



UNDERSTANDING AGILE IN PROJECT MANAGEMENT >

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Why was this research undertaken?

Whilst agile is prevalent in project practice, little of this is grounded in evidence and theory, and there is a lack of credible academic research in contrast to other aspects of the project management domain. There is ambiguity around what is agile within the profession and lots of questions remain unanswered in terms of how is agile being used, and how effective is it particularly outside of IT and software development. Also, the limited available literature does not tend to explore the challenges and barriers encountered with implementing agile.

This report does not present a single definition of agile for the project management community. Rather, we explore existing practice in order to discover whether agile is valuable to project management, and why. We set out to explore agile practice, without first providing a definition. This research makes steps towards an enhanced understanding of the use of agile in project management. It also provides illustrative case studies of projects applying agile. Challenges are discussed in the successful adoption of agile. We also explore the motivation for agile, which includes improved project delivery through enhanced flexibility, adaptability and responsiveness in complex, uncertain and challenging circumstances.

The research team gathered data using a mixed-method approach, including a systematic literature review, interviews with 31 cross-sector project professionals, and a survey that attracted over 600 responses. Both the interviews and survey data showed that agile is overwhelmingly recognised as beneficial to successful project delivery and project team performance.



EXECUTIVE SUMMARY

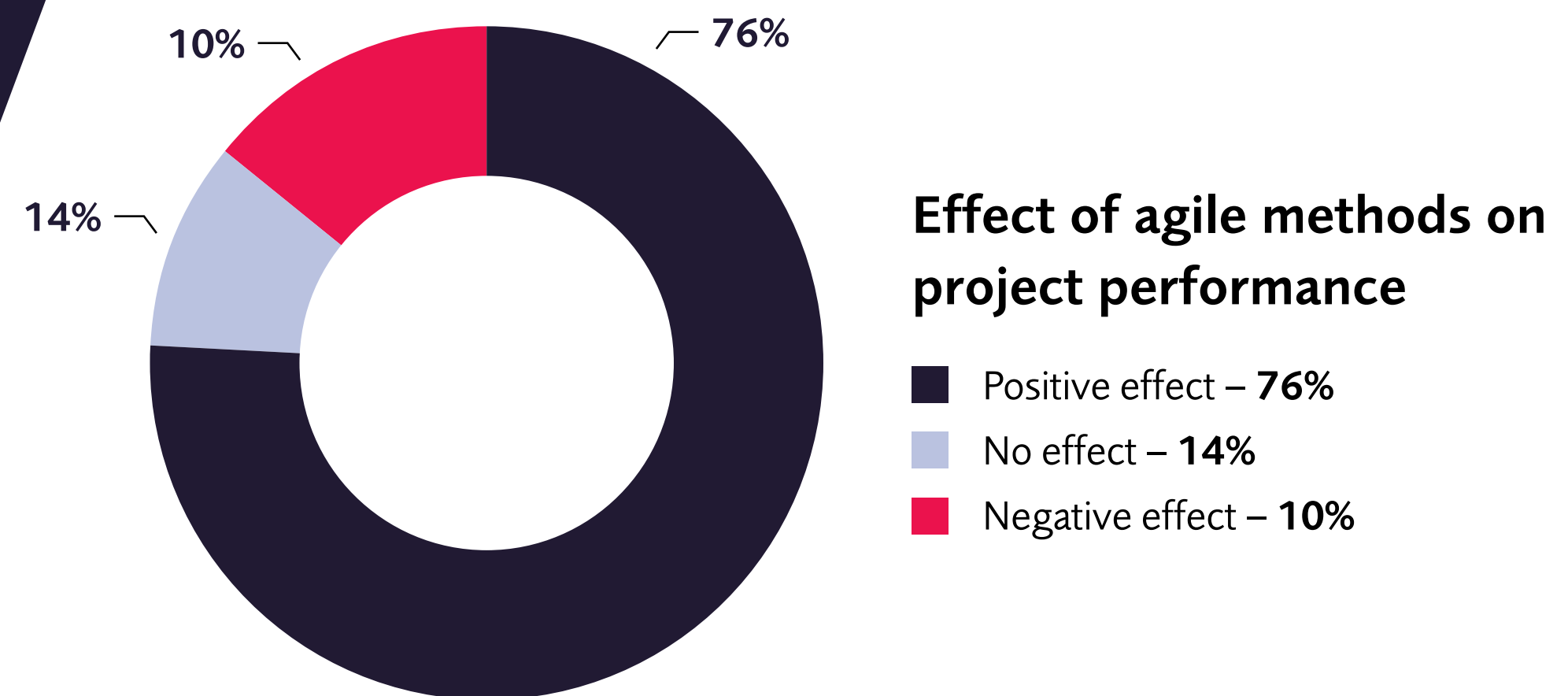
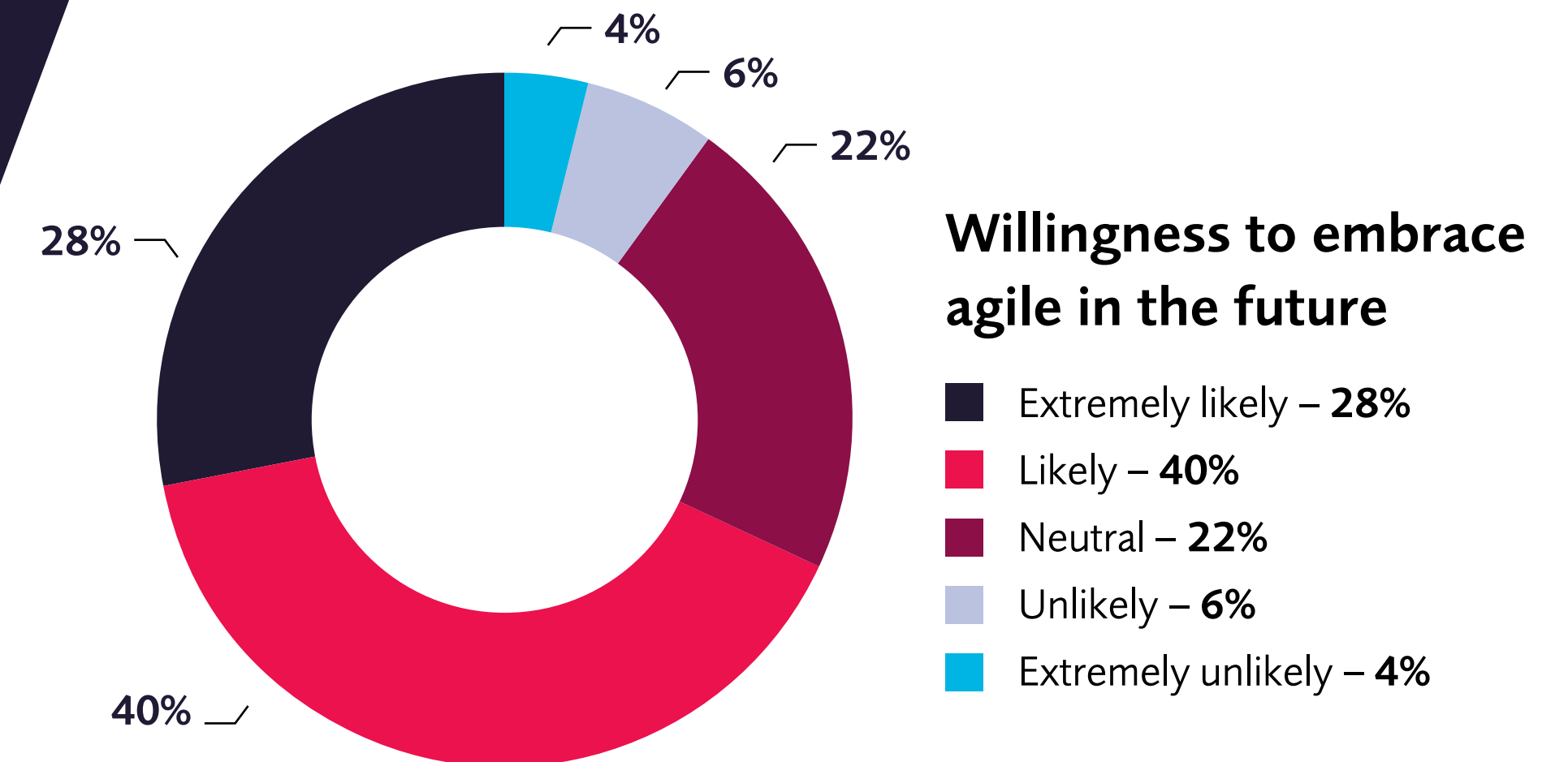
The use of agile in project management remains relatively new and is evolving for many organisations. The majority of participating organisations have less than five years of experience in practising agile. Our survey analysis indicated that experienced project professionals (with over three years of project management experience) hold more favourable views towards agile in project management.

Companies may gain limited value from 'copying' many forms of agile at the moment without wider organisational change. Overall, organisations' competency and culture are not yet fully ready for agile, with no more than one-fifth of survey participants reporting a high level of readiness in either area. Yet, the majority (68 per cent) of the participants consider agile methods promising and will adopt agile in their future projects.

Agile as a professional practice is not yet well understood, and there is variation and disagreement amongst practitioners about its definition. Our empirical findings also echo what has been identified through our systematic review of existing literature on agile in project management - that existing academic studies are highly fragmented, and there is a lack of consensus over, and there is a lack of consensus and fundamental understanding of agile among scholars.

Incorporating transcribed verbal quotations from interviewees, this report draws on case illustrations to show how different project professionals and project-based organisations have already adopted and adapted agile for project management. The study reports on meaningful insights of current practice of agile and has identified significant future research directions to develop the theoretical and practical understanding of agile in project management. This is achieved through our systematic review of the extant academic literature and empirical findings from the extensive survey and case studies. The analysis examined areas stemming from relevant academic literature and was refined through the research process, which includes:

- ✓ Current agile status effectiveness and efficacy costs
- ✓ Culture and process ✓ Agile suitability project and organisation
- ✓ Practical suggestions challenges ✓ Future research



The delivery of projects using agile has become one of the most hotly discussed topics in project management, featuring heavily in many research publications, industry reports and training guides. Yet there is still very little robust research on the subject, certainly beyond the traditional realm of IT/software development projects. Therefore, to achieve a thorough understanding of agile methods and projects and provide a reference for practitioners, we commissioned the Advanced Project Management Research Centre (APROM) at the University of Southampton through an open tender to further investigate the use of agile in project management.

Hence, this project aims to understand current and emerging themes within project management. To satisfy this aim, we have developed five research objectives. A mix of qualitative and quantitative approaches are applied to focus on project management professionals with personal experience of agile. We deliberately sought project contexts beyond IT and software development.

The focus of this research is on project professionals. The practice-relevant research objectives above have enabled us to make

recommendations for project management strategies, processes and techniques. They will also facilitate better-calibrated discussion of agile in project management among practitioners and scholars over the benefits, effects and costs of implementation. Our empirical survey and case studies provide solid and vivid examples of agile projects, highlighting both the benefits and challenges of implementing agile, in order to help practitioners to adopt this research into their projects.

The five objectives were:

1

To conduct a systematic literature review investigating the impact of agile in the project management domain, with a focus on 'beyond software'.

2

To determine the state of agile in the project profession.

3

To explore and investigate the potential use, effectiveness and efficacy of agile while examining the role and effect of governance in agile projects.

4

To examine the costs of implementing an agile culture.

5

To propose future research directions for investigating agile in project management.

In order to understand the state-of-the-art development of agile in project management, this research project adopted a mixed-method approach. This enabled the study to address the five objectives through rich and balanced evidence from practitioners. Focusing on project management professionals while deliberately seeking a context beyond IT, our data collection and analysis followed stringent ethical guidelines, ensuring the safety and anonymity of the interviewees, respondents, and individuals who undertook the research process.

The data used in this report primarily adopted three research approaches. First, a systematic literature review of 353 academic papers¹ on agile in the project management domain. Second, there were six case studies, including 31 interviews in a range of project settings. Third, an online survey of project managers that attracted a total of 604 responses from a wide range of industries. The process of our empirical research is illustrated opposite:

"353 research papers included in the literature review. 31 semi-structured interviews conducted across a range of sectors. Over 600 survey respondents."

¹ This systematic literature review utilises three major academic databases as combined sources of literature, namely Scopus, Web of Science, and Science Direct.



Data Collection

- Online survey
- Semi-structured interviews
- Transcription and open coding (of interview data)



Analysis

- Descriptive accounts
- Analytical coding
- Thematic analysis



Reporting

- Discussion
- Recommendation
- Future research

This section provides a concise review of existing academic research on agile in project management. This summary showcases previous understanding from academia and the gaps/limits which this report aims to advance.

Fewer research papers are dedicated to agile than to other aspects of project management, such as governance, controls, assurance etc. Through five rounds of refining, we identified a core sample of 60 key academic papers from an initial selection of 353 to be reviewed systematically. Half of the core sample papers were published in the five journals out of the total number of 38 journals identified in the review process. Most of these research papers are empirical studies, relying on survey instruments or case study methodologies.

As this was a review of agile in project management, we excluded academic papers focusing exclusively on software techniques or technologies, and still a significant proportion (about two-thirds) of the remaining papers address software-related projects.

Only a small amount of research discusses agile in project management, but while it is mainly applied to software, agile is emerging in a range of sectors, including construction, manufacturing, energy and government. In the 60 academic papers we reviewed, agile was applied to situations with: **changing conditions, conflicting stakeholder values, and complex information.**

The most cited agile terms are scrum (46), adaptive software development (34), and XP (33).

Reported benefits of agile in the academic literature include improved software quality, shortened delivery times², improved customer collaboration and enhanced response to defects. Agile projects have up to four times more successes and one-third fewer failures than non-agile projects.

Introducing agile to an established organisation structure can be particularly challenging and risky. A critical understanding of agile as a 'management fashion' would suggest a careful approach. Agile is not always beneficial and does not always provide benefits, regardless of how well it is implemented. Implementing agile requires a series of changes to the existing organisational structure and management at both project and organisation levels. Agile requires (among other things) new forms of leadership (consensual decision-making

and trial-and-error approaches) and new forms of contracting and procurement. Significant challenges to the successful adoption of agile relate to management and organisation, project team, internal and external relations, and tools and techniques.

Definitions of agile are varied and, especially in the project management domain, the understanding of agile is incomplete and inconsistent. The agile manifesto describes values and principles, not methods, and yet 'agile methods' are frequently the major topic of discussion. However, analysis of our literature review suggests that a focus on the core values of agile in project management (adaptability, flexibility and responsiveness) could overcome some of the difficulties associated with specific techniques.

The key papers included in our academic literature review did not include any tools or measures to evaluate agile maturity, which is a significant gap.

The five journals defined in the table below

No	Journal	Impact Factor ³
1	International Journal of Project Management (IJPM)	7.172
2	Communication of the ACM	4.654
3	Journal of Systems and Software	2.829
4	Project Management Journal (PMJ)	3.570
5	International Journal of Managing Projects in Business	2.634

² 'Quicker delivery' is criticised by some of the project professionals in our study as a common misconception around agile, and they would prefer 'early value delivery' or 'improved customer satisfaction' with similar timelines but without the rework.

³ Source: the journals' web homepages, cross checked with the 2019 JCR journal impact report. Impact factors based on accessing 18 February 2022.

FINDINGS

Our survey with over 600 respondents, contained 29 questions into three sections to explore their experiences and views of agile in project management at individual, organisation and project levels. The coding and analysis of semi-structured interviews from the six case studies are also designed to extract information from these three levels, achieving synergy with the survey and a more in-depth and comprehensive understanding of current and future trends of agile.

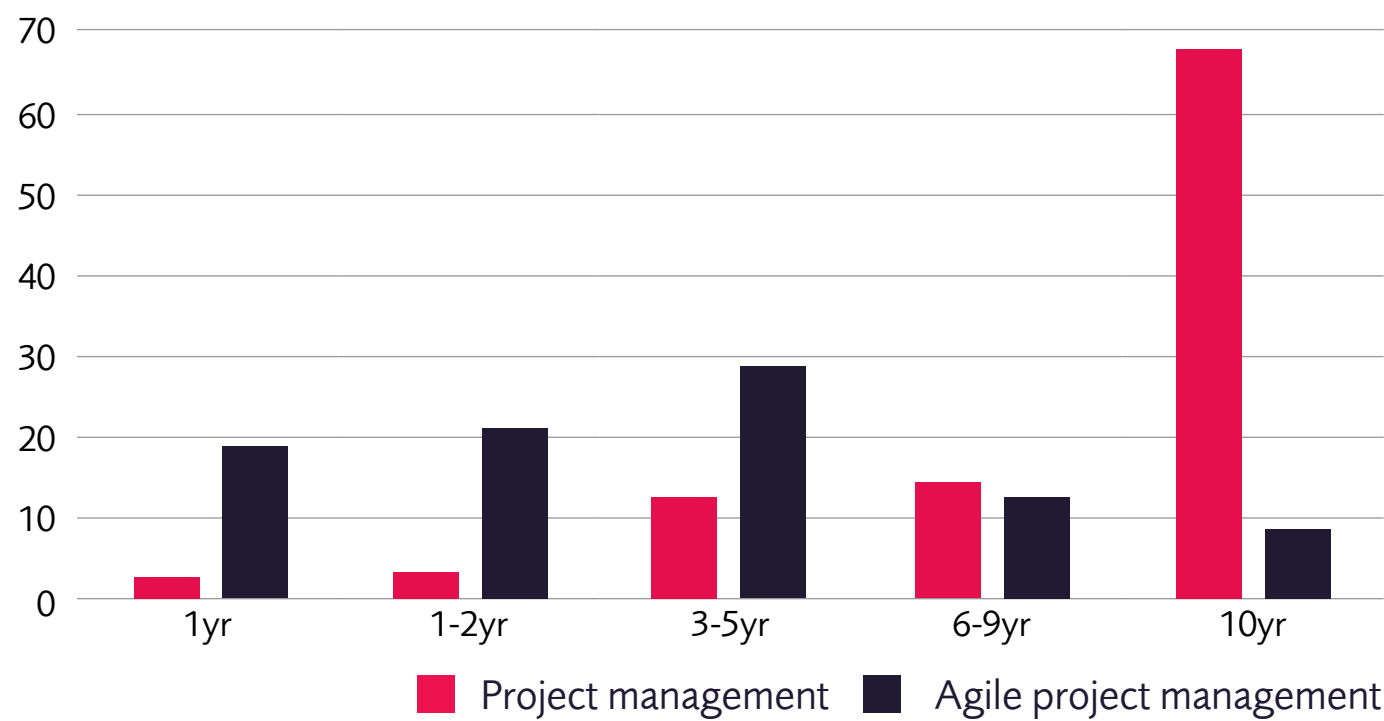
KEY DEMOGRAPHIC INFORMATION

Survey respondents

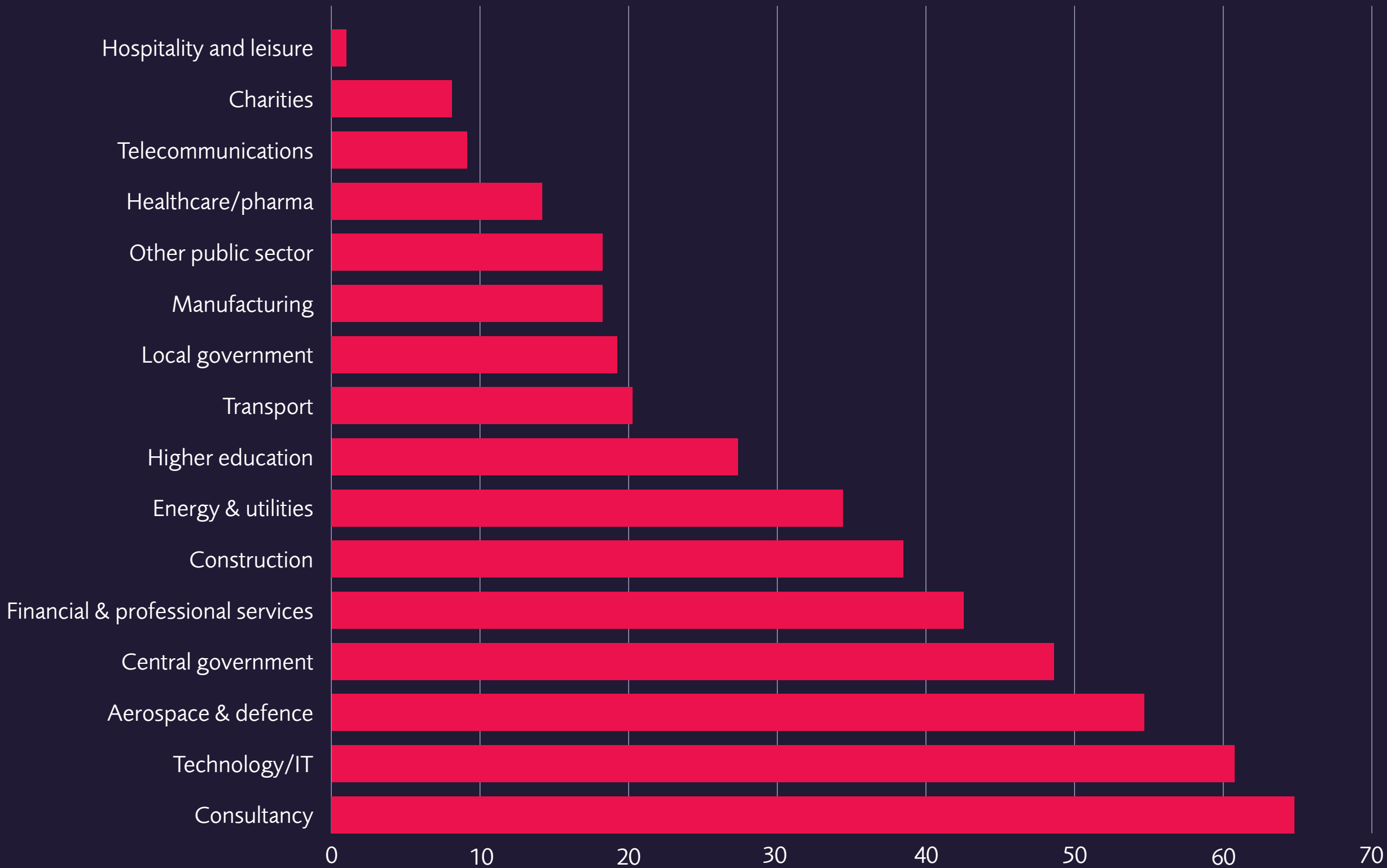
Our survey had participants from a broad range of industries, as shown below. The vast majority of respondents (94 per cent) are qualified project professionals. APM qualifications are the most obtained option (58 per cent), while 14 per cent of respondents have university qualifications in Project Management.

Most of the responses are from experienced professionals. The respective percentages of respondents with different years of experience managing projects are: 3-5 years (13 per cent), 6-9 years (16 per cent) and 10+ years (65 per cent). A lower but still significant proportion of the respondents are experienced with using agile in projects: 1-2 years (22 per cent), 3-5 years (29 per cent), 6-9 years (11 per cent), and 10+ years (9 per cent). It is noticeable that a large share of the participants who have extensive project management experience do not necessarily have the same level of agile experience. In contrast, many relatively inexperienced project professionals have significantly more agile than project management experience. As explored in the case interviews, their agile experience may typically come from roles they held before taking on managing positions (e.g., as engineers or programmers, etc.).

Participants' project management and agile experiences



Responses received by industry sector





KEY DEMOGRAPHIC INFORMATION



Multiple case studies

We have developed six cases from several key industries implementing agile, which resonate with the top industries of agile usage identified in the survey. The projects studied vary in terms of scale (e.g., team size, timespan, budget, location).

As this research project focused on exploring the current status of agile projects beyond traditional IT settings, we purposely chose industries that were well represented by the survey. The table below displays some key information about the cases studied. Some of these projects contain software/IT elements as part of the project, but the software development component is not the main task for any, except case C. The case organisations are anonymised as requested by the participants for confidentiality reasons.

Summary of case projects

Case	Industry	Project focus/area	Team size	Project location
A	Defence/government	Med service eco-system	200-300	UK/international
B	Consultancy	Financial service	About 30, plus client teams	EU/international
C	Higher education	Digitalisation	Less than 10	UK regional
D	Aerospace	Technology	30 plus 60 (two teams)	UK
E	Aerospace/defence	Research and development	About 30	UK
F	Aerospace engineering	Business process design	Unknown	UK

Case A

We have selected one case (case A) as an exemplar to be reported with an extended summary. The contexts of the rest five cases including the anonymised ones are summarised concisely to offer key information about the projects' settings.

Case A is an interesting, large-scale project (in terms of budget, timespan, and people involved), embracing agile and so far the project is delivering to target within a contrasting sector (i.e., defence/central government) with hierarchical organisational structure and waterfall project management heritage as traditions.

This is a large project that involves creating an eco-system for medical services for the UK's defence and military at international scale. The long-term project involves a budget of £200m and hundreds of team members, with a blend of in-house professionals and contractors. The project was initially started as a traditional waterfall project and then switched to agile after both internal and external stakeholders realised that it was costly and barely delivered.

Despite a slow and difficult transition period, the Scaled Agile Framework (SAFe) was adopted and adapted to coordinate all project members involved, as well as other main stakeholders. Gradually, since 2017/18, it has successfully developed a set of mechanisms, including flexible contracting and supportive induction/training for staff, and has been delivering project objectives effectively – nine out of ten project deliverables set in its most recent 18-month project

phase have been achieved, meeting the quality requirement and within their budget, despite the Covid-19 pandemic.

The adoption of agile in managing projects has advantages in terms of flexibility, adaptability and responsiveness, as it offers more transparency and visibility, and more controlled reaction. Stakeholder communication and collaboration are also enhanced through the use of agile and agile mindsets.

One interviewee who has served 30 years in the organisation claims that, across their three-decade long project experience, such a remarkable success has never been achieved before, and due to the complexity and uncertainty involved for this large-scale project, it would not be feasible without agile.

"It's the only programme in 30 years that we...just bucketed a load of capability together and said this is what we're going to deliver...and I'm delivering that to performance, cost and time for the first time ever."



The second case selected for this research, case B, is from the project consultancy industry. More specifically, this is a management consultancy project, coaching and nurturing an implementation of agile for project management in the financial sector. The project scale involves internationally located client teams that operate across the UK, EU, Asia and North America.

Case C is one of the more typical, common-practice agile projects within IT settings. The small project team from a UK higher education institution applies an agile way of project managing including scrum to promote digitalisation to migrate data from physical servers to cloud storage.

The project of case D is from a research and development facility within an aerospace company. The main focus of their programme is to develop next-generation mission systems and flight systems, and the project/programme managers are implementing agile project management within the context of looking at new technologies that can be applied within future platforms. Agile was previously introduced at lower level, and is now being scaled up to the programme and within the organisation. Challenges arose as many areas of the agile methods are outside the organisation's usual business routine.

The case E project and organisation are anonymised, as requested by the participant. The project context is within the defence industry. It involves a research and development project department of around 30 people, developing components for aerospace, using agile to better respond to changing environments.

The case F project and organisation are again anonymised, as requested by the participant. This is an award-winning project implementing business process change and agile in the aerospace industry. The project has included personnel from different divisions across the organisation and is considered a remarkable success.

Agile has been introduced to and is spreading across industries. Most of the participants who engaged with our research suggest that they view agile as promising and beneficial, enabling better project delivery.

"Almost 70 per cent of survey respondents claim they are going to practice more agile in their projects in the future."

Agile is increasingly recognised and applied across industries and project contexts. Agile has been widely adopted by many industries beyond the IT sector; the top industries reporting agile usage are: consultancy, technology/IT, construction, aerospace and defence, central government, financial and professional services, energy and utilities and higher education. One experienced agile project manager who participated in the interviews asserted:

"It's hard to find in government nowadays, especially software-related projects, that are not using some agile."

Not surprisingly, software development and/or IT implementation remain the most common types of projects where agile are applied (though we were deliberately seeking contexts beyond IT). As reflected in survey responses, agile has also been significantly adopted for tasks of: business operations, organisational changes, new product development, and new service development.

Areas where agile methods are applied



CURRENT STATE OF AGILE PROJECTS

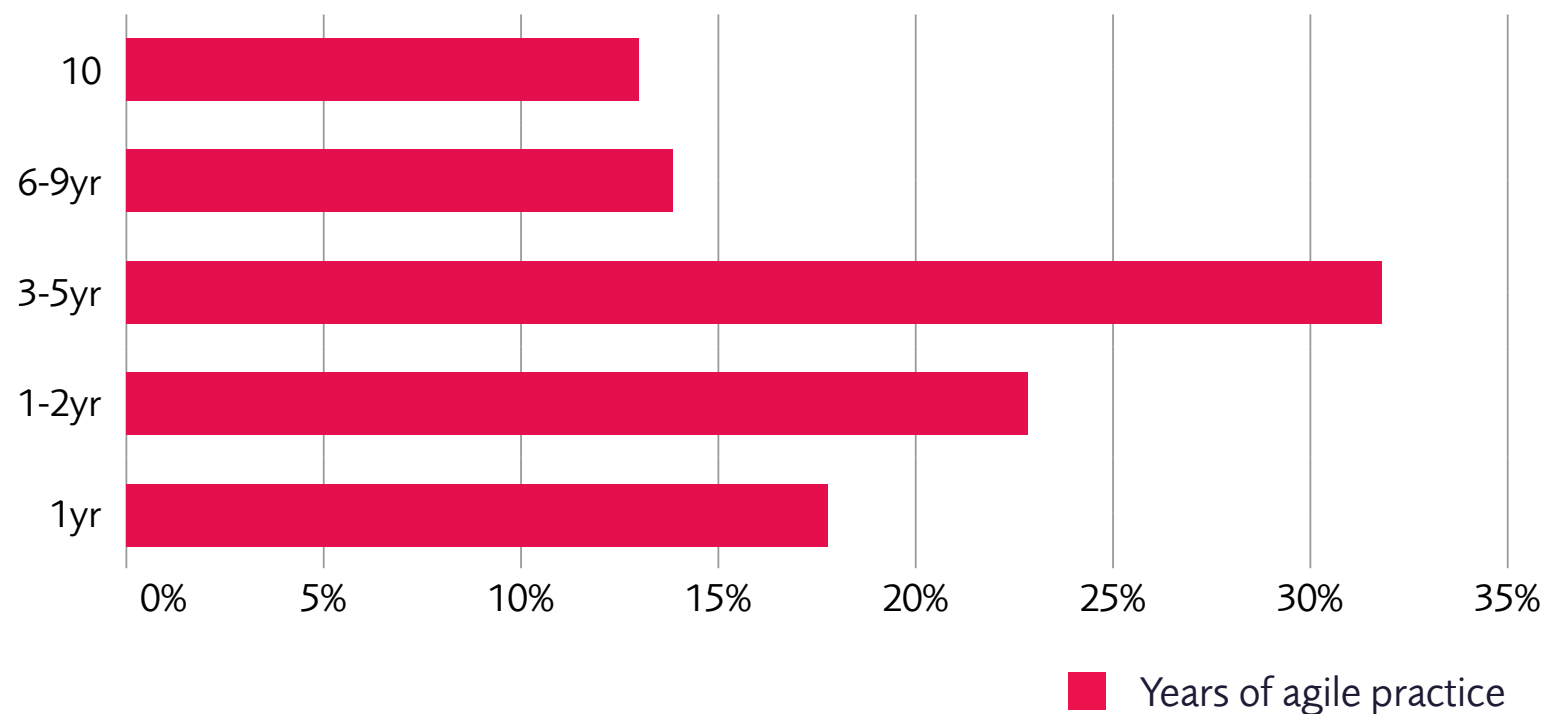
Agile usage is increasing alongside both digitalisation and changes in leadership and culture, enhancing the information flow and communication by enabling the project teams to have their voices heard, and their detailed practical knowledge/information deployed when projects are planned and prioritised. This in turn improves project delivery and brings value to customers sooner.

Our survey indicates that the most used agile terms include: kanban, daily stand-up, retrospective improvement meetings, Iteration planning, Iteration review, and timeboxes. Our case studies showed that SAFe, the Scaled Agile Framework, was also applied. Scrum and agile project management are the two most popular qualifications to obtain.

For many organisations, agile is relatively new and still emerging. Among the organisations that participated in the survey, only a small proportion have agile project experience of more than five years. Neither organisational competency nor cultural readiness are fully developed yet; only 15 per cent of respondents claimed a high level of competency for their organisation, and 20 per cent a high level of cultural readiness.

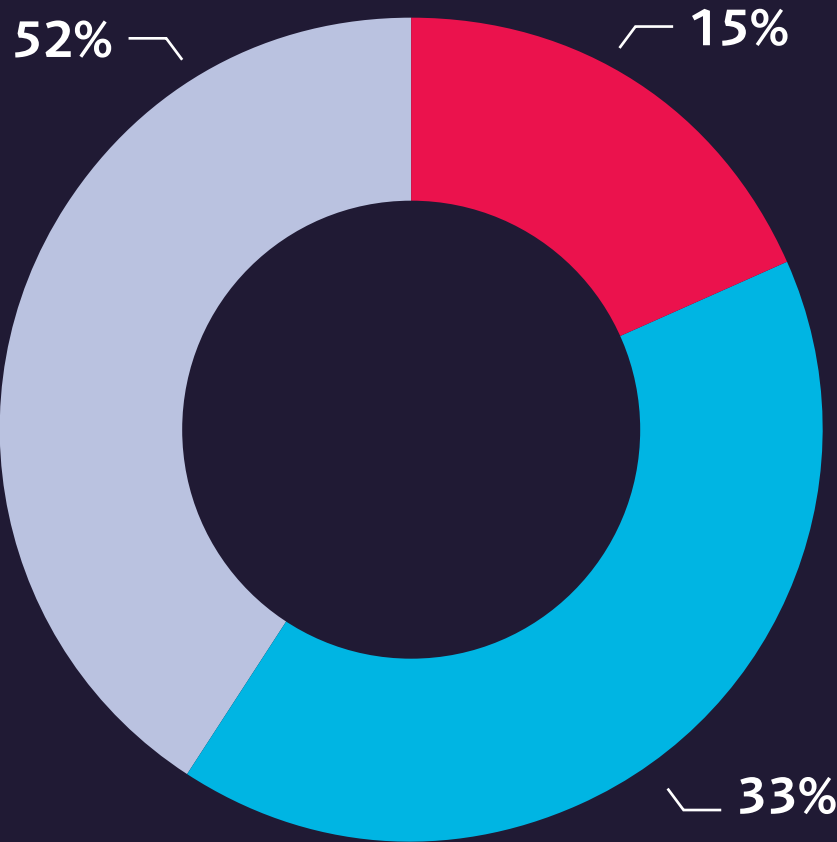
Our empirical findings, particularly from the case studies, echo our systematic literature review in showing that the uses and definitions of agile are highly fragmented. There is a lack of consensus on the fundamental understanding of agile.

Organisations' experience in practicing agile projects



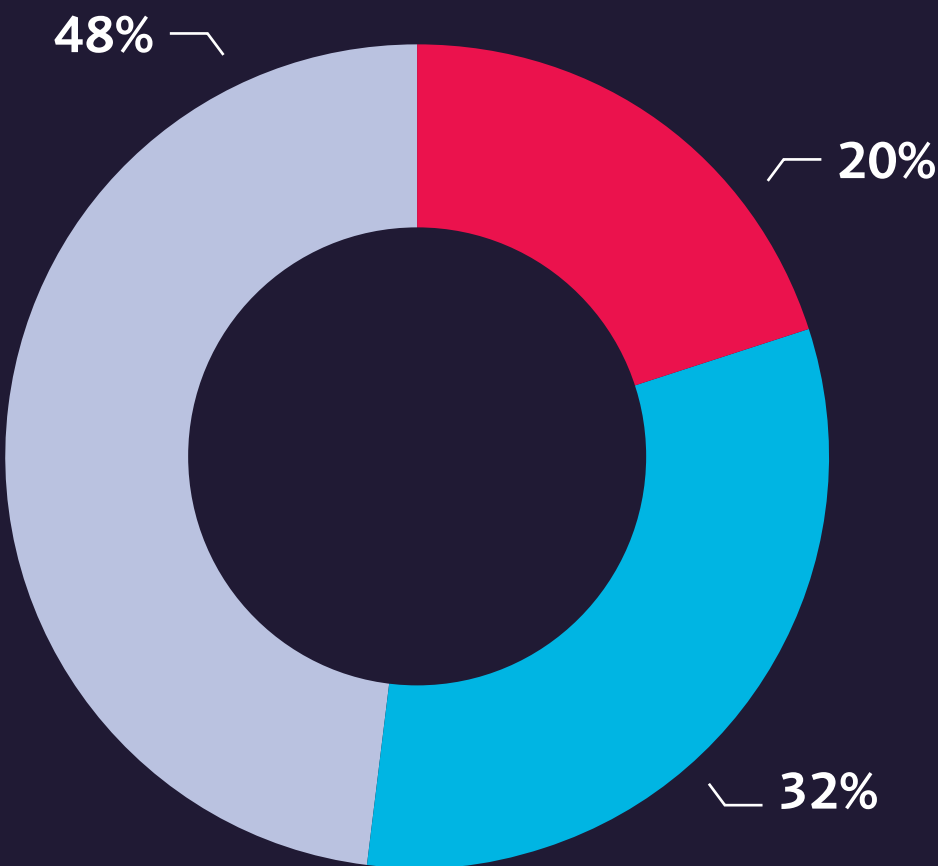
Organisation agile competency

- High – 15%
- Moderate – 33%
- Low – 52%



Organisation agile culture readiness

- High – 20%
- Moderate – 32%
- Low – 48%



Based on the evidence from both the survey responses and the case studies, agile brings positive effects to project performance. Agile is considered beneficial in the opinions of most participants, with experienced project professionals (those with more than three years of project management experience) tending to be more in favour of agile.

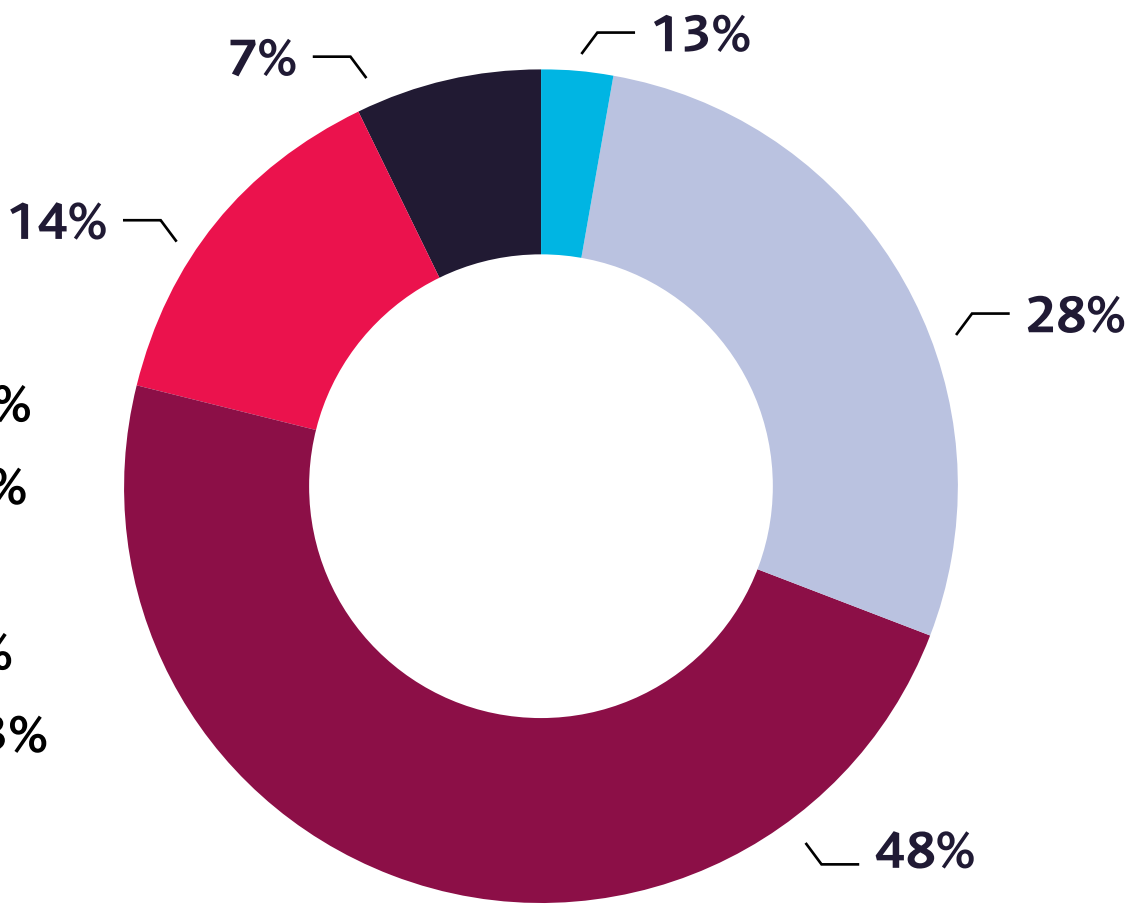
As identified from the case studies, applying agile in project management has advantages in terms of flexibility, adaptability and responsiveness, as it offers more transparency and visibility, and more controlled reaction, over the 'false sense of security' thinking of waterfall, which is often less reliable than it looks. One of the interviewees suggests that agile means:

"Bringing value sooner to enable return on investment, whilst responding to change through empowering development teams to work cross-functionally, collaboratively and in iterative cycles that enable safer and happier delivery for project teams and customers."

Being agile requires making decisions based on value over costs, clarifying the part that people play, and where/how the part fits with the team and the project. Agile offers improved planning in actual details, instead of employing 'make-ups' and 'guesses' to put an unreliable schedule together. Agile looks at documents, governance, plans/roadmaps and what to do if they fail to work out. Agile also achieves responsiveness and flexibility through enhanced customer

Agile effect

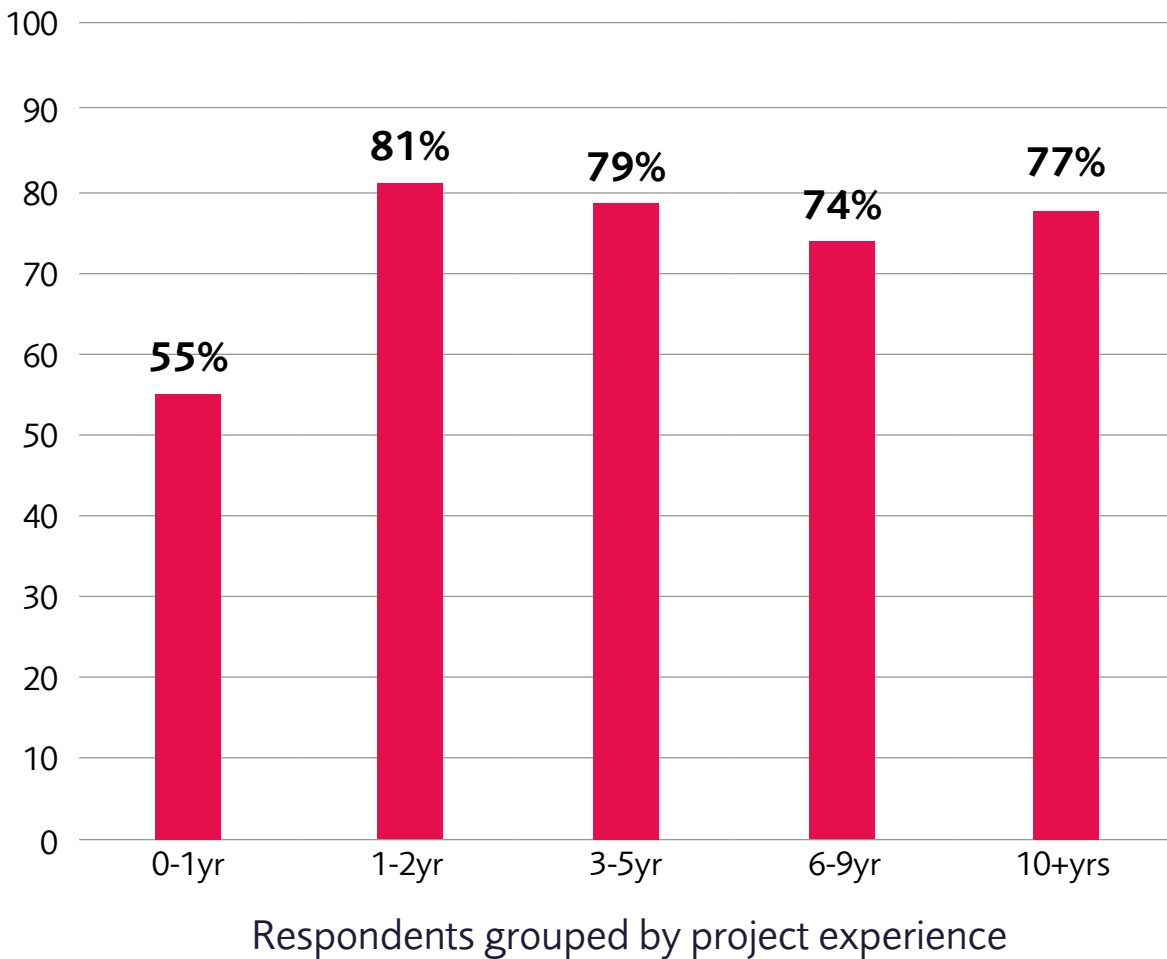
- Large positive effect – 28%
- Small positive effect – 48%
- No effect – 14%
- Small negative effect – 7%
- Large negative effect – 13%



collaboration. Working closely with customers and users is beneficial because they may not be sure what they want at the beginning, and they may change their mind during the project.

Successful agile project practitioners consider agile as both a delivery method and a set of experimental tools that allow for managed failure. Embracing such methods allows testing in early experimental stages of a project which will in turn reinforce success. Project managers can respond quickly to change and focus on providing benefit to end users.

Positive view towards agile



Agile provides the capability for rapid deployment and steering, and adjustments in project directions. This has been impressively proved during the Covid-19 pandemic and lockdowns, when unplanned changes including disruptions and work-from-home regulations occurred suddenly. This research has empirically found that agile projects, including complex ones involving large-scale project teams and organisations, have exhibited strong capability to swiftly adjust and cope with new working environments, which ultimately promotes successful project delivery that would otherwise be disrupted. Due to their complexity and exploring nature, some case projects did not proceed well using a waterfall approach, until the introduction and acceptance of agile, even before the sudden disruptions and challenges brought by the pandemic.

KEY BENEFITS OF AGILE

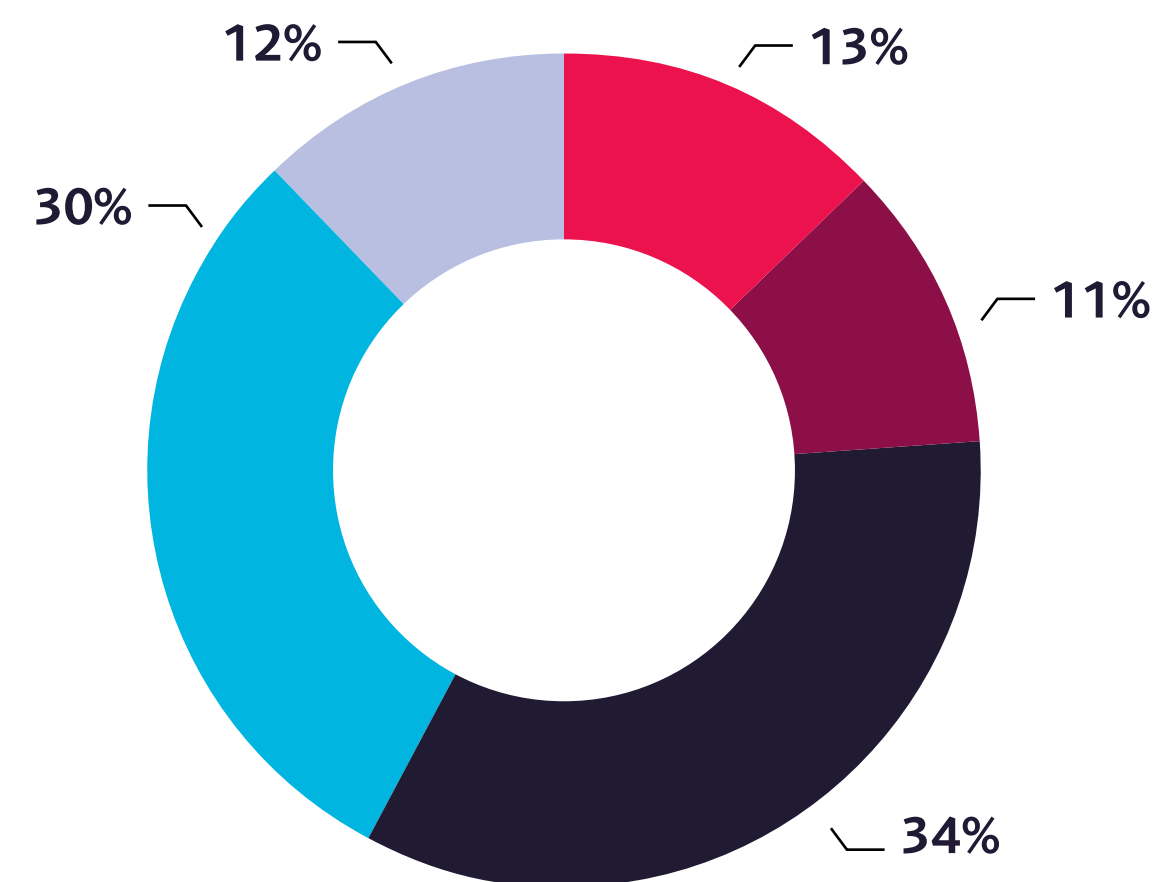
Adoption of agile brought significant improvements for projects and project organisations, with the leading effects shown in the chart opposite. It is worth noting that reduction of project cost is not ranked as a major focus of agile. Some agile practitioners consider the fundamentals of agile projects to be the fixed time and cost, while the requirements can be flexed.

It's also worth pointing out that, as supported by many practitioners, agile does not necessarily mean faster on every occasion – but rather focuses on enhanced success at first try, and facilitates innovation by preventing or allowing for disruptions. The survey result opposite also indicates that the current success rates of agile projects are not perfect. This is largely due to the fact that many project teams and organisations are still at a very early stage of their practice. The explanation of agile's advantages, as well as the potential downsides, are further explored in later sections.

We have found that project professionals with more agile experience tend to value agile more and become more agile. Very positive prospects for future implementations have been observed.

Current success rate of agile projects

- 0-20% success – 13%
- 20-40% success – 11%
- 40-60% success – 34%
- 60-80% success – 30%
- 80-100% success – 12%



1 »

Enhance quality

2 »

Enhance ability to manage priorities

3 »

Shorten delivery time

4 »

Improve customer satisfaction

5 »

Reduce risk in changing environments

6 »

Increase project visibility

7 »

Improve team morale and productivity



AGILE GOVERNANCE AND POTENTIALS FOR AGILE IN PROJECT MANAGEMENT



In contrast to the traditional or waterfall approach of project management, agile is recognised as offering enhanced transparency, visibility and even 'honesty', due to better sharing and management of information, which then serves to improve decision making. The teams are empowered in a sense to 'vote' on the plan, enabling them to have their voice heard and to share the detailed information they have. This is also shown to give the teams purpose and motivation.

"Agile is much more powerful and we can respond to change, we don't have to rigidly follow a plan that we set out at the beginning. We allow ourselves to have requirements for change."

It must be stressed that being agile does not mean 'being without a plan'. This is a common misconception amongst organisations adopting agile, and an 'excuse' often claimed by teams who either don't understand agile or are attempting to cut corners. On the contrary, many interviewees claim that, because of the enhanced transparency, communication and team alignment within agile projects, agile project teams and individuals are more disciplined and have shown improved productivity and responsibility. Agile team members are motivated and accountable to each other, making them more collaborative and flexible, and better at sharing resources in an atmosphere of 'gentle competitiveness' shaped in the workspace.

The benefits of improved visibility and more controlled reaction offered by agile are not only found among project teams; stakeholder communication and collaboration are also enhanced through implementing agile and shifting to agile mindsets.

In terms of the suitability or potential use of agile in project management, a relatively common view (reported by some of the participating practitioners) is that the use of agile depends on the industry, scale or environment of a project. However, other experienced project and agile professionals disagree, taking the view that the core value is in how agile thinking is applied and how it is used for communication and collaboration. Agile, if not limited to specific tools or methods, can be used in a wide variety of projects and organisations with suitable tailoring and appropriate organisational support. We have found agile being used effectively in a range of industries and project types.

Agile is particularly well suited to complex projects. We found that, contrary to the common misunderstanding, agile can also work well for large projects when suitable methods are applied. This is because, when team size goes up, in contrast to traditional project management, agile can maintain the communication required to coordinate the activity of multiple teams, which can diverge in traditional projects. Agile enables a large number of teams to align with the project and goal. Using current frameworks, such as SAFe, can offer a structure for interdependency and collaboration.

Interviewees from case A claim that their agile project teams have the greater flexibility needed to cope with change, complexity and uncertainties, including changing personnel, which for large projects can happen quite often.

In summary, the efficiency and efficacy of agile comes from its features of transparency and iteration, and results in less risk and more predictable outcomes. Agile avoids the problem of 'diffusion of responsibility' and promotes 'respectful roles'. The core agile values of flexibility, adaptability and responsiveness mean agile principles and methods can be successfully applied to various types of projects in a tailored way. As asserted by one interviewee (from case A), a well-implemented agile project is:

"A win-win-win for individuals, projects, and organisation."

From the survey responses, we have identified a list of the most concerning challenges in applying agile. The top five threats that attracted practitioners' attention are: first, the lack of understanding of agile, second, inconsistency across project teams and the organisation, third, general resistance to change, fourth, lack of alignment with compliance guidelines, and fifth, insufficient management inputs/ participation.

Our case studies provide access to more in-depth understanding, and practical insights on the costs and potential challenges for implementing agile projects. Some respondents suggested that one should not consider 'implementing' agile, as it needs to be started small and to grow 'organically'. Others suggested that the widespread changes required to transform the organisation to agile require a top-down approach.

For some, agile seemed too 'loosely defined' and, without an appropriate framework, training and other support, this can lead to significant resistance from the project team. In one of our cases, several rounds of attempts were made before suitable trainers were found to coach the team. It can be very challenging to 'reset' mindsets with strong path dependence, especially for members with extensive experience in, and too comfortable with, traditions to be willing to adapt to agile. Our empirical evidence shows that agile is a more disciplined approach with less risk of misallocation of people and resources and more motivated and responsible team members.

Agile teams need coaches – this is why some claim that agile is 'not a cheap option'. Traditional project managers may not transition easily to an agile team leader role (e.g., scrum master) in which they would normally be expected to coach the team and the wider organisation.

Scrum master and agile coach could be two new posts required. The practice of agile takes time to get better, and often requires senior support and buy-in, as well as the right people with appropriate levels of experience. Well-developed training and induction sessions, ideally tailor-made for specific projects and specific personnel, are necessary, as are regular and frequent (e.g., daily or weekly) ceremonies, because they can shape project routine and nurture an agile culture. These two elements have great potential to empower teams' capability, while promoting more flexibility and adaptability on project delivery, but they do take both financial and human resources to set up and evolve into a suitable and effective form.

The main challenges with agile





Another potential risk is that although the agile practices and ceremonies can keep people accountable, ensure that resources are in place and promote good work ethics, for some traditional managers, they can easily be misused, and can slip away from being an opportunity to share information to just becoming a way of doing regular checks and micro-management.

The research showed that tensions can be created between senior management and those at project team level, and between different divisions or functions at the same level. Many would be very cautious about agile simply because they have a risk-averse attitude or a general resistance to change, or even because of organisational politics or their own different understanding or vision of agile. Some would fear loosened control on the project teams, especially in terms of long-term steering and feeling the lack of traditional planning that people are used to. This is despite the fact that many would say such

effects are not necessary results of adopting agile, and that there our empirical evidence from interviewing project professionals shows that agile teams are more disciplined and motivated, and that they do better jobs. Some, too, may not recognise the value of experiment and early-stage adjustment that are enabled through agile. One senior interviewee strongly suggests that leadership is the 'number one' initiator to apply agile in project management, supported by many other interviewees stressing the importance of leadership in embracing agile.

This research has found that in many situations, the great importance of leadership in promoting agile, cannot be overstated. In most cases, the resources and cross-department collaboration can hardly be achieved without leadership buy-in and/or organisational support. In fact, without the support of leaders, agile can even develop into

dysfunctionality and potentially becomes a major risk. As found in our case studies, it's not uncommon that different reporting forms/requirements are demanded by different levels of management groups. Senior management often has a tendency towards traditional ways of reporting and communication, which means double reporting for agile teams. This can include the use of various software tools among management levels and departments, as well as means to satisfy external stakeholders including regulators and supply chain partners.

The important role of leadership in promoting agile, especially in the context of large organisations, has already been recognised by many experienced agile experts, but is not as apparent to everyone. It's also seemingly missing from previous academic research.

DISCUSSION AND RECOMMENDATIONS

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UNDERSTANDING AGILE
IN PROJECT MANAGEMENT

We were motivated to commission this study in order to understand whether agile could help to improve successful project-based organisations. The study sought to identify and understand how agile is adopted by individual project professionals at both project and organisation levels. Based on a thorough study of current agile status, we propose a number of future directions for further developing agile in project management.

We would like to restate that the adoption of agile will require a transforming period, similar to other types of organisational change. It can incur costs of time, money and human resources in the short term to nurture and manoeuvre into an effective agile way of working for a specific organisation or project, which can be in the forms of training, process and environment, and culture. It's not enough, though it is a common mistake, just to copy the surface techniques or imitate what someone has practised with a totally different project. Two quotes are selected from our interviews to illustrate the importance, when applying agile in project management, of recognising and preparing for the transformation:

"Ironically, it's a journey, not a sprint!" and "You have to go slow to go fast."



Our study has identified a range of future research with the potential to improve the fundamental understanding and practice of agile project management.



- 1 Agile vision**
To address the ambiguity, there is a pressing need to create a shared understanding and vision of agile project management, both among professionals associated with a particular project and among the wider project management community, including decision-makers, trainers, academics, etc. Agile software development has exploded from a movement that defined the principles and values of agile, but agile project management often examines specific methods. In general, there is a lack of clarity on what agile is. In project management, what agile project management is, whether to focus on values and principles or methods, and then on which methods are included, needs further study and debate, in practice and in academia.
- 2 Agile alignment scale**
As supported by literature and evidence, implementing agile in project management brings changes not only at the project team level, but also the organisational level. Hence, an agile alignment scale would help organisations to evaluate their existing capability and any expected conflict from the alignment with existing systems and structures before implementing agile project management.
- 3 Maturity evaluation scale**
The question of 'does agile work' might depend heavily on the quality of its implementation, and many implementations of agile are only partial. A maturity evaluation scale, especially one that can be widely adopted for various organisations (i.e., value- and people-focused instead of over-simplified, quantified performance measures that ignore the vast differences in the nature of projects), would allow researchers to evaluate the quality or fidelity of agile project management, particularly beyond software development.
- 4 Coordination and flexibility**
The cost and effort of implementing an agile-compatible organisational design in terms of supportive leadership, culture and process are not yet fully understood, and should be empirically explored in greater depth.
- 5 Additional empirical research**
There is a neglected area of project management practices that reflect agile values and embody coordination and flexibility but do not use the label 'agile', which requires further examination. Examples of such practices may include Intel's OKRs or the Toyota Development System. The small number of large-scale and in-depth empirical studies investigating whether agile improves project outcomes do not have sufficient breadth and depth to make confident claims as to whether agile is more suitable in a specific project or organisational setting. Therefore, a further developed framework needs to be empirically tested.

Agile has been shown to bring opportunities to enhance project outcomes, when used in complex projects with uncertain outcomes.

However, there also needs to be a strategic fit between the project and the organisation. Many of the report's findings can be readily applied within projects and project teams without much additional expenditure. However, in some cases, greater value can be added through organisational support as identified through our in-depth case studies.



- 1 Induction and training**
Well-developed and implemented induction and training sessions are recognised as being essential to establishing a shared understanding of how to become more agile within project teams. As highlighted in this research, this especially applies to large-scale projects where there is a frequent turnover of people. Project managers should clearly communicate their organisational processes, especially where agile is different from the usual ways of working.
- 2 Adopting a hybrid approach**
Project managers can apply elements of agile alongside traditional approaches. One of our case studies ran an agile project but reported back to a waterfall plan and governance system. In large and complex projects, project managers are advised to adopt agile even though additional reporting may be required.
- 3 Agile values and methods**
When projects are specified according to agile principles, they are continually evaluated against the user goal and organisation goals, rather than against a pre-set, detailed project plan. Hence, contracts for external suppliers must also fit with this model, and one observed practice was to use short time periods. A very large, multi-million-pound project operating with agile principles may have the prime contractor on rolling four- or six-week contracts covering a broad commitment to a defined level of resources. Other contracting models might also be suitable, and this topic would benefit from further investigation.
- 4 Agile structure**
If projects are already specified and run according to agile principles, the final step of organisational control and coordination includes the adoption of agile planning and reporting mechanisms and governance systems. This is a large and complex step that goes well beyond individual projects and may require changes to the organisation structure, hierarchy, and HR systems.
- 5 Implementing agile**
It is found that project managers can operate agile inside a traditional project (e.g., linear) and/or organisational setting(s). However, in such cases, project outputs and progress have aligned with more traditional reporting requirements, resulting in additional documentation to meet the needs of stakeholders outside the agile team. Some refer to this as a 'hybrid' model. Based on our case studies, project managers are advised to adopt agile even though additional reporting is required.

Find out more: apm.org.uk/agile

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