National College of Ireland

Effectiveness of Agile project management methodologies in small and medium sized IT Organization in India

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Abstract

The traditional project management techniques have been making it difficult for companies to cope up with the dynamically changing project management environment. In order to meet client expectations, delivering the projects on time and fit into defined cost budgets, the traditional techniques of project management stand as a major challenge. The implementation of incompetent traditional project management techniques brought in major setbacks for companies in terms of project failure, cost inabilities or delivery time issues. Thus, in order to take charge of the major issues, the agile project management technology was introduced by companies and researchers.

The agile project management technology focused at dividing a particular project into various different parts called sprints, with multiple teams working on different sprints parallelly. The agile project management is considered to be appropriate and efficient for small and mid-sized companies. The research primarily focuses on analyzing the effectiveness of agile project management techniques in small and mid-scaled companies situated in the Indian marketplace. The agile project management technique is identified to be much efficient as the small and mid-sized companies have a limited workforce which can pose a significant challenge for developing and deploying customer satisfaction projects on time with traditional techniques. The agile project management technique allows the small and mid-scale companies to use the limited workforce for completing multiple segments.

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First of all, praises and thanks to **God** for the shower of blessings throughout my journey. I would like thank my supervisor **Anne Cooper** for her guidance for my research. I would also like to thank **my survey participants** for spending their valuable time for my survey. Last but not least I would like to thank **my family and friends** for supporting me in all possible ways throughout my journey.

Table of Contents:

List of Figures:

List of Abbrevation:

PM	- Project Management
PMBOK	- Project Management Body of Knowledge
SME	- Small and Medium sized Enterprise
OSDO	- Offshore Outsourcing for Software Development
CAGR	- Compound Annual Growth Rate

Chapter 1 - Introduction

1.1 Background

For the past decade, the field of project management has been witnessing a major paradigm shift in terms of design and operating system. It has been observed that the traditional approaches adopted by organizations for ensuring effective project management services aren't competent enough in the present work dynamics. With the changing technological environments, the concept and methodologies in context to project management have surely evolved. By the 1990s it was found that the traditional project management methodologies stand inflexible. Thus, generating the need for the development and deployment of new and effective methodologies (Kanbanize, 2020.).

The 1990s crisis was profusely recognized as "the application development crisis," or "application delivery lag." As from the crisis, it was analyzed that the major gap between a validated business and actual application development was identified as 3 years. This highlighted the inability of traditional project management methodologies which meant that the projects were either cancelled midway or didn't meet the content requirements well enough (Wrike, 2020).

Therefore, the giving rise to the requirement of adopting more effective, innovative and appropriate methodologies that can meet business needs as well as deliver projects on time. Agile project management methodologies were developed as a part of quickly building working software and delivering it to the end users (Wrike, 2020).

1.2 Rationale of the Study

Project management has been considered as one of the most significant aspects of growth and profitability for companies. While the majority of businesses are small and midsize businesses, the deployment of efficient project management strategies has become crucial. Agile project management approach has been adopted by various organizations across the world as it helps companies simplify the development and deployment process while keeping the focus on the end-users (Workfront, 2020).

The research study focuses on understanding the importance, benefits and limitations associated with the implementation of agile project management approaches in the SMEs of the Indian marketplace. The study will be inclined towards understanding the Indian SME marketplace.

1.3 Research Aim

On the basis of understanding the primary issues identified in the previous sections of the proposed research study work, the major aim of the research work can be defined as identifying the implementation and effectiveness of agile project management techniques for small and mid-sized companies, setup in the Indian marketplace. The research additionally aims at analyzing the significance of the concept in regard to large projects and how are small-scale companies benefited with agile project management in comparison to traditional project management approaches

1.4 Research Objective

In a bid to identify the importance and effectiveness of agile project management in regard to small and mid-sized companies in the Indian marketplace a well-designed structure and objectives will be followed. The primary objectives for the conduction of the research study can be defined as:

- To provide a basic understanding to the readers about the concept of agile project management techniques
- To understand the major benefits of agile project management technique for small and mid-scaled companies
- To analyze the major challenges faced by small and mid-scaled companies trying to implement agile project management techniques
- To determine that major difference between traditional project management techniques and agile project management
- To testify the efficiency of agile project management technique in context to large-scale projects

1.5 Limitations of Research

The primary objective of the research study is to provide a brief understanding to the readers regarding the concept of agile project management technique as well as to test the effectiveness of the concept for SMEs in India. The preference subject should be chosen depending on personnel's preference and interest. It's essential for the researching personnel to have specific interest in exploring information in the option field demonstrated by the researcher's context (Bilczynska & Wojcik, 2014).

However, the research study work is believed to be affected by various limitations impacting the execution of the proposed research study work. The primary limitations identified by the researcher can be defined as inability to efficiently reflect the population and biases in data analysis. The proposed research study targets a small sample size for the conduction of the research work which can be ineffective in representing the viewpoints of the majority of a population. Moreover, the research work is based upon the personal experiences of the participants which can create biases in data analysis and representation. However, the researcher has tried best to represent data accurately without the any bias.

1.6 Thesis Structure

The thesis will follow a definite structure with various chapters formulated in-line to one another. The chapters will be interconnected and focused on attaining a mutual result in regard to the impact of CRM in B2B marketing. The thesis structure for the particular topic can be defined as:

Introduction: This segment of the study will be a summarised articulation of the entire thesis, helping to understand the focus, significance and rationale of the research study.

Literature Review: The section will be focused on understanding the research study topic and components by rationalizing it with various theoretical concepts and relevant academic studies proposed by various scholars.

Research Questions: The research question section will look at the articulation and formation of potential scope for the proposed study, which will be deduced on the basis of the Literature review carried out in the previous section.

Methodology: The methodology section will comprise the research methodology for the conduction of the proposed study. The section will be aimed at generating relevant methodological pieces of evidence to support the proposed study. The research study will be focused at using primary research methods for understanding the effectiveness of agile project management methodologies in the Indian SME market. A questionnaire-based survey will be conducted among different small and mid-sized companies in the Indian market to understand what project management methodologies they are adopting and to what extent they are being benefited.

Analysis & Findings: Articulated discussion and interpretation of the data collected during the generation of relevant methodological pieces of evidence for the proposed study.

Discussion: The segment will discuss the situation and loopholes that affect the smooth implementation of successful agile project management methodologies in the Indian SME marketplace.

Conclusion: A summarized data for the carried out proposed study that will provide an insight on how to implement effective agile project management methodologies in the Indian SME marketplace.

1.7 Chapter Summary

The chapter focuses on helping people understand the base of the research study. It provides an insight into the structure of the proposed study that can help the readers understand the basic concept and approach.

Chapter 2 - Literature Review

2.1 Introduction

The literature review discusses various aspects of the agile project management methodologies. This section gives an overview of agile project management, software development industry in India. This Literature review also discusses the benefits and limitations on implementing agile project management methodology in small and medium sized IT organizations in India.

2.2 Software Industry

Software has been developed for about four decades since its inception. The Software Engineering sector has since become a mainstream business, evident as the software industry and organization have recently developed enormously.

The world in which we live has software and the need is constant for better, improved and high-performance products, which will be used and provide future improvements and advantages. If computer engineering is a technological discipline, that statement has been discussed for quite a while, but it is widely acknowledged that software technology follows the same lifecycle as the engineering of physical artifacts and uses similar principles. The organizational objectives not just to make innovations in technology, but also in companies dependent on technological innovation, or which profit from all of this (Dzerzhinskiy & Raykov, 2015). Technology demand on the world market has also contributed to a rapid globalization of the tech industry in recent years. This has helped develop and outsource software applications worldwide. This means that strategies must be properly handled and that project management techniques in the software development industry must be established. Recently, the software industry itself acknowledged the need for effective project management perspectives. The conceptualization of methods and strategies as Agile resulted, while the sequential or waterfall methodology was traditionally the standard (Ozer & Vogel, 2015).

The software industry faces very high project failure rates, which is also one of the industry's biggest challenges. Just over 60% of initiatives fail to achieve 100% completion rates. Increasing internationalization and global software development poses industry challenges due to the distributed nature of production through teamwork, connectivity, and management issues. In recent years, India has been named one of the leading digital service providers in many countries, emerging as a key competitive position in the global tech industry. Then over the years, the industry has expanded and is a leading third-party tech or Foreign Service provider. Even so, the Indian software sector was criticized worldwide for high fault levels, product quality, and project management faulty processes. (Öztürk, 2016; Kerzner, 2012).

2.3 Software Development Outsourcing

"Offshore Outsourcing for Software Development (OSDO)" is a situation within the Global Software Development framework. Existing literature has found gaps in work in the field of outsourcing. While a lot of research on providers or companies and their connections with suppliers is available, there is little information on how the production of software is subcontracted. (Khan & Keung, 2015; Khan and Khan, 2016; Jabangwe, Šmite & Hessbo, 2016; Iacovou & Nakatsu, 2008; Niazi *et* al., 2013).

Outsourcing partial or full software development offshore vendors is a strategic choice for acquiring foreign companies working in another region. Outsourcing condemns problems relevant to running these tasks. Another major problem is these projects' high failure rate. Over fifty percentage of business projects deliver no expected advantages. The impact of ongoing research on efficiency in these firms. Spite of criticism, contracting has not been noted to impact productivity in very well-controlled projects. There is inconsistent evidence, and as outsourcing continues to grow and is a preferred procurement method, it is important to resolve project management issues.

Outsourcing has opened the doors for many small software businesses worldwide that offer services. It has built new opportunities for low-wage countries. Providers in these countries that offer the same software services in some host countries at a price of one-third. India and China are the major providers of software services in Asia, such as Wipro and HCL, in major external organizations. In recent years, India has seen extremely significant growth in the outsourcing market. This is also found that in view of its consistency and experience in the management of outsourcing programs, the organization improves production over time. Connectivity and coordination are among the unresolved problems in countries like India. (Khan & Keung, 2015; Khan & Khan, 2016; Jabangwe, Šmite & Hessbo, 2016; Iacovou & Nakatsu, 2008; Niazi *et* al., 2013)

Literature indicates that "the lackness in project management" in countries like India is one of the biggest problems and governance continues to be a problem. In addition communications, a range of difficulties occur, including 'time area issue,' 'coordination failure,' 'information processing,' and 'poor monitoring systems.' This has helped to increase the appeal of contract design throughout the outsourcing sector (Benaroch, Lichtenstein & Fink, 2016).

2.4 Project Management

More than 97% of projects worldwide cannot reach a 100 % success through organizations today and Project management is one of the key factors that contribute to a project's rate of success or failure (Rasnacis & Berzisa, 2015). The project management has evolved from the beginning to other positions in the company as a corporate method, being a company-wide program. Project management is directly related to an organization's success. And Costs for development training programs on the project management inside the companies have been higher in recent years (Herzegovina, 2012). Project management consists of the preparation, coordination, management and control of client resources to accomplish the fairly short-term objectives and goals set. In addition, project management follows the management system approach by allocating functional workers (vertical hierarchy) for a particular project

(horizontal hierarchy) (Kerzner, 2012). The quality of the project is a dynamic and difficult concept to define. It fulfills many requirements that contribute to the completion of a project. While time, budget and success or results remain important, acceptance of customers, consensus on changes in scope, alignment and the protection of corporate culture are other aspects in the dimensions to be taken into account. Although some are easy to grasp, some aspects need closer attention (Herzegovina, 2012).

A successful project is not successful if the two organizations are separate. Although successful project management doesn't always provide a promising productive project, it is certain that project management is one of the main factors for project performance (Herzegovina, 2012). Therefore, it is very important to pick a suitable approach for project management.

The project manager performs the function of project management. The main role of Project Manager is planning, execution, control of projects and effectively manages them. PMI or the Center for Project Management are the official project management business. A body of information called the PMBOK or the Information Project Management Body was published by PMI (Edmund, 2011). The global Information Technology industry is faced with a project failure rate of more than 60% (Zurich, 2016). Technology Project Management is currently important for software engineering. The key goals of any project can be seen in the software industry in the form of the following four goals: delivering the project on time, commitment on cost, client satisfaction and fully functioning project. Nevertheless, the challenges of software development arise from the complex and non-material existence of the software development product. Proofs of success for an intangible commodity like software are difficult to track or obtain. Technology projects are typically special, and the requirements vary widely between projects. These are tailored to various client's needs which are mostly one-on-one (Kerzner , 2013).

Organization needs a different management strategy during the project process. Such challenges raise PM issues and result in a high success rate of software projects. Also experienced project managers will have difficulties in planning and organizing the project if a whole new program needs to be developed, as prior expertise does not necessarily extend to the specification of the whole new project. This leads to higher costs, delays in delivery and often inferior quality. Due to its diverse existence, the administration of software development projects is a dynamic and highly resilient process. There must also be a consideration of other factors influencing the environment and the decision-making of software product management. Another such thing is the company's size.

Communication plays a vital role in project management. This led to the establishment of strategies and platforms enabling companies to improve efficient channels of communication. An organization's size determines how a company implements these communication patterns and associated processes. The customer's character, internally or externally, defines the essence of the agreement and must depend on the terms and conditions negotiated between company and consumer. As above, various different stakeholders have different specifications and unique technical specifications. This also means the program size can vary from project to client. The program's sophistication determines whether project management is complicated or sophisticated. The scope of the project or program will affect communication choices, resources, scheduling or the choosing between distributing or centralizing development

teams. (Al-Zaidi, 2017). The exposure of some sensitive projects to the form of data or procedure or the presence of a customer entity may be seen as a factor influencing the decision-making strategy of project management. Although individual projects are special and no uniform policy applies to the entire project, the company culture influences the path a project is governed or administered. The company culture will impact the plan, planning and execution of the project. This can also impact risk management decisions (Sommerville, 2016).

2.5 Agile project management

Agile project management is known to be an iterative approach to deliver the project to end-users in a defined time limit. The primary objective or agile project management is to break the entire project in a different set of tasks that can be completed in short iterations or sprints. The adoption of the strategy is focused on enabling the organizational team to quickly adapt to the dynamically changing environment and deliver projects on time (Qureshi, 2012).

In project management, agile methodology is preferred due to the quick shifting ability offered by the concept. The differentiating of tasks in various sets allows the team members to evaluate the work they have been doing in the real-time and quickly adapt to the required changes. This not only saves time but ensures effective deployment and service provision to the end-users.

Various authors over the years defined agile in their own definitions, in a bid to provide a platform to understand the concept efficiently. Meanwhile, Ambler (2009) defined Agile/ Agility as "*Agile is the use of continuous stakeholder feedback to produce high-quality consumable code through user stories (or use cases) and a series of short time-boxed iterations*," Lyytien and Rose (2006) identified it as "*In the context of information system development (development), agility can be defined as an development organisation's ability to sense and respond swiftly to technical changes and new business opportunities.*"

On the other hand, Conboy (2009) mentioned agile/agility as "*The continual readiness of an development method to rapidly or inherently create change, proactively or reactively embrace change, and learn from change while contributing to perceived customer value (economy, quality, and simplicity), through its collective components and relationships with its environment*," whereas Highsmith (2002) defined the concept as "Agility is the ability to both create and respond to change in order to profit in a turbulent business environment."

The "Manifesto for Agile Software Development" stated four core principles: (1) Individuals and interactions over processes and tools. (2) Working software over comprehensive documentation. (3) Customer collaboration over contract negotiation. (4) Responding to change over following a plan. However, with a change in the time and definitions of the concept, various new principles were uncovered (Cervone, 2011). At present times there are about 12 identified principles of the concept agile project management which can be mentioned as:

12 Principles of Agile

The 12 principles as defined by Beck *et al.* (2001) in the Agile Manifesto can be defined as follows (Beck *et* al., 2001):

1. *"Highest priority is given to satisfying the customer through early and continuous delivery of valuable software".*

2. *"Changing requirements are welcome, even late in development. Agile processes harness change for the customer's competitive advantage".*

3. *"Working software is delivered frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale".*

4. *"Business people and developers work together daily throughout the project".*

5. *"Projects are built around motivated individuals. They are given the environment and support they need and trusted to get the job done".*

6. *"It is believed that the most efficient and effective method of conveying information to and within a development team is face-to-face conversation".*

7. *"It is believed that working software is the primary measure of progress".*

8. *"It is believed that agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely".*

9. *"It is believed that continuous attention to technical excellence and good design enhances agility".*

10. *"It is believed that simplicity – the art of maximizing the amount of work not done – is essential".*

11. *"It is believed that the best architectures, requirements, and designs emerge from self-organizing teams".*

12. *"It is believed that success is achieved when at regular intervals the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly".*

2.6 Agile Project Management in SMEs

SMEs can be defined as a small-sized to a mid-sized organization with revenues and number of employees falling below a certain number, working in the industry marketplace. Various countries and industries have different demands and definitions for identifying an organization as an SME. Whilst the European marketplace defines an organization with employees below 250 in strength as an SME, the SMEs in the US market segment can have even 1200 employees. SMEs are recognized to be an important aspect of economic growth, innovation and diversity (Varhol, 2020).

SMEs are recognized to make up for the majority of the percentage in a country's marketplace. As per reports from Small Business Administration (SBA) about 99.9% businesses in the US are SMEs as well as the SMEs in the country contributed to about 44% of the total GDP in the year 2014 (Varhol, 2020)

2.7 SMEs in India

In the Indian technological market, SMEs are recognized as the next revenue generators and one of the key driving factors behind the economic development of the country. However, the traditional methodologies adopted for operating business, as well as low rate of technological adoption among the small and medium-sized businesses in India, turn out to be the biggest hindrances in the achievement of success. The total number of SMEs in India is estimated to be at 42.50 million which includes both the registered as well as unregistered companies. They are not only known to drive the economic development of the country but are also recognized as one of the major employment generators in the industry. The SMEs in the Indian employ about 106 million, nearly 40% of the total workforce of the country (MSME, 2016).

The future growth of SMEs in the Indian marketplace seems to be brighter and better than its other Asian country counterpart. It is believed that given the right technological solutions and operating methodological approach, the market in India can witness a significant boom. Thus, digital empowerment in the SMEs of the Indian marketplace is the need of the hour which enables a scope for the adoption of agile methodology in the marketplace. India is expected to touch a 7% CAGR growth rate during the period 2016-2021, which highlights the robust growth and profitability opportunities in place for the organizational leaders and owners (Chawla, 2019).

2.8 Agile vs. Traditional Methodologies

In the dynamically changing project management environment, the operating methodologies of the companies have also witnessed a paradigm shift. The companies in the market industries have shifted their focus to the adoption of agile methodologies than the traditional one in order to provide effective and impressive services to the customers (Kashyap, 2018).The traditional and agile methodologies do not only differ in terms of satisfaction and delivery time but the basic approach of both the methods differ vastly too (Kashyap, 2018).

The traditional project management methodology is defined as an established approach wherein the projects are required to run in a specific sequential cycle. The primary emphasis of the project approach is on the linear processes, documentation, upfront planning, and prioritization while elements like project budget and delivery timeframe are fixed and cannot be changed. This often leads to budget constraints as well as delivery time unmanageability mid-way through the project (Donnelly, 2019).

Traditional	Agile
Design up front	Continuous design
Fixed Scope	Flexible Scope
Deliverables	Features/requirements
Freeze design as early as possible	Freeze design as late as possible
Low uncertainly	High uncertainly
Avoid change	Embrace change
Low customer interaction	High customer interaction
Conventional project teams	Self-organized project teams

Figure 1: Agile vs. Traditional Methodologies

The phases of the traditional project management approach that define the sequential cycle of a project can be defined as:

- Initiation
- Planning
- Execution
- Monitoring
- Closure

On the other hand, the agile methodology of project management can be defined as a more modern and comprehensive approach to project management. The primary objective of agile methodology is to divide the project into a various set of tasks in a bid to make it simpler and easily achievable. Thus, reducing the scope of project failure midway. The division of project in various sets is also known as sprints and each sprint as per the concept lasts for about 2-4 weeks which instigates more productivity and creativity among the employees leading to the delivery of an innovative end-project (Donnelly, 2019).

In a similar manner to the traditional project management approach, there are certain phases related to the agile methodology as well (Workfront, 2020). The primary steps included in agile methodology for project management can be defined as:

- Project Planning
- Product Roadmap creation
- Release Planning
- Sprint Planning
- Daily Stand-ups
- Sprint Review and Retrospective

The major differences between the two approaches of project management range to quite an extent. However, the primary ones can be pointed out as the benefits offered by traditional approaches such as defined objectives, highly-controllable and well-defined processes. While the primary benefits of agile methodology can be highlighted as high flexibility and adaptability (Kashyap, 2018).

The difference between the two approaches can be best understood on the basis of different characteristics of the approaches. These can be laid out as:

Characteristics	**Agile approach**	**Traditional approach**
Organizational structure	Iterative	Linear
Scale of projects	Small and medium scale	Large-scale
User requirements	Interactive input	Clearly defined before implementation
Involvement of clients	High	Low
Development model	Evolutionary delivery	Life cycle

Customer involvement	The customer's involvement begins from the time when the project is started to be worked upon.	Customers are considered to be an integral part of the project since the initial stage which is planning, and not at the executional stage.
Escalation management	In case of a problem occurrence the entire team is dedicated at resolving the particular issues altogether.	Problems are escalated to managers for a better and satisfactory response provision to the users.
Model preference	Agile model favors adaption	Traditional model favors anticipation
Product or process	Less focus on formal and directive processes	More serious about processes than the product
Test documentation	Comprehensive test planning	Tests are planned one sprint at a time
Effort estimation	Scrum master facilitates and the team does the estimation	Project manager provides estimates and gets approval from PO for the entire project
Reviews and approvals	Reviews are done after each iteration	Excessive reviews and approvals by leaders

As pointed out by Larson and Gray, the primary advantage of adopting agile methodology over the traditional approach is that the agile approach can be implemented even with lesser people in the team. However, in order to implement an agile approach for project management on a larger scale it is important that they are applied through a condition called “scaling” in order to reap fruitful results in terms of profitability and growth for the organization (Larson and Gray, 2018).

As per the study of Larson and Gray (2018) the major differences between the two approaches can be highlighted as:

Traditional	**Agile**
Design Up front	Continuous Design
Fixed Scope	Flexible Scope
Deliverables	Feature/requirements
Freeze design as early as possible	Freeze design as late as possible
Low uncertainty	High Uncertainty
Avoid Change	Embrace Change
Low customer interaction	High customer interaction
Conventional Project teams	Self-organized project teams

2.9 Benefits of Agile Project Management Methodology

Agile approach of project management is regarded as ideal for small-sized and mid-scaled businesses that value innovation. The agile methodology is known to focus upon building communication between the development team and the end-user as well as the majority of the focus of the approach is on the end result rather than the project strategies (Sheedy and Sankaran, 2013). The adoption of agile methodologies in project management for SMEs offers plenty of opportunities and benefits to the companies in terms of growth and profitability, some of which can be defined as:

High Product Quality:

The primary benefit as offered by the agile project management approach is defined as high product quality. The approach includes testing in the development cycle itself which ensures that the project is repeatedly checked for errors and compatibility at different stages of the development, ensuring a high-quality product is delivered to the end-users. The regular check-ups between the development phases ensures that the team is able to identify the loopholes in the project timely and deploy related solutions effectively. Moreover, the timely analysis of bugs and errors helps the team maintain the defined delivery deadline as well as the budget specified to the customer (Sheedy and Sankaran, 2013).

Better Customer Interaction & Satisfaction:

Another major benefit identified as a part of adopting agile project management approach can be defined as better customer interaction and satisfaction. The agile approach of project management focuses on establishing a relationship as well as communication between the development team and the end users. This ensures that both the parties are connected to each other throughout the project offering an involved feeling to the customer. Moreover, the flexibility and communication offered to the customer, helps the customer to present his/her ideas, expectations and views efficiently that can help the team understand the customer perspective better and develop the product accordingly. Inclusion of customer demands and expectation is directly linked with customer satisfaction and thus, the adoption of agile methodology offers high customer interaction as well as satisfaction rate (Apiumhub, 2020.).

Better Project Control:

As the project is divided into various sets of tasks or sprints, the communication and work distribution between the teams is done efficiently. The teams focus on segregating the project in various modules including designing, development, testing etc., which allows multiple teams to work together. Moreover, the inclusion of smaller teams helps in establishing an effective communication among the teams and members, easy organization of sprint meetings to discuss progress, feedback and work accordingly. Additionally, PM tools like Jira offers visibility of each step of the project development phase to both the parties, offering clarity and transparency. Altogether, agile project management approach is recognized for offering better project control to the developing team (Apiumhub, 2020.).

Lesser Risks:

The probability of crossing roads with risks while using an agile project management approach is very low as the approach is known to virtually eliminate the chances of complete project failure. As identified in the previous sections of the literature study, project failures when adopting traditional methodology occurred due to the inability of the approach to understand the time and budget requirement. Thus, agile technology was introduced. With the adoption of agile approach, budget and time are indefinite and cannot lead to the absolute failure of the project. Agile methodology gives the freedom to adapt to changes at any point of time while developing the project which reduces the possibility of encountering any failure risks (Apiumhub, 2020.).

Faster ROI:

The return on investment for companies that implement an agile project management approach can be analyzed easily at an earlier stage that can help the companies plan their growth and profitability well in advance. The agile approach iterative which means that the features are delivered incrementally which helps the organizations in understanding the returns beforehand. The agile approach in project management allows multiple teams to work altogether focusing on different modules or sprints of the project that help companies to roll out a functional ready to market product at an early stage. Faster delivery of products hint upon the possibilities of better and increased returns on investments. Thus, offering faster ROIs (Apiumhub, 2020.).

2.10 Chapter Summary

The constantly changing dynamics of the technological world across the world has created various challenges for the companies working in the marketplace. The primary challenge that has been witnessed by the companies is implementation of effective strategies that can help in smooth deployment of projects to the end users. While the traditional project management approaches witnessed delivery failures and risks, the companies were forced to adopt new strategies, giving way to the identification and implementation of agile approaches. The agile approach is known to have significantly reduced the risk of failures of projects while instigating high customer satisfaction rates. From the research study it can be summarized that agile project management approach provides a potential growth and profitability segment for small and mid-sized industries. It has been identified from the research study that the approach is not fit for large-scale organizations.

Chapter 3 – Research Methodology

3.1 Introduction

The specific procedure or technique used to identify, analyze or process certain information about a particular topic is defined as research methodology. The significance of the segment in a proposed research study paper related to providing a critical evaluation of the data, statistics and information provided in the paper, for the readers. The segmentation specifically focuses at identifying two major components that can be defined as the how the data was collected and how the collected data was analysed (Jilcha Sileyew, 2020).

The research includes inquiry through literature review in order to understand the proposed research study topic in a better manner and develop appropriate research questions as well as hypothesis for further scope of the study (Jilcha Sileyew, 2020).

The research methodology section is divided in various sections that focuses on collection of data, defining research strategies, analysing the data collected and then finally drawing upon the finding of the research (Jilcha Sileyew, 2020).

3.2 Research Design

According to Saunders *et* al. (2009), the best approach to evaluate various stages integrated in research work development is to perceive the research cycle as an onion. The research onion peeling should be done from the to inner layer which contains more detailed process phases. The Outer layer will be unwrapped first in order to see the inner layer. Research onion and different layers assisted study by providing instructions for the study. The outer layer of research onion portrays research philosophies accompanied by inner layers such as research approaches, strategies, choices, time horizons and methodologies respectively. Research onion's core reflects data collection methods and data interpretation.

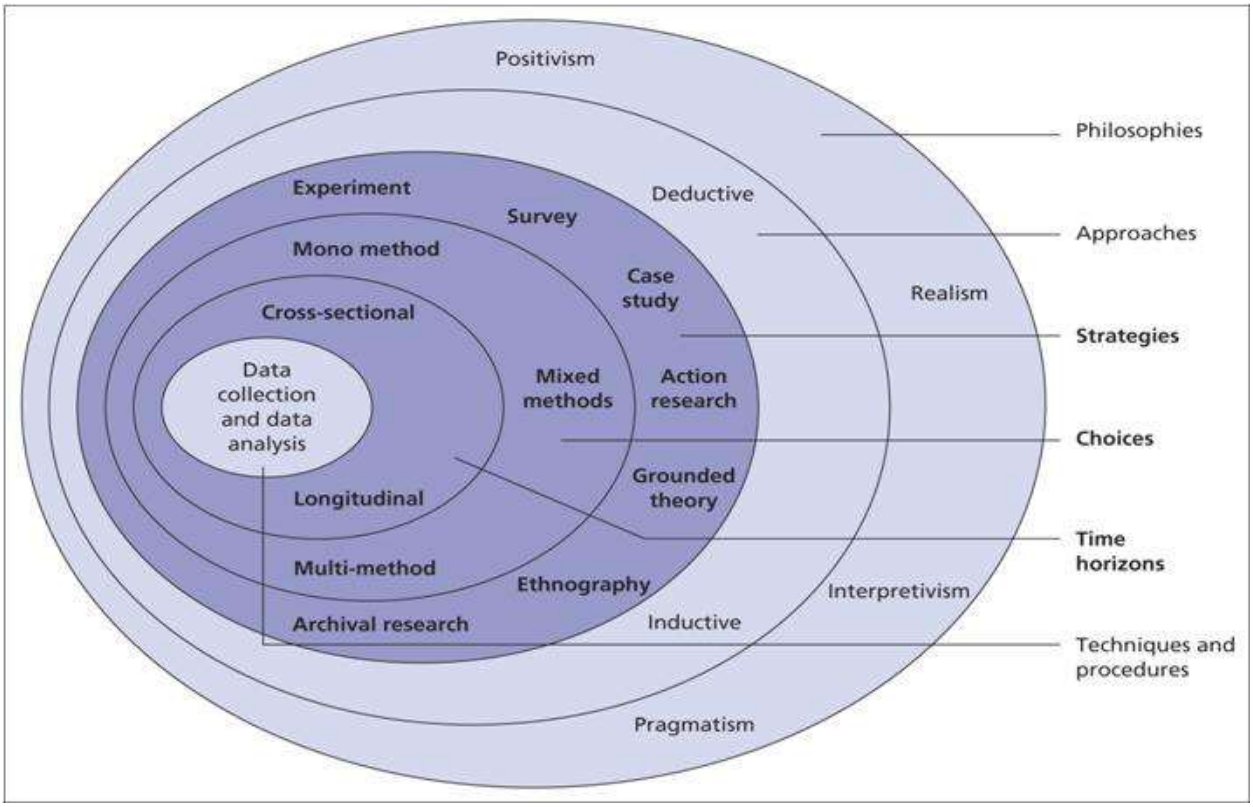

Figure 2: The Research Onion

3.3 Research Philosophy

While conducting a research it is important to make various assumptions that can further facilitate the conduction of the proposed research study and help out in reaching various conclusions. The assumptions can be related to various segments of human knowledge, behavior, realities, experiences and influences. According to Bell *et* al (2019) an Epistemological philosophy in a business research, refers to theories about what is known or what can be known, it has knowledge as a main objective (Bell *et* al, 2019). Moreover, Saunders *et* al (2016) consider the epistemology as assumptions about knowledge and how these can be communicated to others. Another philosophy is Ontology, which refers to theories about the nature of reality (Bell *et* al, 2019), it influences the way the research objects are seen and studied by the researcher, from a business and management perspective, these objects include organizations and individuals (Saunders *et* al, 2016). Finally, Axiology, which is the term that refers to the study of the nature or essence of the values and judgments within the research process. (Saunders *et* al, 2016).

While there have been various philosophies recognised by various scholars, in the masters-level only two are regarded comprising much of an importance. Positivism and Interpretivism are defined as the two major philosophies for masters-level (Žukauskas, Vveinhardt and Andriukaitienė, 2018). The Positivism philosophy is focused at qualitative data collection and analysis wherein the involvement of the researcher is absolutely nil. On the other hand, the Interpretivism philosophy of research focuses on a major inclusion of the researcher in terms of data collection and analysis (Eriksson and Kovalainen, 2008.).

The proposed research study focuses equally on both the philosophies available. The positivism philosophy is highlighted majorly in the literature review segment of the study wherein the base data of the research study has been collected through already published works of scholars. Further to it, the research study focuses at the implementation of Interpretivism approach too wherein the primary data collection method will be used for the conduction of the proposed research study work. The proposed research study will use survey questionnaires for Project Managers and Software Engineers from small and midsize organizations situated in the Indian business marketplace. The survey shall be focused at the implementation and impacts of agile methodology in the organization in terms of various factors.

3.4 Research Approach

There have been various research approaches proposed by various scholars & authors that primarily help in further conduction of the proposed research study. The primary research approaches that have been introduced among the people in the world can be defined as Inductive, Deductive and Abductive. The Inductive approach is inclined towards the inclusion of user arguments for reaching out the conclusions (Maldonato and Pietrobon, 2010). The approach considers various arguments as facts, thoroughly analyzing them on the basis of characteristics, behaviour and phenomenon in order to draw upon various conclusions that can facilitate the research study (Maldonato and Pietrobon, 2010).

As opposed to the inductive approach, the deductive research approach is very much inclined towards the development of a general framework as a matter to begin with. In this approach the conclusions are drawn or considered to be valid on the basis of reasons analyzed (Kumar, 2014). The approach begins with the analysis of postulates, theorems, laws, principles, etc. of universal application, and the validity of the conclusion or the data collected can be established through deduction, arguments, assumptions, etc (Kumar, 2014).

The abductive theory is entirely different from the two mentioned. As a part of this particular research approach, the data collection, identification and analysis process is used to develop new or modify old theories while testing it through additional data collection methods (Teddlie and Tashakkori, 2009).

For the proposed research study work, the inductive research approach shall be used which will define the implementation of qualitative research methods of the study. The approach shall help in drawing on to conclusion considering the responses received from the Project Managers and Software Engineers as the initial bases. The approach is considered to be more suitable with the interpretivism philosophy of research and is recognized to help in easier conduction of the research study. This approach allows formulating the theory after the collection and analysis of data, which will be compared with the literature review of agile project management methodology presented in this research.

3.5 Research Strategy

The research strategy can be defined as the process of conducting the proposed research study work in order to yield related results. The research strategy is divided in two parts as qualitative and quantitative research methods. A qualitative research is defined as an exploratory investigation which focuses on the understanding of latent motives, opinions and motivations while the quantitative research, on the other hand, is more inclined towards statistics to analyze and verify data or specific information (Silverman, 2013). Experiment and Survey are the strategies that are exclusively linked to a quantitative approach while Case Study and Archival & Documentary Research can be linked to either quantitative or qualitative and finally Ethnography, Action Research, Grounded theory and Narrative Inquiry that are exclusively linked to a qualitative research (Silverman, 2013).

For the proposed research study, the research is focused at analyzing the behavior, facts, events and influences that impact the development and deployment of effective agile solutions in a project management organization situated in the Indian marketplace. The primary focus of the research will remain at understanding the views and thoughts of the people associated with such companies, who are recognized to be primarily responsible for the implementation of agile methodologies.

In order to facilitate the conduction of the research study method it is important to focus on qualitative strategy of research conduction. A Survey among the representatives of the company shall help in attaining better insights at the position of implementation of agile methodologies in Indian SMEs. A qualitative strategy would result in valuable insights for accurate conclusions rather than quantitative research strategy, which could limit the scope of the research.

3.6 Time Frame Horizon

There are basically two types of time frame horizons as identified by Saunders *et* al. (2016), which can be defined as Cross-sectional and longitudinal. The term time frame horizon basically refers to the time period required for collecting preliminary data for the conduction of a proposed research work. The cross-sectional studies as a part of the time frame horizon refers to a defined time period during which the research work is conducted. The longitudinal studies in the time frame horizon define a prolonged research study work. The feasibility of a time frame horizon type is decided on the basis of the purpose of the research study work as well as the research questions (Melnikovas, 2018).

Considering the suitability of type of time frame horizon for the proposed research study work analyzing the effectiveness of agile project management technique in Indian small and mid-sized companies, the cross-sectional time frame horizon study seems to be the best option. The proposed research study is an academic work and thus, required to be completed within a defined time period. Meanwhile, this time frame horizon approach is considered to be best suitable for quantitative or survey-based research, this can also be used for qualitative research works. Therefore, for the proposed research study work, which will be focusing on collection of data through surveys among the employees of small and mid-sized companies of Indian market, the approach shall fit best.

3.7 Sampling

In order to create effective and efficient research study results, numbers are known to play a significant role. In order to understand the potential reactions or impacts of a particular thing, analysing a group of audience is considered to be enough rather than going for all possible cases or elements. This procedure of choosing sub-groups over all possible cases of elements is defined as sampling which is known to limit the amount of data required to be collected for a research study. There are two types of sampling techniques known which can be defined as nonprobability sampling and probability or representative sampling. Probability sampling technique allows to know the probability that an individual has to be included in the sample through a random selection, whereas in Non-probability sampling technique, the selection of participants will depend on their knowledge and experience on the topic. (Blumberg, 2014).

The following research work is primarily focused at analyzing the impact and effectiveness of agile project management technology in the small and mid-scaled organizations situated in the Indian marketplace. Thus, in order to understand the research topic and the essence of the research study, the chosen sampling type will be nonprobability sampling technique. The research study will be conducted on the basis of data collected through surveys with different employees of the organization who are known to play a significant role in the success and in implementing project management techniques in the company. The participants for the data collection are selected on the basis of a certain criteria such as knowledge, expertise, and competency with the concept. Therefore, making nonprobability sampling technique the preferred option.

As defined by various scholars, the minimum number of participants required for conducting a nonprobability sampling is 5 and the maximum is 25, the research study focuses on interviewing Project Managers and Software Engineers from about 3 companies on a survey basis. The research participants are chosen on the basis of their knowledge of the concept and technology which makes them suitable for providing insights for the proposed research study work. The sampling was already made understood about the requirements of the proposed research study work and the importance of their contributions while asking them about their consent. No sort of comparison will be drawn between any of the respondent groups during the further research study work.

The nonprobability sampling technique is conducted through different methods while carrying out a qualitative research study work. The primary methods used can be defined as Convenience, Purposive and Snowball. As defined by Blumberg *et* al. (2014) the Convenience sampling is a unrestricted non-probability sample where researchers have the opportunity and autonomy to select whoever they can find to be part of the sample, this includes friends, neighbors and other people found in public places, therefore is the cheapest and easiest sampling technique to conduct but also the least reliable design. In contrast, using Purposive sampling technique, the sample is selected according to certain criteria, participants are selected to represent pre-determined parameters and conditions. It consists of 2 major types: Judgment and quota. Judgment sampling, where the sample is chosen based on the researcher's knowledge of the population, its elements and nature of the research objective. And, Quota sampling, where the researcher ensures

equitable and 46 proportional representation of the subjects, depending on which condition is considered the basis of the quota. (Blumberg *et* al, 2014). Finally, the Snowball sampling technique that refers to the accumulation of results that can be found elsewhere, it is used when it is difficult to locate members of a certain population, to carry out a data collection few members of the target population can be located and asked for the necessary information to locate other members who know of that population (Blumberg *et* al, 2014).

In regard to the proposed research study work, the individuals working in the small and mid-sized companies in the Indian market can provide insights to the implementation and effectiveness of agile project management in the company. They can provide valuable information based on their experiences in the management; however, the only concern that arose was contacting the participants as they are required to be contacted by third-party sources due to no direct relation with the researcher. Thus, the proposed research study work shall be inclined at undertaking Snowballing sampling technique as the preferred option.

3.8 Research Questions

The literature study conducted in the previous segment of the proposed research study work has helped in understanding the basic concept of agile project management methodology as well as the major differences between traditional and agile approaches of project management. Moreover, the literature study has provided a potential base for understanding the need and effectiveness of agile approaches in small and mid-scaled project management companies. However, from the literature discussion it has been identified that agile methodology in project management is quite not suitable for large-scale organizations. Thus, providing a base for further research in the direction.

On the basis of literature gap as analyzed in the previous section, the research question for the proposed study can be mentioned as:

Q1 Are there any benefits associated with the implementation of agile project management approach in large scale organizations?

Q2 How can SMEs in India that lack digital support implement agile project management strategies?

Q3 How are the small and mid-sized companies in India benefited from an agile project management approach in terms of growth and profitability?

3.9 Data Collection

The data collection for the proposed research study will be done through primary research methodology wherein Project Managers and Software Engineers from about 3 small and mid-sized organizations will be participating on a survey. The Survey questionnaire will be primarily focused on analyzing the project management techniques adopted by the organizations and how those techniques contribute to the success and growth of the company. The data

collection will help in developing two hypothesis models, one on the basis of the questionnaire responses received from the project manager and the other on the basis of the answers received from the Software engineers of the company.

3.10 Data Analysis Procedure

The proposed research study focuses on the adoption of qualitative research study for the collection of data (Bhatt, 2020). Therefore, data analysis shall seem as a complex task considering the voluminous amount of data that shall be received through the questionnaire response among a random sampling of about 3 companies. The Survey will be conducted among the Project Managers and Software Engineers of the company as they are recognized as one of the strongest pillars of the company. The data collected shall be analyzed on the basis of two primary hypotheses that will be based out on the responses received from the Project Managers and Software Engineers each. The responses shall be analyzed deeply in order to understand the effectiveness of the agile methodologies implemented in SMEs of India.

3.11 Chapter Summary

The chapter of the proposed research study has been designed to provide an understanding of the strategical methods and approaches adopted for the conduction of the proposed research work. The section shall help the readers understand the significance of adopted research approaches, philosophies and strategies for the research study. Moreover, the segment throws light on the explanation of all the necessary attributes of a research methodology.

In a nutshell, the proposed research study shall focus on the adoption of Interpretivism philosophy in order to understand the opinions, views and thoughts of the people working the project management domain of the Indian marketplace. Further, the inductive approach along with the qualitative research strategy shall be implemented. The combination of inductive approach and qualitative research strategy shall help in developing conclusions on the basis of real-time experiences and approaches of people accustomed to the concept. This shall provide a better insight to the proposed research study topic.

Chapter 4 – Data Analysis and Findings

4.1 Introduction

Data analysis is defined as the process of cleaning, transforming and modelling data collected for a research study. The analysis helps in reaching out to various conclusions for desired results and extract useful information (Bhatt, 2020). This particular chapter of the proposed research study shall process the data collected in the previous sections of the study. A brief description of the profiles of the participants will be provided which will be followed by a detailed explanation of the answers received from the participants.

4.2 Qualitative Data Analysis

The Survey among the representatives of the small and mid-sized companies situated in the Indian marketplace was conducted in two parts. The initial part focused on inheriting the experience and responses from the Project Managers of the companies while the second part was focused at the responses received from the Software Engineers of the company. The research study was conducted keeping in mind the necessary ethical values and no personal or sensitive data was abstracted from the participants.

The Survey questions were primarily based on the below-mentioned aspects, on the basis of which further research study can be articulated.

- Benefits of Implementing Agile Project Management Technologies in the organization
- Challenges to implementing effective agile project management techniques
- Implementing Agile vs. Traditional Project Management Technologies
- Is Agile Project Management technique effective for large-scale projects?

The detailed analysis for the conducted research study on the basis of the defined points and in regard to the viewpoints of both the project managers as well as the software engineers working in the company, can be mentioned as:

4.3 Benefits of Implementing Agile Project Management Technologies

The first hypothesis can be developed on the basis of the responses received from the Project Managers working in the organization. From the managerial perspective, it has always been analysed that defining and managing tasks among multiple teams for a particular project has always been a hectic task. Therefore, around 85% of the respondents have reverted positively to implementation of agile project management techniques in the organization. As per the responses received from the Project Managers working in SMEs of India, it can be defined that the agile technology helps in identifying issues and efficiently adapt to the changes required in the meantime. Sprints, which are recognized

as the major feature of Agile project management approach make it easier for companies to plan out resolving issues effectively & efficiently. One of the Project Manager participants believed that quality improvement does not necessarily depend on the methodology used. However agile methods do help if, for instance, quality issues are encountered during the product development, it is possible to start working on the issue directly. This is indeed one of the benefits of using agile as it is necessary to ensure, always, that everything that is being delivered is of the best quality, and if not, it allows you to make adjustments as soon as possible.

On the other hand, the software engineers working in the organizations helped in the development of the second hypothesis. As per the responses received from the software engineers of the community, about 70% of the sampling mentioned agile project management to be helpful in establishing effective inter as well as intra-team communications. This is recognized to have speed up the working pace resulting in much more satisfactory client project deliveries that further impacts the overall growth and profitability of the company. The Software engineers consider agile project management to be a favorable approach as it facilitates quick client feedback. The insights from clients are received when something is not going as they expected, or when new requirements need to be included. The team has time to react and change the plan without going through heavy work. Also, a better visibility is given by having a plan with all stories which the team needs to work on and which the team can always see.

4.4 Challenges to implementing effective agile project management techniques

In accordance with the hypothesis of one of the proposed research studies, one of the major challenges identified at the managerial level is change resistance among employees. In case a company is planning to switch on to agile technique for project development at the organization, it has been analyzed that change management stands as one of the major challenges in front of project managers. The employees aren't always willing to easily switch from their traditional work approaches which instigates change resistance towards agile among them. One of the limitations of agile is really lack of commitment from the management level; in order to implement an effective agile project management strategy in an organization it is important for all the people working in different teams and levels embrace agile and make a commitment on working in agile, else the agile technique could turn out to be even worse than waterfall. If, for any reason (cultural, monetary, etc.), most of the people within a project or within a company do not want to play agile, it is better not to go agile.

On the other hand, in context to hypothesis two of the proposed research study, the software engineers working in the field consider implementation of agile technique in project management processes of the company as a challenge in terms of clarity around roles as well planning. The members working in a team deployed on a certain project of an organization adopting agile project management technique, it has been felt that there is often no clarity about the job roles in the teams. In certain companies that implement agile as a technique, the teams are left to figure out the rest of the details by themselves which lead to job role uncertainty and then to planning mismatch. It often comes as a challenge when multiple teams or employees are working on the same backlog developing a crossover between the teams at different levels creating a ruckus in the work.

Another major limitation which was identified from the survey is lack of experience among employees. From the Survey response it was analyzed that there was a significant section of the workforce that has been working on agile project management technique for quite some time but is still not familiar with the concept. This can pose as a potential threat to the success of the organization and can affect the growth and profitability of the organization overall.

4.5 Implementing Agile vs. Traditional Project Management Technologies

The major difference between the implementation of agile as well as traditional project management technologies, is that the agile project management technology helps in identifying potential changes or issues on time while offering the liberty to adapt to the change without affecting the overall budget or delivery time of the project. This is majorly due to the inclusion of the testing phase along with the development phase that helps in identifying potential issues on time. However, the limited availability of employees in small and mid-sized companies in India, the deployment of agile itself becomes a major challenge. Therefore, the majority of the companies are familiar with the concept but it is yet to be accepted completely in the SME market of the Indian business industry.

On the basis of hypothesis two of the proposed research work, it is mentioned that the implementation of agile project management techniques in the organizations helps in making work easier for the employees. The real-time testing of projects during the development phase helps in analyzing the issues specifically & efficiently, giving more time to the developers to quickly recall and identify the loophole & efficiently work upon it.

4.6 Is Agile Project Management technique effective for large-scale projects?

About 45% of the Project managers, those who participated in the survey for the proposed research study have worked with larger organizations before making their way to SMEs. They have seen deployment of agile for large-scale projects and found themselves suitable to throw light on the particular segment of the study. The respondents mentioned that in order to make deployment of agile successful for large-scale projects, it is important to deploy each sprint of the technique efficiently. They have witnessed large-scale projects working on agile to be ineffective due to miscommunications among different members of the team which were recognised to have occurred due to improper implementation of the concept.

On the other hand, the software engineers consider agile project management technology to be an effective solution for the large-scale projects too. They believe that with large-scale projects, larger teams are deployed on the field to work and multiple projects can be completed altogether. Through this they signify that agile project management can be effectively implemented in the large-scale projects as well.

4.7 Key Data Findings

The data collected in the previous sections of the conducted research study was analyzed in order to draw upon various conclusions that support the topic of the proposed research study. In order to function out a smooth finding & analysis two different objectives have been set up. The research objectives for the particular section can be defined as:

1. Identifying key challenges associated with project management perspectives within Indian software development companies.

2. Exploring the benefits and limitations offered by Agile management to projects in India by software vendors.

The data for the conduction of research study was conducted on the basis of a questionnaire survey with the Project Managers and Software Engineers of about 3 small and medium-sized companies situated in India. Undertaking the large proportion of research, the proposed research study Heterogeneous or maximum variation sampling. In order to derive conclusions for this proposed thesis study, the selection of participants was made on a number of parameters including the preservation of diversity in context and expertise in the software development industry, the scale of projects and the geographical spread of teams.

The participants were asked various questions in order to analyze the potential impacts, effectiveness, benefits and limitations of implementing agile project management techniques in small & medium sized companies situated in the Indian marketplace. The survey was held keeping in mind the privacy and safety of the participants, adhering to total maintenance of anonymity as well as non-disclosure of any sensitive information.

The survey questions focused at beginning the research work with the overall experience of the participants in the current field as well as developing upon their experience related to the implementation of various project management techniques. The research study focuses at developing conclusions on the basis of the responses received from the participants. Around 60% of the participants were working in the Indian project management industry for about 7+ years while the other 20% had an experience of at least 5 years whereas the rest belonged to the experience category of less than 5 years.

Over the experience of years, the participants who have worked in different positions in the company have gained insights on both small-scale as well as large scale projects, which has helped them develop a better understanding of implementing the right project management technique. The primary objective of the proposed research study is to understand the effectiveness of implementing agile project management techniques in an organization in order to generate better profits and growth. Therefore, the study analyses project management on the basis of various major components that include scope, time, cost, communication and stakeholder management. The respondents that participated in the survey were asked about their experience with different project management techniques on the basis of these factors.

On the basis of the responses received from the survey, the majority of the participants identified communication to be one of the major challenges in project management. Project management requires multiple teams to work together and work jointly in order to ensure successful deployment of the project. However, establishing an effective communication between teams and employees coming from different technological backgrounds. The challenges were identified jointly for both the hypothesis on the basis of the responses received from Project Managers as well as the Software engineers working in the company. Another major challenge identified in implementing efficient project

management strategy in the company can be defined as scope management followed by cost management and time management. While stakeholder management was recognized to contribute least to the deployment of effective project management schemes in an organization.

On the basis of the responses received from the Project Managers working in small or medium sized companies with globally distributed projects, it has been analyzed overall that the major challenges are cost, time and communication. However, in terms of their effectiveness and impact on small and medium scale companies working in the Indian market, the responses highlight that the size of team does not necessarily affect communication among the teams, On the other hand, the budget and costing are not majorly impacted by the methodology adopted as the cost is not judged on the basis of efforts put in by the working individuals.

On the other hand, for organizations operating with restricted project delivery or centralized production teams, the main cost and stakeholder issues are established. For smaller and mid-sized organizations with limited distribution and resources meeting stakeholder expectations within a defined budget often turns out to be a major challenge for the company. Therefore, a project management methodology that shall help organizations involve the customers since the initial stage of the project development can help small and mid-sized organizations work effectively and generate efficient results. Therefore, agile project management techniques can be identified as one of the best and efficient project management methodologies for small and medium-sized companies.

The other major focus of the proposed research study was to analyze the knowledge and importance of agile as well as waterfall project management technologies among the employees working in the small and mid-scale company setup in the Indian marketplace. About 48% of the project managers as well as the software engineers that were surveyed for drawing upon conclusions for the proposed research study work, altogether were recognized to be aware of waterfall project management technique. On the other hand, about 30 percent of the combined sampling was identified as to be familiar with the agile project management technique while the rest of the sampling had insights about both the waterfall as well as agile project management techniques.

The knowledge in regard to the different project management techniques among the employees working in the organizations set up in the Indian marketplace, it has been identified from the survey responses that a significant portion of the workforce is yet to be introduced to the agile project management technique. The non-familiarity among the employees regarding the project management technique restricts the implementation of the technique which can impact the growth and profitability of the company.

While the familiarity with the concept among the employees is recognized to be a major concern for implementing effective project management techniques, the next focus of the proposed research study was to analyze the preferred project management technique put up in practice among the organizations set up in India. From the survey conducted among a sampling of Project Managers and Software Engineers working in the Indian marketplace, it was analyzed that around 60% of the workforce had experience working on the agile project management technique while the rest of the workforce was accustomed to working on waterfall project management technique. The experience of working

on different project management techniques was identified to be varying on a basis of various points that contributed to the overall picking of the right methodology. The primary influencers that play a significant role for organizations to choose upon a project management technique were identified to be scope of the project, delivery deadline of the project, cost budget for the project, client involvement and resource management.

Majority of the participants who were surveyed for drawing upon various conclusions in order to understand the effectiveness of agile project management among small and mid-sized companies in India, responded that considering various influencers either agile project management or a hybrid between agile and waterfall is recognized as the most suitable. The implementation of the waterfall approach is usually avoided when it comes to deploying a successful project. The requirement of the project is recognized as one of the major influential factors that affect organizations' decision making in terms of adopting the right project management methodology. The project requirements help the organization understand whether engaging multiple teams shall help in yielding profitable results. Moreover, agile project management technology is usually used for large-sized projects while the companies still consider the waterfall approach to be suitable for small-sized projects.

While talking about the benefits offered by the implementation of agile project management and waterfall approach of project management, about 65% of the project managers believed that the former lured in better results for the company. The software engineers weren't much connected with the profitability & growth factors offered by different project management approaches. Thus, the project managers were surveyed for a particular factor. On the basis of the responses received from the project managers for the particular question, it was analyzed that the majority of the sampling considered agile project management approach to be very much effective in terms of profitability and growth for the business. As per their views, the approach is focused as binding the company as well as the client together, helping small and mid-scaled organizations meet customer expectations within time and defined budget. This not only helps the organizations offer a better customer experience but also build upon their popularity in the market, affecting their overall growth in a positive manner.

The respondents were asked about their satisfaction rates while working with the companies on agile project management technique as well as the waterfall project management technique. While answering the question, the majority of the employees that have worked with agile project management were identified to be much more satisfied with their jobs. On the other hand, the employees that were working on waterfall project management technique didn't have much of a sound satisfactory level with their job roles. For the employees who had answered as having experience on both agile as well as waterfall project management techniques, they answered to be much more satisfied while working with the agile project management technique. This implies that agile project management not only help the organizations establish effective working and achieve customer satisfaction but also provides higher employee satisfaction rates.

Chapter 5 – Discussion and Conclusion

5.1 Discussion

The data collected and analyzed in the previous sections of the proposed research study work helped in understanding the implementation of different project management techniques among Indian small and mid-scaled companies. The research study was focused at identifying various perspectives, proportions, themes and patterns that were considered by the companies situated in the Indian market while working on different development projects. One of the major project management strategies used by the companies situated in the Indian market is recognized as the agile project management approach that allows the companies to split a project in various segments or sprints.

The agile project management technique is recognized to be effective for the large-projects that are usually undertaken by the companies that have a globally distributed channel. Moreover, it has been identified as one of the major components of companies that prefer working with the client since the initial stage of the project development. On the other hand, companies that are not very much focused on client involvement and have been working in a similar manner over the years, the waterfall project management approach is identified as much suitable. In the previous sections of the proposed research study it has been analyzed that the project requirement requirements play a significant role for organizations when it comes to adopting the right technique.

The major challenges while implementing an effective project management technique was identified as scope, time, cost, stakeholder management and communication. While for companies that work in a globally distributed project development network communication, scope and time remained a major concern, the primary challenge for small and mid-sized companies that worked with limited distribution and limited resources, the major challenge was identified to be cost and stakeholder. The agile project management technique offers resolutions for almost all the major challenges and can help in deploying effective services to the customers.

Budgets and expense control were a greater problem for project managers with smaller companies. Any phase delays resulting in extending deadlines because increased costs to operate the project. Big companies have contracts divided into multiple sub-projects, typically handled by various project managers. Since the customer relationship is typically based on effort-related costs, the financial issue does not influence whether the approach is Agile or Traditional waterfall model. It can be argued that smaller companies will benefit from agile approaches in reducing costs, but customer engagement and participation can be challenging to negotiate.

The major challenges can be effectively resolved with the implementation of agile project management technique that focuses on completing projects by defining them in different sprints and working parallely on each of the sprints. However, awareness among the employees about the project management technique is one of the major concerns. Among the participants of the survey for the proposed research study work, a significant proportion of the workforce wasn't aware of agile project management technique. However, in another segment the majority of the workforce has worked with agile project management techniques. These data highlights that there's no effective knowledge about

the concept among the employees but they are still working with the technique. This emphasizes on the fact that implementing effective agile project management techniques among the small and mid-scaled companies working in the Indian marketplace is a major challenge. In order to ensure effective implementation of the technique, it is very much needed to educate the workforce about the basics and impacts of agile project management on both individual as well as organizational levels.

The primary reason behind implementation of agile project management approach among the organization without any significant knowledge of the concept among the employees is the belief that the concept helps is profitability and growth of the organization through the various benefits associated with itself. The benefits often influence project managers and organizations to adopt a hybrid approach which comprises both the waterfall as well as the agile project management technique. However, the hybrid project management technique isn't identified to be much of a help as the major challenges associated with implementation of effective project management remains unresolved.

Implementing agile project management has been recognized as a major source for boosting the growth and profitability of small and medium scaled organizations situated in India as it allows them to offer better customer services. A higher customer satisfaction rate provides them a potential market exposure that can impact the popularity of the company in the market, allowing it to reach to a wider spectrum of the audience. However, there still are various basic loopholes associated with the effective implementation of the technology. The primary one has been identified as the non-familiarity of the concept of agile project management approach among a significant section of the workforce. This can work as a primary scope for further studies in the direction wherein the impact of implementing agile project management at individual levels can be studied as well as various measures for promoting agile project management among employees can be identified.

5.2 Conclusion

The proposed research study work was focused at analyzing the implementation and effectiveness of agile project management techniques in the small and mid-sized companies situated in the Indian marketplace. A data sampling of Project Managers and Software Engineers from about 3 small and mid-sized companies were interviewed on a survey basis who had hands-on experience working with different project management techniques. From the analysis of the collected data it was analyzed that agile project management not only helps in establishing firm foundations for the growth and profitability of an organization but also provides a company with various attributes including visibility, quality, employee satisfaction, and customer satisfaction.

The participants surveyed during the data collection phase highlighted that the primary benefit offered by agile project management technology was the ability to adapt to changes in the real-time. The agile project management technique focuses on dividing a project into multiple sections called sprints with different teams working on their respective sprints parallelly. This not only helps the organizations save time and budget but also provides them with the opportunity to identify loopholes. The second benefit as highlighted by the respondents of the proposed research study

work is quality. As defined by the Project Managers and Software Engineers interviewed for the proposed research study work, the testing of the project is done simultaneously during the development. The development of the project in sprints allows the employees to incorporate testing with the development phase which helps them analyze issues in the real-time, providing them with much more scope to work on the loose ends of the project. The ease of adoption as well as the opportunity to locate and resolve issues in the development phase reduces the possibility of failure and helps the companies develop effective and efficient projects leading to higher customer satisfaction rates.

The other major benefit offered by the implementation of agile project management technique is employee satisfaction rates. The higher the employee satisfaction rates identified in an organization, the better growth and profitability were recorded for the particular organization. The agile project management technique instigates lesser frustration among the employees as it divides the entire project in multiple sprints assigning different parts to various teams and people. Moreover, the agile project management technology is known to offer a visibility benefit that influences the employee satisfaction rate in a positive manner which works great wonders for the company in terms of growth and profitability. Moreover, the small and mid-sized companies in the Indian marketplace are often short on employees which makes it much more necessary for the companies to keep the employees help in order to develop efficient and satisfactory projects on time for the customers. High employee satisfaction rates shall motivate employees to work overtime without getting frustrated with the amount of work.

The overall benefits as identified in the proposed research study work highlight the effectiveness of and impact of agile project management technologies in the small and mid-sized companies in the Indian companies. Moreover, the benefits have proposed great differences between the agile project management techniques as well as the traditional project management techniques. The agile project management has been identified as more comprehensive than the traditional approach in all terms including employee satisfaction, customer satisfaction and overall development of the company.

Chapter 6 - Recommendations

6.1 Recommendations for Future Research

Further to it, the proposed research study work focused on analyzing the limitations associated with the implementation of agile project management in the small and mid-scaled companies situated in the Indian marketplace. The primary limitations as identified from the proposed research study work can be defined as lack of cooperation from the management, lack of experience among the employees, company policies and culture. The limitations were identified both in the literature study of the proposed research work as well as the particular data analysis for the study. It was identified from both the primary and secondary research study work of the proposed research study that the implementation and effectiveness of agile project management can still be impacted by a lot of factors and those if not addressed on time can drive the overall growth of the organization negatively.

Considering the various factors identified in the research study such as the benefits, limitations and differences between agile and traditional project management approaches, it can be concluded that agile project management holds highly effective for small and mid-scaled organizations as it allows them to deliver highly satisfactory projects to the customers within a defined time and a budget, reducing the potential risk of failure. However, the success of a project developed through the implementation of agile project management technique is highly dependent on the support provided by the management and employees of a company. Moreover, the research study was focused at analyzing the effectiveness of large-projects undertaken by small and mid-sized companies. Meanwhile, it was initially believed that agile project management is not suitable for large-projects, it can be concluded on the basis of the discussion and analysis of the proposed research that agile project management reduces the risk of failure for large projects.

References

Ambler, S.W. (2009) The Agile Scaling Model (Asm): Adapting Agile Methods for Complex Environments.IBM Corporation.

Apiumhub. (2020). *5 Benefits Of Agile Project Management You Must Know About | Apiumhub*. [online] Available at: <https://apiumhub.com/tech-blog-barcelona/benefits-of-agile-project-management/> [Accessed 21 July 2020].

Bell, E., Bryman, A. and Bill, H. (2019) Business Research Methods. 5th ed. United Kingdom: Oxford University Press.

Bhat, A. (2020) *Data Collection: Definition, Methods, Example And Design | Questionpro*. [online] QuestionPro. Available at: <https://www.questionpro.com/blog/data-collection/> [Accessed 21 July 2020].

Blumberg, B., Cooper, D. and Schindler, P. (2014) Business Research methods. 4th edition. New York: McGraw-Hill Education.

Cervone, H. (2011) Understanding agile project management methods using Scrum. *OCLC Systems & Services: International digital library perspectives*, 27(1), pp.18-22.

Chawla, V. (2019) *Why Indian Smes Are The Next Revenue Generators For Tech Companies*. [online] Analytics India Magazine. Available at: <https://analyticsindiamag.com/india-sme-big-tech-companies/#:~:text=The%20small%20and%20medium%20businesses,million%20Indians%2C%20according%20to%20CII.> [Accessed 21 July 2020].

Conboy, K. (2009) Agility from First Principles: Reconstructing the Concept of Agility in Information Systems Development, Information Systems Research (20:3), September 1, 2009, pp. 329-354.

Donnelly, G. (2019) Agile Vs. Traditional Project Management Methodologies: Differences You Need To Know. [Blog] Available at: <https://blog.workep.com/agile-vs.-traditional-project-management-methodologies-differences-you-need-to-know> [Accessed 13 July 2020].

Dzerzhinskiy, F. and Raykov, L. (2015) What Is Software Engineering?. [online] Available at: <https://arxiv.org/abs/1508.02031> [Accessed 21 July 2020].

Päivi Eriksson and Anne Kovalainen (2008) *Qualitative Methods in Business Research*. London, England, United Kingdom: SAGE Publications, Ltd. (Introducing Qualitative Methods).

Ministry of Micro, Small and Medium Enterprises. (2016). *MSME AT A GLANCE*. Ministry of Micro, Small & Medium Enterprises, p.https://www.nimsme.org/ranzo/uploads/articles/MSME_at_a_GLANCE_2016_Final.pdf.

Heagney, J. (2012) Fundamentals of Project Management. New York: AMACOM.

Highsmith, J. (2002). Agile Software Development Ecosystems. Boston: Addison Wesley.

'IEEE Standard Glossary of Software Engineering Terminology' (1990) *IEEE Std 610.12-1990*, pp. 1–84. doi: 10.1109/IEEESTD.1990.101064.

Iacovou, C. L. and Nakatsu, R. (2008) 'A Risk Profile of Offshore- Outsourced Development Projects', *Communications of the ACM*, 51(6), pp. 89–94. doi: 10.1145/1349026.1349044.

Jabangwe, R., Šmite, D. and Hessbo, E. (2016) 'Distributed software development in an offshore outsourcing project: A case study of source code evolution and quality', *Information and Software Technology*, 72, pp. 125–136. doi: 10.1016/j.infsof.2015.12.005.

Jilcha Sileyew, K. (2019) *Research Design And Methodology*.DOI: 10.5772/intechopen.85731

Kanban Software for Agile Project Management.(2020). *What Is Agile Project Management? A Comprehensive Guide*. [online] Available at: <https://kanbanize.com/agile/project-management> [Accessed 21 July 2020].

Kashyap, S., (2018) Traditional vs Agile Project Management Method: Which One is Right for Your Project? [online] Proofhub.com. Available at: <https://www.proofhub.com/articles/traditional-vs-agile-project-management> [Accessed 21 July 2020].

Kerzner, H. (2012) Project Management. John Wiley & Sons Inc.

Kerzner, H. (2015) *Project management 2.0 : leveraging tools, distributed collaboration, and metrics for project success.*

Khan, A. A. and Keung, J. (2016) 'Systematic review of success factors and barriers for software process improvement in global software development', *IET Software*, 10(5), pp. 125–135.

Kudaravalli, S., Faraj, S. and Johnson, S. L. (2017) 'A Configural Approach to Coordinating Expertise in Software Development Teams', *MIS Quarterly*, 41(1), pp. 43–64.

Kumar, R. (2014). *Research Methodology*. SAGE.

Larson, E., Gray, C. (2018). Project Management The Managerial Process. 7th ed. New York: Mc Graw-Hill Education.

Lyytinen, K. and Rose, G. M. (2006) 'Information system development agility as organizational learning', *European Journal of Information Systems*, 15(2), pp. 183–199.

Maldonato, M. and Pietrobon, R. (2010). *Research On Scientific Research*. Brighton [England]: Sussex Academic Press.

Melnikovas, A. (2018) Towards an Explicit Research Methodology: Adapting Research Onion Model for Futures Studies. Journal of Futures Studies, 23(2), pp.29-44.

Niazi, M. *et* al. (2013) 'Establishing trust in offshore software outsourcing relationships: an exploratory study using a systematic literature review', IET Software, 7(5), pp. 283–293.

O' Sheedy, D. and Sankaran, S. (2013). Agile Project Management for IT Projects in SMEs: A Framework and Success Factors. *The International Technology Management Review*, 3(3), p.187.

Öztürk, V. (2016) 'Flexible and Adaptive Life Cycle Framework for Software Development', Journal of Software (1796217X), 11(9), pp. 943–951.

Qureshi, M. (2012). Agile software development methodology for medium and large projects. *IET Software*, 6(4), p.358.

Saunders, M., Lewis, P. and Thornhill, A. (2016). Research methods for business students. 7th ed. England: Pearson.

Silverman, D. (2013) *Doing qualitative research : a practical handbook*. 4th. SAGE.

Sommerville, I. (2004) *Software engineering*. 7th ed. Addison-Wesley (International computer science series).

Sunny, D. and Ablin, C. A. (2015) 'Trends and Future Prospects of Indian and Chinese Software Industry: Aspects Before Indo-China Diaspora', China Economic Policy Review, 4(1), p. 1.

Teddlie, C. and Tashakkori, A. (2009). *Foundations Of Mixed Methods Research*. Los Angeles: SAGE.

Varhol, P. (2020). *The Complete History Of Agile Software Development*. [online] TechBeacon. Available at: <https://techbeacon.com/app-dev-testing/agility-beyond-history-legacy-agile-development> [Accessed 21 July 2020].

Vrhovec, S. L. R. *et* al. (2015) 'Outsourcing as an Economic Development Tool in Transition Economies: Scattered Global Software Development', Information Technology for Development, 21(3), pp. 445–459.

Weilin Zhao and Watanabe, C. (2010) 'Risk Management in Software Outsourcing-a Portfolio Analysis of India's Case Based on Software Export Market Constitution', Journal of Services Research, 10(1), pp. 143–155.

Workfront.com (2020) *Agile Project Management - A Complete Guide | Workfront*. [online] Available at: <https://www.workfront.com/project-management/methodologies/agile#:~:text=Agile%20project%20management%3F-

,Agile%20project%20management%20is%20an%20iterative%20approach%20to%20project%20management,quickly%20and%20deliver%20work%20fast.> [Accessed 21 July 2020].

Wrike.com. (2020) *What Is Agile Methodology In Project Management?*. [online] Available at: <https://www.wrike.com/project-management-guide/faq/what-is-agile-methodology-in-project-management/> [Accessed 21 July 2020].

Žukauskas, P., Vveinhardt, J. and Andriukaitienė, R. (2018) Philosophy and Paradigm of Scientific Research. *Management Culture and Corporate Social Responsibility*.

Appendices

Appendix 1: Survey Questionnaire

The questionnaire that shall be used as the basis data collection and research conduction for the proposed research work can be defined as:

Project Manager Survey Questions

- How long have you been employed in Indian software industry as a project manager?
- Have you worked with internationally dispersed teams before or are you actually working with?
- What are some of the main challenges as project manager to effectively handle a software project?
- What kind of models Iterative/ Hybrid/ Waterfall/ Agile have you previously worked on or currently working with?
- How much experience do you have in applying APM to software development projects at both small and large? If so, can you think about the design variations-are there size drawbacks to agile?
- What kind of impact does agile methodology have on the project lifecycle in terms of PM(scope)?
- What kind of impact does Agile methodology have on finance and budgeting?
- Which key factors are considered while choosing between Agile or any other project management methodologies?
- What is the purpose of using agile methodology in your company?
- Does the chosen methodology impact the size of the project?
- Describe the benefits of Agile in large projects?
- In your organization, what is the utilization ratio between Agile and Waterfall methodologies across projects?
- Mention the choices made by the company you work for and which segment of Agile do they focus and which part of your process is company oriented?
- Considering the fact of your experience in Agile methodology Software development cycle. Do you enjoy working and involving yourself this way and how huge a fan are you?
- Can you explain and compare the advantages of both Agile and Traditional in large software development projects based on your experiences?
- What are the potential challenges encountered while working or using Agile Methodology?
- Does the Agile methodology practices reduce the communication issues when compared to the other model?
- Does the Agile methodology practices increase the efficiency of the team's and individual work?

Software Engineer Survey Questions:

- Explain about your experience as a software engineer?
- What is your working experience on project size, scope and different geographical location?
- What is your call on different Software Development Methodologies such as Waterfall and Agile?
- Have you faced any challenges as a software engineer working on Agile Framework?
- What is your recommendation on Agile or other methodologies to make the process better?
- Being a part of the Agile Software Development team, what is your opinion on these restrictions are mainly associated with the culture and policies of the company, lack of sufficient experience or lack of management aid?
- Being a part of the Agile Software Development team, what is your opinion on these restrictions are mainly associated with the culture and policies of the company, lack of sufficient experience or lack of management aid?