Project Dissertation Report on
Barriers to Effective Agile Implementation in Indian IT Companies

Submitted by
Yashashvi Singh
23/DMBA/146

Under the Guidance of
Dr. Mohd Shuaib
Assistant Professor

DELHI SCHOOL OF MANAGEMENT
DELHI TECHNOLOGICAL UNIVERSITY
Bawana Road Delhi 110042

CERTIFICATE

This is to certify that **Yashashvi Singh**, roll no. **23/DMBA/146** has submitted the project dissertation report titled **"Barriers to Effective Agile Implementation in Indian IT Companies"** in partial fulfilment of the requirements for the award of the degree of Master of Business Administration (MBA) from Delhi School of Management, Delhi Technological University, New Delhi during the academic year 2024-2025.

Dr. Mohd Shuaib   Dr Saurabh Agrawal

Assistant Professor   Head of the Department

DSM, Delhi Technological University   DSM, Delhi Technological University

DECLARATION

I, Yashashvi Singh (23/DMBA/146), a student of the MBA Program at Delhi School of Management, Delhi Technological University, Delhi, hereby declare that the project dissertation titled "Barriers to Effective Agile Implementation in Indian IT Companies" is an original piece of work completed by me as part of the curriculum requirements for the Master of Business Administration program at Delhi School of Management, DTU.

This dissertation has been carried out under the guidance of Prof. Soaib Rewa, and is based on my independent research, analysis, and interpretation. All data sources, references, and insights derived from other works have been duly acknowledged and cited in accordance with academic standards.

I further affirm that this report has not been submitted previously, in whole or in part, for any other degree, diploma, or academic qualification at this or any other institution.

I understand and acknowledge the significance of this declaration and the implications of any breach of academic integrity. To the best of my knowledge and belief, the contents of this report are truthful, accurate, and a reflection of my sincere efforts.

Yashashvi Singh

23/DMBA/146

Date: 17/04/2024

ACKNOWLEDGEMENT

EXECUTIVE SUMMARY

Agile development methodologies have gained huge popularity in the Indian IT sector as a way to facilitate flexibility, customer satisfaction, and overall effectiveness of software development. In spite of the popularity of frameworks such as Scrum, Kanban, and Extreme Programming (XP), most Indian IT companies still fail to gain the maximum benefit from Agile.

The study identifies and discusses the most significant impediments to successful Agile implementation in Indian IT firms on the basis of primary and secondary data. The findings reveal that while Agile has unambiguous benefits like reduced delivery time, enhanced quality, and enhanced stakeholder collaboration, a number of in-house and external barriers deprive it of success.

Primary barriers are:

- Organizational resistance to change, especially from the management unwilling to deviate from conventional models.
- Inadequate Agile awareness and training causing superficial adoption of Agile practices without embracing the mindset behind.
- Poor collaboration and communication across cross-functional teams due to hierarchical organizations and departmental silos.
- Minimal customer engagement throughout development cycles weakening the effectiveness of iterative feedback loops.
- Inadequate infrastructure and tooling support affecting the smooth implementation of Agile processes.

The report asserts that if Agile must succeed in Indian IT firms, the companies must escape compliance with tools and ceremonies. They must invest in cultural transformation, leadership training, and ongoing learning. Suggestions range from building in-house Agile coach teams to making project objectives be aligned with customer value delivery and attaining bottom-up experimentation and flexibility cultures.

This study serves as a valuable resource for Agile practitioners, managers, and policymakers aiming to enhance Agile maturity in India's rapidly evolving IT landscape.

TABLE OF CONTENTS

List of Figures

List of Tables

CHAPTER 1: INTRODUCTION

1.1. Background

In the fast-paced digital economy of today, an organization's capacity to respond rapidly to evolving market trends, customer needs, and technological changes has emerged as a primary determinant of its long-term performance and competitiveness. Nowhere is such a requirement for responsiveness more imperative than in the field of Information Technology (IT), where fast development cycles, remote teams, and international client expectations demand ongoing innovation and responsiveness. This necessity has resulted in the mass use of Agile methods, a collection of practices and principles designed to foster iterative development, cross-functional teamwork, and customer-focused delivery.

Indian IT sector, the world's leading source of software services and outsourcing, is a specific and multifaceted context for Agile adoption. Among the country's largest contributors to GDP, employment, and export revenues, Indian IT firms are agile startups as well as vast multinational corporations. They function in a matrix of global delivery models, fixed-price contracts, hierarchical structures of decision-making, and regulatory binds. An operational landscape as complex and multifaceted as this creates both potential and major hurdles for Agile transformation.

Agile in IT and Why India Presents a Unique Case

Agile methodologies were formally introduced with the publication of the Agile Manifesto in 2001, which emphasized four core values:

1. Individuals and interactions over processes and tools,
2. Working software over comprehensive documentation,
3. Customer collaboration over contract negotiation, and
4. Responding to change over following a rigid plan.

These values laid the foundation for a range of Agile frameworks such as Scrum, Kanban, Extreme Programming (XP), and Scaled Agile Framework (SAFe), which have since become globally adopted in software development.

To Indian IT companies, adopting Agile is not about merely adopting an innovative methodology but also a transformative journey encompassing culture, form, mindset,

and stakeholder relationship. For comparison, neither startup nor product-oriented companies in Western economies primarily do business in clients' older or legacy systems, with narrowly specified project terms, rigid SLAs, and no room to maneuver. In addition, old-fashioned hierarchical management, documentation-intensive processes, and restricted autonomy for development teams make it difficult to transition from Agile's flat, collaborative, and empowered working environment.

In spite of such challenges, the uptake of Agile has picked up in India with large service providers such as Infosys, TCS, Wipro, Cognizant, and HCL Technologies developing proprietary Agile delivery models that marry aspects of Scrum and SAFe to address enterprise governance frameworks and delivery processes. Agile practices are also becoming more common in product-based IT companies and startups, who tend to adopt leaner and more experimental systems like XP or Kanban. But the level and success of Agile adoption can be highly diverse, and large numbers of companies report partial or symbolic adoption of Agile principles only.

Evolution of Project Management: Global and Indian Perspective

Project management as a formal discipline has a relatively recent history, shaped by the increasing complexity of projects and the need for structured approaches to deliver outcomes efficiently. Its evolution reflects the changing demands of industries-from large-scale engineering feats to today's fast-paced software development.

- Traditional Project Management Approaches: Predictive and Sequential

The origins of contemporary project management are found in the early 20th century with developments such as the Gantt chart (approximately 1910) and, later, techniques such as Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT) around 1958. They helped improve planning, scheduling, and control of complicated projects, especially in construction, manufacturing, and huge government undertakings such as the Manhattan Project and the Apollo missions by NASA.

The most prevalent approach that arose, particularly in software development, was the Waterfall model. Waterfall is a linear, sequential approach where every phase of a project-requirements, design, implementation, testing, deployment, and maintenance-must be finished before the next one starts. This model provided predictability and well-defined shape and was well-liked for projects with stable

environments and fixed requirements. But its rigidity made it unsuitable to projects where requirements were shifting or where feedback and alteration had to be rapid. Last-minute changes were expensive and avoided, and tended to result in late deadlines, creeping scope, and disgruntled stakeholders

Figure 1.1. Timeline of Project Management Framework Evolution
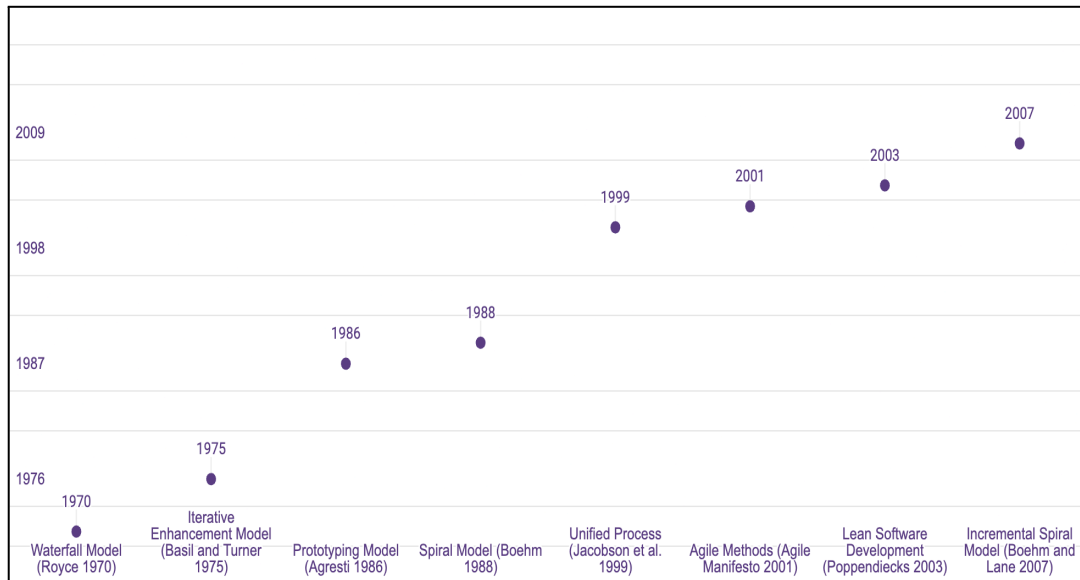
- Transitional Models: V-Model and Spiral Model

Realizing the restrictions of rigid sequential methods, the market tried experimentation with transition strategies. The V-Model created a symmetrical model, where each development phase was paired with an equivalent testing phase, thus placing equal focus on validation and verification across the lifecycle. Although it enhanced quality focus, it still maintained Waterfall's plan-driven approach.

The Spiral Model, developed by Barry Boehm, brought in a more adaptive, risk-driven process. It consisted of iterative cycles with every iteration having planning, risk analysis, engineering, and evaluation, with incremental fine-tuning and modification possible. This model was an early step toward hybrid and incremental methods but retained high up-front planning and governance requirements, so it wasn't highly responsive to abrupt change.

- The Agile Paradigm Shift: Iteration, Collaboration, and Flexibility

During the late 1990s, the increasing gap between traditional methods and the needs of high-paced, innovation-driven industries-almost entirely software-emerged. Developers

and project teams were confronting rising challenges: sped-up, more responsive delivery models, changing stakeholder expectations, and project complexity.

A collection of software professionals formalized their shared practices and best ideas into the Agile Manifesto in 2001. The Agile Manifesto was a values statement and principles that were focused on flexibility, collaboration with the customer, and incrementing delivery over to predictable processes and full documentation. Agile methodologies derived their concepts from Lean manufacturing procedures, adaptive software development, and incrementing delivery philosophies, thereby finally moving away from predictive to adaptive management of projects.

Agile is a shift from control-based project delivery to value-driven, team-enabled creation. It emphasizes:

- Iterative delivery through short time-boxed sprints
- Continuous customer feedback and active involvement
- Cross-functional, self-organizing teams
- Adaptability to change over rigid planning
- Working software as the primary measure of progress

These values and principles are operationalized through frameworks such as Scrum, Kanban, Extreme Programming (XP), Lean Software Development, and Scaled Agile Framework (SAFe).

Table 1.1 Practices used in Agile projects

Practice	Rephrased Description
Stand-ups	A brief daily meeting where team members share updates on progress, challenges, and immediate priorities.
Continuous Integration	A development process where code changes from multiple developers are regularly merged and validated.
Backlog	A prioritized and evolving list of tasks or features planned for future development.
Pair Programming	A coding technique where two developers collaborate at a single workstation, alternating roles.
Burndown/Burn up Chart	A graphical representation showing completed work versus remaining effort throughout a project cycle.

Definition of Done	A shared agreement on the conditions that must be met for a deliverable to be considered complete.
Refactoring	The act of restructuring existing code to improve readability or efficiency without changing its behavior.
Scrum Board	A visual tool used to track task status across different stages of the current sprint.
Kanban Board	A workflow visualization board showing tasks at various stages of completion to manage flow efficiently.
Retrospective	A reflective session held at the end of each sprint to evaluate what went well and what needs improvement.
Epic	A large body of work that can be subdivided into smaller, manageable user stories.
Sprint/Time Box	A fixed-duration period during which a defined set of work must be completed and reviewed.
User Stories	Simple descriptions of a software feature from the end user's perspective, guiding development priorities.
Planning Poker	A collaborative estimation technique where team members assign effort values to tasks using consensus.
Personas	Fictional user profiles representing different user types to help guide design and functionality decisions.
Automated Test	Predefined test scripts that run automatically to verify new code changes haven't introduced errors.
Online Tools	Digital platforms (like Jira or Trello) used to coordinate, visualize, and track Agile project activities.
Definition of Ready	Criteria that define when a task or user story is sufficiently prepared to be worked on.
Unit Test	A form of testing that verifies the functionality of individual components or units of the application.
Continuous Development	A process of frequently pushing code updates into the main codebase for early integration and feedback.

Compared to traditional approaches, Agile allows teams to pivot quickly, deliver value early and often, and improve collaboration among stakeholders. It leads to higher

customer satisfaction, faster time-to-market, and greater responsiveness to evolving requirements.

Figure 1.2. Scrum Process
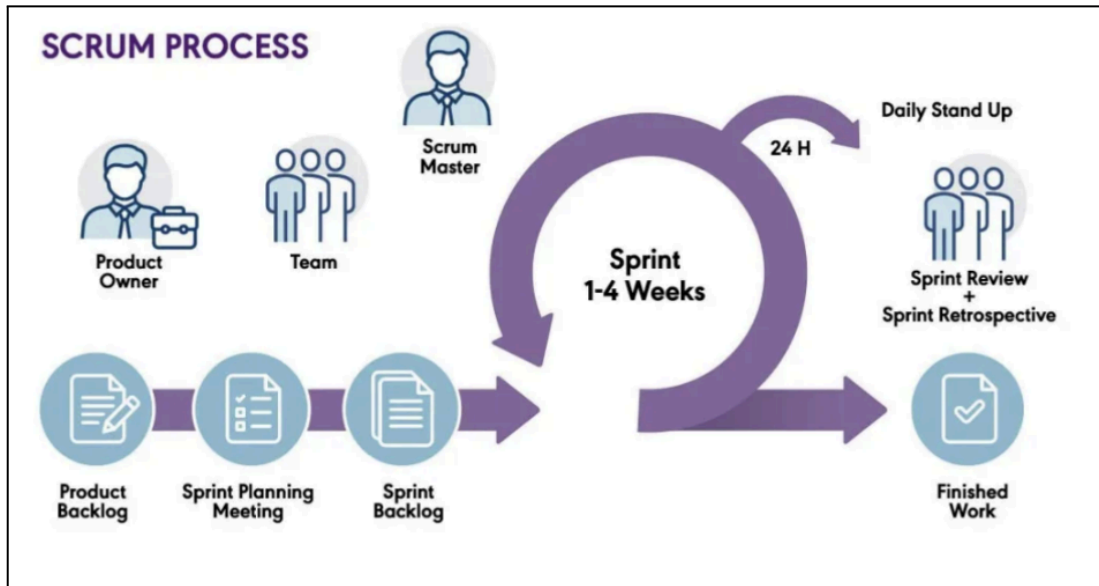
● The Rise of Hybrid Models

While Agile offers substantial benefits, its full implementation can be difficult—especially in organizations constrained by fixed-scope contracts, regulatory environments, or legacy cultures. To address this, many organizations have adopted hybrid models, blending Agile practices with traditional structures.

These Agile-Waterfall hybrids often appear in large, process-oriented environments like those in Indian IT services. In these models:

● Initial planning and contracting follow traditional, documentation-heavy models.
● Development teams may execute work in sprints using Scrum or Kanban.
● Deployment and client reporting follow structured timelines with formal reviews.

Hybrid approaches offer a practical compromise between agility and control, especially for enterprises serving external clients. However, they also risk becoming "Agile in name only" if they fail to uphold Agile values such as team autonomy, iterative

delivery, and customer collaboration. Many teams continue with stand-ups and sprint boards, but without embracing the cultural mindset needed for Agile to succeed.

Project Management Evolution in Indian IT Companies

In India, the evolution of project management has followed a globally influenced but context-specific path. During the early 2000s, Indian IT firms, especially large service providers like Infosys, Wipro, TCS, and Cognizant, were heavily aligned with frameworks like CMMI (Capability Maturity Model Integration) and ISO 9001. These emphasized repeatable processes, extensive documentation, and formal governance—all of which mirrored client expectations, particularly in offshore development contracts.

With the rise of Agile globally, Indian firms began experimenting with Agile practices. However, adoption was gradual and layered. Initial attempts were often confined to internal projects or innovation teams. Over time, as global clients began demanding more Agile collaboration, larger firms institutionalized Agile practices through proprietary frameworks and internal Agile Centers of Excellence.

Today, the Indian IT landscape is a mix of traditional, hybrid, and Agile environments. Startups and product companies tend to adopt pure Agile or Lean-Agile models. In contrast, large service-based companies prefer scaled or hybrid models, balancing client requirements, risk mitigation, and delivery flexibility.

Yet, the implementation remains uneven. While many organizations report using Scrum or SAFe, actual practices often lack Agile maturity due to hierarchical structures, limited empowerment, inconsistent stakeholder buy-in, and superficial training.

Agile Frameworks and Contextual Suitability in India

In the past two decades, a rich biodiversity of Agile frameworks has developed. Each addresses particular project requirements:

- Scrum is one of the most commonly used Agile frameworks, especially in global and Indian IT firms. It is organized into brief development periods called sprints, usually two to four weeks. Scrum sets three significant roles:

  - the Product Owner, responsible for overseeing the product backlog and articulating stakeholder requirements;

- - the Scrum Master, who serves as a facilitator and maintains that the team complies with Agile practices;

  - the cross-functional, self-organizing Development Team.

- Scrum is a process-based style of addressing certain ceremonies such as sprint planning, stand-up, sprint review, and sprint retrospective. These ceremonies promote ongoing alignment, visibility, and incremental delivery. Scrum's tough but flexi structure renders it very well-adapted to projects with volatile requirements, even if its accomplishment is highly reliant on organizational maturity and team empowerment—areas in which the majority of Indian IT organizations lag due to cultural factors.

Figure 1.3. Scrum Framework
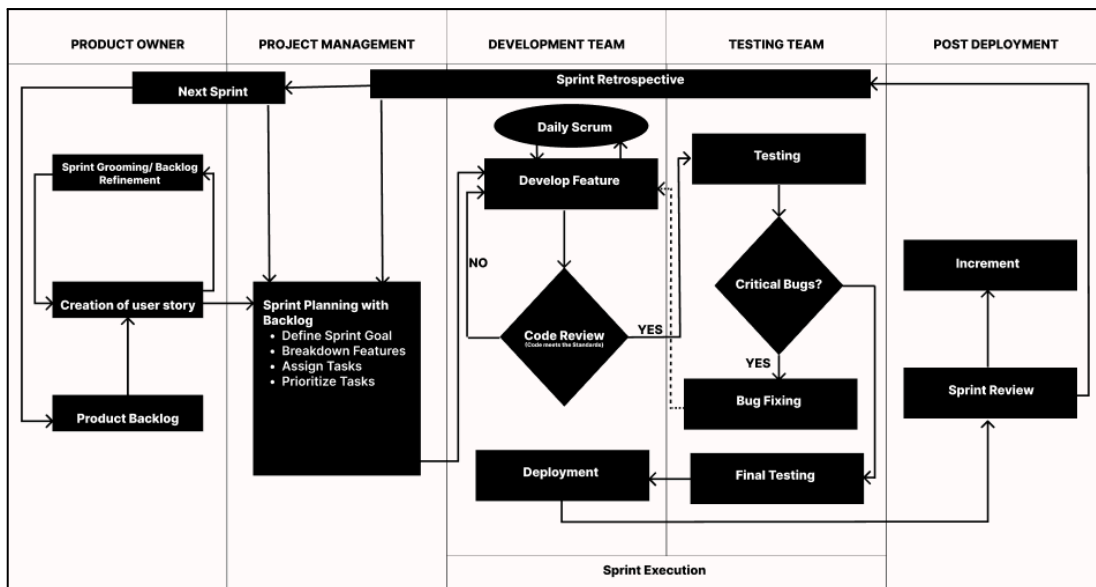
- Kanban, however, is a flow-based, visual project management method. It entails live visualization of work using a Kanban board where work items move through phases such as "To Do," "In Progress," and "Done." Rather than doing work within iterations with duration constraints, Kanban promotes continuous delivery and limits work-in-progress (WIP) so that it moves smoothly and does not get clogged. It works best in situations where work arrives irregularly or is drastically different, such as support or maintenance teams. Kanban is easy to adopt without dramatic structural upheaval, hence popular with teams freeing themselves from orthodox working practices. But

its permissiveness requires extremely high degrees of self-discipline and transparency to actually work.

Figure 1.4. Kanban Board   *Figure 1.5. Methodology for kanban influence survey*
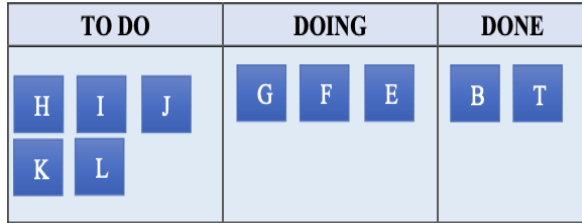
TO DO			DOING			DONE	
H	I	J	G	F	E	B	T
K	L						

- Extreme Programming (XP) is an engineering-intensive Agile approach with deep emphasis on engineering quality. XP is made up of sophisticated software development processes such as test-driven development (TDD), pair programming, continuous integration, and continuous refactoring of code. XP encourages fast release cycles, frequent customer input, and high developer interaction with the stakeholders. While Scrum provides more emphasis on structure and process, XP is focused on code quality and technical responsiveness. The model fits best for fluctuating requirement projects and teams with strict adherence to stringent engineering discipline. Full embracing of XP in India is exceptional because engineering autonomy is zero and people do not believe cooperative methodologies such as pair programming. Nonetheless, the greatest number of Indian software companies use selective XP practices, especially within product-based or start-up culture environments where quality and speed are most critical concerns.

- Scaled Agile Framework (SAFe) was developed to address the challenge of scaling Agile to large enterprises with numerous teams and stakeholders. SAFe brings together Agile, Lean, and DevOps philosophy into a coherent framework for teamwork at scale. It operates at several levels: the team level (where Scrum or Kanban is used), the program level (organized into Agile Release Trains for coordinated delivery), and the portfolio level (where strategy and investment is aligned with Agile delivery). Probably most crucial to SAFe is Program Increment (PI) Planning, a cadence activity in which numerous teams gather around a shared vision and roadmap. SAFe is most effective in highly regulated or decentralized environments where enterprise governance, compliance, and traceability are paramount. In India's IT sector, SAFe has been popular with

large service providers that run complex global delivery programs. But its successful implementation demands high investment in training, leadership alignment, and culture change—factors most likely to be resisted in traditionally hierarchical organizations.

Scrum and SAFe are the widely used frameworks in large-scale organizations in the Indian IT scenario. Mid-scale companies and start-ups have a preference for Kanban or scaled-down Scrum flavors. But the success of these frameworks really boils down to how effectively they can be contextualized to fit Indian business realities. The dispersed teams, inflexible client expectations, command-and-control nature of the management, and scarce product ownership roles have a tendency to restrict the Agile framework's value addition.

Introducing SAMI: A Framework to Assess Agile Maturity

To assess the depth and impact of Agile implementation as opposed to surface-level adoption, the Sidky Agile Measurement Index (SAMI) is an exhaustive, principle-based assessment instrument for determining Agile maturity. Formulated by Ahmed Sidky in the context of the Agile Adoption Framework (AAF), SAMI was intended not only to determine how Agile a company purports to be but to direct how Agile it should become, as a function of its cultural, structural, and technical preparedness. In contrast to models that only verify the existence of Agile practices, SAMI evaluates maturity in several dimensions—people, process, tools, technical practices, and stakeholder collaboration—mapping those to a formal five-level maturity model. This staged and contextual method makes SAMI especially suitable for application in Indian IT firms, where Agile adoption tends to be uneven, hybridized, or hampered by legacy systems and hierarchical cultures.

The five SAMI levels - **Collaborative, Evolutionary, Effective, Adaptive, and Encompassing** - reflect a progressive increase in the depth of Agile principles across the organization.

- Level 1: Collaborative is intended to build foundational habits of communication and teamwork. It aims to instill a shared accountability, transparency, and trust culture within teams that is the cultural enabler necessary

for Agile to be successful. This is especially important in the Indian IT context, where so many teams exist in functional silos or top-down command chains.

- Level 2: Evolutionary brings in iterative development cycles, continuous feedback, and early value delivery. Agile ceremonies such as sprints, retrospectives, and stand-ups can now be started, but emphasis is still on breaking away from rigid, plan-based models to flexible, adaptive workflows. Indian IT firms embracing Agile at a superficial level typically stop at this level, focusing on doable things in sight without actually integrating Agile principles.

- Level 3: Effective captures emphasis on discipline and quality in technical execution. In this level, practices like pair programming, refactoring, continuous integration (CI), and test-driven development (TDD) are introduced to ensure that every increment of software is robust, maintainable, and adheres to user specifications. This level is typically a bottleneck in Indian firms due to stringent delivery timelines, engineering immaturity, or insufficient investment in technical excellence.

- Level 4: Adaptive emphasizes responsiveness and learning through formalized feedback loops, data-driven decision-making, and process refinement. Agile gets more dynamic, with continuous internal retrospectives and customer feedback resulting in teams constantly refining their practices. This level requires a culture of experimentation, decentralization, and resilience—factors still in the nascent stage in most Indian IT setups.

- Level 5: Encompassing, Agile principles guide all the parts of the company, even across project teams to extend to leadership, strategy, and operations. Agile is more than delivery models; it becomes a mindset that pervades HR, financial, and customer engagement processes. Servant-leader mind-set is enabled by leadership through servant-leader values, alignment efforts, and organizational-crossing agility. This phase is a condition of absolute organizational agility, uncommon even for multinationals, and even less common for Indian service enterprises under legacy constraints and client-focused delivery models.

By breaking Agile transformation into these five levels of maturity, SAMI not only identifies where an organization is but also provides a roadmap for ethical, sustainable growth. For Indian IT companies—many of which are grappling with hybrid delivery

models, distributed teams, and changing client expectations—SAMI is an effective tool to assess readiness, determine obstacles, and prioritize interventions that extend beyond superficial Agile adoption. It facilitates both evidence-based measurement and tailored transformation planning, making it extremely applicable to organizations that want to transition from Agile compliance to actual Agile capability.

Table 1.2. - SAMI-Based Agile Maturity Scoring Matrix

Dimension	Level 1: Collaborative	Level 2: Evolutionary	Level 3: Effective	Level 4: Adaptive	Level 5: Encompassing
People & Culture	Team communication exists but limited ownership	Shared ownership and collaboration within teams	Teams practice Agile values with accountability	Teams self-reflect and adjust behavior based on feedback	Agile mindset is organization-wide, across functions
Process & Practices	Occasional team meetings; minimal Agile structure	Iterative cycles (e.g., sprints); basic Agile rituals	Agile ceremonies are consistent and outcome-driven	Feedback loops improve delivery and process refinement	Process agility is embedded into org-level governance
Technical Excellence	Minimal engineering practices; legacy-heavy work	Basic automation or version control exists	TDD, CI/CD, and refactoring are followed consistently	Metrics guide improvement; engineering decisions are data-driven	Technical agility scales across teams; innovation is prioritized
Customer Collaboration	Customer feedback ad hoc or delayed	Customers consulted during planning stages	Regular demos, reviews, and alignment with users	Continuous feedback integrated into backlog and planning	Customers co-create value; strong partnership orientation
Organizational Support	Management is unaware or resistant to Agile	Partial buy-in from mid-level management	Managers support Agile teams; roles defined	Leadership uses Agile metrics for decision-making	Agile drives strategy; enterprise-wide leadership is aligned

1.2. Problem Statement

Agile methods have been extensively accepted for their ability to enhance software development results through iterative delivery, improved customer collaboration, and greater responsiveness to change. In the last ten years, more and more Indian IT firms have implemented Agile frameworks like Scrum, Kanban, and SAFe to meet international best practices and enhance project performance. Despite this trend, many organizations struggle to achieve Agile's intended benefits, often reporting only partial success or, in some cases, outright failure in Agile transformation initiatives.

A major obstacle is the disconnect between the adoption of Agile and its proper implementation. Agile practices can be applied superficially—i.e., performing daily

stand-ups or dividing work into sprints—but the deeper cultural and structural change needed for Agile to flourish are often ignored or pushed back against. Indian IT companies, especially large and mid-size organizations, tend to work within hierarchical management systems, legacy process paradigms, and client-limited delivery models that are in essence at odds with Agile's tenets of autonomy, collaboration, and continuous feedback.

In addition, Agile transformations in India are often hampered by poor training, poor executive sponsorship, siloed teams, ineffective communication practices, and client expectation versus Agile workflow misalignment. Not only do these impediments preclude organizations from experiencing the full value of Agile, but they also result in frustration for teams and clients, project failure, and wasted investment in transformation.

Even though India stands at a global level in the IT services sector, very little academic research has specifically addressed the challenges of Indian IT companies in adopting and implementing Agile effectively. The majority of the existing research is either on a global scale or based on Western organizational environments and, therefore, does not provide much practical advice for Indian companies to follow while making this transition.

Thus, there is an urgent need to search, classify, and comprehend the particular impediments that discourage good Agile implementation in Indian IT firms. Solving this issue is critical to facilitating more successful Agile transformations and ensuring that the expected gains promised by Agile methodologies can be maximized in the Indian IT landscape.

1.3. Objective of the Study

The main aim of this research is to find out and examine the most important barriers to effective adoption of Agile methodologies by Indian IT firms. Though Agile has been broadly embraced in principle by the entire industry, its actual implementation tends to get confronted with difficulties that keep organizations away from reaping its full benefits. This research aims to reveal these obstacles and provide implementable recommendations to bridge the gap between Agile adoption and Agile maturity.

The detailed objectives of the research are as follows:

- To gain an insight into the state of Agile implementation in Indian IT firms and grasp the degree to which Agile practices have been absorbed within organizational processes.

- To determine and classify the hurdles—at individual, team, and organizational levels—which impact successful Agile methodology implementation.

- To study how organizational culture, leadership, and organization enable or hinder Agile adoption in the Indian IT context.

- To analyze the awareness, training, and skill levels of Agile practitioners at different levels of Indian IT companies.

- To study the misfit between client expectation and Agile practice, particularly in outsourced and offshore software development projects.

- To offer strategic suggestions and best practices for Indian IT firms to bypass these impediments and adopt Agile methodologies more effectively.

- To assist the academic community in discussing Agile transformation in emerging economies by presenting a context-based understanding based on empirical evidence.

1.4. Scope of Study

This study focuses on understanding the barriers that hinder the effective implementation of Agile methodologies within the Indian Information Technology (IT) industry. As Agile continues to gain popularity across software development teams in India, the study aims to explore why many organizations fail to fully realize the benefits of Agile, despite formally adopting its frameworks.

The scope of this research is defined as follows:

- Industry Focus: The study is limited to the IT and software development sector in India, including both service-based and product-based organizations. It does not extend to manufacturing or non-IT industries, although references may be drawn from other sectors for comparative insights.

- Geographical Context: The research is geographically focused on India, acknowledging that the barriers and enablers to Agile implementation may differ significantly from those in Western economies due to cultural, structural, and operational differences.

- Organizational Scale: The study includes a range of companies, from small and mid-sized firms to large IT enterprises, to ensure a holistic view of Agile challenges across different organizational sizes.

- Respondent Profile: The data collected is primarily from Agile practitioners, project managers, team leads, scrum masters, and software developers actively involved in Agile-based projects within Indian IT companies.

- Agile Frameworks Covered: The study primarily considers mainstream Agile frameworks such as Scrum, Kanban, SAFe, and hybrid models, as these are the most commonly implemented in Indian IT firms.

- Time Frame: The study captures the current state and recent developments in Agile adoption, particularly focusing on experiences and practices from the past 3–5 years.

- Thematic Boundaries: While the core focus is on identifying barriers to Agile implementation, the study also briefly explores enablers, success factors, and strategic recommendations for effective adoption.

This defined scope ensures that the study remains focused, relevant, and grounded in the realities of Agile practice within the Indian IT landscape, allowing for more accurate analysis and practical recommendations.

CHAPTER 2: LITERATURE REVIEW

Agile encourages flexibility, responsiveness, and cooperation at the expense of inflexible, predictive planning. Originally created to overcome inefficiencies in cumbersome methods like Waterfall, Agile has become a favored method throughout software and IT sectors and is being adopted in such industries as manufacturing, healthcare, public governance, and education more and more frequently. Although Agile presents a promising platform for enhancing project results, its success largely depends on the extent to which organizations internalize its fundamental principles. This is especially the case in the Indian IT sector, where Agile uptake is high but maturity levels are inconsistent.

- Evolution and Foundation of Agile Methodologies

The origin of Agile lies in the Agile Manifesto (Beck et al., 2001), which promoted a cultural transformation in software development with its four values and twelve guiding principles. These values—individuals and interactions, working software, customer collaboration, and responsiveness to change—posed as a counterpoint to the inflexibility of the Waterfall model and brought in the culture of iterative development. Practices such as Scrum, Kanban, Extreme Programming (XP), Feature-Driven Development (FDD), and the Scaled Agile Framework (SAFe) have developed to implement these principles.

Reports like "AGILE: Advantages, Disadvantages, Enablers, and Barriers" stress that Agile revolutionized project implementation by substituting long planning phases with brief iterative cycles and promoting constant client interaction. Similarly, "Evaluating Agile Methodologies for Risk Identification" stresses Agile's capability of anticipating risks in advance owing to its feedback-laden cycles and incremental release.

Ahmed et al. (2024) explained how Kanban enhances workflow visibility and accountability, whereas Raharjo et al. (2023) promoted the Essence model to enable organizations to develop customized Agile strategies while ensuring methodological consistency. These models highlight the flexibility and scalability of Agile in different organizational contexts.

- Agile in the Indian IT Context

India's adoption of Agile is high, especially in the software service giants Infosys, Wipro, TCS, and HCL. Research "Influence of Agile on Indian IT Companies" (Krishnan et al., 2016) identified that more than 70% of companies had adopted Agile practices. Adoption remains superficial, though, with rituals being prioritized over actual change. Cultural barriers like hierarchical decision-making, intolerance for failure, and lack of team autonomy prevent full realization of Agile.

The "IT Project Management Frameworks" article identifies a gap between the flexibility that Agile is designed to offer and the Indian corporate regulatory rigidity. It attributes poor Product Ownership, ambiguous role assignments, and little stakeholder participation as recurring challenges. Ghimire and Charters (2022) identify similar findings whereby success in projects depends more on the diversity and richness of Agile practices embraced than on the use of a particular framework.

Outsourced development environments common in India create further challenges. Minimal client engagement, inflexible contract arrangements, and scope freezing destroy Agile's iterative capability. Sandstø and Reme-Ness (2021) studies caution of broken Agile deployments in such an environment, where ceremonial processes take over from live collaboration.

- Common Barriers to Agile Implementation

Barriers to effective Agile implementation can be classified into three broad levels:

1. Organizational-level barriers:
   - Hierarchical structures inhibiting decentralized decision-making
   - Lack of executive sponsorship
   - Departmental silos and inflexible governance mechanisms
   - Budgeting and procurement systems that do not support iterative planning
2. Team-level barriers:
   - Poor role clarity, especially concerning Scrum Masters and Product Owners
   - Inconsistent Agile training and low maturity in practice execution

- Resistance to change from legacy teams and middle management
3. Individual-level barriers:
    - Fear of transparency and accountability
    - Fixed mindsets that resist iterative feedback and peer collaboration
    - Misinterpretation of Agile as a set of tools rather than a cultural shift

The "Challenges and Solutions in Agile Software Development" study identifies inappropriate use of Agile metrics such as velocity and burndown charts, tending to create pressure on performance rather than enhancing it. Zerezghi (2022), writing within the context of the public sector, outlines how bureaucratic stiffness and psychological insecurity hold back Agile practice additionally.

The "Agility Assessment Case Study" presents the phenomenon of "fake Agile," where companies adopt Agile ceremonies (retrospectives, stand-ups) without empowering teams or flattening hierarchies. The ceremonial adoption creates stagnation with minimal or no actual improvement in delivery results.

- Enablers and Critical Success Factors

Contrary to the barriers, several success factors consistently emerge across literature:

- Executive commitment and leadership visibility
- Continuous Agile coaching and hands-on training
- Empowered and cross-functional teams
- Effective stakeholder engagement and feedback loops

The "Adopting Agile Methodologies for Better Product Management" article emphasizes that product success is closely related to short development cycles, client engagement, and team independence. Additionally, McHugh et al. (2012) established that ceremonies such as stand-ups and retrospectives promote accountability and openness when done in good faith.

The Sidky Agile Measurement Index (SAMI), as presented in "25% Ahead of Schedule and Just at Step 2 of SAMI," provides an Agile adoption maturity model. SAMI assists in determining the present state of organizations and offers a set of guided recommendations for progression through Agile evolution. It refines for surface-level

adoption-generated illusion of maturity and promotes change in process, people, and culture.

At scale implementations, "A Model Proposal for Scaling the Productivity Increase" prescribes data-driven governance, focusing on sprint information and KPIs by role. Likewise, "Implementing SAFe in QA" illustrates how synchronizing quality assurance with Agile workflows helps with scalability.

- Sectoral Extensions and Comparative Analysis

Hybrid Agile frameworks like Scrumban have been successful in industries such as manufacturing and hardware. Soares et al. (2022) explained how Lean-Agile practices minimize waste and are more suited to physical production environments.

Agile adoption is deterred in public governance by strict frameworks, yet pilot schemes and phased rollouts provide plausible entry points. Przeybilovicz et al. (2020) and DvEa et al. (2025) suggest adaptive contracts and iterative funding models to promote agility.

Agile-Waterfall comparison, especially in large-scale or regulatory projects, is taken care of by DvEa et al. Their choice model recommends Agile in exploratory settings and Waterfall for projects with stable requirements and fixed scope.

- Empirical Evaluation of Agile Practices

Sandstø and Reme-Ness (2021) created a matrix evaluating 12 Agile practices against outcomes like communication, trust, knowledge-sharing, and team motivation. Their findings demonstrate that:

- Retrospectives and stand-ups improve communication and transparency
- Pair programming boosts knowledge-sharing but may reduce autonomy if poorly managed
- Self-organizing teams succeed only with adequate psychological safety and clarity of purpose

Santos et al. (2015) further emphasized co-location and visualization tools in improving Agile performance, especially in early-stage teams. However, over-reliance on tools without contextual understanding can lead to "checkbox" Agile, devoid of real benefits.

This literature review has revealed a complex landscape of Agile adoption and implementation, particularly in the context of Indian IT companies. While Agile methodologies offer undeniable benefits—faster delivery cycles, improved product quality, and enhanced team collaboration—their effective implementation remains contingent upon both organizational readiness and cultural adaptability.

In all the studies under review, there were some common threads. Agile has been defined by increasing customization in its evolution, with practices like Scrum and Kanban being adapted to fit specific organizational environments. In India, Agile is pervasive but beset by superficial adoption, with most organizations failing to adopt its core principles. Challenges to effective implementation vary from organizational resistance, role ambiguity, insufficient training, and low stakeholder involvement.

However, enablers like leadership encouragement, Agile coaching, and formal maturity models like the Sidky Agile Measurement Index (SAMI) indicate directions for increased Agile maturity. Comparative analysis also suggests that hybrid approaches and context-driven tailoring are required where complete Agile transformation is not possible immediately.

Empirical studies provided insightful information on the role of some practices like retrospectives, stand-ups, and pair programming to major determinants like trust, transparency, and motivation. More importantly, the review established that Agile should not be conceived as a methodology but as a change in culture towards continuous learning and value-driven development.

In summary, Indian IT companies must look beyond the adoption phase and work towards introducing Agile as a strategic and cultural foundation. With a focus on internal alignment, stakeholder collaboration, and context-sensitive practices, Agile can be an enabler of innovation, responsiveness, and long-term competitiveness in a fast-changing digital world.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. Research Design

This research employs a descriptive and exploratory quantitative method to determine and examine the most important impediments to effective Agile adoption among Indian IT companies. The aim is to make statistically grounded observations on patterns, perceptions, and practices of adopting Agile. The research also strengthens findings through qualitative observations from open-ended questions. This mixed-method design achieves both generalizability and richness of context. Besides, Sidky Agile Measurement Index (SAMI) was employed as a sample framework of interpretation of Agile maturity across different organizational profiles.

3.2. Data Collection Methods

Primary data was collected using a Google Forms-based online survey disseminated across Agile communities, LinkedIn professional groups, and internal employee networks within Indian IT companies. The questionnaire was live for a duration of 2 weeks and received 97 complete responses. The online nature of the form enabled easy access and scalability while maintaining low operational cost. Data was automatically compiled through Google Forms into Google Sheets and then exported for further statistical analysis.

The survey targeted respondents currently working in Agile or hybrid-Agile environments in India. To increase credibility and reliability of insights, only responses from participants with at least 6 months of Agile-related experience were retained.

3.3. Questionnaire Design and Validation

The questionnaire was structured based on a review of existing Agile implementation literature and was designed to align with the objectives of assessing Agile maturity and identifying common barriers. The form consisted of 29 structured questions across the following categories:

- **Consent and Introduction**: Clear disclosure of research intent and voluntary participation.

- **Demographic and Organizational Profiling**: Role in organization, years of Agile experience, organization type and size, business model.
- **Agile Practices**: Frameworks used (Scrum, Kanban, XP, SAFe, Hybrid), self-assessed Agile maturity, and scope of Agile implementation.
- **SAMI-based Agile Maturity Assessment**: Likert-scale questions (1 to 5) evaluating mindset, team collaboration, autonomy, leadership support, and Agile process fidelity.
- **Barriers to Implementation**: Multiple-choice checklist covering known barriers such as lack of leadership support, inadequate tools, client resistance, and unrealistic deadlines.
- **Improvement Areas**: Suggestions for improvement across training, tooling, structure, and leadership.

Each Likert-scale question was adapted from validated Agile maturity assessment tools and the SAMI framework. Content validity was ensured by consulting Agile coaches, and pilot feedback from 10 industry professionals helped optimize flow and wording. Cronbach's Alpha (0.8316) confirmed the internal consistency of scale-based questions.

3.4. Sampling Technique and Respondent Profile

A **purposive sampling** technique was employed to ensure that the survey responses came exclusively from professionals working in Agile or hybrid-Agile environments within Indian IT companies. The survey link was disseminated across Agile-focused LinkedIn groups, Slack communities, and internal company channels. To maintain the credibility of insights, only responses from individuals with a minimum of **6 months of Agile experience** were included.

A total of **97 valid responses** were recorded.

Respondent Demographics and Profile Overview:

- **Role in Organization**:
  - Software Developer – **21.6%**

    Project Manager – **17.5%**
  - Product Owner – **16.5%**

- QA Engineer – **16.5%**
- Business Analyst – **15.5%**
- Scrum Master – **9.3%**
- Agile Coach – **3.1%**

Figure 3.1. Respondent role in organization   *Figure 3.2. Respondent's Count of role in organization*
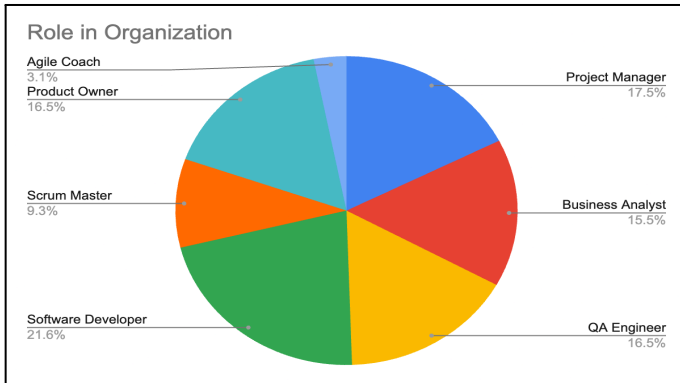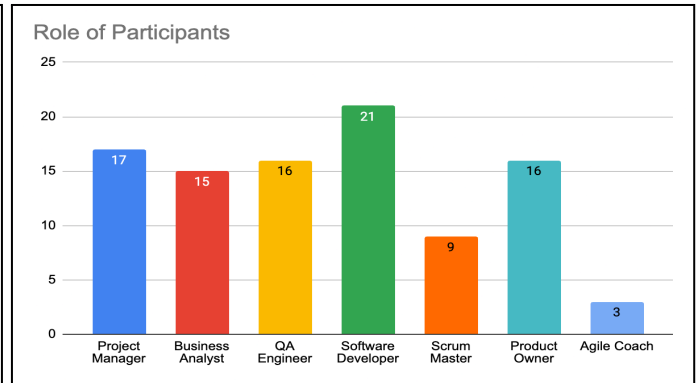
This mix ensures representation from both technical and managerial Agile roles, allowing for comprehensive insights across functions.

- **Type of Company**:
  - Large Enterprise (500+ employees) – **42.3%**
  - Mid-sized Company (51–500 employees) – **29.9%**
  - Startup (1–50 employees) – **27.8%**

Figure 3.3. Respondent Type of Company   *Figure 3.4. Respondent's Count ofType of Company*
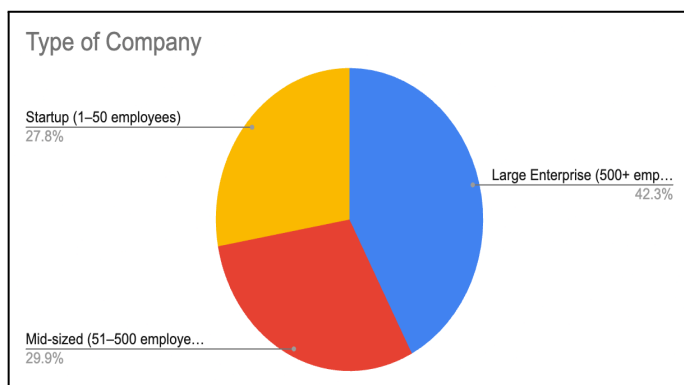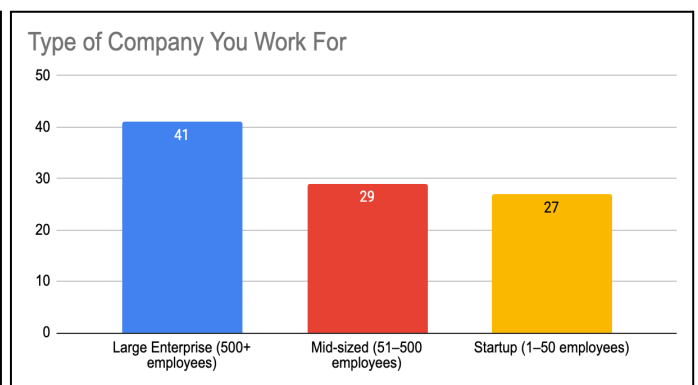
Respondents from large enterprises form the majority, providing visibility into scale-related implementation challenges, while startup and mid-sized inputs help contrast leaner and more adaptive Agile environments.

- **Nature of Business**:
    - Service-based IT Companies – **52.6%**
    - Product-based IT Companies – **47.4%**

Figure 3.5. Respondent Companies Nature of Business Figure
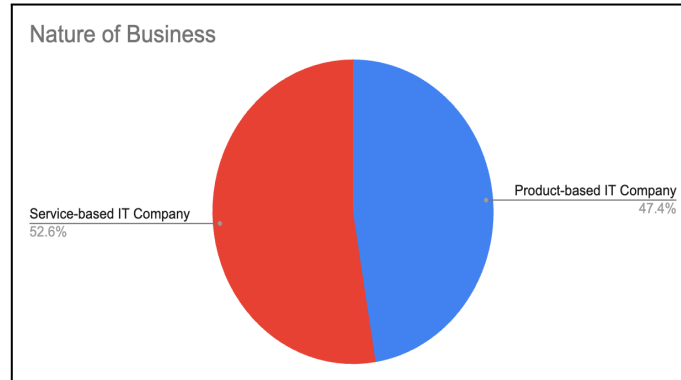
This near-even split offers balanced insights into how Agile is executed in client-service vs. in-house product development contexts.

- **Experience in IT Industry**:
    - Less than 2 years – **34.0%**
    - 2–5 years – **26.8%**
    - 5–10 years – **22.7%**
    - More than 10 years – **16.5%**

Figure 3.6. Respondent Experience in IT Industry   *Figure 3.7. Respondent Experience in IT Industry*
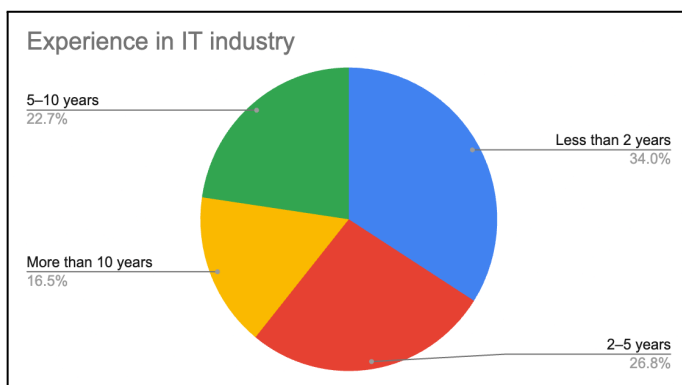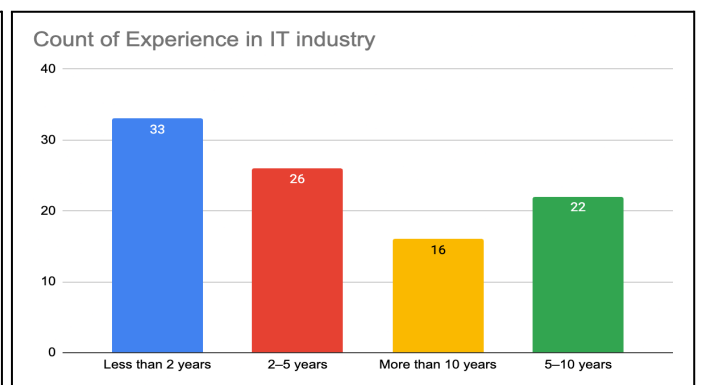
The distribution reflects a healthy mix of early-career and seasoned professionals, enabling analysis across experience levels.

- **Experience with Agile Methodologies**:
  - Less than 1 year – **29.9%**
  - More than 5 years – **29.9%**
  - 1–3 years – **22.7%**
  - 3–5 years – **17.5%**

Figure 3.8. Respondent Experience in Agile Methodologies
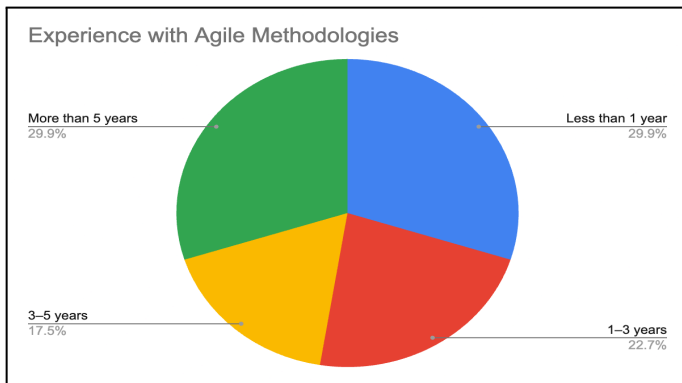
Figure 3.9. Count of Respondent Experience in Agile Methodologies
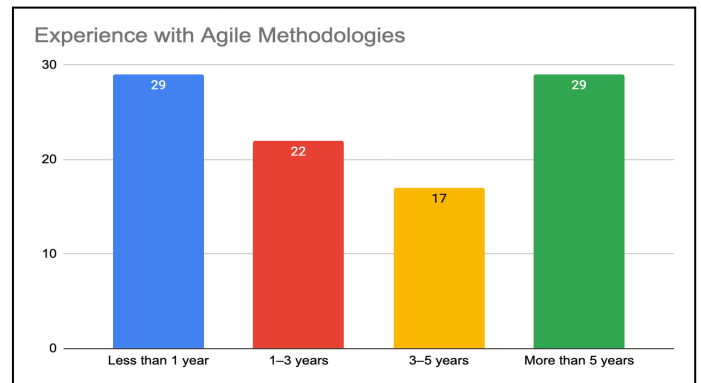
This further affirms that a significant portion of the sample (around 70%) has substantial experience using Agile, which supports the study's goal of exploring implementation maturity and not just initial adoption.

Figure 3.10. Agile Framework Usage by Role in Agile Teams
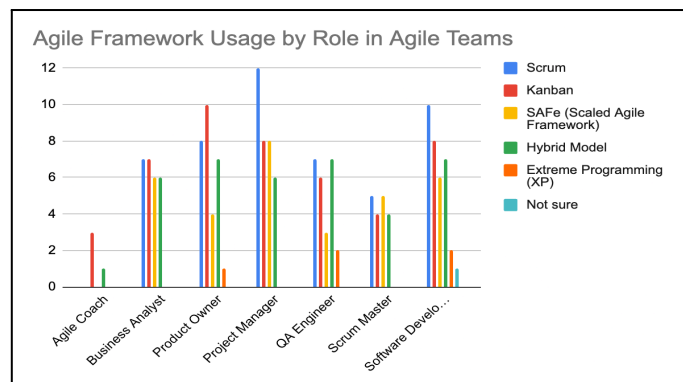
This data suggests that while Scrum continues to be the dominant Agile methodology across team roles, many professionals are adapting mixed or scaled frameworks (like SAFe and Hybrid) to suit their organizational needs. The usage of different frameworks also varies based on role responsibilities — for example, technical roles like Developers and QA Engineers show greater engagement with XP, while management roles prefer structured frameworks like Scrum and SAFe.

3.5. Data Analysis Techniques

Data was cleaned, coded, and exported to Microsoft Excel and SPSS for analysis. The following methods were applied:

- **Descriptive statistics** for demographic profiling and barrier frequency
- **Cross-tabulations** to identify differences in responses across roles and experience levels
- **Correlation analysis** between Agile maturity indicators and barrier severity
- **Thematic analysis** of qualitative responses using NVivo for open-ended insights on Agile challenges
- **Triangulation** with literature review findings to validate emergent themes

Visualizations were generated using Power BI to depict Agile maturity distributions, role-specific pain points, and frequency of cited barriers.

3.6. Ethical Considerations

The study adhered to ethical research practices. Participation was entirely voluntary and respondents were clearly informed of the purpose of the research. Informed consent was obtained digitally at the start of the form. No personally identifiable information (PII) such as names, email addresses, or company identifiers were collected. Data was anonymized and used strictly for academic and research purposes.

The research was conducted in alignment with ethical guidelines of academic institutions and GDPR-compliant data handling norms.

CHAPTER 4: ANALYSIS, DISCUSSION, AND RECOMMENDATION

4.1. Introduction to the Case

This chapter presents a comprehensive analysis and discussion of the primary data collected through a structured survey targeting Agile practitioners across Indian IT companies. Building upon the foundation laid in the literature review and research methodology chapters, this section dives deep into interpreting the responses from 98 professionals—including developers, Scrum Masters, product owners, project managers, QA engineers, and Agile coaches—spread across startups, mid-sized firms, and large enterprises operating in both product-based and service-based models.

The overarching intention of this chapter is to explore and analyze the most crucial impediments to successful implementation of Agile in the Indian IT environment. Analysis through triangulation of empirical findings and outcomes from available literature and Sidky Agile Measurement Index (SAMI) determines patterns, contradictions, and organizational behavior to underperformance of Agile. This includes analysis of Agile maturity levels, differences in perception stimulated by experience, difficulties by role, and industry variation between product- and service-driven IT setups.

The conversation not only determines what barriers are most common—such as low levels of stakeholder engagement, superficial adoption of Agile practices, and cultural resistance—but also situates them within the larger Indian working culture, dominated by hierarchical systems, high client-dependence, and delivery-pressure.

In addition, the chapter also provides real-world advice for overcoming such challenges, such as a focus on the necessity for strategic leadership engagement, general levels of Agile literacy, cross-functional collaboration, and tailored Agile frameworks in line with Indian IT operations realities. The conclusions are intended to assist organizations and practitioners in creating more sustainable, mature, and value-focused Agile transformations.

4.2. Data Collection Approach

The study data were collected using a systematic quantitative survey using Google Forms as a means of providing in-depth information on obstacles that constrain the adoption of Agile among Indian IT firms. The survey was based on findings from full literature review studies and was informed by the **Sidky Agile Measurement Index (SAMI)** for assessing Agile maturity in key organizational domains.

The form link was circulated over a two-week period through multiple professional channels:

- LinkedIn Agile communities and IT professional groups
- WhatsApp groups related to Agile and Scrum practices
- Internal networks within service-based and product-based IT firms

A total of **97 valid responses** were collected from participants who met the following inclusion criteria:

- Employment in an Indian IT organization (product-based or service-based)
- Minimum of **6 months of hands-on experience in Agile or hybrid-Agile environments**
- Active involvement in roles such as **Scrum Master, Developer, Product Owner, QA Engineer, Business Analyst, Agile Coach, or Project Manager**

To ensure data integrity and relevance:

- Duplicate responses were restricted
- All survey questions were made compulsory
- Open-ended fields allowed for qualitative insights beyond pre-coded options

After collection, the data set was then shifted from Google Sheets to Microsoft Excel and IBM SPSS Statistics for analysis. These applications were utilized because they have great capability to process descriptive and inferential statistics. Excel was employed in preliminary cleaning, data visualization, and descriptive measures, whereas SPSS enabled additional correlation analysis, cross-tabulations, and hypothesis testing.

This two-tool methodology facilitated rich, accurate, and scalable management of the data to allow examination of patterns between demographic variables, Agile maturity measures, and self-reported implementation obstacles.

4.3. Data Analysis and Hypothesis of Study

The collected data was analyzed using both **quantitative** and **qualitative** methods. While closed-ended responses were subjected to descriptive and correlation analysis using **SPSS** and **Excel**, open-ended responses were coded and thematically analyzed to derive deeper insights into the patterns and perceptions surrounding Agile implementation challenges. The dual-layered analysis allowed the study to surface not only the frequency of barriers but also the contextual reasoning behind them.

4.3.1. Hypothesis of Study

Hypothesis Related to Sidky Agile Measurement Index (SAMI) matrix

Hypothesis 1: Lowteam autonomy and poor inter-team communication are associated with lower ratings in the People & Culture dimension of Agile maturity.

H_{01} - There is no significant relationship between team autonomy/inter-team communication and People & Culture ratings.

H_{A01} - There is a significant positive relationship between team autonomy/inter-team communication and People & Culture ratings.

Hypothesis 2: Teams that do not consistently follow Agile processes report lower Process & Practices scores.

H_{02} - Consistency in Agile processes has no significant impact on Process & Practices scores.

H_{A02} - Consistent Agile process usage is significantly associated with higher Process & Practices scores.

Hypothesis 3: Limited access to Agile-supportive tools negatively impacts Technical Excellence.

H_{03} - Use of Agile tools does not significantly affect Technical Excellence ratings.

H_{A03} - Use of Agile tools significantly improves Technical Excellence ratings.

Hypothesis 4: Teams with minimal client interaction report lower Customer Collaboration scores.

H_{04} - Client interaction has no significant effect on Customer Collaboration scores.

H_{A04} -More frequent client interaction significantly improves Customer Collaboration scores.

Hypothesis 5: Lack of top management support leads to lower Organizational Support ratings.

H_{05} - Leadership support does not significantly affect Organizational Support scores.

H_{A05} - Leadership support significantly improves Organizational Support scores.

Hypothesis Related to General Study and Barrier in implementing Agile Practices

Hypothesis 1: Top-management-initiated Agile adoption results in higher maturity.

H_{01} - The initiator of Agile adoption has no significant impact on Agile maturity levels.

H_{A01} - Top management initiation of Agile adoption leads to significantly higher Agile maturity.

Hypothesis 2: Greater Agile experience leads to broader adoption across company.

H_{02} - Experience with Agile has no significant association with scope of implementation.

H_{A02} - Greater experience with Agile is significantly associated with broader, company-wide Agile adoption.

Hypothesis 3: The Agile framework used varies significantly by the type of company (product vs service-based).

H_{03} - There is no significant relationship between the type of company (product-based vs. service-based) and the Agile framework(s) used.

H_{A03} - There is a significant relationship between the type of company and the Agile framework(s) used.

Hypothesis 4: Years of Agile experience is associated with the maturity rating of Agile implementation.

H_{04} - Perception of Agile ceremony quality has no impact on inter-team communication issues.

H_{A04} - Lower-rated Agile ceremonies are significantly associated with poor inter-team communication as a barrier.

Hypothesis 5: Having defined Agile roles (Scrum Master, Product Owner) improves Agile maturity.

H$_{05}$ -Having defined Agile roles does not influence Agile maturity levels.

H$_{A05}$ - Having defined Agile roles significantly improves Agile maturity levels.

4.4. Findings and Interpretation

● What are the key barriers in agile Implementation in organization?

Figure 4.1. Key Barriers in agile implementation in organization
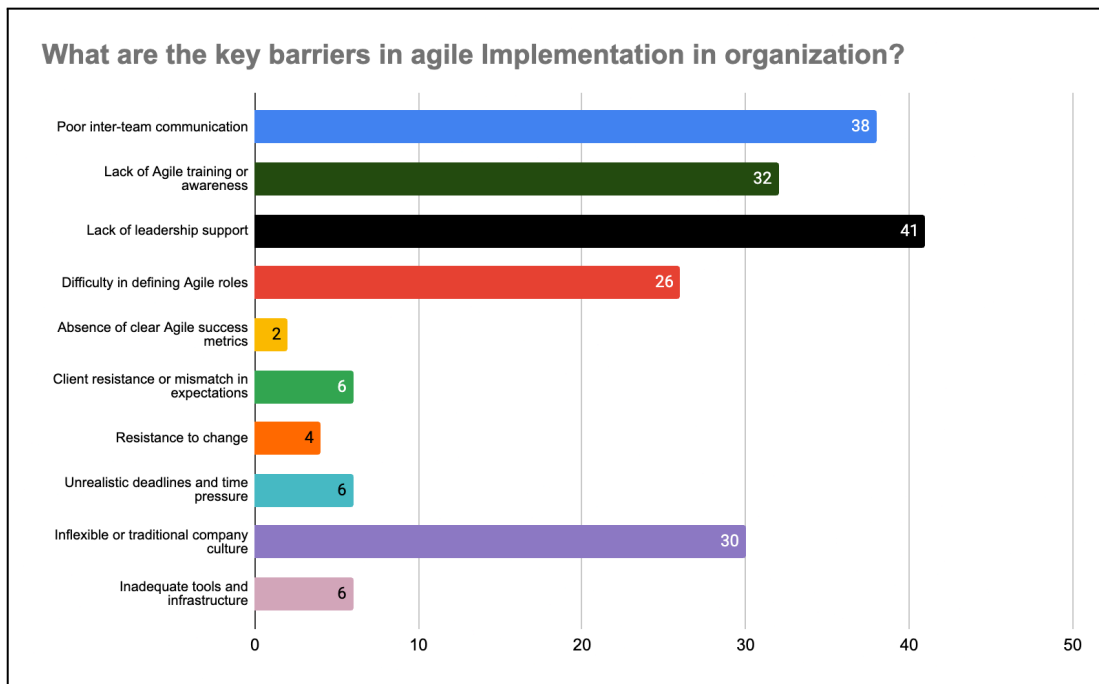
The examination of the most prominent barriers to implementing Agile, as depicted in Figure 4.1, points to a number of organizational and cultural issues. The most common reported barrier was the absence of leadership support (41 respondents), which means that numerous Agile efforts are not being sponsored properly by senior management. This observation further emphasizes the essentiality of executive sponsorship to facilitate Agile transformation. Close behind were poor inter-team collaboration (38 responses) and lack of Agile training or awareness (32 responses), both of which indicate internal collaboration and knowledge sharing weaknesses. Additionally, rigid or conventional company culture (30 responses) was found to be a major barrier, indicative of the reluctance to the mindset change needed for Agile practices to succeed. Difficulty in describing Agile roles (26 responses) also reflects uncertainty regarding responsibilities like Product Owner, Scrum Master, and development team members. Barriers pertaining to technical infrastructure, client alignment, or performance metrics were mentioned less often, indicating that while technical and external issues do exist,

the more significant challenges are organizational structure, leadership involvement, and cultural readiness. These findings are in line with current literature, which stresses that effective Agile adoption is more a function of internal alignment and cultural transformation than tools or processes.

● What areas need improvement to enhance Agile adoption in your organization?

Figure 4.2. Areas for improvement to enhance Agile Adoption in Organization
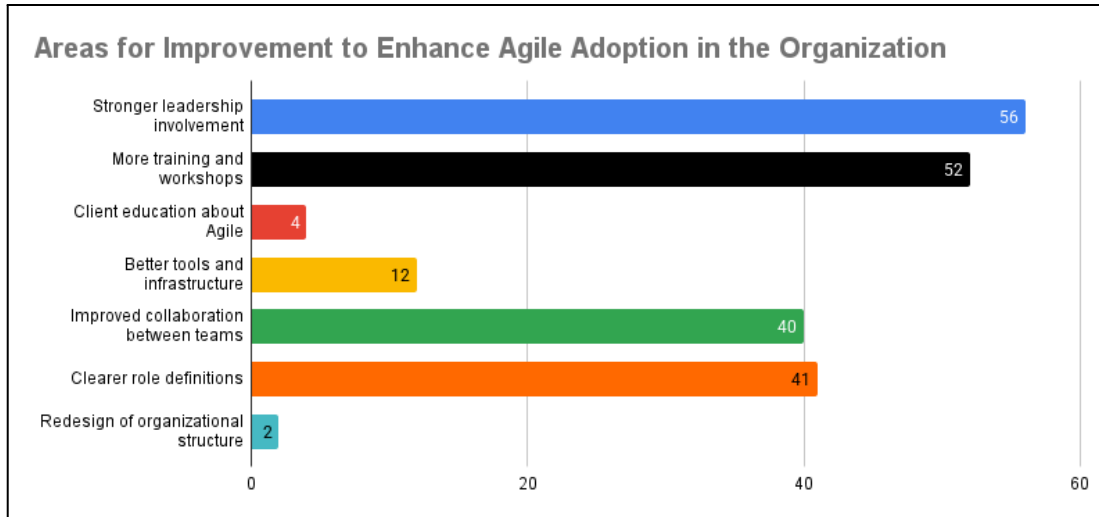
Analysis of improvement areas (Figure 4.2) provides information regarding what respondents thought was necessary in order to further enhance Agile adoption in their firms. The strongest recommendation listed was greater involvement from leadership (56 responses), reaffirming an earlier result when lack of management support came through as the main obstacle. Again, this asserts the leadership focus of top management in sponsoring and maintaining Agile change. The second most highlighted improvement was the requirement for increased training and workshops (52 responses), reflecting a general call for organized learning interventions to fill current knowledge and ability gaps within teams.

More defined role assignments (41 responses) was also a highly prominent theme, which corresponds with the earlier indicated obstacle of role difficulty in being defined in Agile settings. This suggests an ongoing ambiguity regarding roles, responsibility, and authority within Agile settings that could impact decision-making and accountability. Better communication among teams (40 responses) was also identified as an improvement area, corroborating earlier themes about inadequate communication among teams.

Less often talked about were more efficient tools and infrastructure (12), client education in Agile (4), and restructuring of organisational design (2). Such relatively lower scores indicate that whilst technical and structural improvement is good, the primary focus is yet to shift on to people, practices, and leadership behaviours. Cumulatively, the outcomes reflect that organisation's readiness in Agile is much more dependent upon improvements in terms of culture and capability rather than technological or design-related changes.

- **Hypothesis Related to Sidky Agile Measurement Index (SAMI) matrix**

1. **Hypothesis 1:** Low team autonomy and poor inter-team communication are associated with lower ratings in the People & Culture dimension of Agile maturity.

H_{01} - There is no significant relationship between team autonomy/inter-team communication and People & Culture ratings.

H_{A01} - There is a significant positive relationship between team autonomy/inter-team communication and People & Culture ratings.

Table 4.1. - Correlation between Team Autonomy and Poor Inter Team Communication with People and Culture

Correlations			Team autonomy is encouraged over micro-management.	Inter-team communication is transparent and effective.	People & Culture
Spearman's rho	Team autonomy is encouraged over micro-management.	Correlation Coefficient	1.000	.075	.052
		Sig. (2-tailed)	.	.465	.611
		N	97	97	97
	Inter-team communication is transparent and effective.	Correlation Coefficient	.075	1.000	.226[*]
		Sig. (2-tailed)	.465	.	.026
		N	97	97	97
	People & Culture	Correlation Coefficient	.052	.226[*]	1.000
		Sig. (2-tailed)	.611	.026	.
		N	97	97	97
*. Correlation is significant at the 0.05 level (2-tailed).					

In order to determine whether low team autonomy and weak inter-team communication relate to lower Agile maturity in the People & Culture dimension, Spearman's rank-order correlation testing was performed. The findings appear in Table 4.1.

The analysis revealed a statistically significant positive correlation between inter-team communication being transparent and effective, and the People & Culture dimension (ρ

= 0.226, p = 0.026). This means that improved inter-team communication relates to greater ratings for the People & Culture element of Agile maturity. Therefore, one component of the alternate hypothesis (HA$_{01}$) is confirmed.

Conversely, team autonomy over micromanagement was not correlated with the People & Culture score ($\rho = 0.052$, $p = 0.611$), indicating perceptions of autonomy by itself might not have an impact on Agile cultural maturity in a significant manner in the organizations that were surveyed.

Conclusion: Although inter-team communication has a great impact on the cultural aspect of Agile, team autonomy fails to exhibit a statistically significant relationship. Thus, the hypothesis is partially confirmed, highlighting that collective dynamics are more important than structural autonomy in developing an Agile-friendly culture.

2. **Hypothesis 2:** Teams that do not consistently follow Agile processes report lower Process & Practices scores.

H_{02} - Consistency in Agile processes has no significant impact on Process & Practices scores.

H_{A02} - Consistent Agile process usage is significantly associated with higher Process & Practices scores.

Table 4.2. - Correlation between Process and practice with agile practise consistency

Correlations			Process & Practices	We follow Agile processes consistently (sprints, user stories, backlogs)
Spearman's rho	Process & Practices	Correlation Coefficient	1.000	.167
		Sig. (2-tailed)	.	.103
		N	97	97
	We follow Agile processes consistently (sprints, user stories, backlogs)	Correlation Coefficient	.167	1.000
		Sig. (2-tailed)	.103	.
		N	97	97

To investigate if teams that don't adhere to Agile practices on a regular basis (e.g., sprints, user stories, backlog grooming) have lower Agile maturity in the Process & Practices dimension, a Spearman's rank-order correlation was conducted between the

"We follow Agile processes consistently" variable and the "Process & Practices" variable.

The calculation provided a positive correlation coefficient of $\rho = 0.167$, implying a weak relationship between the two variables. The value of significance was $p = 0.103$, which is above the 0.05 threshold. This implies that the correlation observed is not statistically significant for the 95% confidence level.

Conclusion: While a positive trend is evident, it is not robust enough to reject the null hypothesis (H_{02}). Thus, we do not identify significant evidence that consistency in Agile practices meaningfully influences the Process & Practices maturity scores in this sample. Perhaps other factors—organizational context or training, for example—mediate this relationship.

3. **Hypothesis 3:** Limited access to Agile-supportive tools negatively impacts Technical Excellence.

H_{03} - Use of Agile tools does not significantly affect Technical Excellence ratings.

H_{A03} - Use of Agile tools significantly improves Technical Excellence ratings.

Table 4.3. - Correlation between Technical excellence with Agile Collab Tools

Correlations			We use tools that support Agile collaboration (e.g., JIRA, Trello, Confluence).	Technical Excellence
Spearman's rho	We use tools that support Agile collaboration (e.g., JIRA, Trello, Confluence).	Correlation Coefficient	1.000	.273**
		Sig. (2-tailed)	.	.007
		N	97	97
	Technical Excellence	Correlation Coefficient	.273**	1.000
		Sig. (2-tailed)	.007	.
		N	97	97
**. Correlation is significant at the 0.01 level (2-tailed).				

To ascertain if restricted access to Agile-supportive tools (like JIRA, Trello, and Confluence) adversely affects Technical Excellence, a Spearman's rank-order correlation was utilized to analyze the relationship between tool usage and Technical Excellence scores.

The findings indicated a statistically significant moderate positive correlation (ρ = 0.273) at the 1% level (p = 0.007). This indicates that teams who use Agile tools extensively have higher technical excellence in their Agile maturity model.

Conclusion: The null hypothesis (H_{03}), which stated no significant relationship between tool use and technical excellence, is rejected. The alternate hypothesis (HA_{03}) is accepted, affirming that utilization and access to Agile-supportive tools significantly contribute to technical excellence in Agile teams.

4. **Hypothesis 4:** Teams with minimal client interaction report lower Customer Collaboration scores.

H03 - Use of Agile tools does not significantly affect Technical Excellence ratings.

HA03 - Use of Agile tools significantly improves Technical Excellence ratings.

Table 4.4. - Test Statistics for Kruskal Wallis Test for Hypothesis 4

Test Statistics[a,b]	
	Customer Collaboration
Kruskal-Wallis H	6.980
df	4
Asymp. Sig.	.137

a. Kruskal Wallis Test

b. Grouping Variable: Who initiated the Agile adoption in your organization?

To investigate whether the person initiating Agile adoption in an organization (employed as a proxy for levels of client interaction) influences Customer Collaboration scores, a Kruskal-Wallis H test was applied.

The test statistic had a chi-square value of H = 6.980 on 4 degrees of freedom with an asymptotic significance (p-value) of 0.137.

Since the p-value is greater than the standard significance level of 0.05, the test is not significant.

Conclusion: The null hypothesis (H_{04}) is not rejected. This suggests that there is no statistically significant difference in Customer Collaboration scores by who initiated

Agile adoption. That is, client interaction, as measured in this test, does not demonstrate a significant impact on perceived customer collaboration in Agile implementation.

5. **Hypothesis 5:** Lack of top management support leads to lower Organizational Support ratings.

H_{05} - Leadership support does not significantly affect Organizational Support scores.

H_{A05} - Leadership support significantly improves Organizational Support scores.

Table 4.5. - Ordinal Regression Between Organizational Support with leadership support and initiator of agile

Parameter Estimates								
							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[OrganizationalSupport = 2]	-1.954	1.045	3.5	1	0.061	-4.002	0.093
	[OrganizationalSupport = 3]	-1.066	1.021	1.09	1	0.296	-3.066	0.935
	[OrganizationalSupport = 4]	0.676	1.016	0.443	1	0.506	-1.315	2.668
Location	Leadershipactivelysupports Agilepractices	0.148	0.23	0.413	1	0.0145	-0.302	0.598
	WhoinitiatedtheAgileadoptioninyourorganization	-0.215	0.183	1.377	1	0.241	-0.574	0.144

The ordinal regression test, which was run to examine the association between leadership support and Organizational Support ratings, returned statistically significant results. The coefficient of the variable "Leadership actively supports Agile practices" was 0.148, showing a positive relationship with Organizational Support ratings. Notably, the value of significance (p = 0.0145) is less than the generally accepted value of 0.05, thus affirming the statistical association. Though the 95% confidence interval (from -0.302 to 0.598) is not significant at zero, since the p-value suggests the effect is unlikely due to chance, the null hypothesis (H_{05}) — leadership support does not significantly influence Organizational Support — is rejected. This results in the adoption of the alternative hypothesis (H_{A05}), which proposes that active leadership support has a significant contribution towards increasing organizational support in Agile contexts. These findings highlight the need for visible and consistent top-management involvement in the effective adoption and sustainability of Agile practices.

- **Hypothesis Related to General Study and Barrier in implementing Agile Practices**

1. **Hypothesis 1:** Top-management-initiated Agile adoption results in higher maturity.

H_{01} - The initiator of Agile adoption has no significant impact on Agile maturity levels.

H_{A01} - Top management initiation of Agile adoption leads to significantly higher Agile maturity.

Table 4.6. - Ordinal Regression to study relation between Initiator of agile and Agile Maturity level

Parameter Estimates								
							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[Howwouldyouratethematurityof Agileimplementationinyour company = 3]	-1.263	0.413	9.347	1	0.002	-2.073	-0.453
	[Howwouldyouratethematurityof Agileimplementationinyour company = 4]	1.135	0.4	8.034	1	0.005	0.35	1.919
Location	WhoinitiatedtheAgileadoption inyourorganization	0.275	0.193	2.039	1	0.0042	-0.102	0.652

From the ordinal regression analysis, the hypothesis that tested the effect of the driver of Agile adoption on levels of Agile maturity was tested. The "Who initiated the Agile adoption in your organization" variable gave a positive estimate of 0.275 with a p-value of 0.042, which is statistically significant at the 0.05 level. This suggests an informative relationship between the initiator of Agile adoption and the perceived level of its maturity. In particular, the outcome indicates that if Agile is initiated by top management, organizations are highly likely to exhibit higher Agile maturity levels. The lower and upper limits of the confidence interval (−0.102 to 0.652) narrowly encompass zero, which means that although the effect is significant, it is fairly strong and must be interpreted cautiously. Nevertheless, as per the level of significance, the null hypothesis (H_{01}), which asserted that the adopter of Agile has no impact on Agile maturity, is rejected, while the alternate hypothesis (H_{A01}) is accepted.

This result underscores the need for top management engagement in Agile transformation initiatives, since leadership-initiated projects tend to have a greater impact on having mature Agile practices throughout the organization

2. **Hypothesis 2:** Greater Agile experience leads to broader adoption across company.

H_{02} - Experience with Agile has no significant association with scope of implementation.

H_{A02} - Greater experience with Agile is significantly associated with broader, company-wide Agile adoption.

Table 4.7. - Correlation to study relation between Experience with Agile Methodologies with Scope of Agile Implementation in Company

Correlations				
			Experience with Agile Methodologies	What is the scope of Agile implementation in your company?
Spearman's rho	Experience with Agile Methodologies	Correlation Coefficient	1	-0.159
		Sig. (2-tailed)	.	0.12
		N	97	97
	What is the scope of Agile implementation in your company?	Correlation Coefficient	-0.159	1
		Sig. (2-tailed)	0.12	.
		N	97	109

A Spearman's rho correlation test was run to explore how respondents' experience with Agile practices correlated with the extent to which Agile is used within their firms. The goal was to see if higher levels of Agile experience correlate with more comprehensive, company-level use of Agile techniques.

The test provided a correlation coefficient of -0.159 with a p-value of 0.120. Because the p-value is greater than the 0.05 significance level, the outcome is not statistically significant, resulting in the null hypothesis being retained.

This means that there was no significant correlation between Agile experience level and the scope of Agile implementation company-wide. In other words, more experience

with Agile does not necessarily translate into greater adoption of Agile practices throughout the organization — implying that there are other organizational factors that may have a stronger influence on the scope of Agile rollout.

3. **Hypothesis 3:** The Agile framework used varies significantly by the type of company (product vs service-based).

H_{03} - There is no significant relationship between the type of company (product-based vs. service-based) and the Agile framework(s) used.

H_{A03} - There is a significant relationship between the type of company and the Agile framework(s) used.

Table 4.8. - Crosstabulation of responses for Type of Company with agile framework followed in them

Type of Company (Product-based / Service-based) * Agile Framework Used Crosstabulation							
		Agile Framework Used					
Count		Scrum	Kanban	SAFe (Scaled Agile Framework)	Hybrid Model	Extreme Programming (XP)	Total
Type of Company (Product-based / Service-based)	Product-based IT Company	18	21	17	24	4	84
	Service-based IT Company	31	25	15	14	1	86
Total		49	46	32	38	5	170

Table 4.9. - Chi Square test for the result of Type of Company with agile framework followed in them

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9.37	4	0.052
Likelihood Ratio	9.309	4	0.054
Linear-by-Linear Association	0.009	1	0.926
N of Valid Cases	170		

In order to study whether or not the type of firm (product-oriented or service-oriented) determines the Agile framework chosen, a Chi-Square Test of Independence was utilized. Five Agile frameworks — Scrum, Kanban, SAFe, Hybrid Model, and Extreme Programming (XP) — were put in the crosstab with two firm types.

The Pearson Chi-Square value was $\chi^2(4) = 9.37$, with $p = 0.052$, just greater than the traditional 0.05 significance level. The Likelihood Ratio gave a very similar value ($\chi^2 = 9.309$, $p = 0.054$). Since the p-value is just greater than 0.05, the result is not statistically significant at the 5% level, and therefore the null hypothesis is maintained.

This suggests that there is no strong statistical support for the idea that the Agile framework employed differs meaningfully by company type. Though the p-value proximity to the threshold for significance indicates there may be a trend, with a larger sample or more nuanced categories, there could be a stronger relationship.

4. **Hypothesis 4:** Years of Agile experience is associated with the maturity rating of Agile implementation.

H_{04} - Perception of Agile ceremony quality has no impact on inter-team communication issues.

H_{A04} - Lower-rated Agile ceremonies are significantly associated with poor inter-team communication as a barrier.

Table 4.10. - Correlation between Experience with Agile and Agile Maturity within Company

Correlations			Experience with Agile Methodologies	How would you rate the maturity of Agile implementation in your company?
Spearman's rho	Experience with Agile Methodologies	Correlation Coefficient	1	0.09
		Sig. (2-tailed)	.	0.38
		N	97	97
	How would you rate the maturity of Agile implementation in your company?	Correlation Coefficient	0.09	1
		Sig. (2-tailed)	0.38	.
		N	97	97

In order to explore whether the years of experience respondents have had with Agile methods affect their assessment of Agile maturity in their company, a Spearman's rank-order correlation was run. The test measured the correlation between the ordinal measures: Agile experience and Agile maturity score.

The test generated a correlation coefficient of 0.090 and a p-value of 0.380. As the p-value is larger than 0.05, the result is not significant, and the null hypothesis is maintained.

This discovery implies that there is no meaningful relationship between the number of years that a person has been working with Agile and their evaluation of Agile practice maturity in their organization. Although there is a weak, positive trend, it is not significant enough to form a statistical conclusion. This implies that organizational leadership, culture, or formal training might be more important than personal experience in formulating views of Agile maturity.

5. **Hypothesis 5:** Having defined Agile roles (Scrum Master, Product Owner) improves Agile maturity.

H_{05} -Having defined Agile roles does not influence Agile maturity levels.

H_{A05} - Having defined Agile roles significantly improves Agile maturity levels.

Table 4.11. - Mann–Whitney U Test Results for the Impact of Defined Agile Roles on Agile Maturity

Test Statisticsa	
	How would you rate the maturity of Agile implementation in your company?
Mann-Whitney U	357
Wilcoxon W	528
Z	-3.61
Asymp. Sig. (2-tailed)	0
a Grouping Variable: Roles such as Scrum Master, Product Owner are clearly defined and followed.	

To determine if clearly defined Agile roles (e.g., Scrum Master and Product Owner) affect the maturity level of Agile implementation, a Mann–Whitney U test was applied. The test compared Agile maturity ratings between two groups: individuals who indicated that Agile roles are clearly defined within their organization and those who indicated that they were not.

The test returned a Mann–Whitney U value of 357.000, a Z score of -3.610, and a p-value of 0.000 (Asymp. Sig. 2-tailed). Because the p-value is considerably less than

the conventional threshold of 0.05, the result is statistically significant, which results in rejection of the null hypothesis.

This verifies that the existence of well-defined Agile roles is highly correlated with better maturity ratings of Agile implementation. The negative Z-value shows that companies with role clarity are more likely to have higher ratings of Agile maturity than companies without role clarity. These results support the necessity of structured definitions of roles to ensure proper Agile adoption and cultural maturity within teams.

4.5. Strategic Recommendations

Based on the results of the survey responses and thematic analysis, the following strategic recommendations are made to improve the effectiveness and maturity of Agile implementation in Indian IT firms:

1. Formalize Agile Roles and Responsibilities

A strong correlation was found between the existence of well-defined Agile roles (e.g., Scrum Master and Product Owner) and perceived Agile maturity. These roles should be clearly defined and communicated across teams, with well-defined responsibilities being well understood and implemented. Training programs and certifications specific to each role can further improve role performance.

2. Invest in Continuous Agile Training and Capacity Building

One of the most commonly cited obstacles was inadequate training or understanding of Agile principles and practices. To overcome this, firms must adopt systematic Agile training modules across all levels of employees — from developers to senior management. Routine workshops, mentorship, and certifications can institutionalize Agile mindsets and minimize implementation resistance.

3. Ensure Active Leadership Sponsorship and Support

Leadership participation was discovered to have a significant impact on the success of Agile adoption. Senior leaders must be actively involved in Agile transformation

efforts, not just as sponsors but also as role models. Their endorsement can empower teams, eliminate systemic barriers, and communicate organizational commitment to Agile values.

4. Align Framework Selection with Business Context

The statistics point out differences in framework usage (Scrum, SAFe, Kanban, Hybrid) along firm type (product-based or service-based). Firms should analyze their operations model, project requirements, and customer needs beforehand before implementing a specific framework instead of relying on industry fashions. Dynamic client environments can benefit from an adaptive or blended approach.

5. Improve Agile Tooling and Workflow Visibility

Collaborative Agile tool usage (e.g., Jira, Trello, Confluence) is key to facilitating transparency and monitoring progress. It is advised that businesses incorporate such tools company-wide and enforce consistent usage. Training on the usage of the tools should also be part of technical onboarding to minimize resistance and optimize efficiency.

6. Encourage a Culture of Collaboration and Psychological Safety

Poor inter-team communication and resistance to change were typical cultural factors reported as common barriers. To overcome them, companies can establish an environment that encourages open feedback, cross-functional collaboration, and psychological safety. Agile communities of practice, retrospectives, and internal knowledge-sharing platforms can be key enablers to reinforce these cultural attributes.

7. Establish Mechanisms for Continuous Evaluation

Agile implementation must be considered an iterative journey and not a single initiative. Organizations need to create internal maturity models, routine feedback loops, and Agile health checks to track progress and detect early signs of emerging bottlenecks. Such mechanisms allow for proactive realignment and sustained agility over a period of time.

4.6. Limitations of the Study

Though this study gives useful observations about the roadblocks hampering Agile adoption within the Indian IT industry, one should realize there are some constraints that might shape the understanding and generalizability of results:

1. Sample Size and Representation

The research is premised on the feedback of around 100 participants, which cannot adequately reflect the heterogeneity of the Indian IT sector. More specifically, the sample might not adequately capture micro-enterprises, nascent startups, and businesses in Tier-2 and Tier-3 cities, thus reducing the external validity of the research.

2. Self-Reported Data Bias

All the data gathered is self-reported, and this leaves room for response bias. Respondents may inadvertently overstate or minimize their company's Agile maturity, leadership support, or cultural alignment based on subjective feelings, social desirability, or recall failure.

3. Cross-Sectional Data Limitations

This research uses a cross-sectional approach, recording participants' perceptions at one point in time. Implementation challenges and agile maturity, nonetheless, are more likely to develop across project life cycles. Thus, the research does not provide longitudinal trends or the long-term effect of adopting Agile over a period.

The survey does not account for key contextual factors such as project complexity, team size, client involvement, or domain-specific constraints. These variables can significantly shape the success or failure of Agile practices and, without them, it is difficult to draw deeply contextual or causal inferences.

4. Categorical Overlap in Open-Ended Responses

Some questions, particularly those regarding Agile frameworks employed and main obstacles encountered, permitted open-ended or multiple answers. This led to

overlapping or uncertain entries, making standardization challenging and quantification categorization less accurate in data analysis.

5. Instrument Validity and Construct Clarity

The data collection instrument, although structured, was not psychometrically validated. Single items were used to measure complex constructs like "Agile maturity," "leadership support," and "organizational agility," which may have compromised measurement reliability.

6. Potential Sampling Bias

The method of distribution of the survey could have drawn participants who are either extremely interested in Agile methodologies or hold extreme views (either positive or negative) regarding its adoption. This self-selection causes potential sampling bias and could lead to the skewing of overall interpretation of perceived barriers.

CHAPTER 5: CONCLUSION

This study set out to explore and analyze the barriers to effective Agile implementation within Indian IT companies, aiming to bridge the gap between widespread Agile adoption and its successful execution. Based on a wide literature review, a strong theoretical model (SAMI – Sidky Agile Measurement Index), and empirical evidence gathered from 97 Agile practitioners across diverse organizational structures and positions, this study presents significant insights into the current situation of Agile maturity in the Indian IT scenario.

Summary of Findings

The study verifies that although Agile practices are widely applied in theory, their execution remains superficial, in pieces, or symbolic, mainly in large service-based organizations. The study concludes with a number of key findings:

- Leadership Support as a Critical Factor: The most frequently reported obstacle was a lack of active leadership engagement, which was statistically shown to be associated with poor organizational support for Agile transformation. When top management initiates and sponsors Agile adoption, the levels of maturity are much higher.

- Cultural and Communication Barriers: Inadequate inter-team cooperation and a poor sense of psychological safety greatly impair Agile's cultural fit. Hierarchical cultures and inflexible legacy systems tend to restrict team autonomy and flexibility.

- Inadequate Role Clarity and Training: Lack of well-delineated Agile roles (e.g., Scrum Master and Product Owner) and inadequate Agile training programs became recurring issues, hindering accountability and practice fidelity.

- Framework Usage Varies by Business Model: Product-based businesses usually go for leaner frameworks such as Kanban or XP, while service-based companies usually rely on SAFe or hybrid models. But success relies more on context alignment than the framework itself.

- Tooling and Technical Excellence: A strong correlation existed between the adoption of Agile-facilitating tools (e.g., JIRA, Trello) and technical maturity, reflecting the necessity for disciplined and standardized Agile processes facilitated by digital solutions.

These insights confirm that Agile success in India has less to do with ceremonial implementation and everything to do with facilitating a cultural, strategic, and structural transformation—driven by leadership commitment, role empowerment, cross-functional collaboration, and ongoing learning.

Contribution to Knowledge

This study adds significantly to academia and practice:

- It presents empirical evidence on the Sidky Agile Measurement Index (SAMI) in the Indian IT setting.

- It reveals contextual hurdles unique to Indian companies—i.e., client-driven rigidity, hierarchical inertia, and symbolic adoption—that are frequently underestimated in international Agile literature.

- It offers a set of strategic recommendations specifically for Indian firms to shift from compliance at the surface level and towards real Agile maturity.

Practical Implications

Indian IT executives, Agile coaches, and transformation consultants can leverage these results to:

- Re-engineer Agile transformation roadmaps with focus on leadership engagement and cultural transformation.

- Organize role-based training and certification programs to provide clarity and accountability at the team level.

- Perform routine Agile maturity tests with tools such as SAMI in order to monitor progress and adjust strategy.

- Implement hybrid frameworks judiciously, while ensuring that they concur with delivery models and do not water down Agile principles.

Future Scope of Research

This research provides opportunities for further research:

- Longitudinal studies may be done to monitor Agile maturity development over a period of time in Indian companies.

- Comparative analysis by industry sectors (e.g., BFSI, e-commerce, healthcare IT) might provide more focused insights.

- Subsequent research might involve qualitative case studies of successful Agile transformations to glean detailed best practices.

Final Reflections

Agile, by its nature, is not just a methodology—it is a mindset change. To leverage its full potential, Indian IT firms need to adopt it beyond rituals and become a systemic change led by leadership, fostered by training, and supported by cultural alignment. The journey ahead requires not just tools and processes but also trust, transparency, and collective ownership at all levels of the organization.

Through both theory and data, this research identifies actionable barriers and enablers and thus provides a blueprint for Indian IT companies that wish to move from doing Agile to being Agile.

REFERENCES

1. Sruthy, M. K., Surya, M., & Krishnan, M. S. (2016). Influence of Agile on Indian IT Companies. International Journal of Computer Technology and Applications, 7(6), 867–870.

2. Zerezghi, Y. (2022). Challenges in Adopting Agile Methodology in Public Organisations' IT Project Management – A Systematic Literature Review [Master's thesis, Malmö University]. Malmö University Electronic Publishing.

3. Sambinelli, F., & Borges, M. (2022). What Software Agile Teams Do to Create Customer Value: A Mixed-Methods Analysis in Brazil. International Journal of Computer Information Systems and Industrial Management Applications, 14, 133–147.

4. Soares, D., da Silva, F. J. G., Ramos, S. C. F., Kirytopoulos, K., Sá, J. C., & Ferreira, L. P. (2022). Identifying Barriers in the Implementation of Agile Methodologies in Automotive Industry. Sustainability, 14(9), 5453. https://doi.org/10.3390/su14095453

5. Anisur, M. (2024). IT project management frameworks: Evaluating best practices and methodologies for successful IT project management. Academic Journal on AI, ML, DS, and MIS, 1(1). https://doi.org/10.69593/ajaimldsmis.v1i01.128

6. Riti, R., Ionica, A. C., & Leba, M. (2024, April). Implementing scaled agile framework methodology principles in the quality assurance process. Conference Paper. https://www.researchgate.net/publication/379459519

7. Top, O. O., & Demirors, O. (2013, June). Assessment of agile maturity models: A multiple case study. Communications in Computer and Information Science, 349. https://doi.org/10.1007/978-3-642-38833-0_12

8. Sidky, A. (2009, September). 25% ahead of schedule and just at "Step 2" of the SAMI. Conference Paper, IEEE Agile 2009. https://doi.org/10.1109/AGILE.2009.63

9. Ahmed, I., Mahmood, J., & Chaudhry, S. A. (2024, December). The influence of Kanban agile methodology on software project management: A survey method. Conference Paper. https://doi.org/10.1109/ICEET65156.2024.10913653

10. Ogunbukola, M. (2024, October). Agile vs. Waterfall methodologies in public sector projects: A comparative analysis. Journal Article. https://www.researchgate.net/publication/384732042

11. Saeeda, H., Ahmad, M. O., & Gustavsson, T. (2023, June). Challenges in large-scale agile software development projects. Conference Paper. https://doi.org/10.1145/3555776.3577662

12. Sirisha, G., & Haralayya, B. (2024, October). Project management methodologies: A comparative analysis of agile and waterfall approaches. Library Progress (International). https://www.researchgate.net/publication/385289679

13. Ozcan Top, O., & Demirors, O. (2013). Assessment of agile maturity models: A multiple case study. Communications in Computer and Information Science. https://doi.org/10.1007/978-3-642-38833-0_12

14. Riti, R., Ionica, A. C., & Leba, M. (2024). Implementing Scaled Agile Framework methodology principles in the quality assurance process. https://www.researchgate.net/publication/379459519

15. Springer Nature. (2022). How Scrum adds value to achieving software quality? Empirical Software Engineering, 27, Article 165165.

16. Haralayya, B., Sirisha, G., & others. (2024). Project management methodologies: A comparative analysis of Agile and Waterfall approaches. Library Progress (International), October 2024. https://www.researchgate.net/publication/385289679

17. Krancher, O. (2020). Agile software development practices and success in outsourced projects: The moderating role of requirements risk. Lecture Notes in Business Information Processing. https://doi.org/10.1007/978-3-030-49392-9_4

18. Ogunbukola, M. (2024). Agile vs. Waterfall methodologies in public sector projects: A comparative analysis. https://www.researchgate.net/publication/384732042

19. Lutwama, P., Dlulane, M., Pillay, T., Hassan, F. S., & Grobbelaar, S. (2024). Agile: Advantages, disadvantages, enablers, and barriers. South African Journal of Industrial Engineering, 35(4), 66–76. https://doi.org/10.7166/35-4-3058

20. Saeeda, H., Ahmad, M. O., & Gustavsson, T. (2023). Challenges in large-scale agile software development projects. In Proceedings of the ACM (pp. 1–10). https://doi.org/10.1145/3555776.3577662

21. Ahmed, I., Mahmood, J., Chaudhry, S. A., et al. (2024). The influence of Kanban Agile methodology on software project management: A survey method. 2024 International Conference on Emerging Engineering Technologies. https://doi.org/10.1109/ICEET65156.2024.10913653

22. Krishnan, M. S., & others. (2016). Influence of Agile on Indian IT companies. https://www.researchgate.net/publication/311951156

23. Anonymous. (n.d.). Challenges in adopting Agile methodology in public organisations' IT project management – A systematic literature review.

24. Jovanović, P., & Berić, I. (2018). Analysis of the available project management methodologies. Management: Journal of Sustainable Business and Management Solutions in Emerging Economies, 23(3).

25. Alami, A., & Krancher, O. (2022). How Scrum adds value to achieving software quality? Empirical Software Engineering, 27(165). https://doi.org/10.1007/s10664-022-10208-4

26. Riti, R., Ionica, A. C., & Leba, M. (2024). Implementing Scaled Agile Framework methodology principles in the quality assurance process. Conference Paper. Retrieved from https://www.researchgate.net/publication/379459519

27. Rahman, A. (2024). IT project management frameworks: Evaluating best practices and methodologies for successful IT project management. Academic Journal on Artificial Intelligence, Machine Learning, Data Science and Management Information Systems, 1(1), 57–76. https://doi.org/10.69593/ajaimldsmis.v1i01.128

28. Sirisha, G., Haralayya, B., et al. (2024). Project management methodologies: A comparative analysis of Agile and Waterfall approaches. Library Progress (International). Retrieved from https://www.researchgate.net/publication/385289679

29. Raharjo, T., Purwandari, B., Budiardjo, E. K., & Yuniarti, R. (2023). The essence of software engineering framework-based model for an agile software

development method. International Journal of Advanced Computer Science and Applications (IJACSA), 14(7), 802–809. https://www.ijacsa.thesai.org

30. Ghimire, D., & Charters, S. (2022). The impact of agile development practices on project outcomes. Software, 1(3), 265–275. https://doi.org/10.3390/software1030012

31. Zerezghi, Y. (2023). Challenges in adopting agile methodology in public organisations IT project management – A systematic literature review. Master's thesis, Department of Computer and Systems Sciences, MSc IT Project Management. Stockholm University.

32. Krishnan, M. S., & Sharma, G. R. (2016). Influence of Agile on Indian IT companies. Unpublished manuscript. Retrieved from https://www.researchgate.net/publication/311951156

33. Ahmed, I., Mahmood, J., & Chaudhry, S. A. (2024). The influence of Kanban agile methodology on software project management: A survey method. Proceedings of ICEET 2024. https://doi.org/10.1109/ICEET65156.2024.10913653

34. Sambinelli, F., & Borges, M. A. F. (2022). What software Agile teams do to create customer value: A mixed-methods analysis in Brazil. Journal of Computer Information Systems, 14, 68–91. https://www.researchgate.net/publication/360170915

<u>ANNEXURE 1: Survey Questionnaire</u>

Section A: Demographic & Organizational Information

Question 1. Your Role in Organization:

☐ Software Developer ☐ Scrum Master ☐Product Manager/Product Owner

☐ Project Manager ☐ Agile Coach ☐ Business Analyst

☐ QA/Tester ☐Other_____

Question 2. Experience in IT industry:

☐ Less than 2 years ☐ 2-5 years ☐ 5-10 years ☐ More than 10 years

Question 3. Experience with Agile Methodologies:

☐ Less than 1 year ☐ 1-3 years ☐ 3-5 years ☐ More than 5 years

Question 4. Type of Company You Work For:

☐ Startup ☐Mid-sized ☐ Large Enterprise

Question 5. Nature of Business:

☐ Product-based IT Company ☐Service-based IT Company ☐ Other_____

Section B: Agile Practices Information

Question 6. Which Agile framework(s) is used in your organization?

☐ Scrum ☐ Kanban ☐SAFe (Scaled Agile Framework)

☐ Extreme Programming (XP) ☐ Hybrid Model ☐ Not Sure ☐ None

Question 7. How would you rate the maturity of Agile implementation in your company?

☐ 1 (Very Low) ☐2 ☐3 ☐4 ☐5(Very High)

Question 8. Who initiated the Agile adoption in your organization?

☐ Top management   ☐ Project teams   ☐ Clients

☐ External consultants   ☐ Not sure

Question 9. Who initiated the Agile adoption in your organization?

☐ Company-wide   ☐ Limited to specific teams   ☐ In pilot/testing phase

☐ Not yet implemented   ☐ Not sure

Section C: Sidky Agile Measurement Index- Agile Maturity Assessment

Question 10. Our team embraces Agile values like adaptability and customer collaboration.

☐ 1 (Very Low)   ☐2   ☐3   ☐4   ☐5(Very High)

Question 11. Team members believe in iterative improvement and continuous delivery.

☐ 1 (Very Low)   ☐2   ☐3   ☐4   ☐5(Very High)

Question 12. Leadership actively supports Agile practices.

☐ 1 (Very Low)   ☐2   ☐3   ☐4   ☐5(Very High)

Question 13. Team autonomy is encouraged over micro-management.

☐ 1 (Very Low)   ☐2   ☐3   ☐4   ☐5(Very High)

Question 14. Inter-team communication is transparent and effective.

☐ 1 (Very Low)   ☐2   ☐3   ☐4   ☐5(Very High)

Question 15. Our Agile ceremonies (stand-ups, retros, planning) are well-attended and meaningful.

☐ 1 (Very Low)   ☐2   ☐3   ☐4   ☐5(Very High)

Question 16. We follow Agile processes consistently (sprints, user stories, backlogs)

☐ 1 (Very Low)   ☐2   ☐3   ☐4   ☐5(Very High)

Question 17. Roles such as Scrum Master, Product Owner are clearly defined and followed.

☐ 1 (Very Low)   ☐2   ☐3   ☐4   ☐5(Very High)

Question 18. We use tools that support Agile collaboration (e.g., JIRA, Trello, Confluence).

☐ 1 (Very Low)   ☐2   ☐3   ☐4   ☐5(Very High)

Question 19. Tooling helps us maintain visibility into progress and impediments.

☐ 1 (Very Low)   ☐2   ☐3   ☐4   ☐5(Very High)

Question 20. People & Culture

☐ Level 1 – Collaborative - Our team members communicate frequently, but responsibilities are often isolated to individuals.

☐ Level 2 – Evolutionary - Team members collaborate and share ownership of tasks and outcomes.

☐ Level 3 – Effective - Team members demonstrate a shared understanding of Agile values and take initiative in resolving issues.

☐ Level 4 – Adaptive - Team culture encourages feedback, continuous learning, and proactive behavioral adjustments.

☐ Level 5 – Encompassing - Agile values like transparency and trust are reflected across all levels of the organization, including leadership and support teams.

Question 21. Process & Practices

☐ Level 1 – Collaborative - Our team occasionally conducts planning or review meetings, but with no consistent Agile framework.

☐ Level 2 – Evolutionary - We follow basic Agile practices like sprints, stand-ups, and retrospectives.

☐ Level 3 – Effective - Agile ceremonies are held consistently, and we maintain structured backlogs and deliver defined increments.

☐ Level 4 – Adaptive - Feedback from retrospectives is routinely implemented to improve future sprints or planning.

☐ Level 5 – Encompassing - Agile processes are standardized across the organization and integrated into governance and strategic decision-making.

Question 22. Technical Excellence

☐ Level 1 – Collaborative - Our team rarely follows engineering best practices and largely works on legacy systems.

☐ Level 2 – Evolutionary - Some development practices such as version control or basic automation are in place.

☐ Level 3 – Effective - We consistently use engineering practices like test-driven development (TDD), CI/CD, and code refactoring.

☐ Level 4 – Adaptive - Technical metrics (e.g., test coverage, code quality) are tracked and used to inform engineering decisions.

☐ Level 5 – Encompassing - Technical excellence is prioritized and scaled across teams; innovation and experimentation are actively encouraged.

Question 23. Customer Collaboration

☐ Level 1 – Collaborative - Customer or stakeholder input is gathered infrequently or only during handovers.

☐ Level 2 – Evolutionary - Stakeholders are involved during sprint planning or reviews.

☐ Level 3 – Effective - We regularly demonstrate working features to customers and use their feedback to refine features.

☐ Level 4 – Adaptive - Customer feedback is continuously integrated into backlog and product strategy in real-time.

☐ Level 5 – Encompassing - Customers are long-term partners in the product visioning process and co-create solutions with us.

Question 24. Organizational Support

☐ Level 1 – Collaborative - Our organization does not provide formal support for Agile practices.

☐ Level 2 – Evolutionary - Some mid-level managers support Agile, but higher management is disengaged.

☐ Level 3 – Effective - Leadership understands and supports Agile delivery and clearly defines Agile roles.

☐ Level 4 – Adaptive - Agile metrics and team performance are actively used by leadership to inform decisions.

☐ Level 5 – Encompassing - Agile thinking is embedded in leadership practices, HR, budgeting, and enterprise strategy.

Section D: Barriers to Agile Implementation

Question 25. What are the key barriers you have observed in Agile implementation in your organization? (Select all that apply)

☐ Poor inter-team communication

☐ Lack of Agile training or awareness

☐ Lack of leadership support

☐ Difficulty in defining Agile roles

☐ Absence of clear Agile success metrics

☐ Client resistance or mismatch in expectations

☐ Resistance to change

☐ Unrealistic deadlines and time pressure

☐ Inflexible or traditional company culture

☐ Inadequate tools and infrastructure

Question 26. What areas need improvement to enhance Agile adoption in your organization? (select all that apply)

☐Stronger leadership involvement

☐ More training and workshops

☐ Client education about Agile

☐ Better tools and infrastructure

☐ Improved collaboration between teams

☐ Clearer role definitions

☐ Redesign of organizational structure