Anomalies or Leading Indicators: System Failures and What to Do About Them

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Objective

• Share hypothesis...

• Get feedback from you.
Hypothesis

• Systems have gone from ‘simple’ and ‘stable’ to ‘complex’ and ‘dynamic’ (fast moving)

• Requires different approach to management.
  – More compartmentalization
  – Lower threshold, more frequent checks
Key Points

• Multiplicity of Failures across sectors

• Alternative explanations

• Appropriate Responses

• Question and Answer
Multiplicity of Failures

• IT
  – Citi, Lockheed Martin, Sony, IMF, PBS
• Natural Resources
  – BP
  – Upper Big Branch Coal Mine
• Toyota
Anomaly or Leading Indicator

Anomalous experience...
...needs technical fix.

‘Leading indicator’ ...
...needs managerial fix.
Anomaly or Leading Indicator

“Bolt out of the Blue”

• The system was the same system as before
• The way we managed the system was the same as before.
• Failure was unforeseen and unforeseeable.
Anomaly or Leading Indicator

The system was *different* than ever more.

- More ‘people’ and specialties involved.
- More organizations represented.
- More and novel materials.
- More and novel processes.

Things were more *complex* than ever before.
Anomaly or Leading Indicator

Challenge of complexity

More ‘elements’ connected via more linkages than ever before.

• Hard to ‘see’ structure.
• Hard to predict behavior.
Anomaly or Leading Indicator

Complexity: examples

• Autos

• Natural resources

• IT
Appropriate Responses

For *simple, stable*...

Structure... easy to visualize...
Situations... developed slowly.

...we could treat aberrations as ‘noise’ to high thresholds.
Appropriate Responses

For complex, dynamic,

Structure...hard to imagine.
Dynamics...hard to keep up.
Appropriate Responses

Compartmentalization

-- see the pieces and how the pieces relate.

High speed, low threshold diagnosis.
Discussion

• What do you think?????