Successfully Introducing Lean and Agile

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Vector Consulting Services
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Performance is Vital...

80% of developments in the automotive sector overrun their budget. (Automotive News)

Outsourcing of IT-tasks reduced development costs in IT-companies on annual basis by 5%. (WTO, OECD)

Improvement of the engineering maturity saves 34% costs in average. (SEI)

Customers dictate price reductions over 10% per year. (IT weekly)

Cycle time improved by factor seven, productivity by factor six. (HP printer systems)

Development time for diesel engines reduced from 50 to 2 weeks. (Cummins)
Plan-driven Development

What is it?
- Development with focus on systematic analysis, planning and execution throughout the entire life-cycle.

Value
- Systematic approach to manage complexity
- Match with legislative obligations and liability control
- Easy to add new suppliers and rules

Risks
- Formalism reduces motivation
- Administration hinders innovation
- Expensive rework cycles
Agile Development

What is it?

- Development with focus on flexibility, trust and people, without any as unnecessary perceived overheads.

Value

- Flexibility with focus on what is immediately paid for
- Development with small incremental steps
- Light and subtle control

Risks

- Failure risk for large distributed organizations
- Some principles don’t always apply (e.g., customer in project) or don’t scale up to systems and products / services
Agile Principles

- Deliver something useful to the client.
- Include customers to the team. Check what they value.
- Build competent, collaborative teams.
- Meet and talk. Enable team decision making.
- Use short time boxed iterations to quickly deliver features.
- Focus on delivery activities, continuously integrate your system.
- Establish guiding practices to allow teams own decision-making.

Agile principles are not new, but combined with a strong guiding vision: Avoid overheads, put people in the front.
**Example:** Scrum

- **Product Backlog**: As prioritized by Product Owner
- **Sprint Backlog**: Backlog tasks expanded by team
- **Daily Scrum Meeting**: 24 hours
- **15 or 30 days**
- **Potentially Shippable Product Increment**
Lean Development

What is it?

- Development with end-to-end focus on creating value for the customer, eliminating waste, optimizing value streams, empowering people and continuously improving.

Value

- Clear focus on creating customer value
- Teams plan, commit and thus take ownership for results
- Short cycle times, less rework

Risks

- Deliver rather than managing uncertainty
- Cut rather than create value
Common Misinterpretations of Lean

Lean ≠ Cost cutting  
Lean = Increase Value

Lean ≠ Production centric  
Lean = Culture Change – applicable for R&D

Lean ≠ Model  
Lean = Guiding principles

Lean ≠ Final state  
Lean = Journey
Lean Can be Enriched by Agile and Six Sigma Practices

Strategy → Concept → Market entry → Development → Evolution

Lean
Agile
Six Sigma
A Brief History of Lean

Evolution towards Lean

1950s
Deming: Quality, people, PDCA
Toyota: Birth of lean production

1970
Toyota Production System

1990
“The Machine that changed the world”, Womack and Jones, MIT:
Principles can be transferred

1995
Lean production applied e.g. Porsche Turnaround

2005
Lean development

Lean Culture

Lean Management

Lean Product Development
## Principles: From Craft to Production to Lean

<table>
<thead>
<tr>
<th></th>
<th>Craft</th>
<th>Mass production (Taylor)</th>
<th>Lean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall principle</strong></td>
<td>Mastery</td>
<td>Efficiency</td>
<td>Value</td>
</tr>
<tr>
<td><strong>Business strategy</strong></td>
<td>Customization</td>
<td>Economies of scale and automation</td>
<td>Create value for the customer</td>
</tr>
<tr>
<td><strong>Quality</strong></td>
<td>Integration (part of the craft)</td>
<td>Inspection (a second stage after production)</td>
<td>Eliminate waste</td>
</tr>
<tr>
<td><strong>Operation</strong></td>
<td>Single items</td>
<td>Batch and queue</td>
<td>Optimize value streams</td>
</tr>
<tr>
<td><strong>People management</strong></td>
<td>Plan and do</td>
<td>Command and control</td>
<td>Empower people</td>
</tr>
<tr>
<td><strong>Improvement</strong></td>
<td>Master-driven continuous improvement</td>
<td>Expert-driven periodic Improvement</td>
<td>Continuously improve</td>
</tr>
</tbody>
</table>

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Principles

- Continuously improve
- Create value for the customer
- Empower people
- Eliminate waste
- Optimize value streams
Example: Create Value for the Customer
Example: Eliminate Waste

Waste in product development

- Partially Done Work
- Frequent requirement changes
- Rework
- Extra Features
- Task Switching
- Waiting for people or delayed deliveries
- Defects detected too late

Example: Set-based Design

Explore by mapping design sub-spaces

Innovate and optimize without risk by narrowing solution alternatives.
Example: Optimize Value Streams

- Reduce capacity load
  - Allow some time to cope with uncertainties
  - Apply priorities rather than buffers
- Steady rate of arrival
  - Develop in short iterations with business impact
  - Use time-box principle
- Small work packages
  - Plan within team
  - Develop and integrate features individually
- Eliminate Bottlenecks
  - Teams commit and deliver
  - Use Scrum in teams, projects

Example: Dependency Structure Matrix (DSM)
Example: Empower People

Set up a **product core team** that owns the product and that drives the product across releases

- **Product manager** (responsible for business case and overall profitability)
- **Marketing / sales manager** (responsible for revenues)
- **R&D / project manager** (responsible for development project success)
- **Finance / operations manager** (responsible for allocating appropriate resources)

**Empowerment means accountability for results**
Example: Continuously Improve

- What is the value of your products as perceived by markets?
- Perform and update your own SWOT
- Align your portfolio and technology assets accordingly
**A Case for Change: Lessons Learned – Transformation**

**Combine different change needs**
- Cost reduction alone would not have energized people
- The direct client feedback and external benchmark energized senior management and teams – and aligned them in urgency, goals and vision
- Methodology (lean development) must be trained, but with criteria to select, tailor, adapt...

**Motivate with pull and push**
- Pull: Lean development as an internally new and “modern” principle attracted people
- Pull: Providing some initial guidance and then let teams work on “their way” for some time helped to get buy-in
- Push: Performance results and change effects were measured periodically after the initial set-up phase
A Case for Change: Lessons Learned – Lean Effects

- Challenge teams to apply the wisdom of lean thinking to their practices
  - Initially use benchmarks and collective wisdom of experts and practitioners
  - Produce lean enablers: a checklist of do's and don'ts of SE
  - Make engineering as value driven and as waste free as possible
  - Use principles, measure impact, decide what works

- Don’t take lean and agile principles as a mandatory one size fits all process
  - Improve awareness of best practices among all stakeholders
  - If some Lean enablers don’t work, this is not a reason yet to generally reject or resist them.
  - Keep processes lean. Don’t repeat information considered sound, but lacking Lean thinking
Conclusions

- Apply the **five Lean principles**
  - Value focus, waste elimination, workflow optimization, empowered teams, continuous learning
  - Do not copy Toyota or Apple. Learn from principles.
- **Focus on value** – in all your R&D and organization culture
  - What are business needs?
  - What problems need to be solved?
  - What are the real root causes (not the symptoms)?
  - State a compelling future vision
- Address Lean transformation as a professional **change project**

My own simple law for lean development: **RACE**

Reduce accidents and control essence
Lean Thinking: Banish Waste And Create Wealth In Your Corporation

James P. Womack, Daniel T. Jones

Simon & Schuster, 2003

Following on from their book, The Machine that Changed the World, Womack and Jones have developed their ideas further with Lean Thinking. They develop their ideas by suggesting the application of lean thinking to the whole product cycle, from suppliers to customers. Taking the travel industry as an example, the authors show how their methods could eliminate long queues and waiting times for customers. Useful overview with some examples from various industries, but not much on R&D.
This special issue addresses lean software development. What principles deliver value? How are they introduced to best manage change?

It provides a practical tutorial and concrete industry case studies from companies like Siemens, universities such as MIT and Carnegie Mellon, and industries such as Healthcare, IT etc. Hands-on and for each practitioner.

IEEE Software Special Issue on Lean Software Development

Christof Ebert, Guest editor

IEEE, 2012

www.computer.org/portal/web/computingnow/software
Global Software and IT

Christof Ebert


Summary of the author’s first-hand experience and expertise, this book offers a proven framework for global software engineering.

"This book stands out as the best source of information on distributed software development. Seldom do we see a book with the concepts completely backed by industry experiences and views. Software developers and managers benefit from the broad case studies."

- S M Balasubramaniyan, Vice President, Wipro Technologies
Thank YOU for participating!

Have success with Lean development and management!

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