Next in New Product Development:
Agile-Stage-Gate® Hybrids
Robert G. Cooper

A handful of leading firms are rethinking and re-inventing their idea-to-launch gating systems,” Robert G. Cooper wrote in the May/June 2016 CIMS IMR (1). Prof. Cooper, who introduced Stage-Gate® (2) nearly 30 years ago, reported that “reborn” Stage-Gate systems were integrating Agile methods with traditional gating approaches to yield an Agile-Stage-Gate hybrid model that can be adapted to manufactured new products and with dramatic results. His article below explains how this is happening.

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As I explained in my previous IMR article(1), Agile is a set of software development methodologies based on iterative and incremental processes in which requirements and solutions evolve through collaboration between self-organizing, cross-functional teams.

When Agile emerged in the late 1990s, its methods were seen as the solution to many problems in IT development that traditional “waterfall” development processes could not deal with (waterfall is the IT industry’s equivalent to a gated, planned approach to software development).

These traditional processes focus on a big, long-term goal: a final product and its major features. But requirements change rapidly in IT projects—the product features defined when the project was initially planned were often no longer valid by the end of a 12- to 18-month development cycle.

Agile was introduced to deal with these issues through adaptive planning, evolutionary delivery, a time-boxed iterative approach, and flexible response to change. Beck and colleagues (6) coined the term Agile in their “Agile Manifesto,” which elaborated a set of 12 supporting principles, including 1) working software to be delivered quickly and iterated frequently (in cycles of weeks rather than months), and 2) working software to be the principal measure of progress.

**Blending Agile and Stage-Gate**

As Agile took root in the software industry, some IT firms with existing gating systems built Agile into their processes, thereby creating hybrid models. Their experience revealed that Agile and Stage-Gate can be used together to advantage; Karlstrom and Runeson note that, “Agile methods give the stage-gate model powerful tools for microplanning, day-to-day work control, and progress reporting” (7).

Gating models are generally “plan-driven models,” whereas Agile is more “plan and build on the fly.” Boehm and Turner argue the two are complementary: Stage-Gate is a comprehensive idea-to-launch system and a macroplanning process while Agile is a microplanning project management methodology (8).
Agile-Stage-Gate has recently begun to interest developers of physical products. In manufacturing firms, Agile was first adopted by IT groups, whose initial results encouraged R&D groups working on hardware development to experiment with Agile.

Initially, Agile was employed mainly in the development and testing stages of a firm’s Stage-Gate system, stages 4 and 5 in Figure 1 (9). With maturity, Agile-Stage-Gate was even used for early and pre-development stages as well, for example, stages 1 and 2 in Figure 1, and even for ideation.

In practice, the project’s stages—Development, for example—are broken into short time-boxed increments called sprints, each about 1-4 weeks long (the small circles in Figure 1). Each sprint is preceded by a sprint planning meeting: the project team agrees on a sprint goal (what they can accomplish in 1-4 weeks) and identifies the tasks needed during the sprint (10). In this way, the goals and work plan for the sprints are very much within control of the project team.

Each sprint is followed by a retrospective meeting at which progress is reviewed and lessons for the next sprint are identified, including feedback from the customer. Frequent customer inputs and rapid changes in product specs are built into the system; the notion of an early “design freeze” is obsolete. At this point, the method may diverge from its practice in the IT world, where the outcome of each sprint is a completed, useable and potentially releasable product increment.

‘Done Sprints’ for Physical Products

The definition of a “done sprint” is different for physical products because creating a potentially releasable, working product every two weeks is usually not feasible. Although definitions vary by firm, normally a “done sprint” is to have created something tangible that can be demonstrated to customers and management for feedback and revision.

For example, feedback, denoted by the larger loops in Figure 1, might be based on the customer seeing and reacting to a 3D CAD drawing, a
computer animation, a rapid prototype, or a crude model—something between a concept and a final prototype (I call this a “protocept”).

There are other important differences from a typical Stage-Gate system. First, Agile-Stage-Gate project teams are dedicated to one project only and are physically co-located in one project room. The team begins each day with the daily scrum, a 15-minute stand-up meeting at which the team synchronizes activities and creates a plan for the next 24 hours.

Visual tools are key to the new model: Each sprint works from the sprint backlog, a list of priority features, product increments, and tasks to be completed in the current sprint. Progress is monitored with a burndown chart, a two-dimensional graph with the sprint time-period on the x-axis and remaining sprint task times on the y-axis. The scrum master, who is a servant-leader for the team, ensures that the team adheres to Agile theory, practices and rules.

Finally, neither the project plan (e.g., a Gantt chart) nor the product definition is known in advance; the product may be only 20% defined on entering Development (although 40-60% is more normal). Both the plan and product definition evolve over time as the project moves through the sprints within a stage.

**Results in Practice**

Initial results are most encouraging. An in-depth study of five major Danish manufacturing firms (4) revealed very positive results from implementing Agile-Stage-Gate hybrid models: much faster response to change, higher productivity, better team communication and morale. Similar results are found in the IT world, see Figure 2 (1). Positive results from Agile-Stage-Gate case studies are also reported in our other articles (3,5,9).

In the U.S., a large manufacturer of electromechanical control devices for residential construction has increasingly moved into remote control
devices (4). As a result, an ever-larger percentage of the company’s new-product projects require software development, which has led to conflict between the hardware and software developers over choosing Stage-Gate or Agile.

In response, the company introduced the concept of Agile within Stage-Gate, integrating the two methodologies in order to improve development efforts. As the VP of Innovation told me: “We developed a modified Agile approach that requires a rigorous Stage-Gate process, and continual end-to-end assessment.”

The firm now uses Agile sprints and scrums for both physical and IT development within Stage-Gate phases, with Agile employed in the development and testing stages of their Stage-Gate process. A scrum master oversees daily scrums, about 20 minutes long.

Sprints are about two weeks long. For this firm’s products, it is usually not possible to produce a potentially releasable product every two weeks, but the project team must show something physical, the result of completed tasks in the sprint: namely, a set of completed design drawings, a rapid prototype, or an early working model of the product.

Because projects have dedicated team members, not every project is a candidate; consequently, the firm uses Agile-Stage-Gate only for the 20% that are larger, major revenue-generators.

The company has been using this hybrid process on all major new-product initiatives for over 2-1/2 years. The process has worked very well, according to senior management, and has driven cycle times down. Also, there is much better communication within teams, and a heightened sense of community.

A Few Challenges

Senior leaders in this firm were initially skeptical of the new Agile-Stage-Gate system and its new vocabulary. As a result, they were not required to “speak Agile”; the firm’s familiar Stage-Gate process remained in place and Agile was simply inserted into the development and testing stages.

But gates stayed as they had been: deliverables were checked, and a go/kill decision was made. Thus, senior management was quite comfortable with the new system.

Another issue was that project leaders and teams tended to become so focused on the sprints—the next few weeks and their objective for that sprint—that they lost sight of the ultimate goal: the final product. As a result, management met with the team periodically, and more often at gate reviews, to ensure that sprint goals as well as the ultimate goal were visible.

Recent reports from lead users, including this firm, are unanimously positive. Indeed, this new Agile-Stage-Gate hybrid approach promises to be the most significant change to our thinking about how new-product development should be done since the introduction of today’s popular gating systems 30 years ago!
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References


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