

Technology-Enabled Improvement in the Global Supply Chain

Terence T. Burton
President and Chief
Executive Officer



The Center for Excellence in Operations, Inc.

10 Chardonnay Terrace
Bedford, New Hampshire 03110
Telephone: (603) 471-0300

Tizianstrasse 104
D-80638 München Germany
Telephone: 0049 172 824 6401

www.ceobreakthrough.com

APICS

Today's Agenda . . .



1. Supply Chain Improvement: History and Current Status
2. Changing Competitive Dynamics
3. Technology-Enabled Improvement
4. Technology-Enabled Improvement Examples
5. Rethinking Strategic Improvement: *“Improving How We Improve”*
6. Questions and Discussion

Caveat

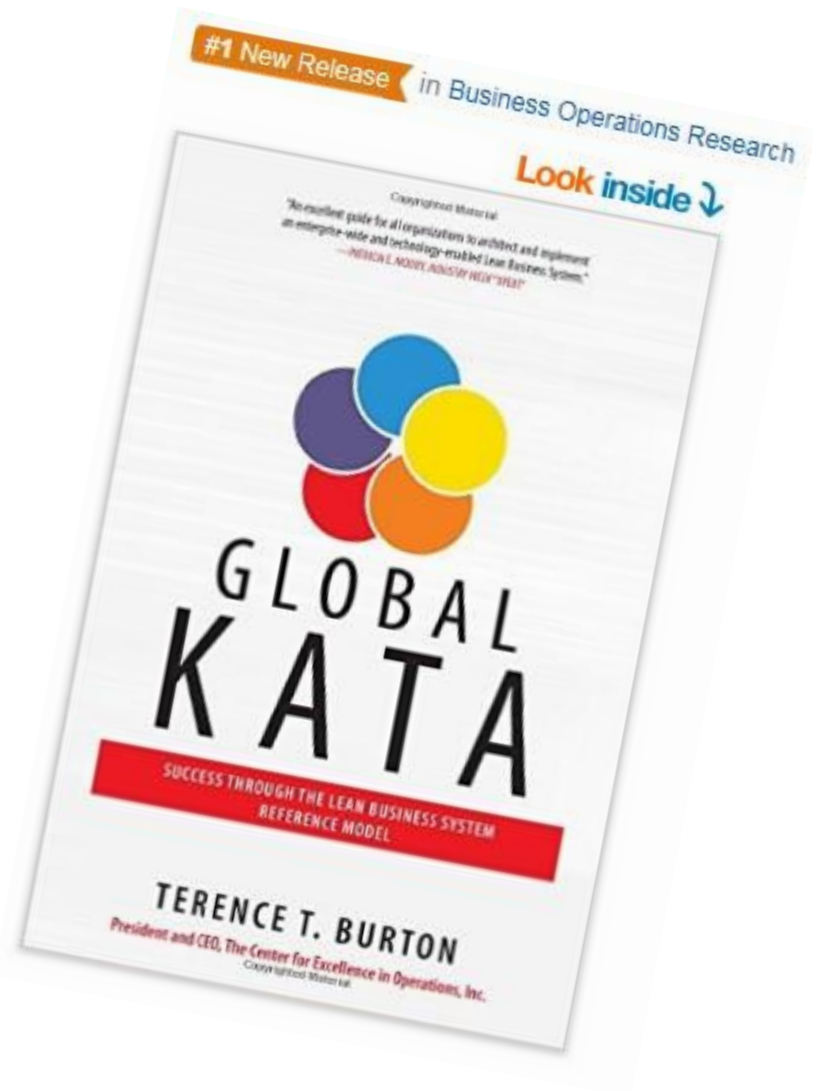


This APICS presentation includes content thinking from a new book by McGraw Hill, **"Global KATA: Success Through the Lean Business System Reference Model™"**.

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For additional information, visit www.ceobreakthrough.com or contact the author directly at burton@ceobreakthrough.com





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Technology-Enabled Improvement in the Global Supply Chain

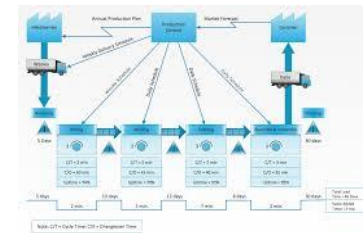
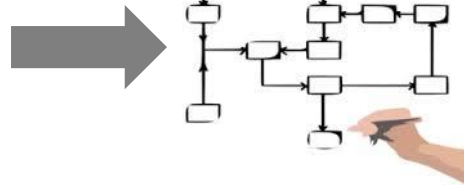
1. History and Current Status

History and Current Status



Value Stream Mapping (*i.e.*, “people communicating process”) has existed for thousands of years:

- Ancient Egyptians, Anasazi, carved stone and cave paintings, etc.
- 20th Century – Meat paper and tape, body diagrams, yarn and push pins, flow charting templates, functional flow charts, D&E size process drawings, TQM free-form charts, Word, PowerPoint, Excel, Visio, CAD.
- Breakthrough in 1999 – “Learning to See” (Shook, Rother) introduced standard VSM process, symbols, terminology consistent with Lean .



VSM became standardized, easy to understand, easy to teach, easy to document end-to-end processes and accompanying descriptive data, easy to share with others.

History and Current Status



From 1999 to present VSM has evolved into a commoditized improvement tool and procedure for documenting processes:

- Follow the recipe – *Field of Dreams* improvement.
- Memorize and mimick the principles, tools, terminology that people can “see” and as a result, become less observant.
- The process changes before VSM is complete: resource/time intensive, not responsive, wallpaper, irrelevant.
- VSM has gone viral in many supply chain organizations, generating more waste than value.

Same People + Same Thinking + Same Process = Same Results

- VSM Crossroads: Conceptually sound but “out-of-step.”
- The World has evolved but VSM has remained the same.
- Why? Why? Why? Why? Why?





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Technology-Enabled Improvement in the Global Supply Chain

2. Changing Competitive Dynamics

Changing Competitive Dynamics



Physical Assets
Equipment
Human-Based

1. “Morphing” of Process



3D Printing
Additive Manufacturing
Subtractive Finishing
Automation and Robotics
Software-Based



Professional-Based
Technology-Based
Software-Based

Changing Competitive Dynamics



2. Rapid Evolution of Transactional Processes



Physical Assets
Equipment
Human-Based
Outsourcing
Decreasing Value-Add

Interconnected Global Networks
Professional, Knowledge-Based
Complex Supply Chains
Shrinking Production Content
Material \$ ↑
Professional \$ ↑
Planning, Logistics \$ ↑



Professional, Knowledge-Based
Complex Supply Chains
Invisible Opportunities
High Transactional Content
Higher Human Dependency
Higher Value Contribution

Changing Competitive Dynamics

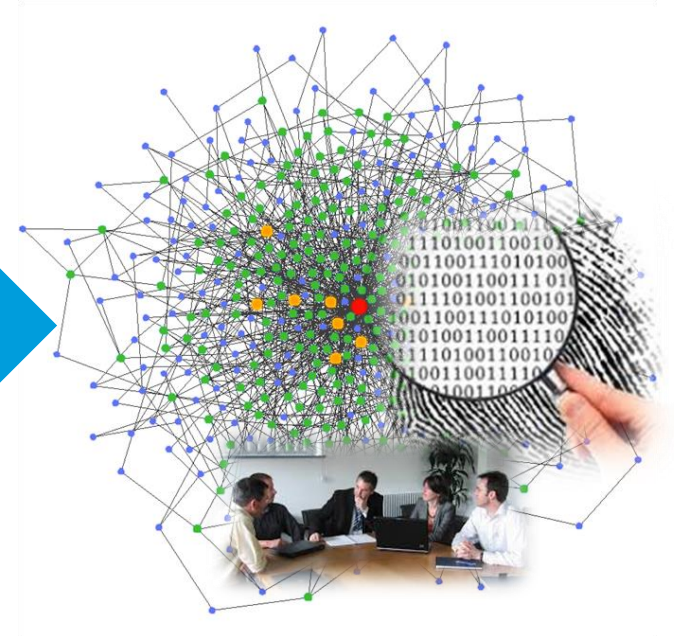


*Physical Assets
Equipment
Human-Based
Outsourcing*

3. Rapidly Evolving Technology

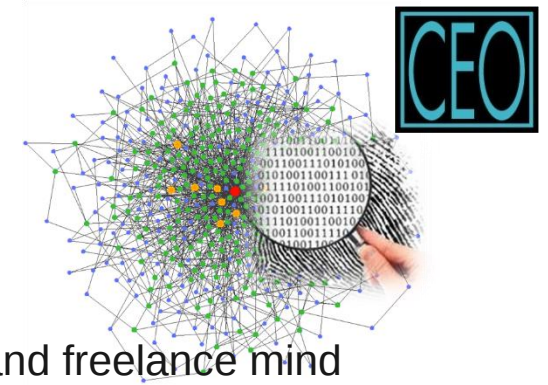


*Cloud and Mobility
Big Data
Business Analytics
Digital Performance Dashboards
Data Virtualization
Virtual Reality Value Chains
Real-Time Improvement (SIDAM)*



*Enterprise-Wide Improvement
Rapidly Evolving
Unknown, Undiscovered Opportunities
Technology-Enabled Improvement
Chronic Disruption
Innovation
Holacracy Organizations*

Changing Competitive Dynamics



“Transactional Forensics” - The Reflexivity Factor

These are situations where it is best to put all the tools aside and freelance mind map the problem situation and its cause and effect relationships.

- Many of these types of challenges have the presence of *reflexivity* – *circular relationships, interaction properties, and interconnectivity between causes and effects*. In essence, causes and effects are multidirectional and affect one another, so neither can be easily assigned as causes or effects. Furthermore, causes and effects are relative at any moment.

Cause?

Effect?

- These are very real challenges in the complex interconnected network of professional, technology-enabled, and knowledge-based transactional processes. These situations require deeper and broader skills and a designed experimental analytics approach (not Design Of Experiments or DOE), plus engagement of the right knowledgeable people.
- Basically this often involves designing and adapting non-standard analytical problem solving methodologies for these unique situations. Mimicking and throwing the standard TPS principles and tools at these complex situations creates nothing but an *improvement ricochet effect*.

Both?

Lean Manufacturing Out – Lean Supply Chains In

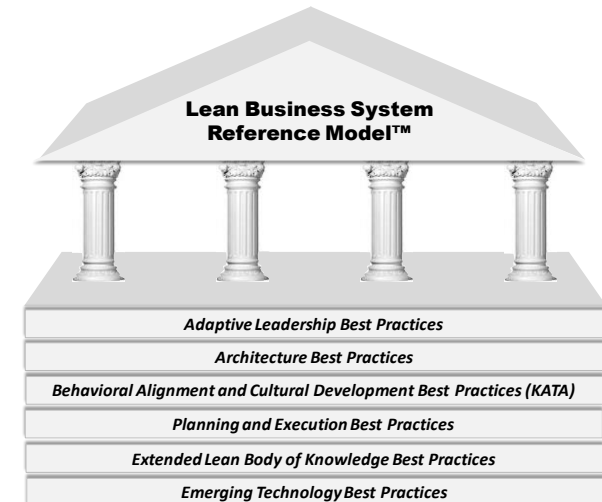


A breakthrough “process” of improvement

?

A higher order Lean or strategic improvement paradigm is needed to address these evolving complex structural, process, and technology changes.

“Improving how we improve”



Not more of the same

Top down, big bang program, train-the-masses, executive mandated, focus on production and tools-based, mimicking implementations, created activity, bogus reporting, questionable benefits and value

- *Laser targeted, rapid deployment, rapid results*
- *Enterprise-wide process scope*
- *Simplified, easy to assimilate into daily work*
- *“For real” Improvement KATA (nurturing the right behaviors and cultural attributes)*
- *Fully integrated body of knowledge vs. single point tools*
- *Technology-enabled, real time improvement*
- *Sustainable through many smaller quicker initiatives*
- *Positive value contribution, unquestionable ROI (Return On Improvement)*



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Technology-Enabled Improvement in the Global Supply Chain

3. Technology-Enabled Improvement

Technology-Enabled Improvement



Definition: The fusion of structured and disciplined strategic improvement (e.g., Kaizen, Lean, Six Sigma, TOC, etc.) with emerging technologies.

What are some of these technologies?

- **Big Data, Data Warehousing:** A central repository of data and information which is created by integrating data from multiple disparate sources. Data warehousing improves data quality and integrity by offering a repository of information that represents a single version of the truth.
- **Business Analytics:** The ability to analyze process performance in real time and make the right evidence-based, preventive and predictive adjustments. Business analytics enables us to execute what was once completed in a project, in real time using a critical thinking process that we refer to as a **SIDAM (Sense, Interpret, Decide, Act, Monitor . . . and continue repeating the process)**. Business analytics provides that "6th sense" needed for transactional process improvement because users and practitioners cannot sense problems before and during the point when they happen, (i.e., feel an invoicing error, hear an incorrect shipment, touch new products that will be late to market or include field reliability issues, see premium freight, or smell a customer service or warranty problem). In the transactional space, most organizations learn about problems after the fact.

Technology-Enabled Improvement



- **Real Time Digital performance dashboards:** This provides the ability to measure performance as it is occurring, almost like the stock market. The customer service organization in many organizations provides a great example of real time digital performance management. Other organizations view real time sales progress to the territory, region, and rep level; evaluate global supply vs. demand positions; monitor contractor quality performance; monitor distribution center and 3PL performance around the globe - and take the right data-driven actions to minimize problems. Well designed digital performance dashboards encourage real time engagement, empowerment, and self management.
- **Virtualization, Mobility, Cloud Technology:** This allows for the ultimate management by walking around. In traditional Lean thinking, there was a saying that we "go to the Gemba" (go out and observe the workplace). In retrospect this is a limited idea. Technology has now placed the Gemba within our fingertips on our iPads and iPhones, on a laptop at a table at Starbucks, in a Go-To-Meeting session, in our automobiles . . . And many other locations (virtual offices)
- **Data Visualization:** This is related to technology and deals with the emerging science of displaying data and information to convey ideas and conclusions effectively, both in terms of aesthetic form and functionality. Data visualization attempts to achieve a balance between form and function, thereby reducing perceptions and opinions about different individual's interpretations about the end result. This is an emerging science as practitioners and researchers create data visualizations that not only communicate information, but reduce measurement system error by engaging people in the right single interpretation of the results, and the right evidence-based corrective actions.

Technology-Enabled Improvement



Virtual Reality Value Chains: This emerging technology is significantly reducing the development and/or sales to cash cycle by providing a virtual customer experience for decision-making. This technology also allows retailers and distributors to upsell their portfolio of products. Some new software platforms have integrated this front end virtual reality software with other supply chain functions such as ERP, purchasing (delivery and pricing commitments), and customer delivery.

Virtual Meetings: This emerging technology enables individuals from around the globe to attend a meeting, speak in their native language and present documents. Everyone is digitally in attendance via a virtual presence. The language conversation and documents are instantly translated into the local language of participants.

Drone Doorstep Delivery, Global Virtual Reality Meetings, etc. not far behind





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Technology-Enabled Improvement in the Global Supply Chain

4. Technology- Enabled Improvement Examples

This section will provide a few examples of technology-enabled improvement with our clients



- Accelerated Value Stream Mapping
- Real Time Digital Performance Dashboards
- Transactional Process Improvement
- Virtual Reality Supply Chain Management
- Virtual Reality Design

Accelerated Value Stream Mapping



Accelerated Value Stream Mapping is a laser targeted, rapid deployment and rapid results model of improvement:

- It leverages organizational knowledge and pre-analytics (operations diagnostics, data, facts, evidence) prior to any VSM activities.
- It is a quicker surgical approach vs. a lengthy, one-shot effort, often conducted by an uninitiated mentor and team following a canned approach.
- It leverages the knowledge, information, and known detractors of performance by those who work within the process every day.
- It integrates several improvement methodologies and tools into the process (i.e., VSM, Pareto analysis, FMEAs, transactional forensics and mapping, hypothesis testing, scored waste logs, specialized spreadsheet analyses, etc.).
- It is interactive and ongoing, focusing on the highest impact opportunities and moving on to other segments. It optimizes limited improvement time and capacity and produces a well dissected, end-to-end VSM over time.

Accelerated Value Stream Mapping



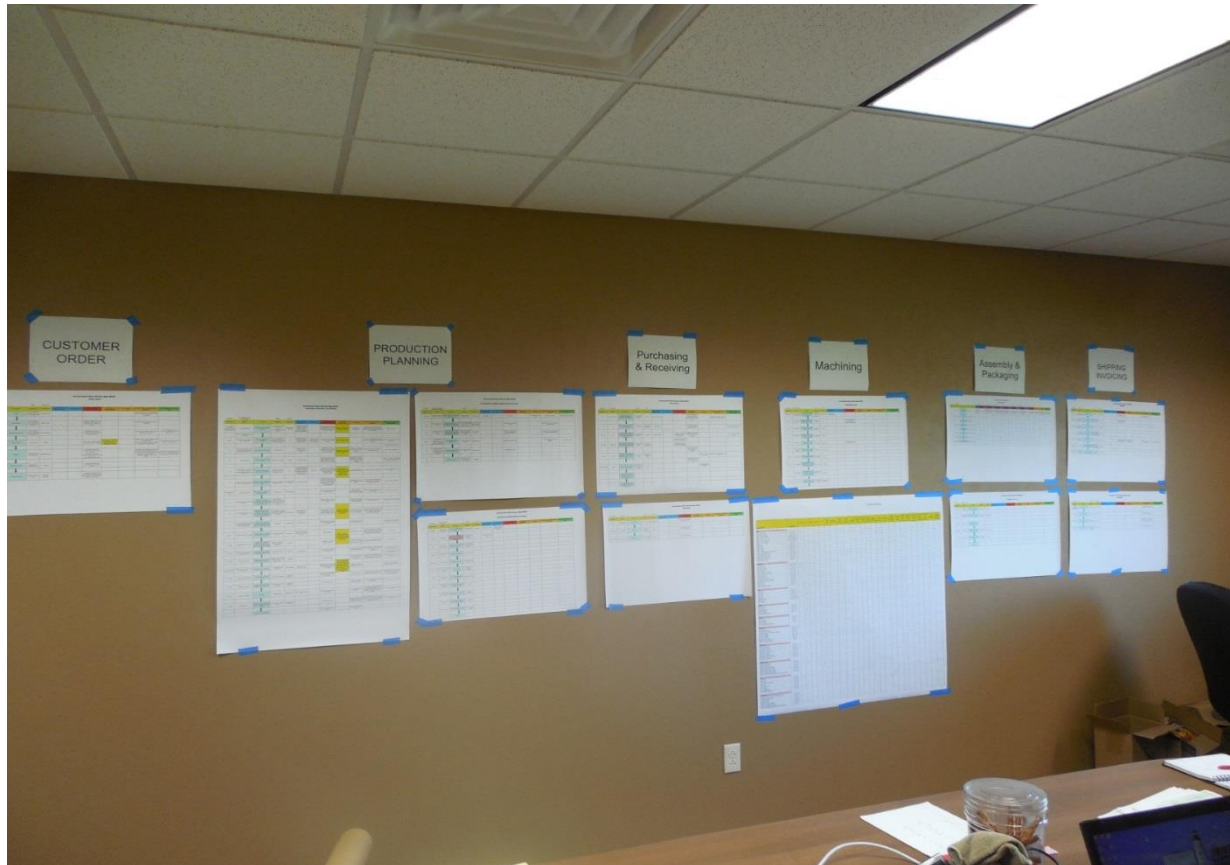
Accelerated Value Stream Mapping is CO's proprietary SIPOC+P/C/O/TGW/D™ methodology

- This is an abbreviated higher level VSM that includes:
 - Suppliers
 - Inputs
 - Process
 - Outputs
 - Customer
 - Performance, how measured
 - Controls for “First time right”
 - Observations and impressions
 - TGWs, things that typically go wrong inside/outside area
 - Data to support claims
- The SIPOC+P/C/O/TGW/D is supplemented with continuous analytics to validate the high level mapping analysis.
- This mapping exercised is updated as new information is learned so it is always current and reflective of the real picture.

Accelerated Value Stream Mapping



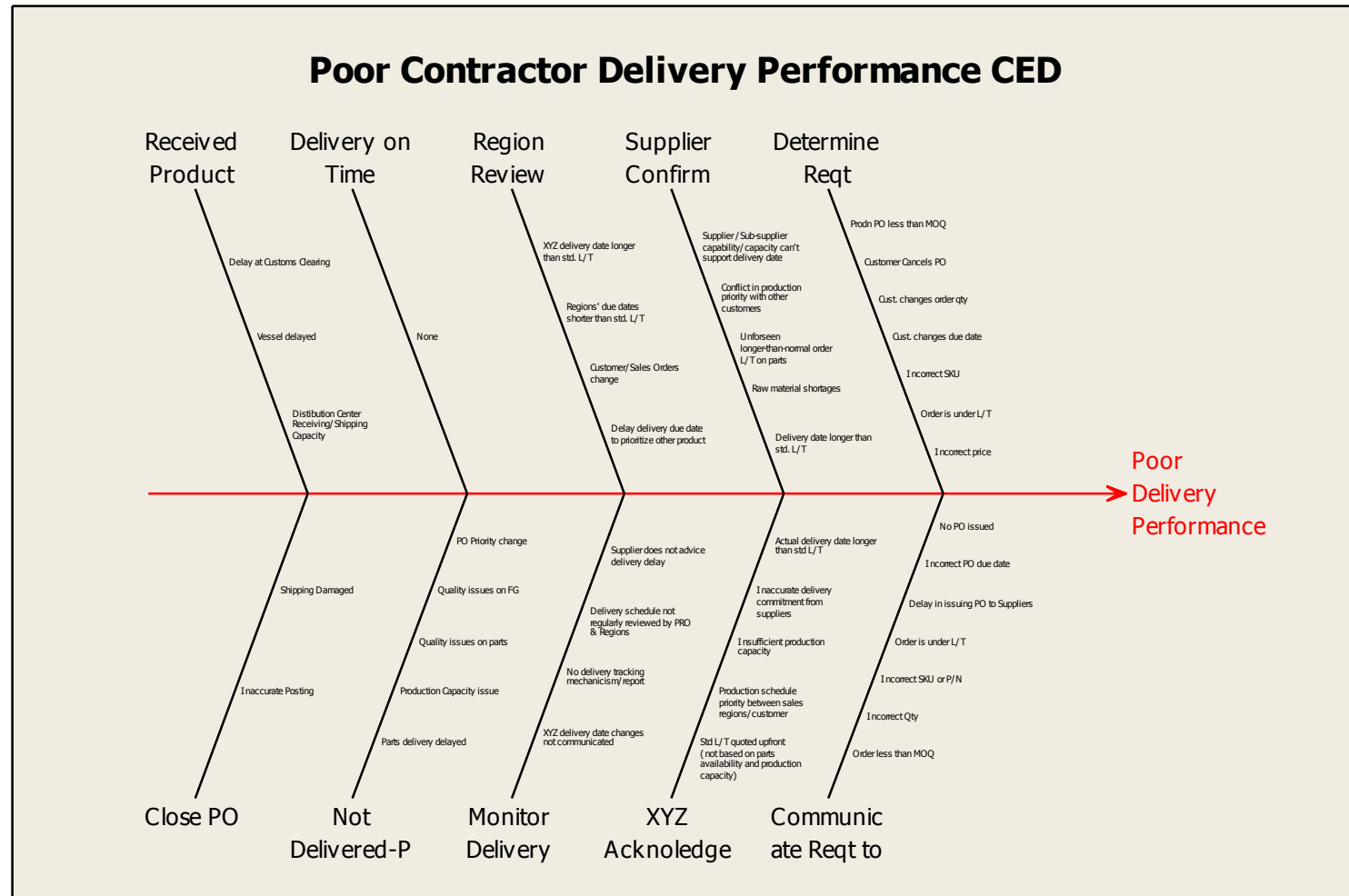
This client's supply chain was mapped and diagnosed in three days using SAP analytics, Excel, and Minitab. Within the first 30 days over \$150K in (unknown, undiscovered) improvements were implemented.



Accelerated Value Stream Mapping



Extended dialogue CED - Preemptive Root Cause Analysis

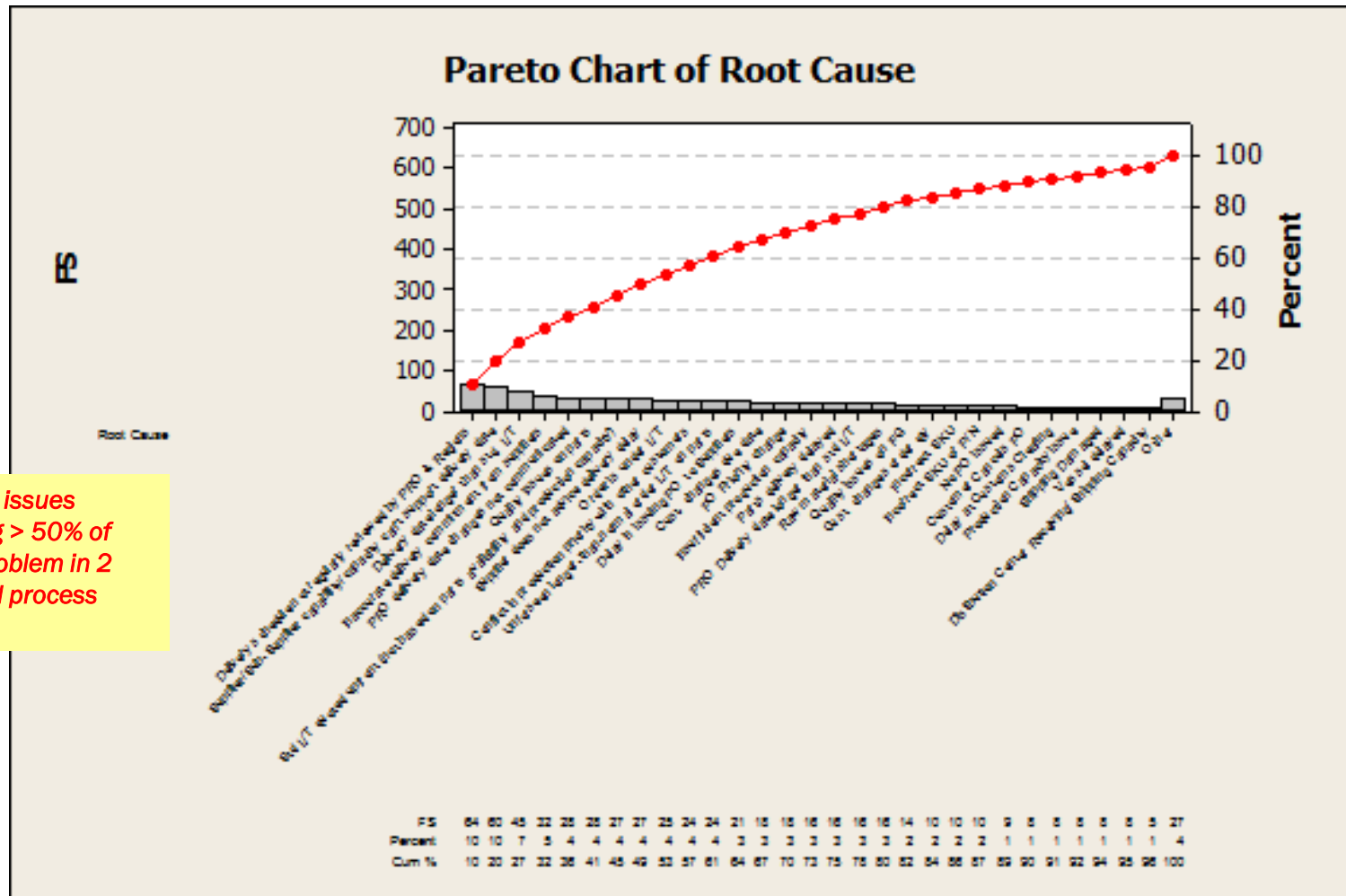


Accelerated Value Stream Mapping



Opportunity Ranking and Prioritization

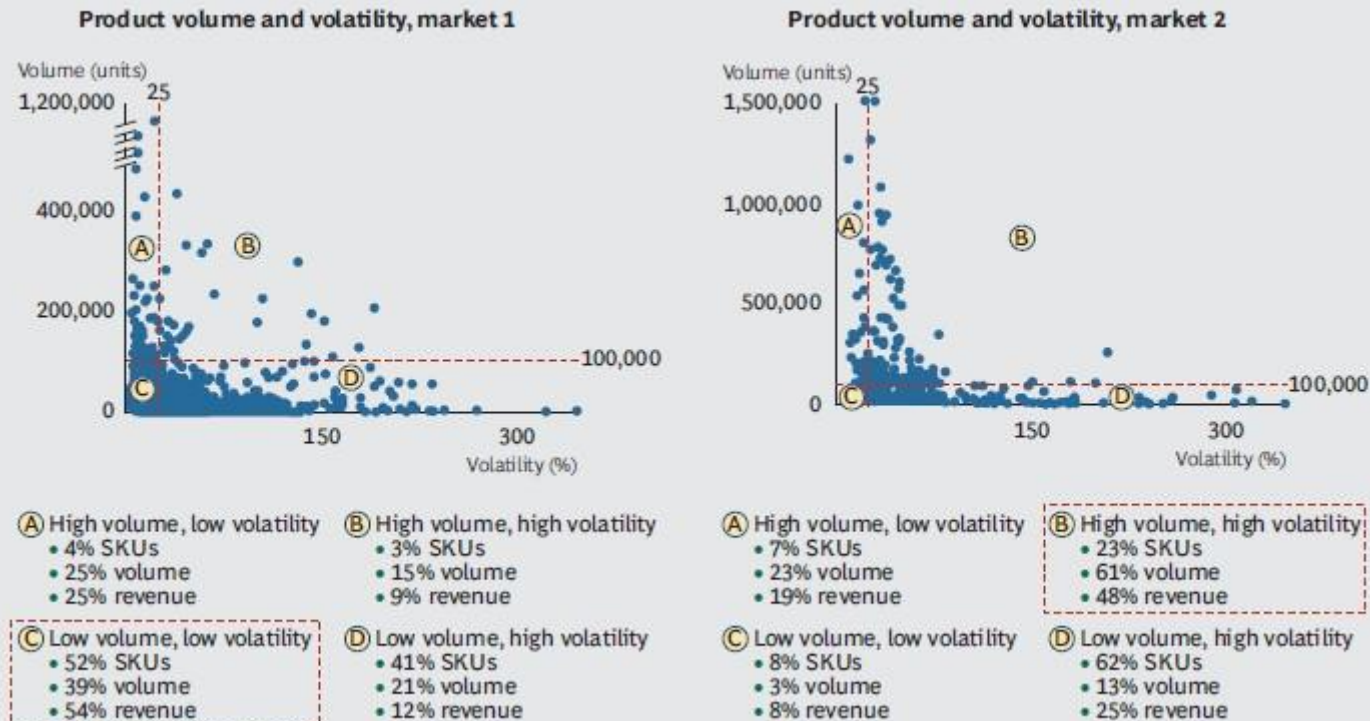
(Where specifically in the end-to-end VSM is creating the highest and most detractors to performance?)



Accelerated Value Stream Mapping

Segmented Sales and Operations Planning

EXHIBIT 3 | Products Can Be Segmented into Buckets



Source: BCG analysis.

Accelerated Value Stream Mapping

Global Supply Chain Rationalization



Modeling and rationalizing the broader holistic customer, strategy, structure, people, process, technology, and metrics.

Real Time Digital Performance Dashboards

Replaced the manual TPS production boards and A3s

“SIDAM” - Real time scanning of productivity, quality, and build performance

3 Panels:
Production
Quality
Operator Troubleshooting

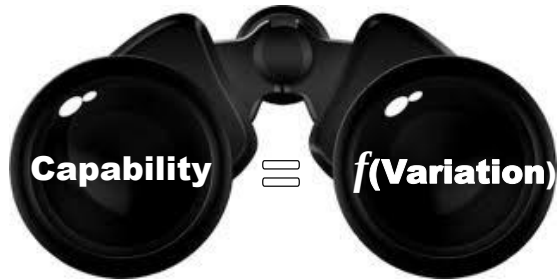
Self Reliant Culture



Transactional Process Improvement Performance Measurement

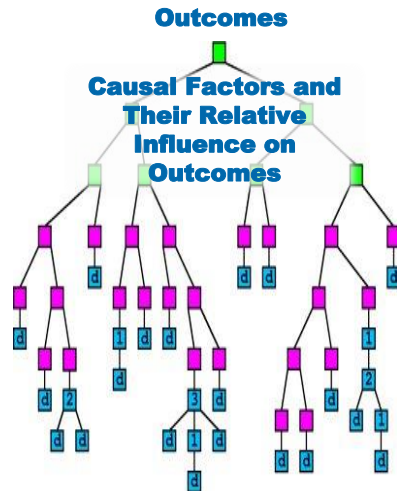


6σ



The Chain of Causation

**Outcomes = f(Casual Factors
and Their Relative
Influence
Outcomes)**



*Traditional
Financial Metrics*



*“Causal”
Metrics*

Performance Measurement

“Organizations cannot improve outcomes. They can influence outcomes significantly by focusing on the right casuals (metrics) of performance



Transactional Process Improvement Performance Measurement



	Objectives	Metrics	Goal	Actual	Improvement Initiatives
Customer Experience	Revenue Growth	Customer Share of Business Customer Retention Rate Customer Satisfaction Index			
	Sole Supplier to Top 20 Customers	Customer Complaints Market Share Conversion Rate			
	New Markets	Returns and Allowances			
Financial Management	Improve Profitability	Net Profit Net Profit Margin Gross Profit Margin Operating Profit Margin EBITDA			
	Improve Margins	Return on Capital Employed (ROCE) Return on Assets (ROA) Return on Equity (ROE) Debt-to-Equity (D/E) Ratio Cash Conversion Cycle (CCC) Working Capital Ratio Total Shareholder Return (TSR) Operating Expense Ratio (OER) Economic Value Added (EVA) CAPEX to Sales Ratio Return on Investment (ROI) Price Earnings Ratio (P/E Ratio)			
Core Business Processes	Manufacturing Excellence	M Performance to Schedule M Capacity Utilization			
	Supply Chain Excellence	Q First Pass Yield (FPY) Q Rework Level Q Cost of Quality Q Warranty			
	Product Development Excellence	M Revenue Per Employee M Process Waste Level M Delivery In Full, On Time (DIFOT) Rate M Overall Equipment Effectiveness (OEE) M Process or Machine Downtime Level SC Order Fulfillment Cycle Time SC Inventory Performance SC Inventory Shrinkage Rate (ISR) SC Supplier/Contractor Performance			
	Perfect Quality	Q Out-Of-Box Quality NPD Time to Market NPD On Time% NPD On Cost % NPD On Budget % NPD Return on Development (ROD) Lean Cum. Savings			
Learning and Development	Develop Technical Talent	Human Capital Value Added (HCVA) Key Organizational Issues			
	Develop Behaviors and Thinking	Behavior/Culture Surveys Employee Turnover Average Employee Tenure Absenteeism			
	Build a LBS Culture of Excellence	Talent Development ROI Coaching and Mentoring Statistics			

Which performance metrics most influence the Customer Experience?
P&L? Cash Flow?
Cultural Development?

“Overall Business Effectiveness”
Metric (OBE)

**Figure 8.3 Lean Business System Reference Model™
Balanced Scorecard – Generic Template**

Transactional Process Improvement Performance Measurement



LBS Analytics® Architecture

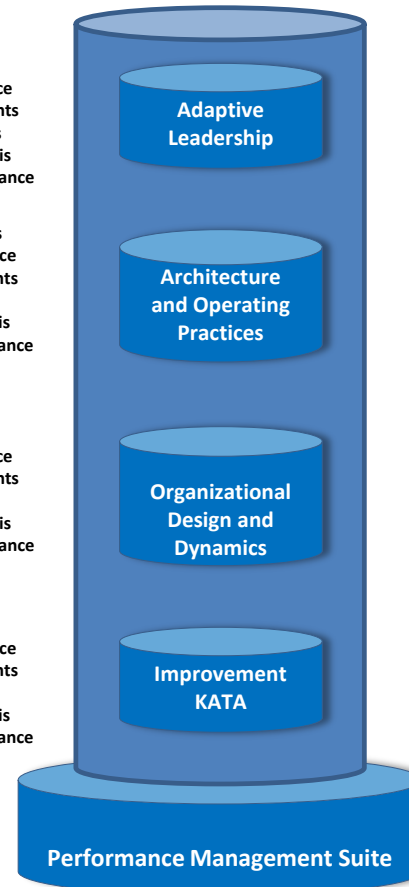
Best Practices Assessments

6 categories
90 best practice
evaluation points
Radar Charts
Pareto Analysis
Prescriptive guidance

33 categories
330 best practice
evaluation points
Radar charts
Pareto Analysis
Prescriptive guidance

6 categories
77 best practice
evaluation points
Radar charts
Pareto Analysis
Prescriptive guidance

8 categories
124 best practice
evaluation points
Radar charts
Pareto Analysis
Prescriptive guidance



Balanced Scorecard-Based
Performance Metrics

Assessment Outlines

Adaptive Leadership

- Operating Practices and Actions
- Behavioral Kata Leadership Attributes
 - Vision
 - Knowledge
 - Passion
 - Discipline
 - Conscience

Architecture and Operating Processes

- Leadership, Operating Strategy, Governance and Interventions
- Aligned Improvement Strategy
- Living Deployment Planning
- Change Awareness, Communication, Management, and Reinforcement
- Talent Development via Center of Excellence
- Execution and Sustainability
- Performance Management

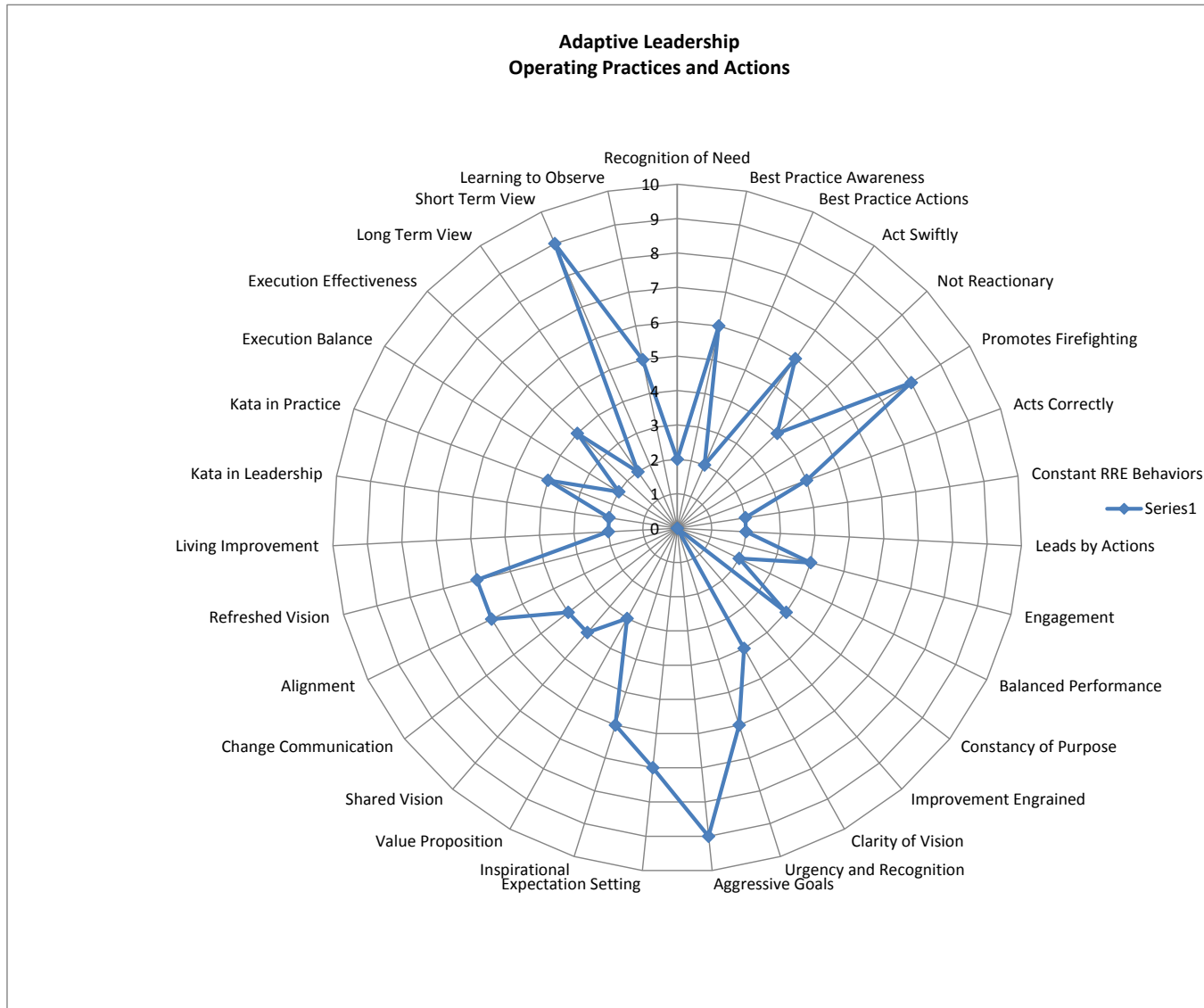
Organizational Design and Dynamics

- Organizational Strategy
- Operating Structure and Flexibility
- Deployment Processes and Practices
- Organizational Dynamics
- Entrepreneurial and Risk Management
- Adaptive Systematic Self-Reliance

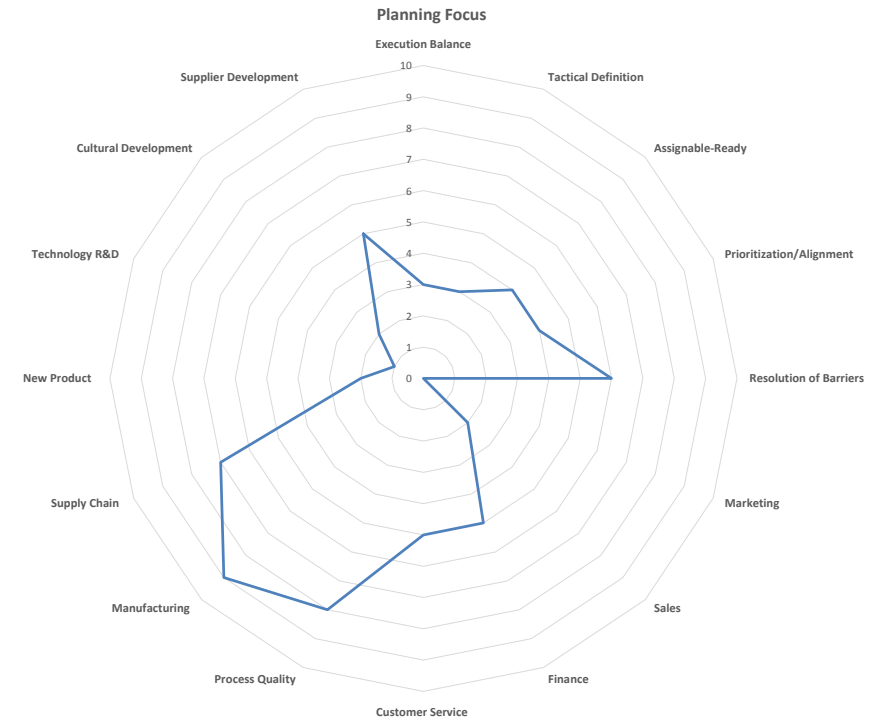
Improvement Kata

- Daily Kata Practices
 - General Observations
 - Improvement Kata
 - Coaching Kata
- Existence of Kata Behaviors and Cultural Attributes

Transactional Process Improvement Performance Measurement



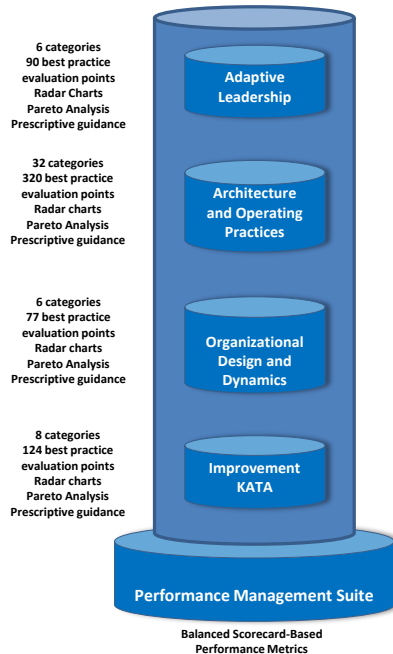
Transactional Process Improvement Performance Measurement



Transactional Process Improvement Performance Measurement



Best Practices Assessments



Assessment Outlines

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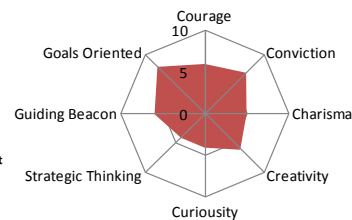
Organizational Design and Dynamics

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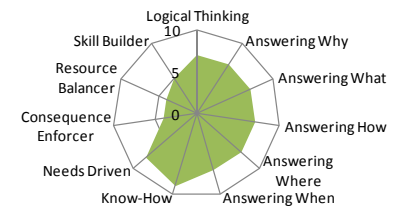
Improvement KATA

- Daily Kata Practices
 - General Observations
 - Improvement Kata
 - Coaching Kata
- Existence of Kata Behaviors and Cultural Attributes

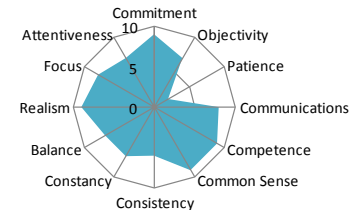
Vision



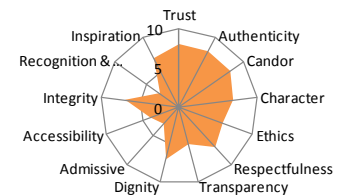
Knowledge



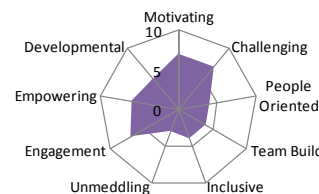
Discipline



Conscience



Passion



Virtual Supply Chain Management

Large Furniture Retailer/Distributor



How many times do people walk into a furniture store and buy nothing?



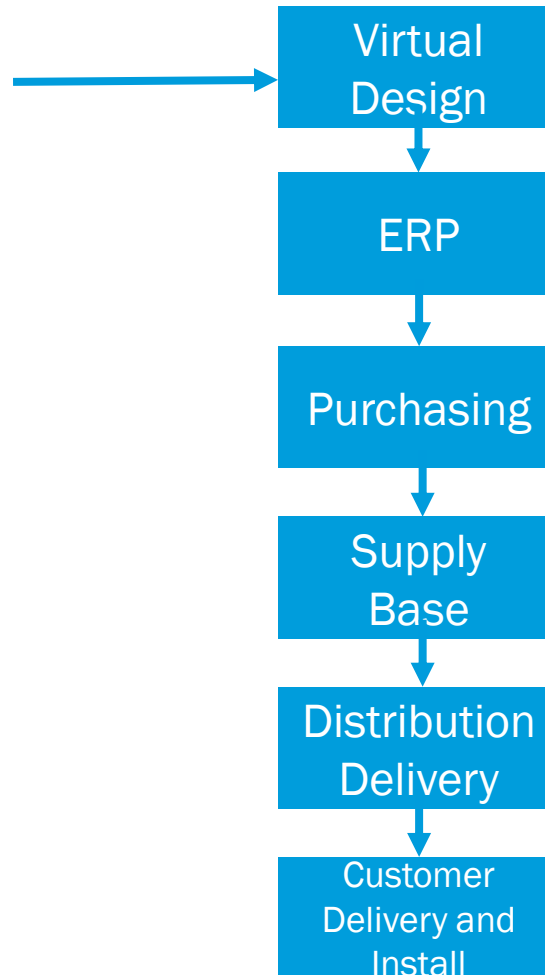
This is a virtual reality rendering design!

Virtual Supply Chain Management

Large Furniture Retailer/Distributor



Get the sale!
Upsell furnishings
Create customer experience
Accelerated cash-to-cash
Deliver customer experience!

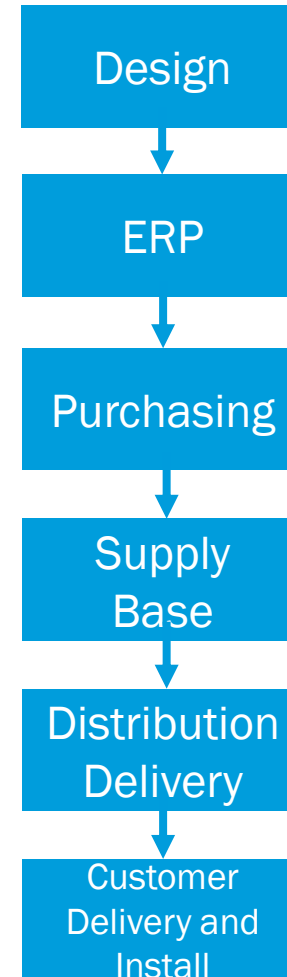
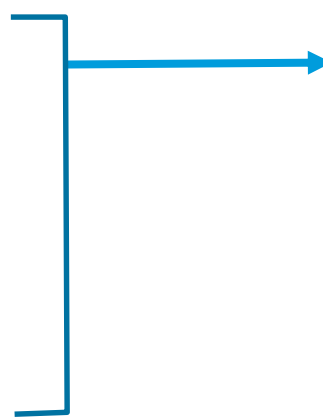


Today:
Appliance manufacturers
Home Depot
Lowes
Restoration Hardware
Bath & Fixtures
Automotive

Tomorrow:
Supply Chain design
Facility design
Product/Process Design
Virtual Lean

Virtual Supply Chain Management

Other Technology-enabled examples

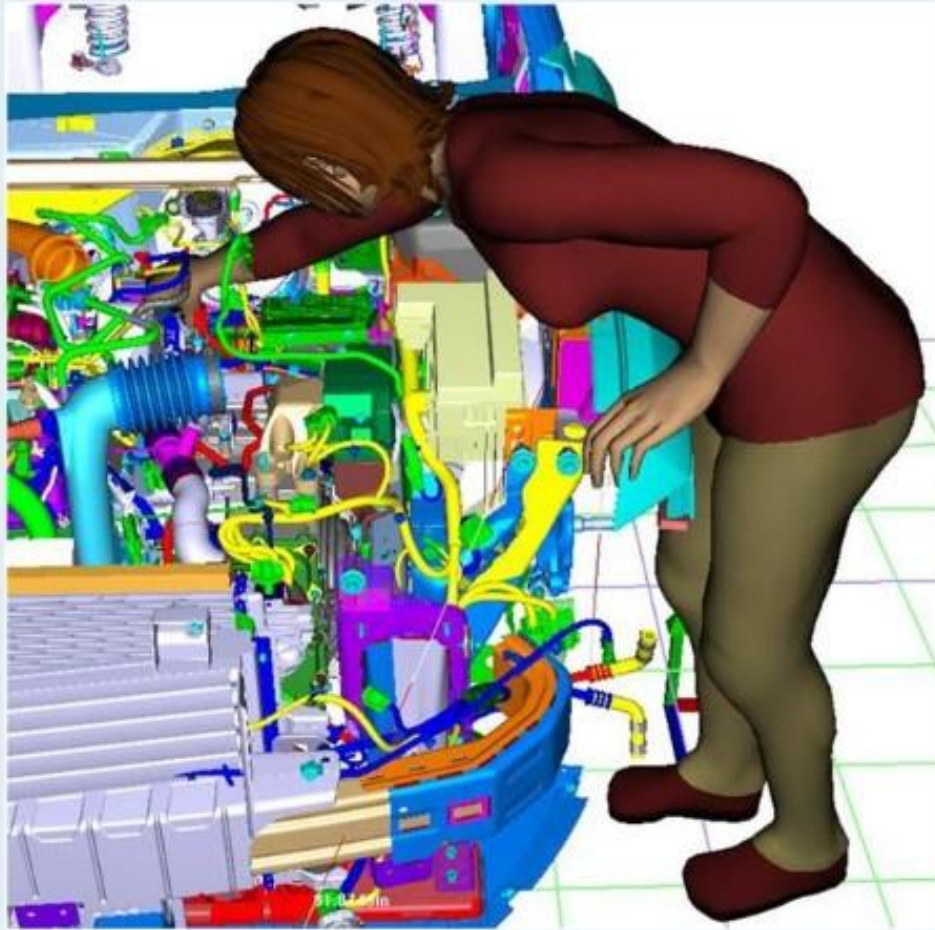


Today:
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Tomorrow:
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Product/Process Design
Virtual Lean

Virtual Supply Chain Management

Ford Motor Company



Virtual reality workstation of a Ford assembly line

Three core technologies are used during the virtual assemble task assessments: 3D printing, full-body motion capture, and immersive virtual reality. In order to validate hand clearance for employees with various hand sizes, particularly for tasks that require precise and detailed work, Ford's ergonomists 3D print full-scale and completely accurate models of certain assembly line machines to test how tight the space will be. The results from these tests have proven to be more reliable than virtual simulations and help to drive better production decisions.



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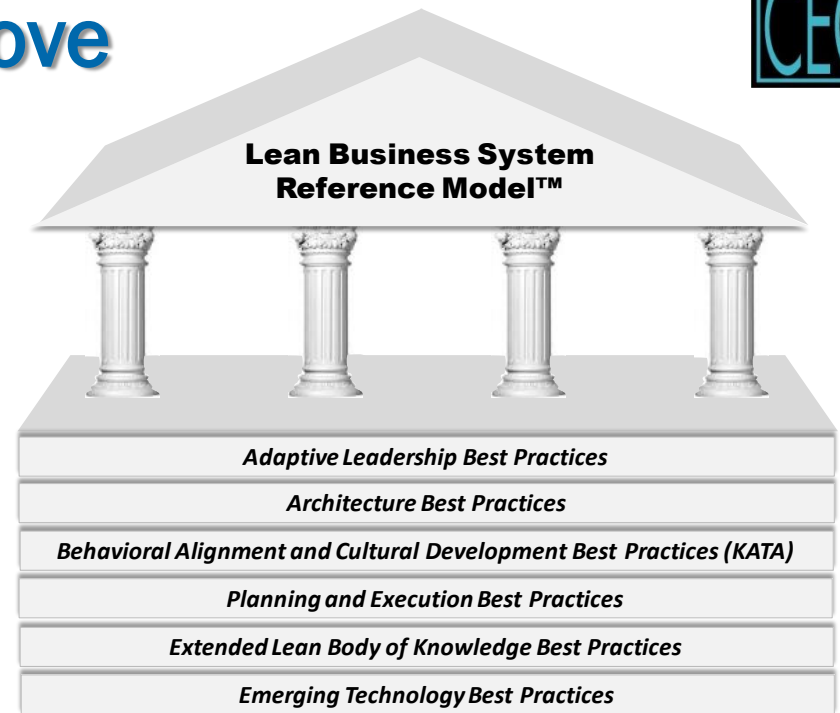
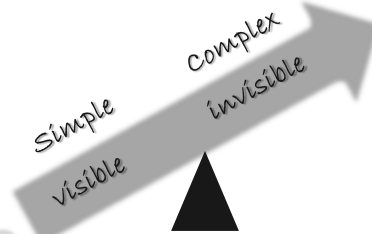
5. Rethinking Strategic Improvement: *“Improving How We Improve”*

Improving How We Improve



Force fitting manufacturing improvement tools and principles can create an “Improvement Ricochet Effect”

- Supply Chain Management
- New Product Development
- Acquisition Improvement
- Customer Service
- Sales and Marketing
- Facilities and Maintenance
- Advertising and Promotions
- Outsourcing Rationalization



Future

- Different, higher order approaches to improvement
- Technology-Enabled
- Enterprise-wide
- Complex Transactional Processes
- Improvement KATA Foundation

Improving How We Improve

Lessons Learned from Technology-Enabled Improvement:

- *The World of improvement is rapidly changing. Organizations cannot keep up to the speed of change with the same people, same thinking, same tools and approaches.*
- *The World of improvement includes much more invisible and unknown opportunities than when organizations focused on production.*
- *Technology-enabled improvement allows organizations to identify unknown and yet to be discovered opportunities for improvement in their supply chains.*

The need for improvement never goes away . . . Improvement is never finished!



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Technology-Enabled Improvement in the Global Supply Chain

Questions
and Discussion

About today's presenter . . .



Terence T. Burton is President and Chief Executive Officer of The Center for Excellence in Operations, Inc. (CEO), a management consulting firm specializing in strategic business and operations improvement. CEO has headquarters in Bedford, NH and European offices in Munich, Germany.

Terry has over thirty years of experience as an operations executive with several premier technology corporations, and as a senior practice leader for two international consulting organizations. Since starting CEO in 1991, he has worked with over 350 organizations in the Americas, Europe, and Asia. Terry holds a BSIE, MSIE, and MBA degrees and is a certified Lean Six Sigma Black Belt. He has been active in APICS, ASQ, PDMA, ISM, ISSCP, AME, and other professional organizations.

Terry previously served as a national SIG chair for APICS and is a frequent contributor to the journal, international conferences, and local Chapter meetings. He is the author of nine books, his latest, “[Global KATA: Success Through the Lean Business System Reference Model™](#)” (McGraw-Hill).

For additional information visit the CEO website www.ceobreakthrough.com or contact the author directly at burton@ceobreakthrough.com

#1 New Release in Business Operations Research

Look inside ↓

