Changing the Way New Products are Developed – Using Collaboration Tools to Improve ROI

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Workshop Objectives

- Highlight the challenges confronting New Product Development (NPD) organizations necessitating virtual collaboration
- Identify high-tech and low-tech collaboration methods successfully utilized by best-in-class NPD organizations
- Review the People, Process and Technology requirements for securing competitive advantage from your company's knowledge assets

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Presentation Premise

NPD organizations that effectively collaborate and share knowledge consistently achieve stronger results

A. They make better product selection decisions

B. They have a stronger up-front understanding of project risks and necessary mitigation strategies

C. They more effectively monitor development efforts, responding to problems and opportunities

D. They receive greater return on investments in physical and intellectual capital

Current Business Environment

- New Product Development (NPD) organizations are confronted with:
  - Increasingly complex technological challenges
  - Shortened product life cycles
  - Global competitive pressures to reduce costs
- "At many companies >30% of revenue comes from products released within the past 6 quarters"[1]
- For every four products that enter development, only one becomes a commercial success"[2]

1 O'Marah, "Open Letter to the Board: Where are your R&D Dollars Going" AMR Newsletter, February 2004

2 R.G. Cooper, Winning at New Products (Reading, MA, Perseus Books, 1993), p. 9.

Reasons for New Product Failures

1. Poor Marketing Research
2. Technical Problems
3. Bad Timing
4. Higher than anticipated Costs

Root Causes:

- Weak risk assessment -- untested assumptions
- Lack of available qualified resources
- Overly aggressive/optimistic schedules
- Reluctance to cancel projects

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Innovation Challenges

- Competing demands:
  - Push the technological envelope – “innovation on the critical path”
  - Reduce project risks which contribute to delays, re-work and higher costs
- Cross-functional, virtual NPD teams increasingly the norm
- Frequently NPD takes place concurrently with the customer as well as the customer’s customer

Requirements for NPD Success

- Well-defined and executed NPD process:
  - Cleary defined deliverables
  - Key technical and business requirements thoroughly assessed up-front
  - Active management involvement
  - Process for securing/prioritizing resources
- Technical roadmap aligning development and mfg requirements with internal and external capacity
- Multi-faceted collaboration embedded within NPD process

NPD Collaboration Requirements

- Formal strategy and methods to effectively leverage organization's technical and intellectual assets throughout development
- World wide, real-time knowledge-sharing accessible from multiple platforms
- Ability to securely collaborate with lead customers and/or vendors
- Focus on collaboration not merely effective communication
- Supportive culture and processes

Isn’t this just another fad?

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What's a Fad?

- Many tools and techniques once labeled "fads" are now the standard way work gets done at many leading companies:
  - Teams
  - TQM
  - JIT
  - DFM
- All of these practices can be misused, but when used appropriately they've provided benefits -- short-term competitive advantage and long-term survival

Business Example #1 – Background

- Founded in 1965, Analog Devices Inc. is a world leader in high performance signal processing solutions
- ADI develops and manufactures high performance integrated circuits used in analog, mixed-signal, and digital signal processing
- ADI is a multi-national Fortune 500 company with test and manufacturing facilities in the US, Europe and Asia

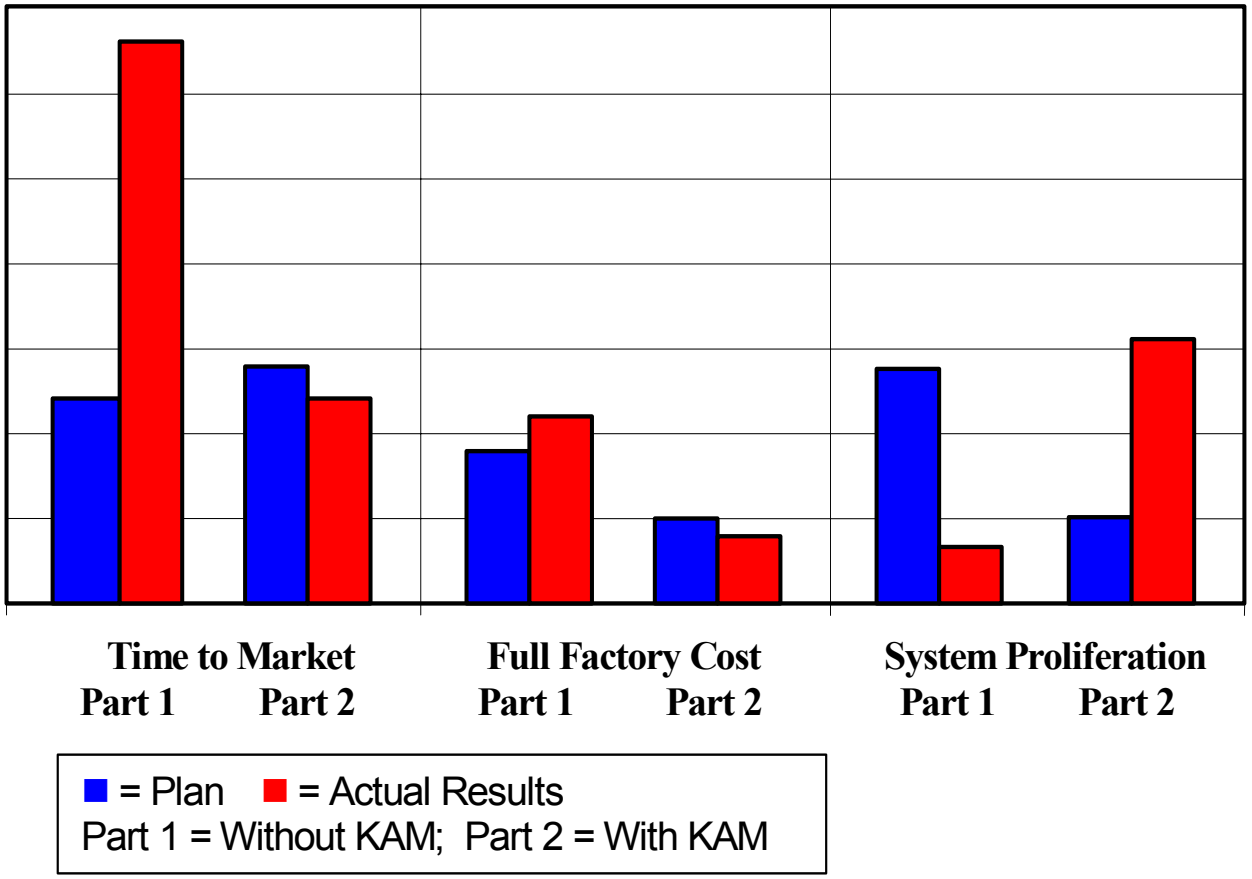
Business Example #1 – The Problem

- An Asian customer contracted for a custom part, with low cost & an aggressive schedule as critical requirements
- Previous projects for this customer had been “difficult”:
  - Projects suffered from frequent spec changes and unsynchronized revisions
  - Time zone lags produced delays in exchanging routine information and making decisions
  - These factors contributed to schedule slips and added costs, while tarnishing ADI’s reputation

Business Example # 1 – The Solution

- Created a project specific web site, containing the most up-to-date documentation, schematics, data sheets…
- Improved data management virtually eliminated errors associated with unsynchronized revisions and/or old data
- Linking a design work station to the intranet enabled engineers in US and Japan to analyze and discuss simulation results real-time
  - Gained increased understanding of the part's performance and impact of design changes
  - Accelerated the pace of decision-making

Business Example #1 - Results



Source: Bruss and Donnellan, “Sharing of Process Knowledge can result in gains in Product Development”, VISIONS, January 2005, pp 20 - 21

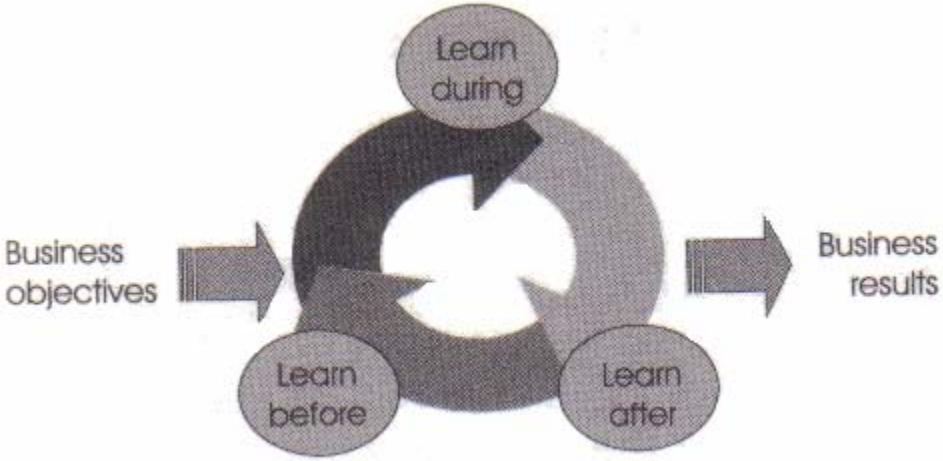
Additional Business Examples

- In June 1995, Ford launched an initiative to make it easier replicate best practices across its multi-national organization. To date:
  - Over 53 Communities of Practices have been formed
  - Resulting in 10,000+ replications/year
  - $1 billion of actual value added to the company
- Schlumberger launched InTouch system “to streamline knowledge sharing and remove the clutter in operations”
  - ROI after the first year of operations has been reported at $200m
- Boeing Aircraft and Missiles established a common repository of engineering drawings, resulting in:
  - Improved configuration control
  - Savings of $4.5 million.

Getting Off on the Right Foot

- Resist "KM Initiatives" – they often become ends in and of themselves
- Focus on key business processes
  - What are the "pain points" – where is improvement needed?
  - What are the key business metrics (e.g., lower costs, reduction in re-work, faster TTM)?
  - Can we more effectively share knowledge assets in pursuit of these goals?

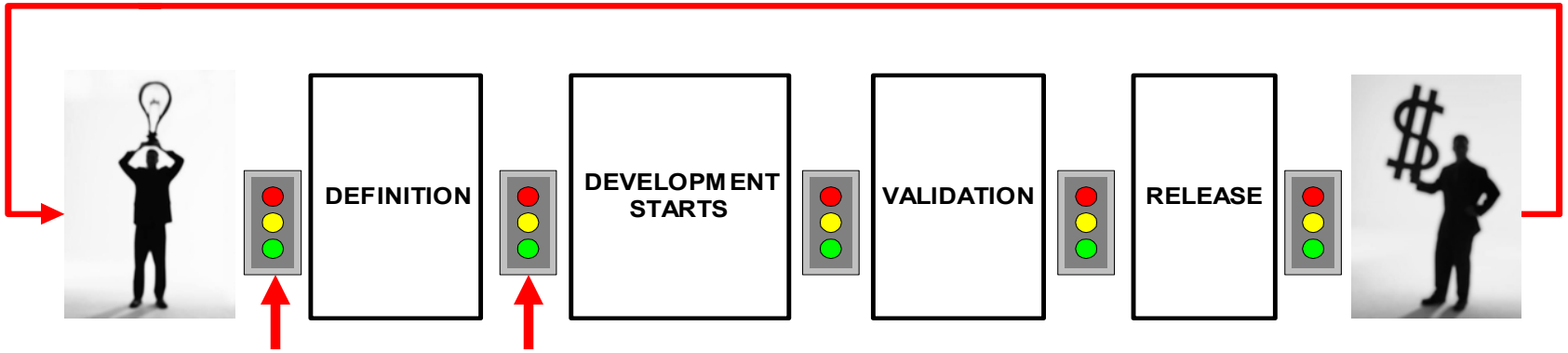
The Learning Cycle



Before, during and after a project there are opportunities to leverage the experience of others, and contribute to the organization's knowledge base

Source: Collison & Parcell – Learning to Fly, Capstone Pub., 2004

Integrating Collaboration into NPD



- Successful teams leverage existing organizational knowledge and expertise to reduce project risks, costs and TTM
- Along the way, these very same teams may create new knowledge
- Management's role:
  - Create a culture where collaboration both within and beyond the specific project team is the norm
  - Ask new teams how they plan to re-use existing technology and whether their plans reflect lessons learned – delay project approval for teams that haven't done their homework

Before Starting a Project

- Identify collaboration and knowledge re-use opportunities to apply in project planning
- Key questions:
  - Who has done this type of activity before? What can we learn from their experience?
  - Who are the company experts? How can we leverage their expertise?
  - Is there in-house knowledge we can effectively use?
    - Latest market and competitive data from the Sales organization
    - Customer feedback from Customer Service & Mfg
  - Can we re-use technology to reduce risks, time-to-market and development expenses?

During the Project

- Capture and share the data, as well as identify new learning needs
- Key questions:
  - Where do we need to improve? Who else might have experience/insight or re-usable technology we could leverage?
  - What have we learned which we want to apply going forward?
  - What have we learned that could benefit others? How do we share this knowledge? Are there process implications?

⇨ Don't wait for the project completion to capture and gain competitive benefit from project learnings!!

What is an After Action Review (AAR)?

- An AAR is a structured meeting that provides a simple but rigorous approach for analyzing the effectiveness of an event or action
- Developed by the U.S. Army, AAR's compare what actually occurred to what was planned
- Key benefits for the military are the ability to collect data from troops on the ground, which is:
  - Shared with other troops real-time
  - Used to revise military processes and procedures
  - Built into military training programs and simulations
- Used by such diverse companies as Chevron, Ford, Harley Davidson and Sprint

AAR Process

An AAR involves several key questions:

I. What were the desired outcomes?

II. Did you achieve the desired results?

III. What accounted for attaining the goal or for variances (+/-)?

IV. What did you learn?

V. What are next steps – for the team and for sharing/acting on learning outside of the team?

SGT York Program Operational Testing Daily After Action Reviews

- Daily reviews of progress
  - Structured test events each day with agreed corrections and scenario
  - Meet each day 5:00 – 6:00 PM (or until we were done!)
  - **Everyone** who had input invited to attend
  - No "side-bars"; all discussion open
  - Total openness; if you have any idea then share it.
  - Agree on and control any configuration changes and next day's objectives and scenarios

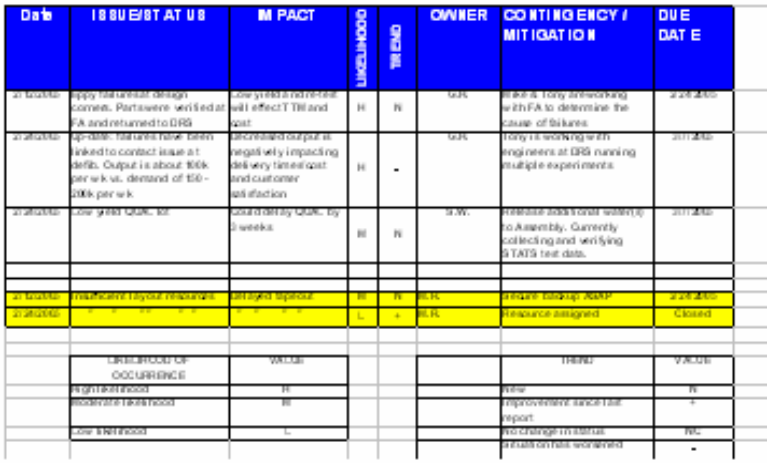
Source: Dick Power, Power Plans

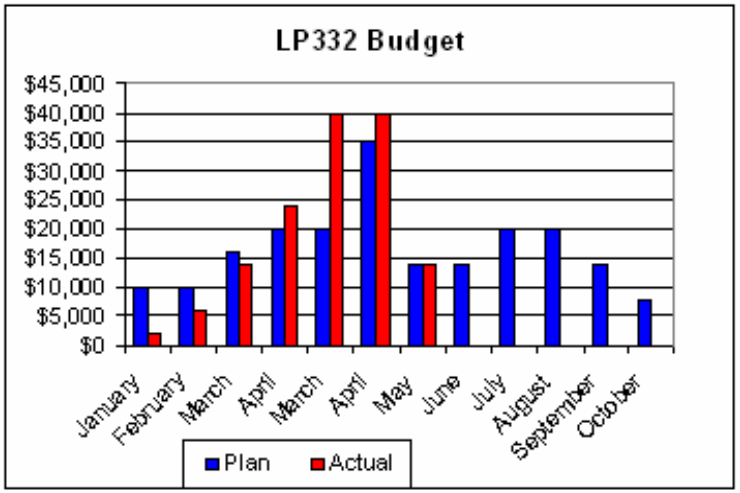
AAR as A Project Monitoring Template

LP332 6 wk Review

LP332 Last 6 Weeks (Did)	
Objective	**Results**
1. Resolve layout resource issue	1. Hired contractor from MDI
2. Determine the cause of Eppy failures at design corners	2. Failures have been linked to contact issues at Defib
3. Confirm customer power requirements	3. Customer would prefer 5 watt part, but would accept 7 watt part
Reasons for Results/Lessons Learned	
1. We had underestimated layout resource requirements. Resource gap should be been identified prior to product launch	
2. Tony is working with engineers at DRS running multiple experiments. An unanswered question is why this problem wasn't picked up during pre-tapeout simulations	
3. Although Marketing kept insisting customer wouldn't accept a part greater than 5 watts, this turned out not to be the case. We should have confirmed this earlier on.	

LP332 Risk Management Matrix





LP332 Next 6 Weeks (Do)	
Objective	**Results**
1. Complete experiments at DRS to determine cause of contact issues at Defib	1.
2. Discuss with customer X-grade shipments to compensate for dalyed samples	2.
3. Monitor yield at Qual	3.
Reasons for Results/Lessons Learned	
1.	
2.	
3.	

After the Project

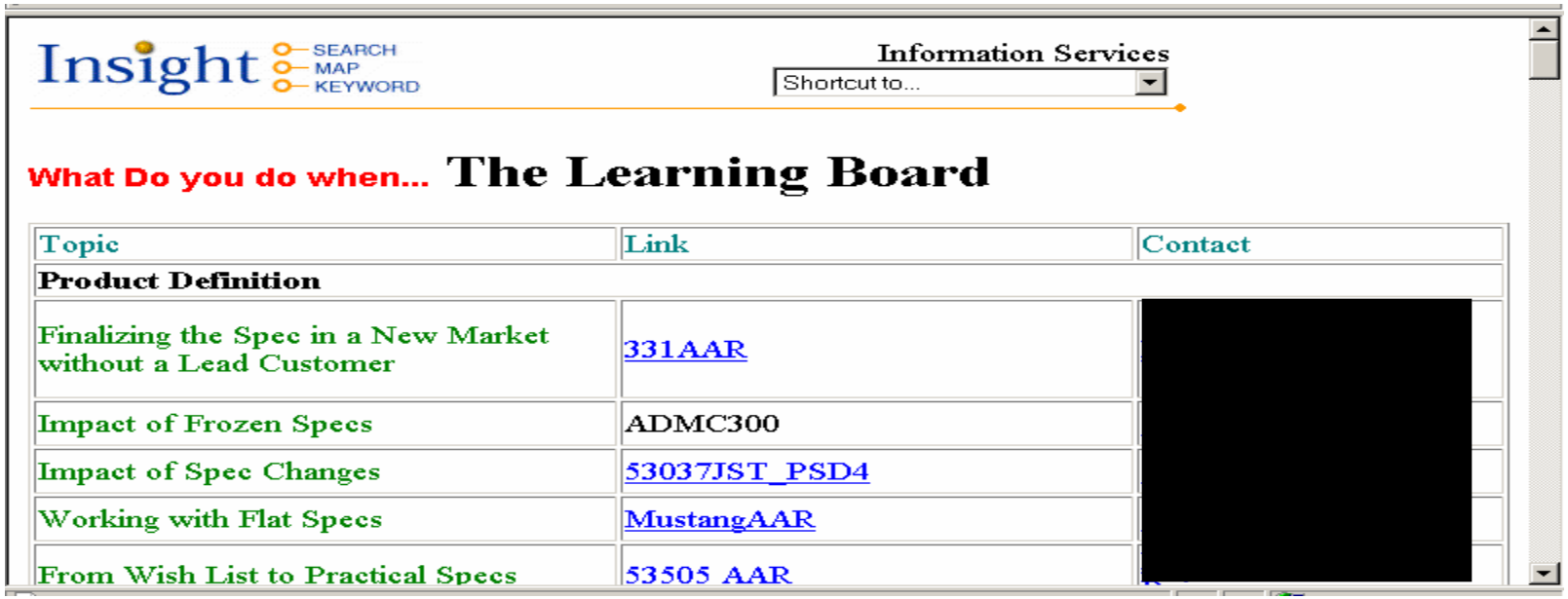
- Before the team disbands, formally reflect on final activities and the project as a whole – identify how learning will be captured, shared and applied
- Key questions:
  - What have we learned which we want to apply to future projects?
  - In hindsight, what should we have done differently?
  - What have we learned that can benefit others in the organization?

Capturing & Sharing the Learning

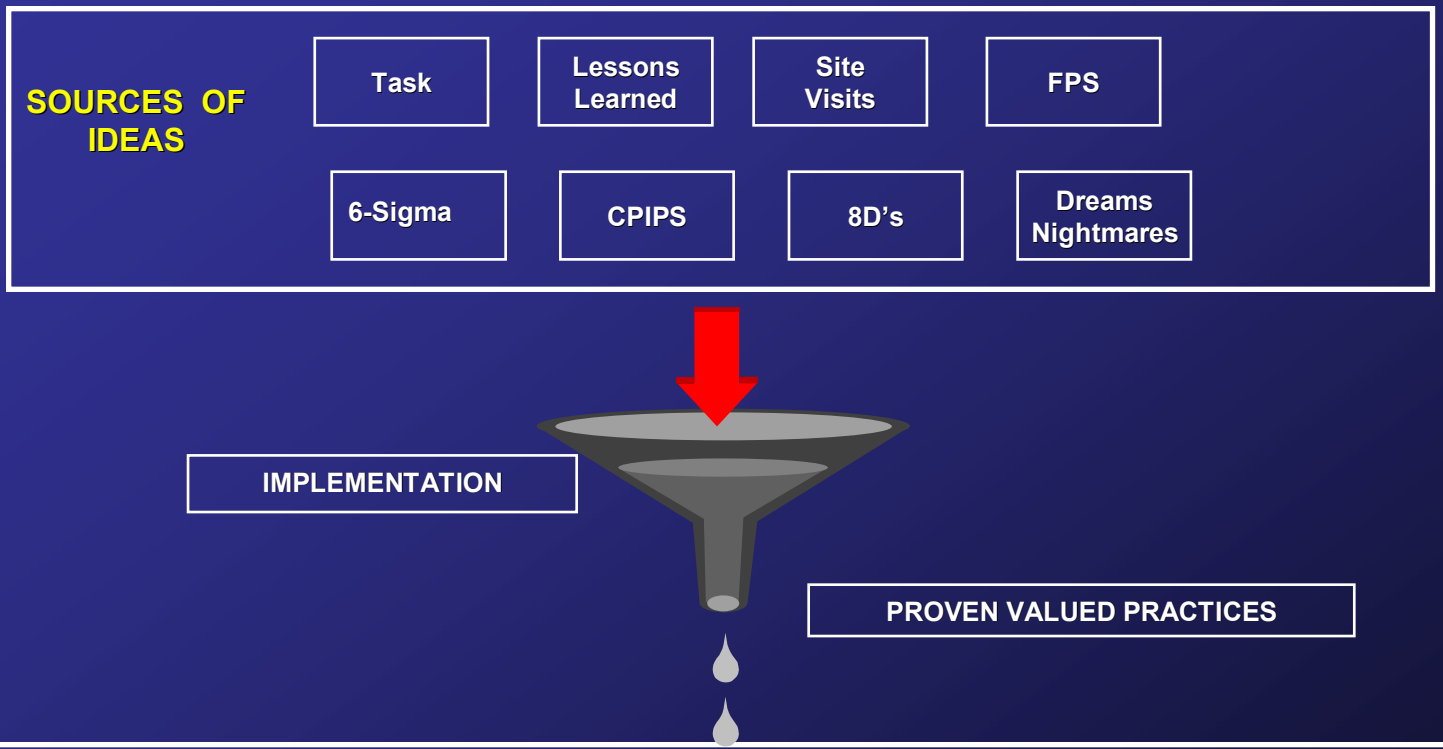
- Short term strategies:
  - Present results at a brown bag/functional forums
  - Post results on the web, write an article, storyboards…
  - Up-date info in Expert Locator system
  - Resource plan should explicitly involve original team members with derivatives/technology re-use initiatives:
    - Extended team members
    - Mentors/coaches
    - Technical Review Board members

Capturing & Sharing the Learning

- Longer term strategies:
  - Keep a copy of AAR with team materials (e.g., team folder, team website)
  - Develop and maintain project history databases, “lessons learned” library – paper or web enabled
  - Look for opportunities to integrate “lessons learned” into standard work processes
  - Build into standard work process requirement that at the start of a new project, teams review “lessons learned”, consult experienced colleagues


Insight
SEARCH
MAP
KEYWORD
Information Services
Shortcut to...
What Do you do when... The Learning Board
Topic
Link
Contact
Product Definition
Finalizing the Spec in a New Market without a Lead Customer
331AAR
Impact of Frozen Specs
ADMC300
Impact of Spec Changes
53037JST_PSD4
Working with Flat Specs
MustangAAR
From Wish List to Practical Specs
53505 AAR

Selection and Replication of Proven Practices at Ford



[redacted] Catering

Function Log

1. Event: Date: JO#
2. Facility Name & Address:
3. Type of Facility: Conference Center __ Hall ___ Hotel ___ Religious ___ Other:

[redacted]

9. What problems/difficulties, if any, did you encounter?
10. Impact – on customers, event, facility and/or staff?
11. How was the problem resolved?
12. What further action, if any, is required?
13. How can we prevent this from happening again?

Completed by: _____

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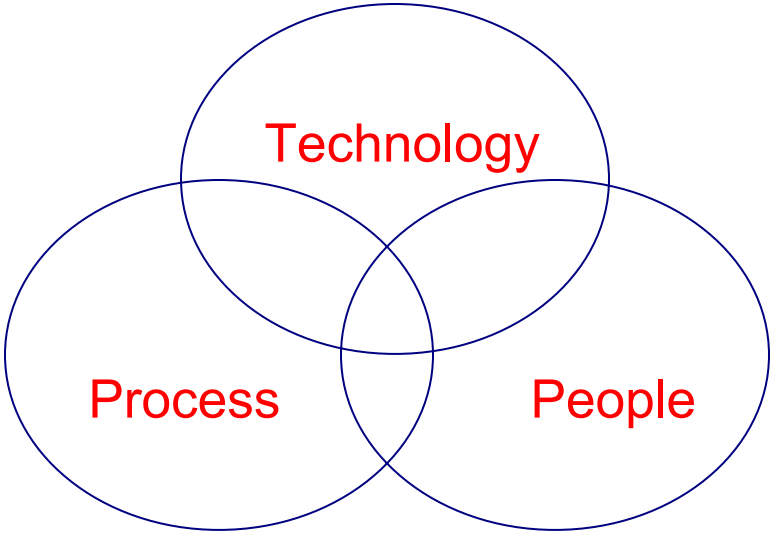
Collaboration Success Requirements



- Technology is an enabler
- Even more important is attention to people and process issues

People/Culture Requirements

- Does your culture value sharing of information, collaboration and mutual learning?
- Does Senior Management role model these behaviors?
- Are your incentive programs aligned with the goals of collaboration and re-use?
- Do success stories get publicized?
- Do you provide physical and virtual collaboration space, as well as, time to engage in these activities?
- Do you facilitate networking (e.g., expert locator systems, functional forums, blogs, communities of practice…)

Process Requirements

- Are collaboration, re-use and learning considered "the standard way work get's done around here"?
- Does the process require on-going communication and collaboration between R&D, S&M and Mfg?
- Is technology re-use a requirement? Is it measured?
- Are there formal learning points built into the process?
  - Is organizational learning systematically captured and transformed into "best practices"?
  - Are "best practices" revised/customized and used?

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Technology Requirements

- Does your technology support collaboration?
  - Is it perceived as user friendly?
  - Are information and tools easily accessible from multiple points of entry – worldwide, multiple platforms and in multiple formats?
  - Can development teams securely communicate and collaborate with external partners
  - Are they organized in the same flow as required by users?

Common NPD Collaboration Tools

- Most common – team e-mail lists, may feature e-mail archiving and calendar/schedule tools
- Team web site
  - Policies and procedures and up-dates
  - Links to document & tool repositories (e.g., text, data, schematics, test programs, cell libraries)
  - Vendor/sub-contractor links
  - Templates
- Project mgnt tools ranging from Microsoft Project to Dashboards
- Central source for latest team documents, with revision control & tracking
- Conferencing tools (e.g., (audio, video, white boarding, etc.) and voting
- Discussion databases, blogs and Communities of Practice
- Lessons Learned libraries

One Size Doesn't Fit All

Same Time, Same Place

- Electronic whiteboards
- Electronic meeting rooms
- Resources
  - Document repository
  - Calendaring/scheduling
  - Project/task management
  - Voting tools

Same Time, Different Place

- E-mail
- Video and teleconferencing, net meetings
- Application/whiteboard sharing: view/create
- File transfer
- Rotating meeting sites

Different Time, Same Place

- Desktop computers, kiosks
- Blackboards
- Group rooms
- Overlapping resources

Different Time, Different Place

- Discussion databases
- E-mail, voice mail, Fax…
- News feeds
- Regular meetings
- Up-front team building

In Conclusion

The demands of New Product Development are such that collaboration activities cannot be seen as additional work, but rather must become the standard manner in which work gets done