DIGITAL REALTY™

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An ePlus Technology, inc. Company



Smart Manufacturing in the Age of AI

Enhancing Productivity and Agility in Modern Manufacturing

Seizing the AI opportunity in manufacturing



Manufacturing is at a critical moment of promise and challenge. The vast volumes of data being generated by digitised operations and the Internet of Things (IoT) explosion holds transformative insights that can revolutionise the industry. Rapidly evolving artificial intelligence (AI) solutions can uncover these insights and make them actionable in real time, leading to more efficient, faster, and cost-effective operations.

However, to fully realise this potential, manufacturers need digital infrastructure that can handle the forces of Data Gravity, integrate from the core to the edge, and operate securely across borders, and in real time.

A recent insights article by Boston Consulting Group (BCG), *'Shaking up the factory floor with digital and AI'* emphasises the importance of long-term infrastructure investments: "consider investments required to support the long-term vision, providing sufficient and reliable data and integrated systems as your technological sophistication increases over time."[1]

It's clear that many still need to address their infrastructure before enhanced value can be gained from data and AI. David Schultz, an industry expert and Director for the SMIIoT Division of the International Society of Automation, told Automotive Manufacturing Solutions (AMS): "Companies are still using paper-based reporting and manual data entry, yet they're talking about implementing AI."

He advises manufacturers to focus on building a robust data architecture before diving into AI solutions.[2]

This paper highlights the transformative potential of AI in the manufacturing industry and the critical role of robust digital infrastructure in realising this potential.

[1]Shaking Up the Factory Floor with Digital and AI, 2024, BCG
[2]Smart manufacturing: Data, AI, and digital transformation, 2024, AMS

Key takeaways

1. AI and data-driven transformation

AI and automation can revolutionise manufacturing by improving predictive maintenance, quality control, and supply chain resilience. These advancements can lead to more efficient, faster, and cost-effective operations.

2. Addressing data gravity

The increasing volume of data makes it harder to move and process. Instead of moving data to applications, manufacturers should bring applications to the data, facilitated by colocation facilities and hybrid cloud environments.

3. Global supply chain resilience

AI-powered supply chain management supported by a globally interconnected network of data centres, can help manufacturers navigate complex geopolitical risks and enhance supply chain agility.

4. Unified digital infrastructure

A Hybrid IT solution that integrates cloud, edge, and on-premises data ecosystems ensures seamless data flow, reduces costs, and maintains compliance, making it easier for manufacturers to scale and deploy advanced technologies.

"Consider investments required to support the long-term vision, providing sufficient and reliable data and integrated systems as your technological sophistication increases over time."

Boston Consulting Group

Overall, the document serves as a comprehensive guide for manufacturers looking to leverage AI and data to enhance their operations and supply chains, while also addressing the infrastructure challenges that come with it. It offers actionable insights and solutions to help manufacturers stay competitive and efficient in the digital age.



1. Key manufacturing AI use cases and their data implications

Smart manufacturing has the potential to transform the industry. AI and automation can help organisations to leverage the vast volumes of data created by manufacturing processes, making operations faster, more efficient, and more cost-effective.

Key use cases include:

Predictive maintenance: Integrating AI with IoT sensors can, for example, help identify wear and tear within machinery, allowing for proactive maintenance scheduling.

Quality control: Rapidly detecting anomalies ensures continued excellence in production.

Supply chain resilience: Intelligent forecasting capabilities can optimise inventory management.

To succeed in these areas, manufacturers need high-performance data processing. However, the challenge of Data Gravity challenges this transition. Manufacturers are having to serve a growing number of endpoints and users, which is moving workloads to the edge and driving the need for more connected data.

Gartner® predicted that 2025 will be the year that 75% of enterprise-generated data will be created and processed outside of traditional centralised data centres or the cloud, highlighting a transition to edge computing.[3]

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Gartner

"Instead of moving data to where the apps are, **bring the apps to where the data is.**"

Tony Bishop
Senior Vice President, Enterprise Platform & Solutions, Digital Realty

To address this, scalable and secure hybrid cloud and decentralised edge infrastructure, supported by high-speed and low-latency networks, ensure the seamless data processing that AI and automation workloads require in manufacturing.

2. Overcoming Data Gravity with robust infrastructure

Let's take a closer look at the Data Gravity challenge and how manufacturers can overcome it. In 2024, Digital Realty conducted a global study to understand how and why enterprises are rethinking data strategies at the global, regional, local, and industry levels to capitalise on AI business value.[4]

The study found that nearly three-quarters of organisations (73%) now tie a data location strategy to their AI plans. It also observes: "Having the right locations is paramount to overcome data and proximity challenges associated with Data Gravity, an objective cited by 56% of the overall respondents." As Tony Bishop — the Senior Vice President for Enterprise Platform & Solutions at Digital Realty — advises in the report: "Moving data creates latency and cost. Instead of moving data to where the apps are, bring the apps to where the data is."

The report concludes that: "AI is nearly universally considered the key to unlocking new business value. However, that goal is not possible without reimagining infrastructure, so data and users are adjacent to storage and processing."

Colocation facilities are a key part of the solution. They place data and applications in close proximity, reducing latency and improving throughput. This setup allows enterprises to manage big data more effectively, enabling faster processing and better

[3]The Critical Role of Data Center Technology in Transforming the Manufacturing Industry, 2024, Cisco
[4]Global Data Insights Survey, 2024, Digital Realty

AI-assisted decision-making. Colocation facilities also address the significant power demands of AI processes by optimising power and cooling for multiple tenants, providing cost-effective solutions, and enhancing performance.

3. Enabling agile, connected supply chains globally

The supply chain landscape for manufacturers is becoming increasingly complex, with geopolitical risks, tariffs, and compliance demands. However, AI-powered supply chain management, enabled by secure and seamless data exchange, can help manufacturers overcome disruptions and streamline operations.

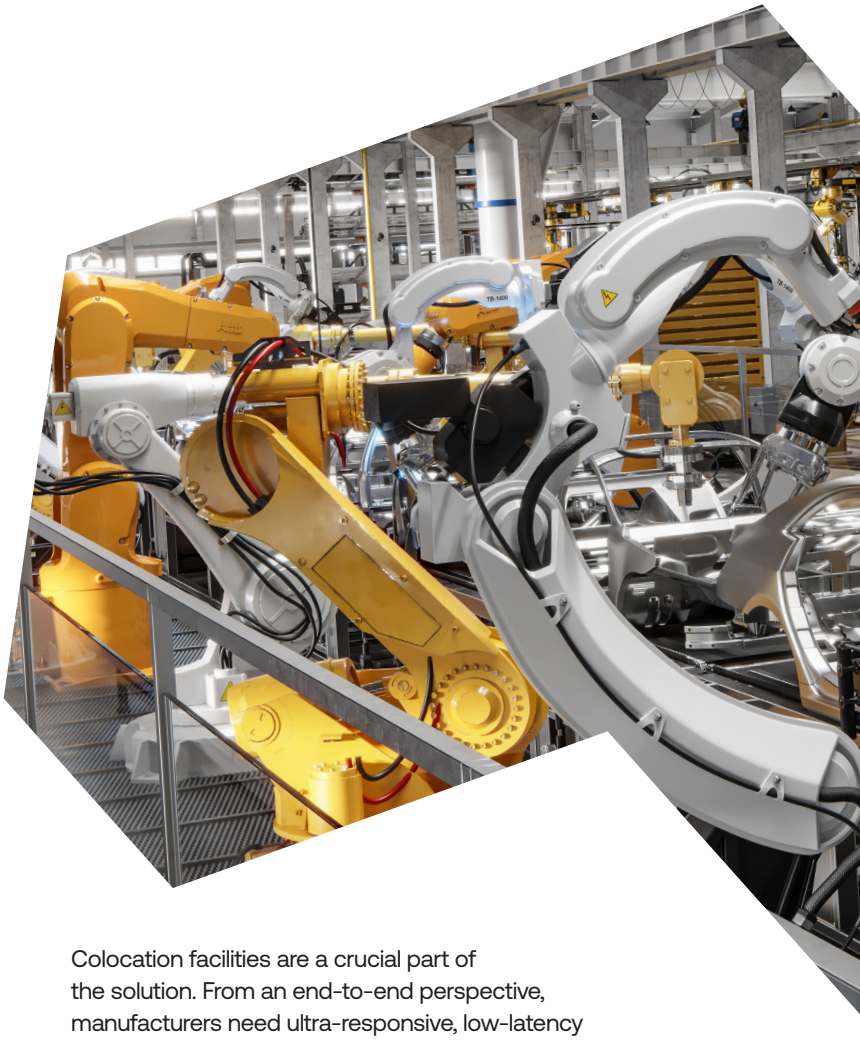
Trade becomes easier with a global network of data centres to support cross-border logistics in real time. Globally interconnected cloud solutions make frictionless data exchange possible, supporting compliance and facilitating multinational supply chains. And at the same time, AI-driven solutions can improve demand planning and forecasting, helping to optimise supply chains for maximum efficiency.

This creates additional impetus to identify the right digital infrastructure – one that empowers manufacturers to achieve faster go-to-market strategies, better inventory control, and regulatory agility. A global IT and data centre infrastructure can make supply chains more adaptable, creating a resilient, AI-powered logistics ecosystem.

4. Unifying cloud, edge, and on-premises data ecosystems for next-generation manufacturing

So, at this time of heightened opportunity and challenge, how can manufacturers combine the elements of modernised infrastructure to accelerate their AI use cases, support a connected supply chain, and ensure operations remain cost-effective?

Indeed, when data is everywhere, how can you consistently achieve the performance demanded by AI and automation strategies?



Colocation facilities are a crucial part of the solution. From an end-to-end perspective, manufacturers need ultra-responsive, low-latency IT environments that can operate across distributed operations. A hybrid IT solution that operates from the edge to the cloud to on-premises, and balances performance with cost and compliance.

Transferring massive amounts of data over long distances can be costly and impractical. By unifying cloud, edge, and on-premises data ecosystems, manufacturers can minimise these costs, ensuring seamless data flow and processing. Interoperable, cloud-agnostic infrastructures maintain agility across both production and supply chains. Processing at the edge can reduce bottlenecks and improves the quality of mission-critical workloads. A Hybrid IT solution both supports and optimises AI-driven process automation.

Future-ready manufacturing environments run on high-performance, cloud-agnostic IT infrastructures, ensuring seamless scalability and cost-effective digital transformation. For manufacturers, these strategies make real time smart factory automation possible, without vendor lock-in.

Conclusion

The manufacturing industry stands at the threshold of a new era, one where artificial intelligence (AI) and data-driven technologies promise to revolutionise operations, enhance efficiency, and drive unprecedented levels of innovation. Realising this potential requires more than just adopting the latest AI solutions — it demands a robust and strategic digital infrastructure that can handle the complexities of Data Gravity, support real-time data processing, and ensure secure, compliant, and agile operations across global supply chains.

By focusing on key use cases such as predictive maintenance, quality control, and supply chain resilience, manufacturers can unlock significant value from their data. The challenge lies in building an infrastructure that seamlessly integrates these AI applications, from the core to the edge, and across on-premises and cloud environments. Colocation facilities and hybrid cloud solutions are pivotal in this journey, offering low-latency, high-performance, and cost-effective data processing capabilities.

The global reach and local expertise of partners like ePlus and Digital Realty are crucial in navigating the complexities of modern manufacturing. Their comprehensive offerings, including zero downtime risk, move-in ready data centre suites, and High-Density Colocation, provide the foundation for a resilient and efficient digital transformation. In partnership, Digital Realty and ePlus ensure a structured and effective path to implementation, reducing unnecessary complexity and enhancing operational performance.

In an increasingly interconnected and data-intensive world, the ability to process and act on data in real time isn't just a competitive advantage — it's a necessity. By investing in the right digital infrastructure and leveraging the expertise of trusted partners, manufacturers can build smarter, more agile, and more resilient operations. This not only prepares them for the challenges of today but also positions them to seize the opportunities of tomorrow, ensuring they remain at the forefront of the smart manufacturing revolution.

Begin your data and AI-ready strategy

At Your Desk Tomorrow

- Understand core business objectives
- Get your data house in order
- Future-proof IT architecture
- Pick the right partner

Get started today.

1. Request a strategy briefing
2. Engage in a solution workshop
3. Co-produce a validated design
4. Co-develop an implementation plan



Learn more

Discover how our AI-ready architecture can help you unlock data insights to propel innovation

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About Digital Realty

Digital Realty brings companies and data together by delivering the full spectrum of data centre, colocation, and interconnection solutions. PlatformDIGITAL®, the company's global data centre platform, provides customers with a secure data meeting place and a proven Pervasive Datacenter Architecture (PDx®) solution methodology for powering innovation, from cloud and digital transformation to emerging technologies like artificial intelligence (AI), and efficiently managing Data Gravity challenges. Digital Realty gives its customers access to the connected data communities that matter to them with a global data centre footprint of 300+ facilities in 50+ metros across 25+ countries on six continents. To learn more about Digital Realty, please visit **digitalrealty.com** or follow us on **LinkedIn** and **X**.

About IGXGlobal

IGXGlobal is an ePlus Technology inc. company. As a technology systems integrator with decades of experience at the forefront of digital transformation, IGXGlobal collaborates with its clients to design, build, and deploy secure cloud, on-premise, and hybrid infrastructure solutions. The company's expertise straddles data center, networking, cloud, security, and AI.

IGXGlobal excels in quickly identifying the right solutions through its team of highly skilled consultants and strong partnerships with leading technology vendors. The IGXGlobal team tailors the best solution for your specific use case to deliver targeted point solutions, providing exceptional support at every stage, including pre-sales workshops and assessments to identify your unique goals and challenges.

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