



# **Business Modeling:**

## **Cost Analysis in the Operations Environment**

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31 March 2010

## Today's Presentation

- ▶ The Burning Platform: A Changing Industry
- ▶ The Traditional Role of the Cost Estimator
- ▶ Changing Environments and Pressure on the Operations Division
- ▶ Existing Challenges in Operations Divisions
- ▶ Business Modeling as a Solution: Cost and Quantitative Analysis as Applied to the Operations Environment
  - How it Works: Useful Metrics and Measurements of Cost and Efficiency
  - The Right Environment
  - Guiding Principles & Applications
  - Metric Design and Decision Support
  - Sample Tools
- ▶ Application Examples

## The Burning Platform: A Changing Industry

### Past Decade

### Current Discussions

#### Roles

- ▶ Contract staff, in conjunction with government staff, have conducted Cost Analysis and Estimation (most notably in the Defense subsector), focusing on acquisition of major programs, systems, and material
- ▶ Cost Analysis and Estimation will still be required for acquisition, but these functions are becoming increasingly classified as Inherently Governmental (IG), based on SECDEF Gates' intent to convert 11,000 contract positions to government<sup>1</sup>

#### Policies

- ▶ Many federal agencies outsourced more work than they actually performed themselves, with some agencies having over 50 % contracted staff<sup>2</sup>
- ▶ Presidential policy and congressional opinion indicate that in-sourcing can balance the federal workforce and ensure that IG work is retained in-house<sup>2</sup>

#### Reaction

- ▶ Cost, as a function, has traditionally existed in the acquisition environment
- ▶ Analysis of cost information can be applied to operations environments where resources are constrained and the need for decision making information is unfulfilled

## Cost Roles – Traditional Pre-Acquisition vs. Operational Support

- ▶ Most cost estimating roles exist prior to system acquisition
  - **LCCE** – *How much will it cost?*
  - **BCA** – *Is it worth the investment?*
  - **AoA** – *What alternative is most cost effective?*
  
- ▶ Operations divisions **rarely** have the same level of cost support, yet are still under pressure
  - To reduce costs
  - To efficiently manage limited resources
  
- ▶ Measuring the fiscal efficiency of a program's activities opens a whole new set of analytical opportunities

There is life beyond system acquisition

## Cost Roles – Where Do They Exist?

*Extended Cost Roles  
Fill Key Organizational Gaps*



*Traditional Cost  
Exists Here*



*Desire to reduce costs and efficiently manage resources*

## Changing Environments

Two types of change: 1) **Increasing transition of acquisition activities** to IG classification, and 2) **Increasing demand for accountability** of spending & responsible resource use

- ▶ Government In-sourcing & Inherently Governmental Policy
  - The ratio of contractors to government is facing increased scrutiny
  - Functions related to finance, contract review, & acquisition are becoming increasingly classified as IG
  
- ▶ Obama Administration Changes
  - Program reviews have begun, an increasing platform of accountability is being discussed

### *If Contractor...*

- ▶ Continued work in acquisition may be limited
  
- ▶ Skills can be extended to many business areas

### *If Government...*

- ▶ Additional hiring in acquisition and needs for talent may be imminent
  
- ▶ Consider other areas of business that can be augmented for improved resource utilization and accountability

## Existing Problems & Challenges

Leaders want to repeatedly measure their organization to determine if they are meeting performance objectives...

*“Across my organization, who is performing best?”*

*“What risks are hampering performance and reducing cost efficiency?”*

*“Everyone is asking for more resources, but who really needs them?”*

*“Is the quality of my organization’s work better now than it was before?”*

*“Do I get an ROI for allowing more overtime costs?”*

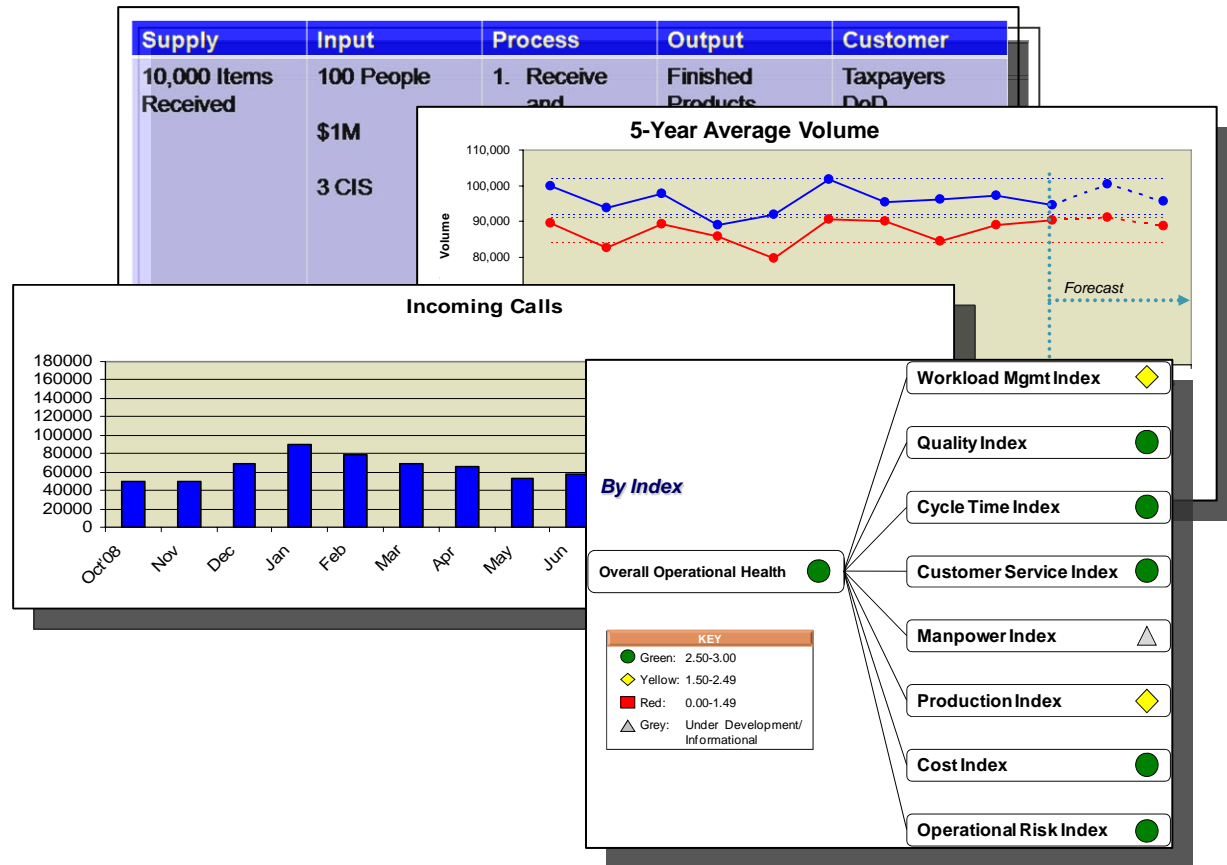
*“Do I get better results by solving specific problems or by incrementally improving everyone?”*

...Few leaders have the tools to effectively analyze their organization to assess the performance of branches

# Business Modeling as a Solution

To add value in face of change, analysts can apply quantitative skills to generate innovative models for operations divisions used to monitor performance and control resource execution

*Operations divisions need objective, data-driven models to illustrate normal operating modes, satisfy service-level objectives, efficiently use resources & minimize spending, and proactively mitigate risks*



## How it Works: Useful Metrics and Measures of Efficiency

- ▶ Cost estimators and analysts have a role in operations divisions that lend themselves to process management
- ▶ Metrics can provide key insight into production characteristics:

Are we meeting demand? Are we outputting what's incoming? Maximizing output per unit of input? Preventing future derailers?



# Metric Design and Decision Support

## Levels

## Performance Measures

### Examples

#### STRATEGIC

*Is the Vision being achieved?*

#### Strategic Measures

- ▶ Link mission and strategic goals
- ▶ Provide focus for operational goals and measures

#### Strategic Measures

- ▶ Customer Service Score
- ▶ Customer Budget Reduction Targets

#### OPERATIONAL

*Are business outcomes being achieved?  
Are customer requirements being met?*

#### Operational Measures

- ▶ Gauge bus. unit performance & evaluate improvement initiatives
- ▶ Evaluate Implementation progress
- ▶ Link org. performance to appraisals

#### Operational Measures

- ▶ Site Budget Execution
- ▶ Cost Reduction Trend

#### TACTICAL

*Is the day-to-day operation efficient/effective?  
Are improvement targets being met?*

#### Tactical Measures

- ▶ Review day-to-day operational activities
- ▶ Support operational measures

#### Tactical Measures

- ▶ Overtime % of Total Cost
- ▶ Cost per Unit
- ▶ Quality Ratio

### Characteristics of "good" metrics

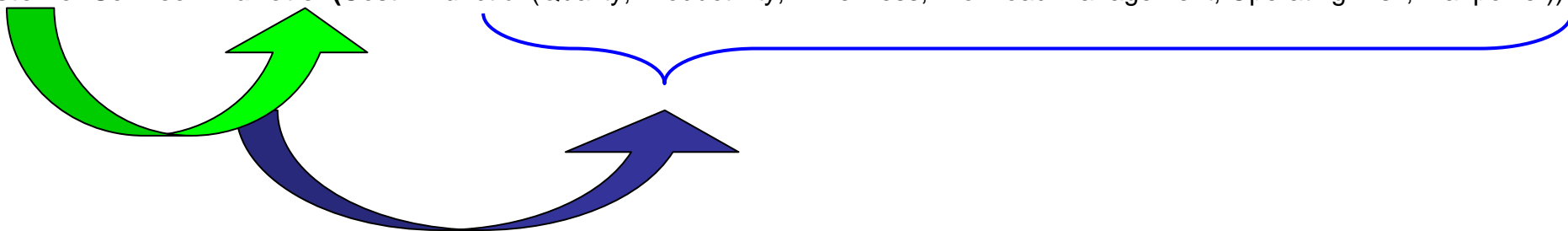
- ▶ Focused on business results OR performance drivers
- ▶ Clearly link to operational health
- ▶ Simple, easy to understand
- ▶ Limited to critical few
- ▶ Supportable by existing objective data
- ▶ Align strategic, operational, and tactical goals/objectives

**Overall Goal of Measures:**  
*Establish Level-Appropriate Mgmt Focus on Operational Health*

## Metric Design & Relationships

Metric Index	Description & Business Decisions**	Examples
<b>Cost</b>	Are we keeping cost low or maximizing value per dollar?	<b>Overtime as a % of Total</b> = OT\$ / Total Execution
<b>Productivity</b>	Are we maximizing output per unit of input?	<b>Units per Hour</b> = Total Unit Output / Total Production Hours
<b>Quality</b>	Are we producing to an acceptable standard?	<b>Process Error Rate</b> = Units Defective / Total Population
<b>Timeliness</b>	Are we producing within service-level objective cycle times?	<b>% Timely</b> = Units Delivered On Time / Total Population
<b>Customer Service</b>	Are our customers happy?	<b>Cust. Sat. Score</b> = # of Favorable Answers / Total Answers
<b>Operating Risk</b>	Are we going to be derailed by a future event?	<b>Seasonal Spikes</b> = % Change in Slope of Incoming Workload
<b>Workload Management</b>	Are we outputting what is incoming?	<b>Processing Ratio</b> = Work Units Processed / Incoming Work Received
<b>Manpower</b>	Do we have the right staff to do the job?	<b>Avg. Yrs Experience</b> = Sum(# yrs exp)/ count(Staff-on-hand)

**Customer Service = Function**(Cost = *Function*(Quality, Productivity, Timeliness, Workload Management, Operating Risk, Manpower))



\*\* Application varies based on the Organization Type

## The Right Environment: Where is it applicable?

- ▶ **Working Capital Fund (fee-for-service style):** The agency *modus operandi* should centralize around the idea of keeping costs to a minimum and efficiency to a maximum – managing like a commercial business
- ▶ **Appropriated Fund Agencies:** The agency should focus on making the most of the limited resources Congress provided – how to maximize results with minimal expenditure
- ▶ **Applies from both the contractor and federal perspective:**
  - Contractors should be interested in remaining competitive by reducing costs
  - Federal oversight organizations need to be able to allocate resources to address productivity gaps
  - Ideally, both organizations can work together to create an environment of operational transparency



## Principles and Applications: Goal-Oriented

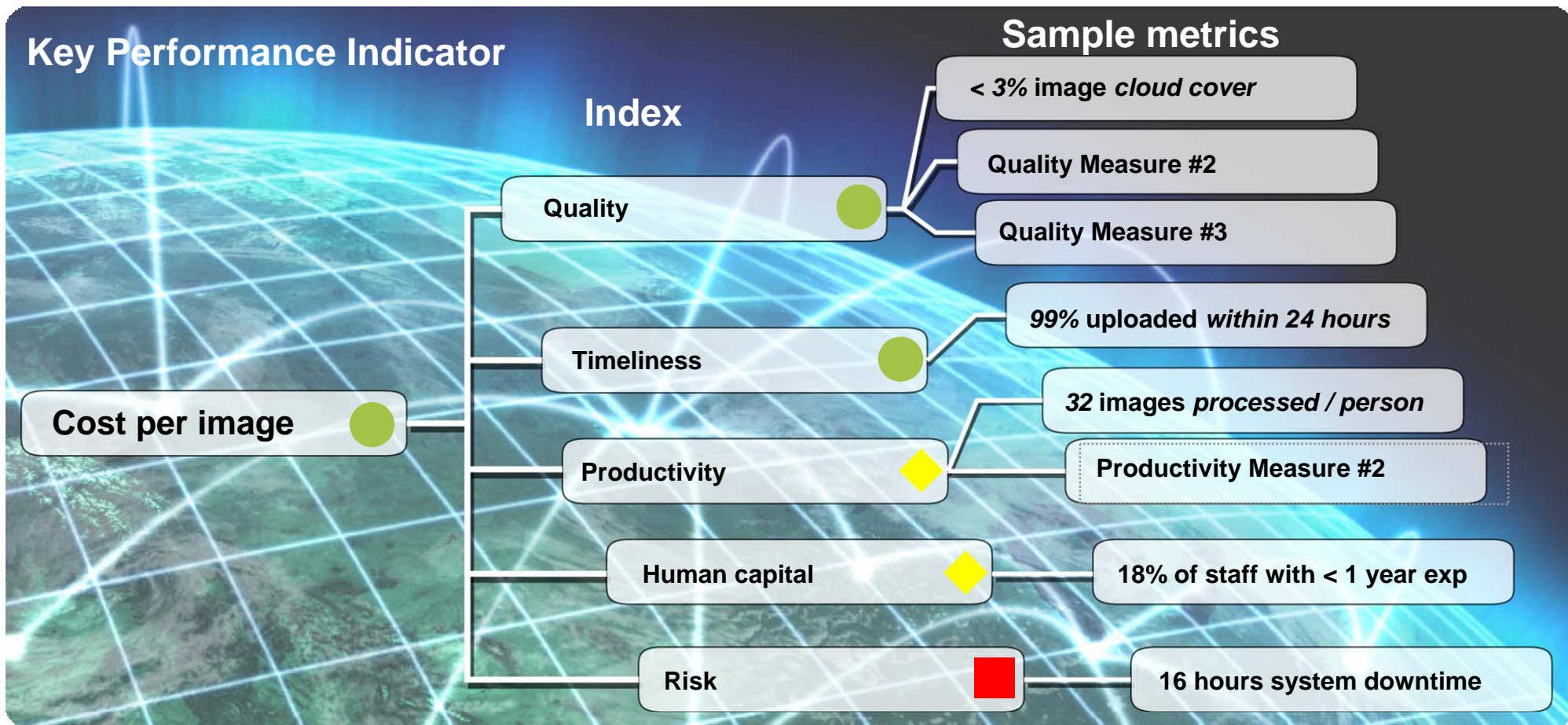
### ▶ Working Capital Fund

- **Principle:** Charge fees to “customers” based on a profile of predictable and demanded services
- **Business Model Need:** The agency must know when it is reducing cost per unit of output, increasing quality of outputs, reducing cycle times, minimizing risk, maximizing customer satisfaction, and maximizing productivity

### ▶ Appropriated Fund

- **Principle:** Spend money given to accomplish the largest percentage of agency goals within a given fiscal year
- **Business Model Need:** The agency must know when it is obtaining the maximum amount of return for its investments, making efficient use of taxpayer resources, and controlling operations in a transparent, end-to-end style

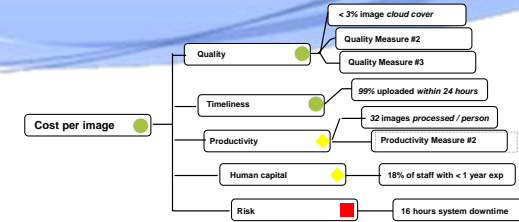
# Application: Satellite Operations Example



## Choosing the right metrics

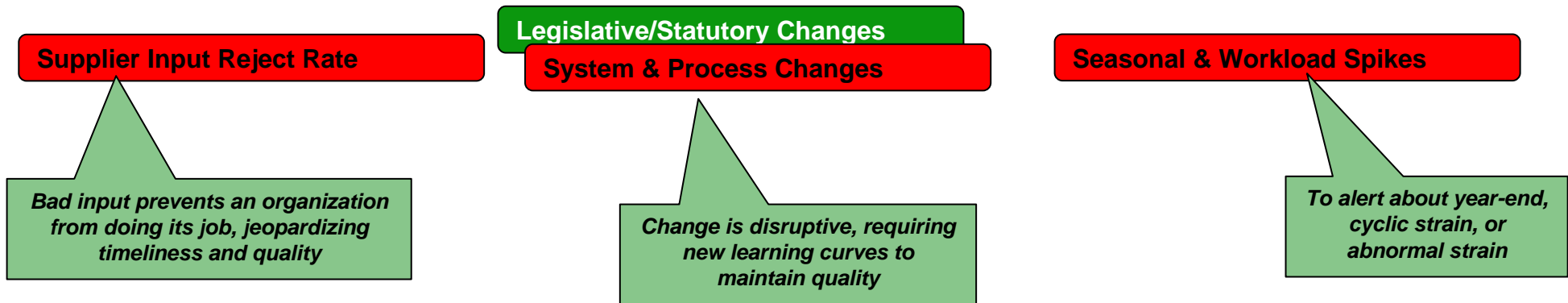
- ▶ Identify Key Performance Indicators (KPIs) that measure progress towards organizational goals
- ▶ Try to create at least one metric for each of the key indices (cost, productivity, quality, timeliness, customer service, risk, workload, and manpower)
- ▶ Use linear regression and various correlation techniques to determine a correlation between potential metrics and cost
- ▶ Not all metrics will have a direct cost relationship
  - Primary relationship: number of over overtime hours worked are a direct cost factor
  - Secondary: quality performance is likely to cause rework that will affect cost
  - Tertiary: measurement of staff experience will affect the quality, thus causing rework, which leads to indirect cost

# Application: Cost Risk Indicators – Metric Pairs



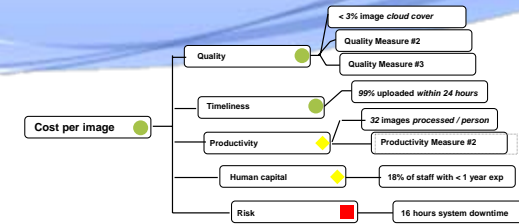
**Operating Risk:** Uncertain situations have the potential to prevent mission success

**Risk Metrics can be paired with Cost Metrics to quantify the unforeseen impacts of risk**



Question	How much does supplier failure result in extra cost to the customer?				
Scenario	Items are returned to suppliers due to incompleteness or error				
Metrics	Logic: Determine % of erroneous transactions imposed by suppliers				
Reject Rate - Supplier Error Monthly Cost of Operations	<b>Example:</b>	Operating \$ Month	\$1,000,000	Rejects (5,000) Total Volume (100,000) =5%	Operating \$ * Reject Rate =\$50,000

# Application: A Common Tool

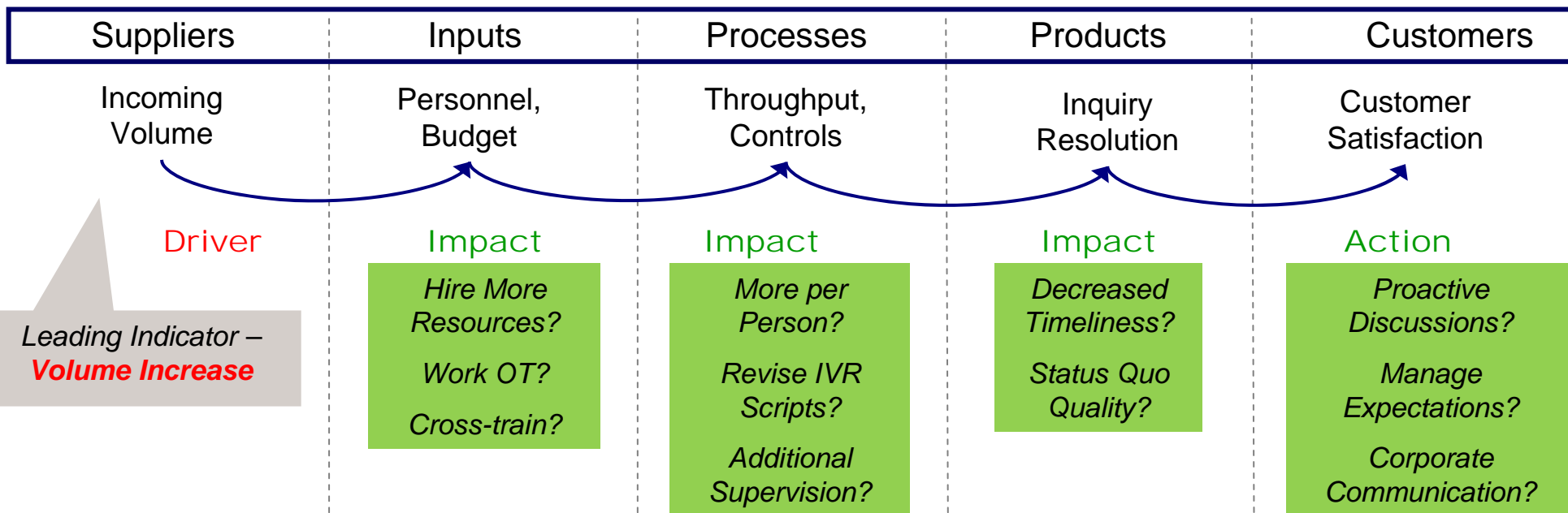
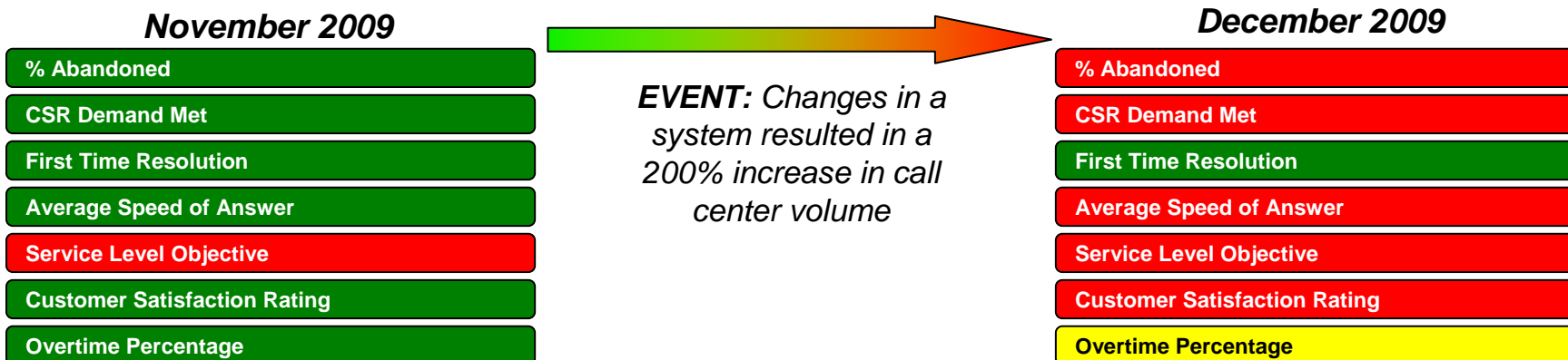


- ▶ Create a Business Cycle by trending historical data to determine periods of higher workflow



- ▶ The Cost Analyst should make cost-effective resource recommendations that balance the increased workflow with adequate personnel that can still meet timeliness and quality standards

# Application: Cost in context of management decisions



## Integrating with the Organization

- ▶ The cost analyst serves as a logical integrator for many other organizations -- risk, scheduling, Lean6. and most importantly. leadership

### Core Business Operations - Production, Value Delivery for Customers



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