Waging War on Complexity in Supply Chains

February 13, 2015

Agenda

- **Introductions**

- Complexity

  - Sources and impacts of complexity

  - Accounting for complexity

  - *Complexity Costing Exercise*

  - Developing and using Complexity Value Stream Maps

  - Utilizing Portfolio Optimization to root out complexity

  - *Case Study: Complexity in M&A*

- LUNCH

- Operational Excellence (OE)

  - Foundations of OE and the Operational Excellence Management System

  - Achieving OE with an OEMS – Case Study: Koch Industries, Chevron & BP

- Operational Discipline (OD)

  - Driving OE with a culture of Operational Discipline

  - *Case Study: Deepwater Horizon*

- *Summary/Closing*

Chris Seifert

- Expertise in manufacturing, operational excellence, and management system design and implementation

- Former Operations Leader, Owens Corning (increased plant productivity by 25% in just 9 months)

- Former Plant Manager and Manager of Business Strategy & Analysis, Georgia Pacific (Koch Industries)

- Top-ranked submarine officer, US Navy (ranked #1 of 9 submarine junior officers)

- MBA, Summa Cum Laude, University of Georgia; BS Business Administration, St. Louis University

Scott Stallbaum

- Expertise in manufacturing, operational excellence, and management system design and implementation

- Former manufacturing & budgeting/planning leader and in the medical device industry

- Former new model launch program manager, manufacturing engineer and front line supervisor in the automotive industry

- MBA, Harvard Business School; BS Mechanical Engineering, Bucknell University

Francisco Soto
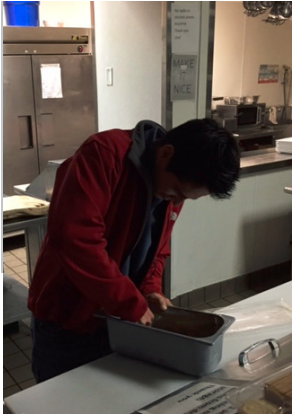
- Experienced in the design and implementation of management systems for achieving operational excellence in highly complex environments

- Former strategy leader of a private healthcare provider, AMG Health

- Former supply chain innovation engineer, Pepsico

- MBA, University of Texas; BS Mechanical Engineering, University of Texas

Ben Cormier

- Led the implementation of risk management to support operational excellence across onshore business, offshore business and joint venture.

- Advised in business decision throughout risk quantification. Developed key performance indicators to focus on continuous improvement in strengthening risk management and production targets to reduce risk profile and gain

- M.S., Ph.D. in Chemical Engineering, Texas A&M University, B.S. in Chemical Engineering, Virginia Tech University

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Complexity is stretching the capabilities of most companies…

New Geographies

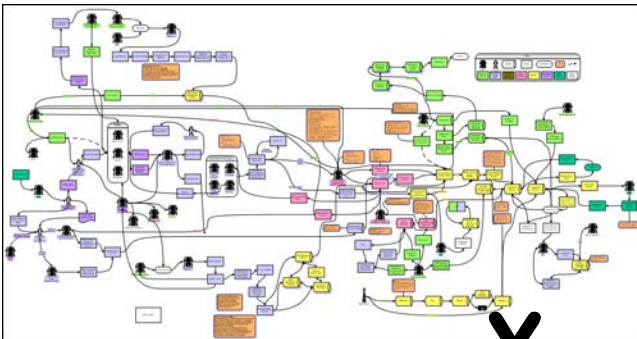*Broader Product Offerings*

New Channels

X

X
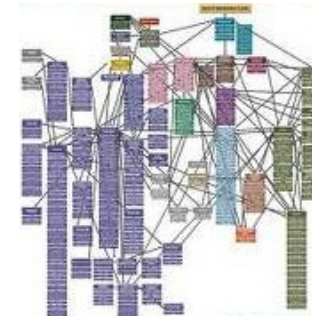
X

More Complex Processes

Matrix organizations

X

X

X

X

More Regulation

More Systems & Technology

... Surpassing the "complexity frontier"

COST & RISK
(exponential growth)

An increasing number of companies are here

Many companies are here

VALUE
(diminishing returns)

Few companies are still here
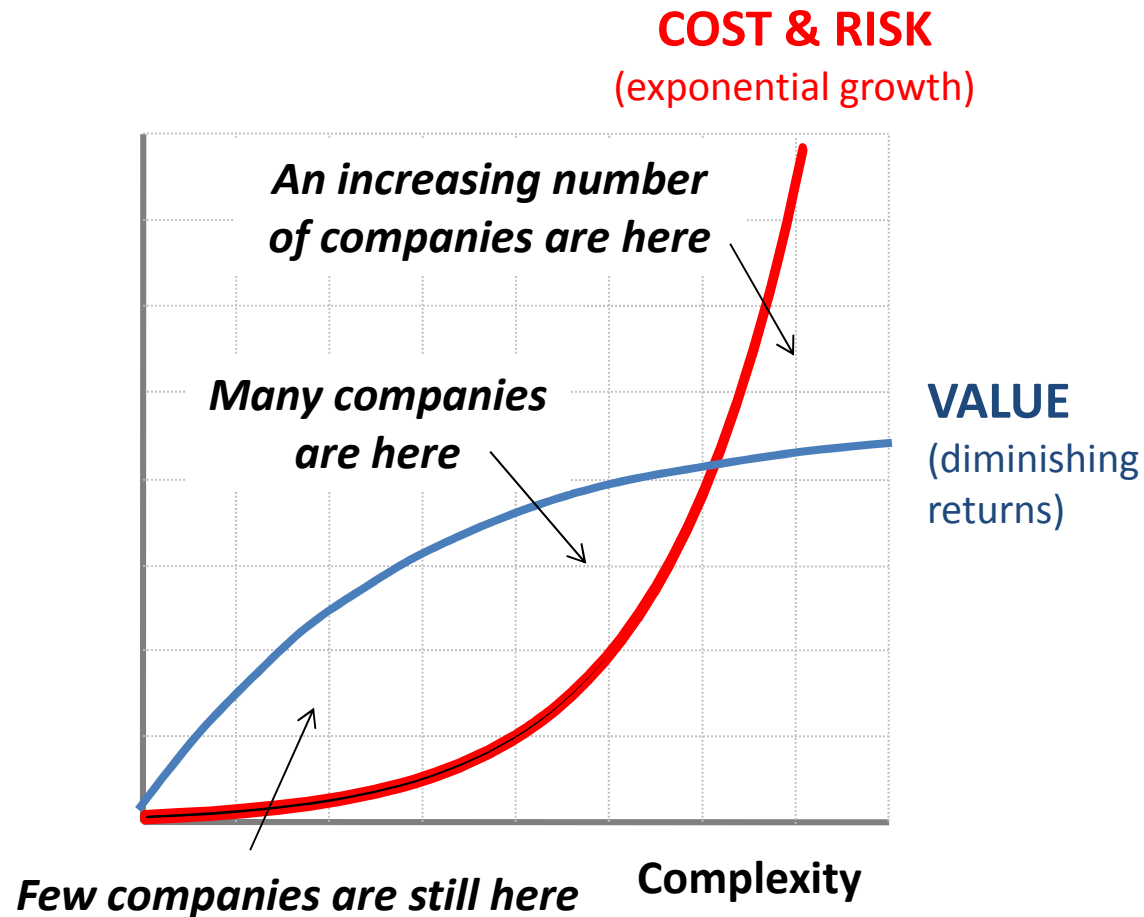
Complexity

The world has changed!

Pre-Industrial Age	Industrial Age	Post-Industrial Age
"Individual productivity"	"Economies of Scale"	"Complexity"

Cost vs Volume (Pre-Industrial): linear increasing

Cost vs Volume (Industrial): concave increasing

Cost vs Complexity (Post-Industrial): convex increasing
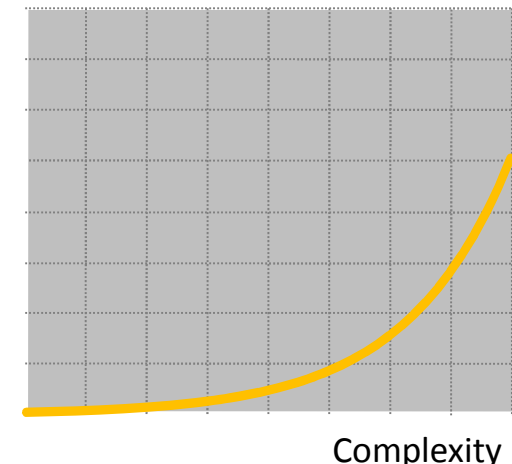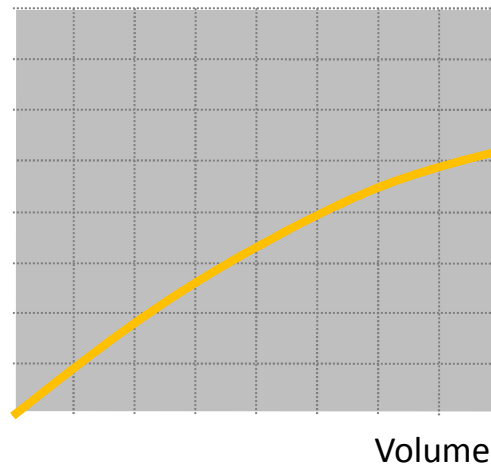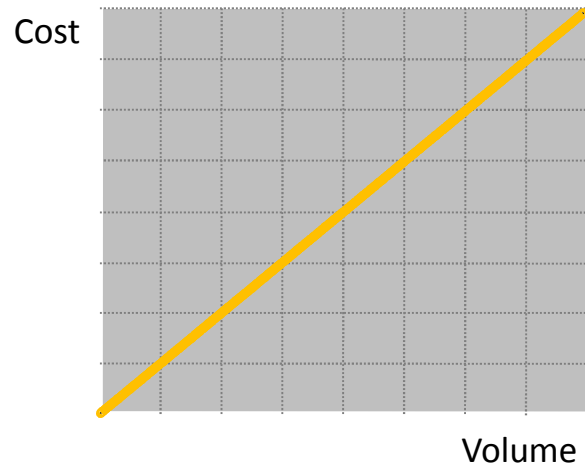
| Dominated by **variable costs** | Dominated by **fixed costs** | Dominated by **complexity costs** |

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Complexity grows exponentially

The Number of Links Increases Geometrically with the Number of Items

# Items		# Links
1		0
2		1
3		3
4		6
5		10
10		45
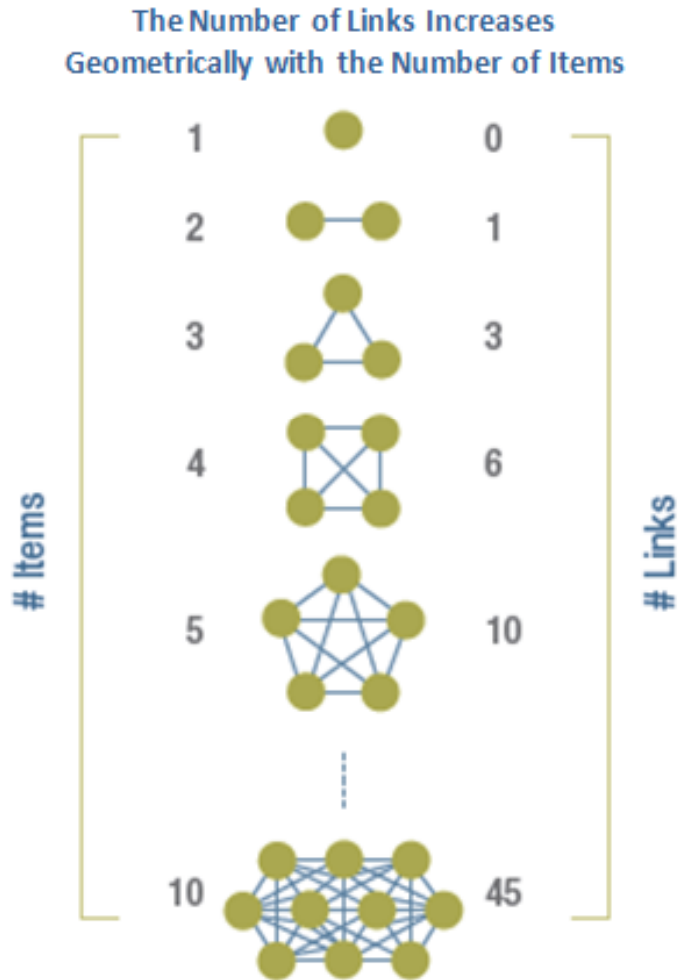
Characteristics of Complex Systems

1. Non-linear reactions

2. Emerging properties

3. Feedback loops

4. Unknown interactions

These characteristics make Complex Systems almost impossible to predict and control

The result is severe profit concentration ...

Typical "Whale Curve"
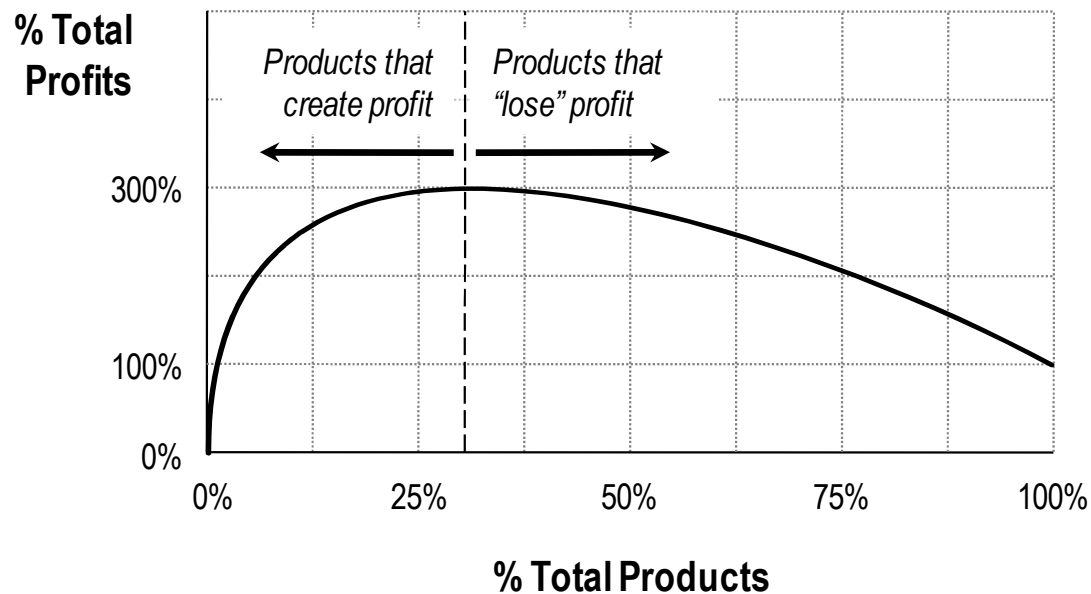
- Often the **most profitable 20% to 30% of products generate more than 300% of the profits** in a company, meaning...

- ...the **remaining 70% to 80% lose 200% of the profits**

… And slowing growth rates

Growth challenges that arise due to complexity:

Inefficient organization	• Processes that led to success in the past don't scale • **Process complexity impairs customer experience, service levels**
Slowing innovation	• Larger number of initiatives pursued to keep up growth actually clogs the development process as **resources are pulled in too many directions**
Customer confusion	• Exploding number of products leads to **customer confusion** • Sales channel loses its ability to effectively support the portfolio
Poor portfolio Management	• Growing number of products sold through multiple business or geographies creates **less accurate forecasting, causing write-offs**
Trading scale for revenue	• Revenue grows in linear fashion, cost of complexity grows geometrically • **Complexity consumes resources, fragments scale, impedes opp to re-invest**

Complexity can be good or bad,
but companies almost always have too much

Type of complexity	Description	Impact of too much
Product	The **variety** of and within the products (and services) you offer	• *Bloated portfolio* • *Customer confusion* • *Strained processes*
Process	The **number** of processes, steps, handoffs, etc.	• *Duplication* • *Rework* • *Work-arounds*
Organization	The **number** of facilities, assets, functional entities, organizational units, systems, policies, etc.	• *Bloated organization* • *Functional silos* • *Disarray* • *No clear picture*

Complexity is a systemic issue, that requires a more holistic approach

The Complexity Cube
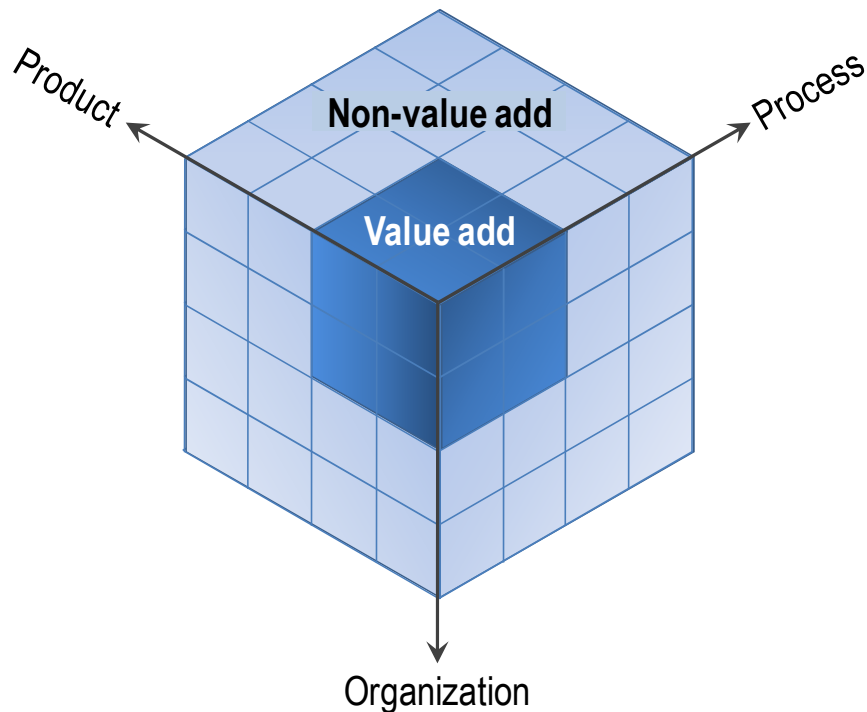
- Complexity resides on the **axis** of the cube

- But complexity costs reside on the **faces** of and within the cube

The interactions between product-process-org create cost and impede productivity; therefore assessing these interactions can be a fruitful angle of investigation

The benefits of complexity reduction can be felt *across the business*

Example typical impacts:

Complexity reduction → Supplier consolidation → Greater volume per supplier → Greater supplier leverage / scale → Better supplier service levels / Lower materials costs

Complexity reduction → Raw material consolidation → Supply pooling (reduced COV) → Fewer RM stock outs → Reduced product lead times; Reduced RM safety stock levels → Less RM inventory

Complexity reduction → Product consolidation / elimination → Reduce changeovers → Direct labor savings / Startup scrap reduction

Redeploy changeovers → Smaller batches for remaining products → Decreased CTI and lead time / Lower FG inventory levels

Demand pooling (reduced COV) → Reduced FG safety stock levels → Lower FG inventory levels / Greater product availability

Plant

Fewer products/ segments → Fewer orders (greater vol/prod) → Increased buyer/planner focus; Reduced cust. service calls → Greater customer service / Reduced customer service costs

Fewer products/ segments → Improved PLM focus → More coherent product line → Greater sales force focus → Higher average sales margin; Reduced cust. confusion → Greater sales volume

Legend:
- ▇ Complexity reduction
- ▇ Cost impact
- ▇ Growth impact
- ⬚ Not in current proposed scope
- ▇ Production plant

Portfolio optimization can be a powerful lever …

WP&C's 6-facet methodology

- How does SKU variety impact process performance, cost and inventory?
- How many SKUs can the process support?

- What is the firm's value proposition?
- How does the firm compete?

- Where does product line overlap (i.e., substitutability)?
- Where are there gaps or opportunities for growth?
- How do we compete in each region?

Strategy

Ops/process

Coverage

Integration framework

Benefits

Profitability

Breakpoints

- Where will benefits be realized?
- From where will costs be extracted post range optimisation?

- At what level of reduction are disproportionate benefits realized?

- Which products are profitable-GP vs OP?
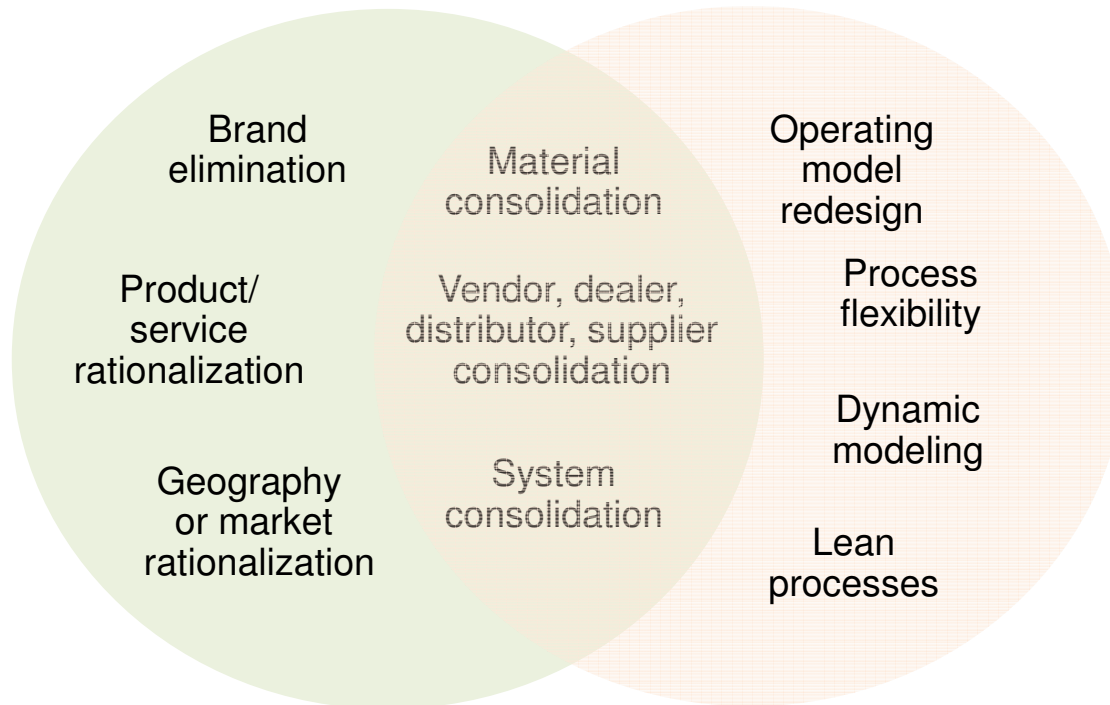- After complexity adjusted costing?
- After taking an incremental view?

An 80% view across all these lenses is better than a 100% view of one

.. But ultimately, mastering complexity requires a two-pronged approach

Reduce amount of complexity?

Brand elimination

Product/ service rationalization

Geography or market rationalization

Material consolidation

Vendor, dealer, distributor, supplier consolidation

System consolidation

Operating model redesign

Process flexibility

Dynamic modeling

Lean processes

Or make complexity less expensive?

ANSWER:

- *Both*
- **We do not live in a "plain vanilla" world (we need variety)**
- **Customers demand good prices (we need cost-competitiveness)**
- **But no real operation is lean enough to support infinite variety**

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Which allocation to use?

By "Volume"
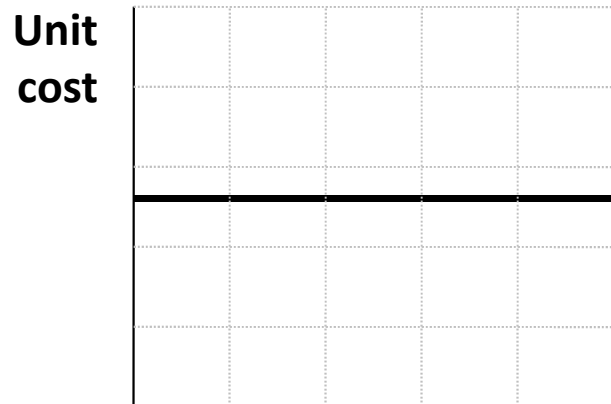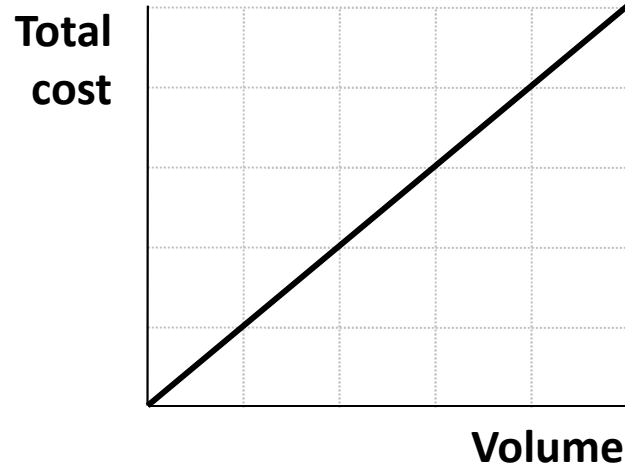
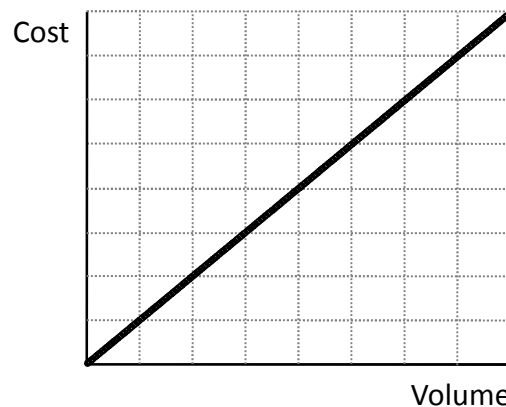**By "Item"**
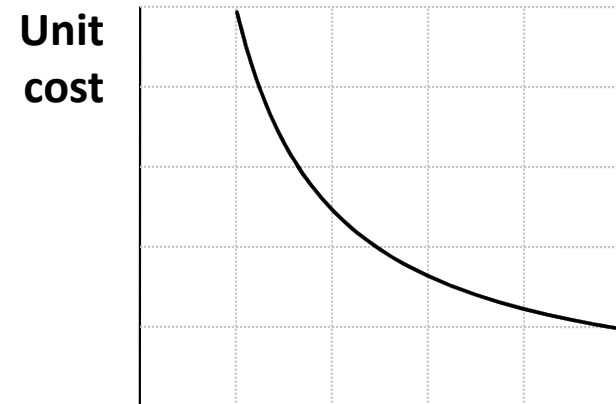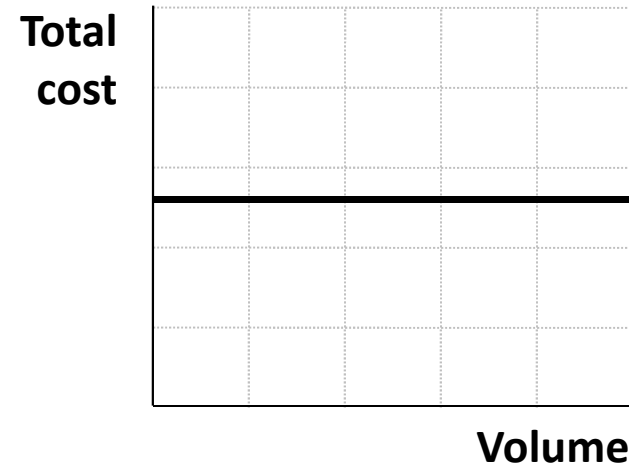
Traditional fixed/variable cost paradigm is no longer sufficient

Pre-Industrial Age
"Individual productivity"

- Energy limited by muscle power (man or beast)
- Little scale efficiencies
- **Efficiency driven by strength and/or speed of individual working unit (narrow range)**

Industrial Age
"Economies of Scale"
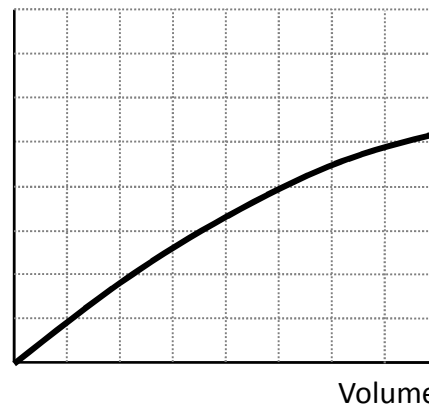
- Revolution in energy and machinery (steam, electricity, oil) create significant scale economy
- **Efficiency driven by volume— "larger is better" (nearly unlimited range)**

Post-Industrial Age
"Complexity Costs"
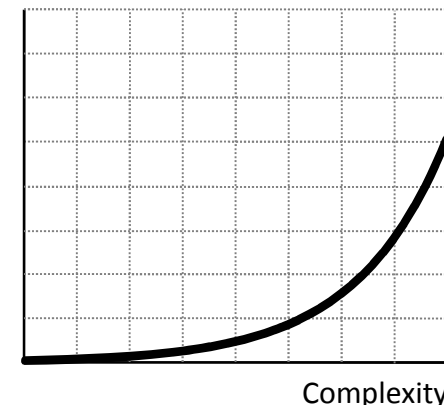
- Significant growth in variety drives geometric growth in "complexity costs"
- **Efficiency and affordability driven by balance between volume and complexity (complexity is the opposite of scale)**

- **Complexity is the opposite of scale**
- **Complexity costs are now the largest driver of a company's cost competitiveness**

Most complexity costs follow the Square-root of Volume relationship

Most NVA costs fall in between "by volume" and "by unit" extremes

We see the SQRT relationship over and over
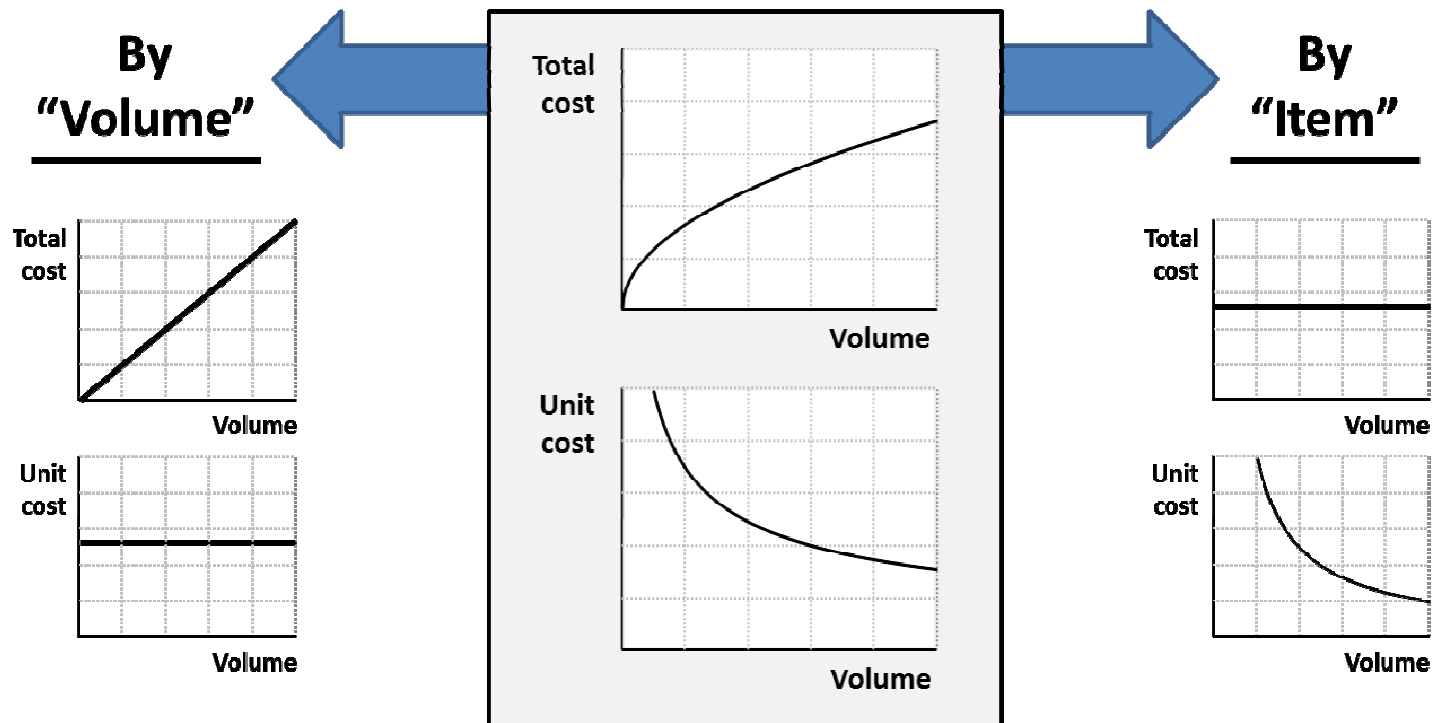
- **Total cost** rises with volume but not as much as in "by volume" approach
- **Unit cost** drops off with volume but not as much as in "by item" approach

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Cost allocation methods

```
                    ┌─────────────────────┐
                    │  Costing approach   │
                    └─────────────────────┘
                              │
              ┌───────────────┴───────────────┐
    ┌──────────────────┐          ┌──────────────────┐
    │  By actual costs │          │   By allocation  │
    └──────────────────┘          └──────────────────┘
                                            │
                            ┌───────────────┼───────────────┐
                   ┌─────────────┐  ┌─────────────┐  ┌─────────────┐
                   │ By 'volume' │  │By 'SQRT vol.'│ │  By 'item'  │
                   └─────────────┘  └─────────────┘  └─────────────┘
```

By actual costs

- Best approach
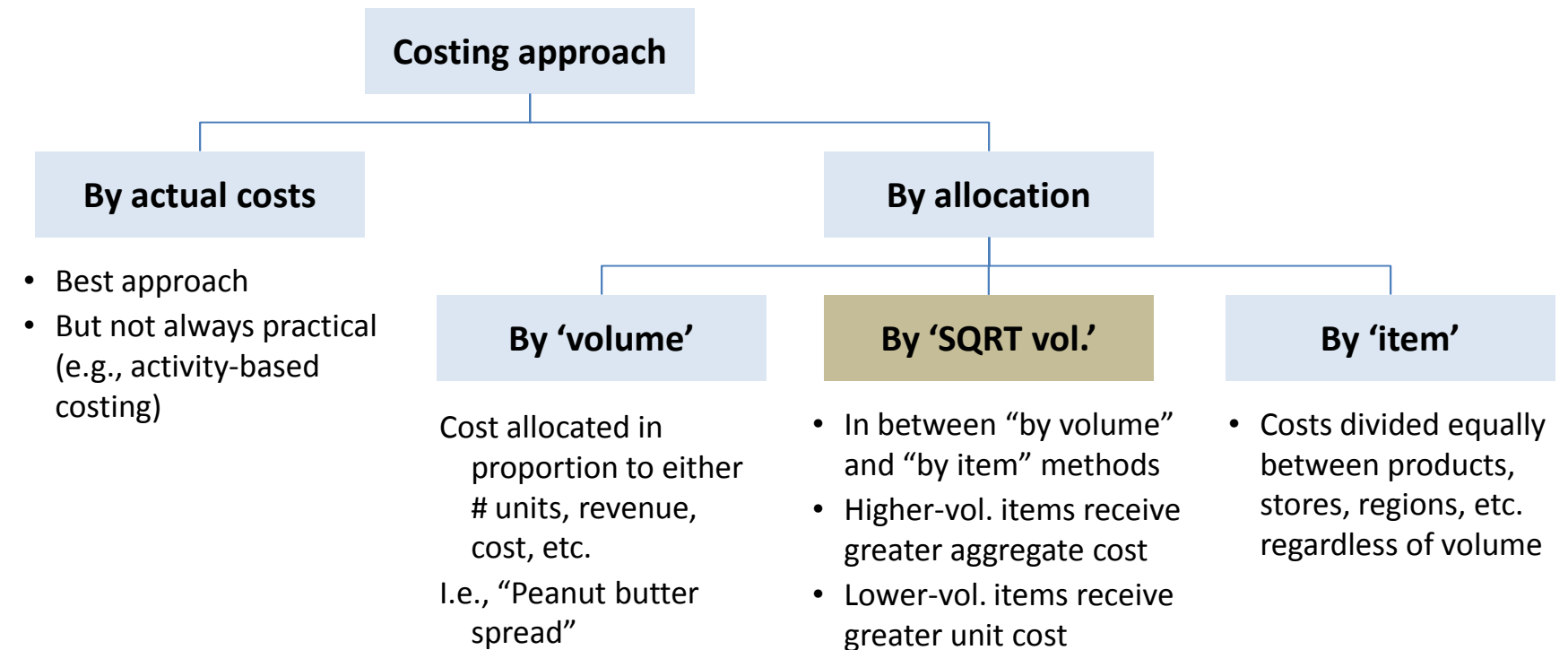- But not always practical (e.g., activity-based costing)

By 'volume'

Cost allocated in proportion to either # units, revenue, cost, etc.

I.e., "Peanut butter spread"

By 'SQRT vol.'

- In between "by volume" and "by item" methods
- Higher-vol. items receive greater aggregate cost
- Lower-vol. items receive greater unit cost

By 'item'

- Costs divided equally between products, stores, regions, etc. regardless of volume

- Most NVA/complexity costs follow the **"SQRT of volume"** relationship
- Without this tool, most companies allocate these costs using the "by volume" method, leading to **over-costing of high-volume items and under-costing of low-volume items**

Square Root Costing

Scenario: Product "A": volume of 1 unit

Product "B": volume of 50 units

Total cost to allocate = $50

"In between" is not simply the average of the two extremes

Allocation method:

"By Volume"

"By SQRT Vol."

"By Item"

Unit cost:

$1 $1

Prod A   Prod B

$6

$0.88

Prod A   Prod B

$25

$0.50

Prod A   Prod B
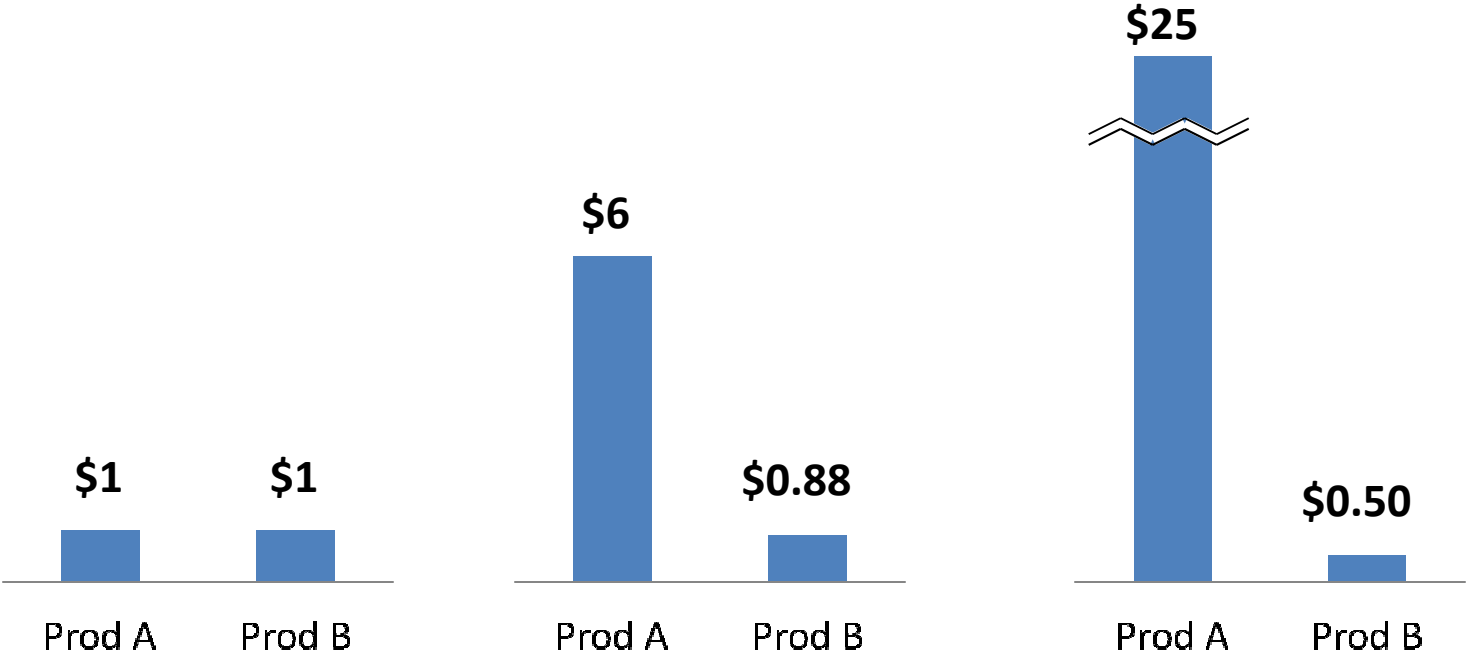
Square Root Costing involves reallocation of buckets of costs

Traditional Allocation Categorization

Variable (α Vol.)

Fixed

"Square Root" Allocation Categorization

Variable (α Vol.)

SQRT costs

Fixed

- Unmasks cross-subsidization
- Corrects for **under-costing small volume items/activities**

- Corrects for **over-estimating potential for fixed cost leverage**

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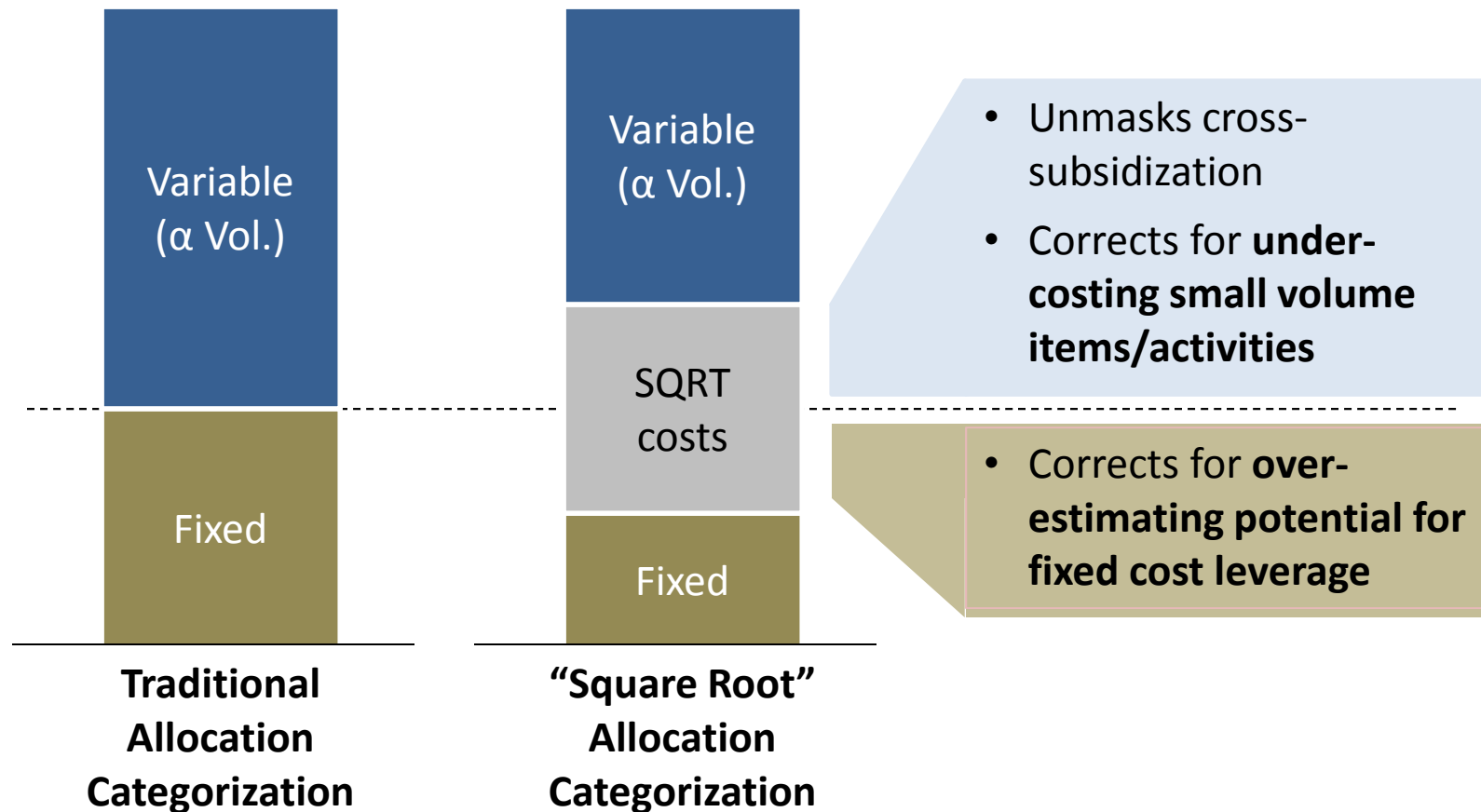
Complexity-adjusted Profitability

Comparison between Standard- and Complexity-Adjusted Profit

% Operating Margin
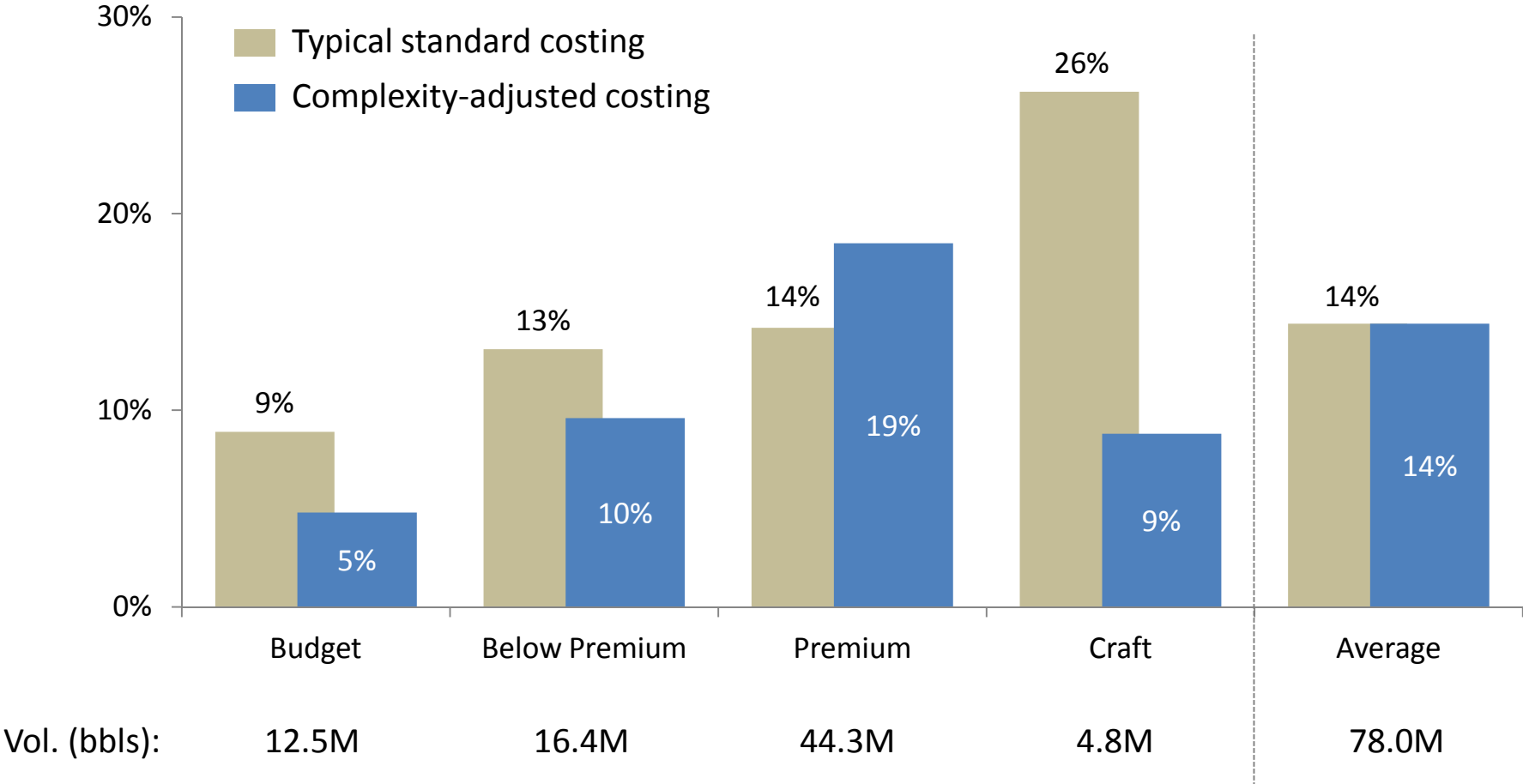
Legend:
- Typical standard costing
- Complexity-adjusted costing

Chart data:

Category	Typical standard costing	Complexity-adjusted costing	Vol. (bbls)
Budget	9%	5%	12.5M
Below Premium	13%	10%	16.4M
Premium	14%	19%	44.3M
Craft	26%	9%	4.8M
Average	14%	14%	78.0M

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Square Root Costing Methodology – Step #1

Step #1

Identify complexity-driven costs

COST CATEGORY	AMOUNT
Direct Labor	$175,000
Indirect Labor	$50,000
Production Materials	$250,000
Packaging Materials	$30,000
Inventory Handling	$25,000
Maintenance	$75,000

Square Root Costing Methodology – Step #2

Step #1

Identify complexity-driven costs

Step #2

Calculate the SQRT of volumes

Take the square root of each of the individual product volumes—these will be the "volumes" used for SQRT allocations

PRODUCT	VOLUME (units)	SQRT VOLUME
Product A	10,000	100
Product B	625	25
Product C	5,625	75
Product D	2,500	50
TOTAL:	**18,750**	**250**

Square Root Costing Methodology – Step #3

Step #1

Identify complexity-driven costs

Step #2

Calculate the SQRT of volumes

Step #3

Determine SQRT allocations

For complexity-driven costs, use these percentages to allocate those costs to each product

PRODUCT	VOLUME (units)	SQRT VOLUME	ALLOCATE BY SQRT
Product A	10,000	100	40%
Product B	625	25	10%
Product C	5,625	75	30%
Product D	2,500	50	20%
TOTAL:	**18,750**	**250**	

Product A: 100/250 = 40%
Product B: 25/250 = 10%
Product C: 75/250 = 30%
Product D: 50/250 = 20%

Square Root Costing Methodology - Step #4

Step #1

Identify complexity-driven costs

Step #2

Calculate the SQRT of volumes

Step #3

Calculate SQRT allocation %s

Step #4

Calculate actual SQRT cost allocations ($/unit) for complexity-driven costs

INDIRECT LABOR - $50,000 total cost

PRODUCT	VOLUME (units)	ALLOCATE BY SQRT	SQRT COST ($/)
Product A	10,000	40%	$2.00
Product B	625	10%	$8.00
Product C	5,625	30%	$2.67
Product D	2,500	20%	$4.00

Product A: ($50,000 x 40%)/10,000 units = $2.00/unit
Product B: ($50,000 x 10%)/625 units = $8.00/unit
Product C: ($50,000 x 30%)/5,625 units = $2.67/unit
Product D: ($50,000 x 20%)/2,500 units = $4.00/unit
allocating by volume would allocate all products $2.67/unit ($50,000/18,750 units) of INDIRECT LABOR cost

Square Root Costing Methodology – Step #5

Step #1

Identify complexity-driven costs
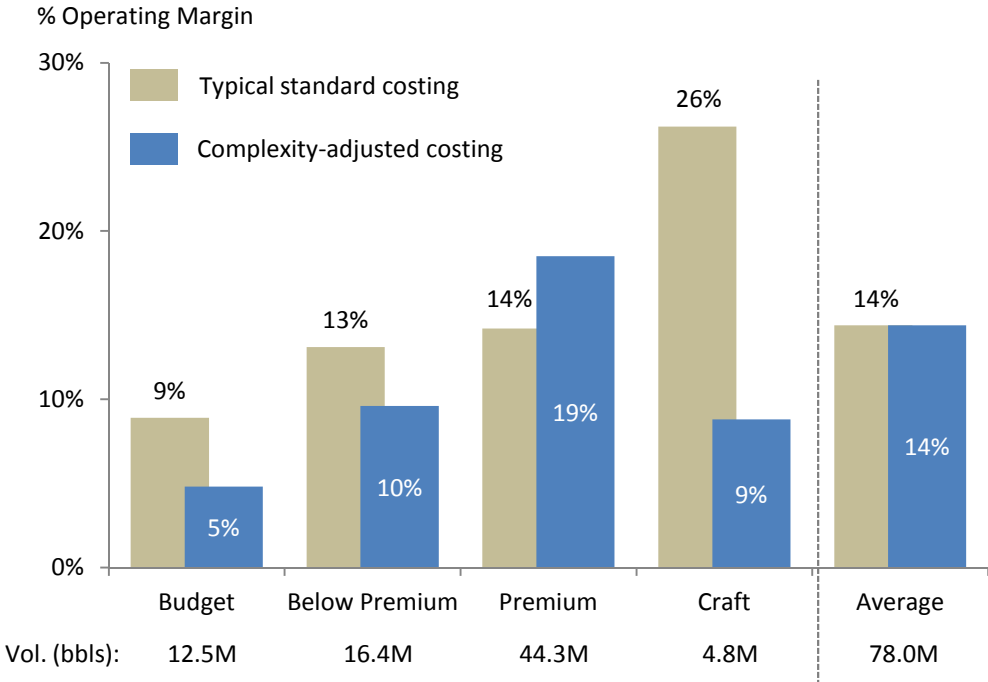
Step #2

Calculate the SQRT of volumes

Step #3

Calculate SQRT allocation %s

Step #4

Calculate actual SQRT cost allocations ($/unit) for complexity-driven costs

Step #5

Consolidate all cost data (by volume, by item, SQRT) for a complete view of costs for each product

% Operating Margin

Vol. (bbls):	12.5M	16.4M	44.3M	4.8M	78.0M
	Budget	Below Premium	Premium	Craft	Average

Legend:
- Typical standard costing
- Complexity-adjusted costing

Budget: 9% / 5%
Below Premium: 13% / 10%
Premium: 14% / 19%
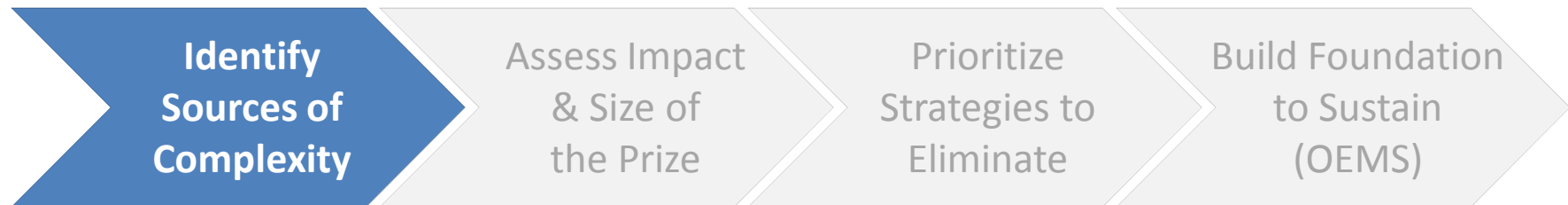Craft: 26% / 9%
Average: 14% / 14%

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Identifying sources of complexity is the first step

Complexity reduction overview

Identify Sources of Complexity	Assess Impact & Size of the Prize	Prioritize Strategies to Eliminate	Build Foundation to Sustain (OEMS)

Now that you know about complexity – What's next?

- Do you have hidden complexity in your business?

- How is complexity impacting your customers? Your internal operations?

- Where is complexity hiding? How pervasive is it?

- How will you identify the sources of complexity and build momentum?

Mapping exercises can be a powerful tool to identify complexity and build consensus for change
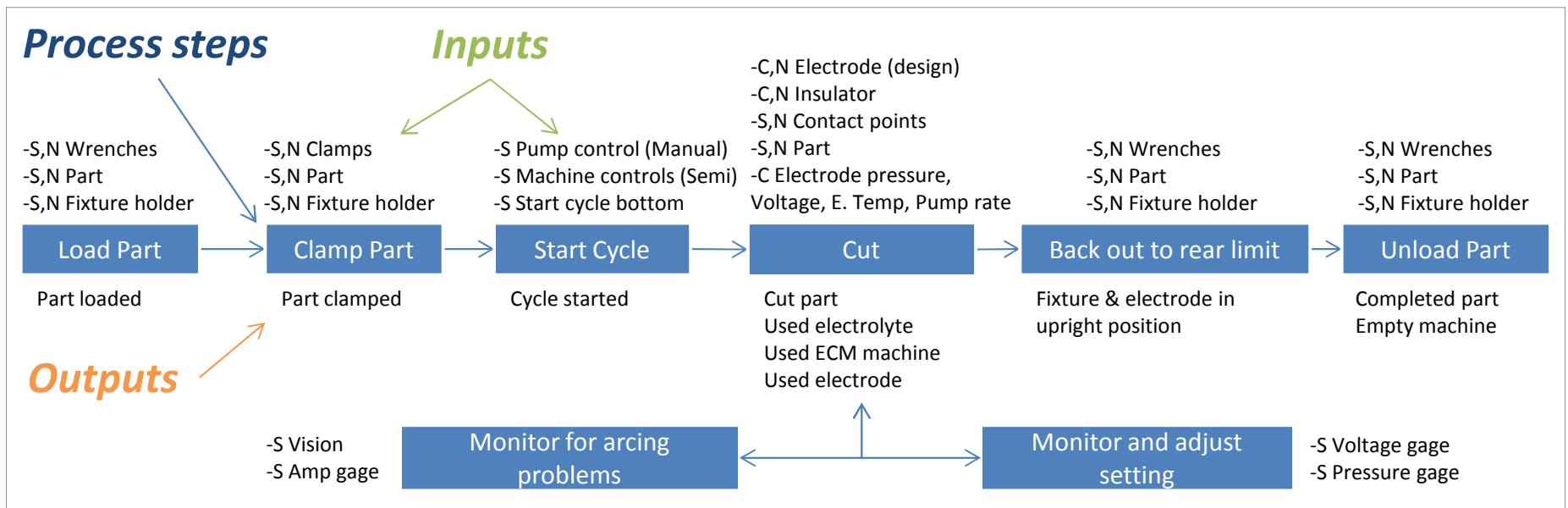
	Benefits	Limitations
Process Maps	• Simple representation of a distinct process • Visualize the basic end-to-end process flow	• No quantification and identification of complexity • Typically a silo perspective
Value Stream Maps	• Takes a broader perspective across entire value stream • Adds data enabling metrics to measure and improve	• Maps standard process, but ignores variation and deviation • Not effective at identifying sources of complexity
Complexity Value Stream Maps	• Holistic, enabling portfolio and org. perspective across value chain • Visually shows complexity, in addition to capturing data	• Requires participation from all stakeholders to create • Rich dialog requires more working sessions

Simple process maps illustrate inputs and outputs, but little else

- A **graphical representation of a process flow**, identifying the steps of the process and the inputs/outputs of each step

- Ideal for quick alignment or high level communication

Simple Process Map
(Illustrative Example from Manufacturing Process)

Process steps   *Inputs*

-C,N Electrode (design)
-C,N Insulator
-S,N Contact points

-S,N Wrenches -S,N Part -S,N Fixture holder	-S,N Clamps -S,N Part -S,N Fixture holder	-S Pump control (Manual) -S Machine controls (Semi) -S Start cycle bottom	-S,N Part -C Electrode pressure, Voltage, E. Temp, Pump rate	-S,N Wrenches -S,N Part -S,N Fixture holder	-S,N Wrenches -S,N Part -S,N Fixture holder
Load Part	**Clamp Part**	**Start Cycle**	**Cut**	**Back out to rear limit**	**Unload Part**
Part loaded	Part clamped	Cycle started	Cut part Used electrolyte Used ECM machine Used electrode	Fixture & electrode in upright position	Completed part Empty machine

Outputs

-S Vision
-S Amp gage

Monitor for arcing problems	**Monitor and adjust setting**	-S Voltage gage -S Pressure gage

Value Stream Maps (VSM) span stakeholders, and add layer of data to better measure the process

- A VSM **extends the usefulness of process maps by adding data**, such as material and information flow, operating parameters, and lead times
- Ideal to measure and improve a standard process across stakeholders

Value Stream Map
(Illustrative Example from Manufacturing Process)
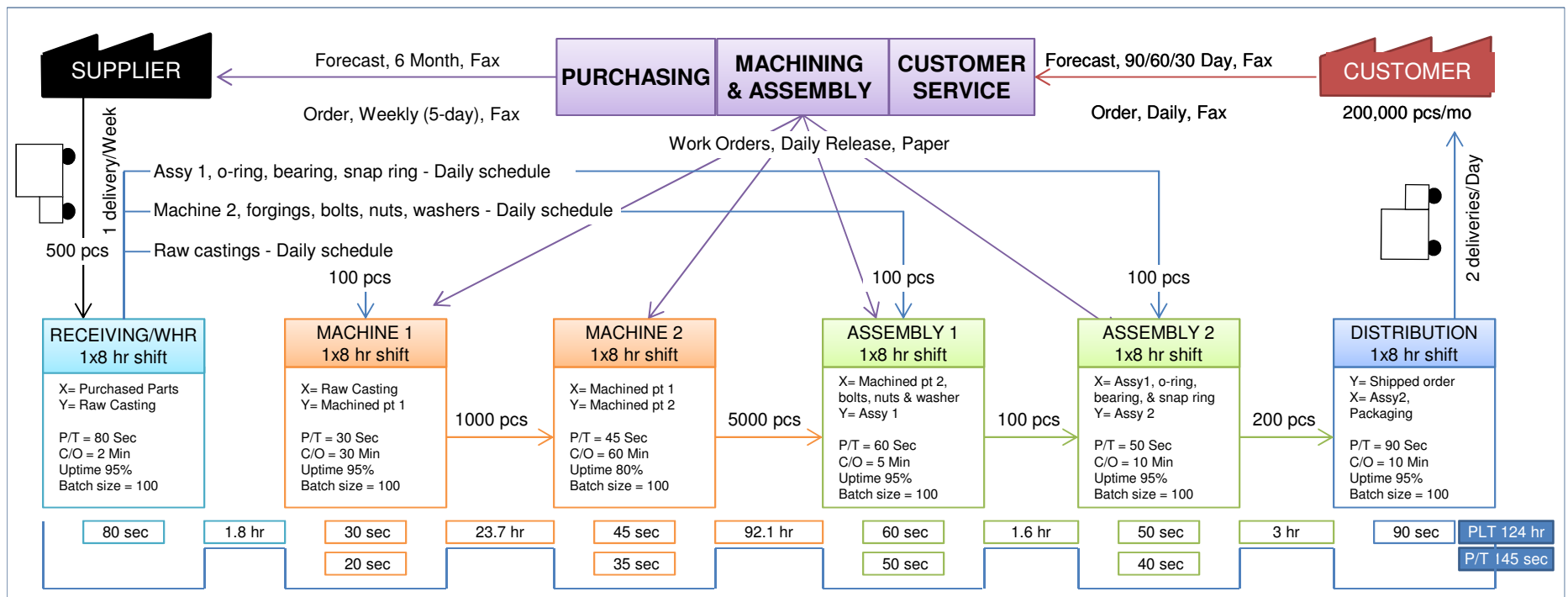
Complexity Value Stream Maps (CVSM) are interactive tools used to identify variation and complexity

The CVSM is a **visual representation of the pain of poor performing, unresponsive, and high-cost processes**
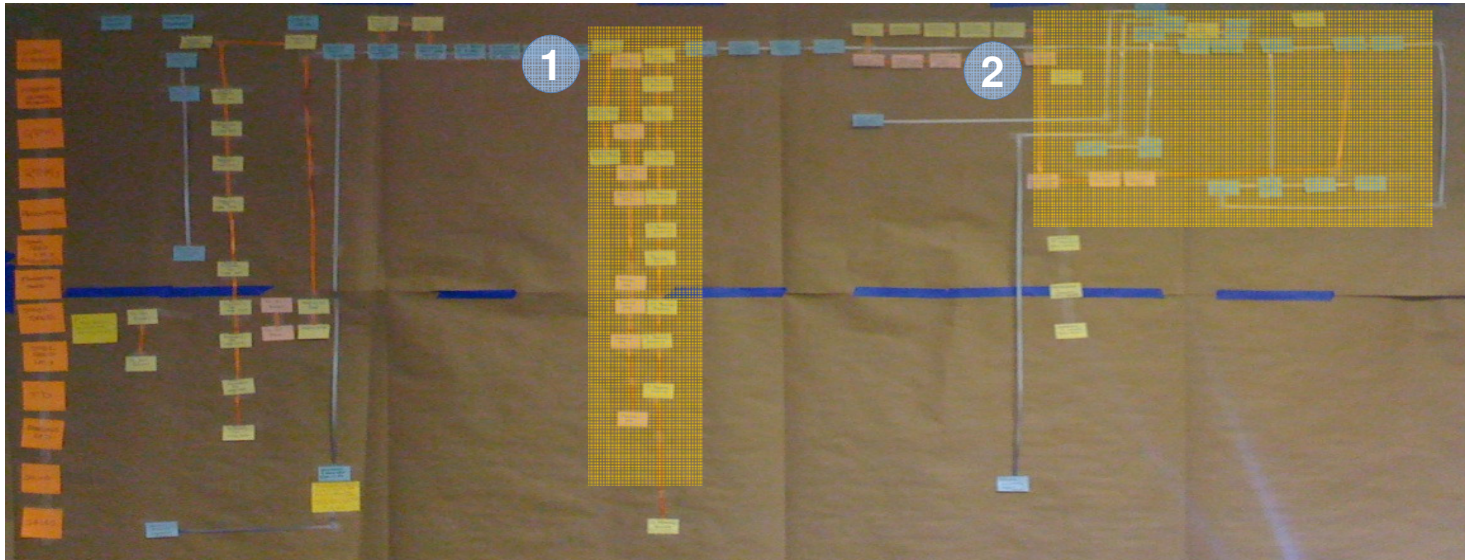
1 **Complexity within a single segment of the process presents an opportunity for deeper dive diagnostics**

2 **Complexity across multiple steps presents an opportunity process improvement across the enterprise**

Complexity Value Stream Mapping:
Characteristics of a CVSM

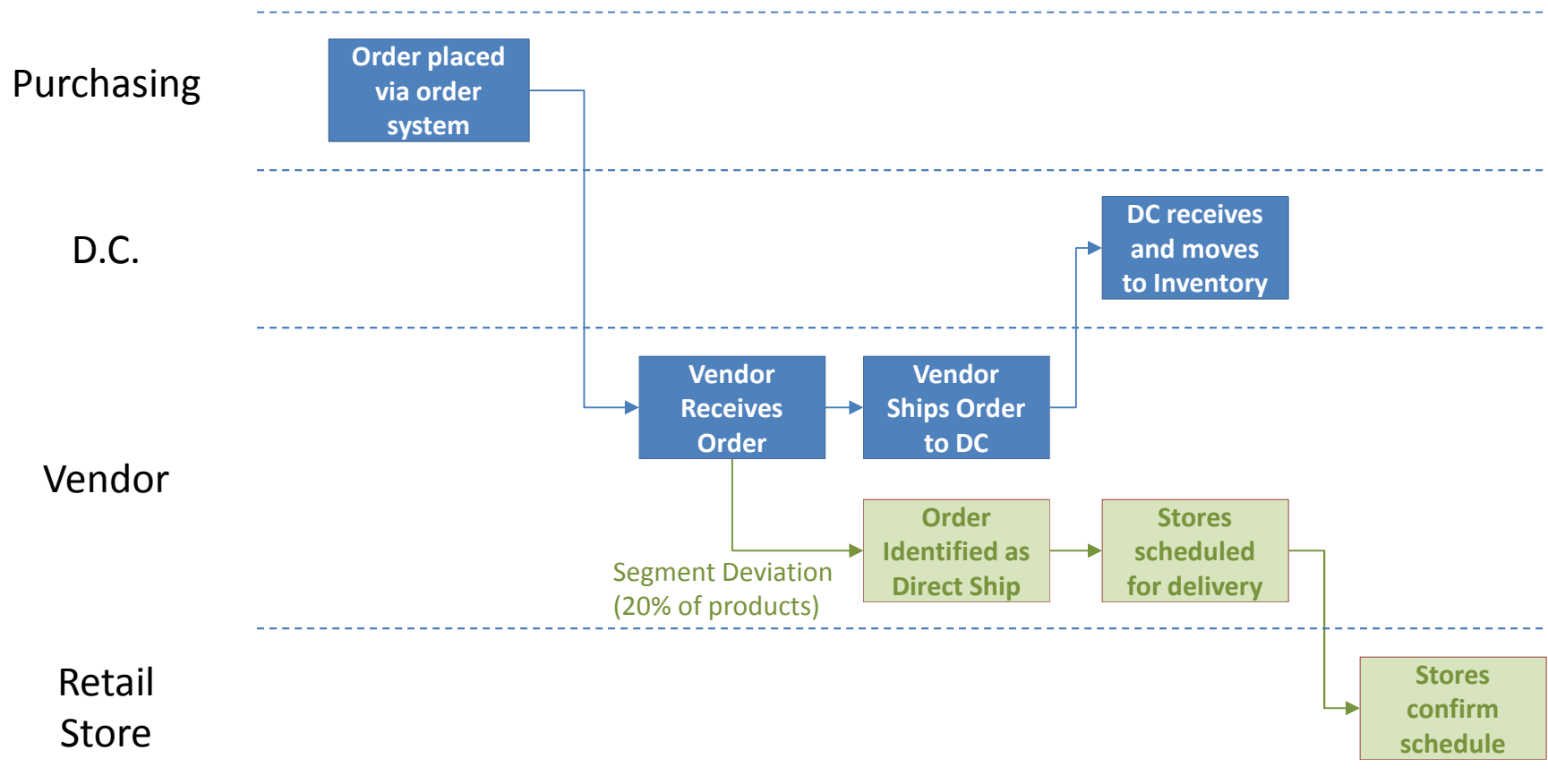**CVSM Workshop Example**
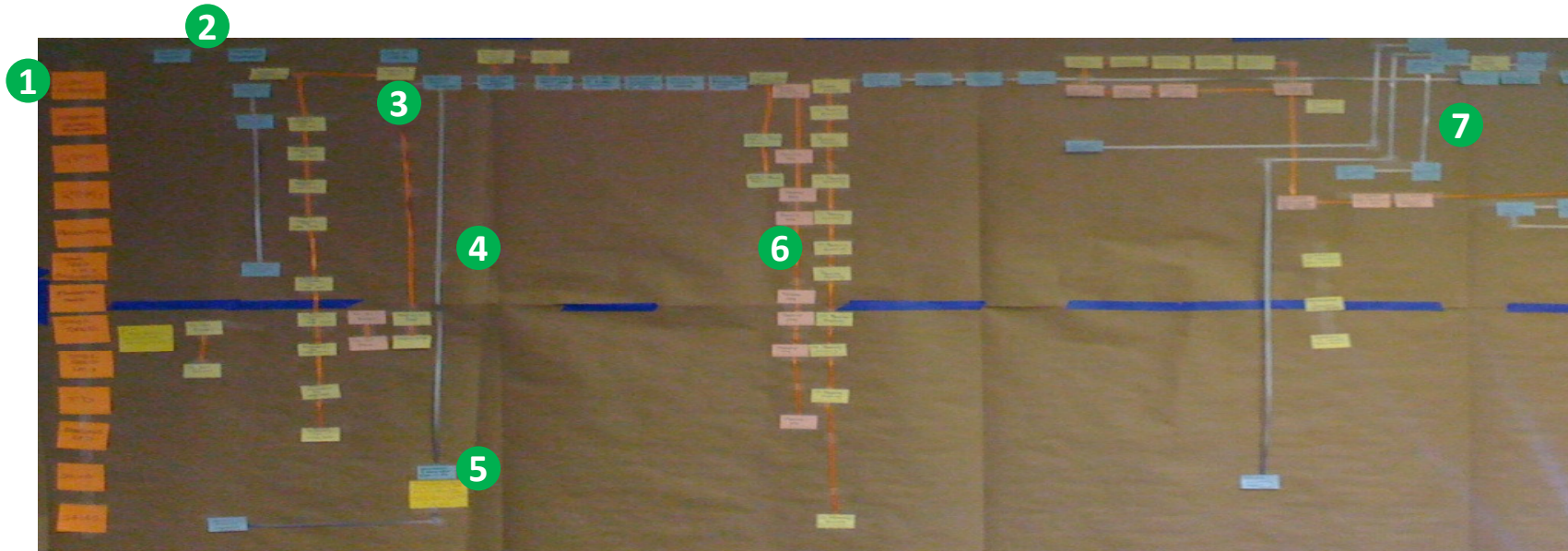
1. Relevant stakeholders are listed and included in exercise

2. Process broken into phases

3. Process steps outlined in detail, by stakeholder and timeline

4. Both material and info flow mapped

5. Data and relevant insight captured throughout

6. Complexity identified directly on impacted process steps

7. Process deviation (planned and unplanned) clearly called out

CVSMs are powerful as a display of unique segments, and their interactions with process and stakeholders

All stakeholders included in the map and mapping exercise. Each process step is in their swim lanes. The most common process or segment is mapped first. Then, additional segments are mapped with supporting data

Purchasing

Order placed via order system

D.C.

DC receives and moves to Inventory

Vendor

Vendor Receives Order

Vendor Ships Order to DC

Segment Deviation (20% of products)

Order Identified as Direct Ship

Stores scheduled for delivery

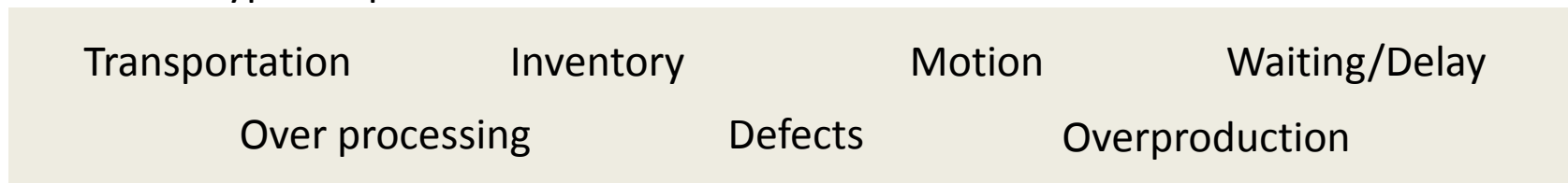Retail Store

Stores confirm schedule

CVSMs also help identify costly non-value-added steps, unplanned deviations, and rework

Quality and value are defined by the customer, and process steps can be defined in terms of:
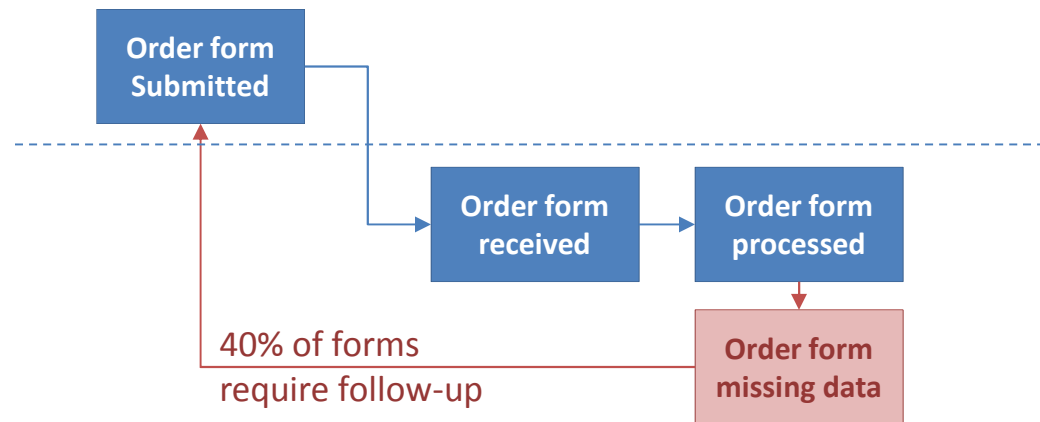
- **Value-add (VA)**: Activities that the customer would pay for
- **Business-value-add (BVA)**: Activities that are required from legal and regulatory perspective, but considered as non-value-add
- **Non-value-add (NVA)**: Activities that the customer would not pay for

The seven types of process waste or non-value-add:

Transportation	Inventory	Motion	Waiting/Delay
Over processing	Defects	Overproduction	

Example:

Rework is a frequent source of NVA activity

Order form Submitted

Order form received

Order form processed

Order form missing data

40% of forms require follow-up

Ultimately the CVSM is a tool to identify opportunity, and align stakeholders on a path to improvement

Complexity Value Stream Map
(Illustrative End-to-End Example)

Planning – adjustments and modifications

Returns – expensive and inefficient

Sample QA requests pulling product

QA process is long

Dryer capacity limitations

Rework loop

Areas of operating complexity and/ or process inefficiency

Customer
Sales
Cust. Service
Warehouse
Vendor
QA
Engineering
Distribution
Finance
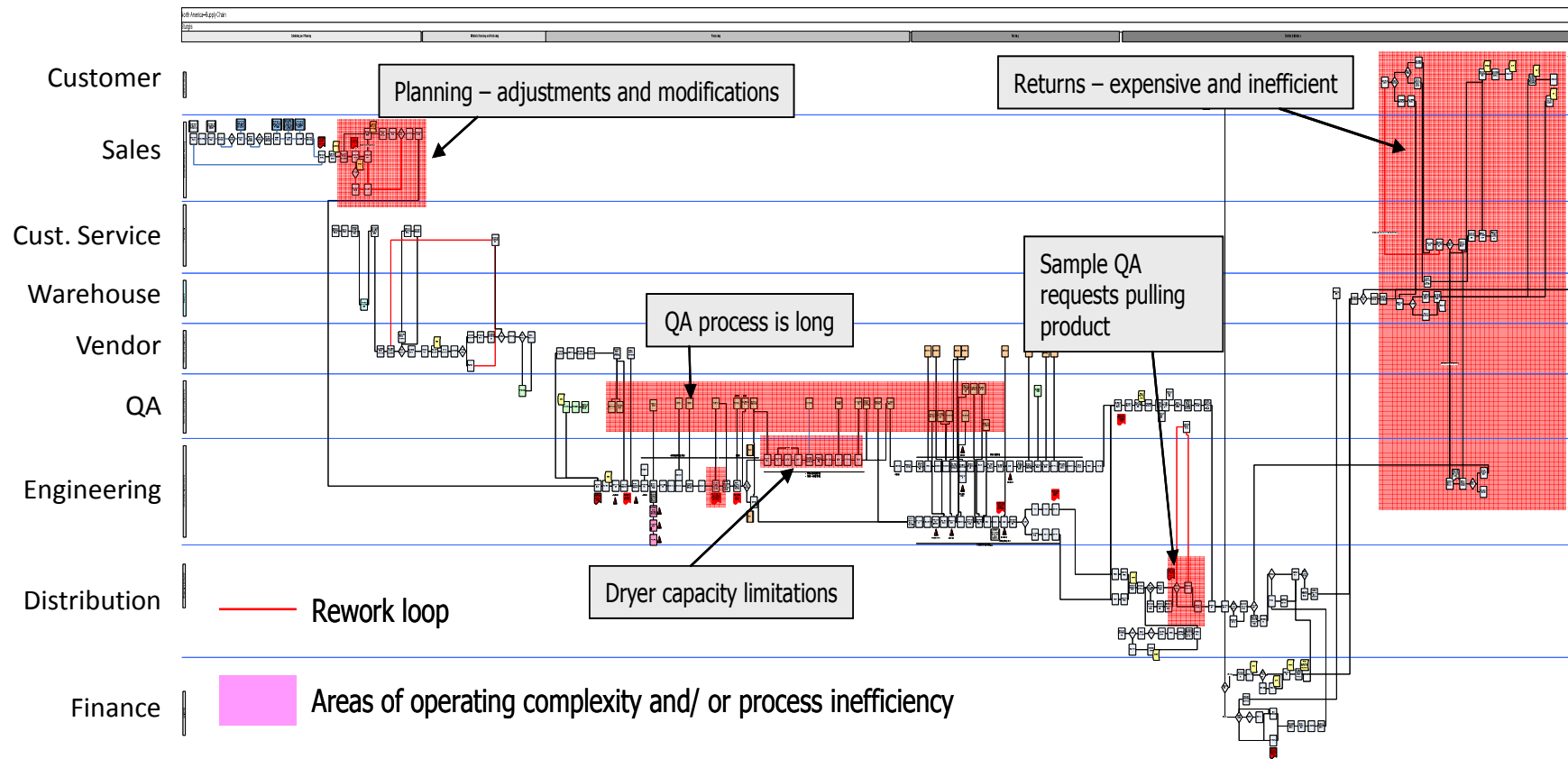
A CVSM allows us to see the business through a different lens

- Differs from standard VSMs by looking at the entire value stream and how **different functions and product families interact** during the process

- Builds clearer **understanding**:
  - The interaction of different things throughout the processes
  - How those interactions affect what the customer sees, as well as how the organization must operate
  - The impact of physical and electronic "hand-offs", rework loops, and IT integration within the processes that may be driving the cost of complexity

- Enables team to **determine:**
  - The financial impact of complexity on the existing processes
  - The impact of individual products or product families on capacity, flexibility, and speed
  - Whether the organization is properly allocating overhead based on product specific complexity inherent in the existing processes
  - The potential effect a product or product family has on the overall quality of the organization

Creating a CVSM:
A CVSM exercise is broken into 4 steps

1 **Define Swim Lanes & Process Stages**

2 **Identify Work Streams**

3 **Overlay Complexity**

4 **Synthesize Takeaways**

Creating a CVSM:
Details at each step (1 of 2)

1 **Define Swim Lanes
& Process Stages**

2 **Identify
Work Streams**

- Conduct a brainstorming session and includes 3rd party to identify every department or role involved in the process:

  ➢ How does information flow through the processes across function and phases?

  ➢ Who manages information?

  ➢ What are the phases of the process across the map?

  ➢ Who are the subject matter experts most knowledgeable about a process or all the processes?

- Discuss the general flow of work and decide on the product, region or other segment that represents the "most common process":

  ➢ Where are the decision points?

  ➢ How is "product" pushed through the work flow?

  ➢ Does "rework" occur in the same "swim lane" or does it require interaction with another group?

- Map the "main process" and identify exceptions on the map using (use color to highlight different features):

  ➢ What does that involve specifically?

  ➢ How do you get the information for that step? In what format?

  ➢ Who does that affect/who needs the information?

  ➢ What happens next?

3 **Overlay Complexity**

- Used data to quantify complexity and call out concerns, deep dive questions are key:
  - ➢ How long does (and how long can) that take?
  - ➢ What data do we need to determine efficiency and capacity?
  - ➢ How does Product A's process differ?
  - ➢ What are the process cycle-times each step of the process? Value-add time? Non-Value add time?
  - ➢ Where is inventory building up? How much standing inventory? WIP?
  - ➢ How much time is spent fixing defects/rework?
  - ➢ What is the demand rate (take time)? changeover times? daily "up time"? How long are the queues?
- Document red flags, every exceptions
  - ➢ Red Flags: In large processes, "Red Flags" are easily identifiable and should capture the majority of complexity concerns
  - ➢ Every Exception: In deep dive projects, it may be useful and feasible to document and consider every exception

4 **Synthesize Takeaways**

- Collecting and formatting the takeaways:
  - ➢ Documenting the exceptions and red flags in an actionable manner
- The CVSM is also a great source for estimating baseline Process Cycle Efficiency
- Red Flag documentation
  - ➢ Opportunity matrix and, after further analysis, a benefit-effort matrix

Long term

Quick wins

Benefit

EXAMPLE

Medium term

step"

Effort
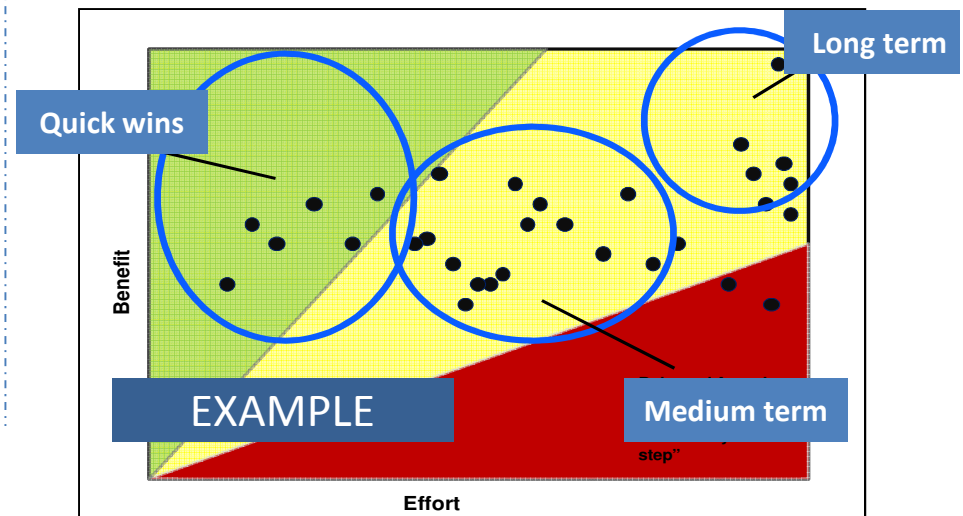
Interactive Demonstration:
Building a CVSM

Customer	Sales	Contracts	Legal	Fulfillment

Order take-in	Order review	Order approval	Shipping/notification

	Order take-in	Order review	Order approval	Shipping/notification
Customer				
Sales				
Contracts				
Legal				
Fulfillment				

Order take-in	Order review	Order approval	Shipping/notification

Customer

Customer submits PO

Sales

Contracts

Legal

Fulfillment

Phase headers: Order take-in → Order review → Order approval → Shipping/notification

Swimlanes: Customer | Sales | Contracts | Legal | Fulfillment

- Customer submits PO
- Sale rep logs PO, enter Order
- Contracts agent review order
- Standard term ?
- Yes
- Agent approves order
- Rep is notified
- Pick order log shipment
- Order is shipped

Order take-in ▸ Order review ▸ Order approval ▸ Shipping/notification

Customer

Customer submits PO

Sales

Sale rep logs PO, enter Order

Rep is notified

Contracts

Contracts agent review order

Standard term ?

Yes

No

Agent approves order

Agent requests approval

Legal

Changes acceptable?

Yes

Attorney makes ok, returns to agent

Fulfillment

Pick order log shipment

Order is shipped

Order take-in Order review Order approval Shipping/notification

Customer

Customer submits PO

Sales

Sale rep logs PO, enter Order

Rep is notified

Contracts

Contracts agent review order

Standard term ?

Yes

Agent approves order

Agent cancels order

Order is not shipped

No

Agent requests approval

Legal

Changes acceptable?

Yes

Attorney makes ok, returns to agent

No

Attorney makes no, returns to agent

Fulfillment

Pick order log shipment

Order is shipped

Timeline (top banner):

24 hr	12 hr	12-48 hr	12 hr
Order take-in	Order review	Order approval	Shipping/notification

Customer
- Customer submits PO

Sales
- Sale rep logs PO, enter Order
- Rep is notified

Contracts
- Contracts agent review order
- Stand ard term ?
  - Yes → Agent approves order
  - No → Agent requests approval
- Agent cancels order
- Order is not shipped

Legal
- Chang es accept able?
  - Yes → Attorney makes ok, returns to agent
  - No → Attorney makes no, returns to agent

Fulfillme nt
- Pick order log shipment
- Order is shipped

24 hr

Order take-in	Order review

Customer

Customer submits PO

Sales

Sale rep logs PO, enter Order

Contracts
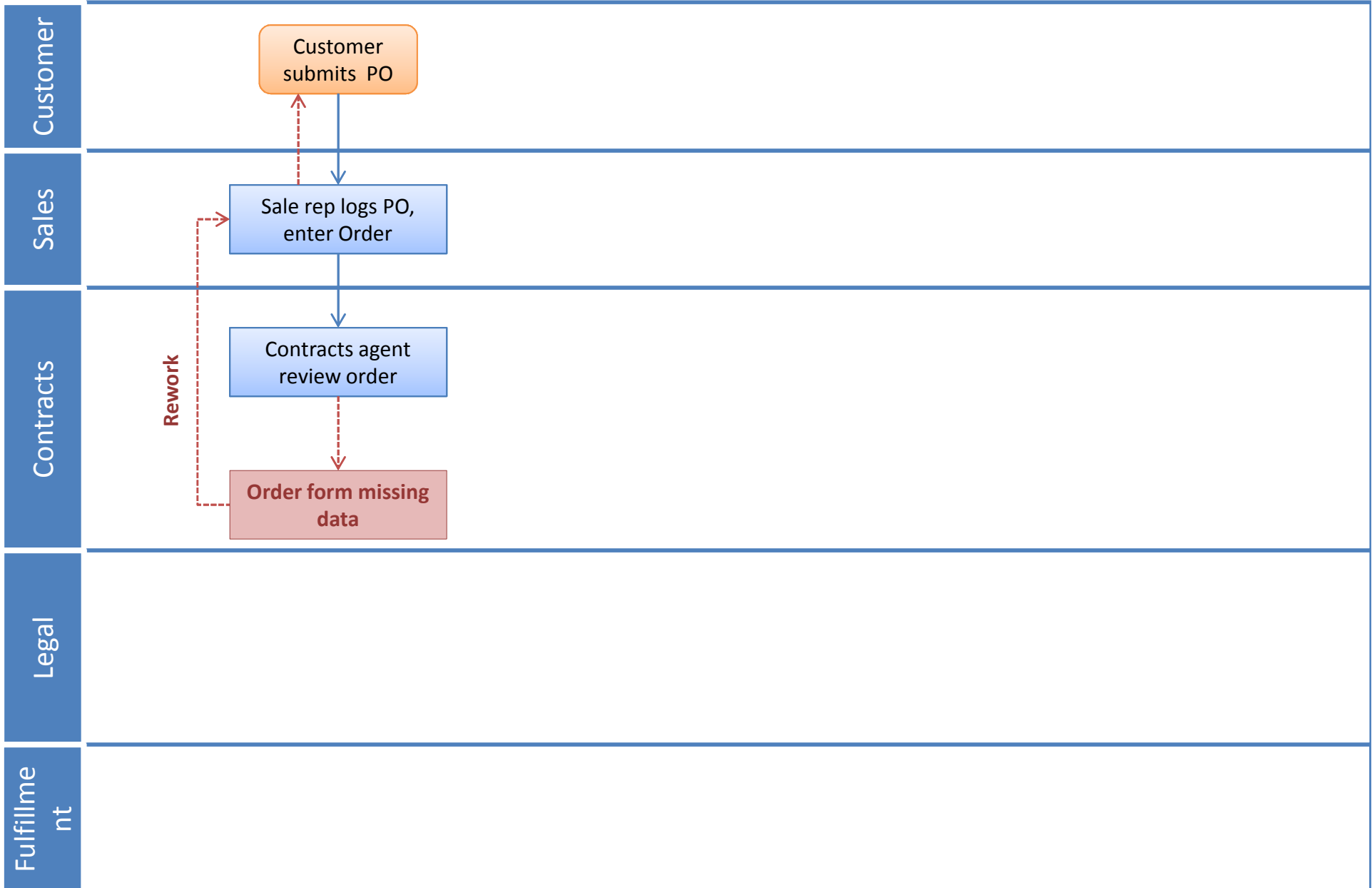
Contracts agent review order

Order form missing data

Legal

Fulfillment

24 hr + delay 12 hr

	Order take-in	Order review

Customer

Customer submits PO

Sales

Sale rep logs PO, enter Order

Contracts

Contracts agent review order

Rework

Order form missing data

Legal

Fulfillment

Agenda

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- Complexity
  - Sources and impacts of complexity
  - Accounting for complexity
  - *Complexity Costing Exercise*
  - Developing and using Complexity Value Stream Maps
  - Utilizing Portfolio Optimization to root out complexity
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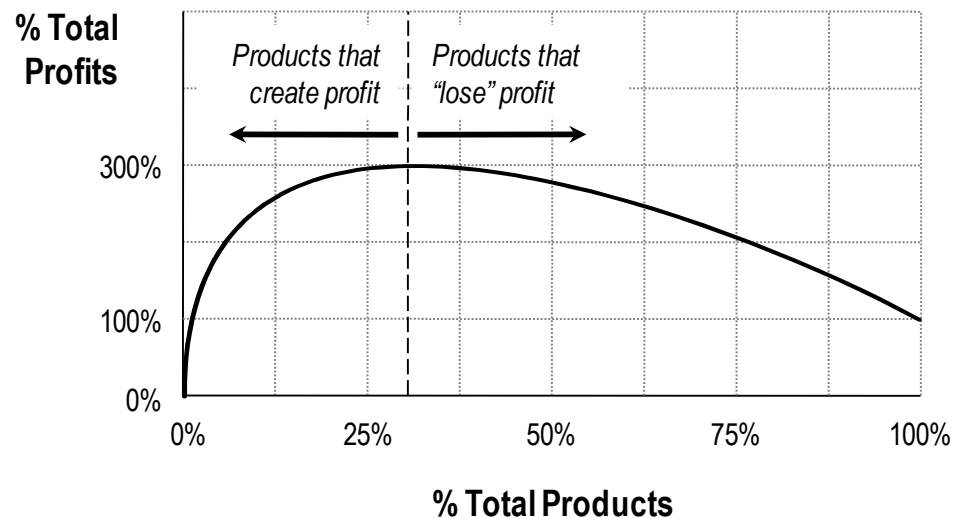- *Summary/Closing*

Recall that complexity can be in the form of products, processes or organizational complexity

The Complexity Cube
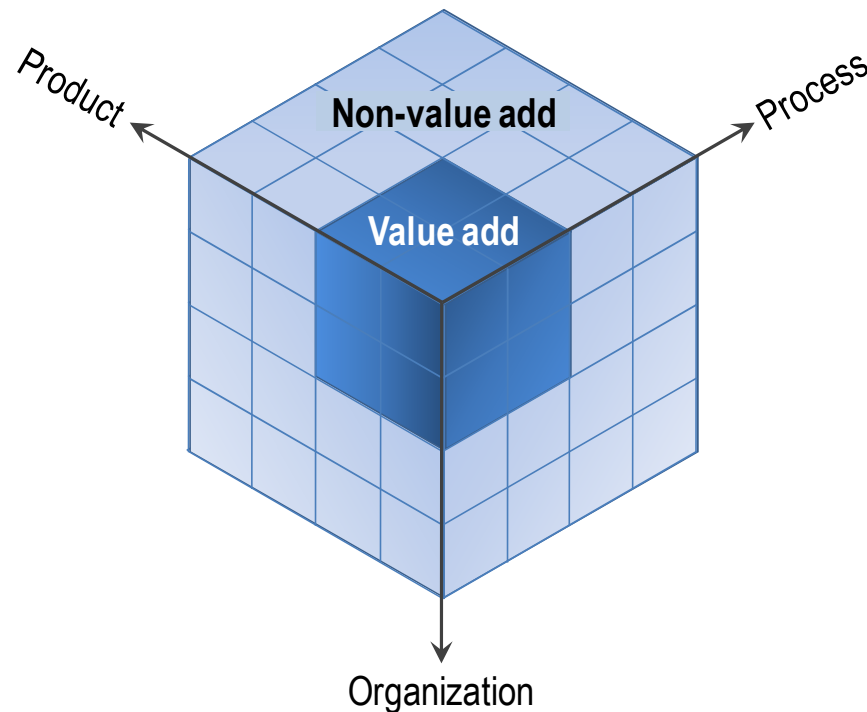
The interactions between product-process-org create cost and impede productivity; therefore assessing these interactions can be a fruitful angle of investigation

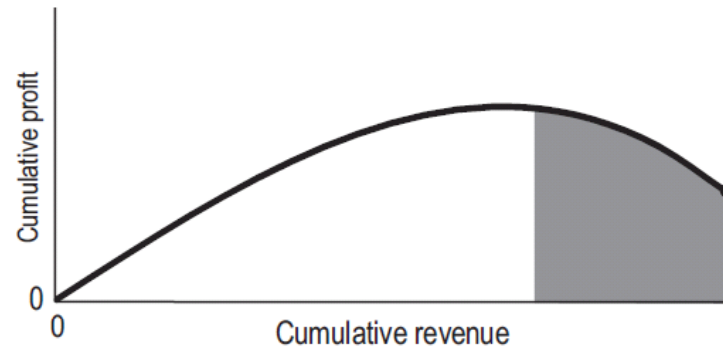# Why is portfolio optimization important?

- Often the **most profitable 20% to 30% of products generate more than 300% of the profits** in a company, meaning…

- …the **remaining 70% to 80% lose 200% of the profits**.

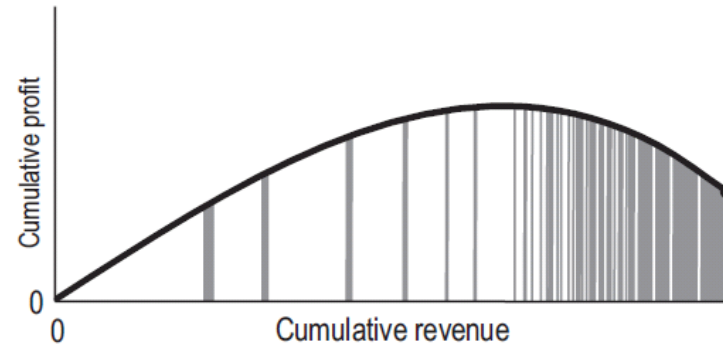**Portfolio optimization is one of the simplest ways to quickly and effectively reduce complexity**

Portfolio Optimization means looking "deeper" into the portfolio → substitutability

Portfolio optimization looks less like this…
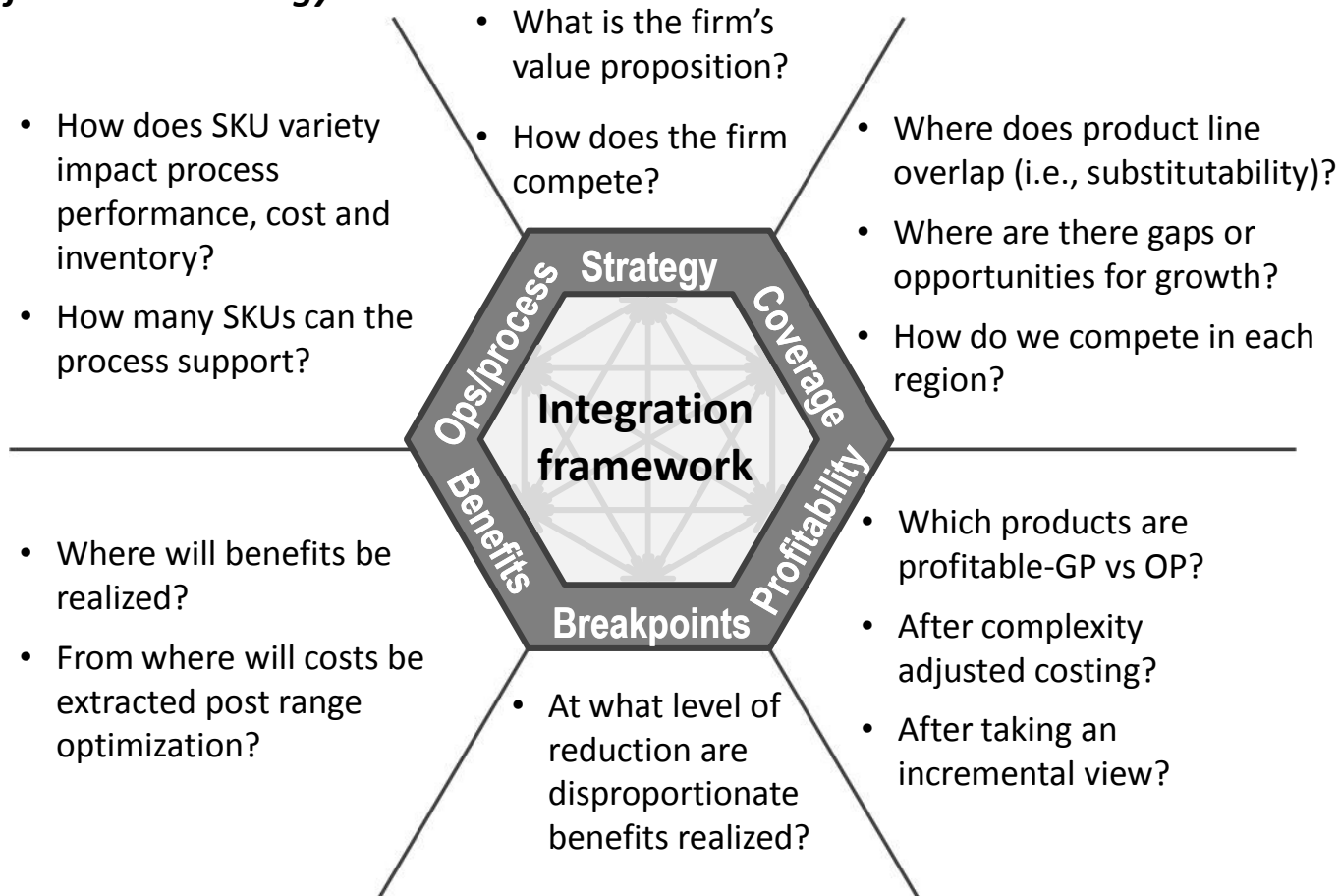
Portfolio optimization looks less like this…

And more like this…

SKU to be cut | SKU to be kept

# Portfolio optimization requires consideration of 6 facets of the business

WP&C's 6-facet methodology

- What is the firm's value proposition?
- How does the firm compete?

- How does SKU variety impact process performance, cost and inventory?
- How many SKUs can the process support?

- Where does product line overlap (i.e., substitutability)?
- Where are there gaps or opportunities for growth?
- How do we compete in each region?

Strategy

Ops/process — **Coverage**

Integration framework

Benefits — **Profitability**

Breakpoints

- Where will benefits be realized?
- From where will costs be extracted post range optimization?

- Which products are profitable-GP vs OP?
- After complexity adjusted costing?
- After taking an incremental view?

- At what level of reduction are disproportionate benefits realized?

Portfolio optimization requires consideration of 6 facets of the business

Product Line Coverage

What should your product portfolio be from just a ***coverage*** perspective?

What we see:
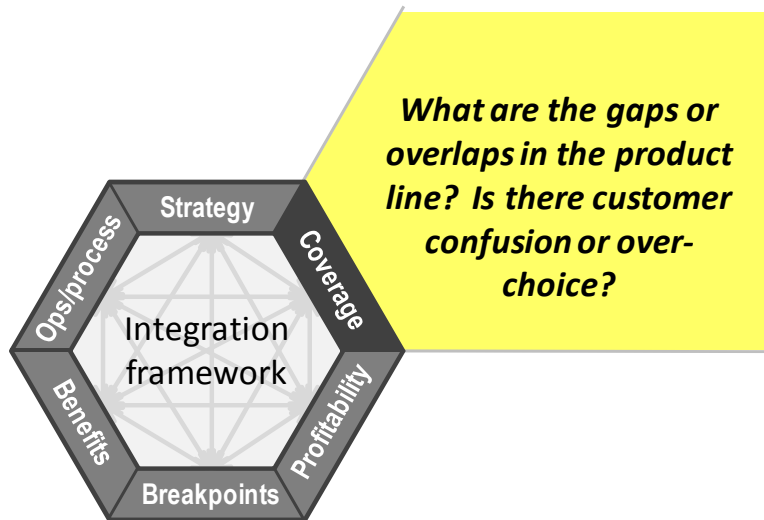
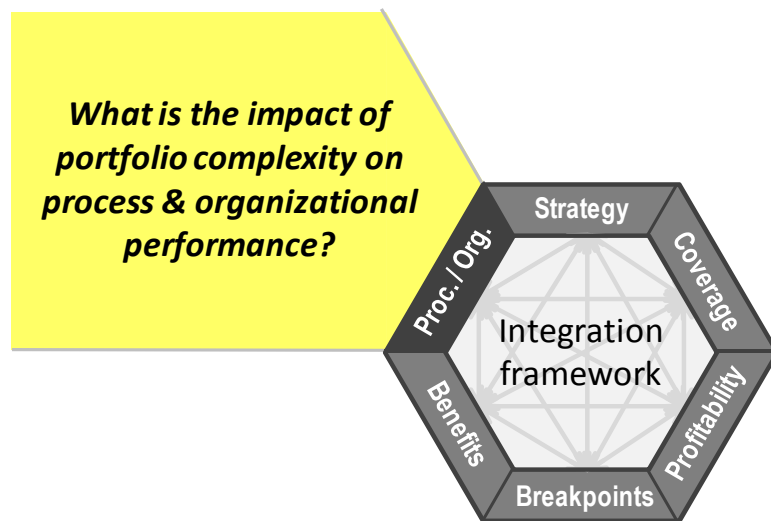*What are the gaps or overlaps in the product line? Is there customer confusion or over-choice?*

- *Complexity injects noise between you and your customer*

- *Portfolios with too much complexity almost always have gaps as well*

- *This is not just a cost/profitability issue but a sales issue as well*

Process Performance & Organizational Effectiveness

What product portfolio would optimize *process & organizational* performance levels?

What is the impact of portfolio complexity on process & organizational performance?

Strategy
Coverage
Proc./Org.
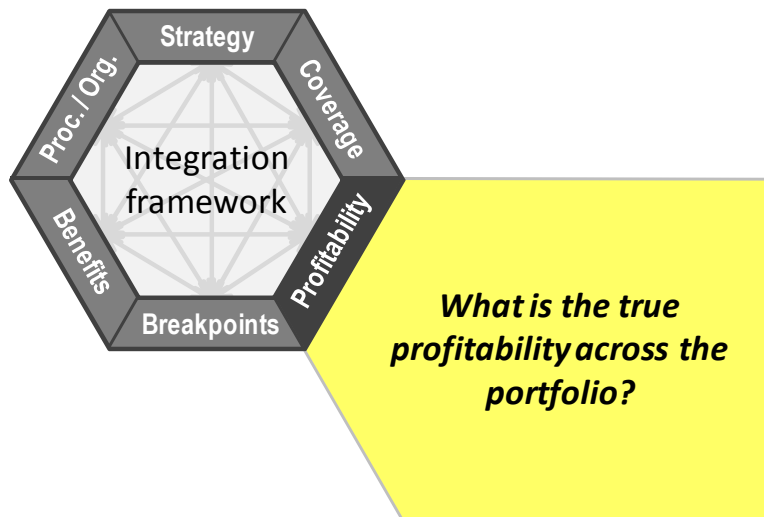Integration framework
Profitability
Benefits
Breakpoints

What we see:

- *Complexity is often the #1 driver of process performance today*

- *Sales force "dilution" often destroys sales force effectiveness and the opportunity to build scale at the product level*

- *Not just a cost but a growth issue as well*

Product Profitability

What would the product portfolio look like if you optimized from a product *profitability* perspective?

What we see:

Strategy
Coverage
Proc. / Org.
Integration framework
Benefits
Profitability
Breakpoints

What is the true profitability across the portfolio?

- **Complexity is often the #1 driver of cost competitiveness**

- **Std. costing methodologies fall short**

  - **Small-volume products are almost always under-costed**

  - **Don't account for incrementality and substitutability**

Benefits

From where will **benefits** be realized? What is the line of sight from product rationalization to **benefit** capture?
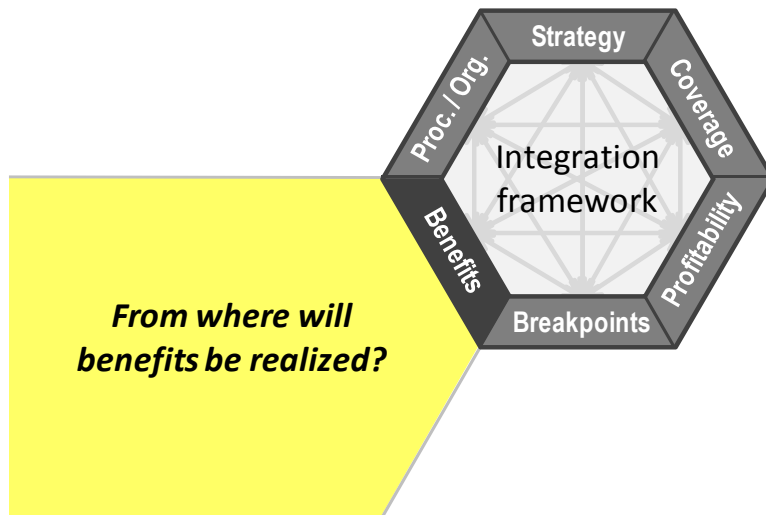
What we see:

From where will benefits be realized?

- *Complexity reduction creates the opportunity for benefit, not the benefit itself*

- *Integrating complexity reduction with other initiatives yields disproportionate benefit— complexity is often the key enabler*

Opportunity Breakpoints

What level of product rationalization, i.e. ***breakpoint***, would allow you to release a chunk of cost or dramatically change your cost structure?
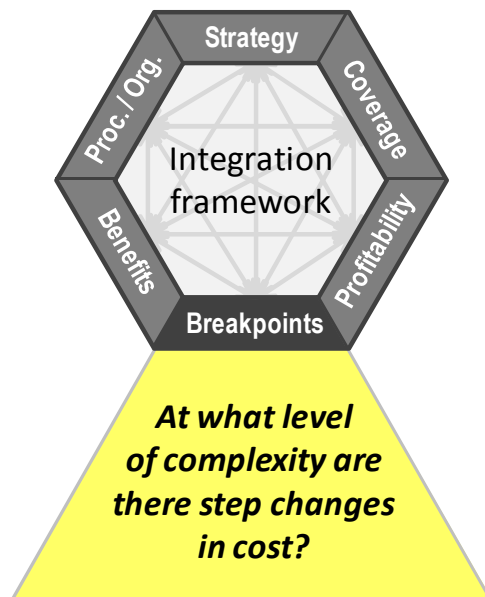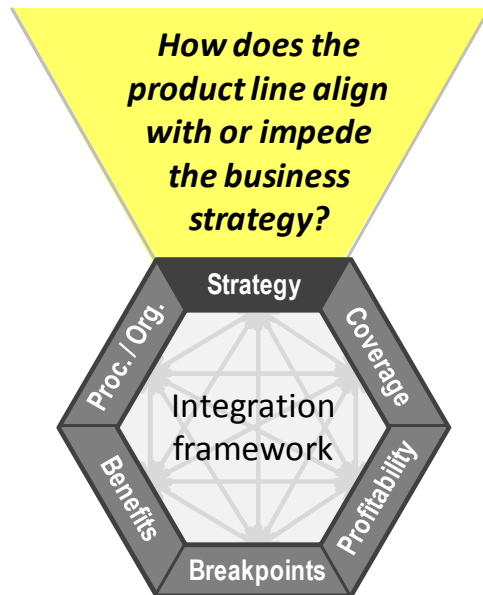
What we see:

- *Costs creep in incrementally but you must take them out in chunks*

- *Product rationalization efforts often fail by not going deep enough to make fundamental changes to the business*

Strategy

Coverage

Proc./Org.

Integration framework

Benefits

Profitability

Breakpoints

At what level of complexity are there step changes in cost?
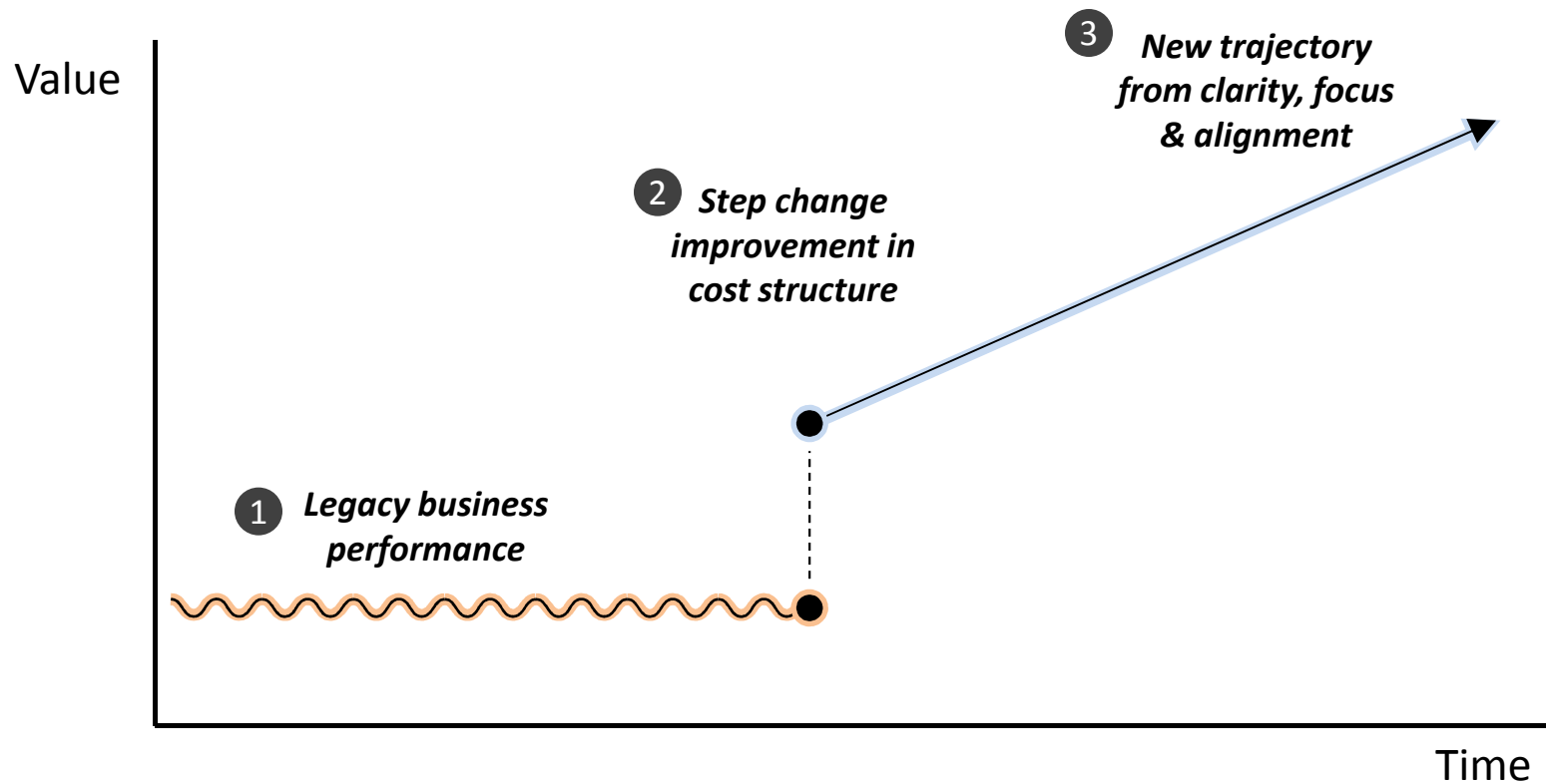
none*Portfolio Optimization Facet:*
Strategic Alignment

What product portfolio would best supports the business **strategy**? Where should you build focus and scale?

How does the product line align with or impede the business strategy?

Strategy · Coverage · Profitability · Breakpoints · Benefits · Proc./Org.

Integration framework

What we see:

- *Portfolio optimization is a strategic question, and the primary driver of value capture from the marketplace*

- *It is about reclaiming scale, which requires clarity, focus, and alignment*

- *The same actions that companies take in order to grow often place a ceiling on their ability to grow*

When executed properly, portfolio optimization can launch the business on a new trajectory

Value

3 *New trajectory from clarity, focus & alignment*

2 *Step change improvement in cost structure*

1 *Legacy business performance*

Time

Key takeaways

- Complexity reduction **creates the opportunity for benefit**, not the benefit itself

- **Substitutability is a significant lever** to reduce costs without significantly impacting revenue

- Portfolio optimization will fail to produce lasting benefits if an **integrated approach** is not used

- Portfolio optimization can **drive growth,** not just cost reduction

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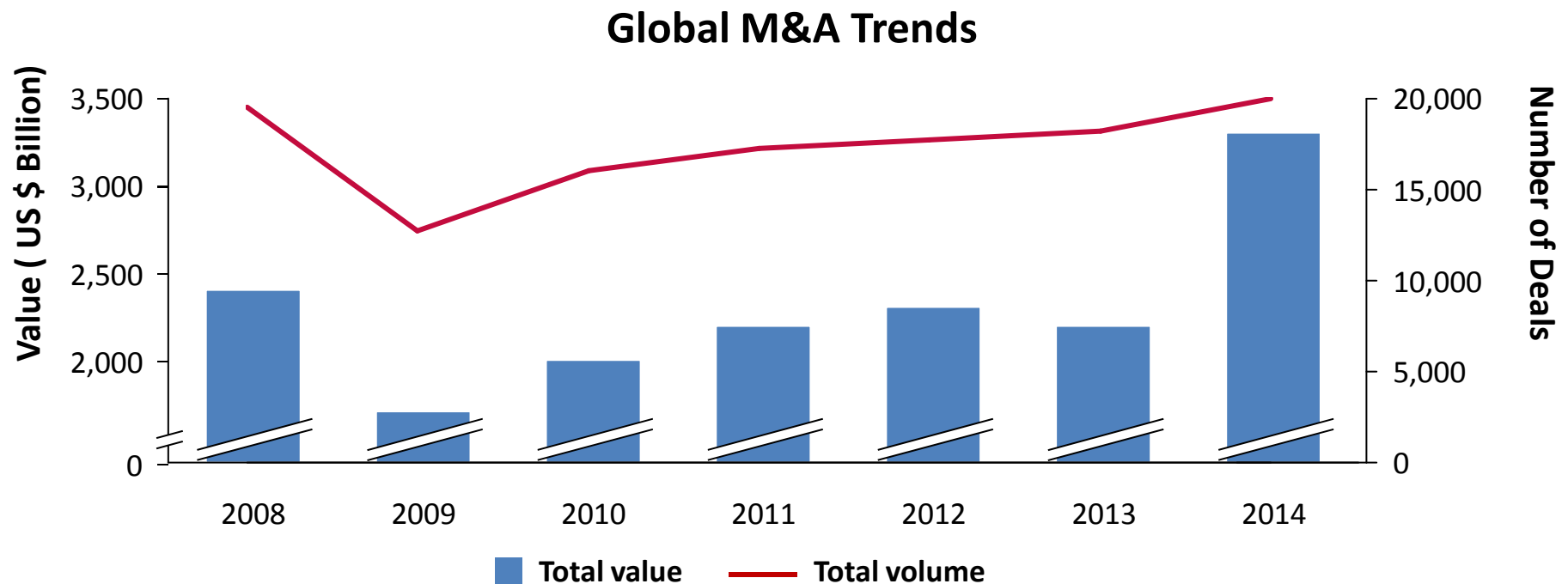- *Summary/Closing*

2014 global M&A activity was the highest since the recession

Favorable conditions have increased the demand for good deals...

- Low cost of capital may increase soon
- Economic recovery
- Less fear of double dip recession
- Large excess cash reserves

along with increasing supply

- Opportunity to reduce tax basis
- Large inventory of companies available for sale

Global M&A Trends

Legend: Total value (blue bars), Total volume (red line)

X-axis: 2008, 2009, 2010, 2011, 2012, 2013, 2014

Left Y-axis: Value (US $ Billion) — 0, 2,000, 2,500, 3,000, 3,500

Right Y-axis: Number of Deals — 0, 5,000, 10,000, 15,000, 20,000

Executives continue to see M&A as a key component of their growth strategy

M&A is the primary intended use of excess cash for 30% of corporations[1]

Primary intended use for excess cash, 2014

Invest organically
44%

Seek to merge or acquire
30%

Buy back stock
11%

One-time dividend
8%

Other
2%

Not applicable
5%
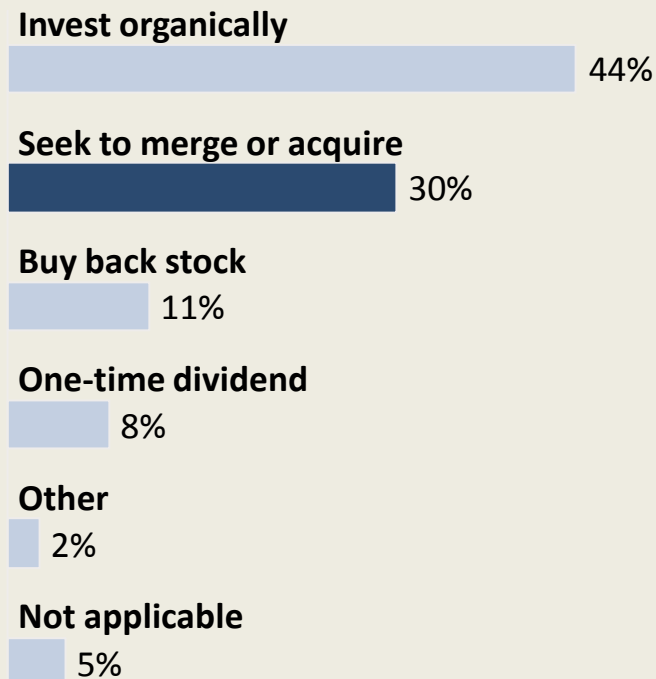
Because those who do it right significantly outperform their peers[2]

Annual total shareholder returns (CAGR 2000-2010)
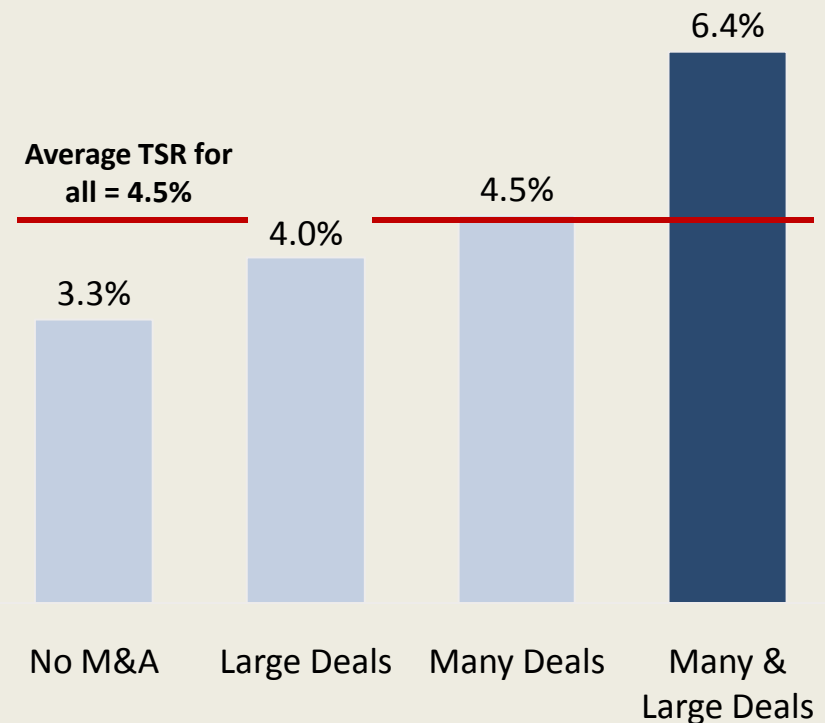
6.4%

Average TSR for all = 4.5%

4.5%

4.0%

3.3%

| No M&A | Large Deals | Many Deals | Many & Large Deals |

Yet the majority of M&A deals fail

50 – 80%[1]
failure rate

With so many deals, you would expect higher success rates
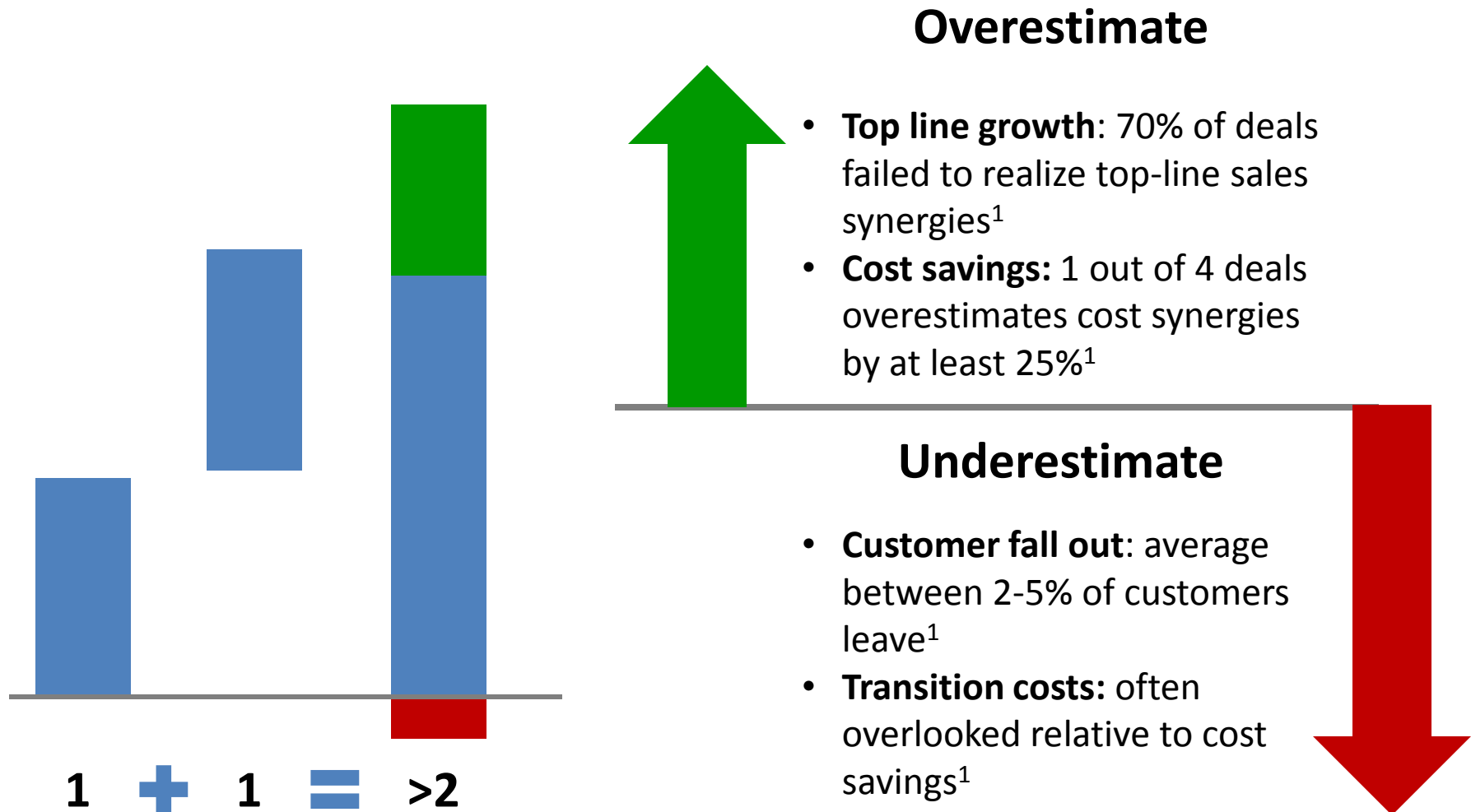
Most reasons provided for failure focus on the analytical process of due diligence

Overestimate

- **Top line growth**: 70% of deals failed to realize top-line sales synergies[1]
- **Cost savings:** 1 out of 4 deals overestimates cost synergies by at least 25%[1]

Underestimate

- **Customer fall out**: average between 2-5% of customers leave[1]
- **Transition costs:** often overlooked relative to cost savings[1]
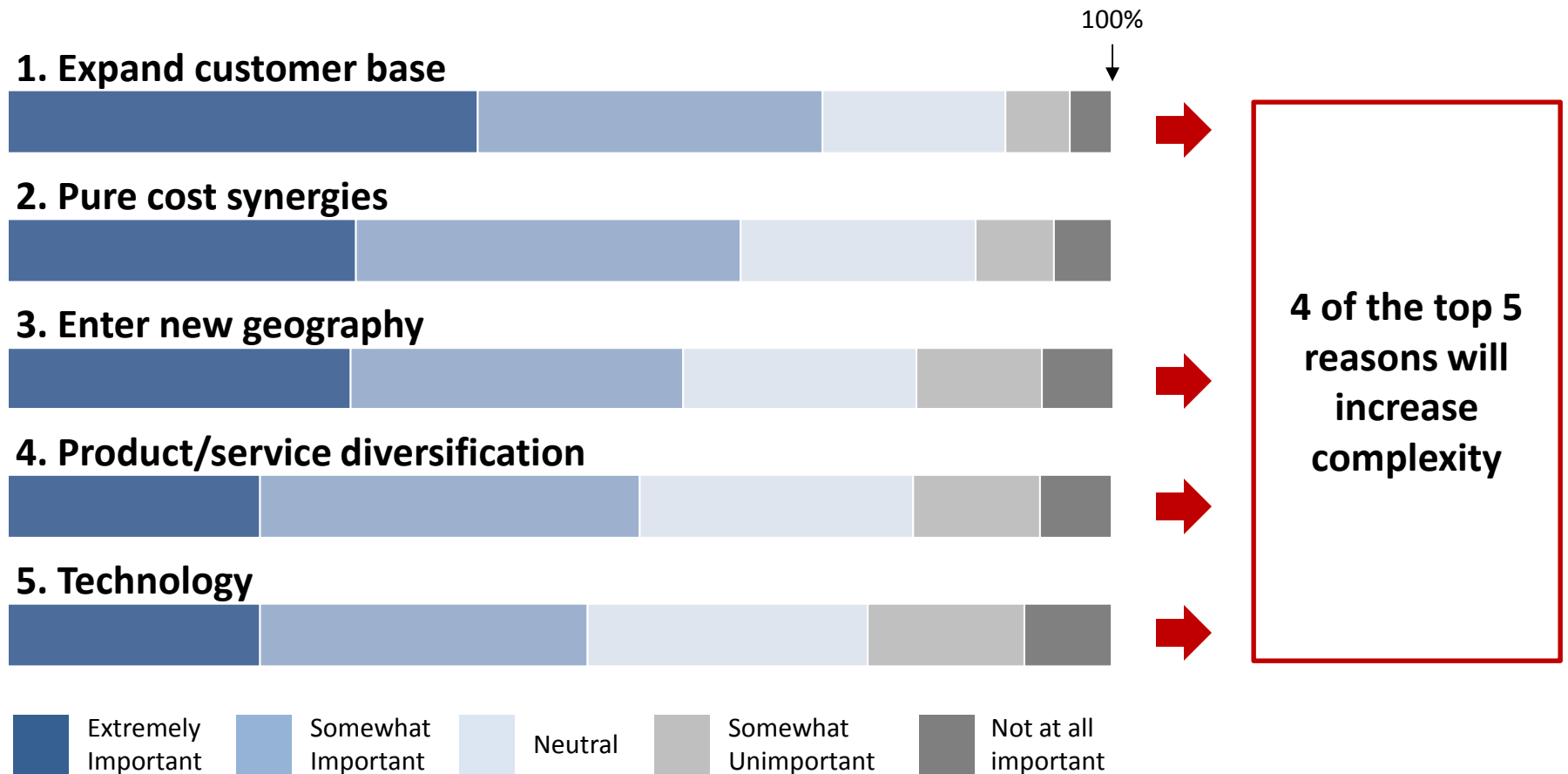
1 **+** 1 **=** >2

We believe most of these assessments are missing the key reason for failure of M&A

Complexity

By definition most M&A activity introduces additional complexity to an already complex system

Top 5 reasons corporations seek to merge or acquire

1. Expand customer base

2. Pure cost synergies

3. Enter new geography

4. Product/service diversification

5. Technology

100%

4 of the top 5 reasons will increase complexity

Legend:
- Extremely Important
- Somewhat Important
- Neutral
- Somewhat Unimportant
- Not at all important

Eaton Corporation strives to be an efficient, safe and sustainable energy provider
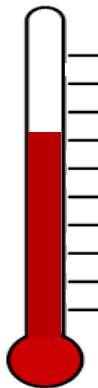
EATON

- **Industrial products** manufacturer
- $22.0B revenue in 2013
- 103,000 employees
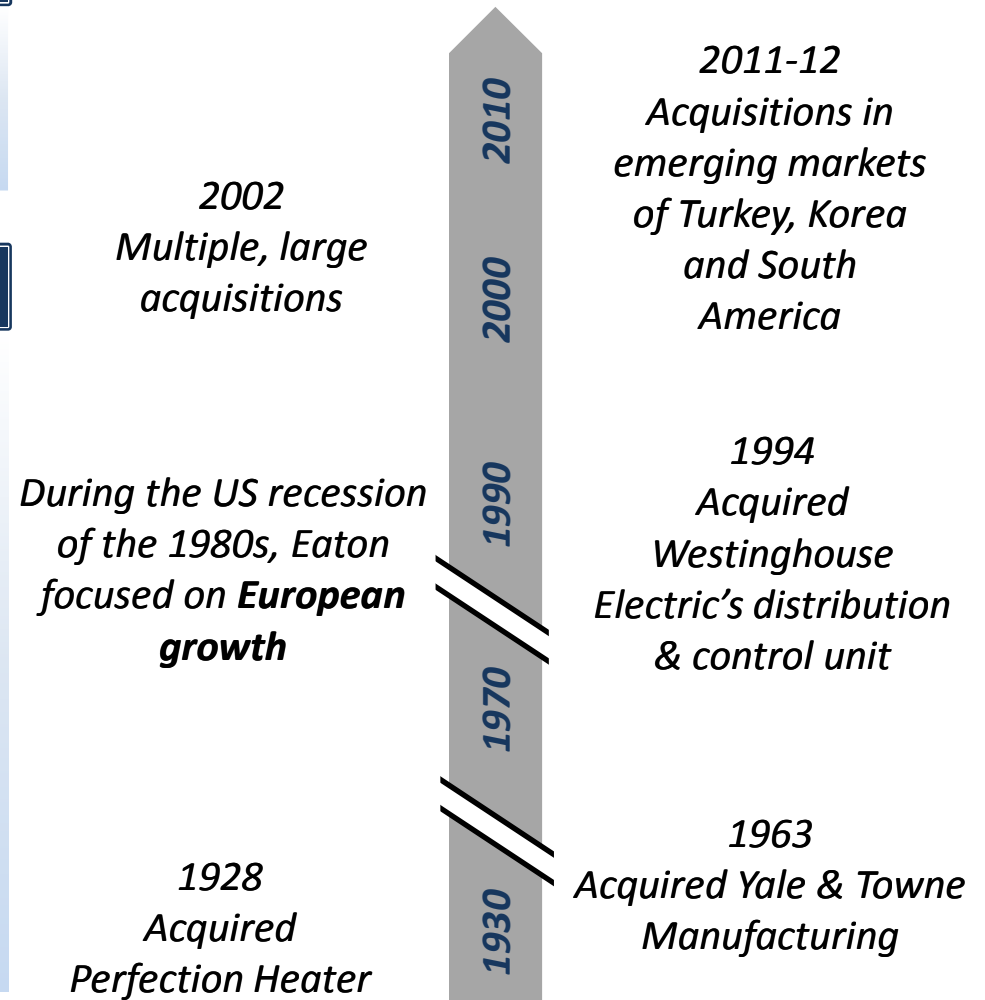
Business Diversity: High

Major Divisions:
- Aerospace
- Electrical
- Filtration
- Hydraulics
- Vehicle
- Industrial Clutches & Bakes
- Plastics Extrusion

Global presence:
Sales to **175+ countries**

M&A Activity

2011-12 Acquisitions in emerging markets of Turkey, Korea and South America

2002 Multiple, large acquisitions

*During the US recession of the 1980s, Eaton focused on **European growth***

1994 Acquired Westinghouse Electric's distribution & control unit

1928 Acquired Perfection Heater

1963 Acquired Yale & Towne Manufacturing
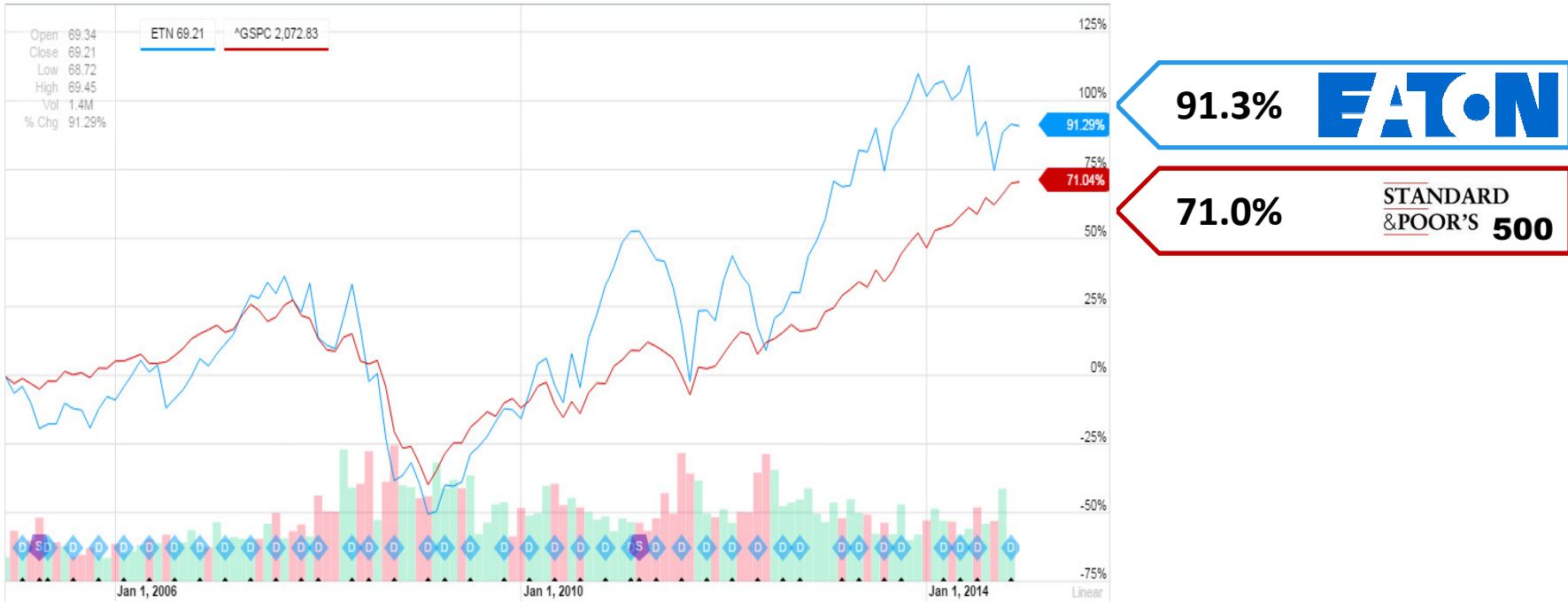
Timeline: 2010, 2000, 1990, 1970, 1930

Sources: Eaton Corporation website, Nov 2014
Notes: M&A Activities are samples of activity that occur in nearly every year, See appendix for detail

Wilson Perumal & Company, Inc.

77

Eaton outperformed the S&P 500 over the past 10 years

Financial performance for Eaton vs. S&P 500 over 10 yrs

Danaher endeavors to improve quality of life through serial acquisitions

DANAHER

- Global **science and technology** innovator

- $19.1B revenue in 2013

- 66,000 employees

Business Diversity: High

Reporting Segments:
- Environmental
- Test & Measurement
- Dental
- Life Sciences & Diagnostics
- Industrial Technologies

M&A Activity

*Since 1984 Danaher has acquired **more than 400 companies**.*

Acquired Pacific
Scientific Company

Merged with Beckman Coulter
(lab diagnostics)

1980　　　　**1990**　　　　**2000**　　　　**2010**

Acquired 12 companies including
UK-based West Instrument

Acquired Maconi
Data systems

Wilson Perumal & Company, Inc.
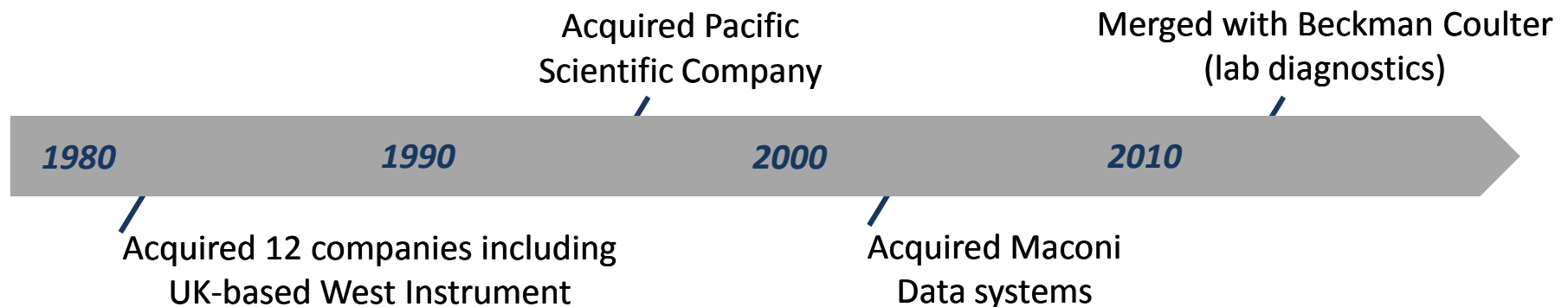
Danaher outperformed the market by 2.7X

Financial performance for Danaher vs. S&P 500 over 10 yrs

190.8%

71.1%
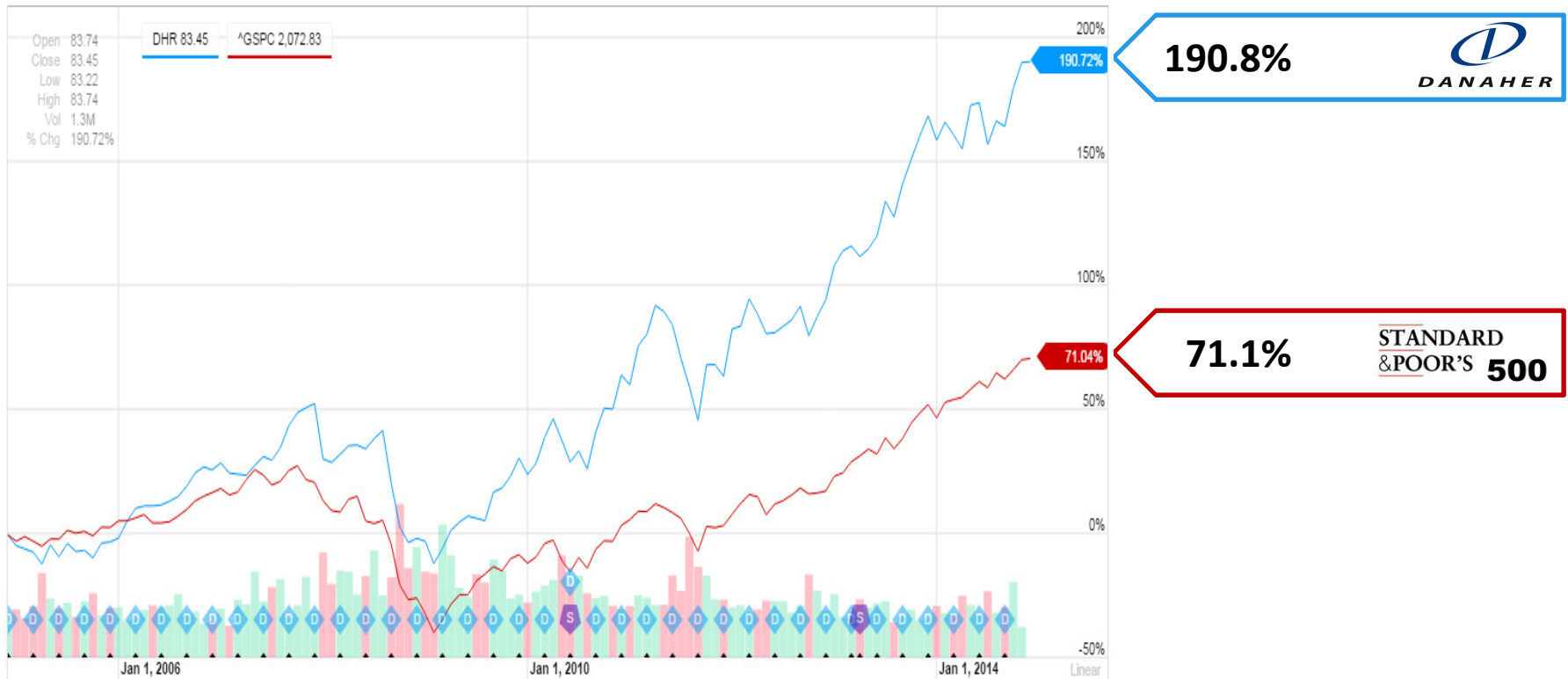
Koch Industries continuously absorbs immense levels of complexity with new products and processes

KOCH

- 2nd largest private company in the US
- $115B annual revenue
- Over 100K employees

Business Diversity: Very High

Major businesses:
- Chemicals
- Refining & Fluid Transport
- Consumer Goods
- Dry Bulk Goods, Electronics
- Ranching, Agricultural Products
- Environmental Processes
- Commodities Trading

Global presence:
Active in at least **50 countries**

M&A Activity

*Koch **reinvests up to 90%** of its annual earnings*

2010
2000
1990
1980
1950

2011: acquires **UK-based fertilizer producer**

1995: established **venture capital** firm

1981-82: acquires **refineries**

1976: purchase of **Chrysler Realty**

1952: formation of **Matador Cattle**

Sources: WP&Co analysis; Koch Industries website, Nov 2014; Yahoo Finance; Nov 2014; Forbes, Oct 2014
Notes: M&A Activities are samples of activity that occur in nearly every year, See appendix for detail

Wilson Perumal & Company, Inc.   81

Koch Industries increased 4200X in value over a 50 year period

Koch Industries Stock Simulation
(based on annual data points)

4200X — KOCH INDUSTRIES INC

30X — STANDARD &POOR'S 500
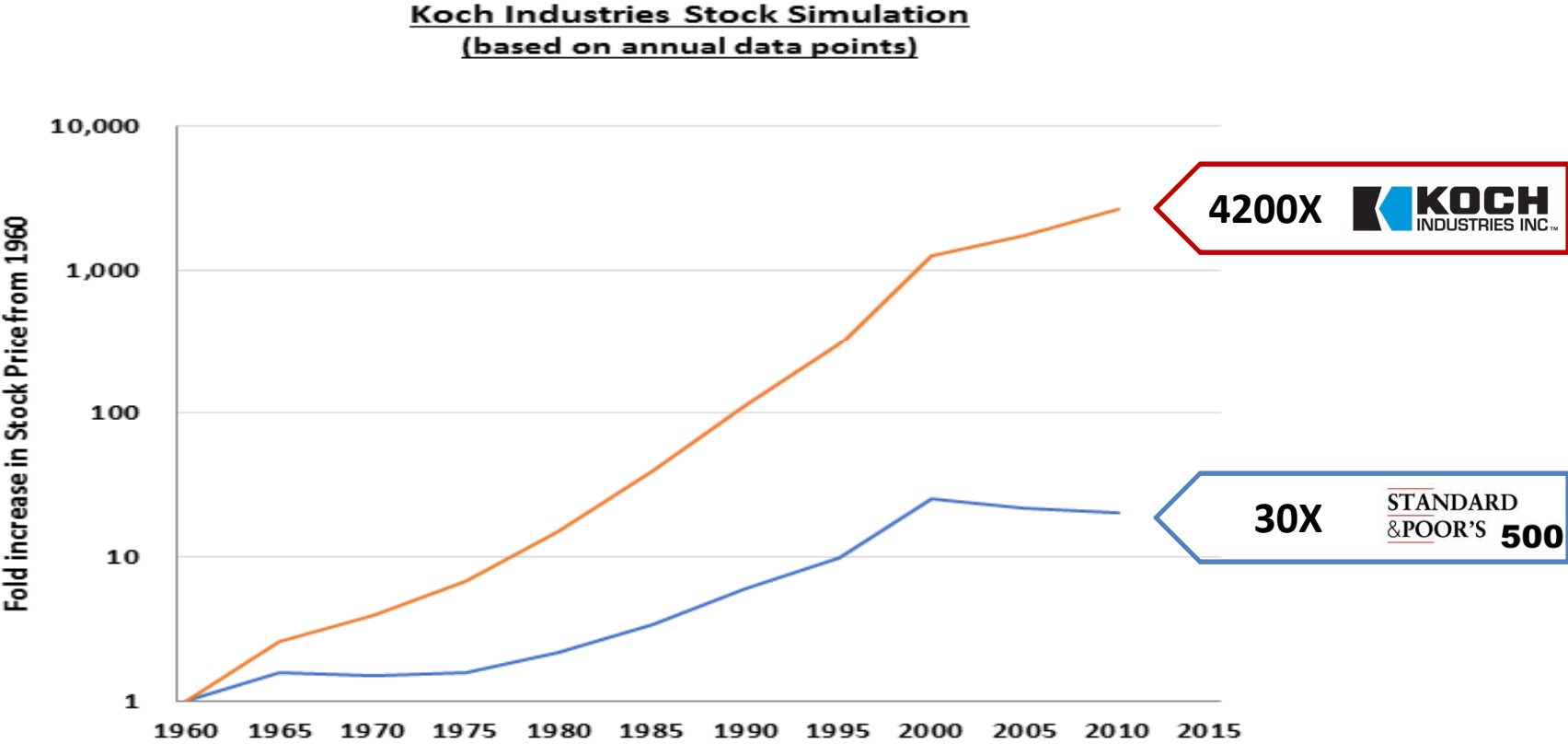
These 3 companies are so successful because they eliminate non-value added complexity

M&A Complexity

Value Added
Complexity that adds value to your customers & is reason for M&A

Non-value Added
Complexity that adds no value to your end customers

	Products	
	Suppliers	
	Technology	
	Geography	
	Channels	
	Management System	
	Culture	
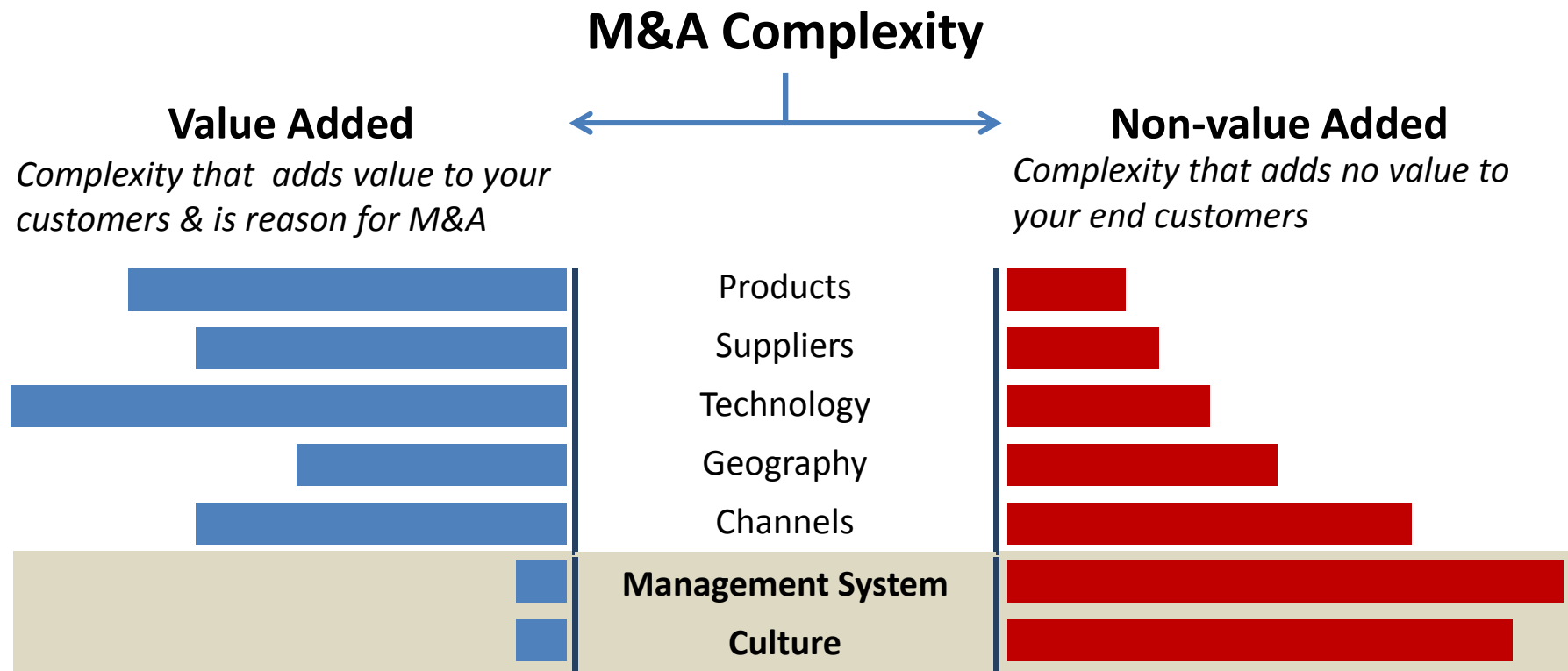
1. **Management System** and **Culture** always add almost exclusively NVA Complexity
2. Most difficult to assess through due diligence
3. Most commonly ignored factors
4. Unlike other complexity, far more difficult to remove

These companies do 3 things differently to address the complexity introduced by M&A

1   Utilize a single Management System and require their acquisitions to adopt it

2   Create a well defined culture and purposefully manage it

3   Take a top-down approach to integration

Agenda

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- Complexity
    - Sources and impacts of complexity
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Operational Excellence delivers industry leading performance across 7 Value Drivers

Sound Strategy ✖ **Operational Excellence** ═ **Leading Performance**

Strategy

1. Product portfolio
2. Markets served
3. Distribution channels
4. Price point
5. Level of service
6. Partnerships
7. Operating model

Operational excellence is the execution of the business strategy more consistently and reliably than the competition.

7 Value Drivers

1. Safety
2. Environment
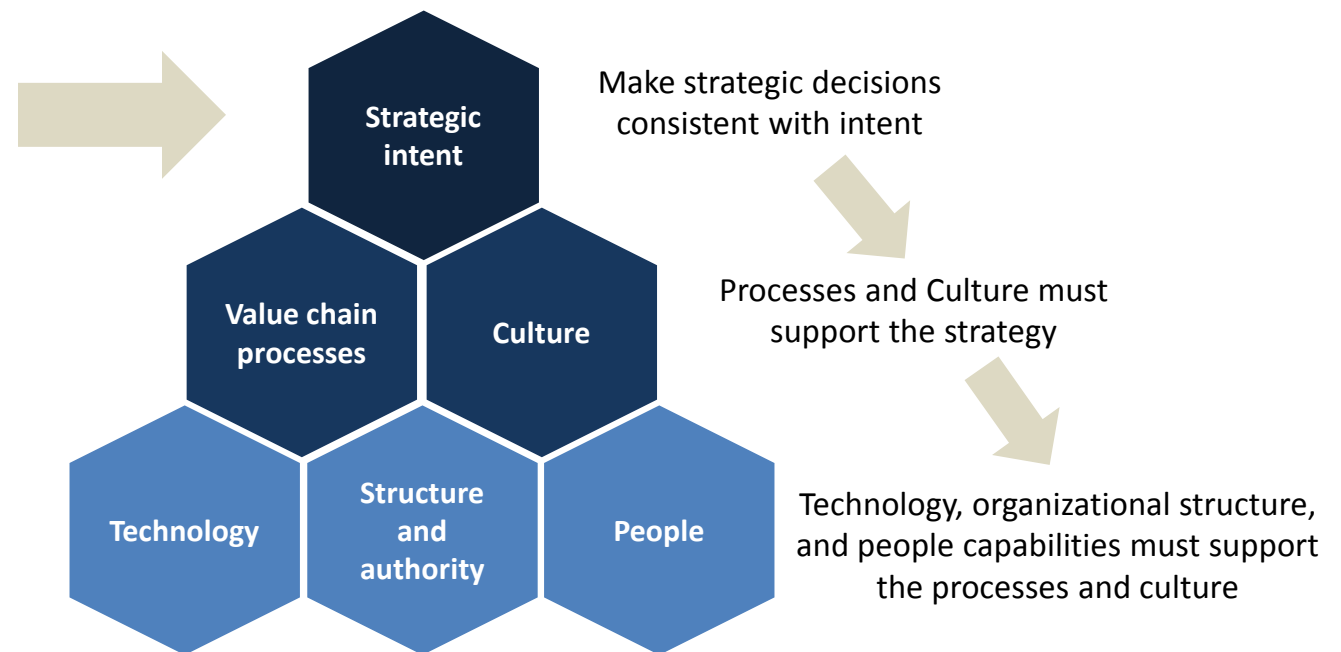3. Compliance
4. Quality
5. Productivity
6. Yield
7. Cost

Given two companies with similar strategies, the one that _executes_ better will have greater performance across _all_ 7 Value Drivers.

Sound strategy requires aligning decisions to allocate resources consistent with strategic intent

Strategic Intent

1. Value discipline
   – Product innovator
   – Customer intimate
   – Low cost

2. Markets to participate in
   – Local
   – Global

3. Value chain
   – Vertically integrated
   – Single segment

Components of the Operating Model

Strategic intent

Value chain processes

Culture

Technology

Structure and authority

People

Make strategic decisions consistent with intent

Processes and Culture must support the strategy

Technology, organizational structure, and people capabilities must support the processes and culture

Aligning the Operating Model to the strategy isn't enough. The strategic decisions must also be executed consistently and reliably.

Wilson Perumal & Company, Inc.

The foundations of an Operational Excellence Management System

Key Value Drivers

OE is defined by measurable business performance across specific value drivers

Safety

Environment

Compliance

Quality

Productivity

Yield

Cost

What risk exists that can keep a company from achieving performance across the value drivers?

The 4 Sources of Risk

The Operation

| Inputs | Acted on by | People   Processes   Equipment | To produce | Finished Goods/ Services |

Any failure of the operation to produce a good or service that meets the customers requirements is a result of 1 of 4 sources:
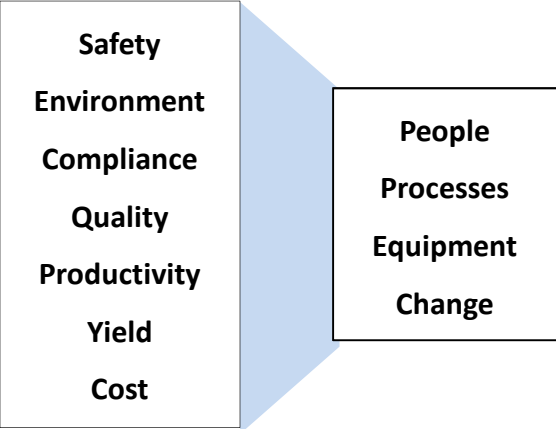
1. A **person** failed to do what they were expected to do.
2. A **process** failed to perform as expected
3. A piece of **equipment** failed to perform as expected
4. Un-managed **change**

The foundations of an Operational Excellence Management System

Key Value Drivers

OE is defined by measurable business performance across specific value drivers

Four Sources of Risk

There are only four sources of risk for failure to perform against the value drivers

Safety

Environment

Compliance

Quality

Productivity

Yield

Cost

People

Processes

Equipment

Change

Each source of risk can be analyzed for the key causes of failure

People

Unaware of expectation
- Expectations don't exist
- Expectations not communicated
- Expectations not enforced

Unable to perform as expected
- Lack of knowledge
- Lack of talent

Chooses not to perform as expected
- Lack of virtue
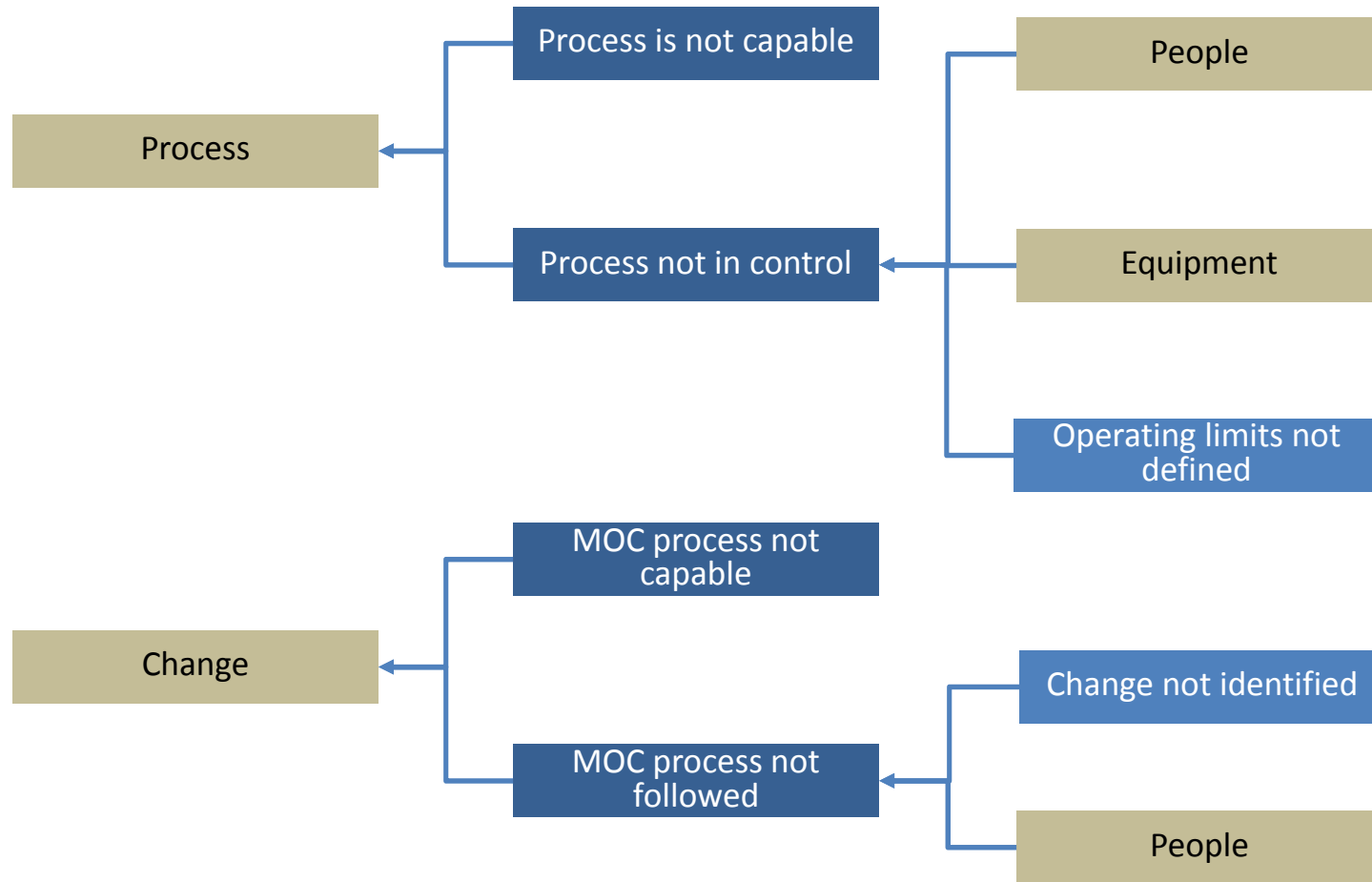- Wrong incentive
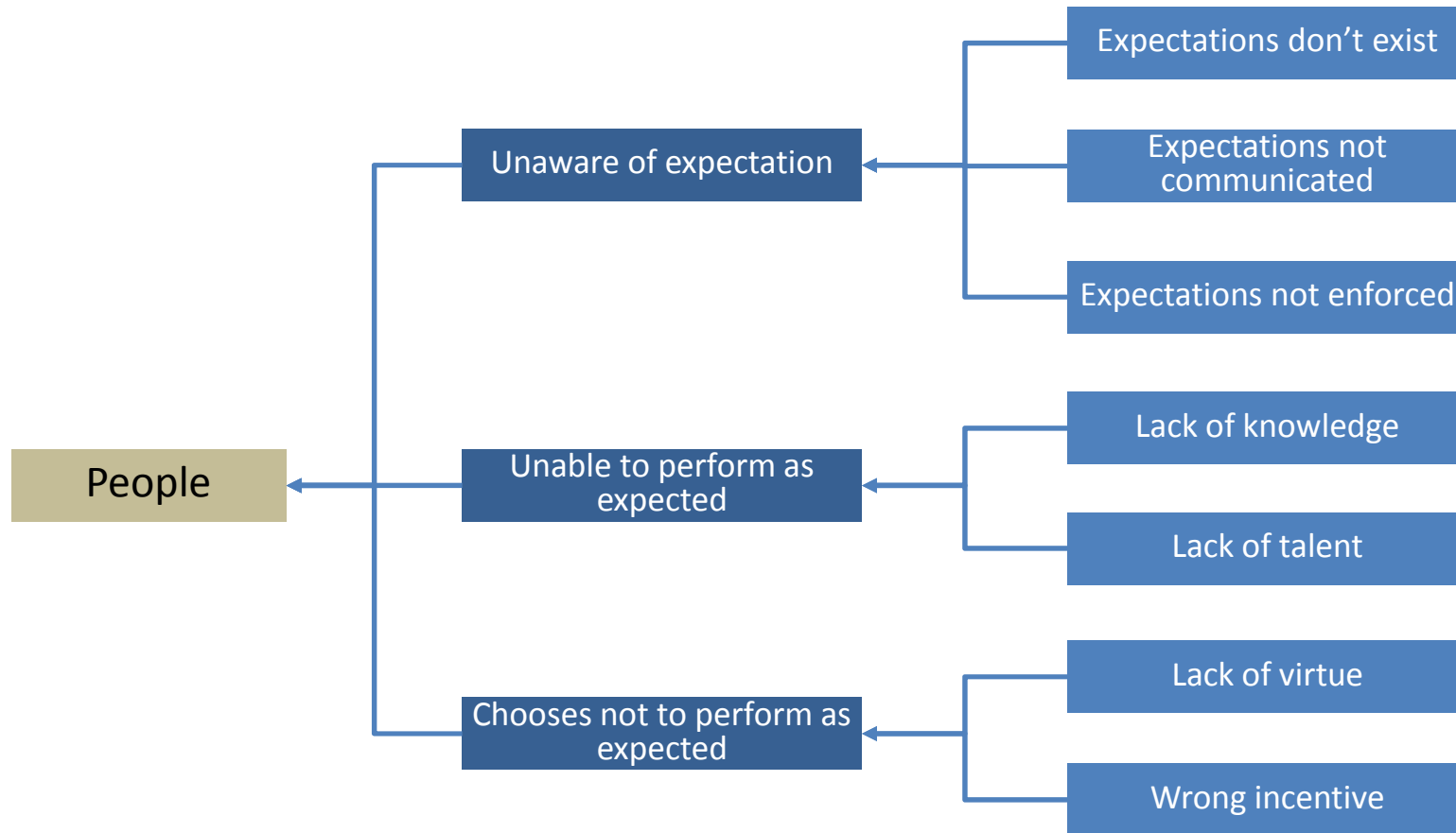
1 People generally fail to perform as expected for the same set of reasons, regardless of the type of operation

2 The reasons they fail are finite

Each source of risk can be analyzed for the key causes of failure

Each source of risk can be analyzed for the key causes of failure
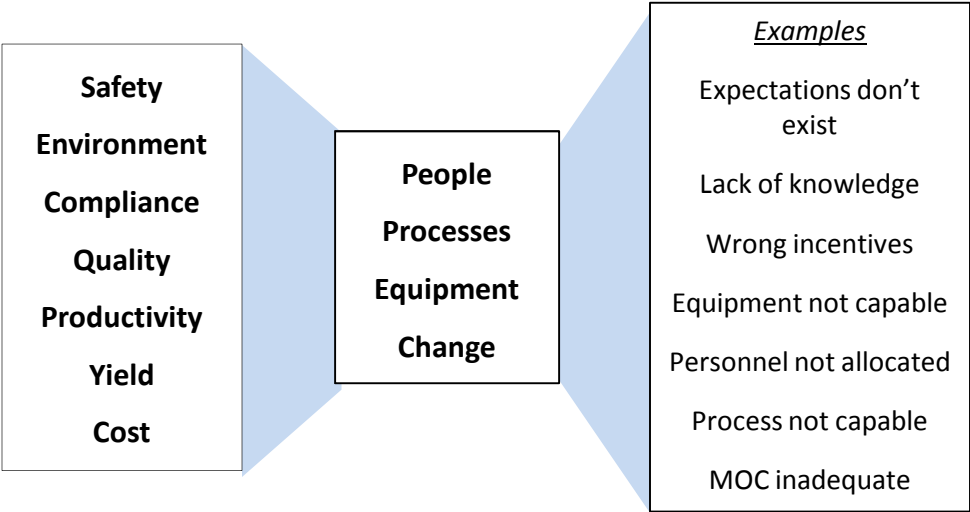

Process

- Process is not capable
- Process not in control
  - People
  - Equipment
  - Operating limits not defined

Change

- MOC process not capable
- MOC process not followed
  - Change not identified
  - People

The foundations of an Operational Excellence Management System

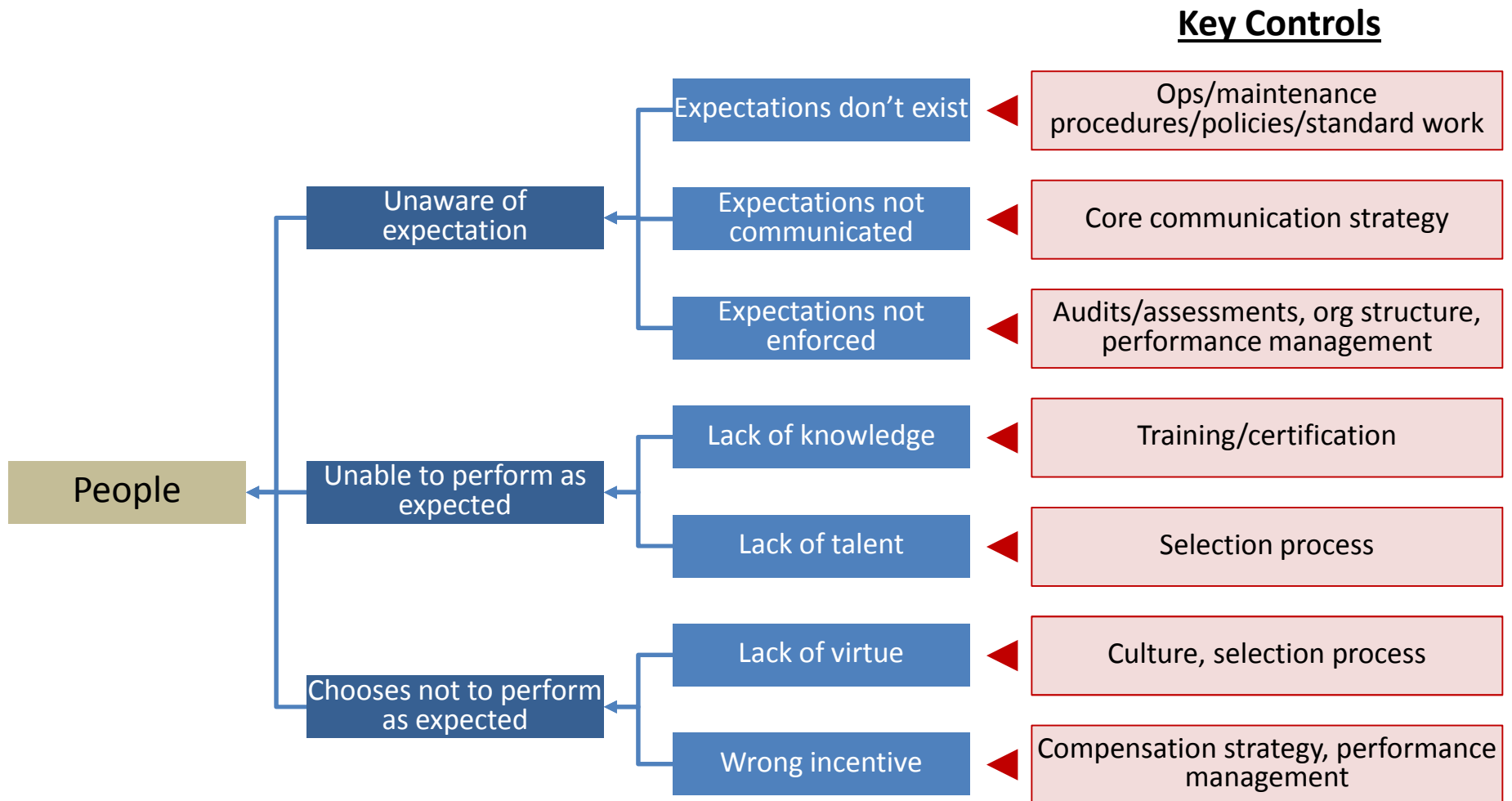| Key Value Drivers	Four Sources of Risk	Common Causes of Failure
OE is defined by measurable business performance across specific value drivers	There are only four sources of risk for failure to perform against the value drivers	The four sources of risk tend to fail for the same reasons regardless of the type of operation

Safety

Environment

Compliance

Quality

Productivity

Yield

Cost

People

Processes

Equipment

Change

Examples

Expectations don't exist

Lack of knowledge

Wrong incentives

Equipment not capable

Personnel not allocated

Process not capable

MOC inadequate

If the causes of failure are consistent across various operations, the necessary set of Key Controls is as well

Key Controls

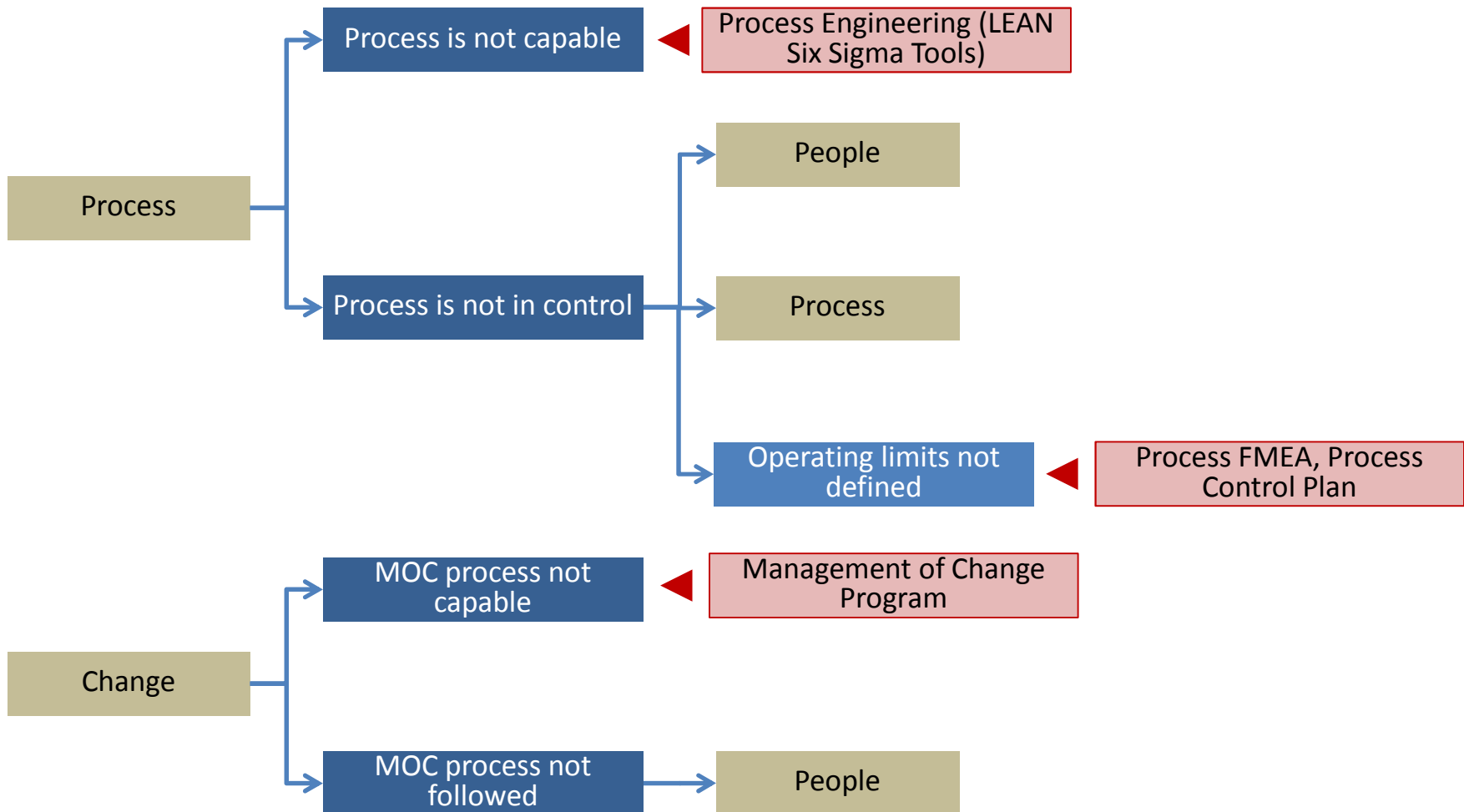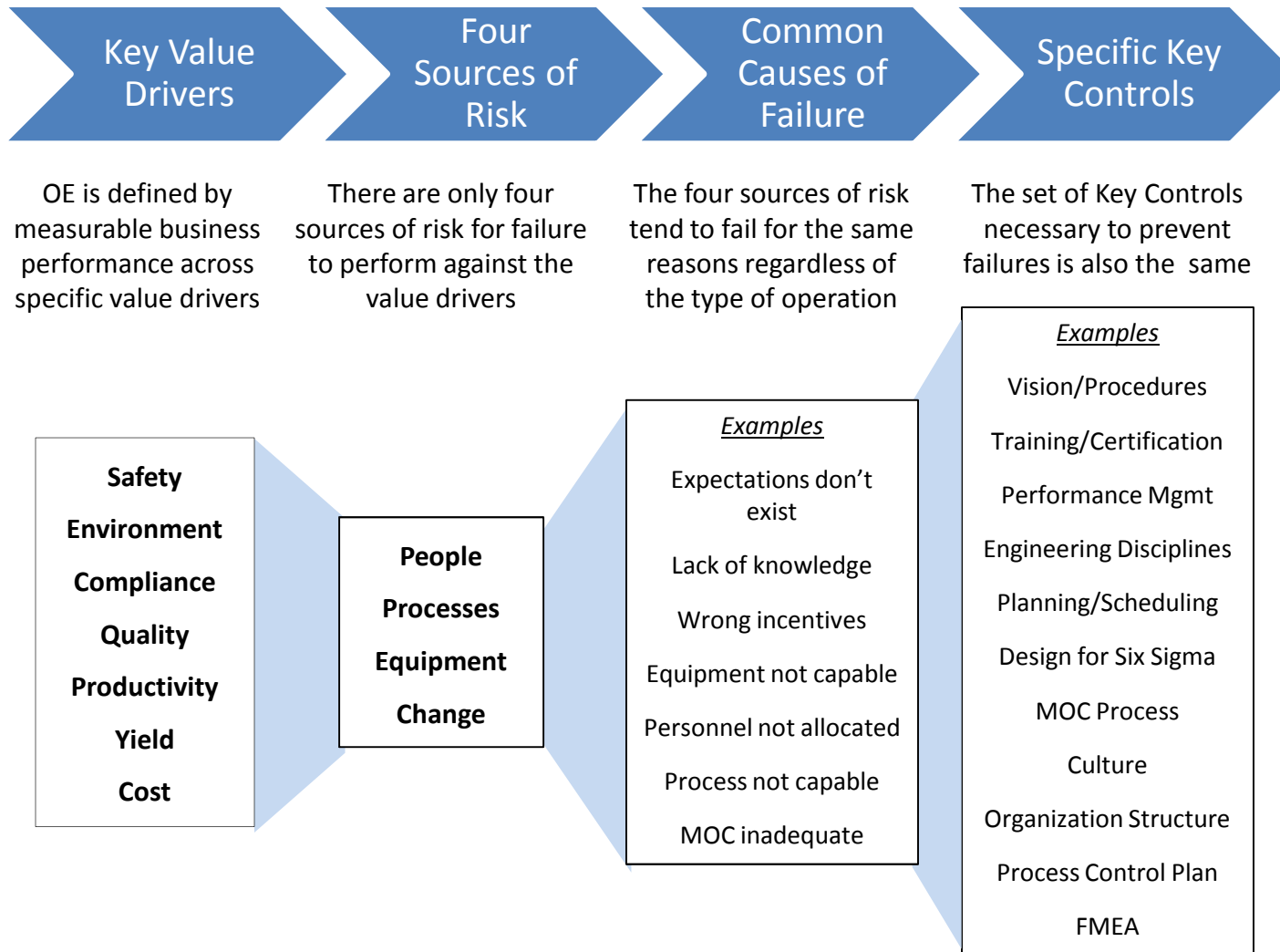|			
Unaware of expectation	Expectations don't exist	◄	Ops/maintenance procedures/policies/standard work
	Expectations not communicated	◄	Core communication strategy
	Expectations not enforced	◄	Audits/assessments, org structure, performance management
People → **Unable to perform as expected**	Lack of knowledge	◄	Training/certification
	Lack of talent	◄	Selection process
Chooses not to perform as expected	Lack of virtue	◄	Culture, selection process
	Wrong incentive	◄	Compensation strategy, performance management

If the causes of failure are consistent across various operations, the necessary set of Key Controls is as well

If the causes of failure are consistent across various operations, the necessary set of Key Controls is as well
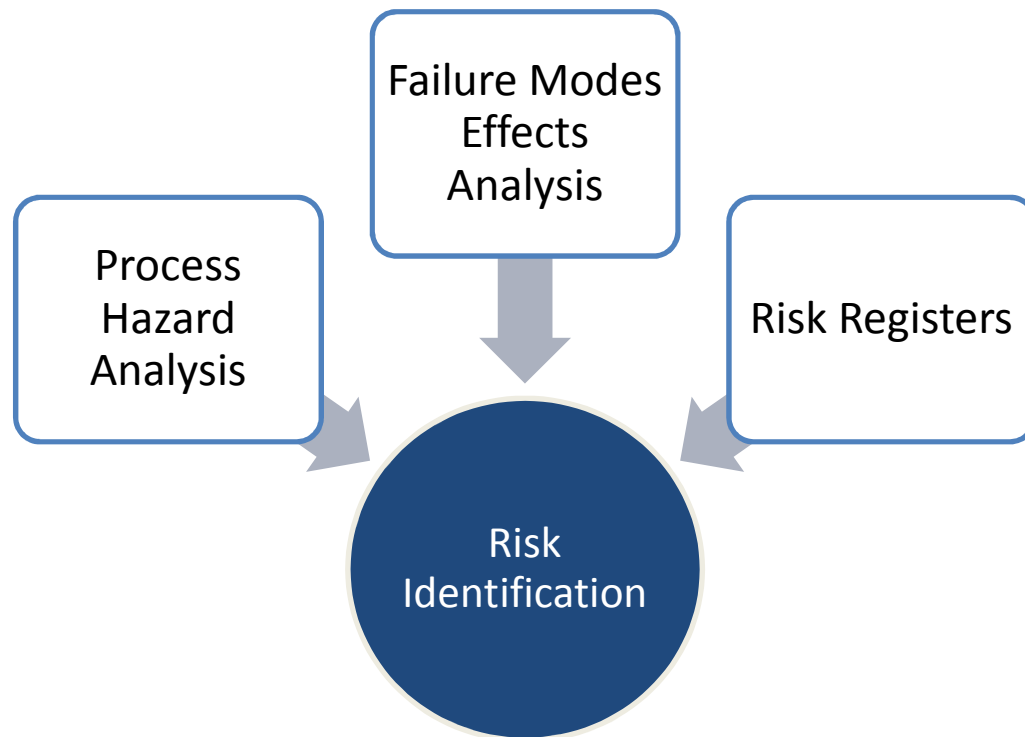
Process → Process is not capable ◄ Process Engineering (LEAN Six Sigma Tools)

Process → Process is not in control → People

Process is not in control → Process

Process is not in control → Operating limits not defined ◄ Process FMEA, Process Control Plan

Change → MOC process not capable ◄ Management of Change Program

Change → MOC process not followed → People

The foundations of an Operational Excellence Management System

Key Value Drivers	Four Sources of Risk	Common Causes of Failure	Specific Key Controls
OE is defined by measurable business performance across specific value drivers	There are only four sources of risk for failure to perform against the value drivers	The four sources of risk tend to fail for the same reasons regardless of the type of operation	The set of Key Controls necessary to prevent failures is also the same

Key Value Drivers

Safety

Environment

Compliance

Quality

Productivity

Yield

Cost

Four Sources of Risk

People

Processes

Equipment

Change

Common Causes of Failure

Examples

Expectations don't exist

Lack of knowledge

Wrong incentives

Equipment not capable

Personnel not allocated

Process not capable

MOC inadequate

Specific Key Controls

Examples

Vision/Procedures

Training/Certification

Performance Mgmt

Engineering Disciplines

Planning/Scheduling

Design for Six Sigma

MOC Process

Culture

Organization Structure

Process Control Plan

FMEA

The Key Controls can be grouped into Elements to facilitate implementation and management

Process Hazard Analysis

Failure Modes Effects Analysis

Risk Registers

Risk Identification

The value of the 7 Elements

- Easier to remember

- More efficient to organize around

- Creates common language that facilitates learning:
  - Between management and employees
  - Between leaders
  - From site to site

- Encourages systems thinking
  - Ensures proactive management of risk in development of new systems
  - Used in root cause analysis, problems aren't seen in isolation

The 7 essential Elements of an Operational Excellence Management System

Leadership	Leaders articulate a clear vision of Operational Excellence and create a culture of Operational Discipline
Employee accountability	Processes are in place to ensure employee's are properly incentivized and know what they are accountable
Risk identification	Risks are identified , assessed , and prioritized for processes and equipment
Risk mitigation	Controls are put in place to mitigate the identified risks
Knowledge sharing	Communication and training systems are in place to share knowledge about the risks and their controls
Management of change	Processes are in place to management changes of people, processes, and equipment
Continuous improvement	All processes are measured, verified, and continuously approved

The foundations of an Operational Excellence Management System
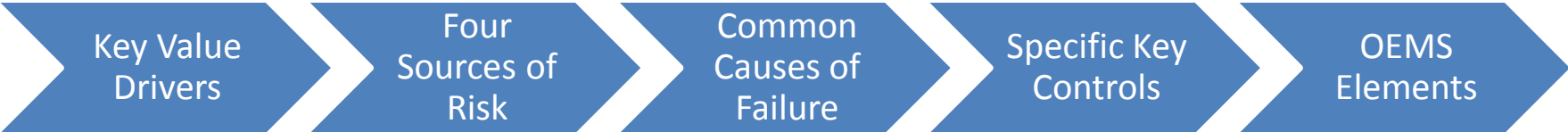
Key Value Drivers	Four Sources of Risk	Common Causes of Failure	Specific Key Controls	OEMS Elements
OE is defined by measurable business performance across specific value drivers	There are only four sources of risk for failure to perform against the value drivers	The four sources of risk tend to fail for the same reasons regardless of the type of operation	The set of Key Controls necessary to prevent failures is also the same	Key controls are organized into Elements to facilitate implementation and management

Safety

Environment

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People

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Examples

Expectations don't exist

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MOC inadequate

Examples

Vision/Procedures

Training/Certification

Performance Mgmt

Engineering Disciplines

Planning/Scheduling

Design for Six Sigma

MOC Process

Culture

Organization Structure

Process Control Plan

FMEA

Leadership

Employee Accountability

Risk ID

Risk Mitigation

Knowledge Sharing

Management of Change

Continuous Improvement

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Robust processes and procedures alone will not lead to Operational Excellence

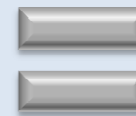**Sound Strategy** ✖ **Operational Excellence** ＝ **Leading Performance**
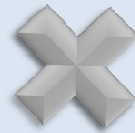
Effective Processes and Procedures ✖ **Culture of Operational Discipline** ＝ **Operational Excellence**

Processes and procedures, without a culture that embraces Operational Discipline, will not result in Operational Excellence.

Background on Operational Discipline – The Birth of the US Nuclear Navy

- Over 60 years ago, Rickover recognized the potential of nuclear energy for the navy

- New technology posed significant technological challenge – nuclear power plants had not even been developed for use on land yet

- **Real challenge: how do you put something as complex as a nuclear reactor on a boat, under the ocean, and operate it safely with a crew of young sailors?**

Answer = Alter the Culture of the Navy

Admiral Hyman G. Rickover

The culture required was a vast departure from traditional military culture

Traditional Military Culture

- Follow orders
- Do what you are told
- Don't ask questions
- Never question your superiors

Rickover's Cultural Pillars

- Have a higher level of understanding
- Follow procedures
- Question those procedures when things don't seem right
- Back each other up
- Do it all with integrity

As a result, the US Nuclear Navy has operated nuclear reactors in uncertain environments for over 60 years without a reactor accident!

Operational Discipline starts with a clear and concise definition

Operational Discipline is composed of 3 simple requirements:

Operational Discipline

1 **Do the right thing**

2 **the right way**
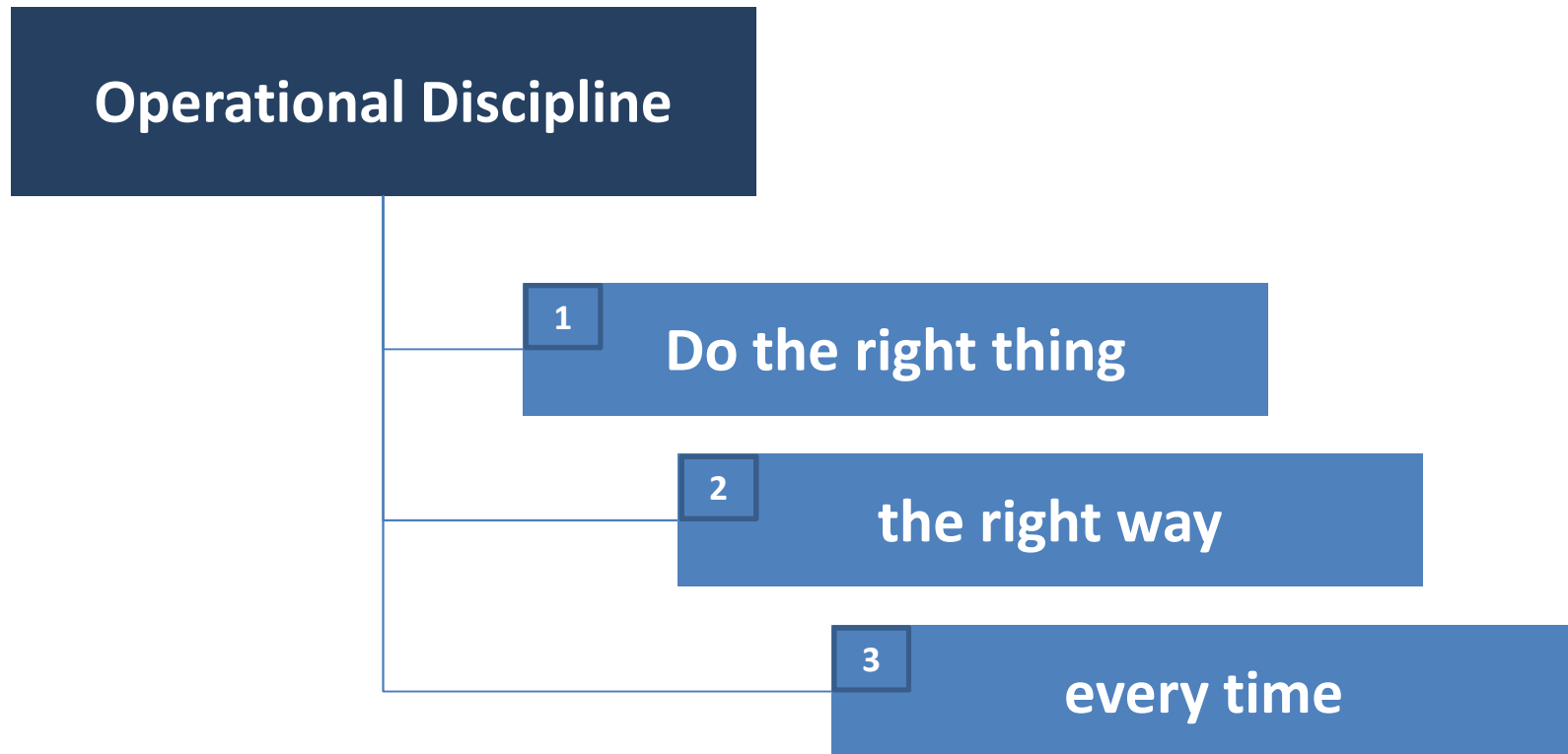
3 **every time**

The definition of Operational Discipline implies the necessary core values

Operational Discipline

Doing the right thing,

the right way,

every time.

The necessary Core Values or "Pillars"

Level of Knowledge. Understand not just what you do, but why you do it. Continually seek greater knowledge about the systems, processes, and hazards in and around your workplace.
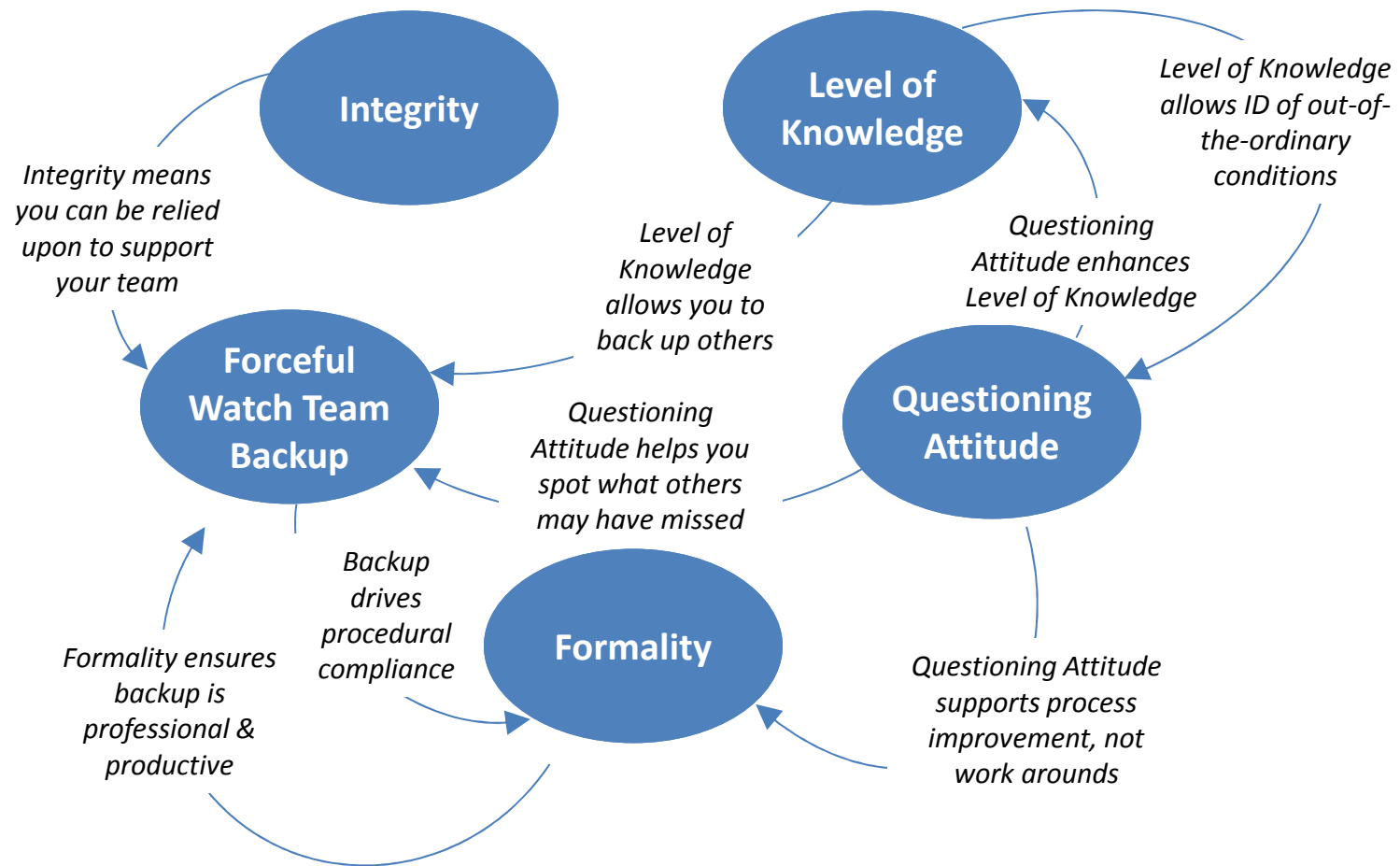
Formality. Treat your workplace and your role with respect, recognizing the seriousness of what you do and your role as a part of something bigger. Follow authorized procedures and expect the same from others. If you think of a better way, follow authorized processes to review and improve the procedures.

Questioning Attitude. Constantly ask yourself what could go wrong. Check for out-of-the-ordinary and learn to anticipate potential problems. Don't assume things are okay—verify.

Forceful Watch Team Backup. Backup your co-workers by looking out for what they may have missed, and expect the same in return. Have the courage to care, intervening even when it makes you uncomfortable. If you see an issue, own it.

Integrity. Be reliable. Do what you say you are going to do, completing every task the right way, every time, even if no one is watching.

The Pillars of Operational Discipline are Self-Reinforcing

Integrity

Level of Knowledge

Integrity means you can be relied upon to support your team

Level of Knowledge allows ID of out-of-the-ordinary conditions

Level of Knowledge allows you to back up others

Questioning Attitude enhances Level of Knowledge

Forceful Watch Team Backup

Questioning Attitude

Questioning Attitude helps you spot what others may have missed

Backup drives procedural compliance

Formality

Formality ensures backup is professional & productive

Questioning Attitude supports process improvement, not work arounds

The Pillars of OD are self-reinforcing and interdependent – OD cannot be achieved by adhering only to one or some of the Fundamentals.

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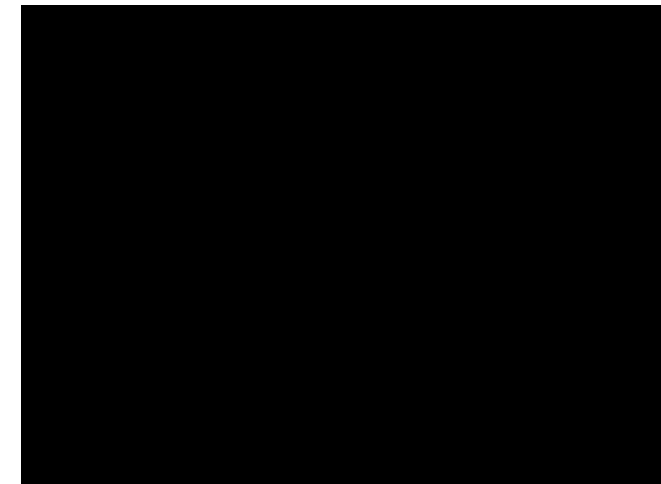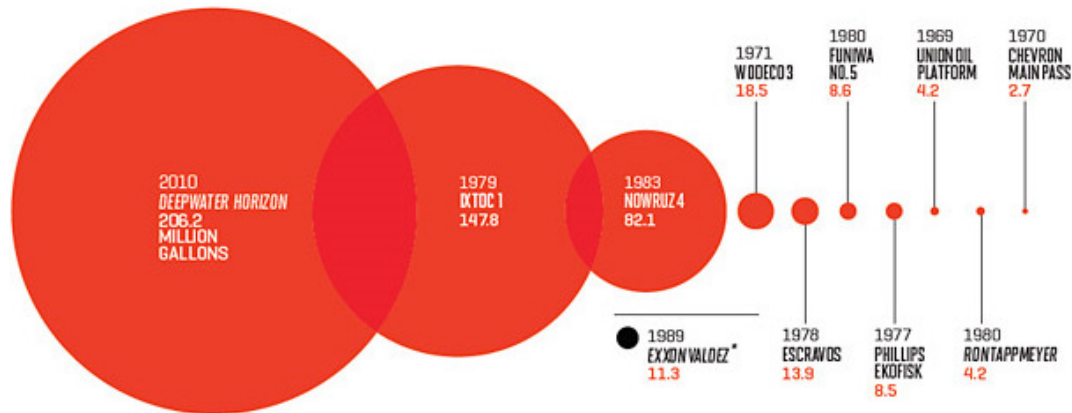 - *Case Study: Deepwater Horizon*
- *Summary/Closing*

Case Study: Leadership activities and Operational Discipline aboard Deepwater Horizon

Deepwater Horizon Facts

- On April 20, 2010, an explosion on BP's drilling rig "Deepwater Horizon" in the Gulf of Mexico was the largest marine oil spill in the history of the petroleum industry[1]

- The explosion killed 11 platform workers, injured several others, and released approximately 4.9 million barrels of crude oil
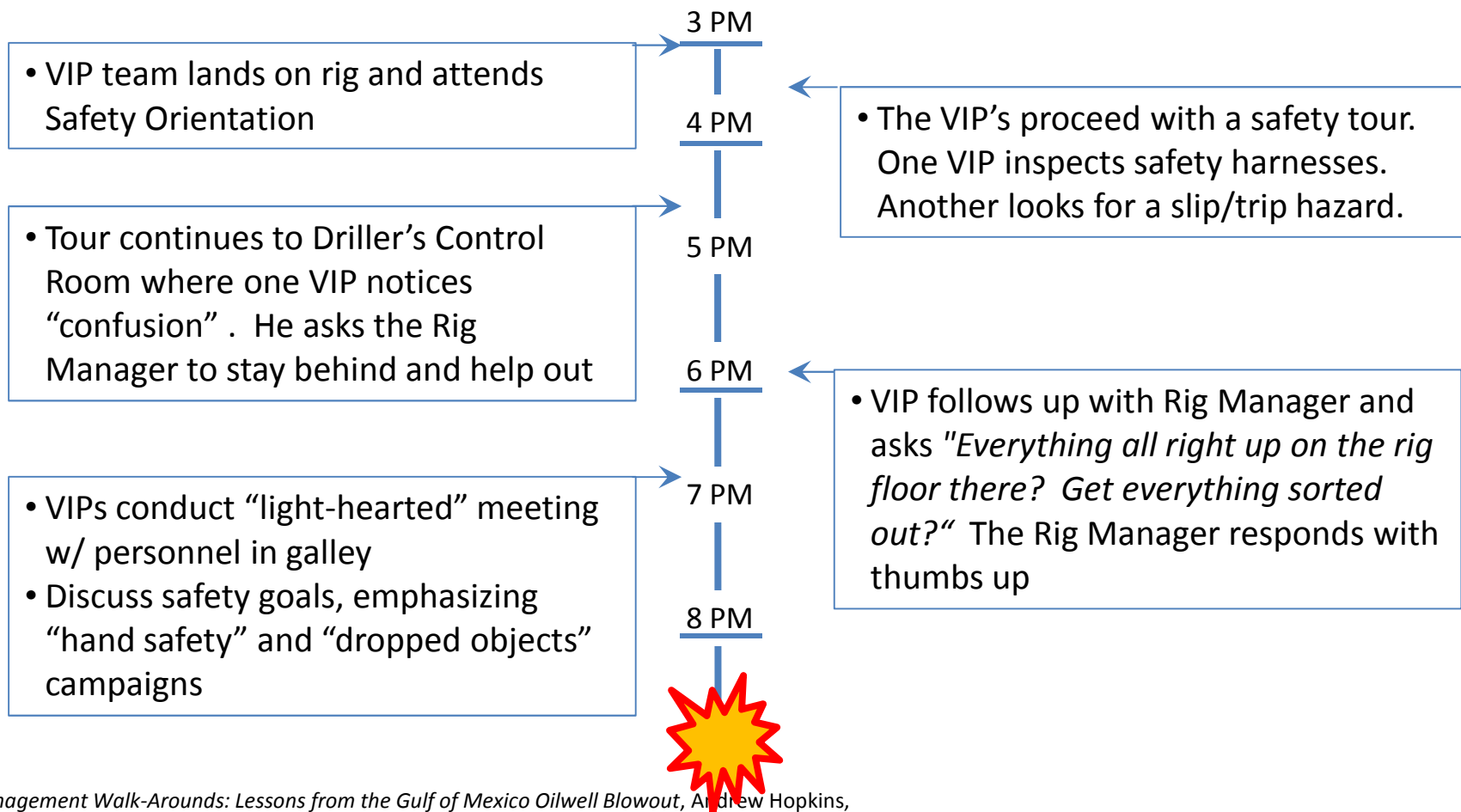

THE TOP 10 OFFSHORE OIL SPILLS IN THE WORLD

- 2010 DEEPWATER HORIZON 206.2 MILLION GALLONS
- 1979 IXTOC 1 147.8
- 1983 NOWRUZ 4 82.1
- 1971 WODECO 3 18.5
- 1980 FUNIWA NO.5 8.6
- 1969 UNION OIL PLATFORM 4.2
- 1970 CHEVRON MAIN PASS 2.7
- 1989 EXXON VALDEZ* 11.3
- 1978 ESCRAVOS 13.9
- 1977 PHILLIPS EKOFISK 8.5
- 1980 RON TAPPMEYER 4.2

1) *BP: 'An accident waiting to happen',* Fortune Features, Jan 24, 2011

Case Study: Leadership activities and Operational Discipline aboard Deepwater Horizon

Most people don't know that a group of four BP and Transocean VIPs were onboard the vessel and conducting a safety focused "management visibility tour" when the explosion occurred. Let's look at the events of the day.

Timeline: 3 PM, 4 PM, 5 PM, 6 PM, 7 PM, 8 PM

- VIP team lands on rig and attends Safety Orientation

- The VIP's proceed with a safety tour. One VIP inspects safety harnesses. Another looks for a slip/trip hazard.

- Tour continues to Driller's Control Room where one VIP notices "confusion" . He asks the Rig Manager to stay behind and help out

- VIP follows up with Rig Manager and asks *"Everything all right up on the rig floor there? Get everything sorted out?"* The Rig Manager responds with thumbs up

- VIPs conduct "light-hearted" meeting w/ personnel in galley
- Discuss safety goals, emphasizing "hand safety" and "dropped objects" campaigns

1) *Management Walk-Arounds: Lessons from the Gulf of Mexico Oilwell Blowout*, Andrew Hopkins, Feb 2011

Robust processes and procedures alone will not lead to Operational Excellence

- From 2008-2010, BP implemented an **Operations Management System (OMS)** to ensure that the processes and procedures necessary to ensure safe and environmentally compliant performance were in place.

- The OMS required that management ensure operating procedures are in place, operators are competent to perform work, and leaders are active and visible.

- We would all agree that the activities or processes that the VIPs participated in were the right ones…..yet the result was not what was intended.

- Why? Because the Pillars of Operational Discipline were not in place.

Effective Processes and Procedures ✖ **Culture of Operational Discipline** = **Operational Excellence**

- **Safety meetings**
- **Leadership visibility tours**
- **Share Lessons Learned**

✖ **No culture of Operational Discipline** = **Activity driven behavior without the intended results**

Deepwater Horizon: In their own words….

We will now view several video clips of the VIPs testifying to their activities and behaviors on that fateful day.

While watching, keep in mind the following:

- They were following the processes and procedures that were expected of them.

- We would all agree that the activities they participated in (safety orientation, safety tour, award ceremony, etc.) were all activities in which we would expect good leaders to participate.

- All of these men thought they were doing the right and good thing that day. None of them woke up that morning anticipating this disaster would happen.

In their own words……

While viewing the clip on the next slide, consider the following questions.

- Why did these leaders go on the Leadership Visit?

- What was their goal?

- How did they prepare for the visit?

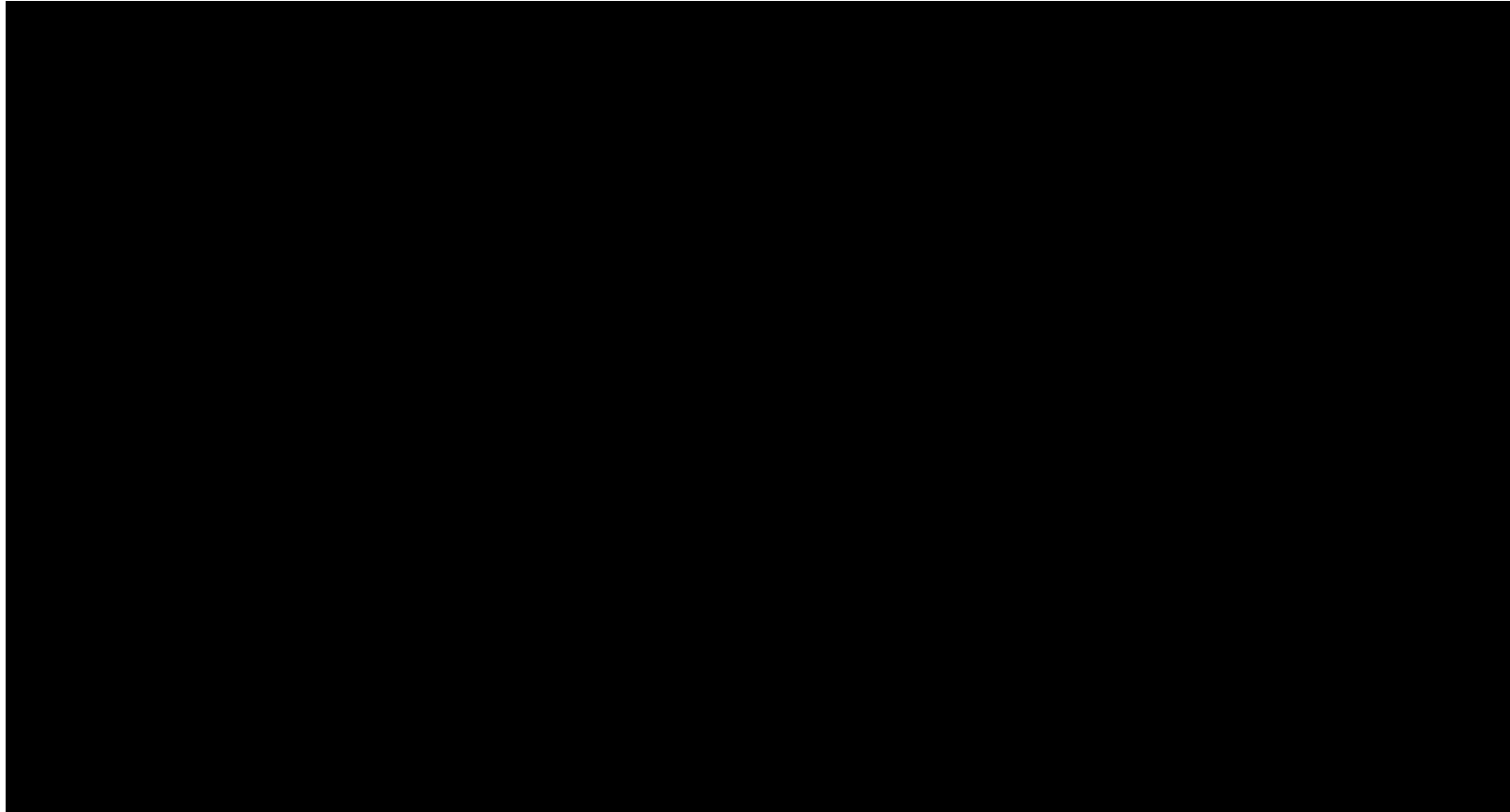- Did they demonstrate the Fundamentals of Operational Discipline?

Video Slide
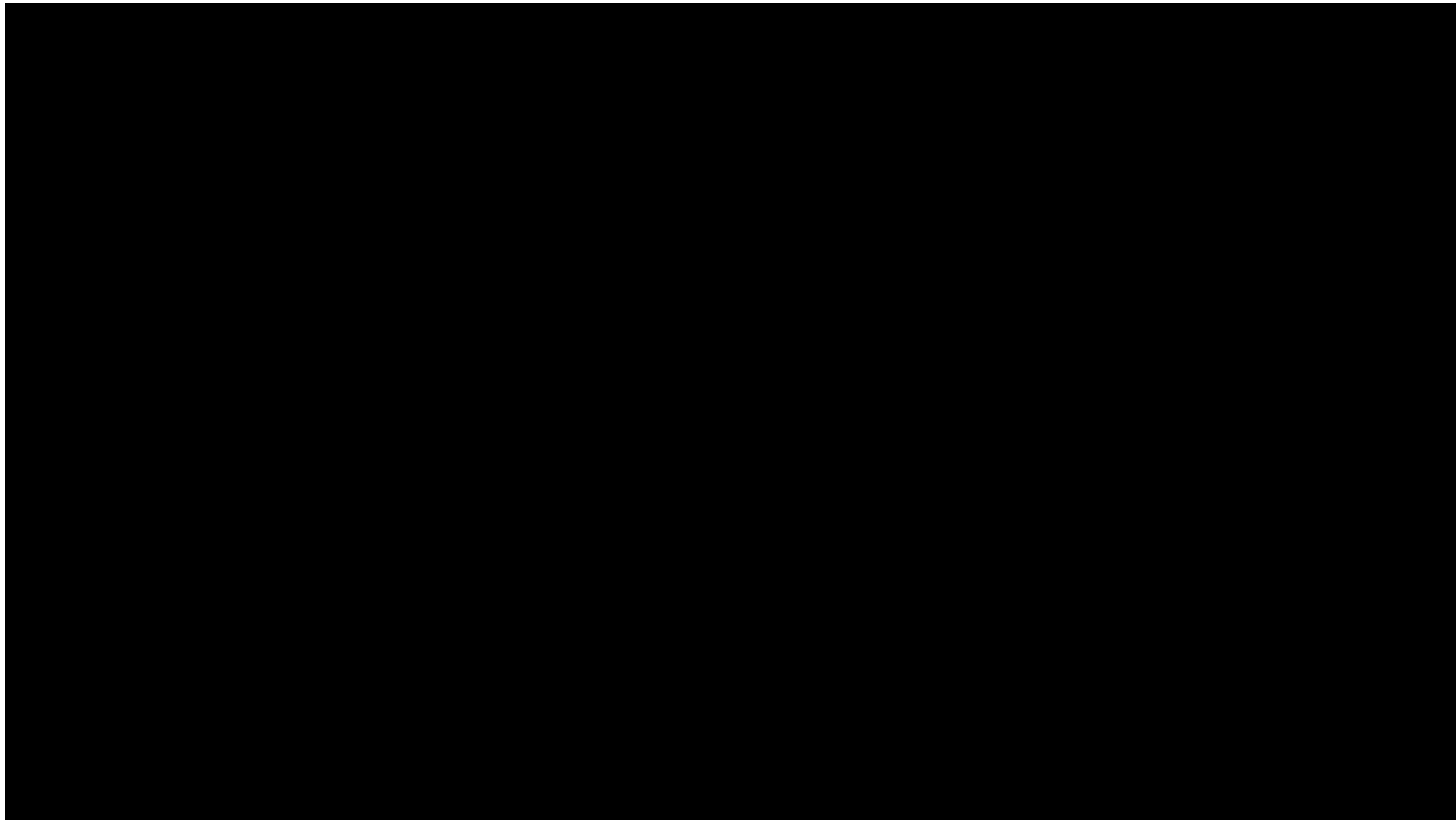
Deepwater Horizon Revisited

Questions to consider while viewing the clip on the next slide

- Why was he in the driller's shack?   Was he there to surface problems?

- What did he do when he noticed the confusion?

- Did he ask the right questions?

- Were the Fundamentals of Operational Discipline exercised?
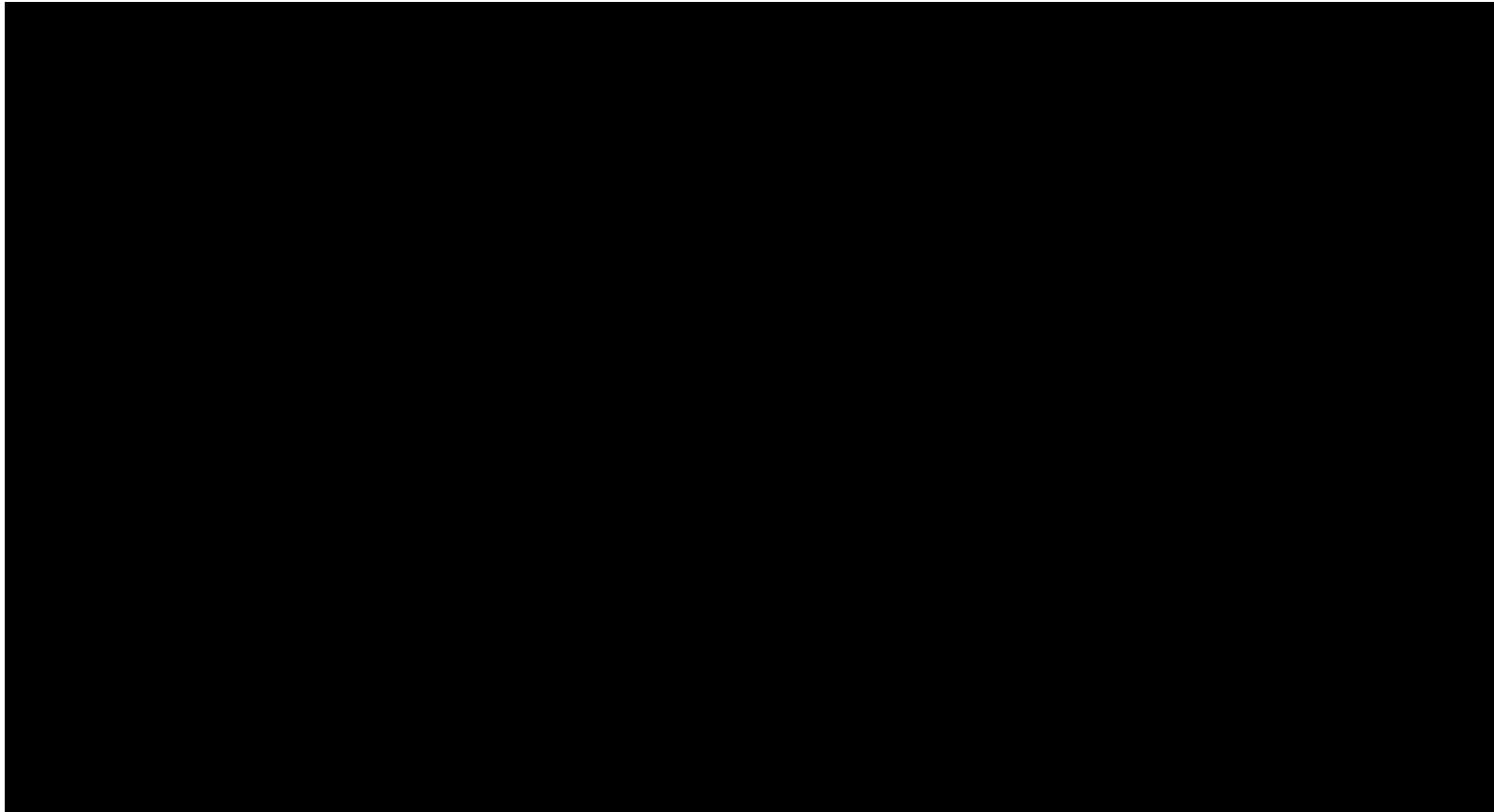
Video Slide

Deepwater Horizon Revisited

Questions to consider while viewing the clip on the next slide

- How do these leaders deal with employees that don't follow procedures?

- How do they make sure that their employees have adequate knowledge? How do they interact with them?

- Were the Pillars of Operational Discipline exercised?

Video Slide

Questions to consider

1. **Level of Knowledge**—Did these leaders demonstrate a desire to learn about and understand the operations they were responsible for?

2. **Formality**—Did these leaders demonstrate a commitment to following procedures and ensuring that others do as well?

3. **Questioning Attitude**—Did they follow up on things that seemed out of the ordinary and seek to surface problems?

4. **Forceful Watch Team Backup**—Did they hold others accountable and expect them to do the same for them?

5. **Integrity**—When things became uncomfortable, did they do the right thing anyway?

What if they had?

Complex operating environments require a different approach to Leadership

- In complex operations, situational inventories are impossible.

- We cannot create comprehensive rules / tasks to cover every situation.

- The Pillars of Operational Discipline create a framework for thinking about the right behaviors.

- This framework is useful for helping leaders understand how they demonstrate the Pillars of Operational Discipline in their daily activities.

Increased complexity

Poor execution

Processes & people are added to improve

Vicious Complexity Cycle

Poor business results

Loss of process control

Let's review examples of how the Pillars of Operational Discipline apply to daily activities using a simple "Right/Wrong" framework

The Pillars of OD enable employees to determine the right behaviors for any activity

Leadership Visits

OD Pillar	Fundamentally Right	Fundamentally Wrong
Level of Knowledge	Leaders view visits as an opportunity to learn about the business	Not preparing or being knowledgeable about the site and its risks prior to visit
Formality	Observe high risk procedures and verify steps are followed	Not asking to see procedures to verify compliance
Questioning Attitude	Review past audits prior to visiting and verify completion of corrective actions	Primary goal is to be "visible", not to identify problems
Forceful Watch Team Backup	Ask other leaders to tour your area and point out issues	Don't want to make a big deal or interfere
Integrity	When you find problems, share them with others even if they might be embarrassing	Visit conducted just because "there is a schedule"

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Key takeaways

- The world has changed – complexity can no longer be an afterthought

- Complexity grows exponentially, and its associated costs can outweigh the benefits of scale

- Identifying and rooting out complexity requires a different toolset

    - Square Root Costing to identify complexity costs

    - CVSM to identify sources of complexity

    - 6 Facet Portfolio Optimization to root out product complexity

- Achieving operational Excellence requires controlling process and organizational complexity through

    - OEMS: Operational Excellence Management system

    - Operational Discipline

- Top performing companies utilize OEMS and OD to manage process and organizational complexity, and drive leading performance across all value drivers