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TwinThread: Digital Twins & AI - The Journey to Autonomous Operations & Continuous Innovation

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Digital Twins & AI

The Journey to Autonomous Operations & Continuous Innovation

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The COMPLETE AI-Powered Digital Twin Platform

What is a Digital Twin?

A digital twin is a virtual, real-time representation of a physical asset, system, or process.

The twin can reflect a single asset, a collection of field-based assets, a process within a manufacturing environment, or an entire multisite industrial operation.

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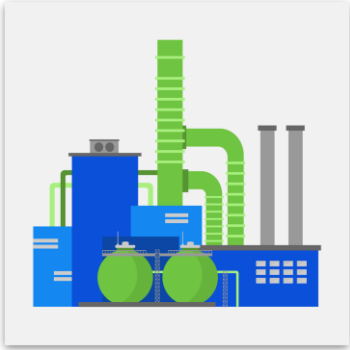

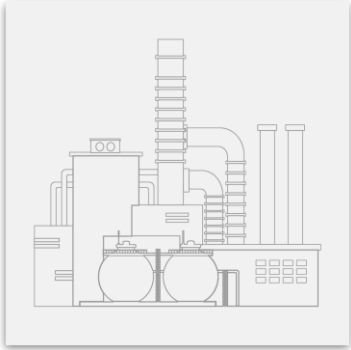

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AI-Powered Digital Twin Platform Requirements

Rapid Time to Value

Implement a solution quickly and efficiently prove value as fast as possible

Operationalization

Identify improvement areas and act on insights and recommendations

Stability & Longevity

Maintain the solution without added resource costs or additional work

Scalability

Scale the solution on all equipment, lines, and facilities - across the enterprise

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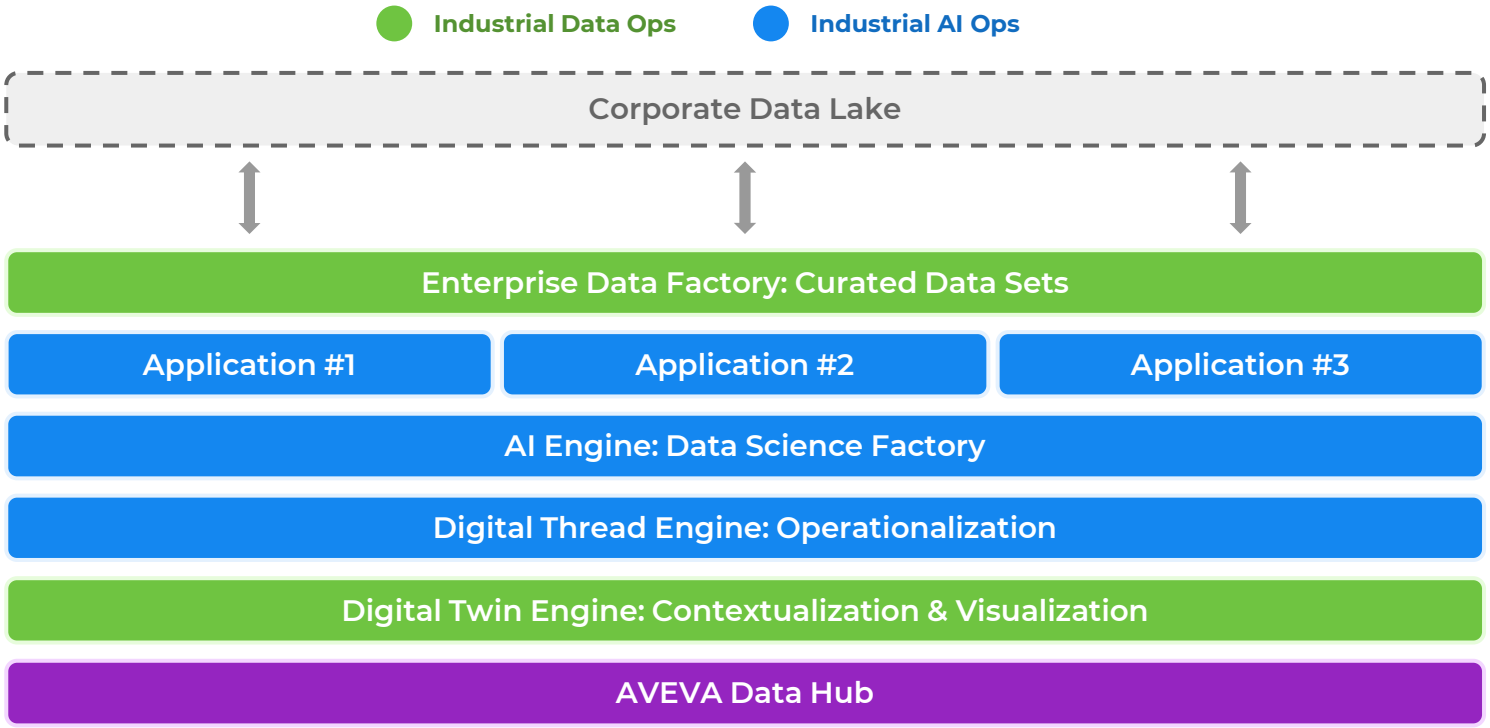
TwinThread Digital Twin Platform Stack



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IIoT Digital Twin Options

Off-the-shelf software tools, platforms, and packaged applications

Building your own solution from scratch

Building components from scratch in combination with tools or platform components from various suppliers

Stitched together components from a range of suppliers

The Economic Case for AI in Operations

Energy Intensity	→	5% - 10%
Material Losses	→	1% - 3%
Production / Capacity Increases	→	2% - 5%
Yield Improvements	→	1% - 3%
Reliability Improvement	→	5% - 15%
Quality Improvement	→	25% - 50%

Impact @ Scale : 5-8% Gross Margin Improvement - 12x Return On Cash (3yr)

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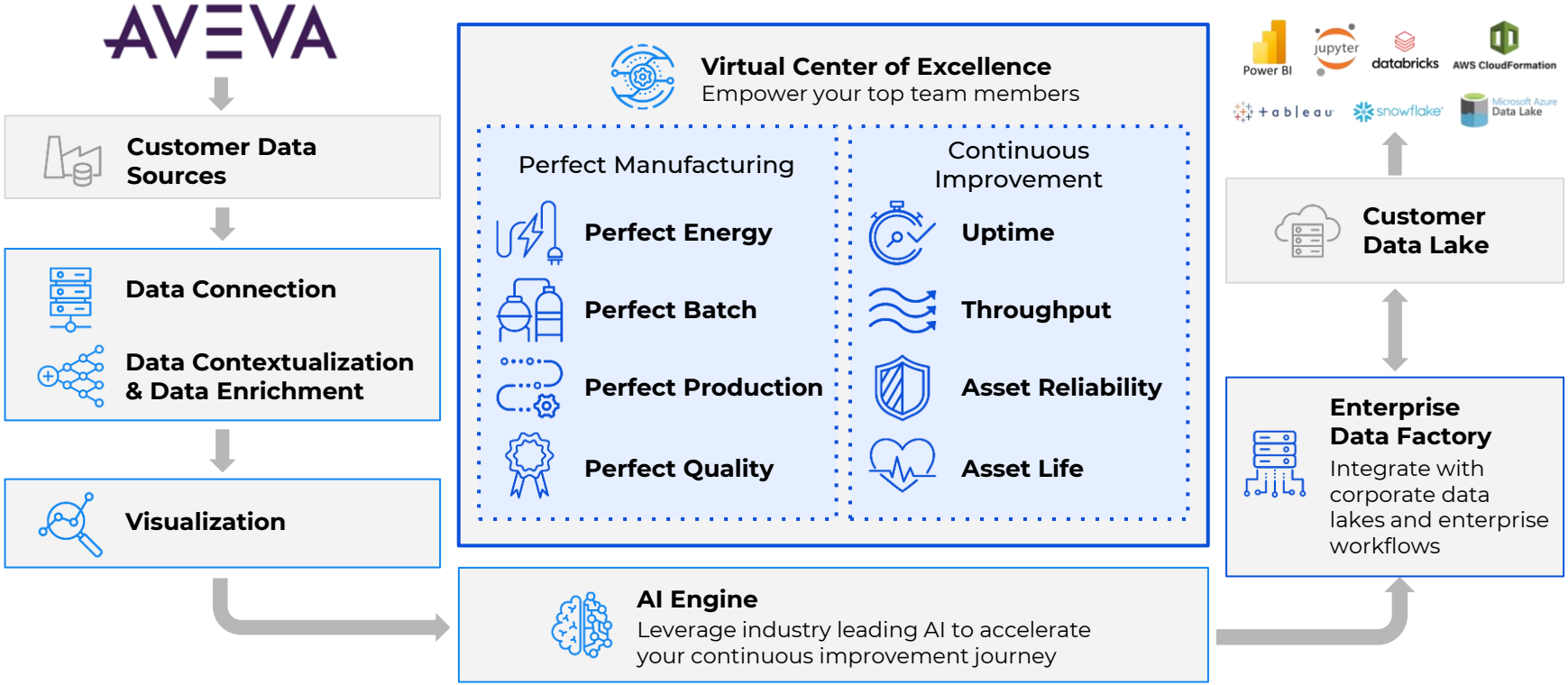
TwinThread's AI-Enabled Applications



AI and the Journey to Autonomous Operations

How Digital Twins + AI Transform Your Supply Chain

Levels of Autonomous Operations

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Composite Models in Action

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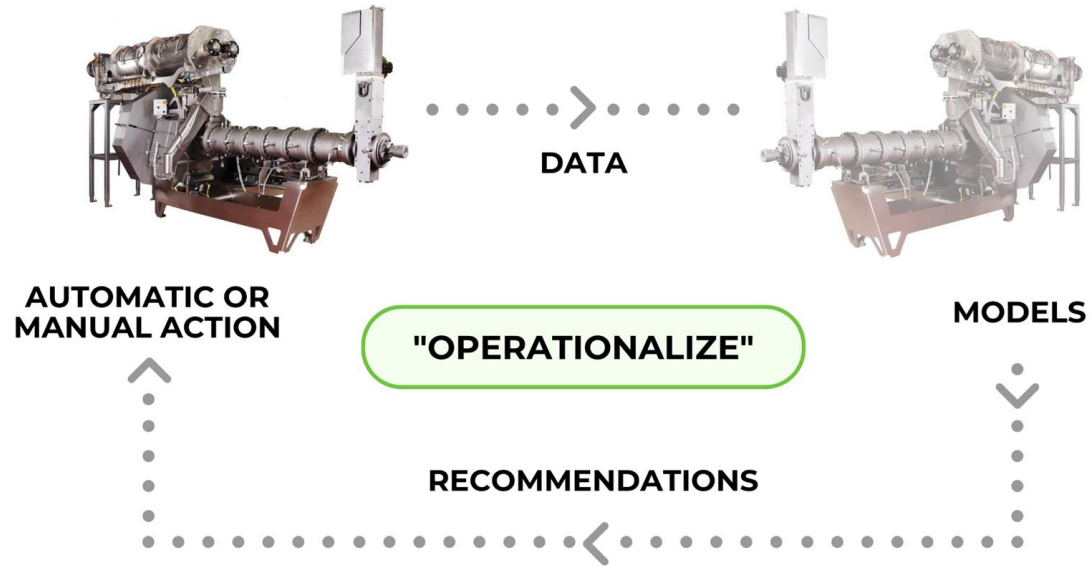
Autonomous Control

Autonomous control of key quality parameters in food manufacturing



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Data is Your Competitive Advantage

"If you own the data, you own the model produced from that data"

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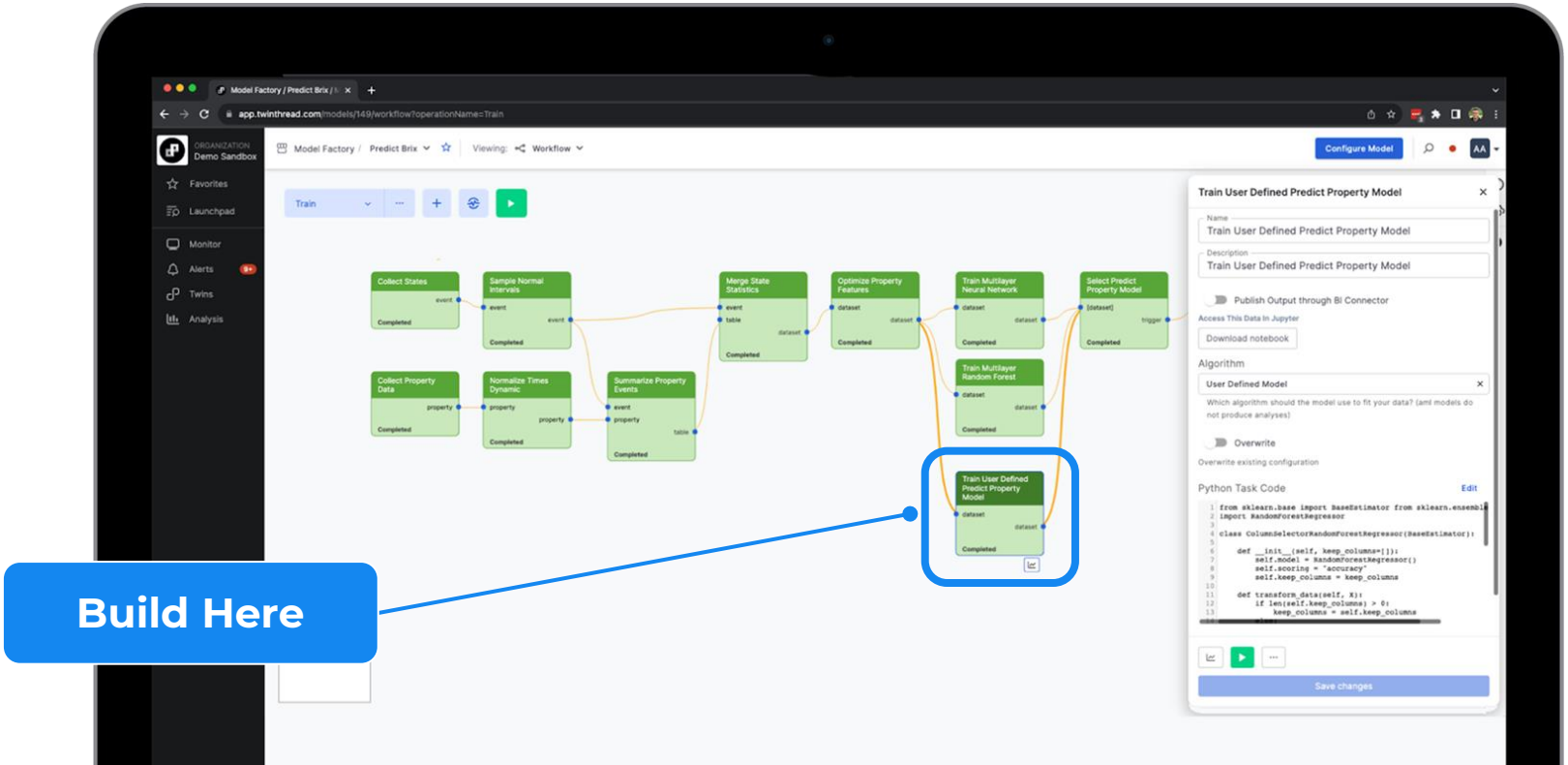
It is Best to “Buy” First, Then “Build”



How Do I Know Which Use Cases to Apply AI?

Characteristics of Ideal Use Cases:

1	2	3	4	5
Has historical data available: 3 months to 1+ year	**Metric and outcome are well defined**	**There is high variation in the metric**	**Meaningful economic benefit in outcome**	**Same or similar objective across many / all sites or production lines**
	Reduce Unplanned Downtime by 15%	Unplanned Downtime is 19% +/- 10% month to month	Consider cost of change management	There is opportunity to scale

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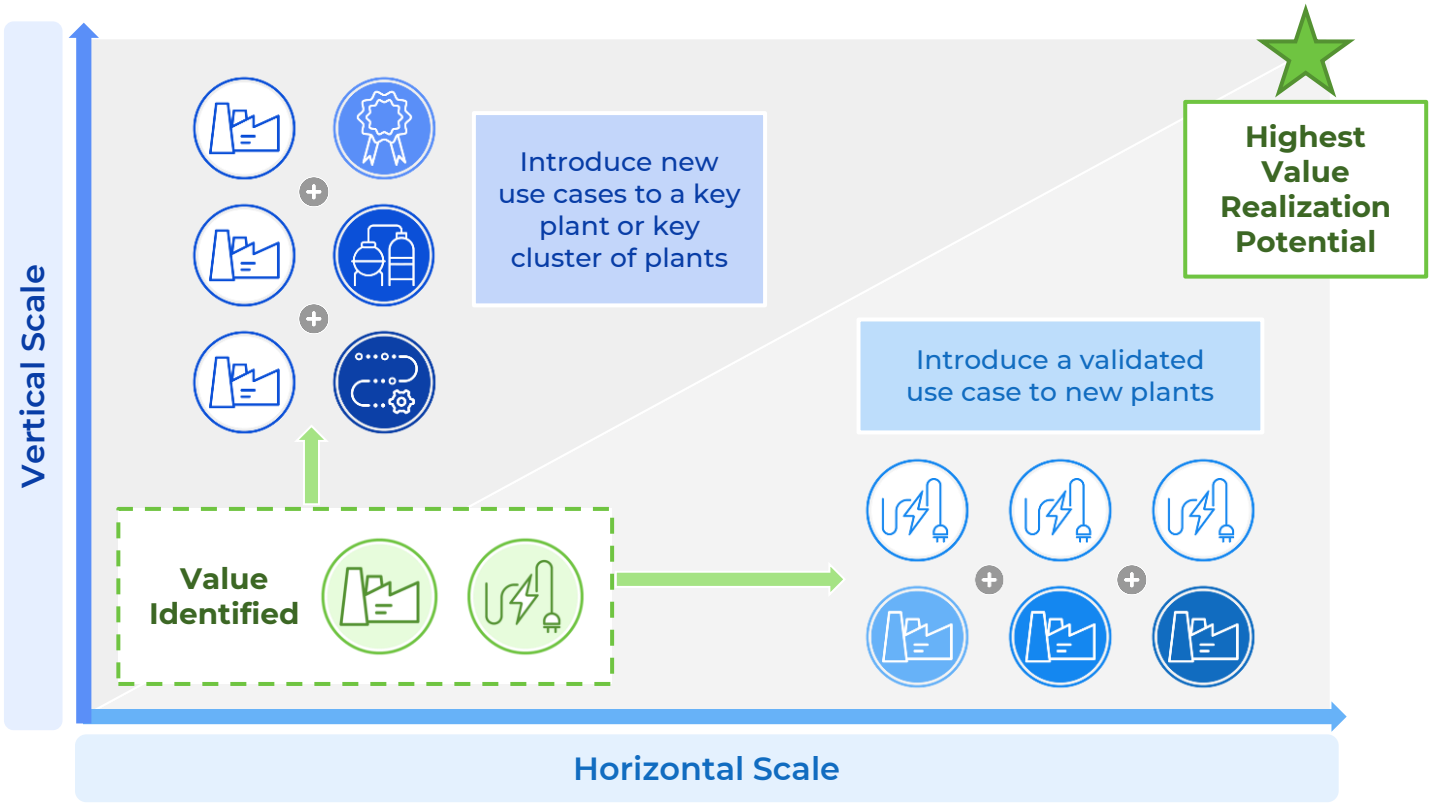
Maximize Value Realization



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Overcoming Barriers to Scaling AI Use Cases

Problem	Solution
Inconsistent [tag] naming line to line	Digital Twins
Different lines have different equipment	Automated “AI Ops”
Configuration burden at scale	Digital Twin Classes
Storage and Compute burden at scale	Automated “Data Ops”
Lack of skilled / experienced resources	Virtual Center of Excellence

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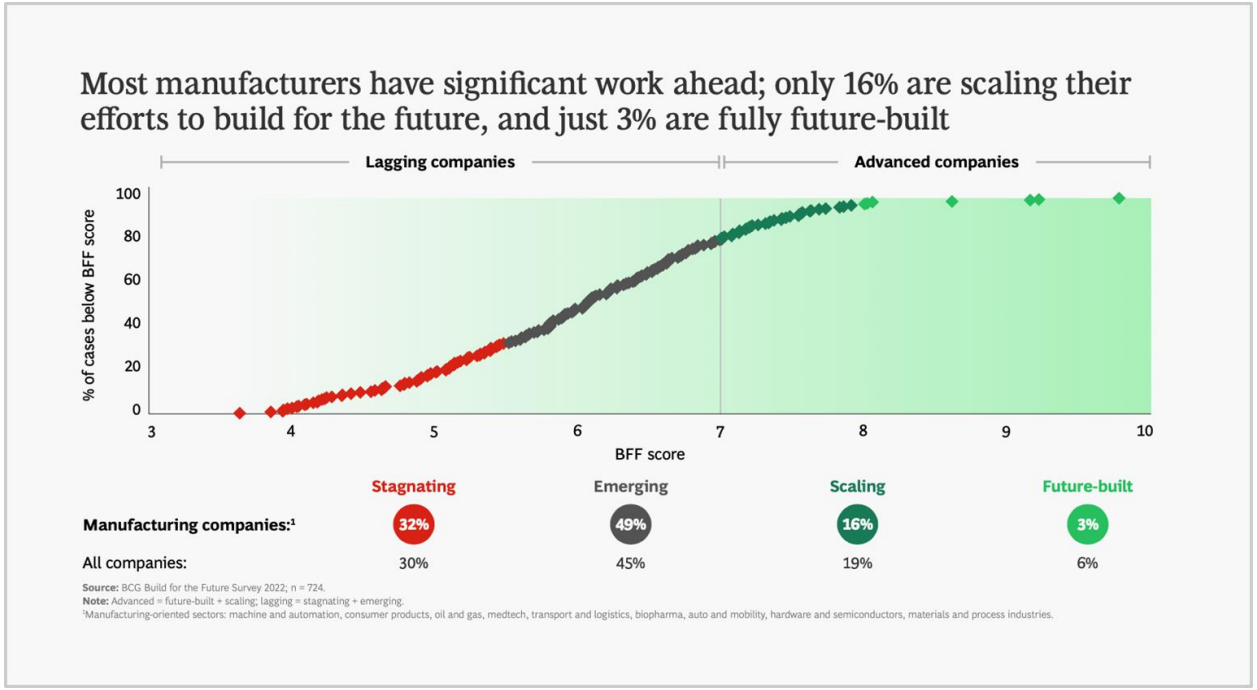
The Virtual Center of Excellence (VCoE) and a Modern Continuous Innovation Process

Just 3% of manufacturers are fully future-built



https://www.bcg.com/publications/2023/designing-factories-built-for-the-future

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The foundational dimensions for factory of the future success directly align with the six key attributes that enable a future-built company

 **People**	1	Align **leadership around a corporate purpose**, particularly sustainable manufacturing.
	2	Develop a clear **people advantage** by attracting, upskilling, and retaining top talent and building the capabilities to drive innovation, operational excellence, and exceptional customer satisfaction.
	3	Institute an operating model to enable **agility and resilience**, making supply chains more responsive and durable to efficiently deliver products.
	4	Establish an **innovation-driven culture** by empowering employees to explore emerging technologies, leverage analytics, and apply advanced solutions to improve operations.
	5	**Embed AI** in the organization to increase transparency, analyze performance, forecast more accurately, and optimize production.
 **Technology**	6	Migrate to **modernized tech platforms**, including scalable infrastructure to leverage the power of manufacturing data and capitalize on advanced technologies such as AI.

Source: BCG Build for the Future Survey 2022; n = 724.

https://www.bcg.com/publications/2023/designing-factories-built-for-the-future

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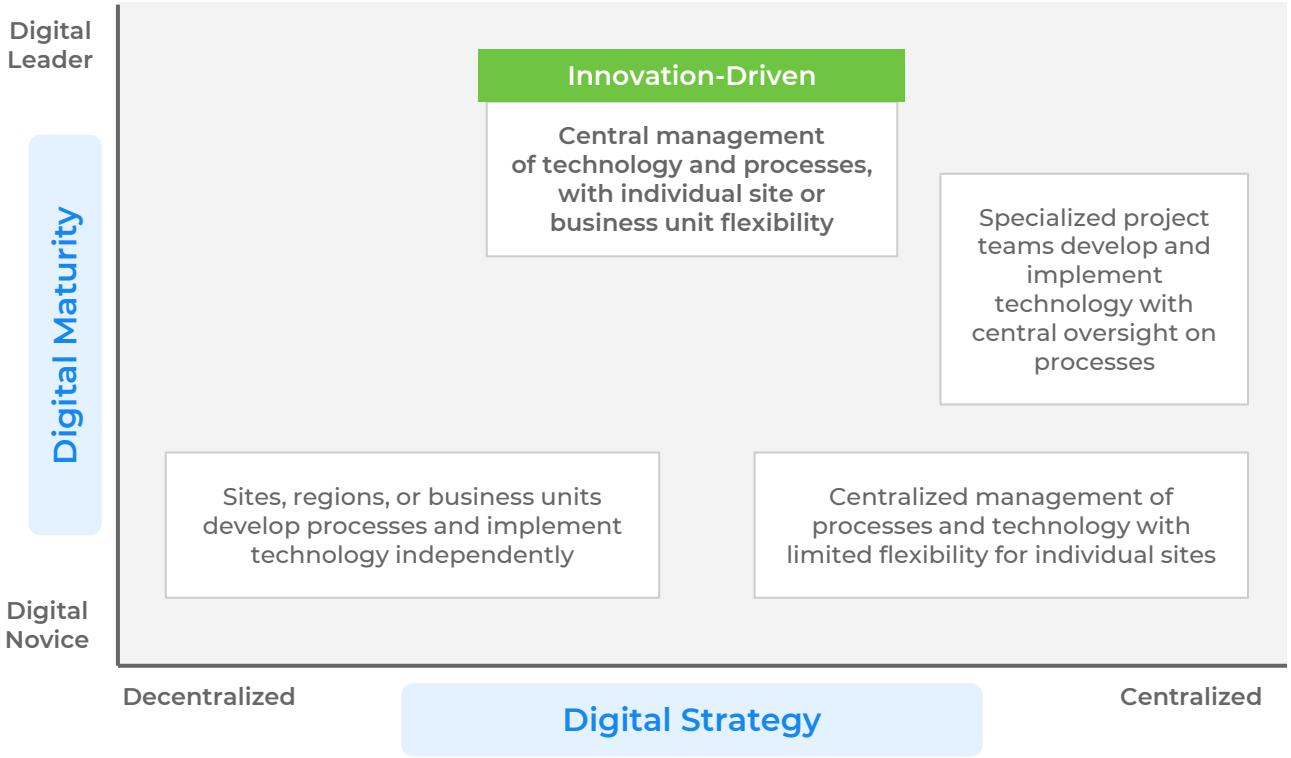
Digital Manufacturing Transformation



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Virtual Center of Excellence

The **Virtual Center of Excellence** brings multiple teams together with a shared mission and shared operational context

The **Virtual Center of Excellence** is the command center for coordinating a modern, scalable Continuous Innovation Process

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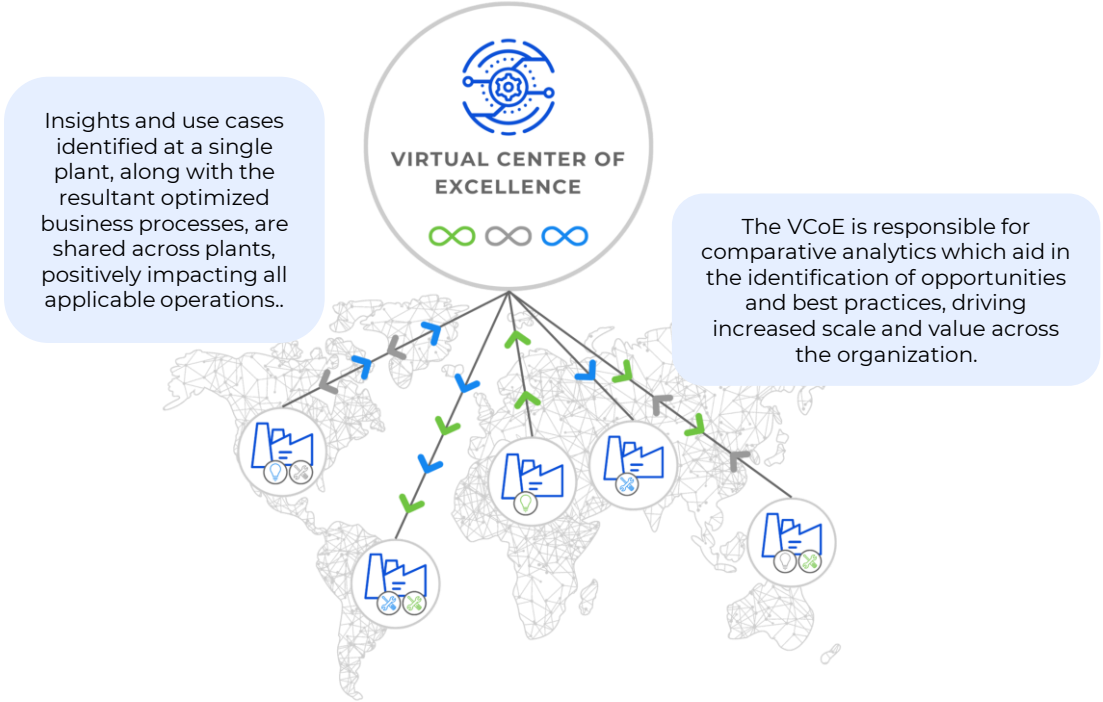
Modern Continuous Innovation & Improvement

Continuous Improvement will always be an important concept for industrial operators. How this concept is approached; however, is positively evolving in the age of AI.

Digital Twins accelerate the speed at which improvements are identified, prioritized and implemented by leveraging AI powered data insight generation capabilities and the enablement of advanced collaboration through TwinThread's Virtual Center of Excellence.



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Key Takeaways

1. Digital Twin, powered by AI, is the foundation
2. Rapid time to value, operationalization, sustainability and scalability are key
3. Requires a complete platform stack
4. Protect your data and your competitive advantage
5. Promote a continuous innovation mindset
6. Build from a foundation of fit-for-purpose AI enabled applications
7. Connect successful Innovation projects with a separate Scaling process

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Please remember to...

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Questions?

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