

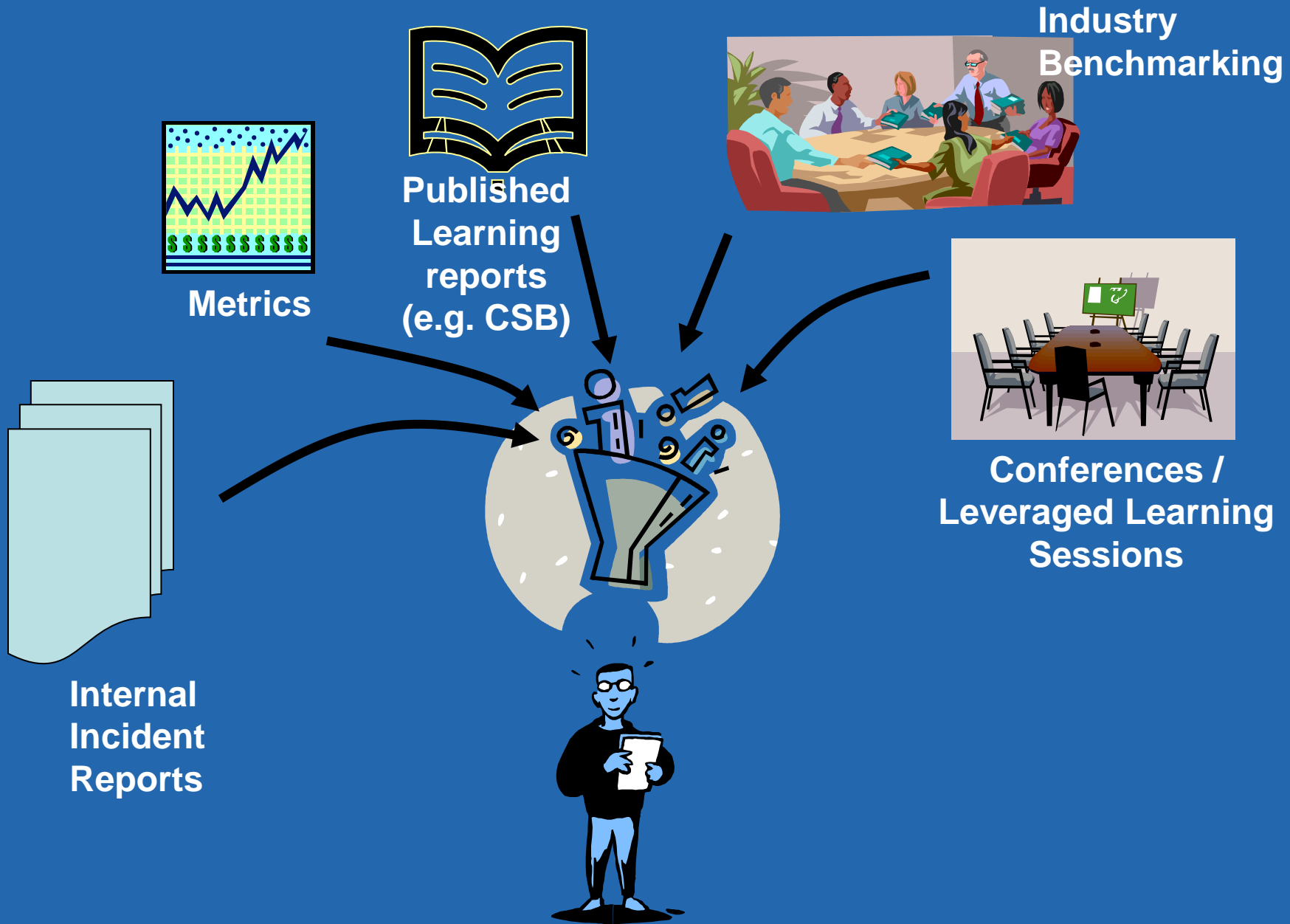
How the industry uses incident data from multiple sources to improve safety

Tim Overton

Group Head of Process Safety

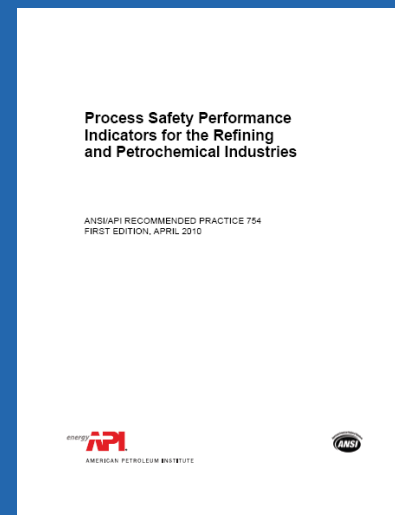
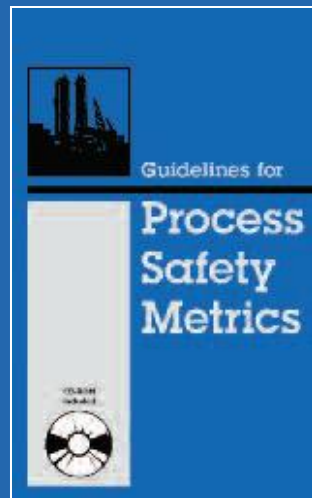
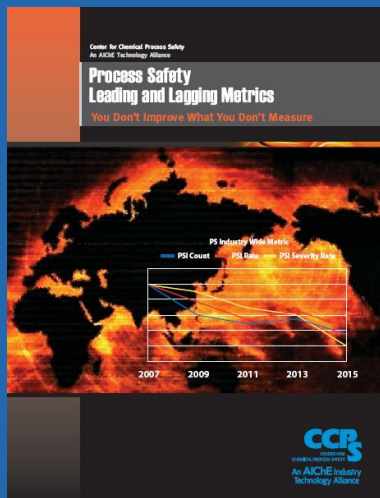
BP

Sources of information

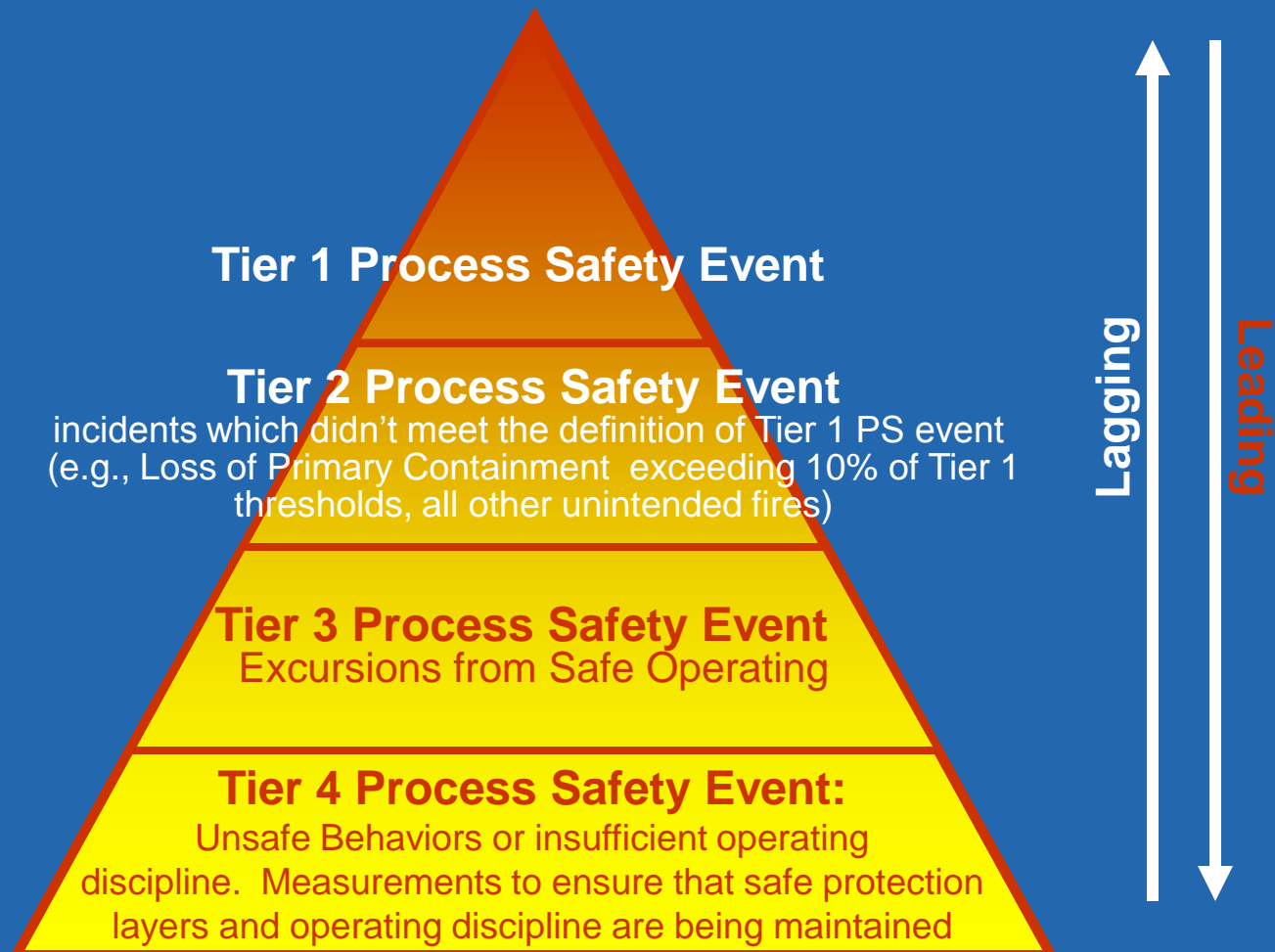


Use of Metrics to aid in analysis and learning

- Significant efforts by Center for Chemical Process Safety (CCPS), API, OGP and others regarding Process Safety Leading/Lagging Metrics for chemical and petroleum industries
 - CCPS Leading / Lagging Metric Project 2006 – 2008
 - API RP 753 2008 -2009
 - OGP 2009 – present



Hierarchy of Process Safety Metrics



Safety Metrics used by BP over the past few years

- **Number of Workforce fatalities**
- **Days Away from Work Case Frequency (DAFWCF)**
- **Recordable Injury Frequency (RIF)**
- **Recordable Occupational Illness Frequency (ROIF)**
- **Number of Major Incidents (MIAs) (overall and process safety-related)**
- **Number of High Potential incidents (HIPOs) (overall and process safety-related)**
- **Timeliness of issuance of MIA and HIPO lessons learned reports**
- **Number and Frequency of Process Safety Events**
- **Number of Fires & Explosions**
- **Number of Losses of Primary Containment**
- **Number and volume of oil spills**
- **Number of Overdue Plant Inspections and Tests**
- **Percentage of Major Accident Risk assessments completed and action items closed**
- **Number of government reportables**
- **Number of BP Safety & Operations Audit delinquent actions**
- **Number of approved audit due date change requests**
- **Percentage of incident investigation actions closed.**

Examples of Metrics used or being considered by BP following release of API RP 754

API RP 754 Tier 1	Tier 1 PSE Rate (Total PS Tier 1 Events / 200,000/total employee & contractor work hours)	API RP 754 Tier 4	Process Safety Action Item Past Due – Percentage and/or number of past-due process safety actions.
API RP 754 Tier 1	Tier 1 PSE count	API RP 754 Tier 4	Safety Critical Equipment Inspection – Percent of inspections of safety critical equipment completed on time.
API RP 754 Tier 1	Tier 1 Severity-weighted rate (same as CCPS PSII metric) or Count of incidents exceeding a CCPS incident severity threshold (e.g., 9 points or 15 points)	API RP 754 Tier 4	Completion of Emergency Response Drills -- Percentage of emergency response drills completed as scheduled.
API RP 754 Tier 2	Tier 2 PSE rate (Total Tier 2 events / 200,000/total employee & contractor work hours)	Other	Number of temporary repairs currently in service (also consider measurement of how long in service)
API RP 754 Tier 2	Tier 2 PSE count	Other	Safety Systems Bypassed or found to be inoperable per month
API RP 754 Tier 3	Excursion Outside of Defined Safe Operating Limits		
API RP 754 Tier 3	Number of Demands on Safety Systems (e.g., RV's, safety instrumented systems). RV releases to atmosphere not part Tier 1 & Tier 2		
API RP 754 Tier 3	Other LOPCs (those which don't meet Tier 1 & 2 definitions)		

Sources of published incident learning reports

Trade & Professional Groups

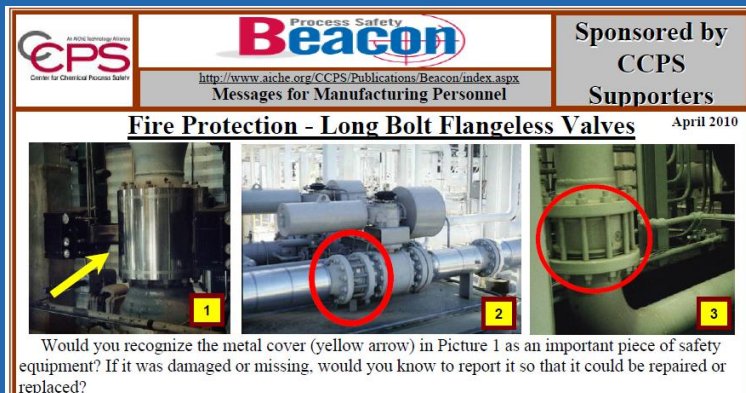
Examples:

- Center for Chemical Process Safety (CCPS)
Process Safety Beacon

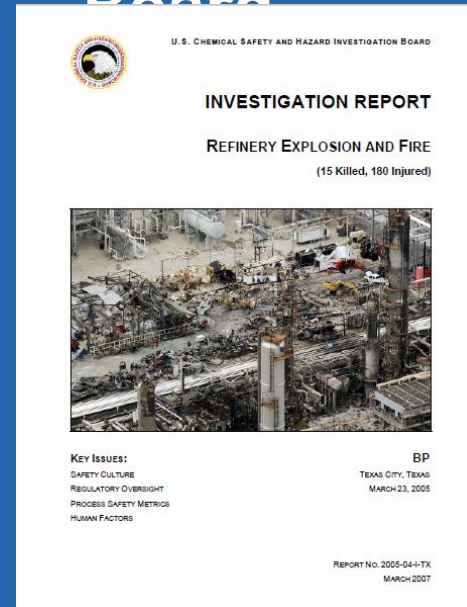
Government sponsored incident learning reports

Examples:

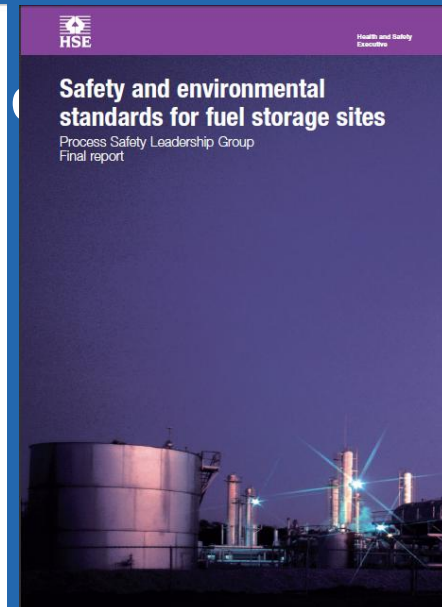
- US Chemical Safety Board



The image shows the cover of a report from the Center for Chemical Process Safety (CCPS). The title is "Fire Protection - Long Bolt Flangeless Valves" and it is dated April 2010. The cover features three photographs of industrial equipment. The first photo shows a metal cover with a yellow arrow pointing to it. The second and third photos show close-ups of flangeless valves with red circles highlighting specific components. The text on the cover asks: "Would you recognize the metal cover (yellow arrow) in Picture 1 as an important piece of safety equipment? If it was damaged or missing, would you know to report it so that it could be repaired or replaced?"



The image shows the cover of an investigation report from the U.S. Chemical Safety and Hazard Investigation Board. The title is "INVESTIGATION REPORT: REFINERY EXPLOSION AND FIRE" and it is dated March 23, 2005. The cover features a photograph of a refinery explosion and fire. The text on the cover includes: "U.S. CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD", "INVESTIGATION REPORT", "REFINERY EXPLOSION AND FIRE", "(15 Killed, 180 Injured)", "BP", "TEXAS CITY, TEXAS", "MARCH 23, 2005", "REPORT No. 2005-044-TX", "MARCH 2007".



The image shows the cover of a report from the Health and Safety Executive (HSE). The title is "Safety and environmental standards for fuel storage sites" and it is dated March 2007. The cover features a photograph of a fuel storage site. The text on the cover includes: "Health and Safety Executive", "Safety and environmental standards for fuel storage sites", "Process Safety Leadership Group", "Final report".

Information versus Learning

Company global scale:

- Employees ~ 90,000
- Contractors ~ 200,000
- Countries >80
- Businesses in corporate safety audit programme ~90 entities

Internal HSE information:

- Internal lessons learned (2-3 per average week)
- Thousands of incident and near miss reports:
Actions per report: 3-4 typical

External HSE information:

- Hundreds of incidents reported annually
 - Often with some indication of causes or lessons learned
- Published major reports (e.g., CSB)
Often with recommended actions

Embedding Learning through Systems

Information sources

Data:

- Incidents & events
- Trend analysis
- Audit findings
- External

Screen, prioritize, recommend

Learning Forum

- Response criteria:
- Material risk
 - Applicability
 - Actions underway
 - Ability to influence
 - Resource prioritization

Transfer Options

Management systems

standards, processes, procedures

Communication

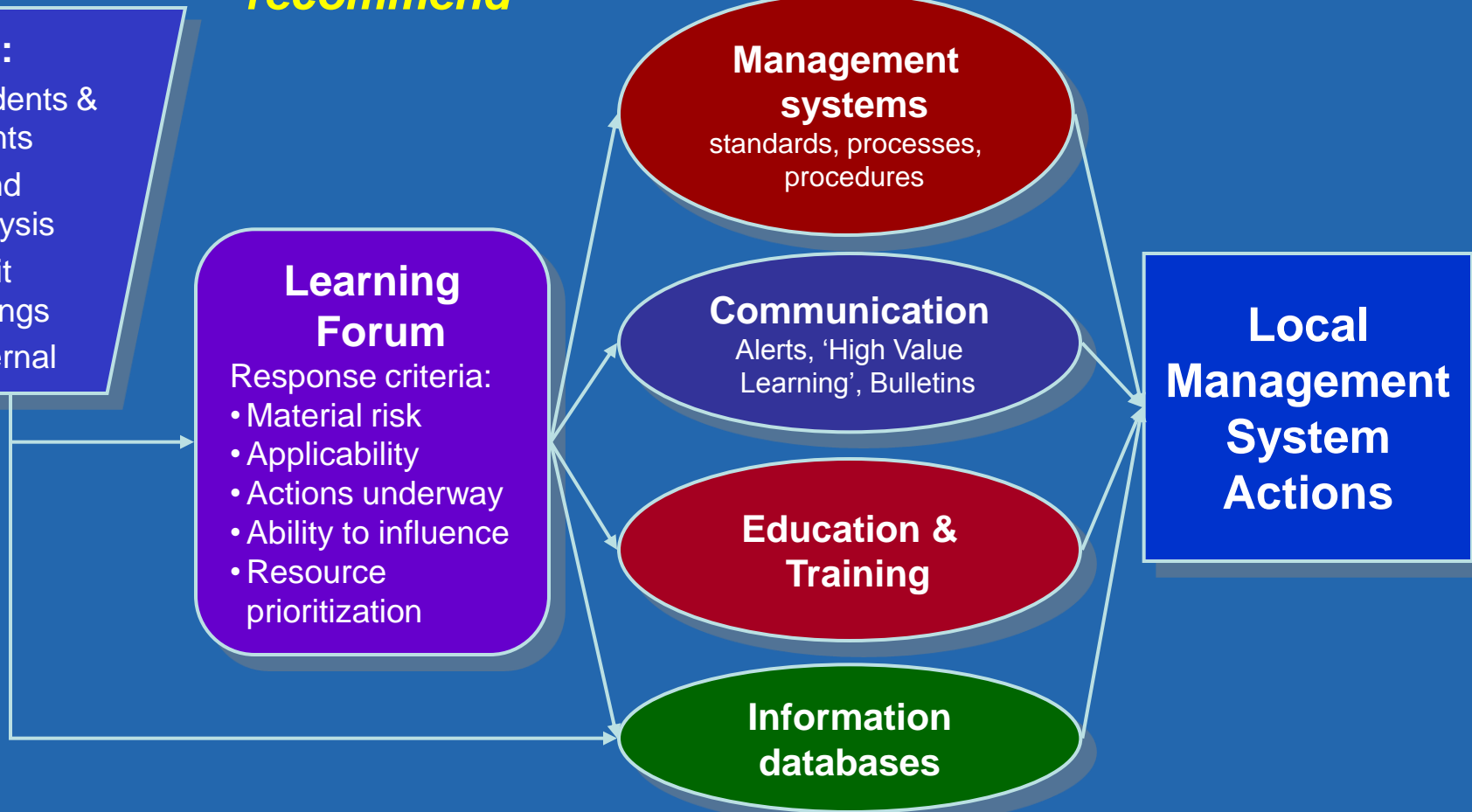
Alerts, 'High Value Learning', Bulletins

Education & Training

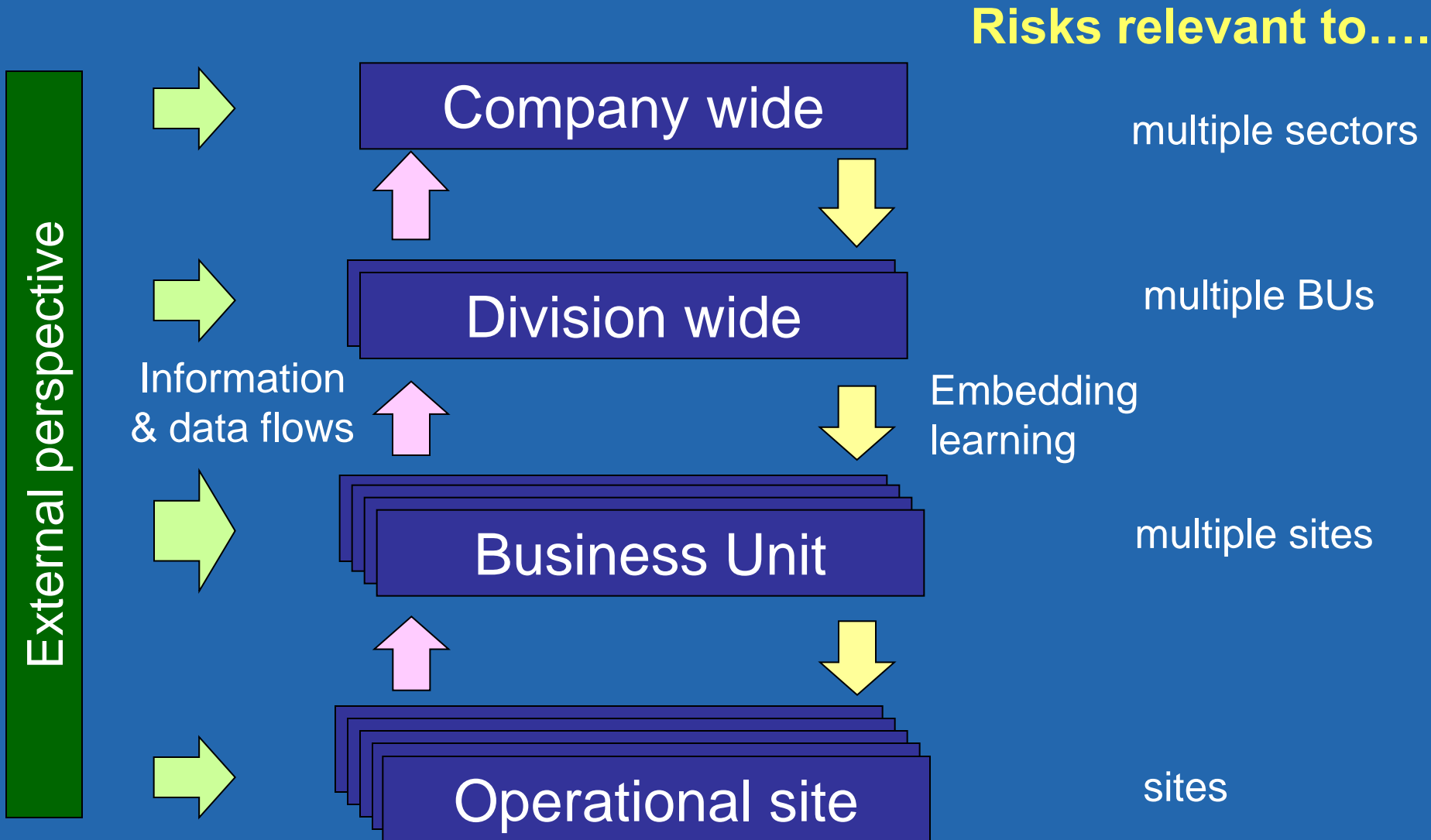
Information databases

Local response

Local Management System Actions



Enterprise wide learning



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safety**

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