Harvard Business Review

AGILE PRACTICE:
THE COMPETITIVE ADVANTAGE FOR A DIGITAL AGE

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Agile development practices have steadily risen to become a trusted and preferred method of development for software teams everywhere. Using agile, organizations can respond to market changes faster, deliver higher quality software, and gain a significant competitive edge.

In today's competitive business environment, software development is increasingly driven by the focused needs of customers and businesses, both of whom require rapid response to their issues and concerns. Feedback must be immediately incorporated into products and engineering teams must be able to deliver the exact product their customer is looking for, on time and before a competitor does.

With so much at stake, it's no longer acceptable for CIOs to plan technology projects on an annual basis or to wait months for solutions to be developed. Instead, IT shops are under the gun to build software in much faster iterations. "Technologies such as cloud are fueling the demand for continual experimentation and rapid refresh rates for many applications," says analyst Jeff Kaplan, principal at THINKStrategies.

That's quite a paradigm shift from a few years ago when development was largely the domain of the development department, often working at a more measured pace on large-scale ERP initiatives and other enterprise projects. "Things are moving so fast and users are so much savvier these days that we need to find ways of not only shortening the time to market, but also creating applications that better fit business needs," says Paul Gartner, vice president, software engineering at National Geographic. "I've run across a lot of projects in the past where you are given requirements and come back six months later with an application, only to find that it's not what the business wanted at all."

In response, IT groups in multiple industries are now using agile practices to accelerate development and respond to change. For many, running in a more agile fashion represents a competitive advantage that delivers benefits from improved software quality and team productivity to lower costs. For example, Tom Paider, associate vice president, build capability, at Nationwide Insurance, says that software defects across the enterprise have dropped by 50 percent each year since 2009. At the same time, application development staff productivity has increased by 60 percent overall.

FIGURE 1

THE AGILE LIFECYCLE MARKET: FULL SPEED AHEAD

The worldwide market for agile application lifecycle management tools will more than double in revenue between 2014 and 2017.

REVENUE IN MILLIONS

2013	2014	2015	2016	2017
$291	$405	$572	$800	$1.10
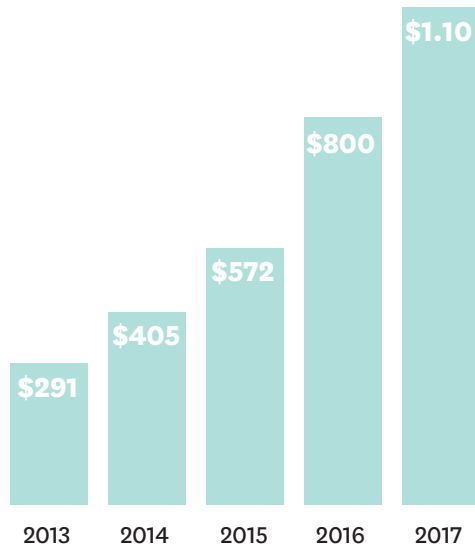
SOURCE IDC, May 2014

A GROWING REQUIREMENT FOR LARGE COMPANIES

Agile software development has been around since the '90s, but only recently has the practice gained mainstream acceptance as a way to boost corporate responsiveness. In fact, the practice is growing so quickly that IDC estimates the market size for agile lifecycle management tools will surpass $1 billion in worldwide revenues by 2017. figure 1 "The urgency companies sensed in the '90s wasn't quite real," says Jeanne Ross, director and principal research scientist at MIT's Center for Information Systems Research. "Today, if you can't do it fast it's too bad for you, because somebody else can."

The agile methodology was recognized in 2001 at a summit of practitioners who found consensus around core values captured in 12 principles called the "Agile Manifesto."[1] "Today agile is a normal term to use. But back when we started, there were multiple times when we thought we would be terminated if we didn't stop using the term," says Nationwide's Paider, which has been using agile since 2002.
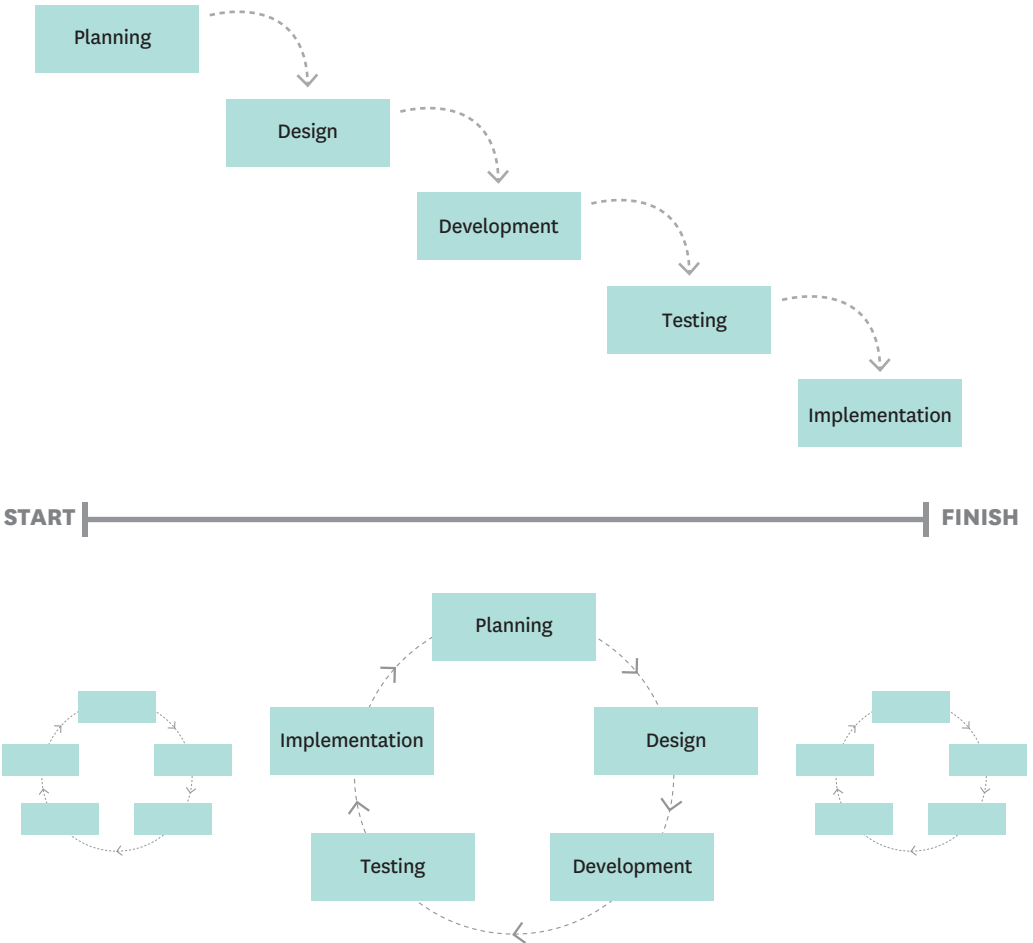
Agile software development fundamentally differs from traditional waterfall-style programming techniques made popular in the 1970s. The waterfall method breaks down software development into discrete steps: planning, design, development, testing and implementation, with each step

occurring in sequence with no overlap. figure 2 This linear approach can take a long time to complete projects—often years—and frequently makes it difficult to adapt to changing requirements and market needs, or fix mistakes made in an earlier step. Finally, waterfall development tends to spawn departmental silos, due to the functional nature of the discrete steps. With collaboration and teamwork lacking, "throw it over the wall" behavior is common among product managers, architects, developers and testers.

FIGURE 2

AGILE VS. TRADITIONAL WATERFALL DEVELOPMENT

WATERFALL

Sequential development process where all required activities in the preceding phases is complete

AGILE

Software development method based on iterative and incremental development encouraging rapid and flexible responses to change

SOURCE "SCALE AGILE THROUGHOUT THE ENTERPRISE," PwC, DECEMBER 2013

The concepts behind waterfall development aren't necessarily bad, says Curt Jacobsen, a principal at PwC in Los Angeles. "The thought was that it would help to write things down and make clear what the business wanted in order to get a finished product that reflected their requirements," he says. "It could take several years to develop, but it was fine. Nowadays, however, companies are increasingly pressured to innovate faster and smarter."

Nowhere is this truer than in the software industry, where companies sometimes create versions of apps with a shelf life of weeks. For example, according to Ray Wang of Constellation Research, the typical life of a mobile app between updates is just 37 days, and there are some companies that update applications daily. This need for speed is reflected in an increasingly large gap between business expectations and the development team's ability to deliver.

A Different Approach to Development

As CIOs search for ways to increase responsiveness, many have turned to agile development for help. Agile software development is geared to rapid delivery of tested software and continuous, adaptive delivery. An agile team builds software in small chunks, with iterative development cycles that span weeks rather than months. Daily standup meetings allow the teams to immediately adjust to changing business requirements, and business managers are intimately involved in the constant prioritization of what "user stories" (the term agile teams use for small development chunks) to tackle next.

"Business requirements are constantly changing and we have to respond quickly," says Maira Benjamin, manager of music engineering at online music site Pandora. "If we can iterate over small bits of code or functionality, it's much easier to change the team's direction."

Benjamin works along with 150 staffers spread across multiple agile teams, and loves the way that agile provides product managers with the transparency necessary to adjust priorities. "It gives us a good sense of what we can and can't do, and what we need to give up to execute during a sprint," she says.

Nationwide's Paider looks at agile on a larger scale, as the company fields a team of more than 8,000 IT staffers with an IT budget of more than $1 billion. His company's years of experience with agile have helped Paider document specific benefits. "Our primary drivers are improved quality and speed to market," he says. Other benefits Paider and others attribute to agile include increased productivity, lower costs and even increased employee satisfaction. figure 3

MAKING AGILE WORK

There's no doubt that agile has entered the mainstream as far as adoption goes. Zubin Irani, managing director of cPrime, an agile coaching and training company, says that his company trains about 1,000 people a month through classes. "When we first started in 2009, we had to sell people on going agile," he says. "Now, the conversations are about how fast should companies adopt agile, or how to improve existing efforts."

That last point is key: In spite of the business urgency driving agile's increasingly mainstream status, many companies still wrestle with how to get more from their agile implementations, says Ross. "There's still a huge gap between companies that are great at it versus those that are not," she says." As PwC's Jacobsen puts it, "We could have almost an entire practice around fixing broken agile teams."

FIGURE 3

THE PROMISE OF AGILE DEVELOPMENT

According to PwC internal benchmarks, agile software development offers big benefits across multiple areas.

DEVELOPMENTAL GOAL	IMPROVEMENT WITH AGILE
Quality	Defect escape rates decrease
Time to market	Improves 18–20% WIDE RANGE REFLECTS INDUSTRY VARIATIONS
Productivity	Improves 14-95% WIDE RANGE REFLECTS DIFFERING TYPES OF SOFTWARE BEING BUILT
Cost	Reduces costs by 7%-29%
Employee satisfaction	Improves 20%-40%

SOURCE PwC, 2014

Underestimating the time and effort involved to implement agile successfully appears to be a big part of the problem.

Embrace Cultural Change

"The agile manifesto is very general, and leaders often think that it's going to be fast and easy to implement—you just hire a couple of good people and turn them loose," says Jacobsen. Such an assumption couldn't be further from the truth. Companies must wrestle with both organizational and structural changes from the outset. Just the fact that many teams have a business user onboard represents a huge mind shift. Inevitably, switching to agile requires significant process and culture change, from both business process owners and developers. "It's important for a broader set of stakeholders to play a role," says Jacobsen.

Adopting agile practices may start in the IT department, but many companies find that for agile to work, collaboration needs to move well beyond software development and become part of a changed business culture. Adjusting to change at the corporate level is never easy, so it's not surprising that many organizations find this aspect of agile the most difficult of all. figure 4

Model New Behavior

Effecting organizational change also requires far more than giving pep talks to developers. "Just because you write 'empower' on the wall doesn't mean anybody is feeling empowered," says Paider. Instead, Nationwide institutes behavior-driven changes by sending coaches out to the teams to model new behavior, and to listen to concerns from the team. Paider calls it getting people to "act their way into thinking" rather than "thinking their way into acting."

Take daily stand-up meetings, for example—hardly a fixture in most business today. "Nobody thinks it's a good idea at first, but after a few weeks you can't imagine not doing it," says Paider.

Keeping a coach on the team in the early days also ensures that the group doesn't lapse into old habits. Most teams will generally internalize the new habits in four to six "sprints," an agile term for repeatable work cycles lasting from one to four weeks in duration. In the meantime, it's helpful to have a coach around to keep the team on track.

Extend Agile to All Developers

Software teams today comprise more than developers and engineers, so organizations should evaluate whether everybody within the larger development environment is using agile. Functions such as product managers, UI/UX designers, architects and other roles all play a role in development, so they need to practice the same methodology. "It's super important for a broader set of stakeholders to play a role," says Jacobsen.
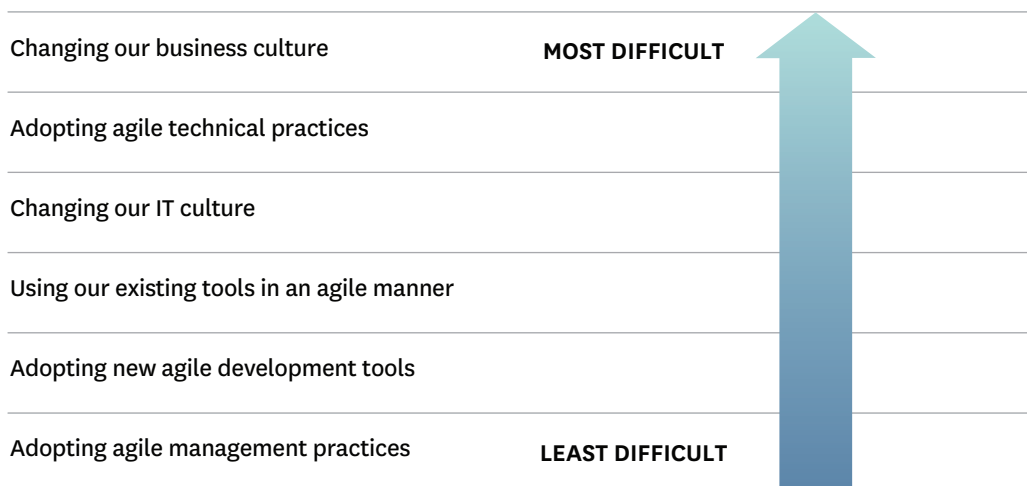
Define Agile for *Your* Company

Agile comes in many forms, and lacks any procedural handbook like those used for waterfall projects. As a result, developers with previous agile experience often bring different interpretation of agile to new teams. For example, the first agile team at Trulia, an all-in-one real estate portal, started developing an agile framework "that was very much someone else's version of agile," says Nate Van Dusen, engineering program management director at the company. "It was a version of agile that worked at that time for the situation and led to a lot of success—for example, the engineering lead learned to closely partner with the product manager because we had no scrum master. But as the company grew, the things that made us successful became hindrances."

FIGURE 4

CHANGING THE BUSINESS CULTURE

How difficult were the following issues to address during agile adoption?

Changing our business culture	**MOST DIFFICULT**
Adopting agile technical practices	
Changing our IT culture	
Using our existing tools in an agile manner	
Adopting new agile development tools	
Adopting agile management practices	**LEAST DIFFICULT**

SOURCE AGILE ADOPTION SURVEY, SCOTT AMBLER + ASSOCIATES, 2014

In order to keep agile flexible and responsive at the rapidly growing company, Van Dusen and his team later sat down to define the agile capabilities that worked best for Trulia. Facing the need to scale agile development across a team of 265 engineers, including offshore developers, Van Dusen instituted higher-level scrum processes, such as quarterly retrospective and planning processes using an agile portfolio tool. By doing so, Trulia fostered cross-team knowledge and was better able to plan for issues such as software dependencies between different teams.

BUILD BETTER COMMUNICATIONS AMONG DEVELOPERS

Agile lives and dies on how effectively a team communicates, both internally and to business stakeholders. When implemented properly, project visibility greatly increases and communication breakdowns occur far less frequently. That's because everyone can see, and constantly discuss, what everyone else is working on at any given moment. How you bake increased communications into your agile process will vary by the size and scope of your initiative, but the following tactics are foundational:

Co-locate When Possible

Because many companies augment software development with offshore agile teams, co-location is not always possible—but when it is feasible, do it. Nationwide got rid of cubes and walls, and located teams in group pods, a factor that Paider says is critical. "It can have a huge effect on the culture," agrees Gartner. "People who work closely together build relationships quickly and teams that are co-located have an easier time than ones that operate on a fully remote work style. Working closely together goes a long way toward establishing long-term trust," he says.

For companies with distributed teams, collaboration tools can help foster the feeling of co-location in a virtual environment. "We have an electronic representation of our agile project board in real time, and it does help collaboration across multiple time zones," says Benjamin.

Give the Business a Voice

Making sure the product "owner" (often the product manager) is at the same location as the developers is also critical. Online retailer Gilt regularly embeds product management staffers into its agile group, which both adds the voice of the business to everyday proceedings and provides a regular communications conduit. For example, one group has a merchandising expert on the team to help them figure out the most attractive way to position products and enhance offerings from different vendors.

"Having her on the team day to day helps us iterate really fast and change things very quickly," says Heather Fleming, a senior program management office director (PMO) at the company. Such practices inevitably help bridge the IT/business gap.

Foster Collaboration and Learning

Learning and communication also need to extend across the entire agile environment, particularly as agile development groups grow beyond 100 people and face-to-face meetings with everyone are no longer practical. For example, software dependencies often cross multiple teams, particularly in complex products being built by multiple groups. In those cases, a standardized communication hub is almost always needed. "When you have multiple products integrated with each other, a change in product 'A' might break product 'B' or 'C,' so you have to coordinate," says Irani.

> **Agile development practices impact many business functions outside of software development, so organizations need to expand agile thinking beyond the programming team to be most effective.**

One of Paider's favorite methods for disseminating knowledge is a practice he calls "Teaching Thursdays," bi-monthly practitioner-led classes that run on Thursday afternoons. "You are either taking a class, teaching a class, or developing curriculum," he says. Last year, the company ran about 190 sessions on topics ranging from coding to running triathlons. "Associates know what they need to learn quicker than management, so we wanted to wipe away the bureaucracy and give them the power to create a learning environment," he says.

EXPAND AWARENESS OUTSIDE OF DEVELOPMENT

Agile development practices impact many business functions outside of software development, so organizations need to expand agile thinking beyond the programming team to be most effective. For example, traditional portfolio management activities involving the annual evaluation of technology initiatives do not naturally jibe with agile's constant reevaluation process. "If you teach a development team to act in an agile way but portfolio requirements are coming in in the old way, you're only doing part of it," says cPrime's Irani.

Foster More Agile Business Processes

To ensure agile's widespread success, companies need to incorporate agile thinking into everyday business processes, including management's budgeting and portfolio planning cycle. The same holds true for other administrative functions, such as finance and HR. For example, HR will need to rewrite job positions and overhaul performance expectations to support agile. "Bring them along and give them a voice early," says Nationwide's Paider. "It makes things so much easier."

Nationwide also uses a lean management system to change the behavior of the management team. "We do this to move them towards being coaches and providing needed support to the front-line teams instead of being taskmasters," says Paider. For example, the company changed everything about how the managers work, from relocating them out of their offices to seats with their teams in collaboration spaces, to how often they interact with their teams, to the types of questions they ask. "Our big theory was that a lot of agile teams fail not because team members resist, but because companies are failing to transform their management systems," says Paider. "In order to empower teams to solve problems and innovate, management can't just change the way they view the people doing the work, management must also change the way they do work themselves."

Secure Senior Management Support

While middle management support is key, transformation on a grand scale often requires support from even the most senior ranks in the organization.For example, National Geographic's Gartner says that C-level support played a big role in agile success at his company. "It was fantastic to have that kind of top-level backing. A lot of times when agile bubbles up from the bottom, you hit road blocks through different levels of management." Similarly, Nationwide's Paider says

top-level executive support was crucial in transforming behaviors at the middle management level, which often resists change. "Sometimes the transformation role is tough, and having our leadership team as huge supporters makes all the difference in the world," he says.

Standardize Definitions

Just because agile developers use terms like "user stories" and "points" to estimate the time needed to complete a coding project, it doesn't mean the rest of the company is following along. In order to build accurate estimates and communicate clearly, companies must first define what all these concepts mean to developers and business users alike.

At Trulia, for example the developers succeeded in getting business functions such as finance to adopt common agile language and definitions. Today many departments use an agile portfolio planning tool that works in terms of themes, epics and user stories—the same nomenclature used by the agile team. "Now there's no need to translate traditional portfolio planning goals into an agile format since they've already been divided into smaller, iterative chunks," says Trulia's Van Dusen.

TECHNICAL BEST PRACTICES

Beyond the cultural shift that agile demands, technical best practices and tools play a big role in on-going success. When it comes to migrating to agile, the leaders in the field emphasize the following for development teams:

Embrace Automated Testing and Integration

As the code base expands throughout a sprint, Paider says that his teams increasingly depend on automated testing and integration. "Today the tech is to the point where you can run end-to-end regression testing in minutes rather than days," points out PwC's Jacobsen. "There's even an emerging field of engineers who specialize in this." National Geographic's Gartner says that continuous integration streamlines the deployment pipeline considerably. "You push a button when you are done coding, and it triggers automated testing and moves things to the testing environment; it also notifies testers so they can begin-front end testing," he says.

Get an Enterprise View of the Architecture

Agile development does not work in isolation. Software teams need to understand the impact of each project on the existing technology infrastructure if they want to support things like a clear flow of information based on a single view of the customer. "You don't want to build a new customer file for a new application just because you can do that fast. You figure out how to link to existing customer information," says Ross. "If you don't have a platform that provides easy access to data it will take longer to do, but it will be done right."

Tighten Integration Between Tools

Agile teams need access to accurate, up-to-date information on the status of any project, release or story that reflects the group's daily progress as well as changing priorities. How teams do this varies widely. Smaller co-located groups can create a physical board with post-it notes and white boards, which is what Nationwide's teams generally use. Other teams rely on automated management suites and dashboards that centralize and standardize information. The point, says Van Dusen, is to make sure that everybody is making decisions based on the same information.

Use a Centralized Collaboration Platform

Particularly important when working with distributed teams, agile groups need a tool that can be used across the entire agile team and lifecycle by all team players, including developers, product managers and line of business executives. The tools used for this purpose don't necessarily have to be full-featured or expensive to get the job done. Gartner, for example, uses a combination internal and external chat rooms along with the team's agile collaboration software to keep his teams in synch.

Gilt's Fleming also likes internal chat rooms, which are used by developers and functional staffers alike. For example, there's one chat room for the program management office to discuss portfolio planning and cross-team management. Her team also uses a mobile app to access the rooms, which she says is incredibly helpful: "I commute two hours each way, so it's a great way to keep in touch."
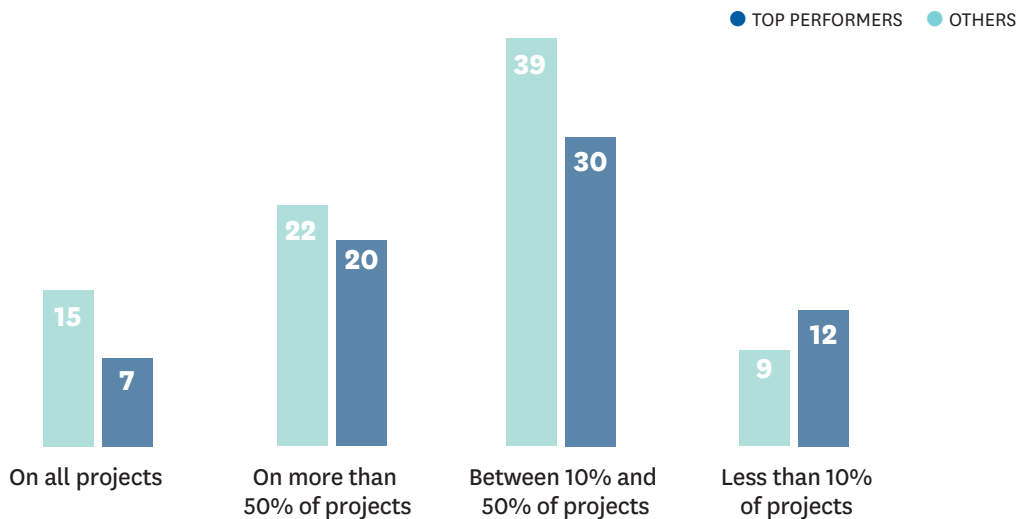
Integrate the Workflow

Many teams opt to standardize on tools throughout the business and technical groups in order to give everybody the same workflow information. At National Geographic, for example, the team uses a centralized dashboard with metrics that measures things like QA and workflow progress. The toolset also enables automated and seamless transfer of information. Product managers start by entering stories, which are then broken down into acceptance criteria, and then moved into the sprint process. "Code reviews and other activities are handled directly within the tools," he says.

FIGURE 5

AGILE PROCESSES IMPROVE INTEGRATED DIGITAL DELIVERY

Percentage of respondents currently using agile processes with their organization.

● TOP PERFORMERS ● OTHERS

	On all projects	On more than 50% of projects	Between 10% and 50% of projects	Less than 10% of projects
Others	15	22	39	9
Top Performers	7	20	30	12

SOURCE "6TH ANNUAL DIGITAL IQ SURVEY," PwC, 2014

> **Agile succeeds best as an executive-led initiative that includes well-thought out strategies to effect foundational change across an organization.**

SUMMARY AND CONCLUSION

The benefits of agile software development are real, especially for companies looking to accelerate time to market and move quickly into the digital economy. Agile offers benefits in several areas, as many companies report that agile increases software quality and team productivity while lowering costs and time to market. In fact, according to a recent PwC survey, companies that use agile processes in any capacity are twice as likely to be top performers. figure 5

Although agile methodologies are now widely accepted, many companies still struggle to get the most of their agile initiatives. Experts and practitioners agree that doing agile right is not a cosmetic fix. Rather, companies need to dedicate time and resources to several key areas:

- **Cultural change led from the top.** Agile succeeds best as an executive-led initiative that includes well-thought out strategies to effect foundational change across an organization.

- **An agile flavor that works for you.** From scrum to Kanban, there are a lot of agile processes out there. Rather than using whatever discipline your team already knows, take time to assess your company's business requirements and choose the agile capabilities that fit most closely.

- **Communication.** From co-locating to using collaborative technical platforms, agile teams need to deploy methods that support clear and constant communication. On-site coaching often helps new teams internalize this change in the early days.

- **Supporting technical tools.** Automated testing and continual integration via a collaborative and centralized agile platform is critical to agile execution, particularly for larger agile initiatives.

Companies that have worked through these issues say agile is well worth the effort. Indeed for many, agile is a crucial tool for surviving in the digital economy—and it's not just for software developers. "Our marketing team went out and created their own Kanban board and started using agile practices," says Gartner. "You don't have to be in software development to be agile."

Indeed, such business-side adoption provides further evidence of agile's continued growth and mainstream success. From agile software development to agile as a business model, organizations in the digital economy realize that agile is a standard for success moving forward.

ENDNOTE

1   http://www.agilemanifesto.org/principles.html

Agile Transformations and the Culture of Trust

Let's jump straight to the punchline: all the agile tooling in the world won't make you agile.

That's probably not what you expected to hear from a company that builds and peddles sophisticated ALM tools. But it's the truth.

Debating the merits of tracking work with sticky notes on a whiteboard vs. using a digital issue tracker like Atlassian's JIRA won't get you any closer to realizing agile's promise. What *will* get you there is discussing the cultural and organizational changes that agile demands, and the unique way you'll go about implementing them.

As you just learned, that's the biggest struggle for most companies. But it's worth it. Because culture is to agile as 1,000 island dressing is to the Big Mac: it's the secret sauce that separates ninja-level companies from the arthritic. Over the years we've seen much of our customer base adopt agile methodologies (as evidenced by their purchase of JIRA Agile). And we know agile becomes a competitive advantage for them. They tell us so when we see them at industry events–not to mention the fact that they add more and more users to their JIRA Agile licenses!

Atlassian has always operated in an agile way. We were fortunate enough to emerge after the Agile Manifesto, so we didn't have to go through an agile transformation–it's just in our DNA. What that looks like on the ground is an open, cubicle-free office space so developers, product owners, marketers, and support staff can fling ideas around and fire questions back and forth with the least possible friction. It's product owners, marketers, and developers building product roadmaps collaboratively to make sure we've got the right balance of business requirements and technical debt remediation. It's engineering managers who investigate new technologies, and mentor 20 or more direct reports because they aren't burdened with organizing their teams' work–we trust developers to self-organize with the help of product management.

That last bit is critical: trust.

Agile companies post their product roadmaps where anyone in the company can see it. They broadcast bug counts and build results on wallboards. They get a proof-of-concept out the door and iterate on it rather than succumb to analysis paralysis. They reflect on their successes and failures regularly and share those insights with other teams.

Why? Because we work faster when we trust each other enough to ditch heavyweight approval and oversight processes, and simply do our work out in the open instead.

Now, this brave new way of working isn't for everyone. When you embark on an agile transformation, go in knowing that you'll lose a few people along the way. And that's unfortunate. But those who stay the course with you will be invested and energized because they've helped define what agile means to your company–and to them as individuals.

So here's to the journey. Here's to continuous improvement. And here's to making software (better).

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