Managing the Hybrid Organization: How Can Agile and Traditional Project Management Coexist?

Federico P. Zasa , Andrea Patrucco & Elena Pellizzoni

Published online: 04 Jan 2021.

Submit your article to this journal

View related articles

View Crossmark data

Managing the Hybrid Organization: How Can Agile and Traditional Project Management Coexist?

Using the proposed practical actions around integration, culture, and perception of Agile, practitioners can manage the inevitable challenges that come with implementing hybrid project management models.

Federico P. Zasa, Andrea Patrucco, and Elena Pellizzoni

OVERVIEW: Agile project management aims to increase the flexibility of product development processes through increased interaction among project stakeholders. Since its introduction in the software industry 20 years ago, Agile project management has progressively spread to other contexts, even though large-scale organizations seem to struggle to switch toward Agile-only practices. In these contexts, we see an integration of the traditional Stage-Gate project management, focused on planning and validation, with Agile, focused on responsiveness and flexibility. Although it's effective, the Agile–Stage-Gate hybrid model is not easy to adopt, as it requires a clear alignment between the project team, the organizational objectives, and the project implementation. We collected interview data from eight Agile coaches experienced in Agile implementation in non-software industries. We identified practical actions that practitioners can use to manage the challenges connected to the implementation of hybrid models. These corrective actions can be grouped at three levels: integration aspects, cultural change, and perceptions of the Agile methodology.

KEYWORDS: Project management, Agile, Stage-Gate, Agile–Stage-Gate, Hybrid models

Federico P. Zasa is a PhD student at Politecnico di Milano's School of Management where he serves as a researcher at the Laboratory for LEAdership, Design, and Innovation (LEADIN'Lab). His research interests lie in the role of individual- and team-level cognitive aspects of innovation management. He is also part of Innovation and Design as Leadership (IDeaLs), a research platform that investigates how to engage people to make innovation happen. federicopaolo.zasa@polimi.it

Andrea Patrucco is assistant professor of supply chain management in the Department of Marketing and Logistics at the Florida International University College of Business. His research interests are in the field of management of buyer-supplier relationships in both the private and public sectors. He actively collaborates with US government organizations, such as the National Association of State Procurement Officers and the National Institute of Government Purchasing. He has published his research in academic journals such as *Journal of Supply Chain Management*, *International Journal of Production Economics*, *International Journal of Production Research*, and *Journal of Purchasing and Supply Management*. He serves as an associate editor for the *Journal of Purchasing and Supply Management*, and he's on the editorial board of the *International Journal of Logistics: Research and Applications*. apatrucc@fiu.edu

Elena Pellizzoni is Ecosystem Value Catalyst and Culture Designer at Flowe S.P.A., an Italian carbon-neutral benefit company, which is pending BCorp. She holds a PhD in management engineering from Politecnico di Milano. During her academic career, she has conducted extensive research, teaching, and consulting activities in the fields of project management and innovation management. She has published her research in academic journals such as *Technological Forecasting and Social Change*, *Research-Technology Management*, *Technology Analysis and Strategic Management*, and *Creativity and Innovation Management*. elena.pellizzoni@flowe.com

Since the 1980s, dramatic changes in the business environment have led to the reengineering of project management (PM) activities and practices to handle new challenges and balance efficiency, speed, and quality. Traditional Stage-Gate project management became less effective when product development activities became increasingly unpredictable and uncertain and required reworking even at later stages. In this new environment, project managers questioned the efficacy of traditional PM approaches, and companies sought more innovative and flexible methodologies. In the software industry, the Agile project management method emerged. *The Agile Manifesto* (Beck et al. 2001) outlined the principles of this new methodology, which attracted attention from companies in different industries seeking to increase their dynamism in handling projects.

The IT industry was an early adopter of Agile project management methods because IT companies' organizational flexibility made the adoption of Agile principles easier. By contrast, companies in conventional industries rely mostly on more complex organizational structures and traditional PM approaches (Cooper and Sommer 2018). Even today, companies outside the IT industry rarely abandon established and successful project management methodologies completely in favor of Agile project management (Cooper 2009). Large-scale organizations are more likely to adopt a hybrid approach,

combining Agile and the more established Stage-Gate project management (Sommer et al. 2015). As a result, companies need to integrate Agile practices within an overarching Stage-Gate model; at each stage, the adoption of Agile sprints should help to increase responsiveness and adaptability (Cooper and Sommer 2018). This hybrid Agile–Stage-Gate model combines the benefits and minimizes the drawbacks of Stage-Gate and Agile project management; failure to manage the coexistence of these two approaches effectively can create conflicting objectives and organizational tensions.

Agile Project Management

The Agile Manifesto (Beck et al. 2001) is the pioneering reference for Agile implementation. It outlines the main values of Agile project management to manage software development projects more effectively. With Agile, individuals and interactions are more relevant than processes and tools; formalization of comprehensive documentation can delay development; collaboration, not negotiation, with project stakeholders is necessary; and the method aims to increase responsiveness and reactiveness to changes.

Several authors (Schwaber and Beedle 2001; Schwaber 2004; Dybå and Dingsøyr 2008) have described Agile project management not as a new single method, but as the combination of many approaches, such as crystal methodologies, dynamic software development, adaptive software development, feature-driven development, Lean software development, extreme programming, and the Scrum method.

In turbulent market environments, the flexibility of responding to changing requirements is at the heart of a successful development project. Therefore, Agile uses an iterative process leading to the progressive release of a complete project output. Based on the assumption that an early prototype is necessary to test the project assumptions, Agile project management aims to release different subparts of the output as soon as possible, at the end of each iteration, with the objective of collecting feedback from the main project stakeholders (particularly customers). Companies use inputs received about the working product to execute (and eventually adjust) subsequent iterations, thus leading to a final output that optimally incorporates stakeholders' needs and expectations.

The Agile approach to project management—and connected practices, tools, and techniques—have proven to be adaptable to any dynamic and continuously changing environment, and have thus been adopted in projects with different characteristics (Conforto et al. 2014). Agile evolved from being a software development-specific approach to an innovative and versatile way to manage projects that several industries (food, construction, and consumer electronics) now use to improve their project performance (Goldstein and Euchner 2017; Ito 2017; Pellizzoni, Trabucchi, and Buganza 2019).

Can Agile and Stage-Gate Coexist?

Organizations that used to manage projects adopting pure Stage-Gate approaches now increasingly use Agile methods (Cooper and Sommer 2018). Stage-Gate introduced a discrete

> Companies that choose to adopt Agile must find ways for it to coexist with existing PM practices.

way of managing projects through a system of interconnected stages (execution phases) and gates (validation points). Its linear approach was the main reason for its widespread adoption across industries for decades.

Today's uncertain and fast-changing environments have challenged the applicability of traditional Stage-Gate models, as companies do not have time to follow its step-by-step approach. In software development, Agile project management increased project responsiveness and quality, which made this approach particularly attractive to solve problems that arise in a turbulent environment, and several companies introduced Agile principles in their organizations (Cooper and Sommer 2018).

Two problems emerged with the transition to large-scale non-software contexts (Thamhain 2014; Karvonen, Sharp, and Barroca 2018; Dingsøyr, Moe, and Seim 2018). First, Agile principles were initially conceived to support the execution of project activities with small teams and to realize outputs characterized by strong modularity. The development of products follows a prioritized list of features grouped in the "product backlog." Over multiple iterations, or sprints, the technical teams self-manage the development and release of a subset of these required features. This subset is called the "sprint-backlog" and represents a functioning part of the product, which is released at the end of the sprint.

In industries outside software development, companies typically, though not always, divide products into independent modules, and their development often requires interactions among different organizational functions. This process challenges the basic premises of Agile and necessitated the development of new work models. Second, large-scale organizations likely have more traditional and consolidated PM practices in place that they won't likely abandon completely. Companies that choose to adopt Agile must find ways for it to coexist with existing PM practices.

Hybrid PM models emerged in response to these challenges (Cooper 2016). Cooper and Sommer (2018) proposed hybrid PM models that integrate heterogenous practices. The hybrid Agile–Stage-Gate project management models can combine the advantages of both approaches, making them particularly effective for new-product portfolio management (Cooper and Sommer 2020) or inbound open innovation (Pellizzoni, Trabucchi, and Buganza 2019). The two main assumptions made by these hybrid models (MacCormack et al. 2012; Cooper 2014; Sommer et al. 2015) are as follows:

1. Strategic phases, such as the definition of a product vision, benefit from the application of the linear and discrete Stage-Gate approach; and

2. Execution phases, such as project planning and controlling, which are affected by rapidly changing customer needs and priorities, benefit from the application of the responsive Agile approach.

At a strategic level, senior management still reviews projects periodically at given milestones to strategically evaluate the entire project portfolio. They can kill weak projects, relocate resources, or ensure the commitment to move the project forward. At an operational level, the project's execution is based instead on a series of short-time boxed sprints planned in real time, making the process highly responsive and adaptive. Incremental releases of product design and rapid prototypes at the end of each sprint allow the development team to collect fast and timely feedback that is hard to obtain in the Stage-Gate model. Using a hybrid approach, senior management can track a project's progress and evaluate its performance from a strategic and long-term perspective, while counting on a flexible execution.

Organizations use Stage-Gate, Agile, and hybrid models to manage innovation projects (Table 1). Different industries and projects successfully use the Agile–Stage-Gate model (Cooper and Sommer 2018), however, the "ideal" structure of hybrid projects remains underexplored (Karvonen, Sharp, and Barroca 2018; Bianchi, Marzi, and Guerini 2020). Even with the separation of application levels, effective integration of Stage-Gate and Agile project management in practice remains difficult. The issue of how organizations can overcome the challenges arising from the coexistence of Agile and Stage-Gate project management remains an open issue, especially in non-software development industries.

Methodology

We contacted two of Italy's largest Agile coaching organizations that train organizations about how to adopt and implement Agile principles and tools. Eight Agile coaches—heterogenous

TABLE 2. Sample information

Coach ID	Seniority	Size of Companies Trained	Agile PM Experience
1	5 years	Large	Different industries
2	10 years	Small, medium, and large	Different industries
3	6 years	Small, medium, and large	Mostly IT
4	12 years	Large	Different industries
5	6 years	Large	Mostly IT
6	20 years	Small, medium, and large	Mostly IT
7	2 years	Small, medium, and large	Different industries
8	5 years	Small, medium, and large	Different industries

in terms of seniority, industry experience, and size of companies trained—agreed to participate in the study (Table 2). The coaches have supported small, medium, and large firms in their adoption of Agile values and philosophy, training their staff in how to adopt Agile principles and tools. Their coaching experience extends beyond the software development environment, enabling them to provide a holistic view of the benefits and hurdles of Agile implementation in different contexts. The coaches also have expertise in different methodologies (for example, Scrum and Kanban) and how they can be adapted to specific contexts.

We conducted semi-structured interviews to collect the coaches' perspectives (Adams 2015). We asked the Agile coaches to describe how project managers managed the coexistence between Agile and Stage-Gate approaches in different projects; what challenges emerged during project execution; what actions coaches took to decrease the tensions between the two approaches; and companies' ability to overcome these challenges. During the interviews, the Agile coaches referred to more than 30 large-scale projects managed using an Agile–Stage-Gate model and highlighted the challenges arising from its adoption.

TABLE 1. Differences between Stage-Gate, Agile, and hybrid models (adapted from Cooper and Sommer (2018) and Bianchi et al. (2020))

Characteristics	Stage-Gate Project Management	Agile Project Management	Hybrid Project Management
Environmental Characteristics	Stable environment characterized by high predictability	Turbulent environment characterized by high uncertainty	Uncertain, but partially predictable, environment
Approach Description	Plan-driven process based on extensive control of sequential phases	Iterative development process based on feedback and change	Agile way of working combined with an overarching plan-driven approach
Project Planning	Traditional planning tools such as Gantt charts, milestones, and critical path planning	Real-time planning of "sprints," lasting 2–4 weeks	Different stages, each comprising a series of time-boxed sprints
Decision-making	Key strategic and operational decisions taken at predefined gates	Key strategic and operational decisions taken by team members	Key strategic decisions taken at predefined gates; key operational decisions taken by team members
Benefits for Project Performances	Focus, structure, and control	Flexibility, productivity, and speed	Design flexibility, prioritization of efforts, and improved (team) working environment

Each interview lasted between 70 and 150 minutes. We recorded and transcribed all interviews except one (as requested by the interviewee). While no quotes are available in this case, the interviewee enriched our understanding and we included the information in our analysis. We triangulated the interview data with data from secondary sources, such as the websites and reports from the companies the coaches had consulted, as well as professional PM magazines. We performed our analysis of transcribed interviews, data, and documents using an iterative process consisting of three phases: reading, coding, and interpreting (Saldaña 2015). In the coding phase, we performed a first cycle of structural coding to group the recurring aspects mentioned by the coaches for each question and select exemplary quotes. We performed a second cycle of pattern coding to identify the main themes and the relationships among them (Saldaña 2015). After our analysis, we shared the results with the coaches to receive feedback on their validity and representativeness.

Integrating Agile with Stage-Gate

Integrating Agile into an existing Stage-Gate project management system is complex. Interviewees highlighted several barriers to implementing a hybrid model for the realization of physical products. Key challenges include different planning cycles, management skepticism, lack of support to dedicated teams, and the difficulty of producing a modular product to be completed within a short sprint. These challenges identified by the coaches correspond with the PM literature (Cooper and Sommer 2016; Karvonen, Sharp, and Barroca 2018; Dingsøyr, Moe, and Seim 2018) and represent barriers to the effective integration of Agile practices in traditional contexts. The current literature lacks specifics about how companies face these challenges during project planning and execution, and what actions need to be taken to successfully integrate Agile with Stage-Gate project management. The information we collected through the interviews can clarify these challenges and actions required.

Introducing the Hybrid Approach

Coaches identified how the introduction of Agile principles in a traditional environment would take place (Table 3). They highlighted the need to first work with the newly established Agile team to share knowledge about the Agile environments and ensure understanding of the differences between the previous approach and the Agile approach. The coaches advise the technical teams because they are affected most by the changes. Managerial levels, where Stage-Gate approaches will be used further, may participate in the transition to the hybrid approach in a later stage. One coach described how she progressively involves senior management: "Your initial mission is making the team work. Afterwards you need to work on a higher level: advising only the single team, or a group of teams, has little impact on the organization as a whole."

Gradual integration of Agile methods at the operational level can follow the knowledge dissemination of Agile principles. Collaborative sessions, in which coaches share and discuss the objectives of introducing Agile introduction, support the integration at the operational level to align senior management's expectations about the benefits of Agile. Karvonen, Sharp, and Barroca (2018) describe how senior management would expect a radically faster schedule, while the iterative nature of Agile benefits most from interactions and collaboration. One coach aptly described the tensions among the traditional and Agile way of working: "In traditional environments, one's job is sometimes seen as 'occupying time with a sequence of activities.' Instead, the idea behind Agile is to perform those activities which are useful, whilst setting aside those which don't contribute to creating value for the client." The coach also explained that the idea of continuous interaction often causes resistance: "Disseminating this reasoning, this new way to use your time, is very challenging, as it relates to personal as well as organizational culture."

All coaches stressed the importance of sharing the mentality and culture of Agile project management, rather than merely introducing knowledge about processes and tools (Beck et al. 2001). In workshops the coaches shared the values and principles from *The Agile Manifesto*, so that participants could experience firsthand the novel way of thinking necessary to support the introduction of the new Agile methodology.

Hybrid Project Challenges

Even with these efforts to introduce and roll out Agile practices, the coaches said several issues may arise when combining Agile and Stage-Gate project management (Table 4). First, companies may struggle to generate the cultural changes needed to implement Agile methods effectively. As one coach recalled, "In one company, we encountered a very hierarchical and aggressive 'Command & Control' culture, where … talking about conflict, norms, and working agreements from the first day does not work. Typically, we begin

TABLE 3. Structural coding process results for the introduction of Agile and Stage-Gate project management approaches at the project level

Themes	Coach	Exemplar Quotation
Team Involvement	1, 7	"Your overarching goal is making the team work."
Gradual Introduction	3	"[Our coaching] is not an invasive intervention; it is rather a progressive introduction of practices, starting from the project team."
Expectations Alignment	4, 5	"Their most motivated person is the one who pursues the own objectives: when these are in conflict with the organization, that is when problems occur, independently from the methodology adopted."
Agile Culture Establishment	6	"The principle [of the coaching activities] is to establish an Agile culture within the organization."

TABLE 4. Structural coding process results for challenges that emerged during project execution

Themes	Coach	Exemplar Quotation
Individual Resistance		
Resistance to change	3, 7	"A two-day workshop is necessary, to break both emotional attachment to the previous way of working and resistance to change."
Cultural gap	2, 3, 6	"[The main hurdle of Agile introduction] is essentially related to a cultural dimension. It is related to organizational and personal culture."
Organizational Dependencies	1, 4, 5, 7	"The most critical problems are related to organizational dependencies; for example, you may need formal approval from legal or audit before a release."
External Dependencies		
Contract management	5	"The problem is related to the old world of budgeting, requirements, and contracts, which clash with an Agile world in which the contract enables a collaboration among supplier and customer."
Supply challenges	4, 5	"Another example is related to external suppliers, which often have an anti-Agile approach and change the contact people. . . . This is a disaster for the team, as each time the members change, you should start from scratch."

addressing … the processes and the product vision. When people start collaborating the cultural aspects emerge, and it is the teams demanding to talk about them." An organizational culture based on control, which is consistent with a Stage-Gate approach, is not compatible with the Agile principles of team empowerment and bottom-up problem resolution.

Similar challenges arise in organizations with a bureaucratic culture. In contrast with "all-Agile" organizations, companies not naturally inclined to an Agile culture usually adopt hybrid PM models. In large, traditional companies, several departments may never have experienced the Agile way of working—they generally use a teamwork approach with formal approval processes typical of Stage-Gate project management (Cooper 2009). Such organizations typically have excessive bureaucracy, which impedes the adoption of Agile (Cooper and Sommer 2018). Agile enables development teams to release a product module at the end of each sprint; however, the teamwork agility is lost when long approval times and control constrain these releases. It can be difficult to integrate Agile principles in an environment that does not favor autonomy and communication (Dingsøyr, Moe, and Seim 2018).

Finally, there might also be external constraints related to interfacing with suppliers involved in the project. One coach indicated that the supplier relationship represents the most

> Agile enables development teams to release a product module at the end of each sprint; however, the teamwork agility is lost when long approval times and control constrain these releases.

critical aspect because "suppliers are not used to working in an agile manner; they require specific and fixed requirements, as well as predetermined budgets." In traditional Stage-Gate projects, suppliers involved with the development team interact and communicate with different points of contact. Although having multiple points of contact aligns with contractual needs, not having a single point of communication hinders collaboration and leads to knowledge dispersion (Dybå and Dingsøyr 2008). One coach said, "The contractual aspect of external suppliers is often completely anti-Agile: as a customer, a company pays for a certain professional. But the supplier is left free to rearrange its internal organization and change the specific resource, as long as the role remains covered. This is a disaster for the team, as each time the members change, you should start from scratch."

Two coaches mentioned that with Agile, particularly in software development contexts, suppliers usually have a single dedicated intermediary, and to minimize coordination costs, the supplier interacts solely with a specific team member. A supplier unaccustomed to Agile might perceive having a single point of contact a lack of commitment from the team, thereby creating both internal and external tensions.

Corrective Actions

To address these common tensions, the coaches took several actions to achieve an optimal integration of Agile and Stage-Gate project management. The coaches used different types of actions to advise the team appropriately, align the managerial approach, and reorganize the departments involved (Table 5).

In Agile project management, the team's ability to "self-manage" is essential to achieve the objectives of a sprint (Moe, Dingsøyr, and Dybå 2010). To prevent tensions, the coaches emphasized allocating time for the team to develop a shared understanding of the Agile way of working. Workshops can create a teamworking environment appropriate for Agile project management. The coaches recommend holding two workshops. In the first workshop, the team discusses reasonable targets—that is, clear and shared

TABLE 5. Results of the structural coding process for actions implemented to manage challenges

Themes	Coach	Exemplar Quotation
Team Focus		
Definition of clear objectives	1, 5, 6	"Through a workshop with leaders, it is possible to mediate the problem of assigning arbitrary objectives to the teams, which are then unable to complete them."
Identification of knowledge gaps	1, 4, 5	"In [company name] we did a workshop with around 15 questions on the role of the product owner and Agile methodologies … we did a self-evaluation workshop, in which each team would assess its knowledge."
Managerial Focus		
Mapping of interdependencies	1, 5, 6	"Besides making all interdependencies visible to management, we made the process connecting the product owners to other functions transparent. … This decreased the conflict among involved actors."
Involvement of management	2, 3, 6, 7	"In large organizations what works best is setting up workshops to meet and discuss with managers."
Organizational Focus		
Establishment of the hybrid team	5	"We are working with the supplier: Now we evaluate a team, which is composed by both internal and external people."
Creation of a work agreement	4	"With the teams we define a working agreement, which is a set of rules to follow in order to work together."
Creation of a safe environment	1, 2, 5, 6	"We create an environment in which diverse people talk at the same level, independently from their role, and from these conversations often creative ideas are born."
Promotion of diversity and inclusion	1, 3, 5, 6	"We always try to work with people who are as heterogeneous as possible, in terms of competences and experience within the organization."
Focus on human relations	2, 4	"These moments [the workshops] are usually faced with the team alone, which helps to create a collaborative environment."

project objectives—and how to achieve them. The team drives expectations rather than having them assigned from the top down. The second workshop focuses on identifying possible gaps in knowledge: each team member self-evaluates their competence and skills to achieve the targets, and the coaches act as supporters, providing knowledge to fill in any methodological gaps.

Second, managerial focus is necessary: managers must be involved to help avoid organizational dependencies and resolve any that appear. Managers should first contribute by helping to map and identify possible interdependencies between the development team and the day-to-day processes. Managers then need to discuss collectively the outputs of this mapping to clarify the nature of the interdependencies, their impact, and the best way to minimize the consequences. As one coach pointed out, managerial workshops enable shared reflection between managers: "To engage people in a position of leadership, we took all those people who knew they would supervise a series of teams working in an Agile manner, and do a joint workshop. This would allow an envisioning process, designing the mission of the teams." Also, these workshops represent a way to increase awareness of the Agile approach, thus contributing to the spread of the Agile culture at different managerial levels.

Finally, the organization should focus on changing the traditional way it operates. The coaches mentioned establishing hybrid teams as one of the most effective ways to solve internal and external dependencies. Hybrid teams must include internal stakeholders, who might be interested in the project decisions, and external stakeholders, such as supplier representatives, to provide high visibility on project progress. Often, establishing a formal work agreement for a defined number of sprints is helpful to govern relationships, especially among different companies, as the members of the team will operate with this shared agreement as a point of reference. The team members usually design this agreement, which supports horizontal and vertical communication through specific guidelines.

During the process of introducing the Agile approach, three coaches stressed the importance of involving people with diverse functional and educational backgrounds to ensure that the Agile culture of openness and inclusion spreads to all the organizational areas. One coach described why she considers this aspect of diversity fundamental: "Talking to all people who will be operatively involved with the product is essential, as they need to have the process clear in mind, as well as being aware that they have the possibility to question each single aspect." Engaging diverse individuals from all over the organization into the initial Agile diffusion workshops saves coordination time in later stages when forming cross-functional teams, as all the members already have the same teamworking mindset. It also creates a safe and welcoming work environment, where people can express themselves and their ideas independent of their role and seniority.

Benefits of Corrective Actions
We asked the coaches to highlight the main organizational benefits of these corrective actions. Our results support the previously described advantages of Agile and its combination

TABLE 6. Structural coding process results for benefits gained from implementing these actions

Themes	Coaches	Sample Code
Business Impact		
Deivery speed	4	"Measuring team velocity is very useful to the team, to assess its performance and autonomously identifying bottlenecks."
Supplier independence	4, 6	"The supplier evaluation was decreased, meaning it was shifted to the team: what we evaluate is the team, comprising both internal and external members."
Team creativity	2, 3, 6	"The workshops are designed to increase the chance of creative contributions, trying to avoid any loss of ideas."
Transparency	3, 5, 6	"Problems and dependencies at the team level are transparent and visible to the tribe-leader; then you go back to the process of team design."
Awareness		
Work-model overview	3, 4	"We consistently have alignment meetings with other parties, both internal commitment and external stakeholders, in the beginning and at the end of new activities."
Awareness on interdependencies and capabilities	1, 3, 7	"We try to map in detail the organizational dependencies of the team towards the organization."
Understand organizational limitations	1	"The main task of managers we are used to working with is removing the organizational hurdles."
Systemic overview	3	"The most effective strategy is developing Agile initiatives while having overall alignment among all parts of the organization."
Alignment		
Alignment of objectives	2, 3, 6, 7	"The objectives of the team and the organization need to be aligned. This … is what unlocks the full potential of a team."
Alignment of vision	6	"I ask [the product manager] to have a vision and share it with the team; that is the starting point. Then we break this vision down into a set of manageable goals."
Human dimension		
Less resistance to change	2, 3	"People who had strong resistance to change ultimately understood this would be an opportunity for their job."
Positive working environment	4	"We try to prioritize the relational climate, to make the team come up with their individual resources and make the magic happen."
Informal knowledge sharing	1, 5, 6, 7	"It is important to speak to all people who have operative contact with the product, to provide clarity on the project and assure the possibility for them to revise some aspects."
Cross-functional collaboration	7	"One advantage is that team members can count on other people, and must not only interact within their organizational function, but can contribute with what they know best."

with Stage-Gate project management (Cooper and Sommer 2016) (Table 6).

The hybrid method has a positive business impact as it can increase delivery speed, reduce interdependencies (especially with external suppliers), and facilitate teams working autonomously on their objectives. According to one coach, in a

> Engaging diverse individuals from all over the organization into the initial Agile diffusion workshops saves coordination time in later stages when forming cross-functional teams.

traditional environment, when one department expresses a change request to a development team, the two parties may discuss their points of view—and the product is a result of these two perspectives. However, the coach said, "The perspectives of who sells, assists, or promotes the product are often lost. The idea is to start conversation among all actors since the early phases, among those people who have different roles, but who can assure that all elements are visible. This increases the possibility of creative contributions, as well as assuring that no key information is left behind."

Three coaches indicated higher team creativity results, which means the team is flexible and can adapt to the "new normal" quickly by implementing novel ways of working when unexpected problems arise. Actions such as definition of clear objectives and identification of knowledge gaps further contribute to increase the level of transparency inside the team.

Second, corrective actions improve the level of awareness about the project. The work model is clear, team capabilities and knowledge gaps are evident, interdependencies get

TABLE 7. Differences in Agile vs. Stage-Gate project management, transformation challenges, actions, and benefits

Differences in Agile vs. Stage-Gate project management (Adapted from Cooper and Sommer 2016)	Transformation Challenges (Adapted from Karvonen, Sharp, and Barroca 2018)	Actions	Benefits
• Definition of a "Done Sprint"	• External Dependencies • Progressive Release	• Integration • Gradual Introduction • Agile Culture Establishment • Managerial Focus • Team Involvement	• Business Impact • Alignment
• Integration of different planning methods	• Organizational Dependencies • Synchronization		
• Resource allocation	• Individual Resistance • Team Cultural Change	• Culture • Team Focus • Organizational Focus • Agile Culture Establishment	• Human Dimension
• Use of Agile for different innovation projects	• Alignment of Expectations	• Perceptions • Expectations Alignment • Managerial Focus	• Awareness

mapped, and a clear understanding exists about the implications of a hybrid Agile–Stage-Gate project management adoption. The coach's role is to support the identification of possible constraints and increase managerial awareness of the impacts of Agile. Managers can subsequently identify projects suitable for Agile management principles, and those that still require Stage-Gate project management (Cooper and Sommer 2020).

Through workshops, managers and technical teams develop shared objectives and an aligned project vision. In Stage-Gate project management, the development of new products is controlled through approval at each gate, where senior managers acting as "gatekeepers" review the work of the previous phase (Cooper 1990). With Agile, the development of a shared product vision is fundamental to orient the work of the technical team, as it guides the inclusion-exclusion criteria for each sprint backlog and represents the synchronization between the team and the management.

The workforce reorganization necessary for Agile provides additional benefits on the "human" dimension (Beck et al. 2001). The definition of a hybrid team and a working agreement are mechanisms to facilitate interaction between the members: the cross-functionality helps to share knowledge of heterogenous perspectives, while the formal agreement mutually coordinates the team members toward the same goals—without formal leadership. The open, transparent climate achieved through the workshops creates a positive, safe working environment, thus favoring informal knowledge sharing. These forms of informal communication in turn enhance the team's capability and flexibility to changing product requirements, as better horizontal communication increases the team awareness of product compared to traditional Stage-Gate project management. Overall, the technical teams have a higher level of cohesion, and they can overcome problems autonomously (Moe, Dingsøyr, and Dybå 2010). Managerial leaders are more likely to accept the different

teams' heterogenous way of working. As Cooper and Sommer (2020) describe, to really adopt and implement the hybrid Agile–Stage-Gate project management model, managers need to adopt a new and more flexible mindset to project management.

Overcoming Agile vs Stage-Gate Tensions

Organizations looking to transition from Stage-Gate to Agile or a hybrid project management approach will face transformation challenges (Karvonen, Sharp, and Barroca 2018). As a final result of our study, we can link the differences between Agile and Stage-Gate identified by Cooper and Sommer (2016) to these transformation challenges and explore their characteristics and potential solutions. We identify three groups of corrective actions supporting the coexistence of Stage-Gate and Agile project management—integration, culture, and perceptions—related to the main challenges resulting from the hybrid project management model (Table 7).

Integration—A first set of corrective actions aims to facilitate the integration between Agile and Stage-Gate project management. These methodologies differ extensively in terms of approaches to planning and execution (Cooper and

> We identify three groups of corrective actions supporting the coexistence of Stage-Gate and Agile project management— integration, culture, and perceptions.

Sommer 2016). The coexistence of Agile with Stage-Gate should be gradual and involve both managers and technical teams to define new working procedures and objectives. Doing so helps to overcome one the biggest changes arising from the integration of Agile with Stage-Gate—namely, the integration of the innovative Agile "backlog" concept, in contrast to traditional planning modes. Each sprint, in fact, has the objective of delivering a functioning output, potentially releasable into the market. While this objective is feasible with software, it may not be the case with physical products that cannot always be easily divided into independent subparts. An organization's managerial and operational levels must collaborate in the early stages of the introduction of Agile principles to identify suitable projects to transition to this approach, revise their internal processes, and gradually spread the Agile culture through all departments. Workshops with managers and the technical teams are necessary to create the open working environment and awareness of the potential benefits of Agile. This gradual, integrated introduction will allow problems to emerge and be solved effectively, thus allowing companies to benefit fully from the hybrid Agile–Stage-Gate model.

Culture—The second set of actions aims to facilitate the adoption of the new Agile culture. While Stage-Gate relies on hierarchy and operates by combining different functional perspectives (the "silos" view), Agile challenges these structural boundaries. Through cross-functional teams, all members engage in strategic activities, including definition of the project vision, planning, and controlling. Resource allocation also requires clarification (Cooper and Sommer 2016). In Stage-Gate project management, gatekeepers supervise project progress and search for necessary resources (Cooper 2009); by integrating Agile into Stage-Gate project management, the team manages this responsibility directly. This change requires a cultural shift on both the team and individual dimension, which the members of the teams must address head-on. Team-level meetings help individuals make sense of this change and provide team members with higher team identity and awareness of their ability to meet project requirements. Working agreements and the use of specific product design (vision board, story mapping) or stakeholder tools such as the power-interest grid (Ackermann and Eden 2011), can support the team in their reorganization. These actions increase the teamworking quality, which is essential to Agile (Dingsøyr, Moe, and Seim 2018).

Perceptions—The last set of actions aims to increase managers' understanding of the value of Agile project management for the organization and to identify the projects best suited to the adoption of the hybrid model. Cooper and Sommer (2016) highlight the applicability of mixed PM approaches to radical innovation projects. In Agile project management, team members adopt a "test-and-learn" approach (Dybå and Dingsøyr 2008), which clashes with the managerial needs of following a fast project schedule and action plan, resulting in tensions between top-down expectations and the bottom-up implementation, that might result in a lack of support for Agile teams (Karvonen, Sharp, and Barroca 2018). Agile teams must collaborate with managers to align their expectations on Agile project outcomes. Collaboration and increased vertical communication provide a clear overview of the capabilities of the teams, as well as the opportunities derived from the new Agile method. Management can gain an understanding of which projects are suitable for Agile rather than Stage-Gate project management and vice versa, or where the hybrid model may be more appropriate.

Conclusion

Companies in industries outside software development have adopted Agile methods. A hybrid approach for managing projects is a relevant topic for managers who want to increase their project flexibility through Agile without losing the structured project control of traditional Stage-Gate (Cooper and Sommer 2018). We identified key challenges organizations face when they try to integrate Agile with Stage-Gate project management and propose possible corrective actions to address inevitable challenges. For a successful integration of Agile into Stage-Gate and hybrid project management, three aspects require careful consideration: the gradual introduction of Agile, the organizational culture, and the usability of Agile methods. We offer PM professionals a series of principles supporting the introduction of Agile into traditional Stage-Gate contexts, and suggest practical actions companies can implement to successfully transition from pure Stage-Gate models to more flexible, and beneficial, hybrid project management approaches.

References

Ackermann, F., and Eden, C. 2011. Strategic management of stakeholders: Theory and practice. *Long Range Planning* 44(3): 179–96. doi:10.1016/j.lrp.2010.08.001

Adams, W. C. 2015. Conducting semi-structured interviews. In *Handbook of Practical Program Evaluation* 4th ed., edited by K. E. Newcomer, H. P. Hatry, and J. S. Wholey, 492–505. New Jersey: John Wiley & Sons. doi:10.1002/9781119171386.ch19

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

Bianchi, M., Marzi, G., and Guerini, M. 2020. Agile, Stage-Gate and their combination: Exploring how they relate to performance in software development. *Journal of Business Research* 110:538–553. doi:10.1016/j.jbusres.2018.05.003

Conforto, E. C., Salum, F., Amaral, D. C., Da Silva, S. L., and De Almeida, L. F. M. 2014. Can Agile project management be adopted by industries other than software development? *Project Management Journal* 45(3): 21–34. doi:10.1002/pmj.21410

Cooper, R. G. 1990. Stage-gate systems: A new tool for managing new products. *Business Horizons* 33(3): 44–54. doi:10.1016/0007-6813(90)90040-I

Cooper, R. G. 2009. How companies are reinventing their idea-to-launch methodologies. *Research-Technology Management* 52(2): 47–57. doi:10.1080/08956308.2009.11657558

Cooper, R. G. 2014. What's next? After Stage-gate. *Research-Technology Management* 157(1): 20–31. doi:10.5437/08956308X5606963

Cooper, R. G. 2016. Agile–Stage-gate hybrids: The next stage for product development. *Research-Technology Management* 59(1): 21–29. doi:10.1080/08956308.2016.1117317

Cooper, R. G., and Sommer, A. F. 2016. The Agile–Stage-Gate hybrid model: A promising new approach and a new research opportunity. *Journal of Product Innovation Management* 33(5): 513–526. doi:10.1111/jpim.12314

Cooper, R. G., and Sommer, A. F. 2018. Agile–Stage-gate for manufacturers: Changing the way new products are Developed. *Research-Technology Management* 61(2): 17–26. doi:10.1080/08956308.2018.1421380

Cooper, R. G., and Sommer, A. F. 2020. New-Product Portfolio Management with Agile. *Research-Technology Management* 63(1): 29–38. doi:10.1080/08956308.2020.1686291

Dingsøyr, T., Moe, N., and Seim, E. A. 2018. Coordinating knowledge work in multiteam programs: Findings from a large-scale agile development program. *Project Management Journal* 49(6): 64–77. doi:10.1177/8756972818798980

Dybå, T., and Dingsøyr, T. 2008. Empirical studies of Agile software development: A systematic review. *Information and Software Technology* 50(9-10): 833–859. doi:10.1016/j.infsof.2008.01.006

Goldstein, V., and Euchner, J. 2017. Transformation for growth at GE: An interview with Viv Goldstein. *Research-Technology Management* 60(6): 14–19. doi:10.1080/08956308.2017.1373045

Ito, J. 2017. The antidisciplinary approach. *Research-Technology Management* 60(6): 22–28. doi:10.1080/08956308.2017.1373047

Karvonen, T., Sharp, H., and Barroca, L. 2018. Enterprise agility: Why is transformation so hard? In: *Agile Processes in Software Engineering and Extreme Programming*, eds. J. Garbajosa, X. Wang, A. Aguiar. XP 2018. pp. 131–145. doi:10.1007/978-3-319-91602-6_9

MacCormack, A., Crandall, W., Henderson, P., and Toft, P. 2012. Do you need a new product-development strategy? *Research-Technology Management*. 55(1): 34–43. doi:10.5437/08956308X5501014

Moe, N. B., Dingsøyr, T., and Dybå, T. 2010. A teamwork model for understanding an Agile team: A case study of a Scrum project. *Information and Software Technology* 52(5): 480–491. doi:10.1016/j.infsof.2009.11.004

Pellizzoni, E., Trabucchi, D., and Buganza, T. 2019. When agility meets open innovation: two approaches to manage inbound projects. *Creativity and Innovation Management*. 28: 464–476. doi:10.1111/caim.12337

Saldaña, J. 2015. *The coding manual for qualitative researchers*. 3rd ed. Los Angeles: SAGE Publications.

Schwaber, K. 2004. *Agile Project Management with Scrum*. Redmond, WA: Microsoft Press.

Schwaber, K., and Beedle, M. 2001. *Agile Software Development with Scrum*. Upper Saddle River, NJ, USA: Prentice Hall.

Sommer, A. F., Hedegaard, C., Dukovska-Popovska, I., and Steger-Jensen, H. 2015. Improved product development performance through Agile/Stage-gate hybrids: The next-generation Stage-gate process? *Research-Technology Management* 58(1): 34–45. doi:10.5437/08956308X5801236

Thamhain, H. J. 2014. Assessing the effectiveness of quantitative and qualitative methods for R&D project proposal evaluations. *Engineering Management Journal* 26(3): 3–12. doi:10.1080/10429247.2014.11432015

THE INNOVATION RESEARCH INTERCHANGE IS WHERE TALENT IS FOUND

THE IRI CAREER CENTER IS YOUR ONLINE RESOURCE FOR QUALIFIED R&D AND INNOVATION PROFESSIONALS

EXPERIENCED | QUALIFIED | TALENTED

IRI Career Center is the exclusive online resource for candidates in the R&D and Innovation industry. The system offers you an extensive resume database and powerful, user-friendly searching capabilities that allow you to find the candidates that you need to meet your organizations recruitment goals.

As a part of the Engineering and Science Career Network, you'll have access to 85,000 top quality candidates. Visit the IRI Career Center today!

EMPLOYER RESOURCES
- TARGETED ADVERTISING
- FULL RESUME ACCESS
- JOB ACTIVITY REPORTS
- ADVERTISING ENHANCEMENTS
- EMAIL NOTIFICATIONS
- MEMBER DISCOUNTS

careers.iriweb.org