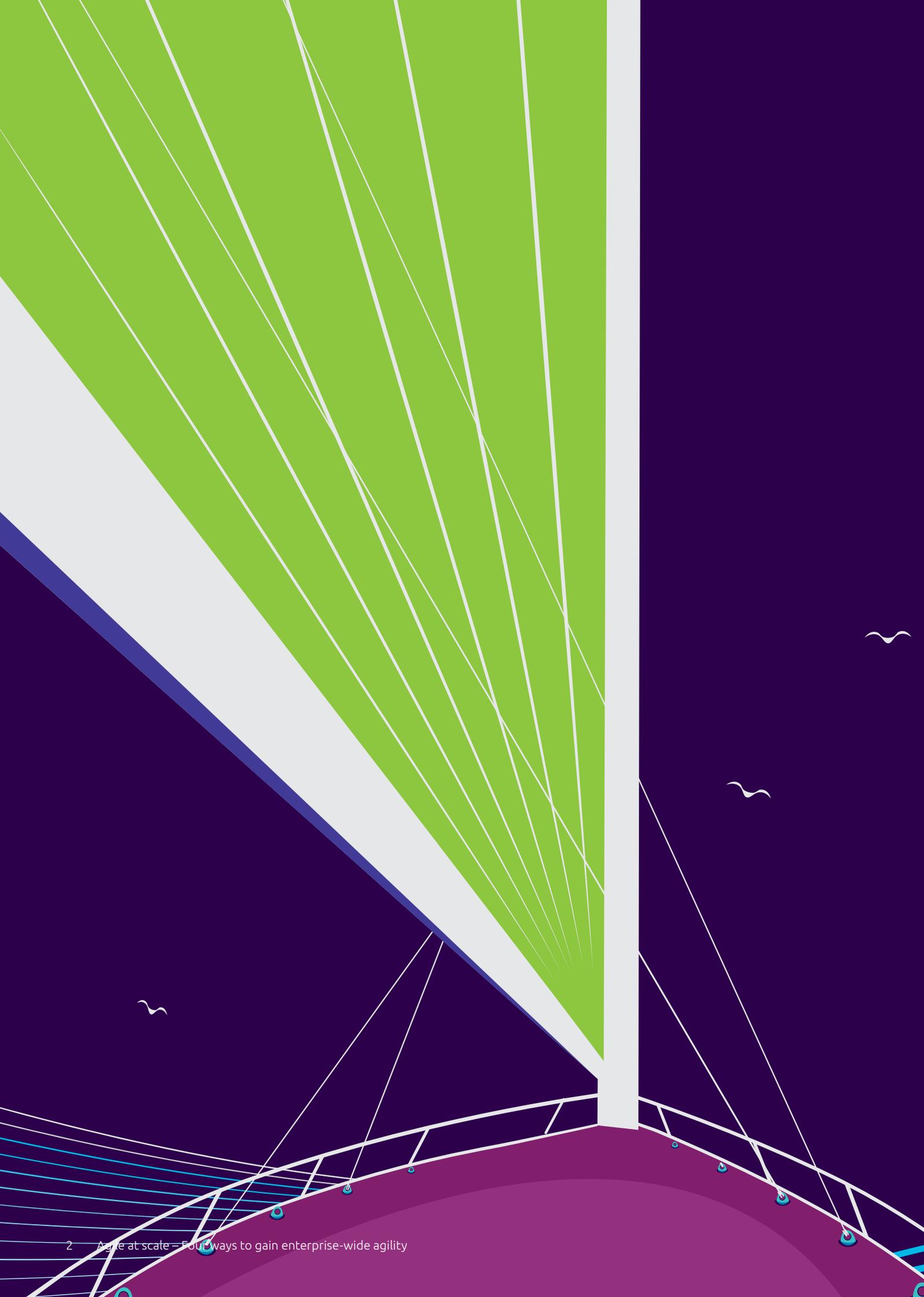


Agile at Scale

Four ways to gain
enterprise-wide agility







Introduction

“Among the many aspects of Agile are the ability to move more rapidly, adapt to market conditions faster, and gain value in incremental components.”

Jeff Farney – vice president, Information Technology,
SouthWest Water Company

SAAB’s Gripen fighter jet was developed in carefully coordinated, three-week iterations at just 18% of the cost of the F-35 jet. Using these Agile-inspired techniques has helped make it the world’s most cost-effective military aircraft.¹ During show production, Netflix relies on the Agile principles of fast feedback and iterative changes via deep data analytics. As a result, Netflix Originals have a 35% higher success rate than other TV shows.² These are just some of the benefits that organizations are reaping by scaling Agile techniques (an iterative, incremental approach to manage change) to help deliver greater organizational agility.

And organizational agility is not only about gaining a competitive edge – it can also be about sheer survival. Today, the lifespan of an S&P 500 constituent company has declined to just 18 years, down from 60 years in 1958.³ In this unforgiving environment, staying relevant is about how fast you can pivot and respond to significant changes, from customer behavior to emerging technologies. Organizational agility – and the agile techniques that support it – are critical to drive innovation, sustained growth and long-term value in a disrupted age.

However, despite the importance of agility today, many organizations struggle to reap the full benefits of the Agile approach. Many are overwhelmed by the considerable transformation effort involved in scaling Agile from its origins as a tactic used in the software field to a program and portfolio level. As a result, they tend to lose focus and momentum, lapsing back into traditional project-management modes. This is because they focus on “doing” Agile without “being” Agile. In other words, they implement Agile practices but do not change mindsets, adopt methodologies without values, and apply frameworks without principles. Moreover, if organizations do not continuously evolve their agile

approach, and do not focus on continuous learning – drawing on what they have learned that is new – they will not achieve organizational agility.

To understand what works when scaling agile, we conducted in-depth interviews with more than 45 executives from global organizations that have scaled agile beyond IT or at a program or portfolio level. We call these ambitious organizations the “Agile frontrunners”. These organizations are drawn from various sectors, including automotive, aviation, banking, insurance, consumer products, retail, pharmaceuticals, telecom, utilities, and the public sector. Together, they represent combined revenues of over \$1.5 trillion. The executives themselves represent a range of functions, such as product development, customer experience, IT, operations, general management, procurement, HR, and sales and marketing.

The characteristics and approaches of these “Agile Frontrunners” offer four key learning points for scaling agile:

- Experiment: Start with customer-focused initiatives; scale gradually
- Orient: Change culture by changing behaviors and focus on developing T-shaped skills
- Govern: Link Agile portfolio planning and operations with business strategy
- Accelerate: Modernize IT with DevOps⁴ and microservices

In this report, we start by defining our different terms, such as Agile and business agility, before examining why only a handful of organizations are able to reap the significant benefits on offer from scaling Agile. We then examine the four critical success factors for turning this situation around and seizing the scaled agile prize.



Defining Agile, Agile at scale and Business agility

The concept of agile originates from Toyota's approach to lean manufacturing from the 1940s – which promoted continuous improvement and elimination of waste. In the 1990s, these principles were adapted by the software industry in the form of iterative development of software, with Agile going on to focus on areas such as incremental software development, delivering customer value and human elements, such as team autonomy and self-organization. With the adoption of Cloud and DevOps, Agile methods were mixed with iterative development. In recent years, Agile has crossed over from the IT domain to non-tech parts of the business, supporting the broader remit of organization-wide agility, with a focus on culture and mindset to achieve business objectives.

There are a number of critical distinctions in the terminology used:

Agile

Agile refers to the mindset and behaviors that support an iterative, incremental approach to manage changes in design, build, deployment and adoption of products in a highly flexible and interactive manner. Typically, it involves self-governing, cross-functional teams working on the product. In this case, "product" might be any kind of deliverable from an Agile team, such as software, a customer product, a process improvement, or a marketing campaign, etc.

Agile at scale

The simplest form of Agile product development is at team-level – which is the foundation. However, in order to create a holistic Agile organization, the practices, values, principles and mindsets of Lean-Agile must be applied beyond teams – to programs, portfolios, and beyond IT as well.

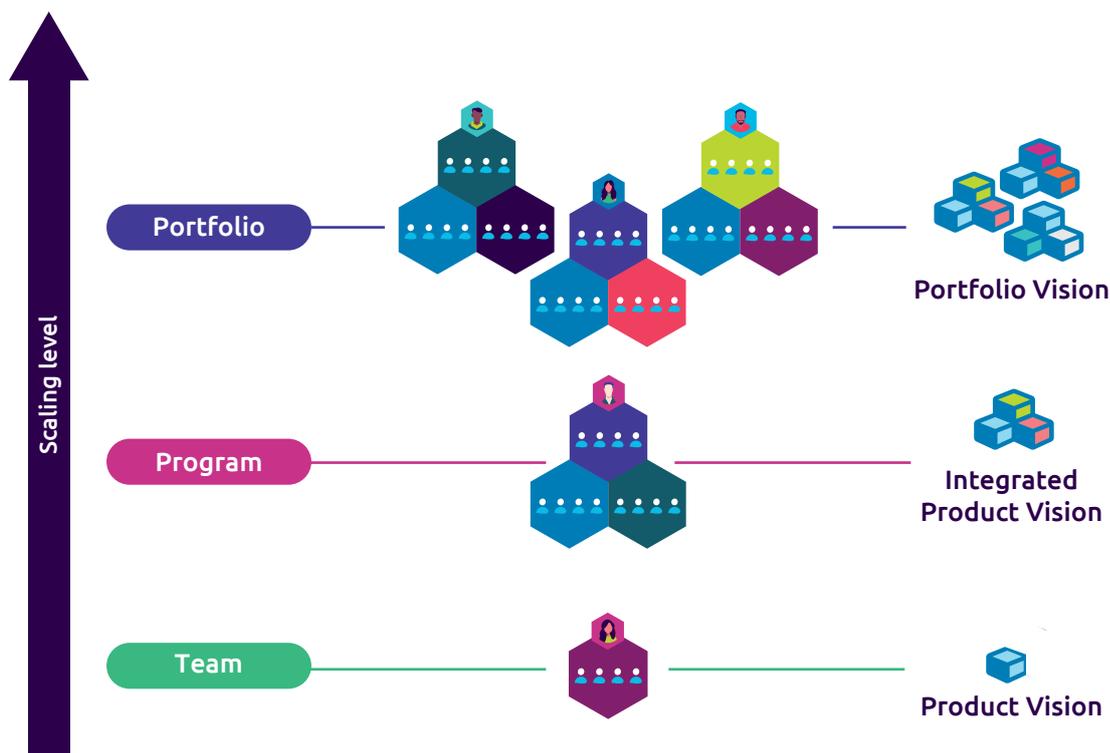
Scaling agility has two dimensions – horizontal and vertical. In our report we look at these dimensions at portfolio and enterprise levels.



1. At a portfolio level

Scaling at a program level allows several independent agile teams to jointly plan, develop, integrate, test and deploy a product based on an integrated product vision. The portfolio level scaling also enables several parallel programs to work on different products, including a comprehensive Lean-Agile portfolio management, and at the same time oriented towards a common strategic vision (see Figure 1).

Figure 1. Scaling Agile from team to program to portfolio



Source: Capgemini, "Agile organization: From buzzword to reality," July 2017.

Scaling at a program and portfolio level is a complicated exercise, as it questions many basic organizational assumptions and demands a cultural-shift. There are several frameworks in the market for supporting this change process, including Scaled Agile Framework (SAFe), Large-Scale Scrum (LeSS), Nexus, and Disciplined Agile (DA) among others.

2. At the enterprise level

Scaling agile at an enterprise level means adopting a Lean-Agile mindset and Agile concepts at a functional level – such as HR, sales, finance or procurement – with different groups also collaborating. Strong senior leadership, clear governance, and a robust infrastructure are all required to make it work.

Business agility

Business agility is the ability of an organization to rapidly adapt to market and environmental changes in a productive and cost-efficient way. Although agility can exist in individual teams by applying Agile principles, business agility is achieved when a company is operating in an Agile manner at scale. Put simply, scaling Agile is an enabler of business agility.



Among the many aspects of Agile are the ability to move more rapidly, adapt to market conditions faster, and gain value in incremental components.

Jeff Farney – vice president, Information Technology, SouthWest Water Company

Scaling Agile can drive significant rewards, yet only a handful of organizations are successful at it

Scaling Agile leads to significant value upside

Organizations today are in the epicenter of a perfect digital storm. In today's everchanging environment, as customer expectations rise, regulations intensify, new rivals emerge, technologies advance and borders between industries blur – it is critical for organizations to adapt to the speed of this change. In this disrupted world, organization-wide agility

is crucial to accelerate time to market, improve customer centricity, gain competitive edge and to stay relevant.

We asked the executives, in our survey, all of whom have spent over three years in scaling Agile, about where Agile delivers the greatest value. As Figure 2 shows, they pointed to focusing the organization on what is strategically important, followed by delivering customer value.

Figure 2. Top five sources of business value from Agile transformations

	1. Focus on what is important for business
	2. Deliver better customer value
	3. Faster value delivery/quicker releases
	4. Better employee morale
	5. Streamlined work

Source: Capgemini Research Institute, Agile at scale in-depth interviews, July–August 2019, N=46 Agile frontrunner organizations.

Furthermore, a key benefit of Agile is faster delivery of value. Scaling Agile at Africa's largest bank – Standard Bank – realized significant gains: team productivity increased by 50%, and time to market reduced from 700 days to 30 days.⁴

Agile also aligns work across the organization, establishes clear priorities based on a shared vision across teams. Moreover, extending Agile to the wider organization changes the perspectives of employees and empowers them to deliver value to internal or external customers. It helps employees at all levels understand the big picture and how they can contribute to organizational objectives.

Many organizations have begun the Agile journey, but fully scaled adoption is rare

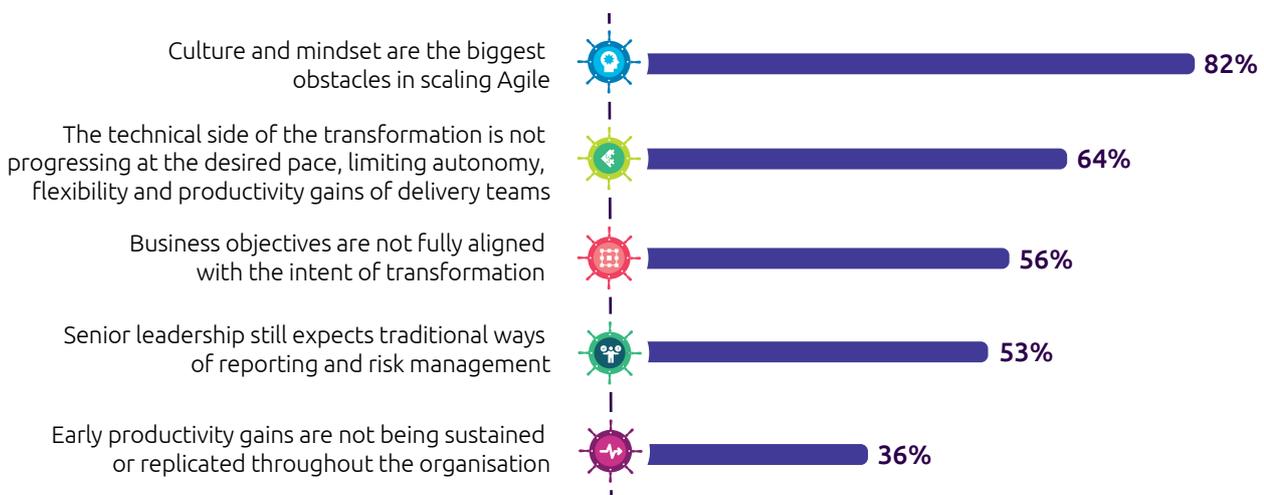
A recent survey of global software development executives found that more than 90% of organizations practice Agile to some degree, but fewer than 20% have achieved a high level of competency with Agile practices across the organization.⁵

Even organizations that have realized some success by adopting Agile methodologies face significant challenges with scaling Agile. Our study focused on a specific sample of "Agile Frontrunners" – those who have either scaled Agile beyond IT/digital centers of excellence or at a program/portfolio level. Yet, even with these accomplished organizations, there

are still significant challenges in realizing enterprise-wide agility. As Figure 3 shows, 82% cited culture and mindset change as significant obstacles in achieving agility. As a senior executive at a global investment bank told us, *“The core of scaling Agile and DevOps is culture change. Shifting a culture is an entirely herculean tasks, because every culture – the*

people, the processes, and the place – exists for a reason. And, shifting the culture isn't instantaneous.” Notwithstanding the soft aspects such as culture, technical aspects also hamper agility. We found that close to two-thirds (64%) said that the technical dimension is moving too slowly. Over half (53%)

Figure 3. Key challenges faced by Agile Frontrunners in scaling Agile



Source: Capgemini Research Institute, Agile at scale in-depth interviews, July–August 2019, N=46 Agile frontrunner organizations.

also said that senior business leaders are often still wedded to traditional approaches. The frontrunners pointed to the challenge of ingraining an understanding of, and adoption of, a culture of “fail fast” among leaders. Often, the Agile values of transparency and trust are at odds with traditional command-and-control styles of project management. Organizations need to address these mindset issues well before they begin to scale Agile. *“Leadership has to live the Agile way,”* says an executive at a German industrial manufacturing company.

During our research, organizations pointed to several other execution challenges:

- Teams tend to adapt Agile processes into their old ways of working, entirely defeating the purpose of Agile. A leading global bank executive told us, *“People want their minimum viable product (MVP) to be such a huge product that they forget the concept of what MVP means.”*
- Product owners become prescriptive – prioritizing product features based on their internal view of needs instead of testing each hypothesis with real customers.
- Teams readily implement ceremonies (such as daily stand-up meeting) and adopt tools but not the underlying principles. Once the trainer/coach leaves and the team is on its own to deliver, it tends to forget the principles, driving in the opposite direction of sustaining agile ways of working.

- Existing organizational operating model often conflicts with the Agile organizing principles
- Leadership adopting Agile practices and methodologies without clarifying expected behaviors at all levels. This can give rise to several myths around Agile (see insert below for details) across the organization.



Common myths associated with Agile

The misconceptions about agile exist at all levels in an organization. We have highlighted below some of the common myths about Agile:

Figure 4. Common myths associated with Agile



Source: Capgemini Research Institute Analysis.

What can we learn from agile frontrunners?

Scaling Agile from just a few teams to multiple teams is challenging in itself and moving to enterprise-level agility is even more demanding. This is a comprehensive, multi-year effort involving a shared vision, values, change management and a clear transformation roadmap. A compelling, commonly understood, and jointly-owned aspiration driven by leadership, and investment in continuous learning are critical for successful transformation.

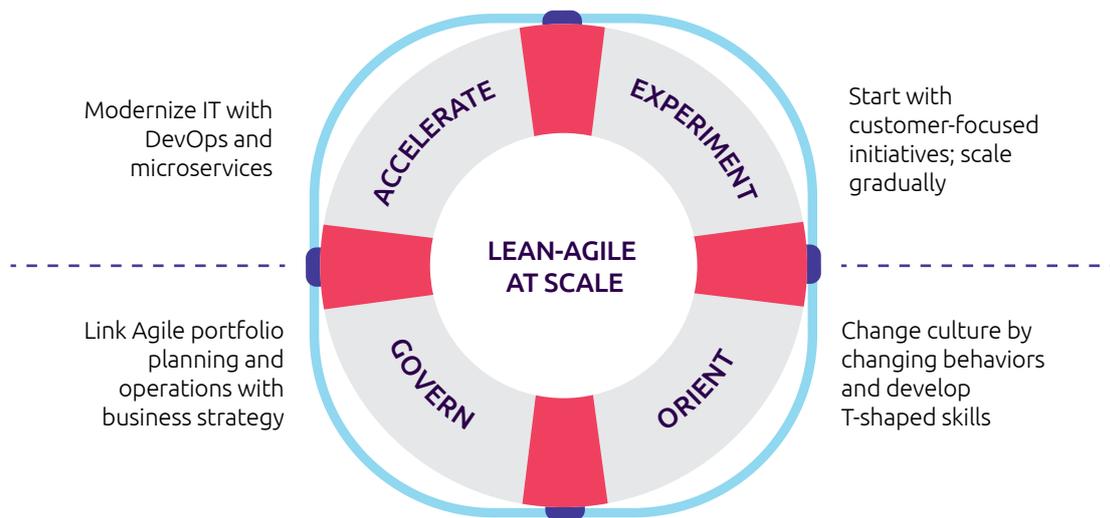
Organizations in all sectors are being disrupted and it is not hard to establish the need to change and achieve a faster time to market. It will be clear to many in the organization that the traditional business model is being disrupted and that a delayed reaction could come at a high price. However, it is important to articulate a compelling transformation narrative that is unique to each business. The first step in such a large transformation is to start with “why”, which communicates the necessity and urgency for change. Next,

you need to clearly define the future-state organization that you are going to build. The detail and intricacies of the steps leading to change can emerge as the transformation progresses.

More than 85% of Agile frontrunners in our research adopt SAFe as the baseline framework to scale Lean-Agile. However, they have adapted it to fit their culture and pace of transformation and mix-and-match a number of methodologies and concepts. These include, among others, design thinking, Spotify model, scrum and Kanban.

Drawing on the leading practices of these Agile frontrunners, we developed four key recommendations for companies looking to join their ranks. These represent the core building blocks to sustain momentum over the course of the transformation (see Figure 5).

Figure 5. Four recommendations to scale Agile



Source: Capgemini Research Institute Analysis

1. Experiment: start with customer-focused initiatives; scale gradually

Big-bang Agile transformations rarely work

Enthused by the successful implementation of Agile at a team level, executives are often quick to adopt a big-bang approach to achieving scale. However, every organization has a different learning curve, culture, talent, and risk appetite. Our research reveals several drawbacks of a big-bang approach to agility:

- In organizations with limited Agile experience, big-bang scaling leads to frustration – as it takes time for an Agile culture to grow organically. Organizations that take this route often get disillusioned and fall back to a waterfall approach or end up doing “bad” Agile along the way.
- It runs counter to the key characteristic of Agile – an iterative and learning approach.
- It can lead to significant technical debtⁱⁱ, as the architects and developers do not get sufficient information or time to design solutions and fix technical issues during the burst of work.

Therefore, a phased approach, with extensive upfront planning to scale Agile, is critical.

Start to scale Agile in initiatives closer to the customers, but introduce agility across the enterprise

Agile frontrunners start small, but they start with areas closest to the customer – either a flagship customer journey or customer service. Areas with a strong customer focus, where innovation and rapid actions are prioritized over perfectionism, are predisposed to Agile working methods. Several reasons for adopting this approach emerge from our research:

- **Tangible customer outcomes are easily marketable.** Lloyds Banking Group began its Agile transformation in 2014 with a focus on 10 key customer journeys. It found that – faster software development and delivery cycles dramatically improved the time to move from idea to prototype. In 2018, the group transformed more than 50 customer journeys.⁶

- **Customer-facing initiatives require active coordination of various functions – making them a perfect testing ground for scaling Agile.** At Liberty Mutual, the journey to Agile at scale started with the process for onboarding new customers. It pulled together functions such as marketing, call center operations, and finance into an empowered team that owned the process. The switch provided an ideal environment for teams to adopt the new ways of working.⁷
- **Customer-facing areas offer significant value, from transforming the customer experience to compressing feedback cycles.** The program manager at a large global bank told us, *“We started with an application on customer onboarding. With Agile, in the first couple of months, we had something that the clients could get their hands on. We invited about 50 clients to start using it and provide feedback. We got so much valuable feedback to make our product stronger.”*

While customer-facing areas provide fertile ground for scaling Agile, our research confirms that there are a few areas that are not well-suited as start points for Agile transformation. Back-end technology refresh programs, such as an ERP or architecture refresh, offer little opportunity to break down functional silos and are not an ideal starting point. Similarly, IT integration projects often involve external third-party companies, or separate divisions within a company, complicating the decision-making process. Successful organizations organize their transformation to follow customer-oriented value streams.

However, to build an Agile mindset, organizations must introduce agile concepts even in areas that are not initial candidates for action. Learning and experimenting with Agile elements – and practicing a Lean-Agile mindset – are important. They help ensure you adapt overall ways of working and prepare the ground for the larger culture transformation that needs to happen.



Michel Levaslot, *deputy director for Transformation at Pôle Emploi*, says,

Do not forget to introduce Agile methods and agility to the teams which initially may appear 'out of scope.' We must also introduce them to the method, train them and associate with them if we want the transformation to succeed.



2. Orient: Change culture by changing behaviors and develop T-shaped-skills

In our previous global research on digital transformation, we found that 62% of organizations cited cultural issues as significant roadblocks to achieving their aim.⁸ The same goes for Agile transformation. In this section, we examine how organizations can make a culture shift by building skills and changing behaviors.

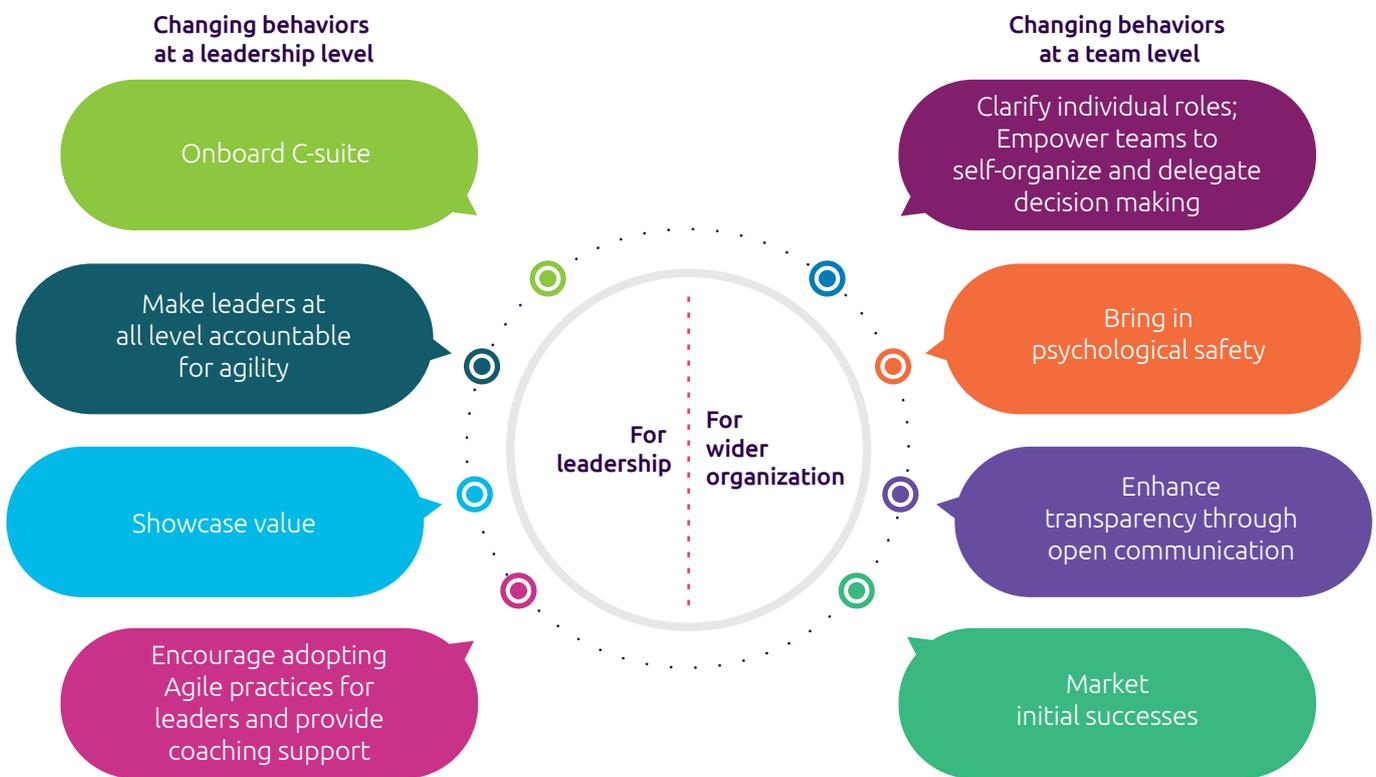
Reboot culture by changing behaviors and mindsets

Cultural change is one of the foremost challenges in adopting and scaling Agile. Capgemini's research into digital culture

found that 72% of companies that in creating a digital culture ensure their leadership act as role models – displaying openness to change and adopting new behaviors. These high-performing organizations also identify employees with the potential to be change agents or digital ambassadors, to demonstrate to peers that new behaviors are not a risk.⁹ The same applies to Agile culture.

Enterprise-wide adoption of a new and Agile culture requires a significant behavior change at all levels. To create an Agile culture, organizations need to engage, empower, and inspire employees to new ways of working. Our research reveals eight critical elements required to change behaviors at leadership, mid-management and team level (see Figure 6).

Figure 6. Key elements to create an Agile culture



Source: Capgemini Research Institute Analysis

Changing behaviors at a leadership level:

The leadership team also needs to internalize new ways of working – demonstrating openness to change and adopting new behaviors. The director of technology and supply chain for a large US-based coffee chain told us: *“Leadership teams need to believe in Agile and should instill Agile values throughout the enterprise – including those parts of the organization that do not really form Agile teams as such. They need to empower the actual teams to make those decisions, give them opportunities, and provide assurance that it is alright to fail.”*

However, shifting leaders from a command-and-control mindset can be a challenge. The Agile coach for a large global bank says, *“Often, leaders are not ready to delegate authority. The challenge, particularly in banking environments, is that there are these power circles and they boil down to one person taking all the decisions. And, breaking this scenario into a distributed decision-making system is a big challenge. I see many Agile transformation journeys failing due to this.”* The leadership needs to imbibe new mindsets, behaviors and actions across various dimensions¹⁰ to sustain an Agile transformation.

To change the behaviors at a leadership level, Agile frontrunners in our research follow a number of leading practices:

- **Agile frontrunners onboard the C-suite on the Agile transformation journey.** Having an Agile proponent in the C-suite vastly improves the odds of success of scaling Agile. ZTE, a leading Chinese telecommunication equipment and network solution provider, conducted an analysis to identify “powerful supporters” in the leadership team for its Agile initiatives – these were people who not only held significant influence but also had an interest in Agile transformation.¹¹
- **Agile frontrunners put onus and accountability on leadership for improving agility in their functional area.** Bryan Campbell, Agile transformation coach at Exxon Mobil, says, *“Effective Agile transformation starts at the top and executive leadership needs to maintain accountability. Each functional leader needs to establish an Agile transformation group with named coaches and champions – these individuals will be directly responsible for applying Agile in their area. However, it is important to place the ownership on the executive leaders to demonstrate the benefits of their Agile adoption. The transformation groups cannot own the success metrics – that has to be owned by the leaders.”*
- **Agile frontrunners showcase the value of Agile to maintain executive buy-in.** The approach has been used successfully at Vanguard. Leah Campbell, program manager of new ways of working, The Vanguard Group, told us, *“We highlight teams working in Agile ways in various forums and showing the business results and the impact that they have had. That has been the most powerful tool to scale Agile.”*
- **Agile frontrunners encourage the use of Agile practices for senior leadership decision making and provide support with a coaching community specifically for leaders.** The IT director for a large financial services organization told us, *“Our executive leadership has a huddle. They are focused on recurring goals, shifting the way that*

they are setting goals for the organization. So, it is not as if it is just happening in one area of our business, it is enterprise wide, and behaviors are expected to be there for our executive members as well, just like they are for a manager.” Similarly, providing exclusive coaching also helps. *“We have created a large coaching community that is actually side by side with the leadership team, helping them. We are also in a process of launching a new set of leadership behaviors. When a leader operates using open-ended questions, it shows a curiosity and willingness to learn about what challenges they are facing, without jumping into solving them. That is a behavior that we are very keen on,”* she says.

Changing behaviors at a wider organization level:

At an organization level, companies need to emphasize elements of autonomy, transparency, and the need for change. Our research identified the following key principles:

- **Agile frontrunners define what is required from individuals at all levels** and let them decide where and how they can contribute. It aligns with the principle of teams “pulling” work instead of work being pushed onto them. As Dave Appert, director, operations and merchandising at The Home Depot, says, *“Thoughtfulness in terms of roles and responsibilities up front can save a lot of headaches down the road – a lot of discussion around how it is actually going to work and who’s going to do what. That should be thoughtfully approached from the get-go.”* Agile frontrunners provide teams with autonomy, purpose, a mission, and work towards minimizing constraints. They also work towards freeing up the capacity of team members. One of the major impediments in scaling Agile is that team members have multiple responsibilities, and Agile initiatives are just added onto the existing set. As Stefan Laux, general manager at Coty told us, *“I think we should give people more room deliberately in their work schedule to dedicate towards Agile initiatives. Very often it is perceived as an additional workload.”*
- **Agile frontrunners focus on psychological safety and enhance transparency to reduce employee anxiety about the implications of change for them and their roles.** At ANZ Bank, for example, leadership used a glass-walled room for transformation planning and design. Anyone was free to walk into the room anytime and look at the walls to understand what’s going on. Twice a week they ran “pizza sessions,” with up to 70 people, to talk about the effort in an informal setting.¹²
- **Agile frontrunners focus on open communication and informal dialogue** to put a strong emphasis on top-down communication. Naga Manubrolu, executive from a global investment bank, says, *“Culture building through open communication is key – which can trickle down via a lot of dialogue. And I am not saying road shows or PowerPoint slides. I am talking about true dialogue, and that can manifest itself through focus group sessions or open forums or coffee sessions with the team members.”*
- **Agile frontrunners market the success of initial Agile initiatives and allow them to spread.** When doing so, organizations focus on business outcomes rather than

just the use of Agile practices and tools. The emphasis on results – rather than complex Agile terminology – ensures that people’s interest is captured. Companies also draw inspiration from peers and players in other industries who successfully delivered results using Agile. This communicates the need and urgency for change.

The role of support functions such as human resources is particularly critical in culture change. Agile frontrunners not only involve functions such as HR, but also make provisions for them to move in sync with agile teams. At Riot

Games, which has 8 million daily concurrent players for its “league of Legends” title, support functions dedicate some capacity to devote to requests from Agile teams.¹³ Some Agile frontrunners go further and make support functions accountable for meeting the objectives of Agile teams. As a regional transformation head at one of Europe’s leading home appliance manufacturers told us, *“Teams like HR and finance are conventionally the governing bodies. But in the new structure, they are not governing a process. They are providing services to help the Agile teams achieve their targets.”*

Extending agility beyond IT and digital delivery

Agile is borderless when it comes to functions. Here, we have identified a range of use cases beyond the IT domain, including HR, product development, sales and marketing, legal, and customer support.

Figure 7. Use cases of extending Lean-Agile beyond IT



Source: Human Resource Executive, “Agile in HR: It has arrived”, June 2019; Wall Street Journal, “Campbell goes agile, from soup to snacks,” July 2019; Marketing Week, “Santander adopts agile marketing approach as it looks to increase effectiveness,” June 2017; Thomson Reuters, UK Practical Law, “From marshmallows to post-it notes: Agile working methods for in-house lawyers,” June 2017; REA Group, “The transformation of a customer contact centre using agile and lean,” August 2014.



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- says a regional transformation head at one of Europe's leading home appliance manufacturers.

Develop “T-shaped” skills

Our research reveals that hyper-specialization and siloed thinking are big challenges to scaling Agile. Agile teams are “T-shaped” – they that have defined areas of specialization (depth), but are adaptive and can work broadly across other aspects of a project (breadth). Agile frontrunners carry out a capability assessment organization-wide, which allows them to identify the skills required to reach the desired state.

Agile frontrunners have identified a range of leading practices critical to building adaptability:

1. **Agile frontrunners use a skills matrixⁱⁱⁱ** – this is a visual, self-reporting tool to identify team-members with T-shaped profiles. Annelies de Meyere, Agile coach at Co-Learning, an agility training company, outlines how a skills matrix can help identify T-shaped high performers. *“A skills matrix offers a lot of insight. You can identify skill gaps but also duplicates. This supports better team planning and helps you identify the ‘T-shaped’ or even ‘[]-shaped’ persons in the team, the truly cross-functional team members.”¹⁴* Agile frontrunners also use the skills matrix to understand people’s ambitions for learning and ensure that learning and development goals are aligned to these ambitions.
2. **Agile frontrunners encourage cross-function collaboration through a number of practices, including the following:**
 - a. **DoJos^{iv} and Communities of Practice:** DoJos provide an immersive environment for teams to practice lean, agile, and DevOps methodologies through timebound challenges in a dedicated space (in Japan, dojos are training or education halls). Technical coaches work with teams to help them learn and refine their craft¹⁵. Capital One adopted the DoJo framework to share insights and

expand its DevOps initiative.¹⁶ Communities of practices organized around common interests spanning teams, projects, and programs are also used by organizations to spread knowledge and skills.

b. **Pair Programming:** This is where two programmers share a single workstation – one writing the code while the other continually reviews it, with the team-swapping roles every few minutes. This technique not only creates a better code quality, but also improves communication and knowledge sharing. To really accelerate T-shaping within teams take this concept and extend it to Pair Development, where programmers and testers, business analysis and architects, in fact any skilled partnership, works together to share skills and knowledge and develop a better product.

3. **Agile frontrunners cross-train team members on adjacent practices in the workflow** – where they handover to the next team member. For example, engineers are trained to work out UI features by themselves. Designers, in turn, can have some basic knowledge of HTML, CSS, and JavaScript for prototyping and some front-end development.¹⁷

Changing the culture, mindset, and upskilling employees becomes even complex in a set-up where teams are working from different locations. Organizations need to rethink their approach to flow of work across multiple locations as old habits are contributing to Agile failures. Agile frontrunners are using proven practices to create a common set of values, principles and practices and build a cohesive work environment even in teams spread in different locations (see Figure 8).

Succeeding with distributed Agile is hard – leading practices make it work

A few organizations in our research have succeeded in implementing distributed agile. They start with full-stack, cross-functional teams at each site, where they independently own a product feature from end to end. But, as Agile scales and teams run into interdependencies with teams at other locations, they adopt a number of leading practices to ensure work runs smoothly across multiple locations:

Figure 8. Leading practices to make distributed Agile work



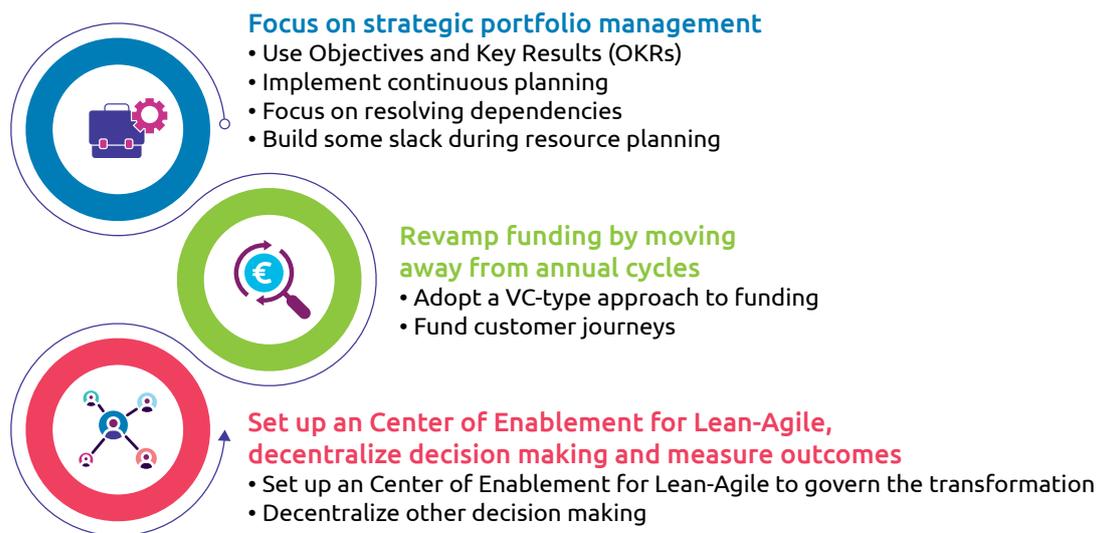
Source: Capgemini Research Institute Analysis

3. Govern: Link Agile portfolio planning and operations with business strategy

Our recent research on digital mastery found that around 68% of 'digital masters' (those organizations with a high digital maturity) constantly look for innovations in their value chains and 65% test promising ideas quickly.¹⁸ This focus on innovation, speed, and the customer experience requires organizations to reset the way they govern their strategic

portfolios. These in turn should be aligned with a clear vision, objectives, roadmap, and overall organizational strategy. As Figure 9 shows, this requires focus on three areas: strategic portfolio management, funding cycles, and the operating model.

Figure 9. Governance and portfolio management leading practices of Agile frontrunners



Source: Capgemini Research Institute Analysis

Focus on strategic portfolio management

Portfolio management in an Agile world needs to connect business strategy with delivery of value across different layers of the organization much more dynamically. This is essential to optimize performance across the enterprise portfolio.¹⁹ Agile frontrunners identify and prioritize opportunities quickly, at the highest level, and regularly adapt them to current business environment. To align efforts across the organization, they set measurable outcomes, resolve dependencies, revamp planning and funding, and establish centralized structure to guide and monitor Agile transformation.

Agile frontrunners use Objectives and Key Results (OKRs)

OKR is an ambitious and aspirational goal at the top level that adds a specific, outcome-based measurement element to track progress. Agile frontrunners use OKRs for setting clear business objectives based on outcomes they desire. The head of group design office at a leading UK-based bank told us, *"We are less focused on KPIs and more focused on OKRs. So KPIs traditionally will go with a target, and a stretch target. OKRs essentially say that they are stretching right from the get-go. The idea is you're never going to achieve an OKR in its entirety – it is a different mindset and behavior."*

Organizations succeeding in strategic portfolio management link OKRs to both customer-facing and operational objectives.

They begin with identifying enterprise-wide key results and prioritize objectives across portfolio teams. OKRs are transparent and individuals can view OKRs at any level – this allows them to establish clear link to the company’s objectives, identify dependencies, and coordinate with other teams to fulfill key results.

Furthermore, in a traditional goal-setting environment, individuals are not empowered to reach organizational goals independently, and they often struggle to understand how their role links with the overall vision. Agile frontrunners focus on individual learning but team-based KPIs. As Aaron Jaffrey, Digital Delivery Director at the UK Department of Work and Pensions (DWP), told us, *“We are moving from individual objective and individual end of year reviews to team-based awards. This performance framework is a big step to help the organization move towards agility.”*

Agile frontrunners implement continuous planning

The traditional annual planning exercise has lost a great deal of its relevance in today’s fluid, fast-moving business environment. Agile frontrunners build self-organizing teams that establish their priorities in short intervals and re-allocate resources accordingly. Instead of creating detailed strategic plans for each function – and then breaking it down even further – Agile frontrunners specify high-level organizational objectives that essentially convey the leadership’s vision. They leave the “how” part to the teams. Teams autonomously create detailed, short-term goals, perhaps every quarter. As circumstances change, these are continued to be fine-tuned after each cycle based on customer feedback.²⁰

Agile frontrunners focus on resolving dependencies

As Agile scales, complex interdependencies emerge and priorities conflict – slowing progress. To resolve these dependency issues, we found some proven practices from leading organizations:

- **Big room planning:** Lego Digital Solutions used big room planning, where all decision makers and stakeholders are brought into one room to resolve multiple priorities across various teams. They also prepare in advance for the event to make it a success. As Thyrded Brandsgård, director at LEGO, says, *“We do some preliminary planning and identify the work we want to prioritize from a business perspective. During the big room planning, the teams present their plans and adjustments are made if needed – removing impediments, mitigating risk, reprioritizing, and moving work to other teams to create flow.”*²¹
- **Scrum of Scrums meetings:** Origin Energy, a leading energy company in Australia, uses “Scrum of Scrums” meetings involving only key people in decision making to direct them towards the organizational objective.

Agile frontrunners build some slack during resource planning

Traditional project management requires 100% resource allocation on pre-identified projects – which makes the

projects rigid. As conditions change, some projects might require more resources than planned or less. This means there is less wiggle room to shuffle resources and it can also create unnecessary people management overheads.

Agile frontrunners limit work-in-progress using key Lean principles, reduce lead time to deliver work, and yet aim for less than 100% utilization rates. They achieve this by creating resource pools that can be deployed as needed, based on changing situations. They keep the ratio of the number of projects to the number of people well below one. This approach has several benefits. First, it limits overwork and the tendency to “stay busy.” Second, it encourages process improvement opportunities and innovation as people can think beyond their next to-do activity. Moreover, building slack is extremely important for sustainable value delivery and the health of the teams involved, as running a team consistently at 100%-or-over capacity is not sustainable.

Revamp funding by moving away from annual cycles

Most Agile frontrunners do away with cumbersome annual planning cycles – consisting of approvals, re-approvals, fixed budgets, and controls to give way to adaptive funding. Some leading practices emerge from Agile frontrunners:

Agile frontrunners adopt a VC-type approach to funding

Agile frontrunners release incremental funds as projects progress against outcome-based metrics. Conversely, funding is stalled for experiments that are not working. According to Bryan Campbell, Agile transformation coach at Exxon Mobil, *“We are encouraging the idea of thinking of projects as investments and encouraging leadership and portfolio management functions to look for investing in projects as a series of small bets – each one with a hypothesis that is being validated. Project managers leverage leading indicators to know if these projects warrant more investment.”* This approach also fosters innovation and allows organizations to test more ideas and nurture the ones that make the most progress. Organizations have optionality as they test and validate each idea using least resources. After each review (usually every quarter), incremental funds are released to develop the idea further. This approach can be applied to products which are mature (adding new features, line extensions etc.) or on the horizon (future business opportunities).

Agile frontrunners fund customer journeys

At Amazon, funding is based purely on customer outcomes or parts of customer journeys. To get a funding approval, teams need to produce a six-page document explaining the new initiative, including a hypothetical press release outlining the value to the customer.²² Frontrunners start by defining “customer journey” and establish guardrails that define the spending policies, guidelines, and practices for a specific portfolio of value streams.²³ The initiatives which provide most value with least effort should take precedence.

The following benefits emerge when funding customer journeys:

- This approach helps teams visualize the flow of value across functions, identify leakages of value or customer pain points, and direct efforts to eliminate them. According to the head of group design office at a leading UK-based bank, *"We have put everything in transformation value streams, so things like mortgages, consumer services, onboarding, etc. Each of those will have a set of product owners, journey owners, feature teams, and lab teams."*
- This approach also empowers Agile teams to take independent decisions. It puts decision-making power in the hands of those who have the richest information and context. As Abhishek Rathi, head of digital, APAC, Pramerica Financial, says, *"Many enterprises still have digital and technology budgets at a functional level – they are not allocating them to a prioritized business value stream which has its sub customer journeys. The SAFe Agile approach provides a future-ready solution of identifying a business value stream like credit cards, life insurance sales, agent recruitment, etc. and allocates budgets at a portfolio level to drive business outcomes within that value stream. Given the importance of speed to market, this approach certainly empowers the team to take faster decisions and deliver better outcomes."*

Set up 'Center of Enablement' for Lean-Agile decentralize decision making and measure outcomes

Agile frontrunners set up a 'Centers of Enablement' for Lean-Agile to govern the transformation

It is misconceived to assume that succeeding in Lean-Agile requires no central authority to govern the transformation. A Center of Enablement for Lean-Agile – comprising cross-functional leaders responsible for defining the vision, principles, framework, strategy, and overall success metrics for Agile – steers the organization in a common direction and drives culture change. *"We have created the central transformation team, including representatives from all organizational units,"* explains the regional head of Agile transformation at a leading European home appliance company. *"We shared the mandate, the overall vision from the board of management, and what is expected from us. After that, we conducted a number of workshops to solidify each pillar: leadership, organization, culture, business management, and Agile work mode."*

Our research reveals that the Center of Enablement:

- Displays leadership commitment and ambition to change the ways of working

- Acts as a sounding board to resolve differences between teams
- Helps clarify roles, responsibilities, and priorities
- Assesses gaps from a technology, skills, tools, and resources perspective
- Establishes acceptable behaviors and identifies unwelcome behaviors in the new environment.

The Center of Enablement for Lean-Agile also works closely with business leaders and Agile coaches who help in marketing Agile successes, implementing frameworks, training fellow executives, and establishing methods and practices. Agile coaches are closer to the execution side of business and can continuously monitor the progress of transformation. Agile frontrunners take the pulse of the transformation using qualitative information and feedback. This ensures that Agile practices are not introduced to show that people are "doing Agile" but to derive actual value. As Fahad Qureshi, enterprise business agility CoE head at RBC, told us, *"We are finding that agility transformations need to be clearly anchored on improving things. As such, a few months in, the first question we ask the leader is: would you go back to working the old way? If they say yes, it is a failure. The second indicator we use is whether the leader is advertising their success to their peers? And then the third is we look at the demand we are getting as a result of that advertising. Success from introducing new practices is only achieved if these practices result in tangible benefits to the organization."*

Agile frontrunners decentralize other decision making

To succeed in scaling Agile, a high-trust environment is needed. Our research reveals that letting empowered teams make decisions by themselves – without requiring centralized approvals – streamlines the governance process, fosters experimentation and innovation, and reduces delay by improving product development flow and throughput. However, decision-making is delegated only when teams are predictable in their commitments. Agile teams in frontrunner organizations make and deliver short-term commitments. When the teams keep their commitments, they gain the trust of the management who can finally delegate decision-making.

Continuous and collaborative planning also supports distributed decision making.

To support a decentralized decision making, Agile frontrunners focus on:

- Management support for distributed decision making based on predictive capacity
- Clear and comprehensive communication of company strategy and values
- Training employees so that they feel comfortable in taking on new responsibilities of decision making
- Mid-management training to gain skills required in the new environment; and
- Extend trust to external vendors through agile contracts, making them partners in their journey towards agility (see Figure 10).



Evgueni Iakhontov of Origin Energy says,
The key is to make it a partnership rather than just saying - here is a fixed scope, give us a fixed price, and we will hold you to account. So it basically counts both ways since it is sharing the risk and it is also sharing the reward. That's what has made the Agile contracts possible.

Agile contracts – extending agility to vendor partners

Traditional contracting approaches – fixed price, with fixed scope contracts and longer RFP cycles – inhibit Agile adoption. This is because these models prioritize requirements that are not fixed in Agile. The contractual framework should be flexible (allowing for flexible scope and adaptation) but also concrete (avoiding opportunistic behavior on both sides). Figure 10 outlines some of the sourcing leading practices that emerge from our analysis of the frontrunners.

Figure 10. Leading practices in Agile sourcing

DEFINE OUTCOMES NOT REQUIREMENTS

Contracts with detailed specifications make them rigid as the work evolves. They should emphasize outcomes which is win-win. Amit Rami, Director for Agile Portfolio at Capital One says, *“You cannot measure how many deliverables you are going to get as you are constantly iterating. You have to measure by outcome, by the quality, by value delivered to customers and by the amount of productivity that you get from teams.”*



SHARE RISK AND REWARD

Agile Frontrunners focus on a contracting model which shares ‘pain and gain’. Evgueni Iakhontov, head of digital IT at Origin Energy says, *“The key is to make it a partnership rather than just saying – here is a fixed scope, give us a fixed price, and we will hold you to account. So it basically counts both ways since it is sharing the risk and it is also sharing the reward. That's what has made the Agile contracts possible.”*

BUILD IN FLEXIBILITY WITH T&M CONTRACTS

Time and materials (T&M) contracts are the best fit for Agile, and minimize risk, but they go against general expectations.

Many agile frontrunners experiment with their vendors for a short-term pilot T&M contract; and then move to fixed-price contracts for similar projects. This builds mutually agreed expectations based on the actual velocity of pilot projects.



EDUCATE FINANCE, PROCUREMENT AND LEGAL ON AGILE PRINCIPLES

Educate your finance, procurement and legal teams that with agile contracts the team's work will be more transparent, and the product's success or failure will be more apparent. Bryan Campbell, Agile Transformation Coach at Exxon Mobil says, *“Areas that we have definitely been exploring is using techniques like lean- Agile procurement, coming up with procurement canvases, accelerating the decision and partner selection processes.”*

Source: Capgemini Research Institute Analysis

4. Accelerate: Modernize IT with DevOps and microservices

Digital giants from Amazon to Google deploy software thousands of times a day.²⁴ But this sort of technical prowess is required by more than just the digital natives – it is critical to anyone operating in the experience economy. Walmart, for example, leverage DevOps to make 170,000 improvements to its software every month.²⁵ This is not just about speed, but also about improved quality, lower failure rates, and efficiency. To prepare for the new economic era, where industry sectors will be replaced by new ecosystems, and data will be the currency, organizations need to modernize their monolithic systems to enter into new collaborations.

However, large enterprises with monolithic architectures face a daunting task in creating a resilient IT infrastructure that can meet the pace of innovation needed to succeed. Our research revealed some common transformation failure points on the technology side. Organizations are trialing continuous integration and continuous delivery, but in pockets. They are seeing limited success in deploying Agile and DevOps widely.

Culture was seen as a critical stumbling block for many interviewees. A regional leader at large investment bank pointed out that organizations need to create a culture where failures and set-backs are discussed and embraced without just apportioning blame. *“When execution fails, teams will move on to a new piece of technology instead of stepping back and say that maybe the technology isn’t the problem ... the approach is the problem,”* he says. *“What’s going to shift your culture is coming to a mature understanding of what went wrong and being able to have that understanding without walking into a room and begin pointing a finger at somebody.”*

Below we look at some of the leading practices of Agile frontrunners that allow them to succeed in their

Combining Agile and DevOps has a multiplier effect

transformation efforts. These leading organizations are combining DevOps and Agile efforts, introducing modularity in their systems, and progressively retiring legacy systems.

Many organizations run Agile and DevOps initiatives separately, with the goal of aligning them at a later point. DevOps and Agile initiatives can be independent, but there are clear benefits to tie them together as one transformation. Quality manager at UK based water utilities says, *“If you don’t have Agile and DevOps working hand in hand, then you cannot deliver the benefit early. This is because you are not making best use of automation, release management, and you are not planning your releases well – you are not getting released windows defined.”*

Agile Frontrunners realize that DevOps is not just about implementing automation tools for faster software deployment, but also about promoting collaboration, sharing responsibility, and improving quality. When Barclays Bank began its DevOps journey, it was conscious of not running DevOps in isolation, but equally focused on promoting entrepreneurial thinking, transformational leadership, and diversity. The multidisciplinary teams involved included not just developers and testers, but also security, legal, and compliance to foster conversations “early and often.” This was critical in a heavily regulated industry where the approach needed to be sensitive to risk, balancing speed with the need for control. Two years on from the program’s launch, the bank has doubled its throughput and halved the time to market for new features.²⁶

Businesses that have aligned Agile and DevOps achieve value faster. There are several key points which emerged from our research on leading practices in establishing the right DevOps culture:

- When implementing DevOps, focus on delivering value early. Clear links to improvement in productivity, operational efficiency, or faster cycle times can help secure executive buy-in.
- Automation is the fundamental pillar of DevOps. Organizations invest in automating deployment and dependency management and teams focus on writing simple and useful tests. Standardized testing methodologies, best practices, and tools ensure high levels of quality across applications – both before deployment and during production. It also provides visibility into the level of quality of any software system or project, helping IT management make deployment decisions
- based on business risk. Organizations need to continuously identify and automate tasks as they move towards DevOps.
- Provide psychological safety by embracing failure and avoiding a blame culture for success in DevOps. Enable teams to work autonomously with a self-service capability, as well as sharing responsibility, risks, and outcomes among teams.
- Make use of the cloud to create test environments that closely match production, accessible on demand, and easy to scale up or down.

As with both DevOps and agile, a continuous improvement mindset needs to be ingrained across the organizations. As a senior executive at a global investment bank says, *“If you started your DevOps journey, you’re never at the end of it. It’s a continuous improvement process.”*

Build microservices on top of legacy IT; slowly retire legacy

A microservice is an independent, reusable service or functionality that fulfills a singular purpose. Microservices and agility are well suited to each other. Microservices allow organizations to quickly and frequently evolve application features or its service components. This enables scalability and makes IT systems adaptable to changing business needs.

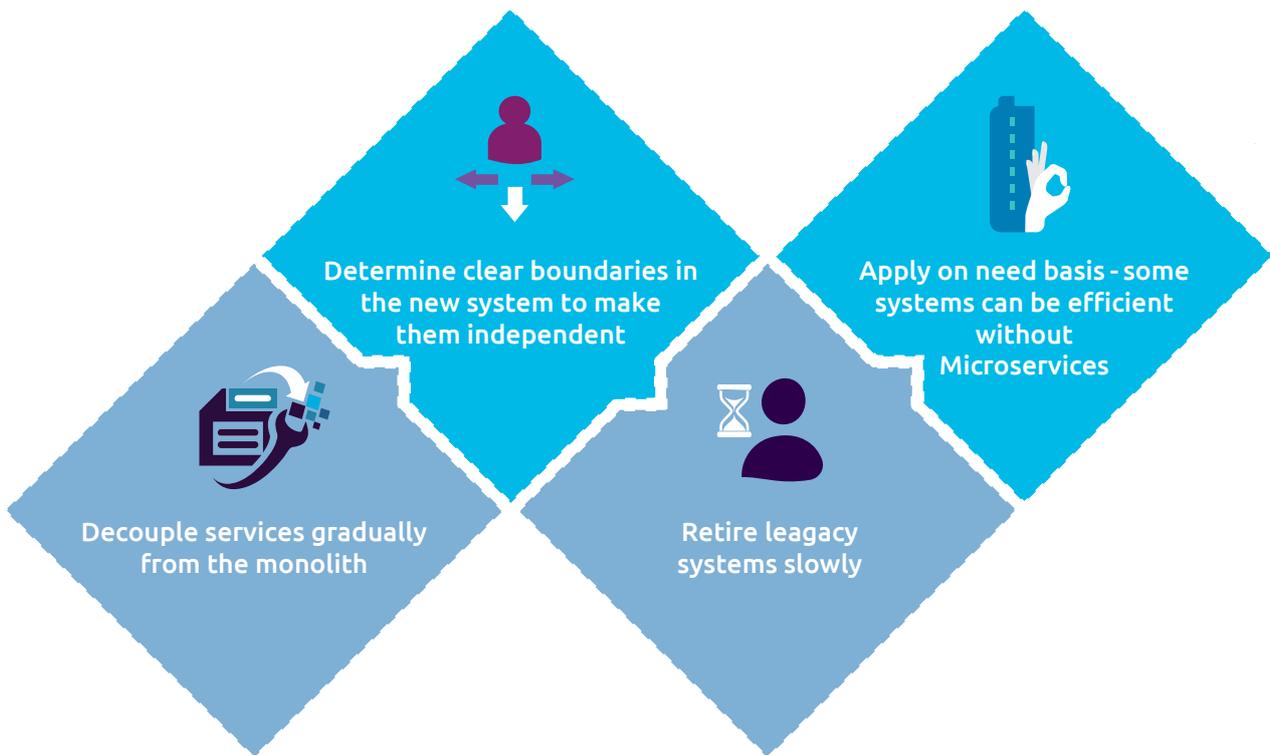
Container technologies are a great choice for running microservice application architecture. They encapsulate a lightweight runtime environment, support rapid development of applications and are economical (saves multiple operating system licensing cost). Orchestrating frameworks such as

Kubernetes help in coordinating multiple tools, teams and environments in an automatic fashion, reducing errors, saving time and effort as well in for faster deployment.

Implementing microservices also requires a level of operational readiness – organizations need to first assess their cloud capability, the complexity of existing IT architecture, and the level of automation.

There are perceived risks – and potentially high costs – to transforming from monolith (large, complex, and interdependent IT architecture) to microservices in one fell swoop. Frontrunners use the mantra of “perform while you transform,” using existing systems while they progressively introduce independent applications.²⁷ Several success factors emerge from our research on Agile Frontrunners:

Figure 11. Success factors in implementing microservices



Source: Capgemini Research Institute Analysis

1. Decouple services with low dependence on the monolith, and gradually minimize dependencies:

Frontrunners initially identify use cases that are loosely coupled with the monolith, build application programming interfaces (APIs), and redirect customers for that specific use cases to the new experience. Several elements should be considered:

- Make sure the applications are not critical and only low risk, as the teams at this stage are starting to learn, build, test, and deploy the new interfaces.
- On a need basis, create microservices for tightly coupled environments. Use Agile-like prioritization to move services out of the monolith.
- Avoid back-and-forth dependencies by following proven architectural practices. Creating services on top of the

legacy system can end up as a “distributed monolith.” It is important to take out the code and transactional data from the legacy system. Also, include other design best practices, including loosely coupled (change in one service does not impact any other), “stupid” (do one thing and do it well), or well-defined interface (hides how service is executed “under the hood”).²⁸

Furthermore, Agile Frontrunners plan for the full lifecycle of their IT solutions and include the cost of exit into their value case. This helps them prepare for the future and regain an edge over the vendors’ lock-in.

- 2. Determine clear boundaries in the new system to make them independent.** REWE, a large German retail and tourism conglomerate, mapped new domains to its customer journey. This led to four areas within e-commerce: customer check-in, product discovery, checkout, and fulfillment. When the fulfillment subdomain grew too large, they shifted it to a new core domain with four components, including inbound storage, inventory, outbound loading, and realization.²⁹
- 3. Slowly retire legacy systems.** It is necessary to consolidate old systems in a safe and controlled manner. The benefits of decommissioning are clear: an efficient system, better utilization of teams’ time, and cost savings.

This involves a series of steps, from identifying rationalization opportunities to planning, designing, and implementing the new workflows. Several tools and techniques – such as retirement-ready checklist, functional redundancy analysis tool, risk/impact analysis, design checklist, etc. – are used to rationalize systems.³⁰

As Bryan Campbell, Agile transformation coach at Exxon Mobil, says, *“Look at the footprint of monolithic enterprise assets, and find ways to cut off those pieces that don’t fit your core strategic goals. The intent is to get the size of legacy systems down to something more manageable. Then, look for ways you can build wrappers around what remains, so that you can abstract their functionality more effectively.”*

- 4. Microservices is not necessary for every system:** Not all IT systems need to be decoupled and moved into microservices. Some systems contain processes that can still fulfill their role efficiently in waterfall mode. They are, however, at the heart of operations, and may contain crucial corporate knowledge and need to be robust, stable, compliant with regulations, and predictable.

Furthermore, some organizations go down the path of implementing microservices without a plan to manage eventual dependencies among applications.

As Agile scales, the number of microservices tends to grow exponentially and makes the IT systems complex, difficult to manage, and hampers reuse. Care must be taken to design microservices with centralized control and discipline and to deploy solutions to manage dependencies among applications early on.

At Vanguard, modernizing IT was one of the critical aspects of its journey to become Agile. As it adopted a new approach, “Business Value at Start-up Speed,” it illustrated the key elements involved – Agile Infrastructure (service-oriented infrastructure and cloud), Agile Technology (testing strategy, new tools and microservices), and Agile Business (lean operating model and innovation).³¹ Our interview with Joe Gribb, head of enterprise advice technology, The Vanguard Group, highlights some nuances of changing the IT architecture to enable agility across the organization.



Brock Deniston, product owner, Order Management Hub at AT&T started with a use case in AT&T’s order management system

We are looking at use cases, integrating microservices, and redirecting traffic to the new experience. While some customers with different order types may still get the old experience, we eventually would cover all use cases, and retire the old pages.



Joe Gribb, *Head of Enterprise Advice Technology at The Vanguard Group* said: **For us, modernizing IT was one of the critical aspects in the journey to becoming Agile. Our first approach was more iterative – adopting some of the agile principles than being Agile. We started to break down the wall separating specialists within IT and put Testers, JAVA/ UI/COBOL developers, all in one team. Focussing on these nuances was the first step for changing the IT architecture to enable agility across the organization.**

An interview with Joe Gribb, head of enterprise advice technology, The Vanguard Group

Q: How did you start to adopt agility at Vanguard?

We started to break down the wall separating specialists within IT and started to put testers, JAVA developer, UI developers, and COBOL developers all in one team. We moved to full stack. Our software was largely a monolith and we had big deployments. We would have three-week sprints, but when it comes to the end of the initiative, we would still have a system acceptance testing period of a month before the software would go into production. Our first journey was more iterative – adopting some of the agile principles than being agile.

Q: How did you decouple from the monolith at Vanguard?

We were writing a lot of code in the monolith and just started to establish some guard rails. We challenged everything new, and said, can we break this out? The first step was to deploy in the same containers as the monolith. The second question was if you break it up to be more granular, could you break it out so that the code is not running in the monolith? Could you run it in its own runtime environment? Now we would call it a “mini-lith” as it wasn't solely independent. It was a little painful at first, as you have to entangle the dependencies. But it was worth the investment to get these applications standing on their own.

There was a three-layered architecture – the user interface, the mid-tier of the business where the JAVA rules, and the actual data component of it. Since it would be harder to break up the data layer, which was tightly coupled together, the easiest thing to break was at the UI – the user interface layer. And we were able to iterate on the UI layer quickly, getting to daily deployment. But we were still relying on the monolith to do any significant changes – like changing the business rules or changing the data, etc.

To get access to that mid-tier layer, we laid some REST end points on top of it and made the UI independent. And we prioritized the best ones to free up from the monolith. There was no surprise that a lot of it was tied to the most frequent stuff that gets used on our website. So then we start to break out the services that powered the most frequently used pages on our website to give them a little bit of independence. Any good micro service owns its data, so now some of the data is being broken out from the enterprise database into more modular type service centers data type component.

Traditionally, organizations migrate their existing systems to the cloud in a ‘lift and shift’ approach (as-is migration of systems). However, Agile Frontrunners are taking a cloud-first approach – business functionalities are built in the cloud. This is a modern approach to delivering, developing, and operating business applications. Organizations can scale up or down, independently, and driven by customer requirements. When cloud capability is combined with containers, microservices and DevOps, organizations can establish a modern, agile infrastructure primed to deliver value faster, cheaper, and more consistently.

These approaches will drastically bring down the maintenance, security, and provisioning work within the IT organization. With the time saved, IT function closely collaborate in cross-functional teams to directly deliver business value. The idea of “you build it, you run it” is operationalized when a dedicated team takes end-to-end ownership of a service to eliminate redundancies and clarify responsibilities.



Conclusion

In the age of disruption, agility is no longer a choice. While many organizations have been implementing Agile for years, many lack a cohesive approach that directs the efforts of different teams towards a common vision.

To be successful, organizations need to “be Agile” and not just “do Agile.” This involves putting less emphasis on generic frameworks and more focus on customizing the approach based on the organization’s culture. As the data platform head at a French insurer says *“We use Agile frameworks only as a toolbox. If we want Agile to work, we need to have a degree of adaptation and be tailored and relevant to our context.”* Moreover, doing Lean Agile at the organizational level allows you to work on both products and all processes of the organization.

Embracing the four building blocks in this report will help organizations move quickly and confidently in scaling Agile. Eventually, adopting them will create a culture that encourages experimentation, learning, and adaptability to changing conditions.

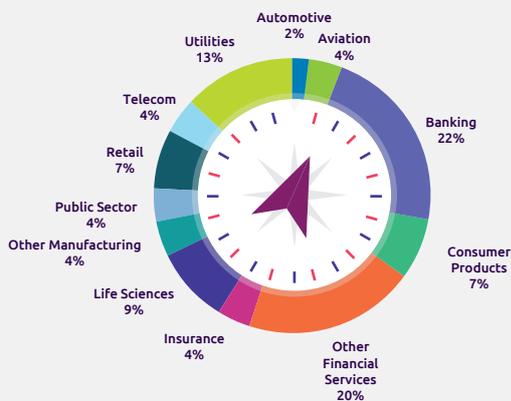
Lastly, it is worth remembering that agility is not a destination – it’s an ongoing commitment to deliver customer value faster and adapt quickly to changing conditions. Once organizations realize that agility’s goal posts continue to keep moving, they can truly describe themselves as “being Agile.”

Appendix

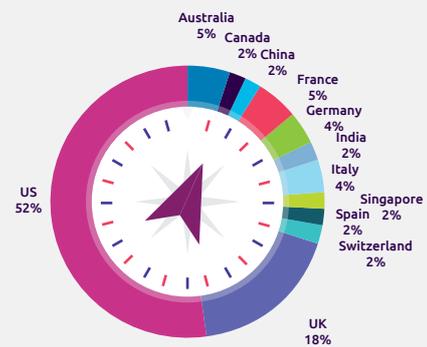
Research Methodology

In July 2019, we conducted in-depth interviews with more than 45 business leaders from organizations that have been successful in scaling Agile across a range of sectors and countries. Seventy-nine percent of the organizations reported revenue of more than \$20 billion in FY 2018.

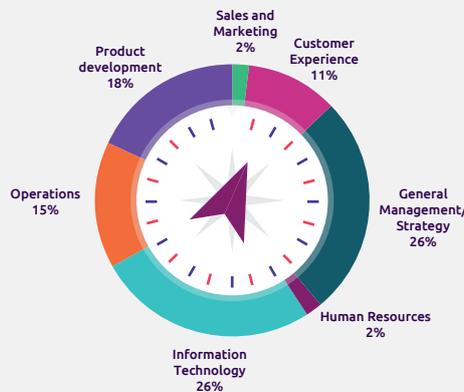
Executives by industry



Executives by country



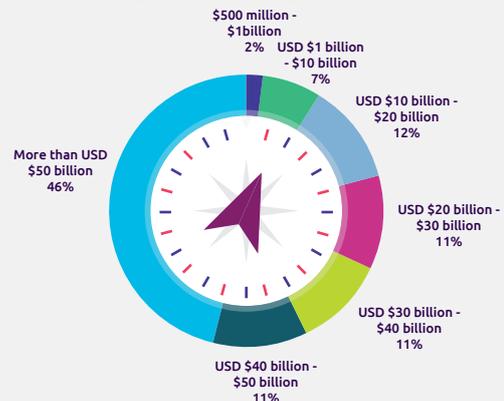
Executives by function



Executives by designation



Organizations by revenue



Source: Capgemini Research Institute, Agile at scale in-depth interviews, July–August 2019, N=46 Agile frontrunner organizations.

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ⁱDevOps: An IT team alignment process, starting with "Dev" (in charge of IT enhancements & changes) and "Ops" (in charge of operating existing applications and infrastructure). Agile fosters collaboration between Business and Dev teams, while DevOps focuses on Dev and Ops collaboration, bringing agility up to production.

ⁱⁱTechnical debt: Deficiencies in software quality that make it harder to modify or improve the systems. This causes extra effort to understand and work on software systems.

ⁱⁱⁱSkills matrix: A two-dimensional representation of depth of expertise and functional areas.

^{iv}DoJos: Based on the philosophy of Japanese places of learning, DoJo is a physical training facility.

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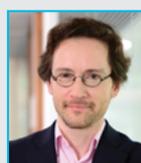
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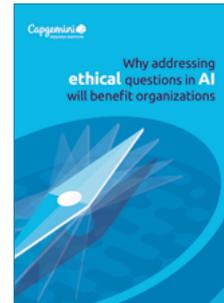
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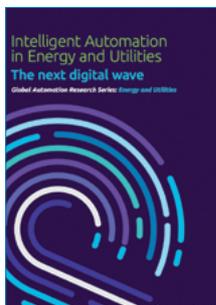
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