NC STATE Poole College of Management

Center for Innovation Management Studies (CIMS)

Corporate Experience

HOW AGILE DEVELOPMENT WORKS FOR MANUFACTURERS: II

By Robert G. Cooper, Angelika Dreher and Peter Fürst

In Part I, Prof. Cooper, who introduced Stage-Gate®, and co-authors Dr. Angelika Dreher and Peter Fürst, managing partners in the Dornbirn, Austria consulting firm Five i's innovation, explained how in order to develop new physical products manufacturers adopted Agile Development, widely practiced in the software industry. Today, after about five years of experimenting and trials, a consensus or dominant Agile-Stage-Gate model is emerging, one that is similar to its software cousin but has some important differences as well (1).

In Part I, we outlined what Agile-Scrum was, and then delved into methodology of this new Agile-Stage-Gate model for manufacturers (2). In Part II, we now focus on two additional themes of Agile-Stage-Gate, namely how manufacturing firms organize their development teams, and adopt and live an Agile mindset.

Unlike physical product development, Agile-Scrum as practiced for software development requires a *100% dedicated development team*—working full time on the project and co-located in the same room. For manufacturers, however, this poses two principal challenges. First, many R&D projects have significant waiting times, for example for test results or for equipment arrival. Thus, team members must work on other projects during this interlude.

A second and more difficult challenge is that most manufacturing firms simply have *too many projects underway* at any one time, spreading players too thinly and across too many projects. This demands effective portfolio management, as a previous *CIMS IMR* article described—finding focus and cutting down the number of projects! (3).

Focused Rather than Dedicated Teams

The emerging model is for manufacturers to employ a "focused team" rather than a 100% dedicated team; that is, a *mostly dedicated team*

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with some team members devoting the majority of their time (60-75%) to the project. For a specified number of days per week, core team members work together only on this designated project. Further, for the 2-3 stand-up meetings per week, the entire team is present.

Some firms, such as the global packaging company Tetra Pak, limit the number of "other projects" to one or two, so that for core team members this new-product project is really their principal job. Thus, the core team is protected from outside disruptions that divert their attention from the project. (The scrum master also protects the team from diversions.)

"The emerging model is for manufacturers to employ 'focused' rather than 100% dedicated teams."

Cross- functional teams are the norm in the emerging model, which is not new to manufacturers but is new to software-Scrum users. The requirement for Marketing, Operations and perhaps even Sales people to be part of the focused cross-functional team is a challenge, because usually these people only devote a minority of their time to any new-product project. One solution is to require that only a handful of people on the team be dedicated, whereas others—from departments outside of R&D—are part-time players but with specific time commitments decided at the previous gate. And they must still attend the regular stand-ups!

Self-Managed and Empowered Within Boundaries

The project team is very much self-managed, self-organizing, and empowered. This is consistent with software-Scrum and has also been a best practice for decades within the manufacturing sector—see (4) and (5) for best practices in NPD. Once their project is approved at a gate meeting, along with a high-level "go forward" plan, the team is free to map out their action plan in detail, decide who does what, and who has the authority to make decisions.

"The project team is very much self-managed, self-organizing, and empowered."

Some senior people worry about a team out of control, leading to chaos. But there are still strong gates in the system, where gatekeepers scrutinize the project and approve concepts and a high level plan-of-action. And there are still validations with management along the way and between gates, in the form of demos. In this way the team is "self-managed and empowered" but *within boundaries*.

Project Managers, Product Owners and Scrum Masters

Most manufacturers maintain the role of a Project Leader or Project Manager, even though software-Scrum eliminates this role. One reason is that Agile projects represent only a minority of projects for the typical manufacturer and one hesitates to create a different organizational structure just for a minority of projects. A second reason is that a cross-functional team has differing time and content contributions per team member, and thus needs more coordination, synchronization and leadership than a fully dedicated software development team.

The Product Owner as found in software-Agile is a much-debated role among manufacturers using Agile-Stage-Gate, and there is *no consensus here*. Some manufacturers embrace the Product Owner role: a senior person, often from Marketing, who meets with the team at the

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beginning of every iteration and provides guidance. One danger here is when the Product Owner acts as the master, dictating his or her needs to the team, which is then reduced to acting as a *contractor or slave*.

A second danger is when the Product Owner speaks on behalf of the customer, thereby precluding the need for the team to do VoC research. For example, in one firm, the Product Owner thought he knew what customers wanted but the team did not agree and so did their own VoC, which changed the direction of the project. Be wary of the "Voice of Product Owner" phenomenon: More new products fail because of faulty market and customer knowledge than any other cause!

Alternatively, some firms already have *executive sponsors* who oversee major projects (these executives usually do not get into the details of the project, however). These firms thus see no need for a Product Owner. In other companies with an effective Stage-Gate system, the gatekeepers are responsible for making investment decisions for new-product projects. Thus, by making a "go decision" they act as *a cross-functional team* of sponsors for the next stage. For large projects with high uncertainties and risk, having the gatekeepers as a group be the de facto Product Owner often works better than relying on a single person as executive sponsor.

"More new products fail because of faulty market and customer knowledge than any other cause!"

The Scrum Master is another debated role among manufacturers. Clearly there is a need for *a coach* to ensure that the team correctly practices the methods and embraces the mindset of Agile-Scrum. But as the team gains experience, a coach in the form of a Scrum Master may be no longer needed, especially a coach dedicated to the one team. The term "agile coach" is currently used more often among manufacturers; they are the "transition managers" to the new Agile-Stage-Gate system.

How Firms Adopt and Live an Agile Mindset

Finally, and most important, both project teams and management must wholeheartedly embrace the Agile mindset and this new way of working. As a start, familiarize oneself with the *Agile Manifesto* (6). Although this was written for and by software developers, it can be adapted to manufacturers.

The chart, next page, shows the adoption rates for some of the ways of working common among best-practice manufacturer users of Agile. The following ten *Agile-Stage-Gate Principles* have emerged as a foundation to embrace this new mindset inherent within Agile-Stage-Gate; some principles are from the *Agile Manifesto* (6), others are more specific to manufacturers.

"Prioritize individuals and their interactions over processes and tools."

1. Prioritize individuals and their interactions over processes and tools.

2. Build projects around motivated and trusted individuals: Emphasize self-organizing, self-managed, and empowered cross-functional teams.

3. Co-locate and hold frequent, regular team meetings—face-to-face conversation is the best form of communication.

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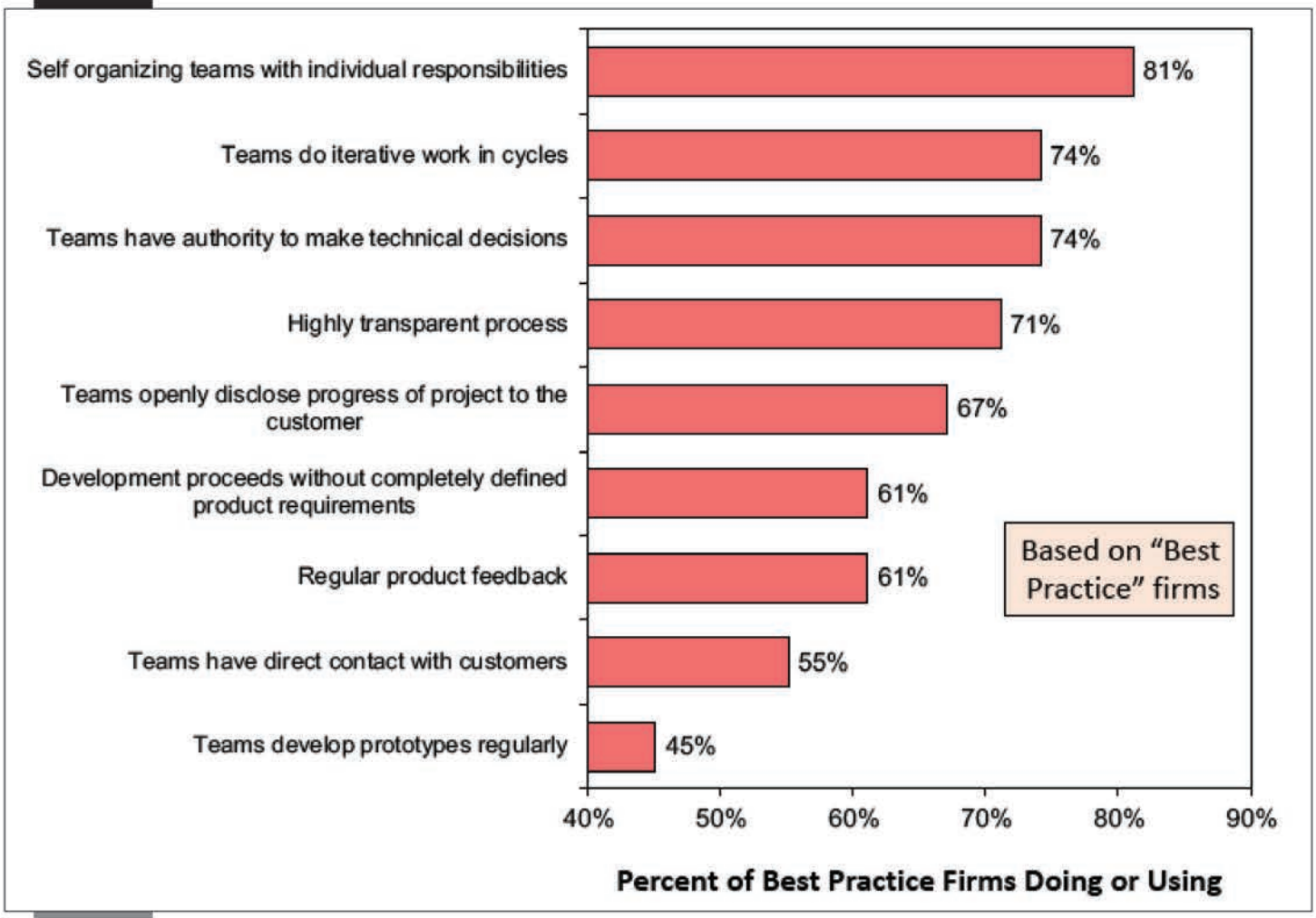

Adoption rate of Agile Development methods by manufacturers. Best Practice firms have a new-product success rate of 65% or better and comprise 28% of the firms studied. Sources of data: (7,8).

4. Collaborate with mutual accountability and respect—the entire team should be accountable for the result, not just individual team members.

5. Focus on working solutions over comprehensive documentation by demonstrating visible results of completed tasks at the end of each iteration.

6. Listen to and understand the voice of the customer (or user), not just the voice of management or the salesperson. Walk in the customers' shoes and understand their points of pain—leave your office and touch real customers and users.

7. Build something and share it with the intended user or customer; then adjust and adapt quickly to customer feedback and changing needs. People don't know what they want until they see it, so show them something!

8. Deliver solutions (design drawings, models, rapid prototypes, protocepts, pretotypes, etc.) frequently—early, often, fast, and cheaply (in weeks rather than in months).

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9. Keep it simple and lean—eliminate all unneeded complexity and non-value-added work. For example, why develop detailed long-term plans if these plans will likely change significantly before they are implemented; or why spend months developing a prototype that users have not validated along the way?

10. Focus, focus, focus—don't spread team members across too many projects and "other jobs." Doing that only guarantees that everything will be late.

Why It Works

This new Agile-Stage-Gate approach yields three important positive results for manufacturers (see "Source of Data on Agile-Stage-Gate" in Part I):

1. *Gets the product right:* Product designs (features, functionality, etc.) are validated by customers (and management) as the project moves along—often and cheaply. Changes needed are identified sooner in the process, when making changes is less costly. Customers or users also learn as the project moves ahead and their needs and requirements become clearer with each iteration and demo. Thus, the product's design evolves as development proceeds (rather than being fixed, and often wrongly, at the beginning of development).

2. *Team morale is higher:* The team is self-managed, self-organizing, and ideally co-located. It defines what it can accomplish and how. The team's objectives are clear and it has some decision authority.

3. *Development is faster:* The team is focused, partially dedicated, and in good communication. Frequent stand-ups allow problems to be identified and resolved quickly. Because iterations are time-boxed, there is some self-imposed pressure and motivation to get the job done fast!

"Because iterations are time-boxed, there is self-imposed pressure and motivation to get the job done fast!"

References

1. Cooper, R.G. "Next in New-Product Development: Agile-Stage-Gate Hybrids," *CIMS Innovation Management Report* Nov-Dec 2016, pp.10-14. Stage-Gate® is a legally registered trademark of R.G. Cooper (and Associates Inc.) in the EU and Canada; and of Stage-Gate International in the USA.

2. Cooper, R.G., Dreher, A., Fürst, P. "How Agile Development Works for Manufacturers: Part 1", *CIMS Innovation Management Report*, March-April 2019, pp. 10-15.

3. Cooper, R.G. "Meeting the Challenges of Agile-Stage-Gate - Part 1", *CIMS Innovation Management Report*, Sept-Oct 2017, pp. 6-10.

4. Cooper, R.G. *Winning at New Products: Creating Value Through Innovation*, 5th edition, New York, NY: Basic Books, Perseus Books Group 2017. See chapters 1-3 for NPD best practices.

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6. Beck, K., Beedle, M., van Bennekum, A., Cockburn, A., Cunningham, W., Fowler, M. et al. *Manifesto for Agile Software Development* 2001. http://agilemanifesto.org/

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