How to Increase Project Success through Scrum

Jeff Sutherland
Co-creator of Scrum
Point #1 68% of projects fail
Standish Group Data

<table>
<thead>
<tr>
<th>Year</th>
<th>Successful</th>
<th>Challenged</th>
<th>Failed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>16%</td>
<td>53%</td>
<td>31%</td>
</tr>
<tr>
<td>1996</td>
<td>27%</td>
<td>33%</td>
<td>40%</td>
</tr>
<tr>
<td>1998</td>
<td>26%</td>
<td>46%</td>
<td>28%</td>
</tr>
<tr>
<td>2000</td>
<td>29%</td>
<td>49%</td>
<td>23%</td>
</tr>
<tr>
<td>2002</td>
<td>34%</td>
<td>51%</td>
<td>15%</td>
</tr>
<tr>
<td>2004</td>
<td>29%</td>
<td>53%</td>
<td>18%</td>
</tr>
<tr>
<td>2006</td>
<td>35%</td>
<td>46%</td>
<td>19%</td>
</tr>
<tr>
<td>2009</td>
<td>32%</td>
<td>44%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Projects late
Management upset
Developers under pressure
Customers unhappy
Point #2 Project Managers don’t understand basic laws of SW development

- Uncertainty is inherent and inevitable
- Software development is an “empirical process”
  Change occurs during the development requires and empirical process of control
  Need to “watch” the project’s progress from beginning to end
- Waterfall “views” development as a predictive process
  Making a plan at the beginning and relaying on the plan throughout
Point #3 Need radical change

- Japanese manufacturing – W. Edwards Deming
- Team process – Silicon Valley entrepreneurs
- Micro enterprise development

Process innovation & productivity research

- Alan Kay & Xerox PARC
- Takeuchi and Nonaka – knowledge generation
- IBM Surgical Team (Frederick Brooks – Mythical Man Month)
- Jim Coplien – ATT Bell Labs *Pasteur Project* (Borland)
- Complex adaptive systems..
Point #4 Scrum can help

Learned about innovation from Xerox PARC
One team in the ’80s invented all this stuff
• Personal workstation
• Mouse
• Ethernet
• Windows Interface
• Laser Printer
• Smalltalk
Alan Kay’s Innovation Strategy

- **Incremental** – NO
  Specialized with small improvements
- **Cross Discipline** – NO
  Jump to and incorporate what others are doing
- **Extreme data point** – ONLY LOOK AT THIS!
  Look for “data points” off the plate (what is currently impossible)

\[ X \]

In a groove
Research (good references)

• Looked at Projects *off the chart*
  - IBM Surgical teams, F. Brooks *Mythical Man Month*
    High risk, not scalable
  - *New New Product Development Team*, Takeuchi & Nonaka
    Best teams worldwide, rugby teams = Scrum
  - *Coplien Borland / Pasteur Project*
    Daily meetings

• **Scrum**: A Pattern Language for Hyperproductive Software Development

• Every team can achieve hyperproductivity
  “*Shock Therapy: A Bootstrap for a Hyper-Productive Scrum*”, Sutherland, Downey & Granvik, 2009
Point #5  SCRUM is Simple

Artifacts
- Product Backlog
- Sprint Backlog
- Burndown Charts

Meetings
- Sprint Planning
- Daily Meeting
- Sprint Review

Roles
- Product Owner
- Scrum Master
- Team
Burndown Chart

This vertical axis shows the amount of work to complete. In this example, the iteration begins with 100 units of work.

The Blue Line represents actual work "done".

This Red Line is the Velocity, it represents the estimated rate of work in the Iteration.

The dates run across the horizontal axis.

Gantt Charts Too difficult to Keep current
Team Performance

- High performance with daily meetings with few roles ($7 \pm 2$)
- Communication broken for large teams, many roles

IBM Rational Projects: 27 roles
Scrum avoids scaling problems

- 500 same size projects, different teams
- As team size increases, project costs increase
- For very large teams, time to complete increases as well

Evidence of *Brook’s Law*:

Adding people late to a project makes it later
Scrum – Linearly Scalable

1,500 People in a Single Scrum

Scrum of Scrums
Point #6 Scrum is Everywhere

• Scrum and Scrum variants the most common of the Agile methodologies being used

• Sample: 4,770 participants in 91 countries

  58% Scrum
  17% Scrum / XP Hybrid
  5% Custom Hybrid
  4% Other
  4% XP
  3% Don't Know
  3% Scrumban
  2% Lean
  2% Feature Driven Development (FDD)
  2% Agile UP
Point #7 – Scrum is different

Key characteristics (based on complex adaptive systems):

• Self organization
• No single point of control
• Interdisciplinary teams
• Emergent behavior
• Outcomes emerge with high dependence on relationship and context
• Team performance far greater than the sum of individuals (synergy)
Scrum is value driven – not plan driven

• Empower teams to deliver more software earlier with higher quality
• Demo working features to customer early and often – customer can inspect progress and prioritize change
• Deliver exactly what the client wants by directly involving the customer in the process
• Provide maximum business value to the customer by responding to changing priorities in real time
Point #8 – Scrum gets results even if not done perfectly

Faster, Better, Cooler!

Scrum
350% better
50 teams

ScrumBut
35% better
200 teams
Saved $350M/yr

Waterfall teams
Point #9 SCRUM changes your company

**BUREAUCRACY**
- Rigid rule enforcement
- Extensive written rules & procedures
- Hierarchy controls

**LEADERSHIP**
- Empowered employees
- Rules & procedures as enabling tools
- Hierarchy supports organizational learning

**AUTOCRACY**
- Top down control
- Minimum rules & procedures
- Hierarchy controls

**ORGANIC**
- Empowered employees
- Minimum rules & procedures
- Little hierarchy

**COERCIVE**

**EMPOWERING**

---

*Image: THE TOYOTA WAY*
Scrum breaks down command & control structure

- Emergent strategy self-organizes through local actions
  - Distributed cognition and actions
- Scrum team must be allowed to self-organize
  - Autonomous
  - Self-motivated
  - Transcendent (team goals over personal goals)
  - Cross-fertilization (no one person specializes)
- Team chooses own work
  - Individuals manage their own work
  - Management gets out of the way
Point #10 – Managers become leaders

- Leaders can find and utilize spontaneously formed **BA**
  Building teams with the knowledge to create the product
  By creating environments where this happens spontaneously
- Leaders can build **BA** by providing space interactions
  - Physical space such as meeting rooms
  - Cyberspace such as networks
  - Mental space such as common goals
- Fostering trust and commitment forms the foundation of knowledge creation (self-organization) – they can count on one another

Good companies have “servant leaders”

- **SCRUM** is based on **TRUTH, TRANSPARENCY, COMMITMENT** and **TRUST**
The Concept of **BA**

- Dynamic interaction of individuals and organization creates a synthesis in the form of a self-organizing team
- Provides a shared context in which individuals can interact with each other
- Team members create new points of view and resolve contradictions through dialogue
- **BA** is shared context in motion where knowledge as a stream of meaning emerges
- Emergent knowledge codified into working software self-organizes into a product
Point #11 – Management needs training

LEAN vs. TRADITIONAL

#1 BANKRUPT
3 Pillars of LEAN

• MURI – overburden (invisible cause of waste)
• MURA – unevenness (invisible cause of waste)
• MUDA – visible waste

“Most managers in America think that’s their job, push people around, give them a hard time, be demanding, change their priorities, make them work late – work weekends…”
Energy of **BA** is given by its self-organizing nature

- **BA** needs to be “energized” with its own intention, direction, interest, or mission to be effective
- Leaders step back: providing autonomy, creative chaos, redundancy, requisite variety, love, care, trust and commitment
- Demanding goals and time pressure facilitate performance
- Equal access to information at all levels is critical
- *ScrumMaster and management must “energize” **BA** through facilitating collocation, dynamic interaction, face-to-face communication, transparency, and audacious goals*
Local action forces self-organization

- Individual self-organizes work
- Team self-organizes around goals
- Architecture self-organizes around working code
- Product emerges through adaptive iterations
- Requires participative approach as opposed to authoritative approach
- Flat organization structure

Teams are given aggressive goals
Management steps back
Gets teams what they need
Removes impediments
Steps back…
Point #12 Going from Good to Great with Scrum

“What should you expect if Scrum is implemented fairly well”

CMMI Company

Level 1 No standard process
Level 2 Start to get standard process
Level 3 Institutionalize process across company
Level 4 Drive company with data collected from these processes
Level 5 Use data to self tune and do performance improvement

SYSTEMATIC

Company in Denmark (large defense projects)
Waterfall to … Scrum
At least 7 years from Level 1 to CMMI Level 5

http://www.systematic.com/
**Scrum and Lean – Systematic**

7 years to move from Level 1 to Level 5

*Scrum brings about Lean*

Tools can be divided in three dimensions

<table>
<thead>
<tr>
<th>VALUE</th>
<th>FLOW</th>
<th>PULL</th>
<th>PERFECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENGINEERING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P6 Build Integrity</td>
<td>P2 Amplify learning</td>
<td>P2 Amplify Learning</td>
<td>P6 Build Integrity in</td>
</tr>
<tr>
<td>T19 Refactoring</td>
<td>T5 Synchronization</td>
<td>T3 Feedback</td>
<td>T16 Conceptual integrity</td>
</tr>
<tr>
<td>T20 Test</td>
<td>T4 Iterations</td>
<td>T6 Setbased Development</td>
<td>T17 Perceived integrity</td>
</tr>
<tr>
<td><strong>MANAGEMENT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 Eliminate Waste</td>
<td>P4 Fast delivery</td>
<td>P7 See the whole</td>
<td>P3 Decide in latest responsible moment</td>
</tr>
<tr>
<td>T1 Eliminate waste</td>
<td>T11 Queuing Theory</td>
<td>T22 Contracts</td>
<td>T7 Options thinking</td>
</tr>
<tr>
<td>T2 Valuestreams</td>
<td>T12 Cost of delay</td>
<td>T21 Measures</td>
<td>T8 Latest responsible moment</td>
</tr>
<tr>
<td><strong>PEOPLE</strong></td>
<td></td>
<td></td>
<td>T9 Bestutningstaging</td>
</tr>
<tr>
<td>P5 Empowerment</td>
<td>P5 Empower team</td>
<td>P5 Empower team</td>
<td>P5 Empower team</td>
</tr>
<tr>
<td>T16 Expertise</td>
<td>T14 Motivation</td>
<td>T15 Leadership</td>
<td>T13 Self-determination</td>
</tr>
</tbody>
</table>

*These are thinking tools - Projects and employees know best how to transform them*
Beginner’s Scrum – *Systematic*
6 months results

Half the price
40% Fewer bugs

CMMI 1

CMMI 5

CMMI 5 SCRUM

- Rework
- Work
- Process Focus

Process Team required
European Union

• Purchasing required *Waterfall* for large projects
• Recognizing the “lower cost, fewer bugs” benefits from CMMI 5 / Scrum, projects were broken into smaller pieces (costing less than a few thousand Euros)… now there were smaller projects
• Bureaucrats prioritized projects … went to bid without requiring Waterfall
• *Systematic* no longer used Waterfall… had moved to CMMI 5 / Scrum
Impediments removed using one single Metric Control charts:

- Collect data over time. Look for the average.
- Consider the moving average for rapidly changing results.
- Set control limits for upper and lower boundaries.
- Look for "out of control" patterns. Points outside control limits, runs up or down, points always under or over the average value.
Control Chart Basic Procedure

Choose the appropriate control chart for your data.

1. Determine the time period for collecting & plotting data.
2. Collect data, construct your chart and analyze the data.
3. Look for “out-of-control signals”. When one is identified, mark it on the chart and investigate the cause. Document how you investigated, what was learned, the cause and how it was corrected. Continue to plot data as they are generated. As each new data point is plotted, check for new out-of-control signals.
Systematic

Control Charts useful for new teams
(provides for data driven removal of impediments)

• Drive gains … using one metric: \textit{time to fix a bug}
• Time defect is detected… how long to create a new build with the bug fixed
• Goal: Keep time to fix below 2 hours
• Above 9 hours, do \textit{root cause analysis} to find out why… identify impediments and remove them
Point #13 – Scrum is a disruptive technology

Client: PatientKeeper  Revenue (millions USD)
Google and Scrum

“With the help of an experienced agile leader (Scrum Master, XP Coach…) it was possible to carefully introduce agile practices into Google –

… an environment that does not have an affinity to processes in general.”

“Along with these practices came a visibility into the development status that gave the approach great management support.:

“All this could be done without destroying the great bottom-up culture that Google prides itself on.”

Mark Stiebeck, Google AdWords
Project Leader & ScrumMaster

Jeff Sutherland 1993-2010
Review – Scrum is Simple!

- **Daily Meeting**
  - Clarify features
  - Establish project environment and initial PBL
  - Release Planning

- **Sprint**
  - READY
  - IMPEDIMENT
  - DONE

- **Value**
  - Automated test
  - Continuous Integration
  - Remove impediments

- **Velocity**
  - Verify sprint deliver

- **Feature**
  - CHK

- **Story**
  - CHK
Product owner:
- Needs to get value clear
- Req’s & Features organized
- Prioritized
- Understandable to the team
- Estimatable & Testable
- Ready for the Sprint

Daily Meeting

Sprint

RE \nAD \nY

IMP \nED \nIMENT

DONE

Value

Velocity

The BEST teams
8 to 10 times the performance of Waterfall teams
The Blind Men and the Elephant

American poet John Godfrey Saxe (1816-1887) based this poem on a fable…

… that was told in India many years ago.
It was six men of Indostan
To learning much inclined,
Who went to see the Elephant
(Though all of them were blind),
That each by observation
Might satisfy his mind

The First approached the Elephant,
And happening to fall
Against his broad and sturdy side,
At once began to bawl:
"God bless me! but the Elephant
Is very like a wall!"
The Second, feeling of the tusk,
Cried, "Ho! what have we here
So very round and smooth and sharp?
To me 'tis mighty clear
This wonder of an Elephant
Is very like a spear!"

The Third approached the animal,
And happening to take
The squirming trunk within his hands,
Thus boldly up and spake:
"I see," quoth he, "the Elephant
Is very like a snake!"
The Fourth reached out an eager hand,  
And felt about the knee.  
"What most this wondrous beast is like  
Is mighty plain," quoth he;  
"'Tis clear enough the Elephant  
Is very like a tree!"

The Fifth, who chanced to touch the ear,  
Said: "E'en the blindest man  
Can tell what this resembles most;  
Deny the fact who can  
This marvel of an Elephant  
Is very like a fan!"
The Sixth no sooner had begun
About the beast to grope,
Than, seizing on the swinging tail
That fell within his scope,
"I see," quoth he, "the Elephant
Is very like a rope!"

And so these men of Indostan
Disputed loud and long,
Each in his own opinion
Exceeding stiff and strong,
Though each was partly in the right,
And all were in the wrong!
Moral:

So oft in theologic wars,
The disputants, I ween,
Rail on in utter ignorance
Of what each other mean,
And prate about an Elephant
Not one of them has seen!