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Evaluating the Impact of Agile Project Management Methodologies on Non-IT Project success rates

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ABSTRACT :

This study used a quantitative research approach to investigate the relationship between Agile project management techniques and non-IT project success. A total of 200 questionnaires were distributed to Project managers, program managers, technicians, and engineers from non-IT projects for primary data collection across various industries, including Construction, Manufacturing, and Product development in India. A purposive sampling technique was employed to select experienced Agile methodology practitioners for this research.

A structured survey questionnaire was used to collect primary data. This questionnaire was pre-tested to refine it based on feedback from a small group of professionals. Descriptive statistics provided an overview of demographic variables. Correlation analysis (Pearson's correlation coefficient) examined the relationship between variables, and regression analysis explored how Agile methodologies, alignment, and customer concerns impact project success.

The study employed Cronbach's alpha to measure the reliability and validity of the survey instrument, ensuring that the data collected is reliable and valid.

This research aimed to provide insights into the application of Agile methodologies in non-IT projects, addressing project success factors, flexibility, and adaptability. The results are of significance to project professionals and organizations seeking to enhance their project outcomes through Agile practices.

Keywords: Agile methodologies, Non- IT projects

1. Introduction :

The traditional waterfall model has historically been used to manage software development projects, but it has encountered significant obstacles characterized by prolonged development cycles and delayed deliverables. The Standish Group's report (Chari, 2018) revealed that only 29% of software projects were successful, with 19% labeled as outright failures, and 52% categorized as challenged due to overruns in cost, time, or compromised features. This alarming track record highlighted the need for a paradigm shift in project management methodologies.

The rigidity of the waterfall model posed numerous challenges, particularly its inability to accommodate evolving user requirements. The conventional approach often fixed the project scope at its outset, resulting in multi-year projects that found the delivered product outdated in the face of changing user needs and market dynamics. Furthermore, communication gaps between development teams and end-users frequently led to misunderstandings, exacerbating project failures (Soares et al., 2022).

In response to these pressing issues, Agile methodologies emerged as a dynamic and adaptive approach in project management. Agile aimed to counter the shortcomings of the waterfall model by embracing iterative development, close collaboration between cross-functional teams, and the capability to swiftly adapt to changing project requirements.

As Agile methodologies gained substantial traction within the realm of IT, particularly software development, they garnered interest beyond this domain. Organizations recognized the potential applicability of Agile principles to diverse non-IT projects, encompassing construction, marketing, product development, and more. For instance, Serrador et al. (2015) reported that Agile and iterative methods were adopted by over 65% of 1386 projects studied, showcasing a positive correlation between Agile approach and project success.

Understanding the influence of Agile principles on the success rates of non-IT projects has become an important area of research due to the increasing interest in implementing these concepts to improve project outcomes. A vast body of literature has extensively discussed Agile project management, highlighting its evolution from iterative project management (Cao and Ramesh, 2008). Central to Agile methodologies is a flexible and interactive model wherein project requirements and plans continually evolve to address changing stakeholder, supplier, and customer demands. The Agile Manifesto, as presented by Beck et al. (2001), establishes the foundational values and principles of Agile methodologies, emphasizing collaboration, adaptability, and customer-centricity.

Although Agile approaches have a well-established track record of success in IT projects (Papatheocharous and Andreou, 2014; Serrador and Pinto, 2015), there is increasing interest in how well they work in non-IT situations. Several scholarly investigations have examined Agile methodologies throughout various sectors, clarifying the advantages and difficulties associated with their execution (Fitzgerald et al., 2006; Pikkarainen et al., 2008). However, a thorough evaluation of the expected influence of Agile techniques on many variables for the success of non-IT projects is lacking

Insight on Agile methodologies

History of Agile Project Management

The history of Agile project management is a narrative of necessity, adaptation, and efficiency. It was born out of a pressing need to find better ways to manage software development projects. The backdrop of this narrative is important; most of the pioneers of Agile methodologies had substantial expertise in the software development industry. They were not theorists but practitioners, which adds substantial weight to the Agile movement.

One of the pivotal moments in Agile's history was the creation of the Agile Manifesto, a seminal event that united individuals who were searching for alternatives to conventional approaches. The Manifesto brought together software developers who had tried and tested their methodologies, such as Scrum, Crystal, and Extreme Programming (XP) (Boehm & Turner, 2003).

One of the creators of Scrum, Ken Schwaber, told a fascinating tale from the early 1990s. He was leading a software company at the time that was struggling with constantly changing project needs. Their development was being impeded by the methods they had taken up, which they had gotten from their clients. Schwaber sought advice from process theory specialists at the DuPont Experimental Station in 1995 to overcome this obstacle (Abrahamsson, Solo, Ronkainen, & Warsta, 2002). They came to the startling conclusion that the business was using the wrong procedure. They underlined that the complexity and unpredictable nature of software development made it an ideal field for "empirical" process control models. This realization raised critical questions; notably why empirical development approaches were delivering higher productivity compared to well-defined processes like the Capability Maturity Model (CMM). The answer, which emerged from the scientific minds at DuPont Chemical's Advanced Research facility, was revealing. The CMM, often considered a well-understood defined process, delivered unpredictable results when executed without adequate control (Booch, 1995).

Kent Beck, the founder of Extreme Programming (XP), contributed his own compelling narrative to Agile's history. In April 1996, he was brought in to address a dire situation at Chrysler involving a payroll system. Just two months away from production, the development team was unable to produce correct results. Beck and the CIO of Chrysler made a radical decision: they would start from scratch with a smaller, more agile team. The first XP project was initiated with three-week iterations in which they meticulously implemented stories selected by domain experts. By April 1997, the system was not only operational but also scalable, cost-effective, and easy to maintain and expand. This project marked an unquestionable technical and business success (Fowler, 2005).

Another important development in the history of Agile came from one of the manifesto's authors, Alistair Cockburn. He was asked to provide a framework for object-technology projects by IBM Consulting Group in 1991. Instead of relying on theoretical constructs, Cockburn took a pragmatic approach. He conducted interviews with project teams, and what he discovered during these conversations was groundbreaking. Their experiences often diverged from the principles outlined in traditional methodology books. The defining characteristic of successful projects was clear: they were marked by close communication, high team morale, and direct access to end users. Intriguingly, Cockburn decided to put these insights into practice on a substantial project worth $15 million, involving a team of forty-five individuals. There were strict limitations on the project, such as set costs and scopes. He recorded and summarized the insights gleaned from the project interviews as well as the project itself in his capacity as lead consultant. His Agile technique, called Crystal, was built around these priceless insights. It's interesting to note that, in contrast to many other authors of the Agile Manifesto, Cockburn initially adopted Agile concepts for the sake of efficiency rather than merely as a reaction to constantly shifting needs (Cohen, Lindvall, & Costa, 2004).

2.2 Global Adoption Trends of Agile Project Management in Non-IT industries

The world has navigated challenging economic landscapes characterized by slowdowns, recessions, and the persistent ripple effects of the ongoing COVID-19 pandemic. The IT sector, like many others, has not been immune to these economic disruptions. It has grappled with the need to streamline operations, leading to employee layoffs and an increased reliance on remote and off-site working arrangements. As these operational shifts continue to unfold, they inevitably influence the quality and delivery of software products.

While each study may present varying statistics, one overarching trend emerges: Agile methodologies are experiencing robust and sustained growth. Significantly, this growth extends beyond the confines of software development and permeates the domains of business development and management.

A seminal study on the early phases of Agile was carried out by the Cutter Consortium in 2001, the same year the Agile manifesto was released. Nearly 200 participants from a wide range of enterprises in North America, Europe, Australia, India, and other international locations contributed their ideas to the study (Cockburn & Highsmith, Agile software development, the people aspect. Computer, 2001). This survey revealed three important discoveries. First, compared to the late 2000s, a considerable proportion of firms reported using at least one Agile approach. Second, there was a little advantage that Agile approaches showed in terms of customer happiness, overall business performance, and quality delivery. Thirdly, the iterative nature of Agile techniques facilitated continuous communication at all levels, particularly with customers. This close interaction provided the ability to remain agile in response to evolving customer needs, ultimately contributing to success.

A few years down the line, in 2005, a study in the United States and Europe shed light on the landscape, revealing that 14% of companies had adopted Agile methodologies while an additional 49% expressed keen interest in them (Cockburn, North American and European Enterprise Software and Services Survey. , 2005)

An informative study with 114 participants that categorized the impact of Agile adoption on organizations was published in 2014. According to the Agile Adoption Mini-Survey (2014), 10.77% of participants characterized this effect as a "Great Success," 32.31% as a "Success," 40% as "Neither a success nor a failure," 4.62% as a "Failure," and 1.54% as "Too early to tell".

In a more recent Hewlett-Packard (HP) online study, which included IT and technology experts, it was shown that sixteen percent of participants had fully adopted pure Agile methodology. Additional research revealed that 51% of respondents had an Agile inclination, 24% were using hybrid approaches, and only 2% were using traditional Waterfall methodologies. There has been a notable movement in the industry, with most development teams and organizations moving toward Agile methodologies and fewer sticking with traditional waterfall methods.

According to a poll by Digital.ai, software development teams have been adopting Agile at a very outstanding rate. This has increased from 37% in 2021 to an astounding 86% in 2021. Similarly, a CertiProf poll noted that the COVID-19 pandemic in 2020 was linked to a rise in the use of remote Agile teamwork. Notably, 72% of the teams surveyed were no longer confined to a single physical location. Furthermore, the study identified a significant growth in professionals with less than two years of Agile experience, reaching 42% in 2021. In 2022, a striking 95% of developers reported their full embrace of the Agile approach. This transition extends beyond software development, infiltrating diverse sectors including marketing, sales, finance, and human resources, underscoring a remarkable upswing in Agile adoption rates (The Agile Adoption Report , 2021).

In the context of non-IT industries, the narrative of Agile adoption mirrors these global trends. Agile methodologies' adaptability and agility are becoming increasingly integral across a spectrum of sectors. These methodologies offer the promise of more efficient project management and delivery processes. The following section will delve deeper into the nuances of Agile's impact on non-IT industries, shedding light on its growing significance and its transformative potential in reshaping conventional management practices.

Overview in Application of Agile Project Management in India

Both the IT and non-IT sectors in India are seeing an increase in the use of agile project management. There is a vast pool of software developers in the nation, and many businesses are implementing agile approaches to enhance their software development processes. However, Agile is not limited to the IT sector in India. It is also being used in non-IT sectors such as manufacturing, construction, marketing, sales, finance, and human resources. Agile methodologies offer the promise of more efficient project management and delivery processes, which is becoming increasingly integral across a spectrum of sectors.

The growth trajectory of Agile project management is fuelled by a range of factors that underline its adaptability, efficiency, and tangible benefits across various industries. Agile methodologies have garnered a reputation for significantly enhancing project success rates. They have evolved into a proven recipe for success across a myriad of sectors, extending well beyond the confines of IT. Agile's rapid ascent is evident from its adoption rates, which have surged by up to 88% since its introduction in 2001. This widespread acceptance highlights the versatile nature of Agile practices, making them suitable for implementation across a multitude of industries and sectors.

Growth of the Agile Project Management Practice

The Agile project management practice, with its roots deeply entrenched in the world of software development, has experienced phenomenal growth over the years. This growth trajectory is fuelled by a range of factors that underline its adaptability, efficiency, and tangible benefits across various industries.

Agile methodologies have garnered a reputation for significantly enhancing project success rates. A staggering 98% of companies reported experiencing increased success due to Agile practices. These methodologies have evolved into a proven recipe for success across a myriad of sectors, extending well beyond the confines of IT (Larman, 2004).

The path of Agile has not been without difficulties. The learning curve that firms encounter when using Agile methodology accounts for about 44% of Agile project failures. Several companies have started to engage in skill development, mentoring, and training programs to facilitate the transition after realizing this obstacle (Highsmith, 2004).

Perhaps one of the most compelling aspects of Agile is its ability to outperform traditional Waterfall project management. In a head-to-head comparison, Agile reigns supreme with a commendable 64% project success rate. In contrast, projects following the Waterfall model report a less impressive success rate of 49% (Verzuh, 2015).

Agile's rapid ascent is evident from its adoption rates, which have surged by up to 88% since its introduction in 2001. This widespread acceptance highlights the versatile nature of Agile practices, making them suitable for implementation across a multitude of industries and sectors (Schwaber & Sutherland, 2017).

The financial implications of adopting Agile practices cannot be overstated. Companies that have embraced Agile have witnessed an average increase of 60% in both revenue and profit. Higher product quality and, consequently, financial success are made possible by Agile's iterative and customer-centric approach (Cohn, 2010).

Agile methodologies extend their influence beyond corporate boardrooms. They also positively affect the quality of life of professionals. Approximately 88% of foreign employees and experts believe that Agile practices enhance their overall quality of life. This can be attributed to Agile's emphasis on collaboration, work-life balance, and continuous professional development (Hendrickson, 2006).

Agile methodologies are not confined to a single industry or sector. Although only 27% of manufacturing firms fully rely on Agile practices, the manufacturing industry is progressively adopting Agile principles. Furthermore, over 50% of companies in the construction sector employ a hybrid approach, blending Agile with other methodologies (Larman, 2009).

The remarkably low failure rate of Agile as a project management methodology is indicative of its dependability. Compared to traditional methodologies, the success rate of projects is significantly higher with Agile, since only 9% of initiatives fail (Schwaber & Sutherland, 2017).

The mainstream adoption of Agile is discernible. A substantial 71% of businesses in the United States are currently utilizing Agile practices in their project management endeavours. This prevalence underscores the widespread recognition of Agile as an effective and adaptable approach (Schwaber & Sutherland, 2017).

2.5 Problem statement and rationale of the study

The conventional approach to project development involves a logical sequence that predefines resources and deliverables, with the project's performance evaluated through various reviews and assessment techniques (Collyer et al., 2010). However, with the evolution of industries, the complexity of projects and the demand for adaptability have grown significantly.

There is still a large body of study on the success rates of Agile projects in non-IT sectors, even though Agile approaches are widely used in process development projects (Dyba & Dingsoyr, 2008). The majority of research that has been done on Agile techniques thus far has mostly concentrated on particular industries, especially the IT industry.

2. Literature Review

1. Agile project management, rooted in the Agile Manifesto by Beck et al. (2001), centers on values such as collaboration, responsiveness to change, and the delivery of customer value. This approach fosters iterative development, wherein project requirements evolve through continual feedback, enhancing the ability to respond to evolving stakeholder needs (Cao & Ramesh, 2008). Iterations, often referred to as "sprints" in Scrum methodology, enable incremental progress and adaptability.
2. Agile methodologies encompass a diverse range of frameworks including Scrum, Kanban, and Extreme Programming (XP). Scrum divides projects into time-boxed iterations, employing roles like Scrum Master and Product Owner to facilitate collaboration and stakeholder engagement (Cohn, 2009). Kanban emphasizes work visualization and flow management (Anderson, 2010). XP promotes practices like continuous integration and test-driven development (Beck, 1999).
3. According to (Papatheocharous & Andreou, 2014). The application of Agile principles to non-IT projects is a burgeoning area of exploration. Arya and Sahay (2017) ponder whether Agile project management will extend to non-IT sectors. As organizations strive to enhance project success rates, understanding the impact of Agile methodologies in diverse sectors is an area of increasing interest (Fitzgerald et al., 2006).
4. Shameem (2017) explains the factors contributing to success is pivotal in comprehending the impact of Agile methodologies on project outcomes. In a global software development context. This systematically reviews the key elements that contribute to the scaling of Agile methodologies. Stakeholder participation, efficient communication, and flexible planning are all included in this list.
5. Tsun and Chow (2008) explore critical success factors in Agile software projects, identifying elements such as skilled team members and customer involvement. Unlike the waterfall project approach, Agile methodologies have unique features that make it more successful, these features are such as rapid progress in the project, proper alignment of customer and stakeholder alignment for good satisfaction of people while focusing on customer concerns, to ensure that projects focus on customer concerns, continuous improvement in the working of projects.
6. Arya and Sahay (2017) raise questions about whether Agile project management will extend its influence to non-IT sectors. As organizations strive for enhanced project outcomes, understanding the application and potential impact of Agile methodologies in non-IT projects is a pivotal area of exploration.
7. Crucial Elements for Agile Software Project Success A survey research on crucial success factors for Agile software projects was carried out by Tsun and Chow (2008). They list important elements that contribute to project success, including customer involvement, team member abilities, and efficient communication.
8. Shaker (2018) investigated definite versus agile project techniques. The promise of Agile approaches in healthcare domains outside of IT is shown by this study.
9. Koskela and Vrijhoef, (2000) that the dominant paradigm of construction inhibits innovation, raising doubts about the applicability of agile project management in this field. Additionally, more research is needed to determine the scope of any possible enhancements in value delivery within the building sector and the ensuing advantages for the economy, utilities, environment, and aesthetics. The structures that currently govern the construction industry, which were partly created (at least in the UK) to assure contractual risk avoidance, don't seem to mesh well with Japanese corporate and individual learning models and collaborative trust. Because agile project management approaches and thought processes inherently demand trust and appropriate risk allocation (that is, from a value maximization viewpoint rather than a(n apparent) financial risk management standpoint), there appear to be impediments to its use. But given how similar the two sectors are, it seems likely that adopting agile would improve project values.
10. Muhammad et al., (2021) investigate the impact of agile management on project performance, focusing on the IT sector of Pakistan. Their work provides insights into the effectiveness of Agile practices in improving project outcomes. Identifying Barriers in the Implementation of Agile Methodologies Soares et al. (2022) identify barriers in the implementation of Agile methodologies in the automotive industry. This study highlights challenges and considerations for Agile adoption in non-IT sectors.

Research Methodology

4.1 Objectives of the Research

The approach of this research was based on the primary objective of this research is; To enhance project success rates by fostering customer-based and continuous improvement through agile project management methodologies.
SPECIFIC OBJECTIVES:

1. To measure the rate of progress in non-IT projects when Agile methodologies are applied.
2. To quantify the level of alignment achieved between customer and stakeholder expectations in non-IT projects through the use of Agile methodologies.
3. To assess the extent to which Agile methodologies prioritize and address customer concerns in non-IT projects.
4. To determine the degree of continuous improvement observed in the execution of non-IT projects as a result of implementing Agile methodologies.

Hypotheses

H0: There is no significant rate of progress in non-IT projects where Agile methodologies are applied.
H1: There is a significant rate of progress in non-IT projects where Agile methodologies are applied.
H2: There is a significant level of alignment achieved between customer and stakeholder expectations in non-IT projects when Agile methodologies are applied.
H3: Agile methodologies significantly prioritize and address customer concerns in non-IT projects.
H4: There is a significant improvement in the execution of non-IT projects as a result of implementing Agile methodologies.

4.2 Research Design

This study examined the impact of Agile project management techniques on the success rates of non-IT projects using a quantitative research methodology. Numerical data can be gathered and analysed through quantitative research, which makes it easier to use statistical analysis to find correlations, trends, and patterns.

4.3 Sources of Data

A survey questionnaire involving the questions related to all required information was prepared via Google Form and was subjected to the respondents through their email for their responses for the collection of primary data. The respondents were; Project managers, Program managers, Technicians, Engineers. Furthermore, secondary data was collected through books, journal articles, pamphlets and published online reports.

4.4 Population and Sampling Method

The research population for this study involved project managers, program managers, technicians, and engineers from non-IT projects across various industries such as construction, marketing, and product development in India.

4.5 Sampling method and Sampling Frame

A sample is a subset of several study units drawn from a predetermined study population. Therefore, a sample is a small representation of a big population. Sampling refers to the method, process, or approach used to choose a subset of the population to be studied (Ogula, 2005). The goal of sampling, or figuring out sample size, is to take a portion of the population such that a portion of the total population may be deduced. The sampling method that was used to collect data was non-probability sampling. The purposive sampling technique was particularly used to select respondents for this research which involved practitioners of agile methodologies in non-IT projects. The sampling frame for the study will involve Agile methodologies such as project managers, foremen, and engineers from non-IT projects who have industrial experience of more than 2-3 years.

4.6 Data Collection Instrument

A survey questionnaire was the primary data collection method employed in this investigation. According to Johnson & Christensen (2014), a questionnaire is a self-report data-collection tool that each research participant completes as part of a study. Researchers use questionnaires to get additional information about the attitudes, beliefs, values, perceptions, personalities, and behavioural intentions of research participants. In another way, researchers use questionnaires to test a wide range of attributes.

4.7 Sampling Technique and Rationale behind Sample Size Selection

A purposive sampling technique was used to select respondents for this research. The reason is that not only does the research demand Agile methodologies practitioners who are from non-IT projects but also those who have industrial experience of more than 2-3 years. The sample size selection was made based on time factor, locality, and accessibility of the respondents thus, the research respondents will be selected based on projects being conducted in the area of Vadodara.

4.8 Data Validity and Reliability

Cronbach's alpha was used to examine the validity and reliability of the instruments. Cronbach's alpha is a measure of internal consistency, or how closely related a set of items is to one another. Sekaran (2003) asserts that dependability increases with the reliability coefficient's proximity to 1.0. Reliability coefficients are generally regarded as good when they are over 0.80, acceptable when they are between 0.70 and 0.60, and bad when they are less than 0.60. With a Cronbach's alpha of 0.75, the validity and reliability of the data instruments are deemed adequate.

Table 4.1: Reliability Statistics

Reliability Statistics

Cronbach's Alpha	N of Items
.750	9

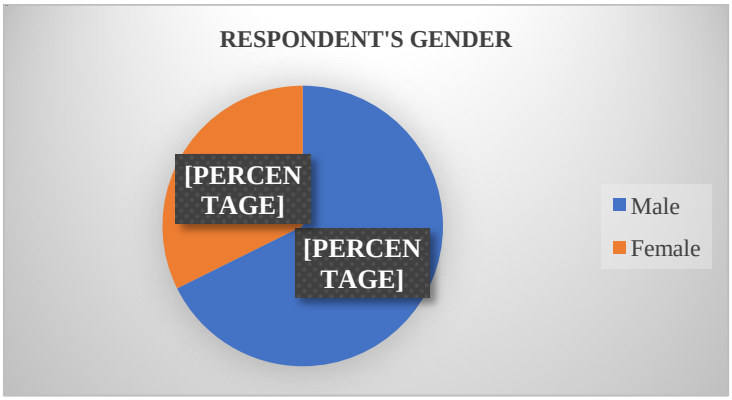
Data Analysis

The data analysis, conclusions, and discussions were presented based on the questions that were asked in the questionnaire that was used to collect the data. The study's 200 participants included engineers, technicians, project managers, and product managers who oversee several projects. An 83.5% response rate was obtained from the questionnaires that the researchers distributed. Babbie (2000) states that any answer of 50% or higher is sufficient for analysis.

5.1 Demographic Profile

Table 5.1: Respondent's Gender

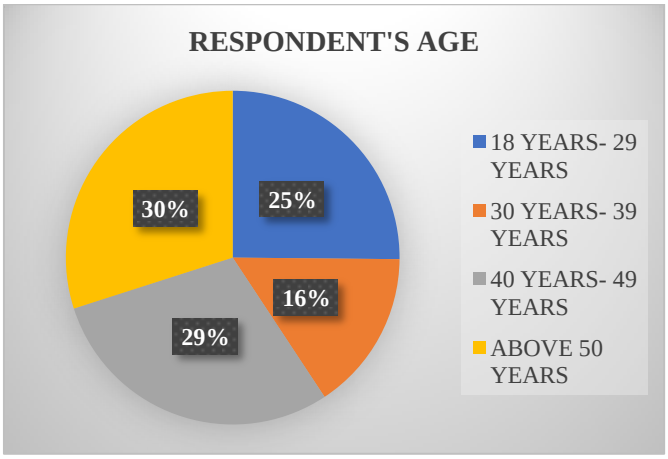
GENDER	NUMBER
MALE	113 (66%)
FEMALE	54 (34%)
TOTAL	167



In this research, a total of 167 respondents participated, with 113 (66%) identified as male and 54 (34%) identified as female. The analysis involved examining various variables and their relationships within the dataset, considering the gender distribution of the respondents.

Table 5.2: Respondent's Age

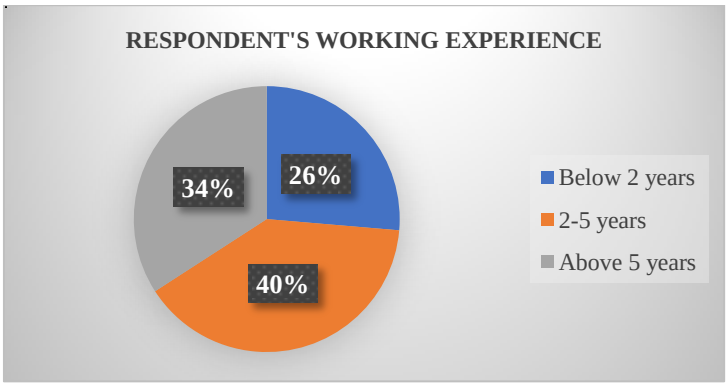
AGE	NUMBER
18 YEARS- 29 YEARS	42 (25.1%)
30 YEARS- 39 YEARS	26 (15.5%)
40 YEARS- 49 YEARS	49 (29.3%)
ABOVE 50 YEARS	50 (29.9%)
TOTAL	167



In this research, a total of 167 respondents participated. The respondents were categorized into four age groups based on the provided distribution. The following is the percentage distribution of responders for each age group: 18 years- 29 years was 42 respondents, representing approximately 25.1% of the total sample. In the range of 30 years- 39 years: the number of respondents was 26, representing approximately 15.5% of the total sample. In the age range of 40 years- 49 years, the number of respondents was 49, representing approximately 29.3% of the total sample. In the age range of above 50 years, the number of respondents was 50, representing approximately 29.9% of the total sample.

Table 5.3: Respondent's Working Experience

Working Experience	Number
Below 2 years	44 (26.3%)
2-5 years	66 (39.5%)
Above 5 years	57 (34.1%)
Total	167

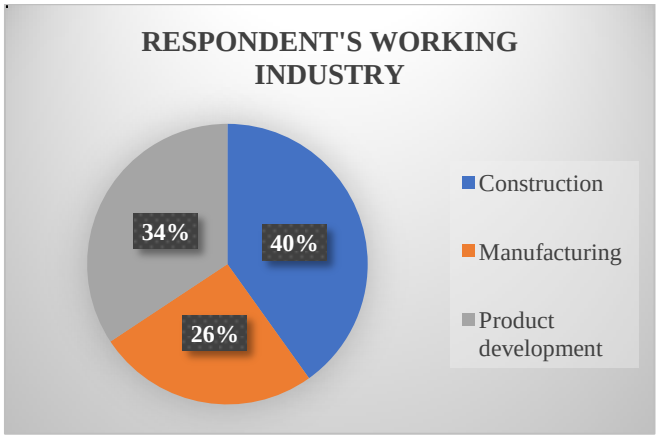


From the total of 167 respondents who participated in the research, the respondents were categorized into three working experience groups based on the provided distribution. The percent distribution of respondents in each age group is as follows: Below 2 years 44 respondents, representing approximately 26.3% of the total sample. In the working range of 2-5 years**,** the number of respondents was 66, representing approximately 39.5% of the total sample. In the working range of Above 5 years, the number of respondents was 57, representing approximately 34.1% of the total sample.

Table 5.4: Respondent's Working Industry

WORKING INDUSTRY	NUMBER
CONSTRUCTION	69 (41.3%)
MANUFACTURING	44 (26.3%)

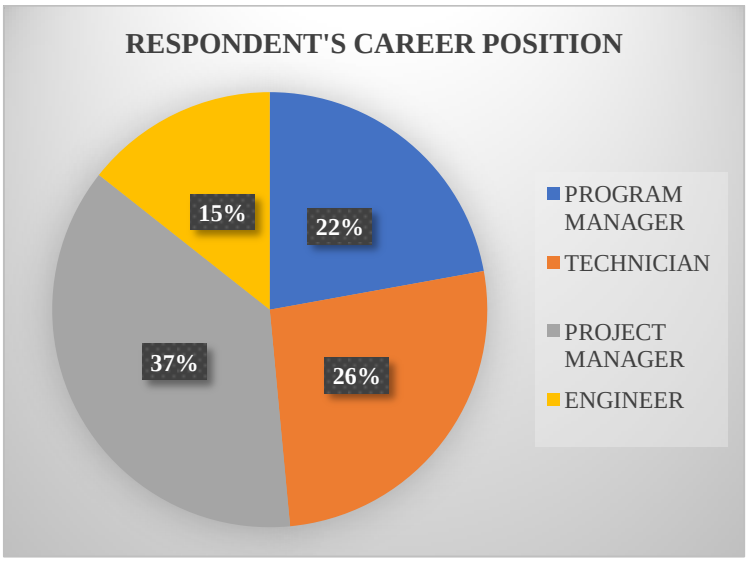
PRODUCT DEVELOPMENT	59 (35.3%)
TOTAL	167



From the total of 167 respondents participated in the research, the respondents were categorized into three working experience groups based on the provided distribution. The percent distribution of respondents in each age group is as follows: In the Construction Industry, a total of 69 respondents represented approximately 41.3% of the total sample. In the Manufacturing Industry**,** a total of 44 respondents represented approximately 26.3% of the total sample. In the Product Development Industry**,** a total of 59 respondents represented approximately 35.3% of the total sample.

Table 5.5: Respondent's Career Position

CAREER POSITIONS	NUMBER
PROGRAM MANAGER	37 (22.1%)
TECHNICIAN	44 (26.3%)
PROJECT MANAGER	62 (37.1%)
ENGINEER	24 (14.3%)
TOTAL	167



In this research, a total of 167 respondents participated. The respondents were categorized into four career positions based on the provided distribution. The percent distribution of respondents in each career group is as follows: The Program Manager career position had 37 respondents, representing approximately 22.1% of the total sample. The Technician career position had 44 respondents, representing approximately 26.3% of the total sample. The Project manager career position had 62 respondents, representing approximately 37.1% of the total sample. The Engineer career position had 24 respondents, representing approximately 14.3% of the total sample.

Table 5.6: Descriptive statistics

	Mean	Std. Deviation	N
AGIPOSPROG	5.65	1.545	167
AGIFASCOMP	6.09	1.344	167
AGIMEETDEADL	6.06	1.221	167
BRISTAEXP	6.12	.813	167
AGIUNDCUS	6.06	1.221	167
AGIPRIOCUS	6.19	.814	167
AGIPRIONEED	5.54	1.656	167
AGICONTRCUL	6.10	.859	167
REDDELAPRO	6.10	.859	167

i. The average value of the variable being predicted by the regression model is represented by the dependent variable's mean. It was noted in the table above that;
ii. Participants, on average, strongly agree (around 6.09) that Agile methodologies result in faster project completion.
iii. On average, respondents express a strong agreement (around 6.06) that projects using Agile methodologies are more likely to meet project deadlines.
iv. Participants, on average, strongly agree (around 6.12) that Agile methodologies help bridge the gap between customer and stakeholder expectations in projects.
v. On average, respondents strongly agree (around 6.06) that Agile methodologies foster better understanding between customers and stakeholders in projects.
vi. Participants, on average, strongly agree (around 6.19) that Agile methodologies prioritize addressing customer concerns effectively in projects.
vii. On average, respondents moderately agree (around 5.54) that Agile methodologies encourage project teams to prioritize customer needs over other considerations. This is slightly lower compared to other statements.
viii. Participants, on average, strongly agree (around 6.10) that Agile methodologies contribute to a continuous improvement culture within project teams.
ix. On average, respondents strongly agree (around 6.10) that Agile methodologies lead to a significant reduction in project bottlenecks and delays.

A Sig. (1-tailed) figure in a correlation table represents the significance level for a one-tailed hypothesis test of the null hypothesis that the correlation coefficient is zero in the population. The Sig. (1-tailed) figure is typically reported as a p-value which, under the assumption that the null hypothesis is true, is the likelihood of finding a correlation coefficient that is as extreme or more extreme than the one that was found. It is possible to conclude that the correlation coefficient is substantially different from zero in the designated direction if the p-value is less than the selected significance level, which is often 0.05 or 0.01; in this case, the null hypothesis is rejected.

Table 5.7: Table for Pearson correlations

Correlations

		AGIPOSPROG	AGIFASCOMP	AGIMEETDEADL	BRISTAEXP	AGIUNDCUS	AGIPRIOCUS	AGIPRIONEED	AGICONTRCUL	REDDELAPRO
Pearson Correlation	AGIPOSPROG	1.000	.207	.248	.125	.248	.117	.902	.067	.067
	AGIFASCOMP	.207	1.000	.191	.045	.191	.089	.205	.019	.019
	AGIMEETDEADL	.248	.191	1.000	.145	1.000	.219	.183	.121	.121
	BRISTAEXP	.125	.045	.145	1.000	.145	.813	.072	.847	.847
	AGIUNDCUS	.248	.191	1.000	.145	1.000	.219	.183	.121	.121
	AGIPRIOCUS	.117	.089	.219	.813	.219	1.000	.070	.810	.810
	AGIPRIONEED	.902	.205	.183	.072	.183	.070	1.000	.018	.018
	AGICONTRCUL	.067	.019	.121	.847	.121	.810	.018	1.000	1.000
	REDDELAPRO	.067	.019	.121	.847	.121	.810	.018	1.000	1.000
Sig. (1-tailed)	AGIPOSPROG	.	.004	.001	.054	.001	.067	.000	.197	.197
	AGIFASCOMP	.004	.	.007	.281	.007	.127	.004	.406	.406
	AGIMEETDEADL	.001	.007	.	.031	.000	.002	.009	.060	.060
	BRISTAEXP	.054	.281	.031	.	.031	.000	.177	.000	.000
	AGIUNDCUS	.001	.007	.000	.031	.	.002	.009	.060	.060
	AGIPRIOCUS	.067	.127	.002	.000	.002	.	.186	.000	.000
	AGIPRIONEED	.000	.004	.009	.177	.009	.186	.	.408	.408
	AGICONTRCUL	.197	.406	.060	.000	.060	.000	.408	.	.000
	REDDELAPRO	.197	.406	.060	.000	.060	.000	.408	.000	.
N	AGIPOSPROG	167	167	167	167	167	167	167	167	167
	AGIFASCOMP	167	167	167	167	167	167	167	167	167
	AGIMEETDEADL	167	167	167	167	167	167	167	167	167
	BRISTAEXP	167	167	167	167	167	167	167	167	167
	AGIUNDCUS	167	167	167	167	167	167	167	167	167
	AGIPRIOCUS	167	167	167	167	167	167	167	167	167
	AGIPRIONEED	167	167	167	167	167	167	167	167	167
	AGICONTRCUL	167	167	167	167	167	167	167	167	167
	REDDELAPRO	167	167	167	167	167	167	167	167	167

From the above, Table, it was clearly observed that each of the independent variables (ie. Agile result in faster project completion, Agile methodologies meet project deadlines, Agile bridge stakeholders' expectations, Agile foster understanding to customers in projects, Agile prioritizes customer concern, Agile prioritize customer needs, Agile contribute to a continuous improvement culture, Agile reduces project bottlenecks and delays has their *P-Values* (0.000), which is less than the "*Cronbach's alpha values* (α 0.05). Thus, the P-value < α 0.05, which shows that "Agile methodologies" have a significant influence on "project success rate of non-IT projects".

Analysis results as aligned to respective Hypothesis

H0: There is no significant rate of progress in non-IT projects where Agile methodologies are applied.
The positive correlation coefficients for "Agile result in faster project completion" (0.207) and "Agile methodologies meet project deadlines" (0.248) suggest that Agile methodologies are associated with higher project success rates, supporting a rejection of H0.

H1: There is a significant rate of progress in non-IT projects where Agile methodologies are applied.
The positive correlations support this hypothesis, indicating that Agile methodologies are associated with higher project success rates.

H2: There is a significant level of alignment achieved between customer and stakeholder expectations in non-IT projects when Agile methodologies are applied.
The correlation coefficient for "Agile bridge stakeholders' expectations" (0.125) suggests a weak positive relationship, providing some support for this hypothesis.

H3: Agile methodologies significantly prioritize and address customer concerns in non-IT projects.
The positive correlation coefficients for "Agile fosters understanding to customers in projects" (0.248) and "Agile prioritize customer needs" (0.902) provide strong support for this hypothesis.
H4: There is a significant improvement in the execution of non-IT projects as a result of implementing Agile methodologies.
The correlation coefficients for "Agile contributes to a continuous improvement culture" (0.067) and "Agile reduces project bottlenecks and delays" (0.067) suggest a weak positive relationship, providing limited support for this hypothesis H4.

Table 5.8: Table for Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.907[a]	.823	.817	.662	.823	124.207	6	160	.000

An R-squared (R^2) value of 0.823 in a model summary means that the independent variables in the model can account for around 82.3% of the variability in the dependent variable. R-squared indicates the extent to which the independent variables in the model account for the variance of the dependent variable. On a scale from 0 to 1, 1 indicates that all of the variance in the dependent variable can be accounted for by the independent variables, and 0 indicates that none of it can.
From the above table, the R-squared values of the independent variables showed a better fit of the model to the data. This also means that the model explains all the variability in the dependent variable.

Table 5.9: Table for ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	326.136	6	54.356	124.207	.000[b]
	Residual	70.020	160	.438		
	Total	396.156	166			

The ANOVA table is used to determine the fitness of the regression model by examining the F-value and its associated significance (p-value). A significant F-value (typically associated with a p-value less than 0.05) indicates that the regression model as a whole is a good fit for the data, suggesting that at least one of the predictors in the model has a non-zero coefficient and contributes to explaining the variance in the dependent variable.
F-value is the ratio of the mean square for regression to the mean square for residuals. From ($F_{calculated}$ > (124.207) $F_{critical}$ (2.155) F-value of 124.207 indicates the regression model as a whole is statistically significant in explaining the variation in the dependent variable of Agile making positive progress.

The p-value is associated with the F-value. A p-value of .000 indicates that the regression model is statistically significant at any conventional significance level p-value less than 0.05 indicates that the regression model as a whole is a good fit for the data. The p-value at 0.000 supports the alternative hypothesis (H1) that there is a significant rate of progress in such projects when Agile methodologies are used.

Based on the regression analysis the evidence supports the hypothesis that Agile methodologies are associated with a significant rate of progress in non-IT projects.

The distribution of the residuals is symmetric, with a tail extending towards the right side of the distribution.

The mention of the values -2 on the left and 7 on the right provides additional information about the extent of the skewness. It suggests that the standardized residuals are more positively skewed towards the higher end, with some values as extreme as 7. On the right side, the distribution is less skewed, with values not extending as far as a minimum of 2.

The presence of skewness in the residual distribution may suggest deviations from the basic assumptions of linear regression, namely the assumption that the residuals are normally distributed.

A right-skewed distribution suggests that there may be more observations with larger positive residuals than would be expected under normality.

Chart 1: Histogram representing Dependent Variable (Agile Results to Positive Progress)

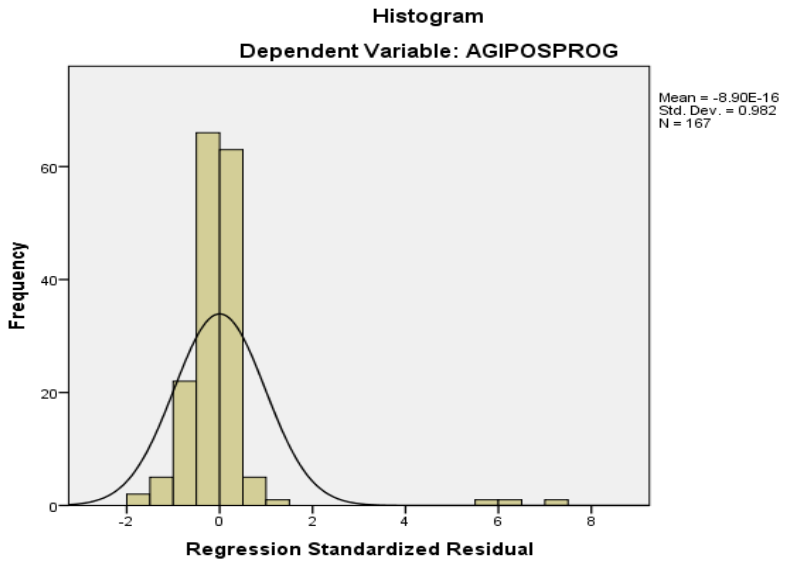


Chart 2: Normal P-P Plot of Regression Standardized Residual

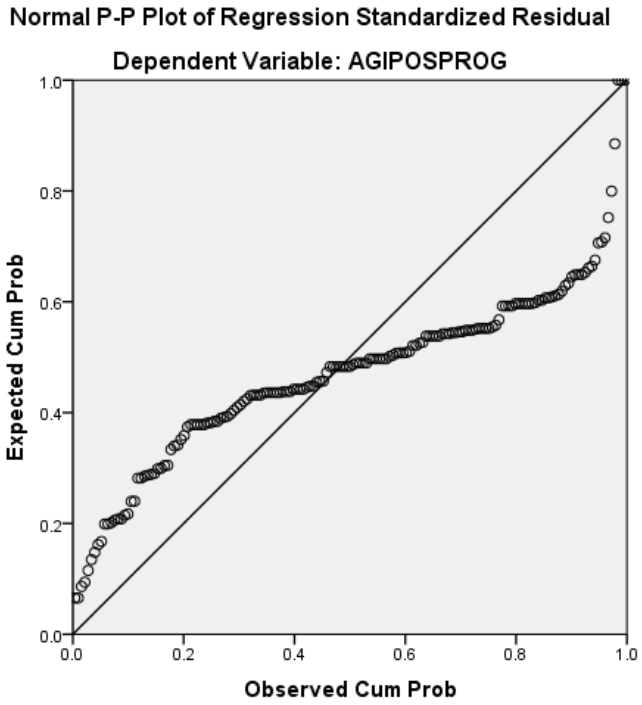
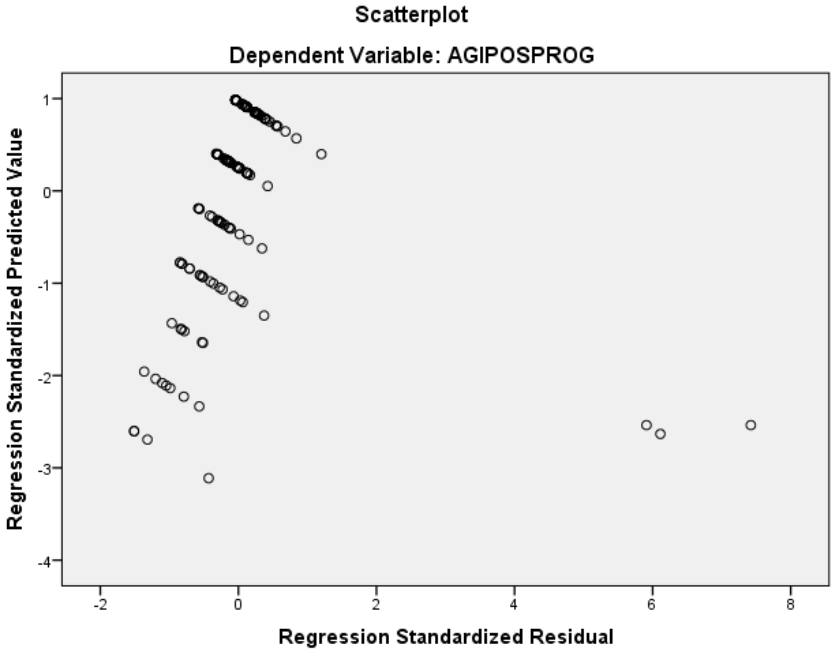


Chart 3: Scatter Plot



A scatter plot is a type of graphic that illustrates the connection between two variables. Every data point is shown on the graph, with the y-axis representing all the variables and the x-axis representing the single variable "Agile Results to Positive Progress".

In this case, the scatter plot suggests that the majority of data points are concentrated within the range of -2 to 2 on one of the axes, while the other variable shows a relatively higher frequency of values within this range. This concentration of data points indicates that there is a higher density of observations within the range of -2 to 2, suggesting a stronger relationship or higher frequency of occurrences in this range.

Findings

- There is just a slight positive association between the "Application of Agile methodologies" with "Agile result in faster project completion, Agile methodologies meet project deadlines, Agile bridge stakeholders' expectations, Agile fosters understanding to customers in projects, Agile prioritizes customer concern, Agile contribute to a continuous improvement culture, Agile reduces project bottlenecks and delays".
- There is a strong positive correlation between the "Application of Agile methodologies" with "prioritizing customer needs and the project success rate".
- The R-squared value of 0.82.3 indicates that approximately 44.6% of the variability in the " Agile methodologies impact on the rate of project progress" dependent variable can be explained by the independent variables included in the model.
- From the ANOVA table, an F-value of 124.207 demonstrates that the regression model is statistically significant in elucidating the variance in the Agile's positive progress. A greater F-value implies a more robust association between the independent variables and the dependent variable.
- The p-value of 0.000 provides strong evidence in favor of the alternative hypothesis indicating a significant rate of progress in projects when Agile methodologies are implemented.
- Based on the regression analysis the evidence supports the hypothesis that Agile methodologies are associated with a significant rate of progress in non-IT projects.

Conclusion :

This study has provided insightful information about how Agile project management techniques affect project success rates outside of the IT industry. The results indicate that Agile techniques have a statistically significant positive correlation with several project success factors, such as improved customer comprehension, timely project completion, deadline adherence, and prioritizing customer requirements.

Some areas, though, call for more research. These include looking into the particular effects of Agile methodologies in various industries, doing long-term studies to evaluate the sustainability of Agile practices, examining the impact of cross-cultural factors on the implementation of Agile, conducting qualitative analysis to obtain deeper understanding, and investigating the possible advantages of hybrid approaches that combine Agile and conventional project management techniques.

Despite the need for further research in these areas, this study highlights the increasing significance of Agile methodologies in industries beyond IT. As organizations strive to enhance their project management practices and overall efficiency, Agile principles offer a promising framework for achieving

success. Organizations may fulfill consumer expectations, successfully react to changing market dynamics, and foster innovation in project management by embracing Agile approaches and iteratively improving their implementation tactics.

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