

AAA Value Chain Enabling Competitive Advantage to Business

整合性、適応性、俊敏性 (AAA) を備えたバリューチェーンでビジネスの競争優位を実現

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Agenda

- About Micron
- Why?
- What?
- How?
- Results?
- Next Steps?

About Micron

Micron is founded on **October 5, 1978**

Headquartered in **Boise, Idaho, USA**

Vision - Transforming how the world uses information to enrich life *for all*

\$30.8B
FY2022 annual revenue

4th
largest semiconductor company in the world

17
countries

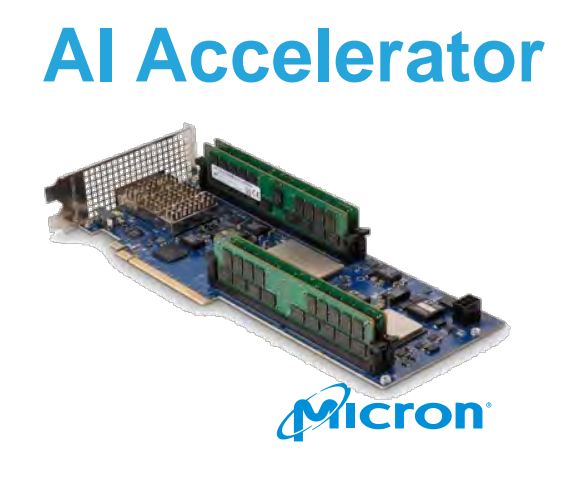
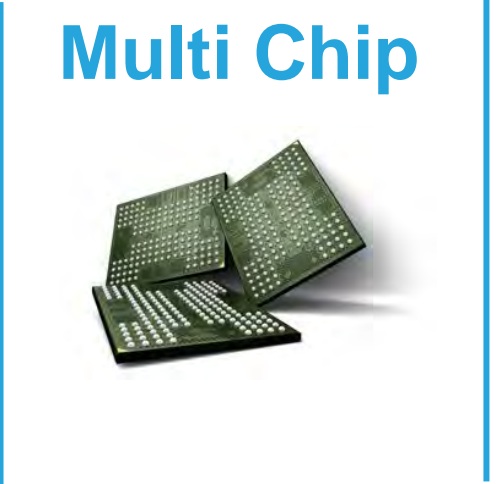
11
manufacturing sites & 15 customer labs

48,000
team members

Micron Is All Around You From Smartwatches to Supercomputers

Micron
For the enterprise

crucial
by Micron
For consumers



How long will it take? for a competitor to catchup on,



New Product Feature

ex: Touch screen, high resolution camera, extra blade to a razor

Months



New Technology

ex: 3D NAND, 5G, Smart Phones, Smart Watch...

Years



Supply Chain

ex: Dell Direct, Amazon last mile delivery, Apple product launch, Samsung new products time to market, Walmart cost, Uberization of assets. . .

Decades

Supply Chain can provide competitive advantage that will last for decades to come...

What are we doing?

Aligned, Adaptable and Agile (AAA) Value Chain Enabling Competitive Advantage to Business



At Micron, Aligned, Adaptable, Agile Value chain is referenced as Demand Driven, Flexible and Responsive Value Chain
AAA Value chain term is borrowed from **The Triple-A Supply Chain** by [Hau L. Lee](#), Stanford School of Business



Aligned Value Chain

(整合性)



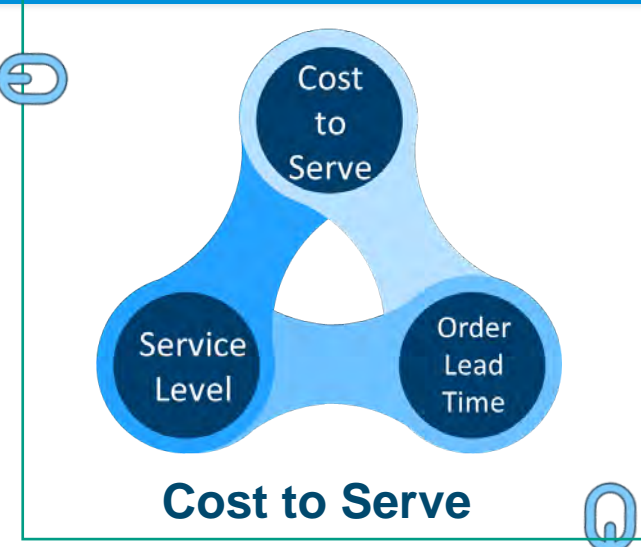
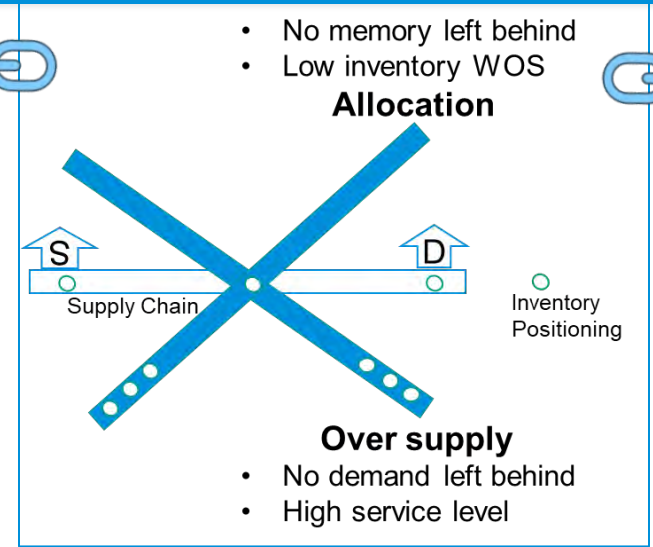
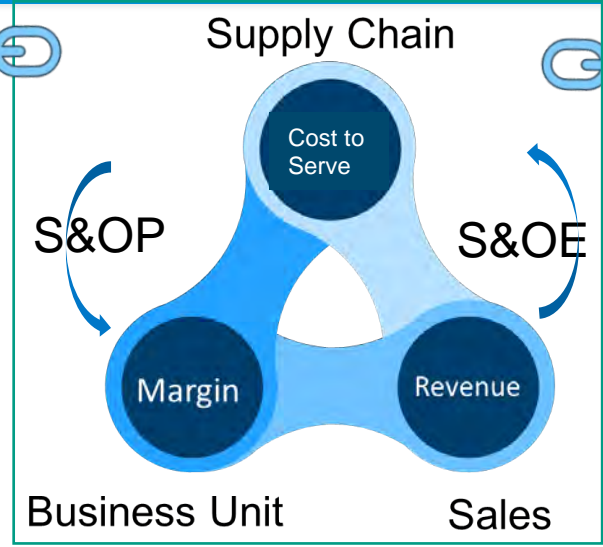
Aligned objectives between all Value chain partners customers, suppliers and Micron. Sales, Business Units and Supply Chain.

What are we doing?

Supply Chain, Manufacturing, Procurement, Engineering...

CUSTOMER

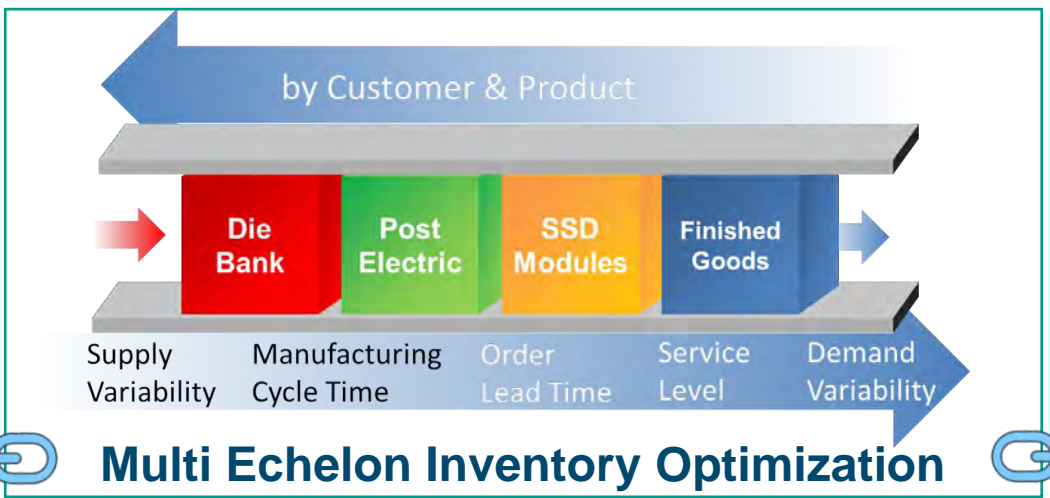
- Long Term Agreements
- Business Plan
- Customer Requirements
- Sell Thru. Market Share. Inventory. Allocation



SUPPLIER

- Long Term Agreements
- Supplier Material & Capacity Allocation
- Structural Flexibility

Agile & Adaptable Supply Chain



- Build to Order
- Build to Target
- Build to Forecast

Hub Virtual Hub Response to Forecast

Segmentation

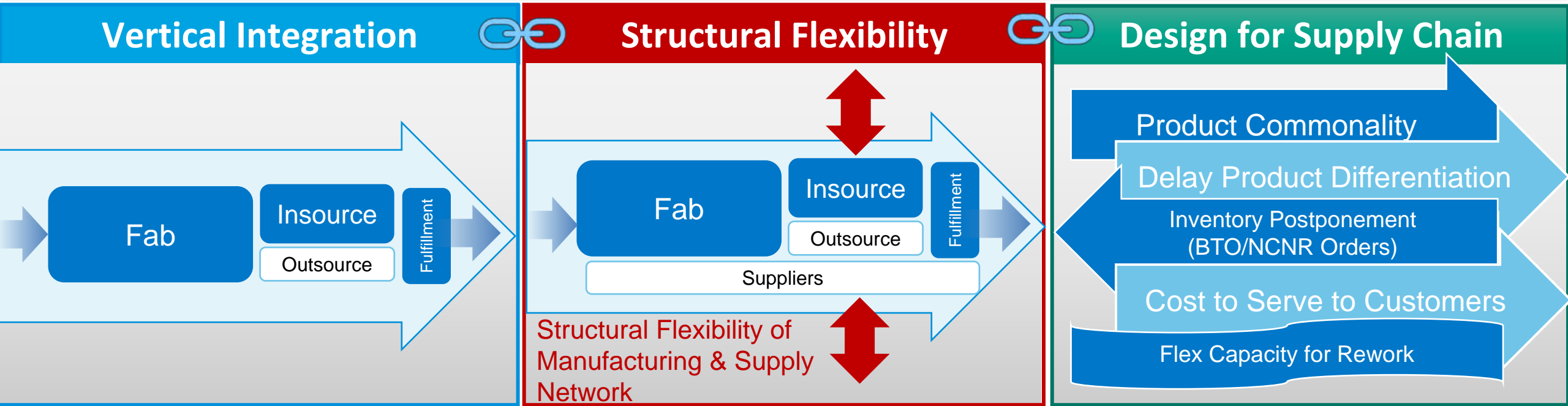


Adaptable Value Chain (適応性)



What are we doing?

to change in market conditions and geo-political-pandemic disruption



Vertical Integration

Structural Flexibility

Design for Supply Chain

Vertically integrated Supply Chain dynamically adapts to change in

- Market shifts (ex: mobile to compute...)
- Customer segments (Industrial to Auto...)
- Product Mix (ex: Capacity, form factor...)

Structural Flexibility of Manufacturing & Supply Network

- Insource and Outsource Assembly Capacity for scale and resiliency
- Supplier Constrained Capacity and Raw material Allocation
- Dual Product and Site Qualification
- Multiple Supplier Qualification

- Design for Supply Chain (DfSC) is a method of optimizing the fit between supply chain capabilities and product designs to minimize over all cost to serve customers
- DfSC is integrated with all stages of product life cycle management process



Agile Supply Chain (俊敏性)



What are we doing?

Is speed of Decisions, Planning & Execution, Information, Material and Cash flow

Planning Cycle Time

Flex Capacity & Inventory Buffers

Manufacturing Cycle Time

Customer Commits

Capacity Plan

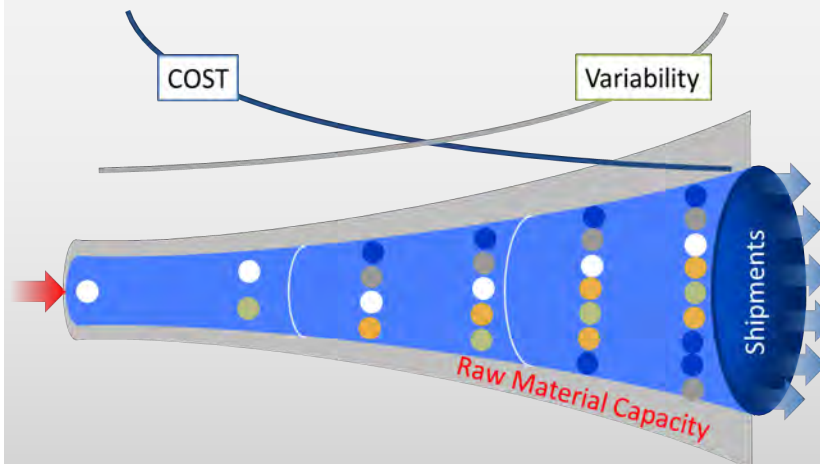
Supply Planning Optimization
 Hierarchical Linear Programming Solve Priorities

1. Maximize Margin
2. Maximize Revenue
3. Minimize Cost

Wafer Outs and Assembly Starts

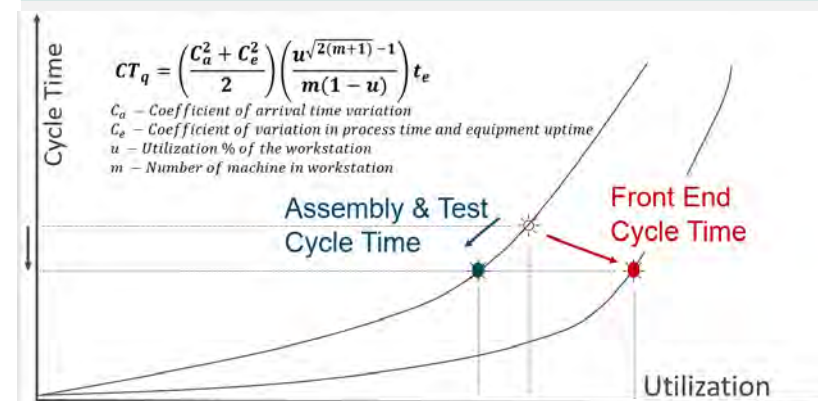
Purchase Requests

- Daily Supply Planning Optimization Run
- Weekly/Daily Aligned Plan across Supplier Requests, Manufacturing starts, Wafer outs, Capacity requests and Customer Commits
- Monthly S&OP Cycles aligned with S&OE



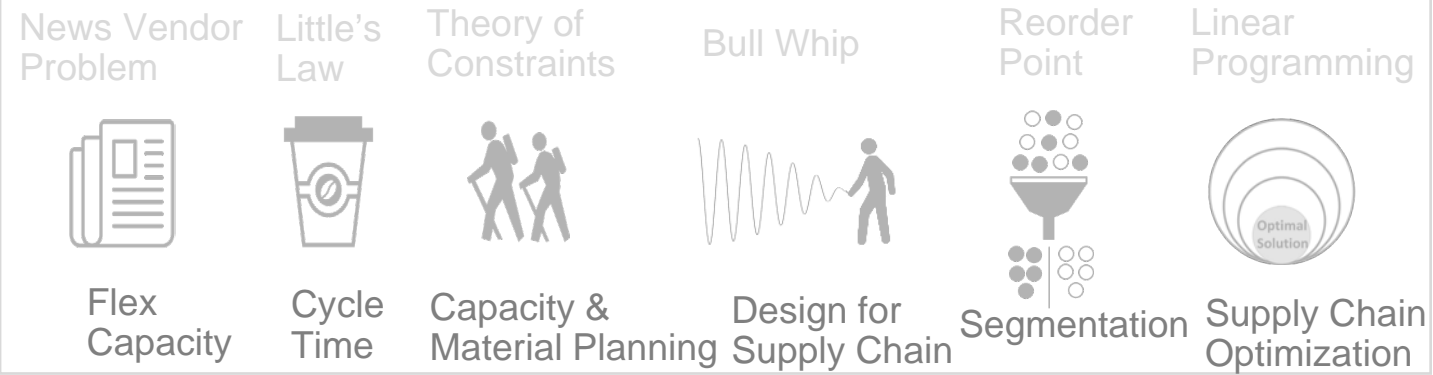
Fab Probe Memory Assembly Memory Test Module Assembly Configuration & Test

- Fab is optimized for Cost → Cycle Time → Scale
- Assembly and Test Capacity is optimized for Cycle Time → Scale → Cost
- Supplier Capacity is optimized for flexibility
- Multi Stage Inventory Optimization



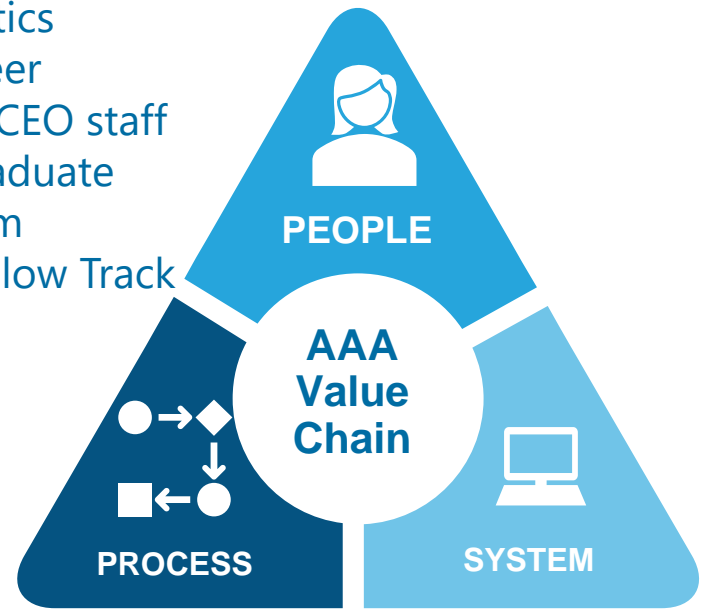
- Front end – move to different operating curve by reducing variability
- Assembly and Test – trade off between cycle time and utilization to achieve 1.-- x theoretical cycle time
- Shorter Supplier Lead Time
- Remix Flexibility at Assembly and Test



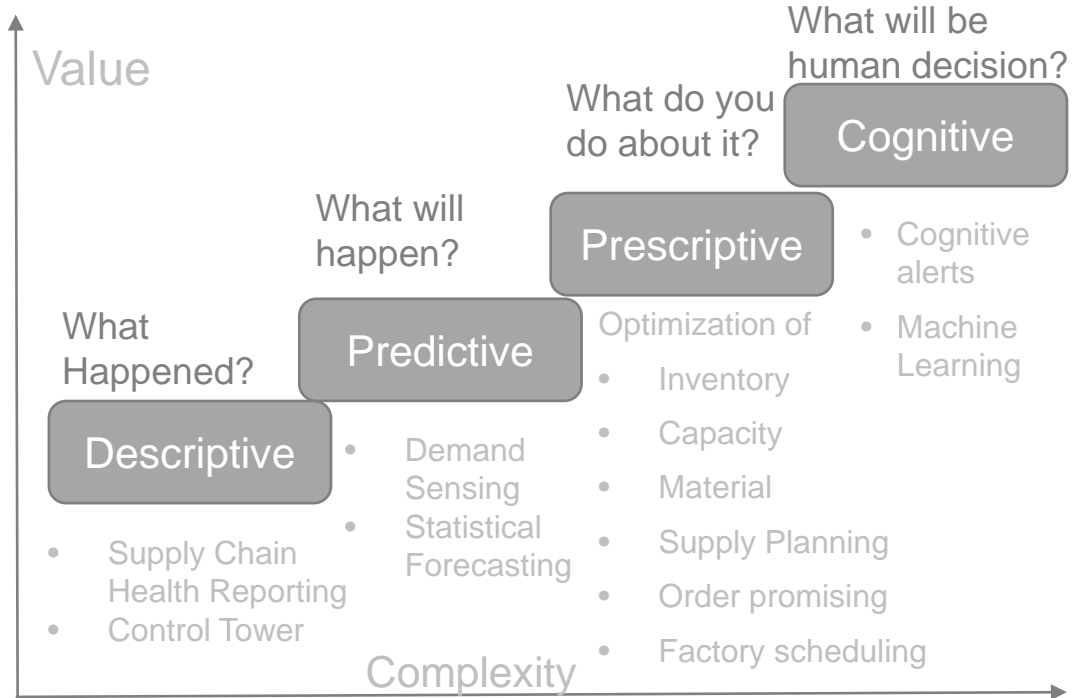


- Science of Supply Chain
- Advanced Analytics
- Industrial Engineer
- Supply Chain in CEO staff
- New College Graduate Rotation Program
- Supply Chain Fellow Track

How did we do?



- Cross Functional Collaboration & Alignment
- SC Digital Twin
- Enables AAA Value Chain
- Enables Scale



System of Innovation	Simulation Block Chain	Machine Learning Linear Programing
System of Differentiation	Supply Planning Optimization Order Promising	Multi Echelon Inventory Optimization S&OP
System of Record	Product Life Cycle ERP MRP	RPA Reporting EDI Mfg Execution Systems

At Micron, we enabled AAA Value Chain through
 1. People → 2. Process → 3. System Transformation over 4 years



AAA Value Chain Initiatives improved Customer and Inventory Metrics significantly

Aligned



Adaptable



Agile



1. Demand Driven Transformation
2. Inventory, Material and Capacity Optimization
3. Enterprise BOM, Production Orders Redesign
4. Supply Planning Optimization
5. One Micron Integration

What Next?

AAA Value Chain Enabling Competitive Advantage to Business

The unexpected is the new normal - the pace of change is accelerating; we should expect to deal with the churn.
Gartner Research

When compared to price increase, **poor supply chain performance is 2.6x more likely to lead to customer disloyalty.**
Gartner Research

Supply chain competes in the future as **collaborative digital ecosystems**, not distinct firms.
Gartner Research

83%+ of supply chain **workforce is overburdened.** Supply chain hiring score difficulty of 10 out of 10.
Gartner Research

Sustainability impacts enterprise strategy more than any other enterprise activity.
Gartner Research

Aligned

Reinvent e2e Alignment
Decisions, Priorities, frequency, Horizon

End customers, **Multi tier** customers, Suppliers, Competitors, Government, Service providers, Academia, Consultants...

Digital Twins enabling aligned people, process and systems.

Adaptable

Artificial Intelligence
validation of all hand-offs

B2B like B2C collaboration
Amazon.com visibility, AirBnB asset utilization, Uber feedback platform...

Explore future of supply chain technologies to enable **Disruptive Innovation.** Block chain, AI/ML...

Agile

Artificial Intelligence, Robotic Process Automation... decentralized use by planners like excel

Acceptable (受容性)

Sustainable. Peak Performance

Wellbeing Initiatives
Alignment on Supply Chain Strategy &

Sustainable Initiatives

AAAA Value Chain Enabling Competitive Advantage to Business

Aligned Adaptable Agile Acceptable Value Chain

