An Assessment of the Attitude Toward Agile in Professional Organizations

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Abstract

The term agile is widely used to describe an iterative and incremental approach to developing products, where small units of value are delivered frequently to customers and feedback is monitored to shape future delivery cycles. Agile practices emerged in the late-twentieth century as a response to the growing complexity of software development. The traditional project management approach, where requirements and design for the total system are created prior to implementation, was not reliably delivering high-quality results. Nowadays, agile practices are incorporated into several project methodologies widely adopted by professional organizations developing technology products. In this paper, we explore the perception of agile's effectiveness among a diverse group of professionals with experience using these methodologies.

To gauge attitudes toward agile, professionals in software development, project and product management, and leadership roles were interviewed. Interviewees were asked to define the agile approach to project management in their own words, contrast the description with their understanding of traditional project management, and to describe outcomes where they have personally experienced agile practices. A questionnaire was developed and distributed to measure the strength of trends detected in interview results. We analyzed the questionnaire results to assess the relationship between experience and the perception of agile's effectiveness. We also analyzed the factors of project success in agile environments based on participants' responses including quality of engagement with business and customer stakeholders, use of agile methodology and tools.

Introduction

In the professional world, the term "agile" has come to describe an alternative approach to traditional project management practices that encourages incremental and iterative changes to systems. The introduction of agile to the common professional lexicon can be traced to the Manifesto for Agile Software Development, published in 2001 by seventeen representatives from the software community, each an advocate for alternatives to documentation driven, heavyweight software development processes[1]. The brief Manifesto expressed what the authors recognized as most valuable to software development, emphasizing individuals and the interactions between them, working software, collaboration with customers, and responsiveness to change[2]. The Manifesto's succinct text captures the ethos of the many agile methodologies introduced before and after its publication.

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Today, agile practices have been widely adopted by industry, with most software teams reporting use of Agile methodologies and Agile practices spreading to other types of work[3][4]. Agile adoption frequently occurs through the application of popular methodologies and frameworks including Scrum, Kanban, and the Scaled Agile Framework (SAFe®)[3]. The organizations responsible for these methodologies report desirable outcomes where they are applied, including productivity, quality, and employee engagement improvements[5]. Additionally, studies have shown that the adoption of agile improved project success measures including efficiency, stakeholder satisfaction, perception of overall project performance, and achievement of time and budget goals[6][7]. However, professionals applying agile practices in their work frequently report barriers to success with agile tied to organizational culture and resistance to change[3].

In this paper, we present the results of interviews with and questionnaire responses from thirty-nine professionals experienced with agile practices. The interviews and questionnaire were designed to measure enthusiasm for agile, to gauge the degree of preference for agile over traditional project management practices, and to detect themes across experiences and industries. We analyze the factors of project success in agile environments based on the interview and questionnaire responses including quality of engagement with business and customer stakeholders and the use of agile methodologies and tools. We also explore the relationship between experience with agile and the perception of agile's effectiveness.

Agile Practices and Methodologies

In the twenty-first century, agile has become near ubiquitous among organizations developing software products, with a majority of these organizations having adopted or committed to adopting an agile way of working[4]. To understand what agile represents, it's important to understand how agile practices are distinct from traditional project management. Traditional project management practices, often termed "waterfall", emphasize long-term, linear plans with rigid scope and requirements. Under the waterfall model, visualized in Figure 1, engagement with customers and business sponsors occurs predominantly in the early and final stages of the work effort, when setting the requirements and design of the total solution and after the solution is implemented.

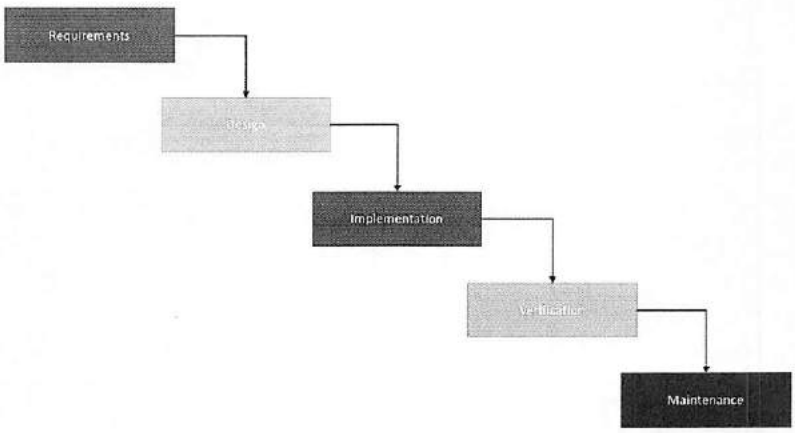

Figure 1. High-level summary of the linear flow of a traditional "waterfall" project.

In contrast, agile encourages delivery of the total solution incrementally, with each increment releasing a working product or working unit of the product for use and evaluation. Unlike traditional project management practices, agile does not attempt to commit requirements and design for the total solution prior to implementation. Instead, the scope of requirements committed in each increment is limited to what can be delivered within the increment, and feedback from stakeholders on what has been delivered is incorporated into requirements for future change. The change accomplished with an agile increment can introduce new functionality (i.e. incremental change) or improve functionality previously delivered (i.e. iterative change) and cycles of change continue until the solution is retired[8]. The flow of agile work is visualized in Figure 2.

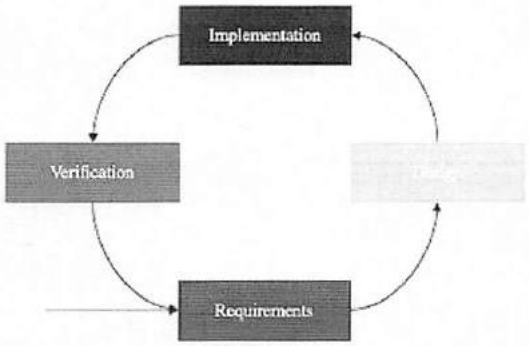

Figure 2. High-level summary of the incremental and iterative flow of an agile project.

Traditional project management approaches assume the requirements of a total solution can be known and fixed at the onset of a work effort; an effective assumption when true, allowing for accurate work breakdowns, detailed timelines, and long-term resource schedules. However, there is risk in a traditional project management approach associated with the possibility of inaccurate or incomplete components of the solution (i.e., requirements, design, or units of the implementation) propagating through later phases of work undetected, resulting in failure to deliver the anticipated value when customers and business sponsors engage with the solution during verification. In complex information technology (IT) projects, the impact of a mistake propagated through later work stages can be substantial, costing organizations and their employees greatly[9]. Complexity isn't exclusive to IT projects; complicated decision-making contexts, where fixing a problem and solution at a single point in time is difficult or cannot be done, are prevalent across the business world[10].

Agile mitigates the risk inherent to solving complex problems by mandating regular assessments of quality, with quality the extent to which a solution addresses the problems posed by customers and business sponsors. The risk of introducing inaccurate requirements, design, or implementation is not entirely removed with agile practices. Instead, by limiting the scope of commitment to what can be accomplished in a fixed period, typically weeks or a month, and delivering the product to stakeholders for acceptance at the close of the period, agile increases the likelihood of detecting a mistake early while the adverse effect on quality is minimal. Further, this regular communication with customers and business sponsors allows for the continual refinement of the delivery team's goals, with goal quality a significant moderating factor for agile team success[6].

Questionnaire Development

To develop a questionnaire for the purpose of measuring enthusiasm for agile among professionals, gauging the degree of preference for agile over traditional project management practices, and to detect general themes across experiences and industries, we began with a series of interviews. In total, six professionals agreed to an interview. The interviewees held product management, software development, and design roles and their experience on agile teams ranged from as little as ten weeks to more than a decade. They described professional backgrounds spanning a wide range of industries, including technology, marketing, industrial design, and medical research.

Each interviewee was asked the same seven questions in an identical order:

1. Describe project and product management in your own words.
2. Describe the agile approach to project or product management in your own words.
3. How does agile differ from traditional project management?
4. What factors contribute to success in an agile project?
5. What are the weaknesses of the agile approach to project management?
6. Where you've experienced agile in your professional career, what has been the outcome?
7. Would you choose agile over a traditional methodology for every project?

When interviewees answered no to question 7, indicating they would not choose agile over traditional project management practices for every project, they were asked to elaborate on the response. After answering the interview questions, interviewees were prompted to describe their total professional experience and their experience with agile practices.

Interviewees' descriptions of traditional project management and agile coalesced around a common understanding of traditional project management as oriented toward the delivery of a pre-determined solution and agile toward problem solving and adapting to change. None of the interviewees defined agile as adherence to a particular agile methodology, for example Scrum or SAFe®, or associated agile with the use of a particular tool, for example a Kanban board or product backlog. All interviewees indicated a preference for agile in some circumstances, with the interviewee who reported the least experience on agile teams stating a preference for agile in all circumstances.

Two notable themes emerged when interviewees' described factors contributing to success with agile and its weaknesses. First, stakeholder buy-in and team autonomy were described as significant success factors, with ideal being an environment where leadership provides direction to an agile team and serves as a constant advocate for the team without dictating solution details. Second, interviewees described the importance of the two factors as a potential of weakness of agile. In the absence of positive engagement with leadership capable of aligning interests and delivery between agile teams, most of the interviewees cautioned that agile may not deliver greater value than traditional project management practices. The strength of this opinion was greatest among the two most experienced interviewees from project and product management backgrounds, with one describing agile as "fragile" and difficult to maintain when the scope of a team's work creates major dependencies with areas of an organization outside of the team's control.

We designed a questionnaire to further explore the significant themes detected during the interviews. The questionnaire was written to elicit general enthusiasm for agile, to measure the extent to which experience on agile teams moderates the perception of agile as superior to traditional project management practices. We also aimed to quantify the finding in interview results that professionals on agile teams associate agile with change and interactions between people, not strict adherence to a particular methodology advertised as agile or the use of tools associated with agile. We created a draft questionnaire, accessible through a hyperlink, with thirteen questions. The draft questionnaire was distributed to eight respondents, four of whom who had provided an interview.

The themes across draft questionnaire responses closely aligned to those detected in interviews. Most feedback received from the eight respondents was usability-related, with mobile users struggling with open text fields that allowed only a single line entry and some respondents reporting difficulty with the types of controls used for the ranked list question and to input years of experience. Minor changes were made to the questionnaire to address the usability concerns. Additionally, a question was added to elicit the industries the respondent was working in or had worked in. The final version of the questionnaire, after incorporating the usability and industry changes, is summarized in Figure 3.

Question #	Question	Possible Values
0 (Landing Screen)	Agile Experience and Perceptions Survey: The intent of the following survey is to collect information from professionals who are working, or have worked, with Agile teams about their experience and their perception of Agile's effectiveness. The survey results will be aggregated and incorporated into ongoing research of Agile practices. Personal information, such as names and employers, will not be collected with the survey or reported with survey results. The brief survey consists of 14 questions and will take approximately 5 minutes to complete. If you'd like to participate in the research, please click the arrow below to continue. Your input is greatly appreciated.	
1	Which job category below best describes your experience?	Software Engineer, IT Manager, Project Manager, Product Owner/Manager, User Experience Designer, Other (with text entry)
2	Select all industries from the list below that describe the industry, or industries, that you're working in now and have worked in.	Technology, Telecommunications, Health Care, Financials, Real Estate, Consumer Discretionary, Consumer Staples, Industrials, Basic Materials, Energy, Utilities, Other (with text entry)
3	Select all methodologies from the list below that you've experienced in your career.	Technology, Telecommunications, Health Care, Financials, Real Estate, Consumer Discretionary, Consumer Staples, Industrials, Basic Materials, Energy, Utilities, Other (with text entry)
4	The Agile team(s) that I've supported/been a member of delivered results that satisfied end users.	Strongly agree, Somewhat agree, Neither agree nor disagree, Somewhat disagree, Strongly disagree
5	The Agile team(s) that I've supported/been a member of delivered results that satisfied the business sponsor(s).	Strongly agree, Somewhat agree, Neither agree nor disagree, Somewhat disagree, Strongly disagree
6	The Agile team(s) that I've supported/been a member of were successful.	Strongly agree, Somewhat agree, Neither agree nor disagree, Somewhat disagree, Strongly disagree
7	Rank the influence of the factors below on the success of an Agile team	Agile methodology used, Engagement

	from greatest to least influence on success. (Drag and drop to rank)	with end users, Issue tracking tool used (ex. Jira, Rally, Azure Boards), Relationships with business sponsors, Skill of the team's members
8	I would choose Agile for projects or product development efforts.	all, most, some, few, no
9	What factors influence your decision to choose an Agile or traditional approach to a project or product development effort?	[text entry field]
10	Can Agile practices be scaled to a large organization?	Yes, Maybe, No
11	Briefly explain why you believe Agile practices can or cannot be scaled to a large organization.	[text entry field]
12	How many years of professional experience do you have? (Enter a number)	[number entry field]
13	How many years of experience do you have supporting Agile teams? (Enter a number)	[number entry field]
14	How many years of experience do you have supporting teams developing a software product? (Enter a number)	[number entry field]

Figure 3. Summary of questionnaire distributed to professionals with experience on or supporting agile teams.

Questionnaire Results

We distributed our questionnaire, accessible via a hyperlink from a computer or mobile device, in September and October of 2022. The hyperlink was provided through LinkedIn and direct communication to personal contacts known to have professional experience with agile teams. Those contacted were asked to complete the questionnaire and to share the link with their agile-experienced contacts. In total, twenty-nine professionals provided a response.

The respondents' reported years of professional experience, years of experience working as a member of or supporting teams developing a software product, and years of experience with teams applying agile practices are summarized in Figure 4. What the years of experience results highlight is that widespread adoption of agile practices among the professional population is a relatively recent phenomenon, occurring within the last decade. This trend is most evident in the distributions of respondents' experience with software teams and experience with agile practices, where despite a common median of six years, the middle of the agile experience distribution (i.e. second and third quartiles) is much narrower than the middle of the software experience distribution at four to ten years and three to fifteen years, respectively.

	Respondents' Total Professional Experience	Respondents' Experience with Software Teams	Respondents' Experience with Agile
Average	16 years 7 months	8 years 11 months	6 years 7 months
Median	15 years	6 years	6 years
Minimum	5 years	0 years	2 years
Maximum	40 years	28 years	16 years

Figure 4. Summary of questionnaire respondents' reported years of experience.

A summary of respondent's job categories, their industries, and the project methodologies they have experienced is included in Figure 5. The job categories reported by respondents can be categorized in two groups as they relate to agile teams, direct IT contributor roles and support and management roles. The direct IT contributor group includes nine respondents who reported holding a software engineer, server support, or system engineer role. The support and management roles group includes twenty respondents representing all other job categories reported, with project manager and product owner/manager most common among the set.

Most respondents reported working in, or having worked in, technology. Other common industries were financials, health care, and telecommunications. Scrum was the most common project methodology reported by respondents, followed closely by Kanban and waterfall/traditional. Many respondents also claimed experience with a hybrid agile/traditional methodology and with SAFe®.

Respondents' Job Categories	Responses (% of Respondents)
Software Engineer	7 (24%)
Project Manager	5 (17%)
Product Owner/Manager	5 (17%)
IT Manager	2 (7%)
Agile Coach	1 (3%)
Business Analyst	1 (3%)
Business Intelligence Analyst	1 (3%)
Cloud Architect	1 (3%)
Data Scientist	1 (3%)
Server Support	1 (3%)
Strategy Advisor	1 (3%)
Strategy Chief	1 (3%)
System Engineer	1 (3%)
[Multiple]	1 (3%)

Respondents' Industries	Responses (% of Respondents)
Technology	24 (83%)
Financials	10 (34%)
Health Care	9 (31%)
Telecommunications	6 (21%)
Industrials	5 (17%)
Consumer Staples	5 (17%)
Energy	3 (10%)
Utilities	2 (7%)
Consumer Discretionary	2 (7%)
Real Estate	2 (7%)
Medical Device Manufacturing	1 (3%)
Banking	1 (3%)
City Government	1 (3%)
Transportation/ Airports	1 (3%)
Defense	1 (3%)
Entertainment	1 (3%)
Grocery	1 (3%)
Quick Service Restaurants (QSR)	1 (3%)

Respondents' Project Methodologies	Responses (% of Respondents)
Scrum	25 (86%)
Kanban	23 (79%)
Waterfall/Traditional	21 (72%)
Hybrid Agile/Traditional Methodology	19 (66%)
Scaled Agile Framework (SAFe®)	14 (48%)
Lean Software Development	8 (28%)
Feature Driven Development (FDD)	2 (7%)
Extreme Programming (XP)	2 (7%)
Dynamic Systems Development Method (DSDM)	1 (3%)
Engagement Delivery Framework (EDF)	1 (3%)
Unified Process	1 (3%)

Figure 5. Summary of questionnaire respondents' reported job categories, industries, and project methodologies.

Respondents overwhelming reported that the agile teams they have been a member of or supported were successful and produced satisfactory results for end users and business sponsors. The strength of the reported success was split closely between strongly agree and somewhat agree on a five-point Likert scale. This result is visualized in Figure 6. Notably, the strength of agreement remains consistent when the results are separated by years of reported agile experience into above median experience and at or below median experience sets. This did not coincide with the interview observation that experience with agile practices moderates the perception of agile as effective. However, when the results are separated by job categories into direct IT contributor and support and management role sets, direct IT contributors were less enthusiastic about agile than their support and management peers; the majority response among direct IT contributors was somewhat agree while the majority response among support and management team members was strongly agree.

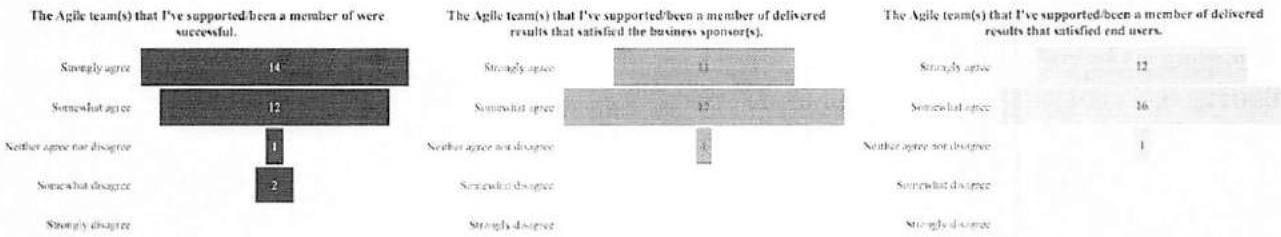

Figure 6. Summary of questionnaire respondents' assessments of the success of the agile teams they've been a member of or supported

Asked if they would choose agile for "all", "most", "some", "few", or "no" projects or product development efforts, the majority of respondents answered "most", with "some" and "all" the second and third most common responses, respectively. None of the respondents answered "few" or "no". Respondents were similarly enthusiastic about the scalability of agile practices to large organizations, with most answering "yes" when asked if agile can scale and only a single "no" response. These results are captured in Figure 7.

Respondents' elaboration on factors influencing their decision to choose an agile approach to a project or product development effort and the reasons they believe agile can or cannot scale to large organizations aligned to two common themes, the organization's buy-in and the complexity of the deliverable. Regarding an organization's buy-in, respondents expressed a preference for agile when they perceive their organization as knowledgeable and supportive of agile practices but indicated they may avoid agile when the perception is that the organization lacks knowledge of effective agile practices or has a leadership team that favors traditional project management. On complexity of the deliverable, multiple respondents positively associated agile with circumstances where the details of the deliverable are not well-defined and where the effort will benefit from incremental and iterative change. Some respondents stated a preference for traditional project management for simple deliverables.

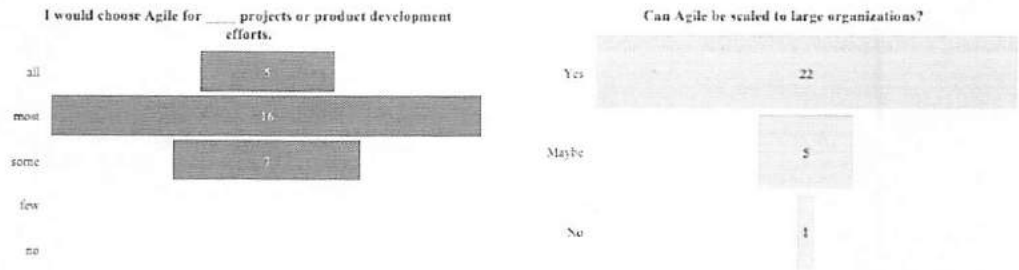

Figure 7. Questionnaire respondents' preference for agile and opinion on the scalability of agile to large organizations.

Skill of an agile team's members was identified by respondents as most influential to the team's success, with the quality of end user engagement and relationships with business sponsors close second and third most influential factors. The agile methodology and issue tracking tool used by a team were ranked fourth and fifth most influential, respectively. This result is captured in Figure 8, where each factor has a weighted total calculated by awarding five points for each instance of the factor being at the top of a respondent's ranked list, four points for each instance of the factor being ranked second in a respondent's list, three points for third, two points for fourth, and one point for being in the fifth position on a respondent's list.

When the questionnaire results are separated by agile experience into above median and at or below median years of experience sets, team member skill, engagement with end users, and relationships with business sponsors remain the top three most influential factors for agile team success, with agile methodology and issue tracking tool used a distant fourth and fifth for both groups. Notable, however, is that when the results are separated by direct IT contributor and support and management role sets, agile methodology used becomes the second most influential factor for team success among the direct IT contributor set, only a single point behind skill of the team's members in the weighted total list.

Factors Influencing Agile Team Success	Count of Responses					Weighted Total
	1 (Most Influence)	2	3	4	5 (Least Influence)	
Skill of the team's members	10	7	6	3	1	103
Engagement with end users	9	8	5	3	2	100
Relationships with business sponsors	4	6	12	3	2	96
Agile methodology used	4	4	3	8	8	69
Issue tracking tool used (ex. Jira, Rally, Azure boards)	0	2	1	10	14	45

Figure 8. Questionnaire respondents' ranking of factors that influence the success of agile teams.

Summary and Conclusions

Agile practices have been widely accepted for software development to improve product quality and project outcomes, and agile adoption outside of software is growing. Our research has shown that among a small, diverse sample of professionals applying agile practices in their work, enthusiasm for agile is high. Most respondents to our questionnaire agreed that the agile teams they have been a part of were successful in delivering satisfactory results for business and customer stakeholders. Among the professionals surveyed, most expressed a preference for agile practices over traditional, waterfall project methodologies. However, their decision to apply agile practices to a project or product development effort is moderated by their perception of the organization's buy-in on agile and the perceived complexity of the deliverable. The perception of greater buy-in was associated with a higher likelihood of applying agile practices among respondents and respondents indicated a preference for agile when the details of a deliverable are not well-defined.

Regardless of experience, respondents to the questionnaire identified the skill of a team's members, quality of engagement with end users, and strength of relationships with business sponsors as more influential to the success of agile teams than the agile methodology or agile tooling used, with a possible exception among respondents who identified themselves as holding a direct IT contributor role on an agile team. Among that group, the agile methodology used by a team was identified as having greater influence on outcomes than end user engagement and business sponsor relationships. Additionally, director IT contributor respondents were less likely to strongly agree that their agile teams were successful. In totality, the results indicate that the professional community has accepted agile practices for organizing project and product development work but perceive organizational barriers to the effective use of agile. An opportunity exists to address the organizational barriers by extending a common education in the principles and practices of agile to all roles with influence over agile teams, from team members to supporting roles and leadership, to improve institutional knowledge of agile and further the perception of organizations as bought-in on agile as a preference for project and product development efforts.

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