15th State of Agile Report

Agile adoption accelerates across the enterprise
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Welcome to the 15th State of Agile Report, the longest continuous annual series of reviews of agile techniques and practices.

This year’s report highlights several important milestones in Agile’s journey from its initial principles aimed at software development teams to its current widescale adoption to drive business value and deliver speed and quality in software delivery.

As we reach 20 years since the creation of the “Manifesto for Agile Software Development,” we feel it is a good time to look back and reflect at the remarkable journey Agile has experienced over these past two decades.

Since the global pandemic emerged in early 2020, organizations are now aware of the opportunities and challenges ahead and realize being successful in the digital age requires agility in software development and delivery, as well as business strategy and operational execution. With today’s enterprises under increased pressure to respond quickly to the needs of their customers and stakeholders, they must bring new products to market faster and accelerate improvements to existing solutions and services.

This report offers a chance to look at the role Agile has played during this tumultuous period and to reflect on how the benefits of agile practices can help organizations adapt and excel in the path ahead.

As you explore the 15th State of Agile Report for current trends in agile software delivery with key highlights from past surveys, clearly Agile has the potential to be a steadying force in uncertain times.

To recognize the significance of the 15th edition of the State of Agile survey, we spoke with many notable agile software delivery experts and influencers to get their take on the past, current and future states of agile software delivery. You’ll see their views intermixed throughout the report, providing more depth and context to the findings. We’d also like to thank both Scrum.org and Scaled Agile for their help in distributing this year’s survey.
What’s Trending

Remote/hybrid workforces require a new way of thinking

For years, respondents to the State of Agile surveys indicated a workforce becoming increasingly distributed and the frequent outsourcing of work to external vendors located across the globe. Unsurprisingly, this year’s survey saw a dramatic increase in this move toward remote work and a clear indication that this direction isn’t temporary.

- **Only 3%** indicate they plan to return to the office full time
- **25%** of respondents say they will remain fully remote in a post-COVID world
- **56%** favor a hybrid approach, returning to the office regularly but not daily

This mix of both remote and co-located work will present a challenge for organizations looking to continue to build on their success in 2021 and beyond. The State of Agile survey respondents aren’t alone in this realization.

In reflecting on how COVID-19 has changed the global workforce, Gartner research found that,¹

> “In response to the pandemic, organizations are accelerating the adoption of new processes, practices, and technologies to support changes to product and service delivery.”

Gartner also found that organizations will need to adapt to succeed, stating “The radically distributed software engineering resulting from the COVID-19 pandemic exposed process and skills gaps that impact the ability of organizations to successfully deliver applications. The ‘new normal’ will be led by organizations that are able to quickly identify and address the critical skills needed to drive their business.”¹

Agile goes mainstream

Perhaps fueled in part by an increasingly distributed global workforce, this year’s report sees an explosive increase in Agile adoption across the functions of the enterprise. Since the first report 15 years ago, we’ve seen a steady increase in the number of organizations adopting agile practices and processes, both inside Development and within non-IT groups including Finance, Human Resources, and Marketing.

This year’s findings indicate significant growth in Agile adoption within software development teams, increasing from 37% in 2020 to 86% in 2021.

Growth in non-IT lines of business also rose significantly, doubling in adoption since last year’s report. What’s stopping even broader adoption? The survey shows no fewer than ten barriers to adoption, including:

- Inconsistencies in processes and practices 46%
- Cultural clashes 43%
- General organizational resistance to change 46%

Despite these challenges, it’s clear that respondents continue to see the value of broadening Agile adoption as a way to achieve critical business outcomes. In fact, 2/3 of respondents identified managing priorities, visibility, or alignment between business and IT as seeing the strongest positive impact from Agile adoption. Conversely, organizational culture — once regularly cited as a barrier to adoption — is no longer a top challenge, with only slightly more than four in 10 respondents identifying it as a barrier.

Driving DevOps and value stream management initiatives

More than ever, organizations are under increasing pressure to deliver features that provide greater value and new solutions that improve efficiency and reliability. Year after year, more respondents tell us their organizations view both DevOps and value stream management (VSM) initiatives as essential to achieving these goals.

3/4 of respondents say DevOps transformation is important or very important to their organization

2/3 are involved with implementing or planning a VSM initiative

“We placed a focus on the business and transforming how we work first and foremost. We used that as a catalyst to begin to drive agility through the organization — speed of decision making, clarity of focus on purpose, showing that we can deliver incremental value — without forgoing the larger picture.”

David Paine, Domain Information Office Toyota Financial Services
Company Experience with Agile

How long has your company been practicing agile?

- <1 year: 7%
- 1-2 years: 33%
- 3-5 years: 22%
- 5+ years: 32%
- Don’t know: 4%
- Not practicing agile: 2%

94% report their company is practicing Agile.

65% say their company has significant experience with Agile.

How many of your company’s teams have adopted agile practices?

- None: 3%
- Less than half: 46%
- More than half: 34%
- All: 52%

Over half of respondents (52%) say either a majority or all of their company’s teams have adopted Agile.
Multiple industry studies have shown a growth in distributed teams. This survey indicates that 89% of teams are geographically distributed.

Remote work isn’t just a temporary trend during COVID-19 — a mere 3% say they will be back in the office all of the time after COVID-19.
Agile Adoption

Supported by shifts toward value stream management and business agility, survey respondents indicate their organizations are now better able to meet their agile transformation goals based on their continued adoption of agile practices.

The two most urgent reasons for adopting Agile are the speed and flexibility required by working environments that continue to be both unpredictable and volatile. These are closely followed by a continued need to focus on alignment across teams to streamline the software delivery process.

What were the most important reasons for adopting Agile within your team or organization?

(*Respondents were able to select multiple responses to this question.*

- **64%** Enhance ability to manage changing priorities
- **64%** Accelerate software delivery
- **47%** Increase team productivity
- **47%** Improve business and IT alignment
- **42%** Enhance software quality
- **41%** Enhance delivery predictability
- **40%** Improve project visibility
- **39%** Reduce project risk
- **39%** Better respond to volatile market conditions
- **35%** Improve team morale
- **24%** Improve engineering discipline
- **24%** Better manage distributed teams
- **23%** Reduce project cost
- **20%** Increase software maintainability
- **5%** Other

**STATE OF AGILE LOOK BACK**

The reasons organizations want to adopt Agile remain unchanged for several years. However, we have seen an increase in their ability to meet those goals, particularly as DevOps and agile practices expand across the organization.
Agile Adoption

Business and IT alignment and visibility across agile teams were highlighted as key to leading agile adoption. 2/3 of respondents identified management, visibility, and alignment as receiving the strongest positive impact from adopting agile approaches.

Has the implementation of agile positively impacted each of the following areas within your company?

<table>
<thead>
<tr>
<th>Area</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing changing priorities</td>
<td>70%</td>
</tr>
<tr>
<td>Visibility</td>
<td>70%</td>
</tr>
<tr>
<td>Business/IT alignment</td>
<td>66%</td>
</tr>
<tr>
<td>Delivery speed/time to market</td>
<td>64%</td>
</tr>
<tr>
<td>Team productivity</td>
<td>60%</td>
</tr>
<tr>
<td>Team morale</td>
<td>60%</td>
</tr>
<tr>
<td>Managing distributed teams</td>
<td>52%</td>
</tr>
<tr>
<td>Predictability</td>
<td>51%</td>
</tr>
<tr>
<td>Risk reduction</td>
<td>49%</td>
</tr>
<tr>
<td>Software quality</td>
<td>45%</td>
</tr>
<tr>
<td>Engineering discipline</td>
<td>45%</td>
</tr>
<tr>
<td>Software maintainability</td>
<td>35%</td>
</tr>
<tr>
<td>Cost reduction</td>
<td>23%</td>
</tr>
</tbody>
</table>

When assessing the metrics organizations use to determine agile transformation success, the survey shows three in five respondents look to externally focused measures of success.

How does your organization measure success of Agile transformations?

<table>
<thead>
<tr>
<th>Metric</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer/user satisfaction</td>
<td>59%</td>
</tr>
<tr>
<td>Business value</td>
<td>58%</td>
</tr>
<tr>
<td>Business objectives achieved</td>
<td>50%</td>
</tr>
<tr>
<td>On-time delivery</td>
<td>48%</td>
</tr>
<tr>
<td>Quality</td>
<td>48%</td>
</tr>
<tr>
<td>Productivity</td>
<td>41%</td>
</tr>
<tr>
<td>Organizational culture/morale</td>
<td>41%</td>
</tr>
<tr>
<td>Process improvement</td>
<td>39%</td>
</tr>
<tr>
<td>Predictability</td>
<td>37%</td>
</tr>
<tr>
<td>Project visibility</td>
<td>30%</td>
</tr>
<tr>
<td>Product scope</td>
<td>19%</td>
</tr>
<tr>
<td>Don't know</td>
<td>10%</td>
</tr>
<tr>
<td>Other</td>
<td>4%</td>
</tr>
</tbody>
</table>
Agile delivery success is focused on external measures, with almost half of respondents focused on business value delivered 49% and customer satisfaction 49%. Additionally, delivery velocity 45% is seen as an equally important measure of Agile success.
Agile Challenges

“"The future requires agile at scale, being able to achieve DevOps, being able to achieve flow, have everybody operating with an agile mindset, having the leaders understand that this is a new way of working — they need to get it."

Dean Leffingwell, Co-founder and Chief Methodologist of Scaled Agile

Organizations face a variety of challenges as they introduce agile techniques, practices, and tools.

In fact, **30% of respondents** identified no fewer than ten different challenges faced while adopting Agile.

The most significant Agile adoption barriers include:

- Inconsistencies in processes and practices **46%**
- Cultural clashes **43%**
- General organizational resistance to change **42%**
- Lack of skills and experience **42%**
- Absence of leadership participation **41%**
- Inadequate management support and sponsorship **40%**

**The key challenges organizations face when adopting Agile have remained largely unchanged for the past several years.** Challenges with organizational culture, resistance to change, and lack of support and skills continue to be problems.
Agile Challenges

What are the most significant barriers to adopting and scaling Agile practices in your current organization?

- 46% Inconsistent processes and practices across teams
- 43% Organizational culture at odds with agile values
- 42% General organization resistance to change
- 42% Lack of skills/experience with agile methods
- 41% Not enough leadership participation
- 40% Inadequate management support and sponsorship
- 35% Insufficient training and education
- 35% Pervasiveness of traditional development methods
- 31% Lack of business/customer/product
- 30% Fragmented tooling and project related data/measurements
- 22% Unwilling to admit mistakes and learn from delivery failure
- 17% Minimal collaboration and knowledge pairing
- 13% Regulatory compliance or government issue
- 7% Don't know
- 5% Other

**STATE OF AGILE LOOK BACK**

Organizational culture and Agile values are becoming more aligned. A few years ago, more than 8 out of 10 respondents identified culture as a significant barrier to Agile adoption. That number now stands at slightly more than 4 in 10.
Agile Techniques and Maturity

The survey once again highlighted Scrum as the most popular Agile approach with 66% identifying it as the methodology they follow most closely, with an additional 15% who follow derivations of Scrum (ScrumBan 9% and Scrum/XP 6%).

Which Agile methodology do you follow most closely at the team level?

In terms of agile techniques and practices, at least four out of five respondents cited:
- Daily standups 87%,
- Retrospectives 83%, and
- Sprint/iteration planning 83% were used.

In addition:
- Kanban boards 77%,
- Task boards 67%, and
- Spreadsheets 66% are all widely used for agile planning.
Over the years, the State of Agile survey determined “practices used” as an indication of the maturity of Agile adoption. Most notably, we have seen the use of Scrum increase from 40% of respondents in the first survey to 66% in the most recent. Other approaches such as extreme programming (XP) dropped from use by almost a quarter of respondents to less than 1% today.

In contrast, the use of specific individual Agile techniques and practices remained relatively constant across the surveys. Key activities including daily standups and retrospectives have been at the heart of agile approaches, supported by sprint planning and reviews. Perhaps the most significant growth trend has been the use of kanban boards for workflow management and visualization. This approach is now used by 61% of respondents, steadily increasing from 6% in the first survey.
Almost nine in 10 respondents use daily standups while over four in five use retrospectives and sprint/iteration planning.

Which of the following Agile techniques and practices does your organization use?

- Daily standup: 87%
- Retrospectives: 83%
- Sprint/Iteration planning: 83%
- Sprint/Iteration reviews: 81%
- Short iterations: 63%
- Kanban: 61%
- Planning Poker/Team Estimation: 58%
- Dedicated customer/product owner: 56%
- Release planning: 54%
- Product roadmapping: 52%
- Single team: 51%
- Frequent releases: 51%
- Story mapping: 40%
- Agile Portfolio planning: 32%
- Common work area: 24%
- Agile/Lean UX: 23%
- Other: 3%

3/4 of respondents say they use kanban boards while 2/3 use taskboards and spreadsheets.

Which Agile planning and delivery tools do you currently use?

- Kanban Board: 77%
- Taskboard: 67%
- Spreadsheet: 66%
- Agile Project Management Tool: 64%
- Bug Tracker: 62%
- Wiki: 62%
- Product Roadmapping: 58%
- Automated Build Tool: 54%
- Unit Test Tool: 54%
- Continuous Integration Tool: 53%
- Wireframes: 51%
- Release/Deployment Automation Tool: 47%
- Requirements Management Tool: 43%
- Traditional Product Management Tool: 43%
- Product and Portfolio Management (PPM) Tool: 39%
- Static Analysis: 37%
- Story Mapping Tool: 36%
- Automated Acceptance Test Tool: 35%
- Timecards: 29%
- Refactoring Tool: 24%
- Index Cards: 19%
- Customer Idea Management Tool: 18%
While a wide range of scaling frameworks are in use, the Scaled Agile Framework (SAFe®) continues to be the most popular with 37% of respondents identifying it as the framework they most closely follow. SAFe® significantly outdistances the next nearest scaling method, Scrum@Scale/Scrum of Scrums (9%).

Over the last several years, there has been increasing awareness of both the opportunities and challenges offered by scaling Agile practices across the organization. Initially, scaling agile was addressed through a “Scrum of Scrums” approach. Over the past five surveys, we have seen the use of SAFe® grow significantly to become the dominant approach, in use by more than a third of respondents.
Agile Tooling

Agile practitioners rely on a wide variety of tools to support Agile techniques and practices. However, the survey indicated that two tools, Atlassian Jira (81%) and Digital.ai Agility (70%), were the most highly recommended to colleagues by their users.

Based on your experience using agile planning tools, which ones would you recommend to someone else?

*Respondents were able to select multiple responses to this question.

From the earliest days of the State of Agile survey, tool support has been a key component determining the success of Agile.

A varied collection of tools is employed, ranging from generic planning and management tools (e.g., Microsoft Office) to specialized commercial offerings.

In the past few years, Atlassian Jira and Digital.ai Agility have seen the highest percentage of recommendations from their users.
**DevOps Initiatives**

“I think you would struggle to become a digital enterprise without using Agile and DevOps.”

Helen Beal, Chief Ambassador DevOps Institute and Chair of the Value Stream Management Consortium

With **74%** of respondents stating they either have a current DevOps initiative or are planning one, DevOps maintains a steady strong level of investment.

<table>
<thead>
<tr>
<th>DevOps Initiative</th>
<th>Currently Underway</th>
<th>Planning</th>
<th>Not Initiatives</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>No DevOps initiatives</td>
<td>13%</td>
<td>18%</td>
<td>56%</td>
<td>13%</td>
</tr>
</tbody>
</table>

**Do you have a DevOps initiative currently in process?**

**How important is DevOps within your organization?**

<table>
<thead>
<tr>
<th>Importance</th>
<th>Very Important</th>
<th>Important</th>
<th>Somewhat Important</th>
<th>Not Important</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>44%</td>
<td>31%</td>
<td>16%</td>
<td>9%</td>
<td>13%</td>
<td>13%</td>
</tr>
</tbody>
</table>

Broad organizational recognition and acceptance of DevOps continues to grow. In the current survey, **75%** of respondents indicate DevOps is important or very important to their organization with only **9%** stating it has no importance.

The interest in DevOps has been a notable trend throughout the past few editions of this survey. Over the past four years, the percentage of companies who consider DevOps transformation “Very Important” has continued to increase (**33% to 42%**) while those who believe DevOps to be “Somewhat Important” or “Not Important” has decreased (**35% to 25%**).
Improving DevOps Success

DevOps helps increase software delivery frequency and reliability while reducing bugs in production. Accelerating software delivery and improving quality are shown to be the top measures of success for DevOps transformation initiatives.

\( \frac{2}{3} \) of respondents say accelerated delivery speed is the most critical measure of success for their DevOps transformation initiatives while three in five say it is improved quality.

What are the most critical measures of success for your DevOps transformation initiatives?

- 67% Accelerated delivery speed
- 61% Improved quality
- 47% Reduce risk
- 45% Increased customer satisfaction
- 43% Improved relationship between “Dev” and “Ops”
- 35% Decreased IT costs
- 35% Delivery aligned with business objectives
- 32% Increased visibility of flow of value to users
- 28% Ensure compliance/governance
- 7% Other

STATE OF AGILE LOOK BACK

Over the last several years, delivery speed, improved quality, customer satisfaction, and compliance/governance have steadily increased in importance, reflecting a growing focus on outward-facing metrics that directly impact customer experience.
“While value streams are a critical aspect of lean methods, it’s a common misconception that improved efficiency is their primary objective. Every value stream’s goal is to deliver the maximum amount of value to the customer, with the highest possible quality and delight in the shortest sustainable lead time.”

Richard Knaster, Chief Scientist, Value Stream Management, Digital.ai

Introduced in last year’s State of Agile survey, value stream management continues to be an important focus for respondents. As defined in the current study, VSM is a combination of the people, processes, and technology that maps, optimizes, visualizes, measures, and governs the flow of business value (delivered by epic, stories, work items) using end-to-end enterprise software delivery pipelines spanning from idea through development and into production.

Consistent with last year, more than half (56%) of respondents have implemented or are planning to implement VSM and an additional 23% report their organization is interested in VSM. This data is consistent with Gartner research that predicts “By 2023, 70% of organizations will use value stream management to improve flow in the DevOps pipeline, leading to faster delivery of customer value.”

About the Survey

The 15th State of Agile survey was conducted between February and April 2021.

Sponsored by Digital.ai, individuals across a broad range of industries in the global software development communities were invited to participate.

A total of 4,182 responses were received with 1,382 complete survey responses collected, analyzed, and prepared into a summary report by Regina Corso Consulting, an independent survey consultancy.

Unlike previous years, this survey was conducted entirely online due to the global pandemic. To encourage the widest possible participation, the survey was promoted by Digital.ai through a variety of online channels.
Demographics

The 15th Annual State of Agile survey reflects the input of Agile practitioners of all levels, from more than 100 countries, in companies large and small and across a wide range of domains. To ensure broad access, all responses were collected online, and the survey was broadly advertised through social media channels, website requests, blog postings, and email to relevant curated mailing lists.

This year, two in five respondents come from companies with 1,000 employees or less and ¼ work in companies with over 20,000 employees.

Despite the changing approach to gathering data and publicizing the survey, company size has held relatively steady over the past five years, providing a consistent foundation for the survey.

How many employees are in your entire company?

- 39% 1-1,000
- 19% 1,001-5,000
- 17% 5,001-20,000
- 25% Over 20,000

Over ⅓ of respondents say the software organization in their company is between 101 and 1,000 people and ⅓ say it’s less than 100 people.

It is notable that over the past several years, respondents to this survey have consistently been drawn from small, medium, and large software teams.

How many people in your organization (including contractors) are responsible for planning, developing, testing, and delivering software?

- 33% Less than 100
- 35% 101-1,000
- 15% 1,001-5,000
- 17% Over 5,000

- How many employees are in your entire company?
- How many people in your organization (including contractors) are responsible for planning, developing, testing, and delivering software?
Respondents are evenly dispersed across North America, Europe, and the rest of the world.

A majority of respondents (38%) describe themselves as Scrum Masters or Internal Coaches. This trend has been consistent over the past several years of the State of Agile survey.

**Where are you located?**

- **North America**: 39%
- **Europe**: 37%
- **Asia**: 14%
- **South America**: 6%
- **Australia/New Zealand**: 3%
- **Africa**: 2%

**Which role best describes your current position?**

- **Scrum Master or Internal Coach**: 38%
- **Development Leadership**: 14%
- **Project/Program Manager**: 13%
- **External Consultant/Trainer**: 8%
- **Product Manager/Product Owner**: 7%
- **Development Team Member**: 6%
- **C Level Exec**: 4%
- **Business Analyst**: 3%
- **DevOps**: 2%
- **Other**: 6%