



Making the Transition to Lean Product Development

Eric Rebentisch
Massachusetts Institute of Technology
January 21, 2009

- **Lean PD transformation framework**
- **PD organization transformation case studies**
- **Survey of adoption of lean PD practices**
- **Survey of high-performance PD practices**
- **The broader PD research portfolio**

Developing a Guide for Creating Lean PD Organizations

- **Background**: What is lean product development (beyond Toyota practices), and how can a PD organization transform from average to lean?
- **Research Objective**: Study and understand lean product development systems attributes and their evolution
- **Approach**: Draw on a diverse array of research and implementation knowledge resources
 - Books, journal articles, student thesis research, surveys case studies, benchmarking exercises, application experience and action research
- **Outcome**: A guide to creating lean PD systems
 - Provide PD system managers insights for prioritizing future improvement efforts and assessing progress along the way
 - Not just a(nother) list of lean tools

Framework for Transformation of Lean PD Systems

Emergent

Motivations: Problem-solving (e.g., cure programs, cut costs)

Change Orientation: Reliance primarily on expert change agents (many external)

Framework induced from existing research findings and observations

Maturing

Motivations: Changing system behaviors (e.g., address fundamental changes in resources, relationships)

Change Orientation: Emphasis on development of all employees as change agents; top-down, middle-across, bottom-up system change

Accelerating

Motivations: expand system capabilities for growth (e.g., high throughput, market expansion)

Change Orientation: Expand/exploit capacity/capabilities across enterprise and extended enterprise network (e.g., partners/suppliers)

In-Depth Case Studies Help Define Transformation Framework

- **Understand stages of lean progress in PD systems**
 - Study over longer period of time—identify trends and practices *enabling* lean PD implementation
 - Roles of leadership, organization structure, work design, tools, formal improvement methods, etc. in change
 - Assess changes in behaviors and outcomes that persist
- **One case study underway currently**
 - UTC ACE journey at Pratt & Whitney TMC Engineering
 - More studies as opportunities present themselves
 - Many LAI members have been implementing lean in their PD systems over a number of years now, and represent a potential population for additional case studies

Lean PD Benchmarking Events Surface Implementation Issues

- **LAI member suggestion: “Let’s benchmark each other and share learning about lean PD implementation”**
- **2 successful events this year**
 - Boeing Space and Intelligence Systems, El Segundo (Feb 2008)
 - Raytheon Missile Systems, Tucson (June 2008)
- **Sharing experiences in the areas of:**
 - Visual workflow, Lean project management
 - Lean Innovation
- **Desire to use web-based approaches to maximize peer-to-peer interactions, minimize travel costs**

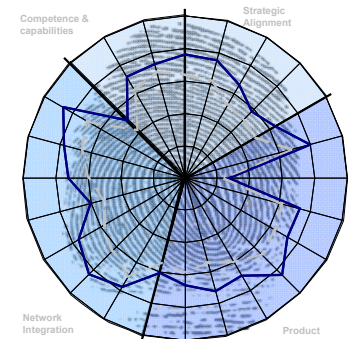


Survey Assesses Extent of Implementation of *Lean Practices*

- **Survey of 11 principal lean PD practices and their implementation extent and sequence**
- **Joint with IFU (at the Technical University of Braunschweig, Germany)**
 - **Sample of European partner firms**
- **Assess the degree of penetration of lean practices in PD organizations and issues with implementation**
- **TUB student Joern Hoppmann expecting to complete study June 2009**

Investigating the Impact of a Wide Range of PD Practices

- Collaborative research effort to advance the understanding of practices in product development and how they correlate to overall company performance
- Developed the “fingerprint diagnostic” jointly with McKinsey to provide feedback on products’ performance relative to peers and across industries
- The diagnostic also provides a prioritized set of improvement levers based on specific product development environment, with an impact assessment and a roadmap to assess progress
- Global sample of PD organizations



- **Broad areas of focus: Right Product, Right Process, and Organizational Capabilities**
- **Multiple research methods develop rich understanding**
 - **Cross-functional interviews of senior leaders – Product Development, Operations, Marketing**
 - **Survey of project teams**
 - **Survey has 143 questions about PD practices and 17 questions about project outcomes, plus numerous firm-level financial measures**
 - **Interviews with selected project team members and functional leaders**
 - **Assessment of key performance metrics**
- **~ 100 observations so far from global PD organizations**
- **MIT SDM (SM) student Nisheeth Gupta performing analysis and will complete thesis May 2009**
 - **Jointly-published articles with McKinsey colleagues**

Multiple Studies Enhance Understanding of PD System Design and Transformation

- **Combination of studies examines challenge of Lean PD system design and management from multiple perspectives**
 - **Surveys and benchmarking enhances scope and generalizability of observations—what to do**
 - **Case studies provide rich insights into management choices and actions—how to do it**

Survey of use of broad range of PD practices across firms

Survey of implementation of Lean PD practices across firms

Case studies of
change in PD systems

Case studies of
change in PD systems

Case studies of
change in PD systems

LAI Lean PD Research Portfolio Addresses Additional Topics

Lean PD Enterprise Process Design

- **Sid Rupani—Creating adaptive, efficient PD enterprise process architectures**
- **João Castro—Coordination/Alignment for flow in PD systems**

Developing Portfolios of Complex Products—Government Acquisition

- **Lt Col Dan Gillespie—Factors that enable innovation in new product and mission requirements**
- **Maj Robb Wirthlin—Modeling the Acquisition system to understand high-leverage processes for improvement**
- **Lt Col Dave Long—Identifying opportunities for commonality and product family architectures across multiple platforms/systems**