Agile-Stage-Gate

Using Agile in Manufacturers’ New-Product Development Processes

ISBM Members Conference
Marketing Excellence Roundtable

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Why Agile for Manufacturers?

- Accelerate the development process
- Get the product right... first time
- Was already giving good results in IT departments since 2000

Early Case Study of 5 EU Firms (2014)

- Flexibility of design -- faster response to change: 4.5
- Improved team communication &...: 4.4
- Improved productivity: 4.4
- Better fit between the work process & methods: 4.2
- Higher morale on team: 4.2
- Improved focus on the project -- better prioritization: 4.2

Improved focus on the project -- better prioritization
Another Reason: Digital Transformation

- Smart products with embedded software
- Embedded software now 29% of manufacturers' new products
- Example: Volvo Construction

How to handle these projects with IT people & engineering people
  - Each using a different system, different cultures
- One option: Split the project, run as two separate projects
- Another option: a hybrid model → Agile-Stage-Gate
WOW! Performance Improvements with Agile: Actual Vs. Expected Results
(2018 DE Study of 228 EU Manufacturing Firms – Mostly Engineering)

- Shorter product development (time to market)
  - Actual: 2.5
  - Expected: 3.0

- Improved adherence to schedule
  - Actual: 2.5
  - Expected: 3.0

- Improved team morale/motivation
  - Actual: 2.8
  - Expected: 3.0

- Reduced project risk (tech feasibility; project failure)
  - Actual: 2.4
  - Expected: 2.7

- Increased productivity of development project
  - Actual: 2.6
  - Expected: 2.9

- Increased flexibility to react to changes
  - Actual: 3.1
  - Expected: 3.1

Source: Schmidt, Weiss & Paetzold, “Agile Development of Physical Products”, 2018
Let’s Look at Agile Methods

- **Agile for software relies on:**
  1. A focus on the customer – understand the customer’s problem
  2. Welcoming change – learn something with each iteration
     - A time-boxed iterative approach – sprints: 2-4 weeks
     - Deliver something of value after each iteration: test & learn
     - Evolutionary development (Product Definition changes as development proceeds)
     - Adaptive planning: rapid & flexible response to change: the Plan changes
  3. People interacting (vs. following a process)
     - Align with objective & the solution
     - Empowered team – autonomous

- **A dedicated team: 100% working on this one project**
  - Co-located (all people in one room)
Traditional project: defined target, fixed plan
Agile-Stage-Gate: Target = Evolving product definition
Plan is fluid & changing
Agile-Stage-Gate: Scrums, Sprints, Demos & Retros

- **A sprint is the basic unit in Agile-Scrum:**
  - Sprints last 1-4 weeks
  - Are a "time-boxed" (i.e. restricted to a specific duration) effort of a constant length

- **Each sprint is starts with a team meeting**
  - The **Sprint Planning Meeting**
  - Agree on sprint goals
  - Map out sprint tasks

- **Daily “stand-ups” or scrums**
  - 15-20 mins to organize each day
  - Set priorities, shift responsibilities, knowledge management, learning

- **And followed by a demo & retrospective meeting**
  - **Demo:** Where completed work (e.g. a model) is demo’d to stakeholders
  - **Retrospect:** Where progress is reviewed & lessons are identified.
Uses sprints & scrums for physical & IT developments
- Daily scrums, about 20 minutes

Build in design reviews into some scrums
- Bring in peers (peer review) & outsiders too

Scrum Master in place

Sprints:
- About 2 weeks in length, now 3 weeks
- Must show something physical, the result of a completed task (not just a PPT show, but for example, design drawings)

Project teams have dedicated team members per project

Only use for larger, major revenue generator projects – about 20% of total

Working well, 6 years into

Problems: project leader & team loses sight of ultimate goals, just focused on the next 2 weeks
Agile sprints (green) and feedback loops to customers (red) built into each of the 5 stages
Demos with Protocepts

- **Protocepts can be...**
  - Simple, easy-to-build models (paper, cardboard, clay, wax)
  - Drawings and sketches
  - CAD drawings & 3-D CAD drawings
  - A series of MVPs (something that actually functions)
  - Rapid prototypes, 3D printed
  - Crude working models
  - Early prototypes, pretotypes
  - Computer simulations, computer animations
  - Virtual & Augmented Reality

- **Anything to test the proposed product before & during Development**
  - Technically – can we develop and/or make it?
  - Market-facing – does the customer like it?
Examples

Fed Ex tests protocept drop-boxes (cardboard) using VR
  - Quickly, low labor
  - In users’ own home environment…. much more realistic than in the Lab

Volvo trucks tests new construction vehicles that don’t yet exist
  - A real driver drives the off-highway vehicle in a simulator
  - “A lot cheaper & faster to develop the software than the truck”

https://www.invisionapp.com/inside-design/vr-user-testing/
Example: Agile-Stage-Gate at LEGO-Education

**LEGO Education:**
- Software & physical products for education for children
- Began highly innovative NP project, “Story Starter” in 2011

**Project managed using LEGO’s tried-and-proven stage-and-gate model**
- Did not fit well with the design iterations – moved slowly

**Decided to incorporate a digital documentation software tool**
- Digital Solutions group already used Agile methods for Software
- Joined the Story Starter team, brought Agile with them

**Story Starter team decided to try new Agile approach for managing the entire project**

**Management did not want to lose the strategic benefits of SG**
- Kept SG while implementing Agile within the gating system.
- Agile-Stage-Gate hybrid emerged – for software & physical components

Source: Cooper & Sommer, *JPIM*, 2016
Agile-Stage-Gate Hybrid at LEGO Education

- Began using this new Agile-Stage-Gate hybrid model
  - Sprints
  - 15-minute daily stand-up meetings (scrum)
  - Visual scrum board
  - Daily activity logs A prioritized project backlog
  - Sprint planning meetings

- A-SG used during Development phase & continued into the Implementation phase in LEGO’s gating model

Result:
- *Story Starter* project saw a remarkable acceleration
- Immediate *increase in productivity*
- Much better team communication & a decrease in misunderstandings
- Improved work-flow each day – problems solved at the next morning’s scrum meeting

Resulted in the launch of this highly successful & innovative new product just 12 months later!
Summary for Manufacturers: The Team, Tools & Procedures

- Stages broken down into sprints: 2-4 weeks long
- Sprint works from a Sprint Backlog:
  - Lists the tasks: priority features, knowledge gaps to be filled, or tasks to be completed in the sprint
  - Created at the Sprint Planning Meeting (start of sprint)
- Regular scrums or stand-ups – daily, or 2-3 times/week
  - 15-minute time-boxed event for the Development Team
  - To synchronize activities & create a plan for the next 24 hours
- Sprint progress is monitored via a burndown chart
  - Tasks versus times
  - On a scrum board
  - Also may show Kanban board & Backlog chart
- Agile-Stage-Gate teams are dedicated (ideally, or ‘focussed’)
  - Only working on this one project.
- Co-located in a dedicated project room (ideally)
  - Where the team is physically located