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The Role of Performance Measurement in Organizational Improvement



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My Background

- Received BS, MS, and PhD degrees in IE from Virginia Tech
- Have worked in electronics manufacturing and at the Virginia Quality and Productivity Center prior to joining ISE faculty in 1996
- Research and teaching interests in: **performance measurement, Kaizen events**, process and organizational improvement, lean work systems, team-based structures, organizational assessment
- Active in the Institute of Industrial Engineers (IIE) and the American Society for Engineering Management (ASEM)








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Overview of Virginia Tech


- Located in the mountains in southwest Virginia in **Blacksburg**
- **Founded in 1872** as an all-male military school, land-grant (public) university – rich tradition in agriculture, engineering ,and service (extension) to the state of Virginia
 - Still have a “corps of cadets” of about 800 students
- Quick facts about the university:
 - 65 bachelor's degree & 145 master's and doctoral degree programs
 - **30,000+ full-time students** (Town of Blacksburg has about 50,000 including students)
 - Main campus includes more than 125 buildings and an airport
 - **Eight colleges:** Science, Engineering, Business, Liberal Arts & Human Sciences, Architecture, Agriculture & Life Sciences, Veterinary Medicine, Natural Resources
 - Football is a big deal
- **College of Engineering** is the largest College at VT and offers more than 15 different degree programs, including less common ones such as:
 - materials, mining, ocean, biomedical, biological, construction engineering & management (in addition to all the usual ones)













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Overview of ISE Department

<http://ise.vt.edu>

- **Founded in 1920** under the name “*commercial engineering*”
- About **600 total students** (380 undergraduate, 150 master’s, and 90 doctoral)-- about **100 students per year graduate** with BS in ISE
- **25 tenure-track faculty** and ~5 adjunct faculty
- Teaching and research encompasses: **OR, mfg systems, human factors engineering & ergonomics, and management systems**
- **Ranked 5th in the U.S. for undergraduate and 4th for graduate programs** in industrial engineering
- Recent initiatives :
 - improving undergraduate labs
 - increasing externally-funded research
 - growing the PhD program
 - increasing student participation in undergraduate research, study abroad, and community service/volunteer projects






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Objectives of this Presentation

- **Business performance measurement systems**
 - Identify challenges and problems in current business performance measurement practice
 - Describe ongoing research at Virginia Tech in business performance measurement
- **Measuring performance outcomes for Kaizen events**
 - Provide overview of Kaizen events
 - Describe ongoing research at Virginia Tech to identify factors influencing performance/success of Kaizen events

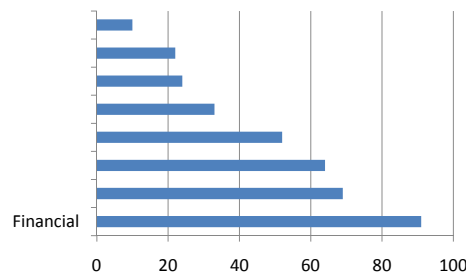


Defining Performance Measurement

- Business performance measurement is the *“organizational approach to assess and monitor performance in relation to set goals and objectives. It encompasses methodologies, frameworks and indicators that are used to help organizations in the formulation and assessment of strategy, to motivate people, and to communicate or report performance to external stakeholders”* (Marr & Schiuma, 2003)
- Also called strategic performance measurement and enterprise performance measurement


Typical Problems with Performance Measurement

- Existing measurement systems are not **balanced**
 - Despite widespread recognition about the need for a more balanced approach to measurement, actual practice falls short (although progress has been made in the past 10-15 years)
 - Over-reliance on financial and operational measures
 - A recent study of 155 companies found that more than 60% of respondents have financial measures representing more than half of their PM systems



(from Kaplan & Norton, 1992)

(from Marr, 2005)



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Typical Problems with Performance Measurement

- Measures and performance measurement system are not strategic
 - Lack of focus on strategic measures – measures are not aligned with vision, strategy, or the unique “value exchange” of the organization
 - De Waal (2002, p. 10) calls this *one-sided information* – “information about client satisfaction, vendor performance, innovation, product quality, and intellectual capital is insufficient or unavailable”



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Typical Problems with Performance Measurement



- Too much data and too many measures
 - **Too much information** for meaningful performance review and decision making
 - In one large company, a study determined that **thousands of measures** were collected, **hundreds of pages of reports** were generated -- yet **only 5%** of the data was considered useful!




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Typical Typical Problems with Performance Measurement

- Measures that may **drive the wrong behavior**, for example:
 - “Talk time” (or “call handle time”) in a call center

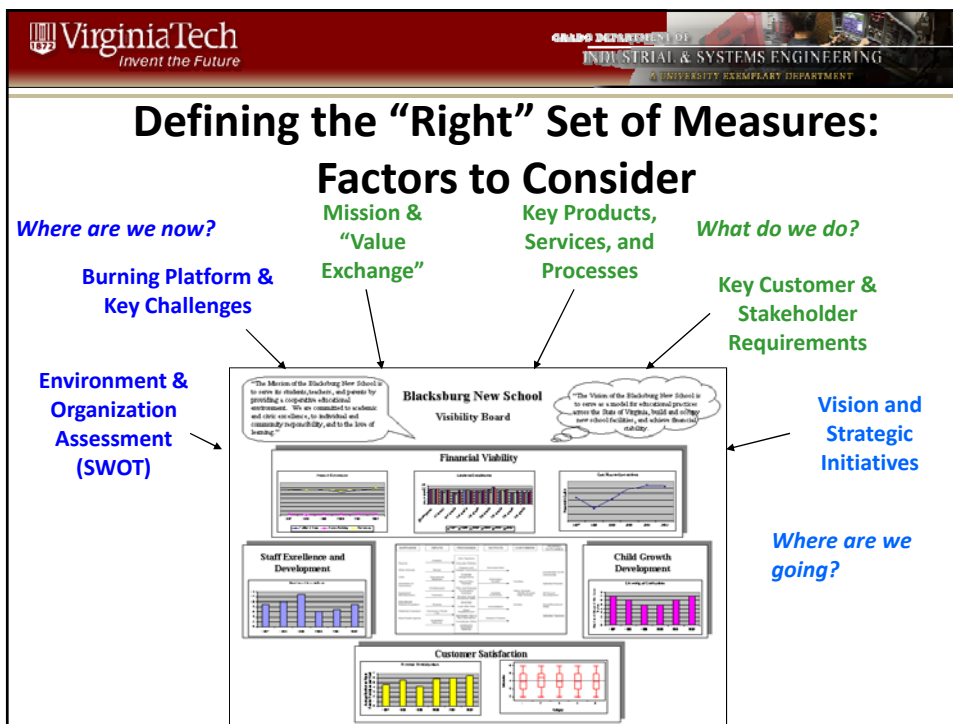



- → what behaviors occur if a customer has a complicated problem or has a second (or third) question?
- What is the impact on true problem resolution and customer satisfaction?
- Too much focus on measures of **activity/process** and absence of focus on measures of **results/accomplishments/outcomes: having the right set of measures**

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Measures that Drive the Wrong Behavior: *What’s the Potential Problem?*


Organizational unit	Performance measure
Urban police department	No. violent crimes reported
Trash collection unit	Pounds of trash brought in to central site
Bill (invoice) investigation unit	Invoices/hour investigated
Sears automobile repair shop	Number and dollar amount of service orders written




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Useful Analogies for Performance Scorecards



Cockpit






Dashboard

- More likely to be:
 - Balanced
 - Strategically-oriented
 - Focused (the "vital few")
 - ... & Visual

} The "right" measures



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Performance Dashboards






(Management Cockpit at Siemens, from Neely, 2006)



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Typical Problems with Performance Measurement

- Measures are not defined, operationalized, or collected in a **valid, reliable** way
 - 40 percent of companies surveyed do not think that their performance measures are based on good quality data (Neely et al., 2008)
 - “Customer satisfaction metrics are still rudimentary and lack refinement” and “Human resource metrics are still close to worthless” (Brown, 2007)
- Poorly defined or constructed measures with poorly defined data collection processes lead to bad data → bad information → bad decisions.

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Typical Problems with Performance Measurement

- Lack of effective portrayals for performance information
 - Fails to promote statistical thinking and fact-based decision making
 - “Management information does not contain ratios, trends, indicators, graphs, colors, and standardized layouts.” (De Waal, 2002, p. 11)

(from Wheeler, Understanding Variation, adapted from Bounds)

The industrial engineering profession is uniquely suited to help address this problem

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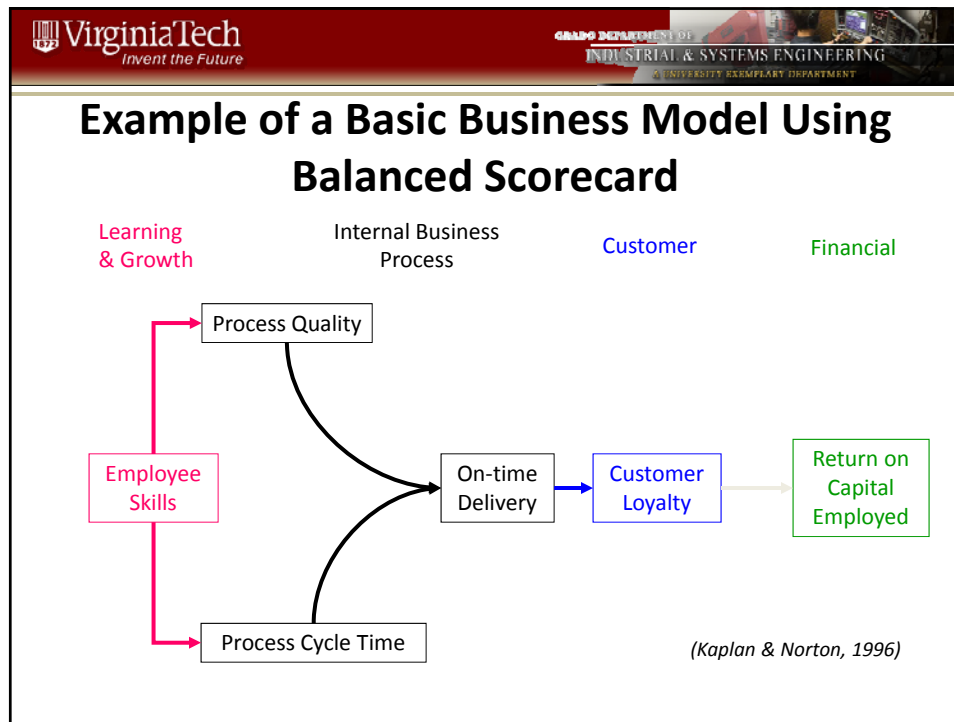
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Typical Problems with Performance Measurement

- Lack of effective performance analysis, interpretation, and decision making
 - To realize full benefit of BSC, it should be used not only as a measurement system but also as a **performance management system** – to facilitate strategy development, make process improvements, create organizational learning, etc. (Kaplan & Norton, 2001)
 - Of those organizations with a formal business performance measurement system, about one-third to one-half have an **incomplete understanding of causal relationships** between measures (Neely et al., 2008)
 - “One tool widely advocated for performance measurement system design is success or strategy mapping... building a causal model of the hypothesized links between an organization’s performance measures.” (Neely, Michel, & Martinez, 2007, p. 24)

Business Model
(strategy map, causal map, success map)


The industrial engineering profession is also uniquely suited to help address this problem




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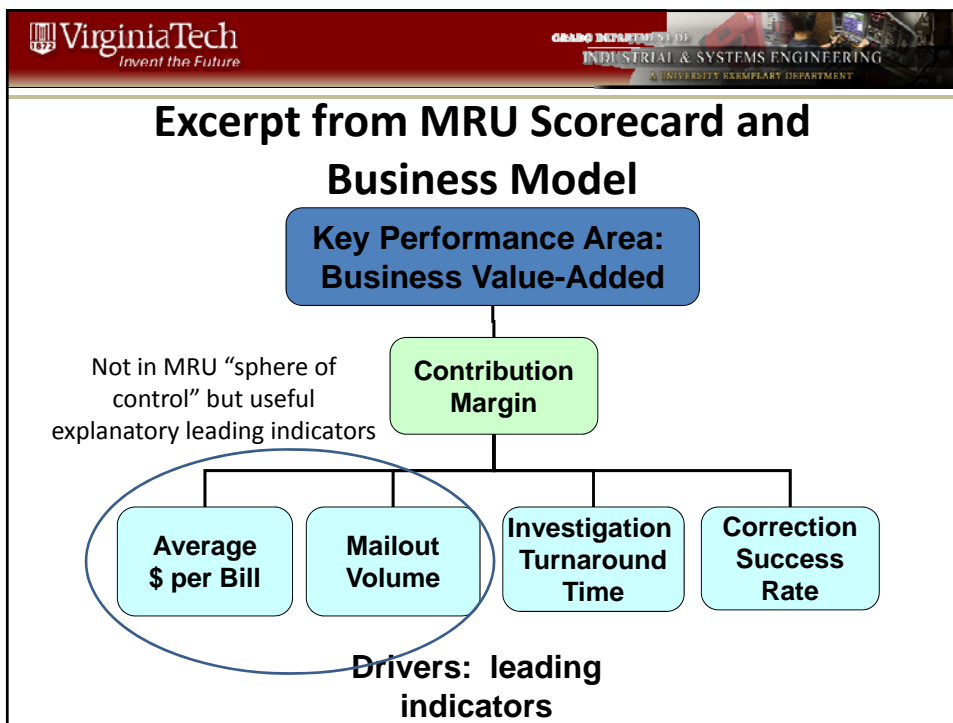
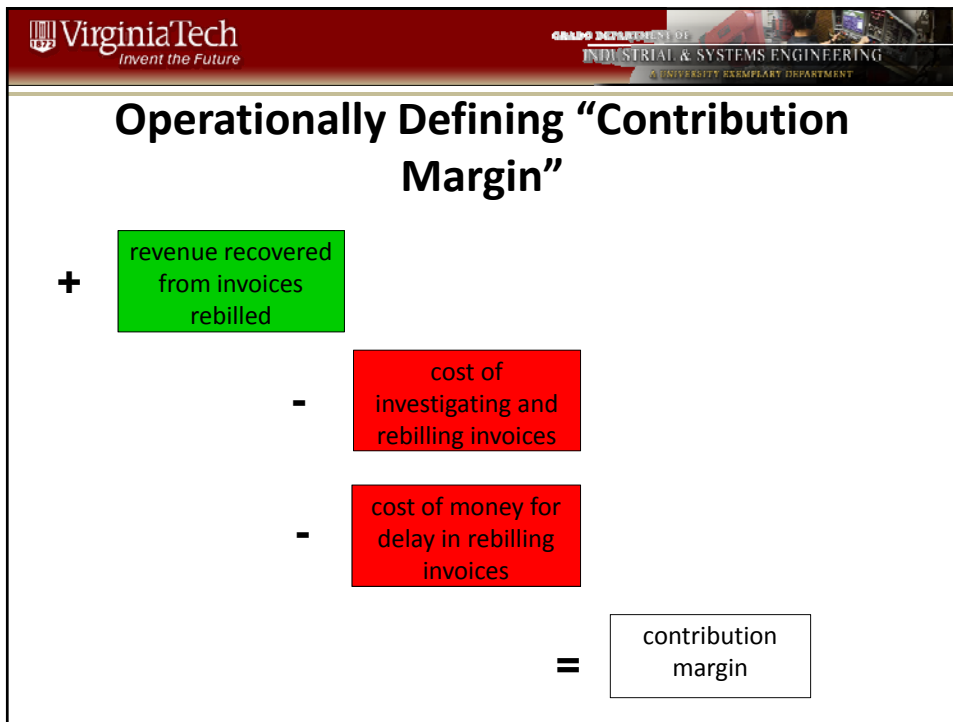
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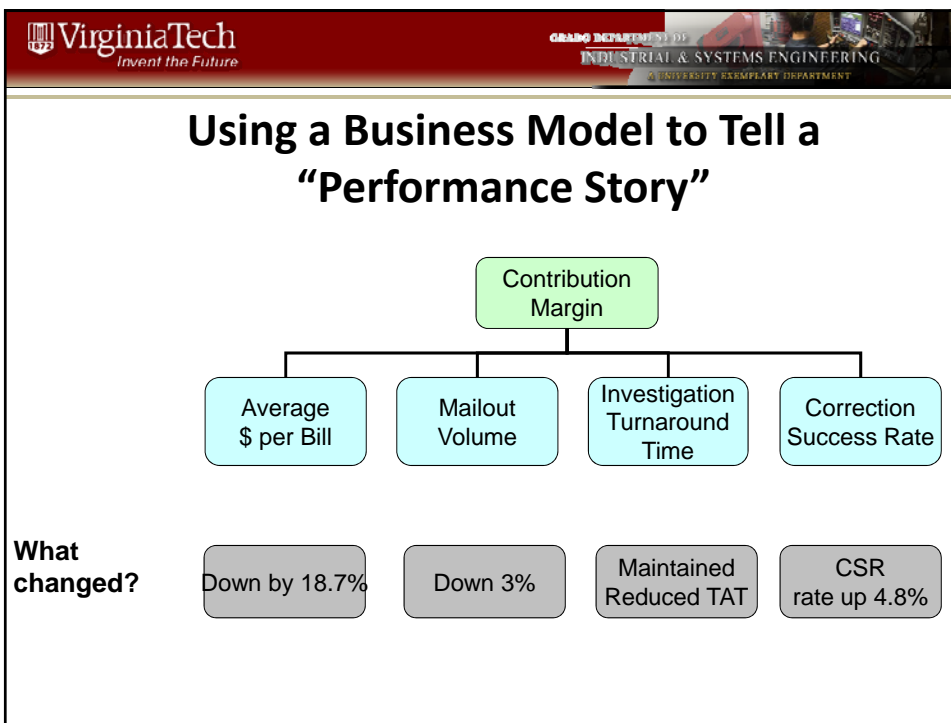
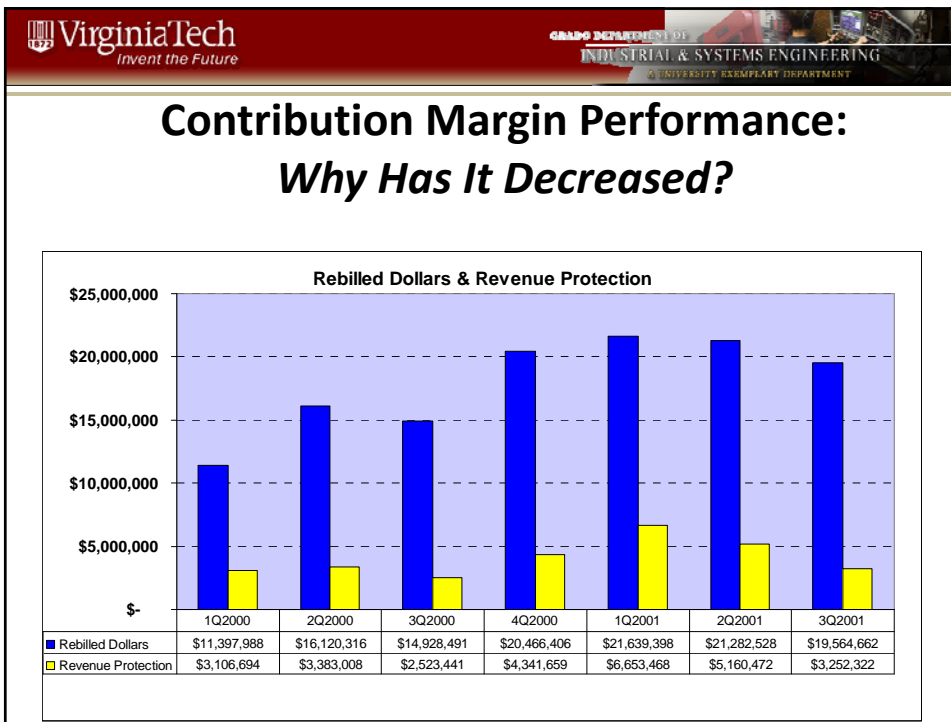
Example: The Mail Return Unit




- The MRU investigates undeliverable (returned) mail (invoices for telephone service) and finds the correct address to rebill external customers
- Work is performed for internal business units
- Developed a more balanced and comprehensive scorecard with four Key Performance Areas:
 - Business Value-added, Operational Processes, Employee, Customer Relationships
- A key measure in the Business Value-Added KPA was “contribution margin” to assess the impact (value) of the MRU’s work.









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Defining an Effective Performance Measurement System

“The process of performance measurement does not automatically lead to performance improvements.” (De Waal, 2002, p. 5).


- An *effective* performance measurement system...
 - ✓ ...provides *actionable information*...
 - ✓ ...on a *focused and aligned* set of measures...
 - ✓ ...to provide a *balanced view of performance* of the organizational unit ...
 - ✓ ...and is *used to make decisions and implement actions* to improve results.


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The Current State of Performance Measurement Knowledge and Practice


- Widespread attention on the need for more effective performance measurement has existed for some time
- Evidence suggests that:
 - Progress has been made – for example, 66% of companies worldwide have adopted the Balanced Scorecard (BSC) or similar frameworks (Rigby & Bilodeau, 2007)
 - More effective performance measurement can have an impact on business results (although some mixed results)
- **Yet**, the “knowing-doing” gap remains significant
 - Differences between prescribed vs. actual practice
 - many companies claiming to have a formal business performance measurement approach often lack important elements
 - Dissatisfaction with performance measurement systems - BSC ranked fifth in defection rate among 25 management tools surveyed (Rigby & Bilodeau, 2005)
 - Large differences across organizations in “doing”




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The Current State of Performance Measurement Knowledge and Practice


- This creates challenges for researchers -- most of the current evidence about the success or failure of BPM is anecdotal (Marr, 2005)
- Need for more empirical research on the “what, how, and why”
 - Research attention on performance measurement **use** remains insufficient




Design: how the “right” set of measures should be selected, what measures are most common



Implementation: how measures are implemented (data collected, portrayed, etc.), what tools can be used



Use: how measures are used (practices, tools, etc.)



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Research Initiatives in Performance Measurement

- Developing and testing methodology for performance measurement system design and implementation
 - Van Aken and Coleman, *Industrial Management* (2002)
- Developing assessment tools to diagnose existing performance measurement systems
 - Van Aken, Letens, Coleman, Farris, and Van Goubergen, *IJPPM* (2005)
- Exploring methods for visualizing and testing cause-and-effect relationships between performance measures
 - Sousa, Carpinetti, Groesbeck, and Van Aken, *IJPPM* (2005)
 - Groesbeck, Sousa, Van Aken, and Coleman, *ASEM* (2002)
- **Investigating the impact of performance measurement use practices on organizational outcomes**
 - Chearskul, P. *ASEM* (2007) and Chearskul, P. *ASEM* (2008)

Some More Terminology

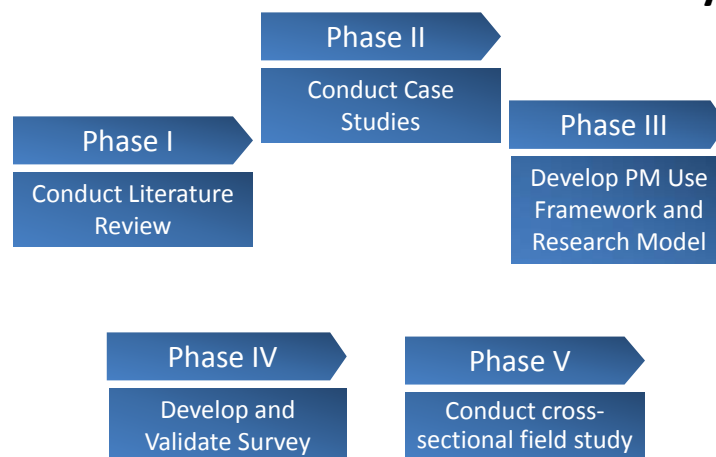
- Performance review process:


“The organizational activities to monitor, evaluate, and communicate performance information that lead to decision-making and action-taking to aid managers in achieving the goals of the organizational unit. This process includes activities that occur both within and outside the performance review meeting.”

- Performance review meeting:

“A formal meeting in which a defined group of people comes together on a regular basis to discuss and make decisions about the performance of their organizational unit.” May also be referred to as an operational review meeting, a strategy review meeting, business review meeting, etc.

Performance Review Process Study







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A Framework for Defining Performance Measurement Use

- Used literature review and case studies to develop initial framework
- Classified PM “use practices” prescribed in the literature into:
 - 5 **key processes** of PM system use
 - 14 **subprocesses**
 - 78 most common **themes representing more than 1,000 specific practices**







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Performance Review Process: Case Study 2

- A large international manufacturer of electromagnetic, mechanical, and control products
- Recently developed more structured approach to performance reviews
- Objectives of the case study:
 - To confirm PM use practices observed compared to prescriptions in the literature
 - To inform the development of the PM use framework






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Data Collection

- Direct observations of two performance review meetings:
 - A monthly policy deployment review
 - 18 participants, 4 of which joined via telephone
 - A monthly product development review meeting
 - 25 meeting participants, 11 of which joined via telephone
- Observed and documented discussion (content and time) related to:
 - Each measure (or project)
 - Each of 9 discussion modes: *Reporting, Clarifying, Analyzing, Interpreting, Forecasting, Validating, Generating, Justifying and Deciding*



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Key Findings

- Most focus was on **reporting, generating, clarifying, and analyzing** activities.
 - Similar to first case study in terms of time spent on reporting and clarifying
- Least focus was on **forecasting** and **validating** activities.
- No use of “business model” to define causal relationships or statistical tools to test relationships.
- Findings used to modify and provide support for the PM use framework

Policy Deployment Meeting

Product Development Meeting

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Monitoring

Providing feedback on performance

- ❖ Procedures for collecting performance data are well defined.
- ❖ Performance data collected to support the review process are reliable and valid.
- ❖ Data for the performance review process are collected on a timely basis.
- ❖ Visual and graphical methods are used to portray performance information
- ❖ Performance portrayals and reports are updated in a timely manner.
- ❖ Results on key performance measures are distributed to relevant decision makers.
- ❖ We review performance information on a regular basis.

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Evaluating

Extracting insight from performance information

- ❖ Definitions of key performance measures are clearly understood by all decision makers.
- ❖ We understand the performance portrayals and reports used.
- ❖ We compare current performance levels with performance of similar units or organizations.
- ❖ We compare current performance levels to expectations such as goals or targets to identify performance gaps.
- ❖ We seek to identify causes to explain current performance results.
- ❖ The insights we gain in the performance review process enable us to focus our attention on the most critical areas.
- ❖ We test and verify the impact of improvement actions and strategies on performance measures.
- ❖ We test and verify causal relationships between different performance measures.
- ❖ Based on our review of performance information, we predict future performance on key measures.

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Decision Making

Identifying the best rational alternative

- ❖ Relevant stakeholders such as employees and managers are engaged in identifying potential solutions and improvement actions.
- ❖ Once problems or opportunities are identified, we define potential improvement actions.

- ❖ We compare potential improvement actions by considering their strategic importance.
- ❖ We consider both costs and benefits for each potential improvement action before selecting a course of action.

- ❖ Once improvement actions are determined, we define clear action plans with tasks and priorities.
- ❖ We make decisions when it is clear that action is needed.


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Taking-Action

Putting decisions into practice

- ❖ Decisions we make are put into action.
- ❖ Action plans for improvement are implemented in a timely manner.

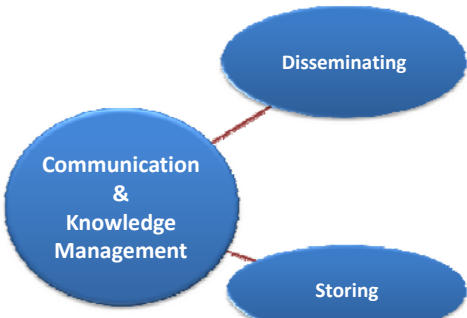


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Communication & Knowledge Management

Communicating and managing emergent and existing knowledge

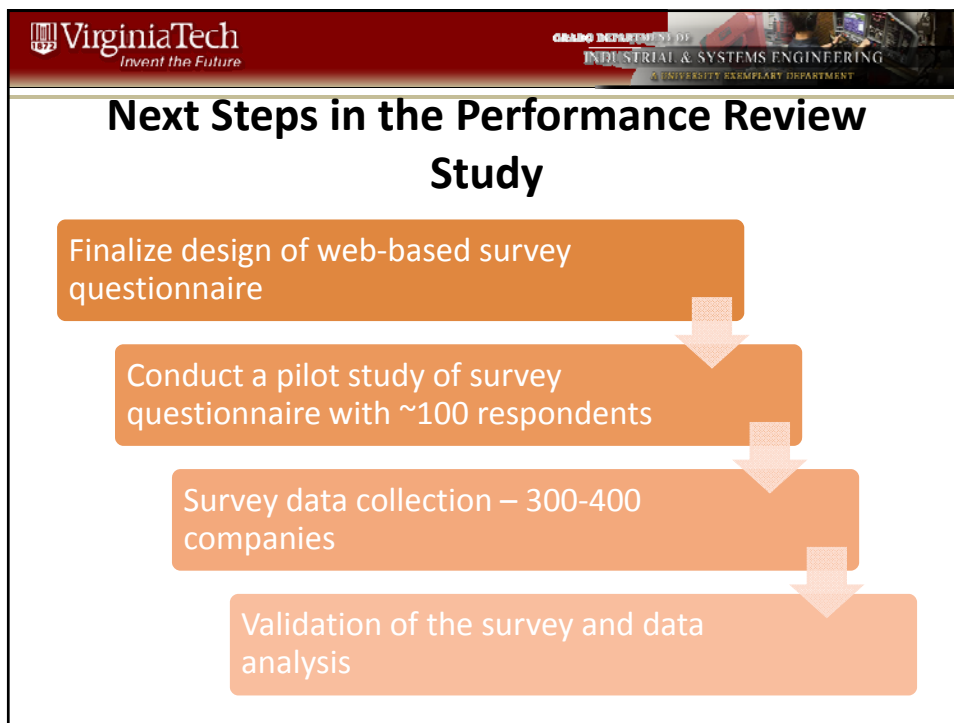
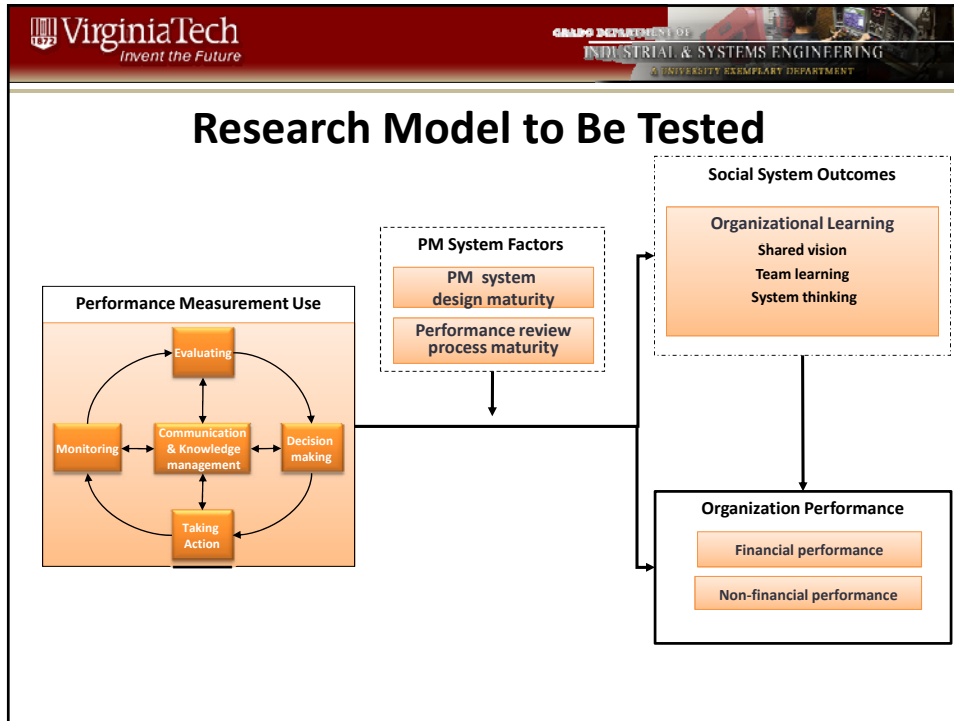



- ❖ We communicate performance information and review findings to internal stakeholders within the organization.
- ❖ Performance information and review findings are shared with stakeholders using multiple mechanisms.

- ❖ Performance information and knowledge are stored and made accessible using effective methods and tools.
- ❖ Review findings are documented for future reference and use.

Content Validity Study -- Selected Results

Intended Dimensions (No. of items)	Assigned Dimension														Total Hit	Item Placement %			
	GA	UP	RE	AN	IN	VA	FO	CL	GE	JU	DE	IM	DI	ST					
Gathering (6)	35			1				2				4			42	83%			
Updating (9)		36	9	11				6					1		63	57%			
Reporting (6)		2	30		1	1						1	7		42	71%			
Analyzing (6)			2	36	3	1									42	86%			
Interpreting (5)				2	28			1			2	1		1	35	80%			
Validating (8)		4	1		12	30	6			3					56	54%			
Forecasting (3)					1	1	18				1				21	86%			
Clarifying (3)		1						20							21	95%			
Generating (4)									24	2	2				28	86%			
Justifying (5)					1	1	1		2	28	2				35	80%			
Deciding (9)					4	1	9	1	3	5	36	4			63	57%			
Implementing (5)										1	3	28	1	2	35	80%			
Disseminating (4)		1	1					1							25	89%			
Storing (5)	1	1											1	32	91%				
Total Number of Items	78	Total Item Placement				546				Total Hit				406		Overall Hit Ratio		74%	
Kappa j	0.85	0.48	0.52	0.71	0.46	0.47	0.64	0.61	0.71	0.55	0.50	0.68	0.65	0.84	0.61	0.78			
Std. error (kj)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.01	0.09			
95% lower CI	0.76	0.39	0.43	0.62	0.38	0.38	0.56	0.52	0.62	0.46	0.42	0.59	0.57	0.75	0.60	0.69			
Evaluation	Excel	Fair	Fair	Good	Fair	Fair	Good	Good	Good	Fair	Fair	Good	Good	Exce	Good	Good			







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Objectives of this Presentation

- Business performance measurement systems
 - Identify challenges and problems in current business performance measurement practice
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 - Provide an overview of Kaizen events
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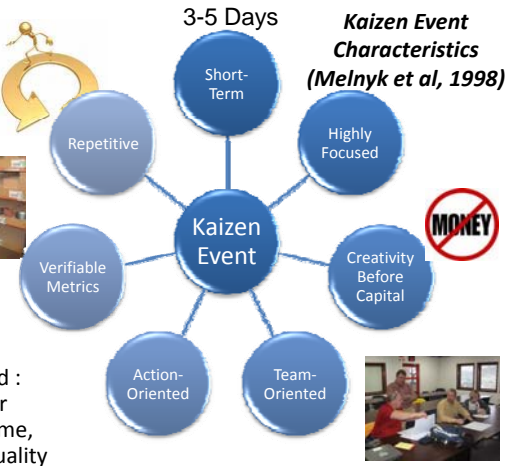
NSF Grant No.
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Defining Kaizen Events

A Kaizen event is a:

- ...structured improvement project...
- ...using a dedicated cross-functional team...
- ...to improve a targeted work area, process, or product...
- ...with focused goals...
- ...in an accelerated timeframe.

Typical performance measures targeted :
Productivity, Flow time/lead-time, floor space, inventory, set-up/changeover time, production throughput, parts travel, quality (Kosandal & Farris, 2004)




3-5 Days
Short-Term

Kaizen Event Characteristics (Melnyk et al, 1998)

- Repetitive
- Highly Focused
- Verifiable Metrics
- Team-Oriented
- Action-Oriented
- Creativity Before Capital

~~MONEY~~



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Typical Kaizen Event Activities

Formal Kaizen event

- Kick-off
- Training
- **Documentation and analysis of current state**
- **Identification of opportunities for improvement (design future state)**
- **Implementation and evaluation of changes****
- Development of action plan for follow-up
- Report out to sponsors/stakeholders

Improvement approach varies depending on goals and scope of KE



Standard Work



DMAIC

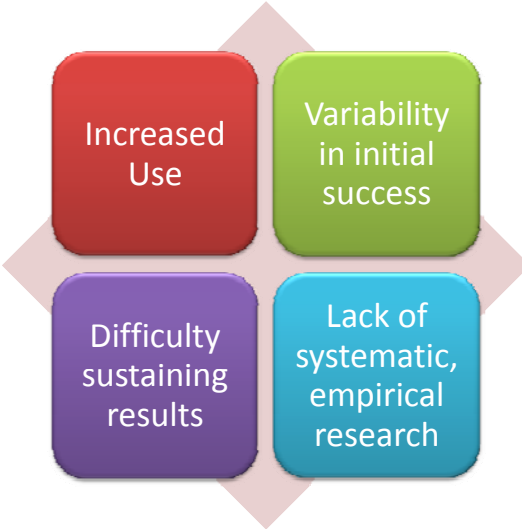


TPM




VSM

Why Study Kaizen Events?



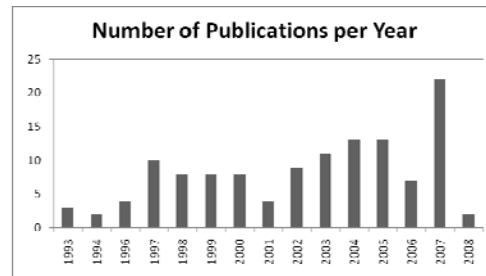
- Purported benefits (particularly for social system outcomes) remain largely untested
- Lack of attention to less successful events
- Lack of focus and consensus in the literature about prescriptive guidelines



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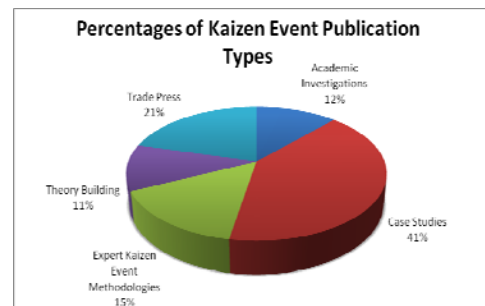
Summary of Literature on Kaizen Events

- Characteristics of KE literature:
 - 125 published between 1993 and 2008
 - Substantially lower than other improvement practices
 - ~13 authors > 2 publications each
 - 4 out of the 125 publications are books or Kaizen event manuals
 - Most publications are in practitioner journals



Characterizing Kaizen Event Publications

- *Case Study* : Boeing frequent case study example
- *Expert Kaizen Event Methodologies*: includes practitioner guidebooks and detailed presentations and articles by consultants
- *Academic Investigations*: academician-conducted case studies that focus on providing practical insights
- *Theory-Building Works*: Bateman (e.g., 2005), Miller (2005), Patil (2003), and the VT-OSU research project



Kaizen Event Literature: *Focus? Consensus?*

Factor	Example
Task Design	<p><u>Event goals:</u></p> <ul style="list-style-type: none"> • Linked to organizational strategy • Used to implement lean manufacturing • Realistic goals • Extremely challenging goals
Team Design	<p><u>Team size</u></p> <ul style="list-style-type: none"> • 3 – 5 people • 6 – 10 people
Event Process	<p><u>Problem Solving Tools/Techniques:</u></p> <ul style="list-style-type: none"> • Using the same general improvement process • Using customized improvement processes depending on event

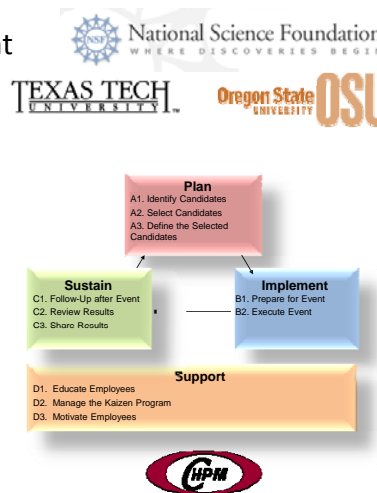



Ongoing Kaizen Event Research in Enterprise Engineering Research Lab

- An empirical investigation of Kaizen event effectiveness: outcomes and critical success factors (Farris, 2006)
- Sustainability of Kaizen event outcomes (Glover, 2010)



- Development and application of a Kaizen event program framework (e.g., Letens, Farris, & Van Aken, 2006)






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Summary of Study on Kaizen Event Performance Outcomes



National Science Foundation
WHERE DISCOVERIES BEGIN

NSF Grant No.
DMI 0451512

Organization and Event Summary

Organization	# Events	% Studied	Target %
Organization A (wood products)	15	100%	100%
Organization B (motors)	8	56%	100%
Organization C (wood products)	11	100%	100%
Organization D (transportation equipment)	4	13%	25% - 33%
Organization E (specialty equipment)	12	33%	50%
Organization F (steel components)	6	24%	60%
Total Events	56	Usable:	51

Selection criteria: At least 1 yr experience, frequent use of KEs, and strategic use of KEs. Event selection determined by research team.

Example Types of Events and Benefits			
Comp	Examples of Events	Examples of Measured Benefits	Examples of Non-Measured Benefits
A	5S, SMED, Standard Work	Improved throughput, lead-time, safety, quality, on-time completion, WIP	KEs engrained in culture, plant-wide belief in CI, employee ownership and involvement in improvement
B	5S, SMED, Standard Work, 3P, VSM, Transactional Process Improvement, Variation Reduction Kaizen	Improved lead-time, WIP, setup times, productivity, floor space, product quality, product cost, defects,	KEs engrained in culture
C	5S, Standard Work, Production Planning Kaizen, Six Sigma	Preventive maintenance, quality	Increased employee ownership/empowerment
D	VSM, RIW, 5S	Reduction in man-hours, throughput, cycle time, lead time	Breaking down functional silos through cross-functional work, spreading CI in culture (KE participants using lean concepts in everyday work)
E	DFM, SMED, TPM, Work Cells, 6S, Standard Work, Value Stream Mapping, 3P, Poka Yoke, One Piece Flow	Improved inventory turns, safety	increased morale, increased work floor flexibility, improved cross training, decreased resistance to change from staff, increased customer flexibility
F	6S, flow	Established flow through plant, reduced lead times, improved productivity, improved quality, reduced scrap, reduced cycle time	Visual work place, growth in employee "lean" understanding, increased employee pride

Data Collection Activities Throughout Kaizen Event

During kaizen event

- Kick-off (survey questionnaire, **quantitative + qualitative data**)
- Training
- Documentation and analysis of current state
- Identification of opportunities for improvement (design future state)
- Implementation and evaluation of changes**
- Development of action plan for follow-up
- Report out to sponsors/stakeholders (survey questionnaire)

**Event information sheet (facilitator),
 Team activities log, event documents
 (report out file, charter, etc.)**

Input Variables	Process Variables	Outcomes Variables
<p>Perceptual:</p> <ul style="list-style-type: none"> • <i>Goal Clarity</i> (Team, Kickoff Survey) • <i>Goal Difficulty</i> (Team, Kickoff Survey) • <i>Team Autonomy</i> (Team, Report Out Survey) • <i>Management Support</i> (Team, Report Out Survey) • <i>Work Area Routineness</i> (Facilitator) <p>Objective:</p> <ul style="list-style-type: none"> • <i>Team Member Kaizen Experience</i> (Team, Kickoff Survey) • <i>Team Functional Heterogeneity</i> (Facilitator) • <i>Team Leader Experience</i> (Facilitator) • <i>Event Hours Planning</i> (Facilitator) 	<p>Perceptual:</p> <ul style="list-style-type: none"> • <i>Action Orientation</i> (Team, Report Out Survey) • <i>Affective Commitment to Change</i> (Team, Kickoff Survey) • <i>Internal Processes</i> (Team, Kickoff Survey) • <i>Tool Appropriateness</i> (Facilitator) • <i>Tool Quality</i> (Facilitator) 	<p>Perceptual:</p> <ul style="list-style-type: none"> • <i>Attitude</i> (Team, Report Out Survey) • <i>Kaizen Capabilities</i> (Team, Report Out Survey) • <i>Impact on Area</i> (Team, Report Out Survey) • <i>Overall Success</i> (Facilitator) <p>Objective:</p> <ul style="list-style-type: none"> • <i>% of Goals Met</i> (Facilitator)

Analysis Methods
<ul style="list-style-type: none"> • Received data from 51 Kaizen event teams – about 350 survey responses • Data preparation and screening (e.g., treating missing responses/data) • Because data were collected on individuals within teams, and the goal was to aggregate data to the team-level for analysis: <ul style="list-style-type: none"> – calculated interrater agreement (r_{wg}) (James et al. 1984, 1993) and intraclass correlation coefficient ICC(1) to evaluate whether the data demonstrated team-level properties, and therefore could be aggregated to the team-level • Factor analysis used to demonstrate evidence for construct validity for variables • Regression modeling with mediation analysis


Outcomes: Team Member ATTITUDE and KAIZEN CAPABILITIES

ATTITUDE

**KAIZEN
CAPABILITIES**

Definition of Attitude: liking for event, desire to be part of future events, comfortable working together to improve.

Definition of KC: increased knowledge of CI (what it is, need for it, how its applied, & role in it), skills (communicate improvement ideas & gained skills), and performance orientation (motivation to perform better, interest in work, & working together to improve).




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Outcomes: GOAL ACHIEVEMENT

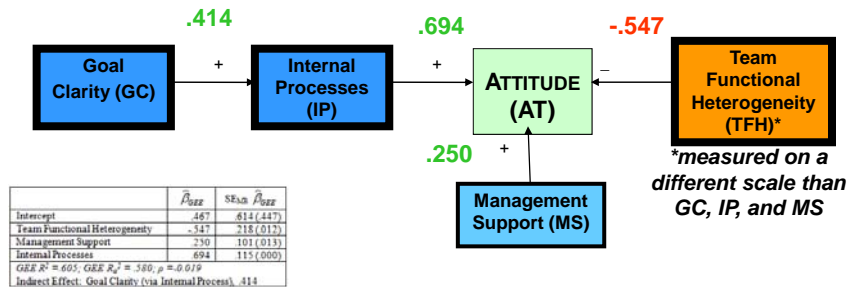
**GOAL
ACHIEVEMENT**

Goal achievement is the percentage of primary goals achieved by the team.



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Relative Impact of Drivers on ATTITUDE

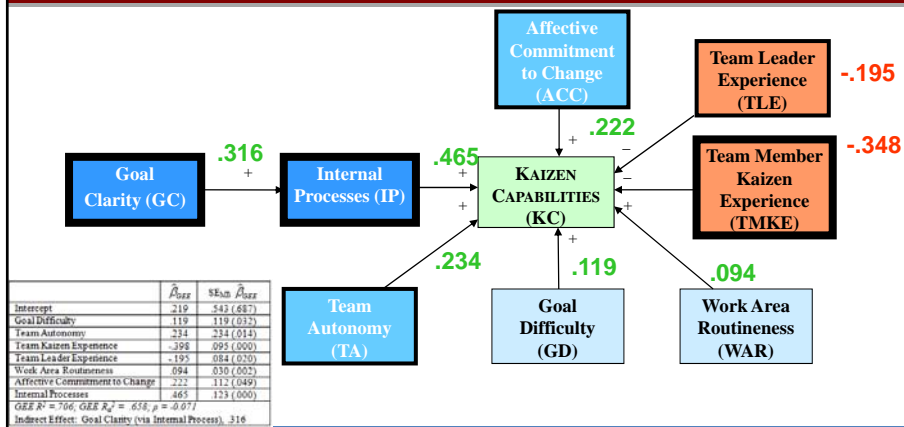


IP and its driver, GC, have a much larger *positive* effect on AT than Management Support. TFH also has a moderately large *negative* effect.

As GC, IP, and MS *increase*, perceptions of AT *increase*.
As TFH *increases*, perceptions of AT *decrease*.

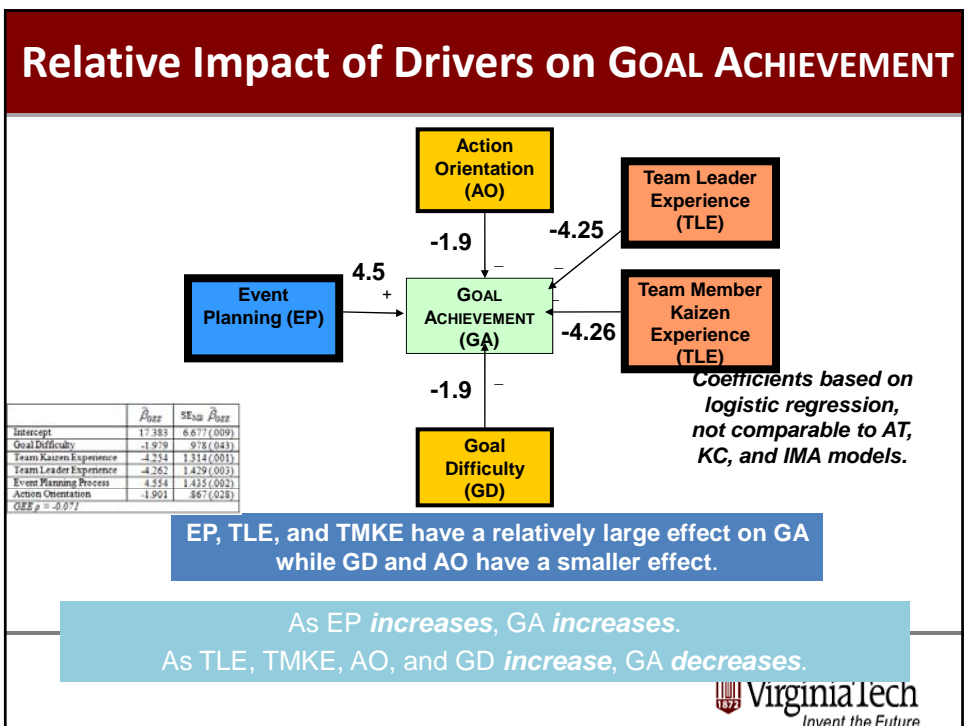


Relative Impact of Drivers on KAIZEN CAPABILITIES



IP, and its driver GC, have the largest effect on KC. TA and ACC have a moderate effect, while GD and WAR have a smaller effect. TKE has a much larger negative effect than TLE.

As GC, IP, TA, ACC, GD and WAR *increase*, KC *increases*.
As TLE and TMKE *increase*, KC *decreases*.



Factors Relating to Kaizen Event *Initial Success*

Factor	Attitude	Kaizen Capabilities	Goal Achievement	Perceived Impact on Area
Management Support	+			+
Goal Difficulty		+	--	--
Team Autonomy		+		+
Goal Clarity	+	+		
Internal Processes	+	+		
Work Area Routineness		+		+
Team Member Kaizen Experience		--	--	
Team Leader Experience		--	--	
Action Orientation			--	+
Functional Heterogeneity	--			
Affective Commitment to Change		+		
Event Planning			+	

Key questions:

- Where do you get the biggest “bang for the buck” to invest in creating the right conditions?
- What can you do to offset negative relationships for factors for a given outcome of interest?

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Contributors and Obstacles to Kaizen Event Team Success: Qualitative Findings

Themes	Sub-Themes	Definition
Organizational Context	Management Commitment	Willingness of senior executives and lower-level managers to accept change or provide help
	Supporting Departments	Willingness of organizational department other than the target area to accept change or provide help
	Resource Support	Specific external resources used by team before, during, or after event
	Environment	Organizational or external environment conditions surrounding the Kaizen event, which are not inherently specific to the Kaizen event
Kaizen Event Design	Goal Clarity	Extent to which event goals are clear to team
	Goal Difficulty	Extent to which the event was challenging due to the scope of the goals set for the event
	Team Composition	Team compositional characteristics which affected the success of the event
	Autonomy	Extent to which the team was given control over its work during the event
Work Area Context	Process Characteristics	Technical characteristics of the target work area which affected team progress
	Process Contributor Support	Willingness of employees in the target work area to accept change or provide help
Kaizen Event Process	Solution Process	Characteristics of the solution development and implementation process which affected team goal achievement
	Internal Processes	Extent to which team member interactions were harmonious
	Affective Commitment to Change	Team member commitment to the extent to which they accept change and provide help



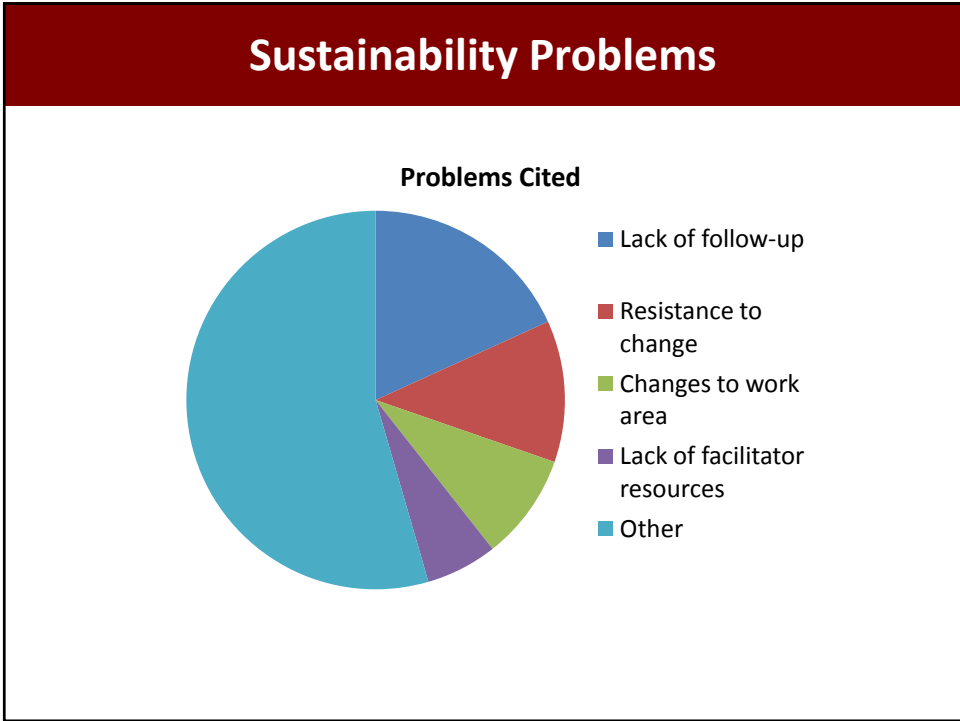
Analyzing Frequency of Qualitative Themes

- Themes ranked by the total number of comments made by Kaizen event team members
- More than 85% of the contributor codes and 70% of the obstacle codes came from the top six themes

Top 6 Themes: Team Contributors	
Internal Processes	34.2%
Affective Commitment to Change	20.5%
Team Composition	14.4%
Resource Support	7.5%
Solution Process	6.2%
Supporting Departments	5.1%
10 Additional Sub-Themes	12.1%

Top 6 Themes: Team Obstacles	
Resource Support	19.9%
Target Process Characteristics	13.0%
Solution Process	11.9%
Supporting Departments	10.4%
Internal Processes	9.3%
Team Composition	6.1%
10 Additional Sub-Themes	29.1%





Factors Influencing Sustainability



Impact of Kaizen Event Goals

- *Goal Clarity and Goal Difficulty*



The Role of Work Area Management

- Impacts *Improvement Culture* (e.g., Work area mgt supporting use of Kaizen events and CI)
- Impacts *Avoiding Blame* (e.g., avoiding negativity when things don't go as planned)
- Establishes processes for *Institutionalizing Change* and *Performance Review*
- Creates direction and foundation for work area employee behaviors



The Role of Work Area Employees

- Key behaviors: *Learning and Stewardship* & *Experimentation*

Sustainability Practices

Pattern Matrix for Post-Event Constructs.

	Component				
	1	2	3	4	5
ICulture8				-.730	
ICulture7				-.881	
ICulture6				-.901	
ICulture3			.952		
ICulture4			.947		
PR2		-.753			
PR4		-.778			
PR1		-.789			.260
PR5		-.824			
PR7		-.854			
ICChange1	.833				
PR3	.800				
ICChange5	.741				
ICChange4	.705				
ICChange2	.672				
ICChange3	.601				

Improvement Culture

- supporting the use of Kaizen events
- championing the value of continuous improvement
- allowing employees time to work on continuous improvement activities

Institutionalizing Change

- documenting follow-up action items
- working on follow-up action items
- training employees in new work methods/processes
- updating work method and process documentation
- involving employees (not on the Kaizen event team) in follow-up and completion of action items
- meeting to review progress and/or develop follow-up strategies

Performance Review

- regularly reviewing performance data related to event goals
- conducting regular audits on changes made
- meetings with management about progress or follow-up
- meetings with Kaizen coordinator or facilitator about progress or follow-up
- informing management of issues with follow-up and sustainability

Avoiding Blame

- avoiding blame or negativity when changes are made, but results are different than expected
- avoiding blame or negativity when goals are not achieved

Next Steps in the Kaizen Event Study

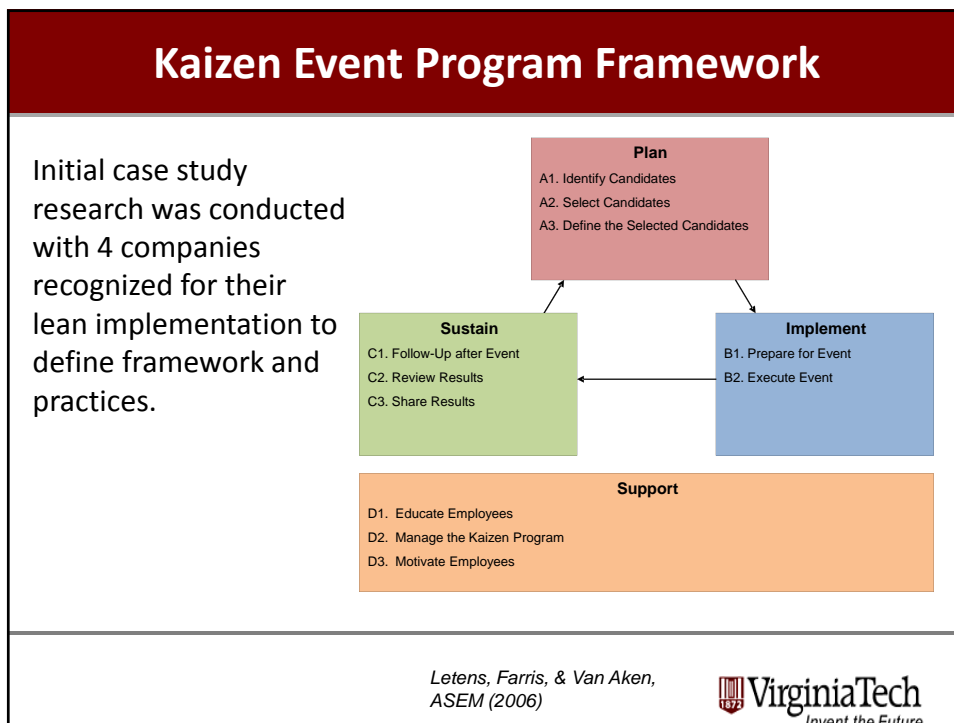
Finalize data preparation and clarification

Analyze data to test research model on sustainability of performance outcomes (~65 events)

Analyze data to re-test research model for initial performance outcomes with ~85 events



Kaizen Event Program Framework: Defining KEP Practices based on Case Study Research



Kaizen Event Program Manual

- 125 published sources reviewed
- Case studies conducted with 12 additional organizations
 - total of 16 manufacturing, service, and government organizations
- Practices organized around major framework process areas
- Highlights critical factors to influence at each framework process area




Participating Companies


Company	Description	First Kaizen Event	Average Kaizen Event Rate	% of Organization that has Experienced Events	Major Processes Targeted	% Manufacturing Events
A	Wood products manufacturer	1998	2-3 per month	100%	Operations	~100%
B	Electronic motor manufacturer	2000	1 every other month	90%	Operations, sales/marketing, customer service/technical support, product design/redesign, production planning/inventory control, process design/redesign	75%
C	Wood products manufacturer	1992	2 per month	Not known	Operations	~100%
D	Large transportation equipment manufacturer	1998	16 per month	85%	Engineering (and related activities)	30%
E	Specialty equipment manufacturer	2000	8 per month	100%	All areas of organization	Not known
F	Steel component manufacturer	1995	1 per month	20%	Manufacturing, order entry, accounts receivable, distribution, vendors, engineering product development	80-85%
G	Aerospace engineering and manufacturer	1993	16 per month	70%	All areas of organization	70%

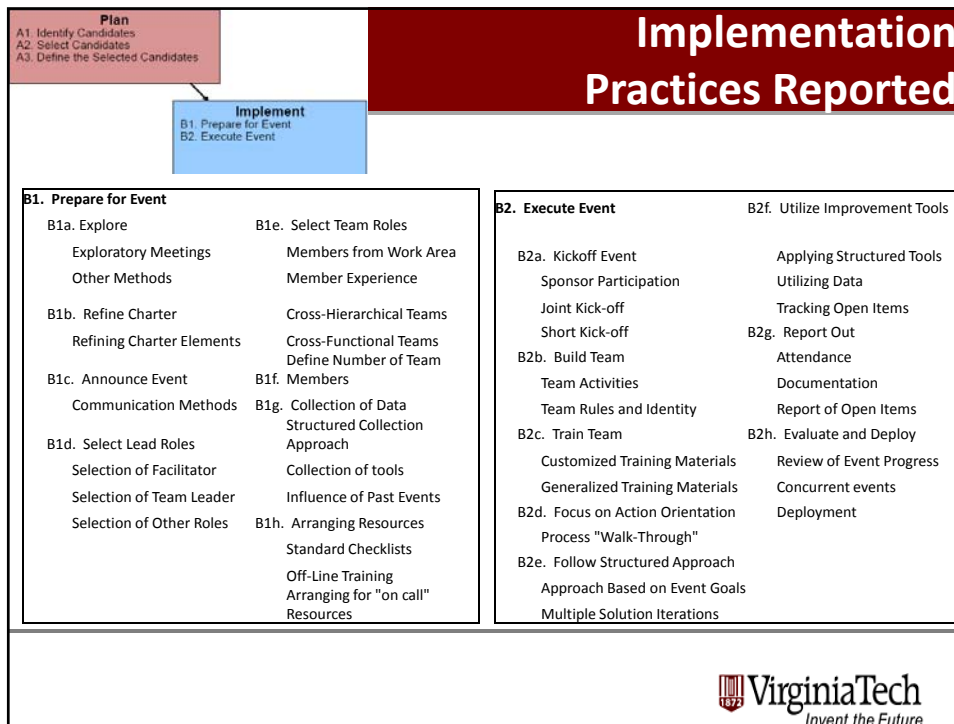


Participating Companies (cont'd)						
Company	Description	First Kaizen Event	Average Kaizen Event Rate	% of Organization that has Experienced Events	Major Processes Targeted	% Manufacturing Events
H	Defense applications	2001	3-4 per month	70%	Manufacturing and Business transactions	30%
I	Government contracted engineering design	1994	2-3 per month	25%	Engineering (and related activities)	40%
J	Wood products manufacturer	2005	1 per month	100%	Operations and Sales	90%
K	Electronic systems manufacturer	2001	4-5 per year	30%	Production, quality, material management, engineering, proposal management	20%
L	Medical device manufacturer	2005	2 per month	15%	Operations and business processes	80%
M	Defense IT applications	2004	1 per month	10%	Servicing, product maintenance	5%
N	Financial service provider	2005	4 per month	40%	Operations, account servicing, information flow	0%
O	Continuous food production	2000	2-4 per month	5%	Operations and extended supply chain	90%
P	Defense Systems maintenance	1999	50 per month	75%	Product maintenance, engineering processes	0%
		Avg: 1999	Avg: 7.8 (4.2)	Avg: 55.7%		

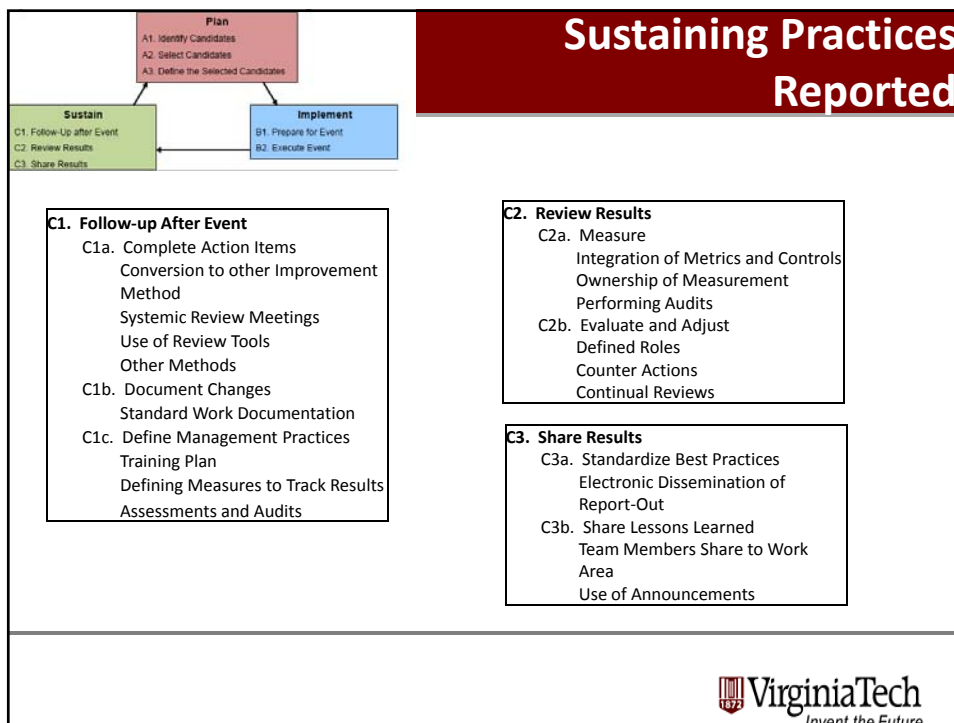
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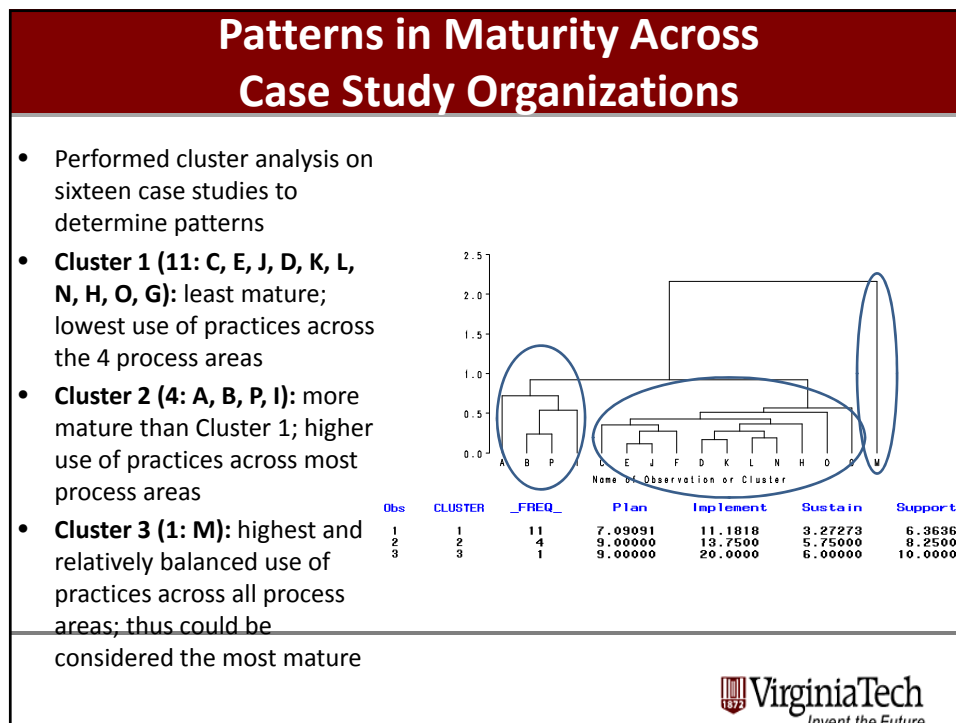
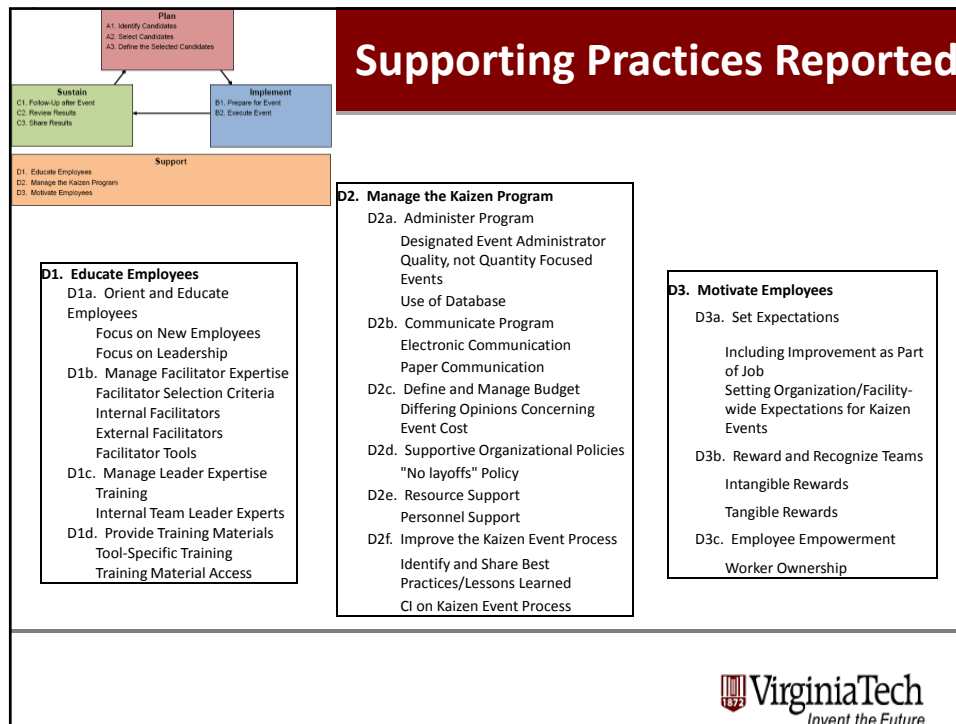
Plan	Planning Practices Reported	
A1. Identify Candidates A2. Select Candidates A3. Define the Selected Candidates	<p>A1. Identify Candidates</p> <ul style="list-style-type: none"> A1a. Derive Candidates from Strategic Direction <ul style="list-style-type: none"> Policy Driven Objectives Funneling Approach Leadership Directives A1b. Perform Analysis to Define Candidates <ul style="list-style-type: none"> Analysis Tools A1c. Respond to Emerging Problems <ul style="list-style-type: none"> Targeting Opportunities Customer Needs 	<p>A2. Select Candidates</p> <ul style="list-style-type: none"> A2a. Define Improvement Strategy A2b. Application of Selection Criteria <ul style="list-style-type: none"> Use of Structured Approaches Reviewing Business Case Information Leadership Guidance Other Methods A2c. Use of Informal Events A2d. Sequencing and Synchronization of Events <ul style="list-style-type: none"> Ordering Events Concurrent Events A2e. Scheduling Events <ul style="list-style-type: none"> Overall Improvement Event Schedule Defined Planning Horizon Consideration of Resource Constraints
	<p>A3. Define the Selected Candidates</p> <ul style="list-style-type: none"> A3a. Define Initial Project Charter <ul style="list-style-type: none"> Charter Elements Creation of Charter A3b. Define Event Time Frame 	

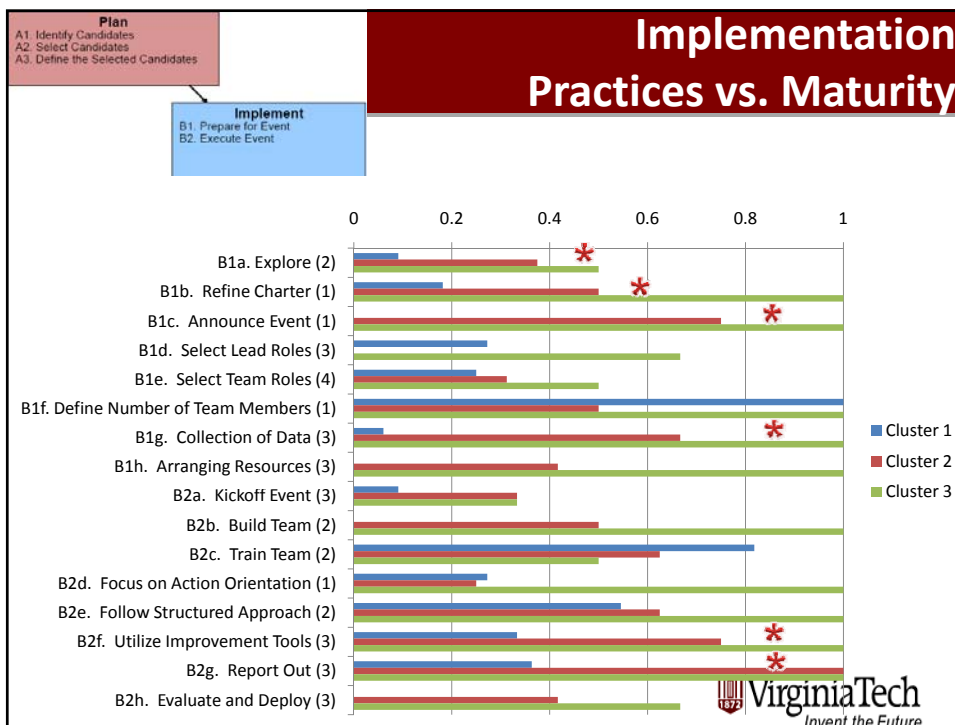
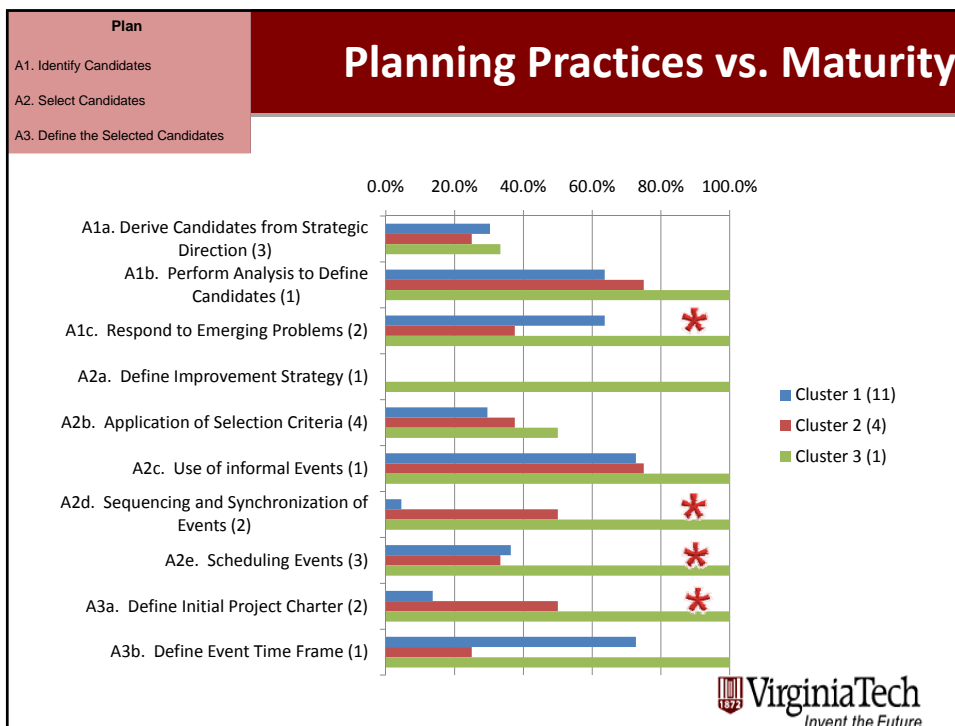
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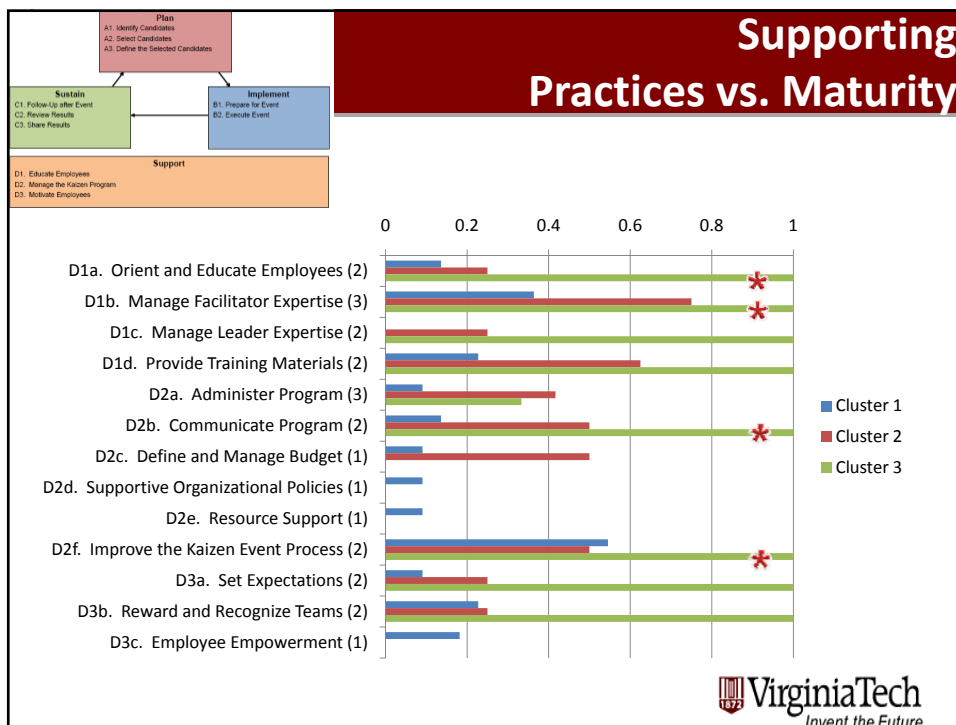
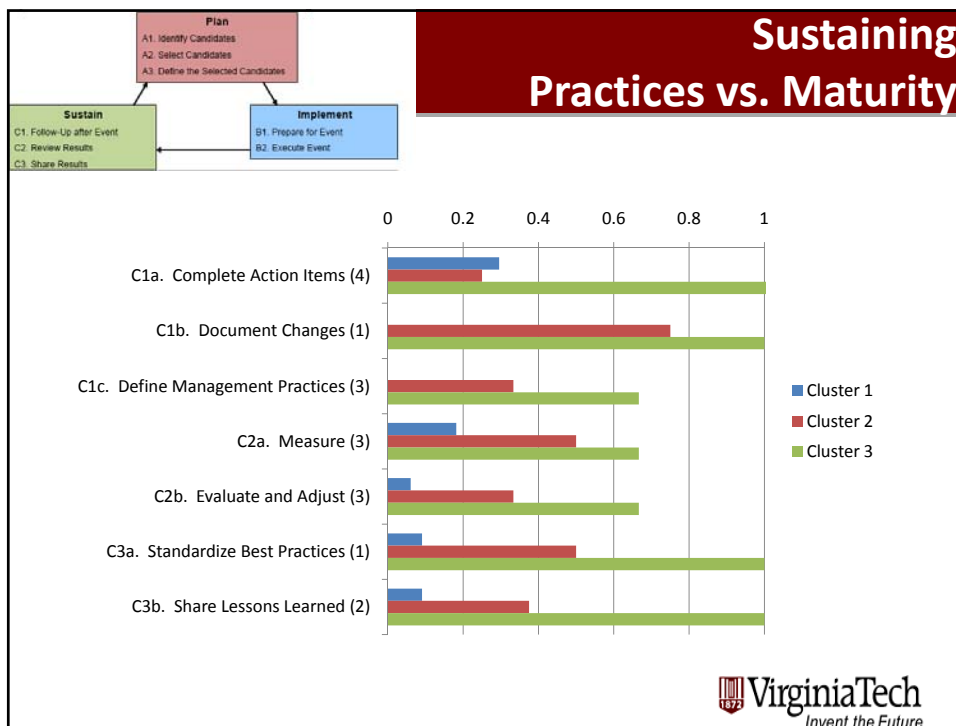



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Questions?



For more information (e.g., request a copy of this presentation, research papers), contact:

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