driven decision making in manufacturing

For manufacturers seeking to access the latest in industrial technology, the exponential growth of data presents a formidable challenge, with organizations often find themselves struggling to connect disparate data sets into usable forms. This struggle to sift through the noise and extract relevant insights is exacerbated by the staggering pace at which data is generated – a challenge that escalates with each passing day.



Data explosion: A global phenomenon

The year 2016 marked a historic milestone in internet usage as collective data generation crossed the "zettabyte threshold," amassing an astonishing 1024 trillion terabytes - a volume that took all of human history to accumulate until that point.

By 2022, global IP traffic had escalated dramatically, reaching a remarkable 333 exabytes annually, nearly a third of a zettabyte. This exponential growth in data shows no signs of slowing down.

Since the onset of 2023, the advent of Generative AI (GenAI) technologies has fueled another surge in data volumes. These advanced AI systems, capable of creating new data and insights, have significantly contributed to the already burgeoning data landscape. This further amplification highlights the critical importance of effective data interpretation in managing and making sense of the ever-expanding sea of information.

Industry 4.0: Driving digital transformation

In the midst of the data deluge, the industry is witnessing a significant evolution where enabling technologies and solutions central to Industry 4.0 are anticipated to experience remarkable expansion. Forecasts suggest a growth from $94.42 billion in 2023 to an impressive $2 41.58 billion by 2028, marking a compounded annual growth rate (CAGR) of 20.67%. This expansion is underpinned not just by established technologies like the Internet of Things (IoT), cloud computing, machine learning, data and analytics, human-machine interaction, and robotics, but also by the advent of emerging tech trends. GenAI and hyperautomation represent the convergence of these technologies, driving forward the next wave of industrial advancement.

Additionally, the manufacturing sector is showing increasing interest in nascent trends like the metaverse and quantum computing. While the adoption of these technologies is still in its early stages, the exponential growth and complexity of data are already prompting manufacturers to explore their potential applications.

Despite this surge, a PwC Global Digital Operations study reveals a stark reality: a mere 9% of 1,155 manufacturing executives across 26 countries have implemented artificial intelligence (AI) in their processes to enhance their operational decision making.

Sustainability and data: A nexus for progress

As the manufacturing landscape continues to evolve, the effective utilization of data emerges as a catalyst for sustainability and profitability. Strikingly, a Drax study highlights that a significant 85% of key decision-makers in manufacturing consider data analysis a top priority for achieving net-zero goals, emphasizing the pivotal role data plays in combating climate change and reducing carbon emissions.

Strategic harnessing: Operationalizing data beyond insights

In the manufacturing sector, the sheer volume of data produced is staggering, yet its full potential is unleashed when it's strategically harnessed for more than just reports and insights. When utilized effectively, data can facilitate advanced simulations and predictive analytics, enabling preemptive decision making and enhanced operational foresight. Furthermore, data can activate Robotic Process Automation (RPA) and workflows, streamlining processes and increasing efficiency. It also plays a crucial role in the generation of new workflows, fostering innovation and driving continuous improvement in manufacturing operations. This proactive and dynamic use of data transforms it from a static resource into a catalyst for action and change.

Emphasizing the need for transparency and traceability

For manufacturers, compliance with an array of regulations and standards is critical, often varying by sub-industry, region, or even country. These regulations, which govern product quality, safety, and environmental sustainability, represent not just a legal mandate but also a foundational commitment to responsible business practices. As the industry evolves, staying attuned to regulatory developments becomes paramount for manufacturers seeking compliance with existing standards as well as anticipating and aligning with emerging legislative trends.

A focus on environmental sustainability

In the US, the recently enacted climate bill, officially titled the Inflation Reduction Act of 2022, signifies a monumental step towards addressing climate change concerns. Allocating a substantial $369 billion towards climate-related initiatives, this legislation offers businesses a dual incentive structure.

The act incentivizes businesses to adopt greener practices by offering tax reductions for the implementation of carbon capture and storage systems. This encourages investment in more environmentally friendly operations. Concurrently, it introduces penalties for companies that exceed federal emission limits on pollutants like methane, thus financially motivating businesses to reduce their environmental impact.

Importantly, sustainability initiatives encouraged by this bill should not be viewed merely as regulatory compliance or financial burdens. They also present opportunities to enhance productivity, reduce energy costs, and improve customer experience.

By integrating sustainability into their core operations, companies can unlock new avenues for growth and efficiency, demonstrating that environmental responsibility can go hand-in-hand with improved business outcomes.

The SEC mandate: A paradigm shift in financial transparency

As the manufacturing sector braces for significant regulatory changes in 2023, a pivotal development comes in the form of a requirement from the Securities and Exchange Committee (SEC). This mandate compels a broader spectrum of companies to disclose detailed financial information concerning their oil and gas production activities. Beyond its immediate financial implications, this mandate is poised to revolutionize transparency within the sector.

The SEC's directive not only fosters transparency but also empowers the U.S. to conduct comprehensive analyses of the true utilization of finite resources across businesses nationwide. Beyond the financial realm, the regulation serves as a protective shield for investors, offering insights that guard them from investing in companies with adverse environmental impacts.

This regulatory move is not just an isolated measure; it sets the stage for a cascade of environmental safeguards, creating a domino effect that reverberates through the entire manufacturing ecosystem in search of improved sustainability.

As the regulatory landscape continues to shift, industry professionals must arm themselves with the necessary knowledge and tools, like Life Cycle Assessment (LCA) software, to adeptly navigate these changes. Equipping themselves in this way enables them to position their organizations at the forefront of compliance and environmental stewardship. LCA software, in particular, provides a detailed analysis of the environmental impacts associated with all the stages of a product's life, ensuring informed decision-making that aligns with both regulatory demands and sustainability objectives.

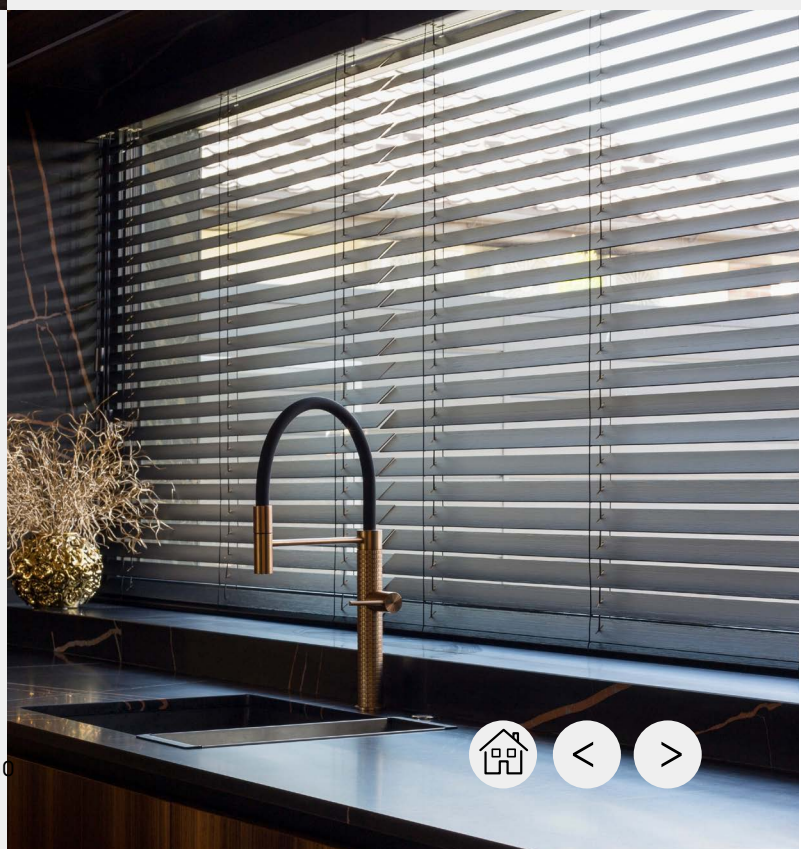
Highlighting real-world instances where visualization led to sustainability gains

Quantum-inspired computing optimizes Bayer's supply chain

Bayer tested the quantum-inspired Digital Annealer of Fujitsu to optimize complex seed production planning and materials campaign scheduling. By partnering with the Digital Transformation services of Fujitsu, Bayer leveraged the Digital Annealer to significantly improve the processing of numerous variables simultaneously. This innovation led to more efficient and robust supply chains, demonstrating the feasibility of complex campaign scheduling and a more stable seed supply for farmers. Alongside Bayer, we were able to showcase how advanced computing can solve intricate problems in agricultural production and supply chain management.

Hunter Douglas leads the Industry 4.0 transformation

Hunter Douglas urgently needed a new partner with the expertise to rapidly deploy SAP Manufacturing Execution and SAP MII at its Mexico plant and roll out to its other North American facilities. On SAP's recommendation, it chose Fujitsu to drive plant stabilization as it was affecting the plant's capabilities for order fulfillment. The results yielded complete visibility of inventory across various businesses, enhanced on-time delivery, and increased stability, ensuring better availability. Additionally, there was access to precise, real-time data and reports.



A look at the Enterprise Visualization Suite of solutions by Fujitsu

Managing the velocity of data in the manufacturing sector is critical. Fujitsu provides comprehensive and cutting-edge solutions that seamlessly integrate diverse data sources, collection and interpretation. We look to empower manufacturers with tools that not only process data instantaneously but also prioritize user-centricity and offer advanced analytics capabilities.

Real-time insights: Harnessing the Enterprise Visualization Suite for agile manufacturing

In today's manufacturing world, real-time data processing is essential for swift and accurate decision-making. The Enterprise Visualization Suite by Fujitsu is designed with advanced capabilities to empower manufacturers:

Data integration

Seamlessly amalgamates data from diverse sources, including cloud and edge environments, ensuring comprehensive visibility and security.

Visualization

Offers intuitive and sophisticated visualization tools that transform complex data sets into understandable and actionable information.

Contextualization

Interprets data within the appropriate context, enhancing the relevance and precision of insights.

Data aggregation

Compiles data across various streams, providing a holistic view of operations.

This suite's features ensure that no matter the variety or complexity of the data source, manufacturers have the capabilities at their fingertips to make well-informed decisions rapidly, keeping pace with the ever-evolving demands of the manufacturing sector.

User-centric data interpretation: Bridging the technical divide

Beyond the speed of data processing, the effectiveness of data lies in its interpretation. Recognizing the diverse technical expertise of users in the manufacturing ecosystem, we emphasize making data easily understandable at all technical levels.

This user-centric approach ensures that insights derived from complex data are accessible to a broad audience, fostering collaboration and informed decision-making across the entire organizational spectrum.

AI and data analytics: Forging integrated manufacturing intelligence

The approach of Fujitsu to artificial intelligence and data analytics is transforming the manufacturing landscape by breaking down functional, organizational, and technical silos through IT/OT/ET integration. Our solutions, including the advanced Kozuchi system, analyze data patterns to forecast outcomes and pinpoint areas for enhancement, enabling seamless connectivity and insight across all manufacturing dimensions.

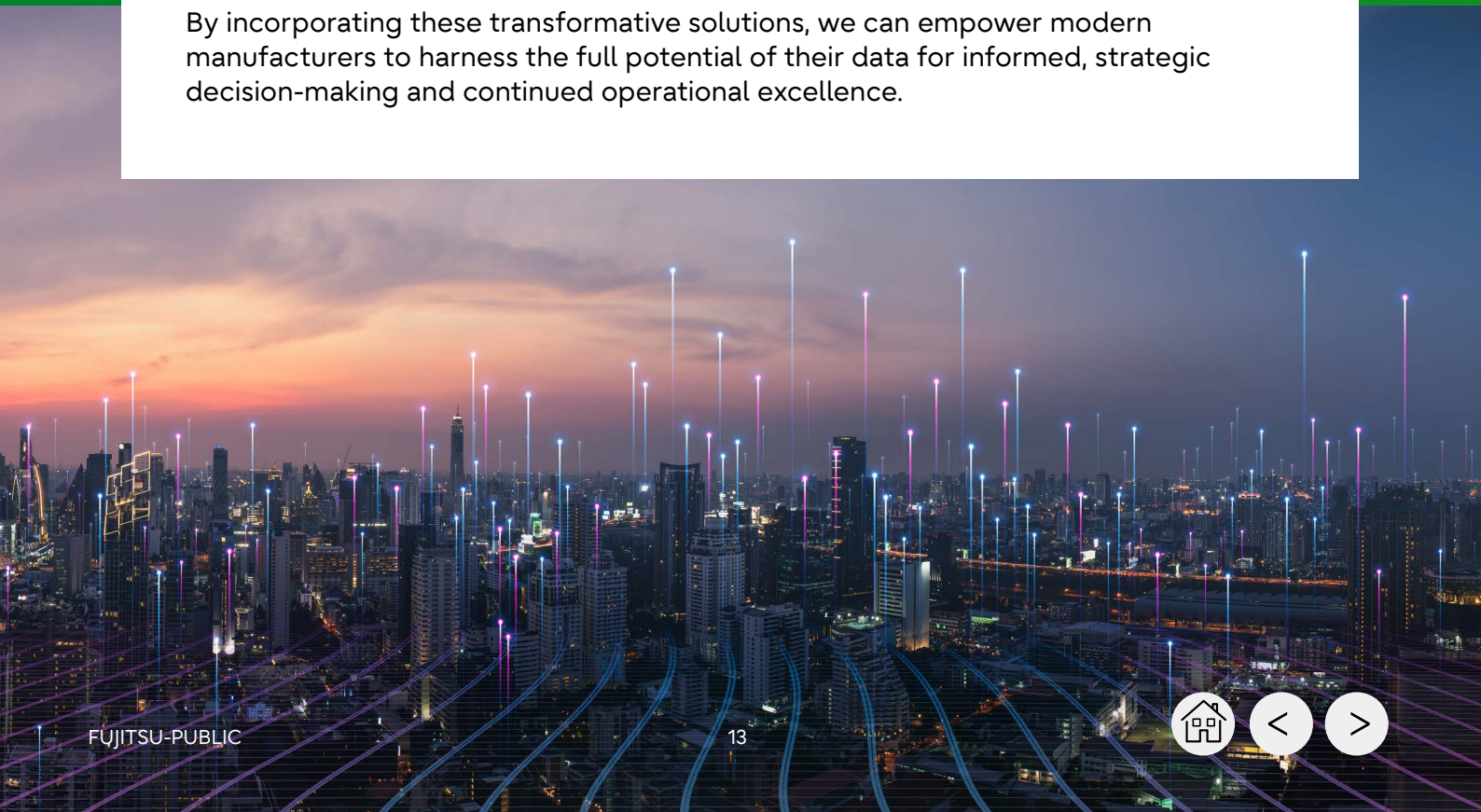
A pivotal element of our technological suite is the integration of AI Trust, a feature meticulously crafted to ensure the integrity of AI-driven analytics. It serves as a safeguard against solution bias, cementing the trustworthiness of data insights. This is particularly crucial for critical decision-making processes where accuracy is paramount.

Furthermore, the aggregation of these insights lays the groundwork for creating digital threads, from which cross-functional digital twins are derived. These twins serve as virtual replicas of physical assets, processes, or systems, enabling a plethora of manufacturing use cases. Through this integration, we unlock a comprehensive visualization of operations, facilitating a multitude of enhancements in areas like product development, maintenance, and overall operational efficiency.

Immersive visualization with the Industrial Metaverse

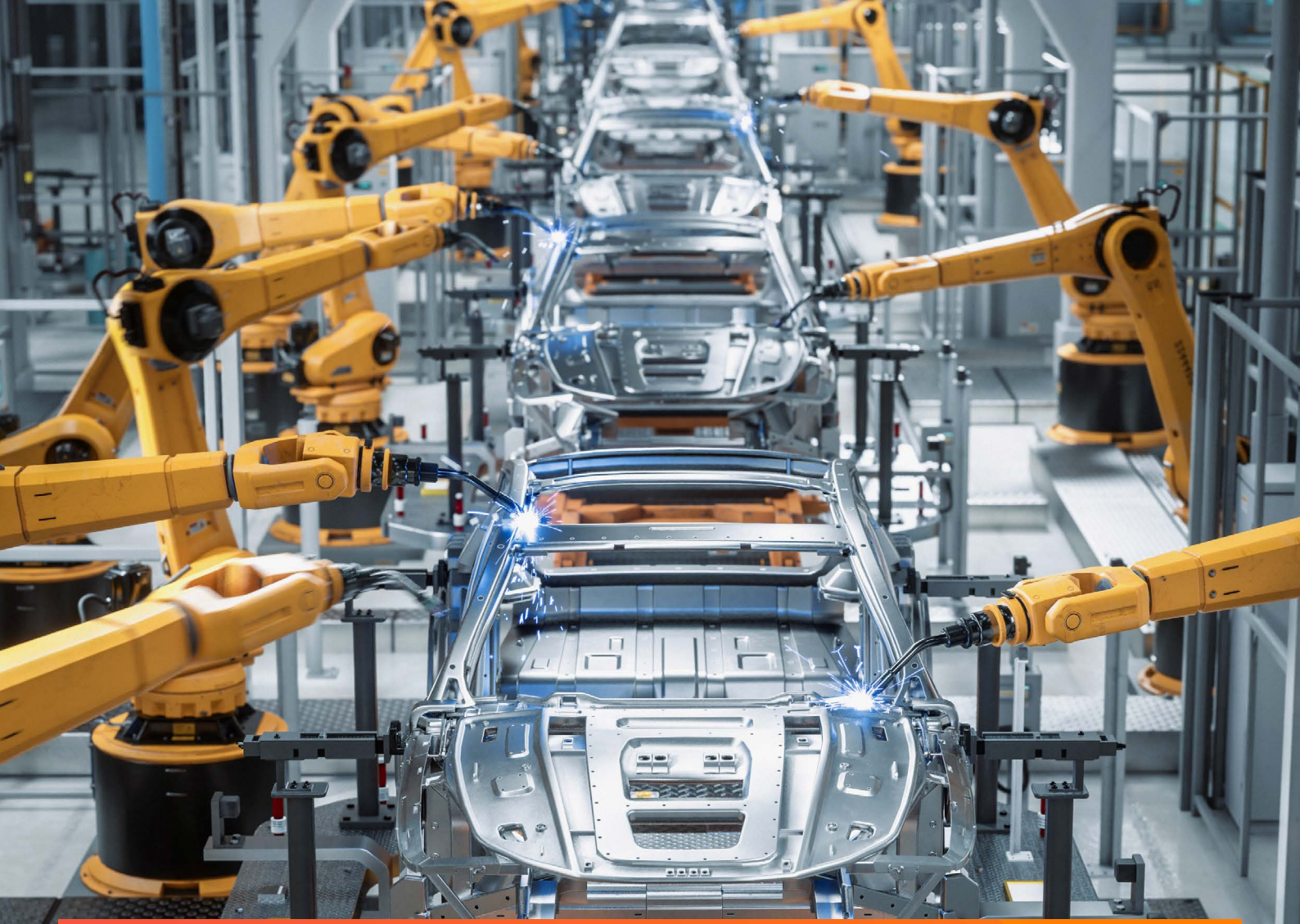
As the manufacturing landscape evolves, so do we. Fujitsu utilizes the Industrial Metaverse, offering an immersive visualization experience that transcends traditional decision support tools. This technological advancement allows manufacturers to sift through vast data sets, distinguishing actionable information from the noise and pinpointing data that is truly relevant to the decision-making process.

By incorporating these transformative solutions, we can empower modern manufacturers to harness the full potential of their data for informed, strategic decision-making and continued operational excellence.



The future is visual, and Fujitsu is leading the charge

As manufacturing continues to evolve and become more technologically centric, the symbiotic relationship between effective data utilization, sustainability, and profitability stands as a cornerstone for success. Moving forward, the judicious use of data can support manufacturing leaders to not only enhance their operational efficiency but also contribute to a more sustainable and profitable future.



Harnessing data for enhanced business outcomes and sustainability

Leveraging real-time data is revolutionizing the manufacturing landscape, driving not just sustainability but also significant business outcomes like product and operational excellence, customer experience, and innovation. Efficient factory operations and automation, powered by data insights, not only enhance quality and throughput for heightened productivity but also optimize energy costs. This optimization directly contributes to a reduced carbon footprint and less material waste, aligning operational efficiency with environmental responsibility.

In this way, sustainability initiatives are not only fulfilling ecological commitments but also serving as accelerators for business benefits. For instance, by implementing energy-efficient processes, a manufacturer may not only reduce emissions but also lower operational costs, resulting in a dual benefit. Similarly, automation not only streamlines production but also ensures consistent quality, which enhances customer satisfaction and trust. Thus, a focus on sustainability, when integrated with data-driven strategies, can catalyze improvements across all facets of manufacturing, from internal processes to market competitiveness.

Data-driven decision-making: A path to carbon neutrality

The culmination of these efforts in data-driven decision-making propels manufacturing processes to new heights of optimization and efficiency. Companies, armed with real-time insights and predictive analytics, navigate the complex terrain of regulatory changes with agility, ensuring adherence to evolving standards. This strategic use of data not only helps meet sustainability goals but also propels organizations towards achieving carbon neutrality, setting a new standard for environmental responsibility in the manufacturing realm.

Navigating towards a data-driven manufacturing renaissance

As manufacturing leaders and executives confront evolving regulations, emerging technologies, and shifting market dynamics, the mandate is unequivocal: to forge ahead into a data-driven era. The advent of real-time data isn't just a conceptual leap; it's a practical stride towards tangible gains that resonate with the triple bottom line: benefiting people, preserving the planet, and driving profit.

Today, the strategic employment of data stands at the heart of manufacturing, bridging sustainability ambitions with profitability aspirations.

This synergy paves the way for a future where responsible manufacturing isn't just a facet of success – it's its very definition. The landscape ahead is rich with opportunities for those ready to harness the full spectrum of data applications – from simulations and scenario planning that anticipates future needs, to complex workflows powered by GenAI, immersive experiences within the metaverse, and the pioneering potential of quantum computing. Embracing this data-centric evolution is more than a strategic choice; it's the cornerstone of pioneering a new era of manufacturing excellence.

Contact Fujitsu to find out more about our services and products for manufacturers.

Contact Fujitsu: Fujitsu Global