Chapter 1 - Introduction

1.1 Overview
This chapter begins with an overview of the chapter in Section 1.1. Section 1.2 presents the current scenario of IT projects. This is followed by general introduction and background of research in Section 1.3 and Section 1.4. Section 1.5 outlines the statement of the problem and Section 1.6 shows gap analysis and uniqueness of the study followed by justification for the research study in Section 1.7. The next Section 1.8 discusses the research objectives and Section 1.9 & Section 1.10 discusses the research questions and the hypotheses developed for the research study. Section 1.11 presents the research methodology and an outline of chapters of dissertation is provided in Section 1.12. This is followed by definitions of the key terms in Section 1.13, assumptions in Section 1.14, scope in Section 1.15 and the limitation of the study in Section 1.16. This is followed by the summary of this chapter in Section 1.17.

The diagrammatic presentation of the structure of Chapter One is shown in figure 1.1.

Figure 1.1: Structure of Chapter 1

1.1 Overview of Chapter

1.2 Current Scenario of IT Projects

1.3 General Introduction

1.4 Background of Research

1.5 Statement of the Problem

1.6 Gap Analysis and Uniqueness of the Study

1.7 Justification for the research study

1.8 Research Objectives
“Life can only be understood backwards, but it must be lived forwards”

- Kierkegaard

Therefore, to understand the actual status quo of Information Technology Industry, first of all, the real scenario of IT projects is to be investigated which is been presented by the researcher in the following section.

1.2 Current Scenario of Information Technology Projects

1.2.1 Interesting Facts and Figures about IT projects

A number of studies have been performed, between the years 2005 and 2015 that look into the success/ failure rates of IT projects. These studies indicate that serious problems exist in the industry. Below is a summary of the reports published by various agencies for the last ten years, beginning from the latest.
**Source:** McKinsey & Company Global Survey Results

**Type of Survey:** Survey on business and technology strategy.

**Date:** March 2015

In the survey, overall respondents were negative about their IT performances over previous years and the majority suggest that replacing the current IT management is the best remedy.

**Study Findings:**

1. The most substantial challenges in IT are demonstrating effective leadership, finding, developing and retaining IT talent. Therefore, more IT executives see changing IT leadership as a priority to improve IT performance.
2. In the coming years, executives expect their IT organizations to spend less on infrastructure and more on analytics and innovation.
3. To address talent challenges, companies should focus on culture and compensation.

**Source material:** IT under pressure

**Source:** McKinsey & Company in conjunction with the University of Oxford

**Type of Survey:** Study on large scale IT Projects

**Date:** 2012

A study of 5400 large scale IT projects (projects with initial budgets greater than $15M) finds that the well-known problems with IT Project Management are persisting. Among the key findings quoted from the report:

1. 17 percent of large IT projects go so badly that they can threaten the very existence of the company.
2. On average, large IT projects run 45 percent over budget and 7 percent over time, while delivering 56 percent less value than predicted.

**Source material:** Delivering large scale IT projects on time, on budget and on value.

**Source:** Geneca

**Type of survey:** Interview based study of software projects

**Date:** 2010-2011

Interviews with 600 people closely involved in software development projects finds that even at the start of a project many people expect their projects to fail.

1. “Fuzzy business objectives, out-of-sync stakeholders and excessive rework” mean that 75% of project participants lack confidence that their projects will succeed.
2. A truly stunning, 78% of respondents reported that the “Business is usually or always
out of sync with project requirements.”

Source material: Why a Majority of Business and IT Teams Anticipate Their Software Development Projects Will Fail.

Source: KPMG (New Zealand)
Type of survey: Survey of 100 businesses across a broad cross section of industries
Date: Dec 2010
KPMG survey of Project Management practices in New Zealand finds some truly startling results:

1. Survey shows an incredible 70% of organizations have suffered at least one project failure in the prior 12 months.
2. 50% of respondents also indicated that their project failed to consistently achieve what they set out to achieve.

Reference article: Most Business Experience Project Failure
Source material: KPMG Project Management Survey 2010

Source: IBM
Type of survey: Survey of 1500 change management executives
Date: Oct 2008
IBM survey in the success/failure rates of ‘change’ projects finds:

1. Only 40% of projects met schedule, budget and quality goals.
2. Best organizations are 10 times more successful than worst organizations.
3. Biggest barriers to success listed as people factors: Changing mindsets and attitudes-58%, corporate culture-49%, lack of senior management support-32%.
4. Underestimation of complexity listed as a factor in 35% of projects.

Source material: Making change work

Source: Logica Management Consulting
Type of survey: Survey of 380 senior executives in Western Europe
Date: Oct 2008
Logica Management Consulting and the Economist Intelligence Unit studied success rates for business process change projects (most of which have significant technology components). A cross section of different industries were included in the survey.
Findings showed:
1. 35% of organizations abandoned a major project in the last 3 years.
2. 37% of business process change projects fail to deliver benefits.

**Source material:** Failing business process change projects substantially impact financial performance of UK business

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**Source:** United States Government Accountability Office  
**Type of survey:** Review of federally funded technology projects  
**Date:** 31 Jul 2008

Study finds:

1. 413 of 840 (49%) federally funded IT projects are either poorly planned, poorly performing or both.
2. Project Railhead provides a good example of the types of problems involved. In the Railhead case the complete $500M investment is in jeopardy.

**Source material:** GAO-08-1051T

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**Source:** Information Systems Audit and Control Association (ISACA)  
**Scope:** 400 respondents  
**Date:** May 2008

Key findings:

1. 43% of organizations have suffered a recent project failure.
2. At a typical enterprise 20% of technology investments are not fully realized.

**Source material:** IT Magazine

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**Source:** Guardian Newspaper (UK)  
**Scope:** Investigation into government waste in the UK since the year 2000  
**Date:** 5 Jan 2008

1. Study of government projects reveals, $4 billion in wasted efforts as a result of failed projects.
2. “Only 30% of our projects and programs are successful” - Joe Harley, programme and systems delivery officer at the Department for Work and Pensions.

**Source material:** Not fit for purpose

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**Source:** Dr Dobbs Journal  
**Scope:** 586 respondents to email survey (Dr Dobbs subscriber list)  
**Date:** Aug 2007 and Oct 2011
1. 70% of respondents had been involved in a project they knew would fail right from the start.

2. Success rates for agile projects, 72% success rate for traditional approaches 63%.

**Source material:** IT Project Success Rates Survey (2007 version).

**Updated version 2011:** 2011 Project Success Rates

**Source:** KPMG-Global IT Project Management Survey

**Scope:** Survey of 600 organizations globally

**Date:** 2005

1. In just a 12 month period, 49% of organizations had suffered a recent project failure.

2. In the same period, only 2% of organizations reported that all of their projects achieved the desired benefits.

3. 86% of organizations reported a shortfall of at least 25% of targeted benefits across their portfolio of projects.

4. Many organizations fail to measure benefits so they are unaware of their true status in terms of benefits realization.

**Source material:** Global IT Project Management Survey

To summarize the above facts and figures, it can observed that though Information Technology has proved to be the fastest growing industry contributing highly towards the economy of the nation still, it faces many problems and challenges. The facts and figures of the IT projects, as shown by various agencies in their published reports, state that there are very less percentage of projects that are successful while the projects with time/budget overrun or with failure rate are very high.

Since the last 10 years, every year approximately 20% of the projects gets cancelled leading to enormous loss of resources. Project managers are caught in a state of anxiety. On one side, they are working very hard to conquer this situation, by constantly looking for effective project management practices while on the other hand, such reflections and corresponding learnings are key to improve the existing project management practices.

*Therefore, the Information Technology industry was an obvious choice for the researcher to conduct the research study, in order find a remedial solution for effective software project management. Now, the forthcoming section presents the introduction to the dissertation.*
1.3 Introduction

“Leaders become great, not because of their power but because of their ability to empower others” - Jon Maxwell

Information technology (IT), project success has been a common topic for discussion over the past several years. Many researchers have highlighted the importance of project leadership as a key aspect of IT project success.

According to Schwalbe (2004) and LeBlanc D. (2008), IT project manager's leadership style is crucial to the success of a software project. Turner & Muller (2005) added that, IT projects require project managers to have the effective leadership style to understand what motivates, inspires and stimulates the thinking of IT project team members. Research suggests that more dynamic, demanding market conditions and project constraints require stronger focus on leadership and knowledge skills to ensure project success. It is also believed that successful project outcomes would require an increased emphasis on the organizational and human aspects of project management.

Since, the mid 1970's project management started to be known as a separate discipline. During the early phases, project managers were selected on the basis of their technical expertise. Kerzner (2000), point out that project success was measured by the technical merit of the project with little or no concern for the knowledge of business or its customers. Later, when the principles and practices of project management evolved, it focused on the behavioral aspects of project management with main emphasis on the managerial and leadership skills of the project manager. Today, it is expected that modern project managers should possess basic technical skills and significant business expertise along with leadership skills. Managers must not only need to be involved in the day-to-day technical activities of their company, but they must also effectively provide vision that will lead, inspire and motivate employees.

Project managers have to fulfil two prime responsibilities in managing a project: the technical components of the project like: planning, scheduling, budgeting, statistical analysis, monitoring and controlling involved in the various knowledge areas and processes and managing the people in such a way so as to motivate the team towards successful completion of the project goals. The main efficiency of a project manager lies in getting the toughest and challenging work done through people rather than reporting its disaster status to the management.
Even though extensive literature is available on leadership, management and behavioral skills, addressing issues like: leadership style, stress, uncertainty, motivation, learning and teamwork, still a very small portion of literature specifically addresses relevant leadership styles for software project managers.

In the year 1994, the Standish Group was the first, to conduct a research study to understand the impact and magnitude of software project failure, the factors causing software failure and the factors that could increase the potential for software project success. The results of the report issued are based on the collection of project case information on real-life IT environment and software projects. Its new database has just under 50,000 projects which are surveyed to find and interpret the results.

The Chaos reports of Standish Group from the beginning i.e. from the year 1994 showed a shocking result stating that 31.1% of projects are cancelled before they ever get completed and 52.7% of projects cost 189% of their original estimates. The average success rate was only 16.2% for the software projects that are completed on-time and on-budget.

The recent CHAOS reports for the year 2011, 2012, 2013, 2014 and 2015 revealed the following information, as showed in Table 1.1:

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful</td>
<td>29%</td>
<td>27%</td>
<td>31%</td>
<td>28%</td>
<td>29%</td>
</tr>
<tr>
<td>Challenged</td>
<td>49%</td>
<td>56%</td>
<td>50%</td>
<td>55%</td>
<td>52%</td>
</tr>
<tr>
<td>Failed</td>
<td>22%</td>
<td>17%</td>
<td>19%</td>
<td>17%</td>
<td>19%</td>
</tr>
</tbody>
</table>

**Source:** The Modern Resolution (on time, on budget, with a satisfactory result) of all software projects from FY 2011-2015 within the new CHAOS database.

It can be seen from the above table, that though the success rate of the projects are almost constant over the past several years due to improvement in processes, methods, skills, tools, decisions, cost optimization, internal and external influences, still the average success rate for projects is approximately 29%, which is very low. The average rate for the challenged projects comes to approximately 52%; this shows that more than half of the projects exceed their time limit, are over budget, suffer in terms of quality/poor performances or do not meet other specifications. For the failed projects, the average rate comes to approximately 19%,
which means that these many projects are cancelled every year. These figures implies that there is something, definitely important which is missing from the IT project environment.

The reports suggested that the solution to achieve project objectives that meet stakeholders’ expectations and to reduce the number of challenged or failed project lies in project manager's acquisition of the behavioural skills and adaption of the role of a business leader. In another research study conducted by Cambridge University’s School of Business and Economics, Zhang & Faerman (2007) found that 80% of projects failed because of poor leadership.

Hauschildt et al. (2000) reported that the success of a project depends more on human factors, such as project leadership, top management support and project team, rather than on technical factors. They also found that the human factors increased in importance as projects increased in complexity, risk and innovation. The researchers found that the project manager's leadership ability had a direct correlation to project outcomes. Their findings further suggested that poor leadership skills reflected limited or no teamwork, inadequate communication and an inability to resolve conflicts.

Tornatzky & Fleischer (1990) found that projects failed to achieve successful results because of three factors: the organizational background, the external environment and the technological framework. Failure in the organizational context can be attributed to leadership, corporate culture, corporate project knowledge base and top level support. Failure in the external environment is linked to competitors, suppliers, customers, vendors, government and education. Failure in the technological framework can be hardware, software and telecommunications or a combination of the three areas.

Kumar (2000), in a study of reengineering projects, found that failure was primarily linked to the organizational context and could attribute to lack of leadership, organizational culture, lack of integration and lack of commitment by senior management.

Leadership can also be considered as an exclusive contributor to failure, as it supersedes all other organizational factors. According to Shore (2005), leadership affects corporate culture, project culture, project strategy and project team commitment. It also affects business process reengineering, systems design and development, software selection, implementation and maintenance. *Without appropriate leadership, the risk of project failure increases.*
Although leadership has been identified as critical to the success of software projects still, the topic of leadership in relation to project success has not been adequately explored. There are a variety of leadership styles that may be applicable for dealing with the challenges faced by project management. Leaders need to identify them and provide leadership that encourages followers and employees to take on ownership of issues and problems, to think creatively to solve business problems and to demonstrate self-sacrifice for the good of the team and the organisation.

The successful attainment of organizational objectives is mainly determined by the quality of relationship that exists between the project leader and his team. The success of the leader depends upon the level of support that he receives from his team. The earlier leadership theories focused on how leader's behaviour influenced followers’ attitudes, motivation and group effectiveness. The later theories concentrated on the importance of the followers in supporting leaders in accomplishment of organizational objectives. Presently, the leader-member exchange theory (LMX) developed upon the social exchange process between the leader and the subordinate is considered to be worth, as it explores how leaders/managers develop relationships with team members and explains how those relationships can contribute towards growth of the organization or hold people back.

Burns (1978) sought to establish that leadership can be viewed either as a transactional or transformational process. Transactional leaders tend to focus more on task completion, influence followers through goal setting, well defined performance, feedback and rewarding for achieving the desired results. Burns concept of transformational leadership refers to transforming the thoughts of the followers and creating commitment for the strategies, objectives and mission of the organization.

According to Bass (1985), transformational leaders inspire others, create vision and set direction. This approach would encourage greater commitment, loyalty, trust and respect from employees and increase the overall effectiveness of the organization. Bass (1985) further expanded and refined the theory of transformational leadership and argued that while transactional leadership is based on the exchange process but transformational leadership appeals to the person's deeply held value system. The primary focus of transformational leadership style is to achieve organizational objectives through followers’ development and empowerment.
Researchers believe that there is one more style of leadership in leader-member exchange theory (LMX), the Laissez-Faire leadership. The leaders exhibiting this leadership behaviour takes a “hands off” approach to management, delays decisions and does not consider himself accountable or responsible for any kind of deviations.

Burns (1978) and Bass (1985) along with many other researchers believe that transformational leadership is the key towards future success. Previous researches have indicated that a manager's leadership style can affect an employee's willingness to exert extra effort, satisfaction and effectiveness with the leader. Burns and Bass have identified a model that focuses on three key leadership behaviours: Transformational, Transactional and Laissez-Faire leadership. Over the period, this model has been refined and current researchers have found that the term Laissez Faire should be replaced by Passive or Avoidant leadership.

Technical leadership refers to the leadership of employees engaged in technical/scientific occupations, such as engineering, information technology and research and development activities. According to Thite (1997), scientific/technical employees, particularly in the IT industry, possess certain distinguishing personality traits and occupational characteristics, such as high need for autonomy, achievement orientation, first and foremost loyalty towards profession and second towards organization, craftsmanship approach, association with logic or absolutes, project orientation, bifurcated career path, youth, mobility, isolation from corporate society, intenseness and sensitivity towards work. Therefore, technical leaders in a high-technology world need to be "High-touch", i.e. they must possess certain distinguished skills and competencies, so that they are able to handle the group of such dynamic personnel.

According to the leadership literature, there is no one leadership style that is always fully effective to handle the complexity of IT projects or to achieve desired level of output. Project managers who exhibit only passive/avoidant leadership tend to produce less than desirable results, lower follower motivation and are seen by followers as ineffective project managers. Other, group of project managers which exhibit only transactional and technical leadership tend to produce average results like: projects are completed but they do not meet their specific time, quality or cost requirements.

It is observed that different situations or phases require different kinds and styles of leadership to be implemented by the project manager. Therefore, a leadership model which
uses transactional, technical and a small proportion of passive/avoidant leadership, is viewed as a leadership **combination model** which can lead to desired/expected output.

However, by adopting **transformational leadership** methods, along with the above leadership combination model, the project manager can **enhance or augment** the effectiveness of his/her leadership behaviour. In an ‘optimum’ leadership model, proactive transactional, technical behaviours and reactive passive/avoidant leadership behaviours should be combined with transformational leadership behaviours to achieve extra or performance beyond expectations.

Researchers believe that project monitoring and control is a difficult and often imprecise process. Therefore, a project manager must constantly look out for various cues and information, to track projects performance throughout the implementation stages. Further, the more complex the project is, the project managers are more likely to be faced with technical, human and budgetary issues. As a result of the complexity involved in project management which demands the project manager's time, the project management process has seen the rise, increasing acceptance and use of a wide variety of tracking systems.

Jeffrey K. Pinto and Dennis P. Slevin (1990) has identified ten critical project success factors and named them as strategy and tactics factors. As the project moves forward through its life cycle, the project manager must be able to effectively transition from strategic to tactical issues in order to enhance project success. Also there is a need to explore the significant style of project leadership which must be implemented by the project manager at various phases of the project life cycle.

The need for a further study on these areas led to the research on this topic. The objective of this research is to provide additional insight into leadership with project management by determining the difference in leadership styles of successful, challenged and failed projects and to study whether there is a relationship between project leadership outcomes and effective leadership style of project managers. Thus, the contribution of this research is three-fold: First, it throws more light on the nature, characteristics and importance of technical leadership, in general and IT project leadership, in particular. Second, it adds to the research on transformational leadership by testing its relevance, predictability of success and augmentation effect in an IT project environment. Third, it finds out the most effective leadership style at various phases of the project life cycle, the dominant critical success
factors of Project Implementation Profile (PIP) at each phase and also proves that there is robust presence of critical success factors in successful projects than challenged and failed projects.

Through the examination of the available literature on leadership styles, IT software project management, project life cycle, technical leadership factors and critical success factors of Project Implementation Profile (PIP), the survey instrument has been developed and statistical analysis has been done to interpret the results about the research which attempts to find out the effective leadership style for project management of software development projects of CMMI level 5 software companies of Pune.

1.4 Background
After reviewing the history of project management research it was found, that the project management principles between the years 1960's till 1990's considered, planning and scheduling as their key aspects. In 1990's concentration was laid in the domain of scheduling, controlling and automated tools, which led to the development of research in the area of risk management planning and life cycle costing, for tracking and measuring the technical elements of projects.

Then, a study by Hauschildt et al. (2000) concluded that a project’s technical components, make up only 50% of the challenge of executing and completing a project. The researchers further claimed that the other 50% of the challenge is involved in the organizational and human aspects of leadership and team building. Therefore, modern project management i.e. the project management practices, since late 1990's has shifted its focus more on managerial and human aspects of project work rather than technical aspects. The concepts of leadership and team building have been applied to address the problems related with project success. Despite emphasis on leadership skills in the current period, still there are huge number of projects that fail to achieve successful outcomes. These projects fail despite the use of established project management methodologies and techniques as the project managers are not aware which leadership competency is required for successful project outcomes. Project managers use a variety of leadership approaches but they are not necessarily effective, due to the absence of formal leadership training among project managers. According to Pomfret (2008), the basic principles and methodology that defines the approach to project management are defined by the Project Management Body of Knowledge (PMBOK), but this body does not provide guidelines for leadership in a project environment.
What kind of leadership is necessary to help employees transform themselves, to demonstrate personal sacrifice for the benefit of their company and to help their company move forward to the next level and beyond, this is a critical question for business. *Research proves that there is a dearth of research work conducted on effective leadership style in the project management domain.*

1.5 Statement of the Problem

Leadership appears to be the easiest looking but difficult concept, to fully apprehend and understand. Burns (1978) commented that “leadership is one of the most observed and least understood phenomenon on earth”. This statement appears to be relevant in the present scenario as well. The kind of attitude, characteristics or leadership behaviour that has a positive impact on the followers is a mystery even today.

Software development is carried out through projects. *Despite setting up best project management methodologies and virtuous technologies, still a large number of software projects do not succeed. The reasons could be many, but the most prominent is “ineffective leadership”. A survey of managers published by Thayer, Pyster and Wood (1981) identified the commonly experienced problems during software project development. They are as follows:*

- Poor estimates and plans.
- Lack of quality standards and measures.
- Lack of guidance about making organisational decisions.
- Lack of techniques to make progress visible.
- Poor role definition.
- Incorrect success criteria.

Similarly, perception of the **project team members** about problems faced during software project development are as follows:

- Inadequate specification of work.
- Management ignorance of Information Technology.
- Lack of knowledge of application area.
- Lack of standards.
- Lack of up to date documentation.
- Preceding activities not completed on time, including late delivery of equipment.
- Lack of communication between users and technicians.
- Lack of communication leading to duplication of work.
- Lack of commitment, especially when a task is tied with one person, who then moves.
- Narrow scope of technical expertise.
- Changing statutory requirements.
- Deadline pressure.
- Lack of quality control.
- Remote management.
- Lack of training.

Most of the **problems** identified by the research study are caused due to *display of poor attitude and leadership behaviour by the project manager*. The need for effective leadership is accepted among academicians and practitioners in the domain of project management. In spite, of this fact the **leadership style that mostly influences** the followers and is helpful to successfully deliver the project is **unknown**.

The information technology sector has proved to be India's fastest growing sector. The software and service industry, a major component of IT sector showed significant momentum, which is much higher than other industries in the country. According to NASSCOM's strategic review for 2015, the number of IT professionals have grown at a significant rate of 3.7 million in 2010 to 5.8 million in 2015. Despite the prominent growth in software sector, there are certain **important issues and challenges**.

- **Attrition**: Global demand for software professionals has resulted in a heavy turnover and increased salary costs for the Indian software service industry. In a recent survey, the Indian software companies indicated that irrespective of their age, size and market focus, manpower shortage and employee attrition are the most serious problems affecting them. Studies suggest that, the average cost of replacing an employee comes to about one hundred and twenty percent of his/her salary.

- **Difficulties in attracting talent**: Software companies are now competing for market share for their products and services and also for the talent required to produce them. A company's success in the business market is determined by its success in the talent market. Although business markets are increasing but talent markets are shrinking. The shortage of talent has created a lot of problems like:
  - Loss of critical system knowledge.
✓ Escalating salaries and benefits.
✓ Increasing product and service costs and
✓ Unfinished work.

- **Mentoring:** Junior team members look forward to interacting with senior team members. However, the latter consider mentoring as an unnecessary drag on their busy schedule and thankless job. The temporary nature of the team makes the managers even more reluctant to invest time and effort in teaching junior members.

- **Knowledge Management:** The software companies are knowledge intensive. Many software professionals prefer to hold their expertise to create a niche for themselves in the organisation. It is a way to weed out their insecurity.

*So, the research tries to find out what kind of leadership style can be a solution for the above problems.* Software projects managers need to constantly interact with project team members, with members of other teams and with clients. Therefore, excellent interpersonal skills is a mandatory requisite for a software professional.

But the software professionals experience difficulties in understanding the stakeholders’ needs and relating with them due to their weak interpersonal skills. They are promoted to leadership positions based on their technical competencies and meanwhile, they also supersede some of their colleagues who are much older than them in experience.

According to Agrawal and Thite (2006), the project managers have trouble in managing people who are senior to them in terms of age and experience or people who were their colleagues until recently. Software professionals also reported difficulties in influencing people who do not report to them or relating to other module leaders. They also have difficulties in building good rapport with their superiors. Lack of planning skills and difficulties in balancing short term and long term objectives further add to the problems as experienced by them.

The findings of the study conducted by Agrawal and Thite (2006) at the Indian Institute of Management, Bangalore (IIMB) on software professionals, revealed that-

⇒ Motivation of the staff is particularly low in certain repetitious tasks, such as testing, documenting, maintenance and quality control.
⇒ The project managers have lack of power to provide discretionary rewards to project team members.
⇒ Managing teams consisting of people with different educational and cultural backgrounds with varying degrees of capabilities and commitments, is also considered as a major challenge by respondents.
⇒ Many of the team members are individually excellent and highly capable, but they are poor working in team.
⇒ The projects with shorter life cycles face the major problem of team building as the members are not conducive to bonding.
⇒ The team felt the need for sharing and utilization of knowledge within and between projects.
⇒ The team members expect that as a leader the project manager should provide opportunities for them to learn the latest in the field.
⇒ Perceived inequity in learning opportunities between different projects pulls the demand for development projects and lead to reluctance in demand to undertake maintenance projects.
⇒ There is lack of recognition and reward for knowledge generation, sharing and utilization.
⇒ Software leaders also have trouble planning and creating shared ownership for a vision.
⇒ The customers are prone for demanding frequent changes to their original specifications, so there is a need for the ability to cope with this.
⇒ System diagnostics, ability to manage growth and create infrastructure amidst frequent organizational change and ability to identify essential technology and convert them into opportunities are other aspects required by leaders in software industry.

1.6 Gap Analysis and Uniqueness of the Study

The project management literature suggests that projects usually fail not because of technical matters, but on matters related to personnel issues. Leadership is regarded as a critical success factor for successful project outcomes, as concentration on only technical skills would counter serious threat to the project and will not assure successful project outcomes. Project managers have to combine technical knowledge and expertise with effective leadership behaviours to bring the best out of their team and achieve successful project outcomes.
The empirical evidences regarding leadership influence on project success have not provided much guidance in terms of specific leadership styles that are associated with successful project outcomes. *The principles and methodologies of project management are defined by the Project Management Body of Knowledge, issued by the Project Management Institute, but this body does not provide guidelines pertaining to the type of leadership style which is best suitable for technical projects.* Hence an effort has being made by the researcher in this regard.

Thus, the research study tries to find out whether, **BASS AND AVOLIO’S -“FULL RANGE OF LEADERSHIP MODEL”** available in the existing literature, can contribute to overcoming many of the leadership challenges faced by software project managers or not. *The objective of this study is to add to the existing body of project management leadership literature by investigating whether or not transformational, transactional, passive/avoidant and technical leadership can be an appropriate style of leadership for improving project success. It was also the motive of the study to find out which of the four leadership styles facilitate the followers to attain highest level of performance at the work place.*

The current investigation fulfills the gaps of the prior empirical work in at least **five** ways:

1. The study believes that one leadership style is not effective to achieve project success. Therefore, it integrates the different leadership styles transformational, transactional, passive/avoidant and technical and tries to find out whether significant relationship exist between these particular leadership styles and leadership outcomes, like: project team members’ willingness to exert extra effort, project manager’s effectiveness and satisfaction with the project manager.

2. The total population consisted of practicing project managers and his technical team members in software project management. Presently, there are very few empirical studies that examine the relationship between leadership style of project managers and his project team's willingness to exert extra effort, perception of leader's effectiveness and satisfaction with the leader.

3. To make the study relevant for the software industry, elements of technical leadership were also deliberated.
4. This study adds value to the existing leadership literature by finding out the significant leadership style to be practiced by project managers and the critical success factors of the Project Implementation Profile (PIP) that should be focused at each phase of the project life cycle along with verifying that there is a robust presence of critical success factors of Project Implementation Profile (PIP) in successful rather than challenged and failed projects.

5. The study also attempted to verify the augmentation effect of transformational leadership over the other leadership styles and also finds out whether transformational leadership is able to achieve outcomes beyond expectations.

Further there is a dearth of research focusing on significant leadership style in software project management domain. In summary, the results of this research contribute to project management field by making the project managers aware that the leadership style exhibited by them have an impact on the behavior of project team members which ultimately affect organizational outcomes. Thus, it plays a small role in bringing an old idea of leadership into limelight in Pune's software industry.

The current research study is unique in the sense as it attempts, to propose a new leadership model which capture the key behaviours of transformational, transactional, passive/avoidant and technical leadership and phases of project life cycle along with critical success factors leading to positive and better outcomes quantitatively and qualitatively. According the derived knowledge from the existing literature, the researcher developed her own model and formulated the hypotheses. Then, it was tested on software project managers of Pune city by conducting a survey.

1.7 Justification for Research:
1.7.1 Need for the Study

Lowry, Morgan and FitzGerald (1996) argue that managerial, organizational and cultural factors, rather than technological determine success in the IT industry.

In a study done by Lowry et al. (1996), IT staff described their ideal manager in metaphorical terms as: a coach, one who manages by walking around, diplomat, stands up for staff, open door policy, promoter of the best in people, juggler, directional, maintains momentum, a large ear and superman.
According to Bates (1994), “the key ingredient to effective project management is good people management and leadership skills. The more complex the people situation, the more critical a project manager’s leadership capabilities become”.

Ganey (1995) argues that “in today’s corporations, tremendous responsibility lies with the IT project manager, who must take the corporation’s vision and translate that vision into systems that support the company’s strategic direction”.

The growth of Information Technology (IT) industry is critical for any economy and especially for the economies of developing countries like India; as it is the major contributor of foreign exchange earnings, generating employment and increasing the Gross Domestic Product (GDP) of the country. Software is the backbone of IT. The software professionals consist of systems analysts, developers, programmers, technicians, project managers etc. These software professionals support and maintain current systems. They build new applications and integrate them with other systems already in place. Their technical expertise is extremely critical to a company’s success and it can become quickly out-of-date. IT professionals always need to continually grow and learn about new upgrades, new enhancements and new directions in IT. A wrong decision taken can cost millions of dollars and force a company to fall behind the competition.

As the professionals of this industry are working in so much stress and burnout, there is definitely a need to motivate these people so that they can reach their maximum potential, channelize their energies in attaining organisational goals and can take wise critical decisions. The Indian Software industry is the highest paying industry in India, still it contains maximum dissatisfaction among the people, therefore studies should be made on how to deal with these people and also to find out the best possible way to manage them.

Good leadership skills lead to satisfied workers, creating high performing team members who understand the goals and are encouraged to reach those goals. Thus, work flows more smoothly and efficiently. Everyone stays focused on business goals, decreasing wasted time and effort. Staff become much more comfortable and even "happier" at their jobs and happy workers are more productive, more likely to stay than leave and more likely to take the business's well-being seriously.

Although since 1980's substantial research has been done on transformational, transactional and passive/avoidant style of leadership, but there has been limited research conducted in the
software sector of IT. It is important to investigate the differences in perceptions of the software project managers and their project team members and to identify the style of leadership under which these project team members perform their best. It is generally recognised that technical employees lack leadership skills to effectively manage people. While there is a dearth of empirical research in the project management literature that focuses on leadership as a critical success factor, leadership researchers also have ignored the occupational characteristics of technical leaders. Accordingly, there is a need of the study to empirically examine the nature and importance of leadership in IT project management and explore the leadership characteristics of successful project managers.

Also, there is widespread dissatisfaction about the performance of information technology projects. Wateridge, quoted a survey which reported that twice as many IT projects are considered to be 'less successful' than are considered to be successful and indicated that there is lack of research in examining the success factors. Therefore, there is a need to analyse the critical success factors of IT projects and their crucial role in determining the success of a project. A project manager has to understand that successful project management plays an important role in contemporary business. To accomplish successful project delivery, he has to do more than simply work within predefined project management constructs and techniques. One major additional element is team leadership, but understanding how leadership works from the project management perspective remains unclear, therefore there was a definite need for such type of research.

1.7.2 Purpose of the Study
The purpose of this study was to investigate the differences in leadership styles (transformational, transactional passive/avoidant and technical) of project managers of successful, challenged and failed projects as perceived by themselves and their subordinates and to explore the relationship between integrated leadership styles of software project managers and the leadership outcomes, like: project team members’ willingness to exert extra effort, project manager’s effectiveness and satisfaction with their project manager. The objective was to add to the existing body of project management leadership research by investigating the type of leadership style that is effective at various phases of the project life cycle and what critical success factors of PIP need to be focused at various phases by the project manager to increase the chances of project success along with, to verify that there is robust presence of critical success factors of the PIP in successful projects rather than
challenged and failed projects. It also investigates the augmentation effect of transformational leadership style in the outcomes over remaining leadership styles (transactional passive/avoidant and technical) and also find out whether transformational leadership is able to achieve outcomes beyond expectations.

_The results of the study might be used to help software project managers, organizational leaders and chief executive officers to become more sensitized to the needs and perceptions of the diverse IT workforce. In addition, this study might enable the leaders to develop positive corporate culture within the organization more effectively. The results might yield increased chances of project success due to improved motivation and subordinates satisfaction._

1.7.3 Rationale
Leadership is believed to be an important aspect of project success, despite of the fact still only limited number of studies have been done on the topic. Transformational and transactional leadership, augmentation effect, has never been studied in the context of the project environment or project success in Indian software industry. Also, the most effective leadership style and critical success factors of the PIP at various stages of the project life cycle and their robust presence has never been explored before. For that reason, the research herein will contribute new knowledge to the study of leadership in project management.

1.7.4 Significance of the Study
Since, globalization the economies are witnessing tremendous growth worldwide and to implement this strategic change, everyone is recognizing the worth of common methodologies and competent employees for the execution of projects. Therefore, project management has emerged as a separate discipline and its techniques and methodologies may be a partial solution to the problem of implementing this strategic change.

According to Ives (2005), since the latter years of the 1980s, the links between the implementation of change and project management has been strengthened. Organizations experience, high level of uncertainty and change which challenges traditional systematic approaches to project management which mainly focused on project processes, tools and techniques and less on the leadership behaviours of projects.

_This study is designed to determine what kind of leadership style can contribute towards project success. The results from this study could benefit project management practitioners by providing specific constructs that can be applied towards improving the current approaches_
to project management leadership. The study will add to the existing body of knowledge on leadership in project management.

1.8 Objectives
The objectives of the current research are to study the following characteristics:

- To investigate the differences in leadership styles and behaviours of project managers of successful, challenged and failed projects as perceived by themselves and their subordinates (project team members).
- To explore the relationship between integrated leadership styles of software project managers and combined project leadership outcomes: project team members’ willingness to exert extra effort, project manager’s effectiveness and satisfaction with the project manager, in successful, challenged and failed projects.
- To study the augmentation effect of transformational leadership style, in all the three leadership outcomes, over other leadership styles (transactional, passive/avoidant and technical).
- To explore whether the project managers who score higher on transformational leadership style can get better/extra outcomes from their project team members.
- To find out the most effective leadership style at each phase of the project life cycle.
- To explore the dominant critical success factors of the Project Implementation Profile (PIP) at each phase of project life cycle.
- To investigate whether there is robust presence of critical success factors of the Project Implementation Profile (PIP) in successful projects rather than challenged and failed projects.
- To propose a new leadership model which capture the key behaviours of transformational, transactional, passive/avoidant and technical leadership and phases of project life cycle along with critical success factors leading to positive and better outcomes quantitatively and qualitatively.

Many researchers use the Multi factor leadership questionnaire-MLQ (5X-Short Form) to identify the leadership styles used by the participants in their studies. This study also make use of the MLQ (5X-Short Form), but add to it, components of technical leadership style, phases of the project life cycle and the components of critical success factors of the Project Implementation Profile (PIP), according to the research objectives of the current study and makes it an extended version of the MLQ.
The researcher in the present study was interested in determining, the differences in leadership styles and behaviours of project managers of successful, challenged and failed projects as perceived by themselves and their subordinates. The relationship between integrated leadership styles of software project managers and combined project leadership outcomes: project team members willingness to exert extra effort, project manager’s effectiveness and satisfaction with the project manager, in successful, challenged and failed projects was also explored in this current study. The researcher also studied the augmentation effect of transformational leadership style over other leadership styles (transactional, passive/avoidant and technical), with respect to all the three leadership outcomes and explored whether the project managers who score higher on transformational leadership style can get better/extra outcomes from their project team members.

To find the most effective leadership style at each phase of the project life cycle and to explore the dominant critical success factors of the Project Implementation Profile (PIP) at each phase of project life cycle was also the motive of the researcher. In addition, the researcher wanted to investigate, whether there is robust presence of critical success factors of the Project Implementation Profile (PIP) in successful projects rather than challenged and failed projects.

Finally, the current research study attempts, to propose a new leadership model which capture the key behaviours of transformational, transactional, passive/avoidant and technical leadership and phases of project life cycle along with critical success factors leading to positive and better outcomes quantitatively and qualitatively.

1.9 Research Questions

According to Malhotra (1996), research questions are refined statements of the specific components of a problem. The study examined the relationship between the full range of leadership model comprising of transformational, transactional and non-transactional or passive/avoidant leadership along with technical leadership style of IT managers and the three leadership outcomes like: project team members’ willingness to exert extra effort, project manager’s effectiveness and satisfaction with the project manager as perceived by themselves and their subordinates. It tries to find out the augmentation effect of transformational leadership style in the outcomes over other (transactional, passive/avoidant and technical) leadership styles. The study also explores the most effective leadership style required at each phase of the project life cycle along with the dominant critical success
factors of the PIP that should be focused. It also verifies that there is robust presence of critical success factors of PIP in successful projects rather than challenged and failed projects.

The following questions were used to guide the research in lieu of the gaps identified.

- **Research Question 1:** Is there a difference in the leadership styles (Transformational, Transactional, Passive/Avoidant and Technical) of the project managers (both self-perceived and subordinates-perceived) with respect to successful projects?

- **Research Question 2:** Is there a difference in the leadership styles (Transformational, Transactional, Passive/Avoidant and Technical) of the project managers (both self-perceived and subordinates-perceived) with respect to challenged projects?

- **Research Question 3:** Is there a difference in the leadership styles (Transformational, Transactional, Passive/Avoidant and Technical) of the project managers (both self-perceived and subordinates-perceived) with respect to failed projects?

- **Research Question 4:** Is there a significant relationship between (both self-perceived and subordinates-perceived) integrated leadership styles (Transformational, Transactional, Passive/Avoidant and Technical) of project manager and combined project leadership outcomes (project team member’s willingness to exert extra effort, project manager’s effectiveness and satisfaction with the project manager) in successful, challenged and failed projects?

- **Research Question 5:** Is there an improvement in the predictive ability of the model (Transactional, Passive/Avoidant and Technical leadership predicting all three project leadership outcomes: project team member’s willingness to exert extra effort, effectiveness of the project manager and satisfaction with the project manager) for successful, challenged and failed projects after Transformational leadership is added to the model?

- **Research Question 6:** Do Project Managers who scored higher on Transformational leadership style get better/extra outcomes from their project team members in comparison to those who scored lower on Transformational leadership style?

- **Research Question 7:** Is there a difference in the effectiveness (both self-perceived and subordinates-perceived) of the leadership styles (Transformational, Transactional,
Passive/Avoidant and Technical) of the project manager at various phases (initiation, planning, execution, monitoring & control and closure) of the project life cycle?

- **Research Question 8:** Is there a difference in the criticality (both self-perceived and subordinates-perceived) of the success factors of the Project Implementation Profile (PIP) at various phases (initiation, planning, execution, monitoring & control and closure) of the project life cycle?

- **Research Question 9:** Do successful projects exhibit robust presence of the composite ten critical success factors of the Project Implementation Profile (PIP) in comparison to challenged and failed projects?

### 1.10 Hypotheses

Based upon the research questions, identified due to research gaps in literature review, the following hypotheses were formulated and tested:

**Hypothesis No.1**

**Ha1:** Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) of the project managers (both self-perceived and subordinate-perceived) differ in magnitude with respect to successful projects.

**Hypothesis No.2**

**Ha2:** Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) of the project managers (both self-perceived and subordinate-perceived) differ in magnitude with respect to challenged projects.

**Hypothesis No.3**

**Ha3:** Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) of the project managers (both self-perceived and subordinate-perceived) differ in magnitude with respect to failed projects.

**Hypothesis No.4**

**Ha4:** There is a significant relationship between (both self-perceived and subordinate-perceived) integrated leadership styles (Transformational, Transactional, Passive/Avoidant and Technical) of project manager and combined project leadership outcomes (project team member’s willingness to exert extra effort, project manager’s...
effectiveness and satisfaction with the project manager) in successful, challenged and failed projects.

**Hypothesis No.5**
This hypothesis seeks to establish the augmentation effect. It is further divided into three sub-hypotheses; 5a, 5b and 5c.

**Hypothesis-5a**
Ha5a: There is an improvement in the predictive ability of the model (Transactional, Passive/Avoidant and Technical leadership predicting project team members’ willingness to exert extra effort) for successful, challenged and failed projects after Transformational leadership is added to the model.

**Hypothesis-5b**
Ha5b: There is an improvement in the predictive ability of the model (Transactional, Passive/Avoidant and Technical leadership predicting effectiveness of the project manager) for successful, challenged and failed projects after Transformational leadership is added to the model.

**Hypothesis-5c**
Ha5c: There is an improvement in the predictive ability of the model (Transactional, Passive/Avoidant and Technical leadership predicting satisfaction with the project manager) for successful, challenged and failed projects after Transformational leadership is added to the model.

**Hypothesis No.6**
Ha6: Mean values of project leadership outcomes (project team members’ willingness to exert extra effort, project manager’s effectiveness and satisfaction with the project manager) differ across high, medium and low Transformational leadership.

**Hypothesis No.7**
This hypothesis seeks to find out the most effective leadership style at various phases of the project life cycle. It is further divided into five sub-hypotheses; 7a, 7b, 7c, 7d and 7e.

**Hypothesis-7a**
Ha7a: Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) differ in effectiveness (both self-perceived and subordinates-perceived) during
initiation phase of the project life cycle (leadership styles have different weights during initiation phase).

**Hypothesis-7b**

**Ha7b:** Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) differ in effectiveness (both self-perceived and subordinates-perceived) during planning phase of the project life cycle (leadership styles have different weights during planning phase).

**Hypothesis-7c**

**Ha7c:** Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) differ in effectiveness (both self-perceived and subordinates-perceived) during execution phase of the project life cycle (leadership styles have different weights during execution phase).

**Hypothesis-7d**

**Ha7d:** Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) differ in effectiveness (both self-perceived and subordinates-perceived) during monitoring and control phase of the project life cycle (leadership styles have different weights during monitoring and control phase).

**Hypothesis-7e**

**Ha7e:** Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) differ in effectiveness (both self-perceived and subordinates-perceived) during closure phase of the project life cycle (leadership styles have different weights during closure phase).

**Hypothesis No.8**

This hypothesis seeks to find out the dominant critical success factors of the Project Implementation Profile (PIP) at various phases of the project life cycle. It is further divided into five sub-hypotheses; 8a, 8b, 8c, 8d and 8e.

**Hypothesis-8a**

**Ha8a:** Factors of Project Implementation Profile (PIP) differ in criticality (both self-perceived and subordinates-perceived) during initiation phase of the project life cycle (factors have different weights during initiation phase).
**Hypothesis-8b**

**Ha8b:** Factors of Project Implementation Profile (PIP) differ in criticality (both self-perceived and subordinates-perceived) during planning phase of the project life cycle (factors have different weights during planning phase).

**Hypothesis-8c**

**Ha8c:** Factors of Project Implementation Profile (PIP) differ in criticality (both self-perceived and subordinates-perceived) during execution phase of the project life cycle (factors have different weights during execution phase).

**Hypothesis-8d**

**Ha8d:** Factors of Project Implementation Profile (PIP) differ in criticality (both self-perceived and subordinates-perceived) during monitoring & control phase of the project life cycle (factors have different weights during monitoring & control phase).

**Hypothesis-8e**

**Ha8e:** Factors of Project Implementation Profile (PIP) differ in criticality (both self-perceived and subordinates-perceived) during closure phase of the project life cycle (factors have different weights during closure phase).

**Hypothesis No.9**

**Ha9:** One of the mean values is different from the rest.

**1.11 Methodology of Research**

This research make use of both positivist and interpretive paradigms because they describe and explain the actual scenario by using data collected from a questionnaire survey and through interview process. The quantitative and qualitative approaches are both relevant to different aspects of the research been conducted therefore, the researcher uses both questionnaires and interviews techniques to explore the facts from the participants. The study involves both exploratory research and descriptive research methods. Exploratory research was used to identify the gaps in the existing literature and provide an alternative solution considering the four leadership styles (transformational, transactional, passive/avoidant and technical) on the other hand descriptive research was conducted to explain the characteristics of participants and calculate the statistics. This study also involves two approaches for research, deductive approach and inductive approach. In this study, deductive approach was used, since the process was started by a literature review. As per the derived knowledge, the researcher developed her own model and formulated the hypotheses. Then, it was tested on
software project managers of Pune city by conducting a survey.

The research design has basically **two techniques**. The first was the **qualitative technique**, where the researcher collected and analysed the data through interviews of the senior/delivery managers. The data collected were about the typical organisation structure of software organisations, criteria to manage complexity of an IT organisation, roles and responsibilities of a project manager, average duration of project life cycle, average size of project team members in a project and brief discussion about selection of the software development model.

The second is a **quantitative technique** which is been used by the researcher to employ the replication principle by adhering to standardised methodological procedures, measured with the help of numbers and then analyse the data through various statistical tools. This research used an established and validated questionnaire to identify types of leadership, demographics and the levels of willingness to exert extra effort, effectiveness and satisfaction of managers using each of the four leadership styles. Moreover, this particular technique was used by the senior managers to identify three projects from their organisation as successful, challenged and failed based upon certain specific parameters. The research used SPSS version 21 to analyse the data.

The research used the Multifactor Leadership Questionnaires MLQ (5X-Short Form) to measure the dominant leadership styles of a sample of software project managers from successful, challenged and failed projects of CMMI level 5 software companies registered with NASSCOM Pune as perceived by themselves and their project team members. According to Bass (1997), the MLQ (5X-Short Form) has proven validity and reliability as a leadership instrument and is very popular among many researchers around the world. It makes use of three leadership styles transformational, transactional and passive/avoidant. Since, the research has been done for technical projects therefore, components of technical leadership are also been added to the questionnaire. The questionnaire also tries to find out the most relevant leadership style to be executed by the project managers at each phase of the project life cycle and the most dominant critical success factors at each phase of project life cycle. On the basis of the research survey, the augmentation effect of transformational leadership style on the leadership outcomes considering the other leadership styles (transactional, passive/avoidant and technical), then transformational leadership style leads to better outcomes and there is robust presence of critical success factors of Project Implementation Profile (PIP) in successful rather than challenged and failed projects were
also verified.

The survey questionnaire used five-point likert scale with closed ended questions. It had four parts: The first part gathered data on the demographics of participants, the second part ascertained the leadership styles of the project manager, the third part measures the effective leadership style at each phase of the project life cycle and the fourth part measures the dominant critical success factors of Project Implementation Profile (PIP) at each phase. A pilot survey was also conducted twice first before the final/main survey and then after the main survey where, researcher attempted to establish the trustworthiness of the findings by addressing issues like: validity and reliability.

Data analysis used several statistical tests to measure the dominant leadership styles, the levels of extra effort, effectiveness and satisfaction with the four leadership styles, augmentation effect, effective leadership style and dominant critical success factors at each phase of the project life cycle along with the verification of the presence of critical success factors of the PIP in successful projects rather than challenged and failed projects.

This research followed a **thirteen step research plan**, design as outlined in Table 1.2, below.

### Table 1.2: Steps in this Research Plan

<table>
<thead>
<tr>
<th>STEP</th>
<th>PROCESS</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Literature Review</td>
<td>Desk research on Leadership, Project Management, Project Implementation Profile (PIP), Information Technology, Software and Evolution of Indian software industry was done.</td>
</tr>
<tr>
<td>2</td>
<td>Construct conceptual/theoretical framework or model and overall research framework.</td>
<td>Constructed conceptual/theoretical framework and formed a model along with overall research framework. Investigated leadership instrument and added factors related with technical leadership, project life cycle and critical success factors of PIP.</td>
</tr>
<tr>
<td>3</td>
<td>Identify population and participants for the study.</td>
<td>Identified population and participants for the research, as 21 project managers and his 231 project team members consisting of project architects, business analysts, developers and testers working in seven CMMI software companies registered with NASSCOM Pune.</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Details</td>
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<tr>
<td>---</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>4</td>
<td>Organization Approval and discussion with the company representatives.</td>
<td>Organizations were approached, followed by survey, discussion and interviews with the senior/delivery managers.</td>
</tr>
<tr>
<td>5</td>
<td>Conduct Pilot Study (n=25; 2 project managers and 23 project team members).</td>
<td>The survey was conducted in a CMMI Level 5 software company, registered with NASSCOM Pune as identified in the sample.</td>
</tr>
<tr>
<td>6</td>
<td>Test the leadership styles of software project managers, effective leadership style and dominant critical success factors at each phase of project life cycle of a CMMI Level 5 software company registered with NASSCOM Pune.</td>
<td>Distributed the extended version of Multifactor Leadership Questionnaire (MLQ) to 2 project managers and their 23 project team members.</td>
</tr>
<tr>
<td>7</td>
<td>Perform reliability tests using Cronbach’s alpha method in the SPSS program version 21.</td>
<td>Ensured valid and reliable construct of the survey instrument for use in final data analysis, through calculation of Cronbach’s alpha.</td>
</tr>
<tr>
<td>8</td>
<td>Conduct main/final survey (n=252; 21 project managers and 231 project team members).</td>
<td>The survey was conducted in seven CMMI Level 5 software companies registered with NASSCOM Pune as identified in the sample.</td>
</tr>
<tr>
<td>9</td>
<td>Test the leadership styles of software project managers, effective leadership style and dominant critical success factors at each phase of project life cycle of CMMI Level 5 software companies registered with NASSCOM Pune.</td>
<td>Distributed the modified Multifactor Leadership Questionnaire (MLQ) to 21 software project managers of 7 Successful, 7 Challenged and 7 Failed projects of 7 different CMMI Level 5 software companies registered with NASSCOM Pune identified and their project team members working on the same projects to find out the most dominant leadership style of software project managers, most effective leadership style at each phase of project life cycle and also the critical success factors of Project Implementation Profile (PIP) at every phase.</td>
</tr>
<tr>
<td>10</td>
<td>Reliability tests using Cronbach’s alpha method with</td>
<td>Again identified validity and reliability of the survey instrument, using Cronbach’s alpha method.</td>
</tr>
</tbody>
</table>
the Actual respondents: N=206; 21 project managers and 185 project team members.

| 11 | Analyze data | Analysed data through SPSS version 21, using Friedman’s chi-square test, Pearson and Spearman Correlation analysis, Hierarchical Regression, MANOVA and One way ANOVA. |
| 12 | Interpret Results | Made interpretation about the current study by ensuring that the objectives of conducting research are fulfilled and the research questions are properly been addressed. |
| 13 | Develop Conclusions | The results can make significant contribution to the existing body of project management research. |

**Source**: Developed for this research

1.12 Outline of Chapters of Dissertation

The outline of the chapters of the dissertation is presented with the help of figure 1.2 below:

**Figure 1.2: Outline of Chapters**

```
Chapter One - Introduction

Chapter Two - Literature Review

Chapter Three - Conceptual Framework

Chapter Four - Research Methodology

Chapter Five - Data analysis and Interpretation

Chapter Six - Presentation of Findings and Discussions

Chapter Seven - Conclusions
```

**Source**: Developed for this research
Chapter One - Introduction:
This chapter provides a brief overview of the background to the research, statement of problem, need and purpose for the study and methodology of research.

Chapter Two - Literature Review:
This chapter is divided into sections.

Section I: provides an overview of the literature on leadership theories and leadership styles. The leadership styles examined are: transformational, transactional and passive/avoidant along with components of technical leadership style which are also been explored along with critical success factors of the Project Implementation Profile (PIP).

Section II: provides an introduction to information technology, definition and evolution of software, information technology industry and software development industry of India, concepts of project management, project management life cycle, software development life cycle, methodologies for quality assurance etc.

Chapter Three - Conceptual Framework:
This chapter presents the independent and the dependant variables of the research study, conceptual model framed, the hypotheses formulated based upon the research objectives and the research questions along with the overall research framework.

Chapter Four - Research Methodology:
This chapter presents the paradigm of this research, the research design, the population, sample, the questionnaire design, the procedure of the pilot study, the full survey, and the interview process. The Statistical Package for Social Science (SPSS), version 21 is used to evaluate the extended version of the MLQ (5X-Short Form).

Chapter Five - Data analysis and Interpretation:
This chapter presents the results of data analysis of this research, the hypotheses are been tested, evaluated and the research questions are been answered along with the analysis of the demographics of participants, examination of the leadership styles and outcomes, reliability and validity by various statistical tools like: Friedman’s chi- square test, Correlation, Hierarchical regression, MANOVA and ANOVA. The data for the successful, challenged and failed projects are compared and contrasted.

First the subordinates’ ratings on their project manager’s leadership behaviour and their
perceived effectiveness are discussed and later compared with the self-ratings of managers. Thereafter, using the subordinates’ ratings, the augmentation effect of transformational leadership style over other leadership styles has been proved. The most effective leadership style at each phase of the project life cycle has been found out along with the dominant critical success factors at each phase. The robust presence of critical success factors in successful projects rather than challenged and failed projects are also explored. The findings are examined and the results are used to propose a new model for leadership behaviours.

Chapter Six - Presentation of Findings and Discussions:
This chapter presents a brief account of the findings in relation to the hypotheses formulated. It goes on to analyse them one by one, in the light of previous research findings and theoretical and practical issues of the current study. It basically test the reliability of the proposed model based upon the results of the measurement instrument.

Chapter Seven - Conclusions:
This chapter presents answers to the research questions generated through literature review. It throws light on the applicability of the proposed model and limitations of this research. Research implications for leadership in organisations and research implications for project management in organizations are also discussed in this chapter. It also reflects recommendations for action for software organisations, recommendations for future research and conclusion.

1.13 Definition of Key Terms
The key definitions or terms used in this research are stated below:

Leadership: Leadership is the ability to make strategic decisions and make use of the human resource skills like: interpersonal relationship, motivation, decision making and emotional maturity, to mobilize subordinates who are part of project team towards achieving successful project outcomes.

Technical Leadership: Technical leadership refers to leadership of employees engaged in technical/scientific occupations such as engineering, information technology, and research & development (R&D).

Leadership in Project Management: Kodjababian & Petty (2007), characterized leadership in project management as the ability to accomplish the following:
Motivate a diverse group of team members to follow the leader,

See around corners and identify issues that need to be dealt with,

Anticipate and resolve people orientated issues that may derail the project,

Keep executive leaders properly informed of what is going on and how,

Identify and manage project and business risks.

**Software:** Software is a generic term for organised collection of computer data and instructions often broken into two major categories, system software and application software.

**System Software:** It consists of an operating system and some fundamental utilities responsible for controlling, integrating and managing the individual hardware component of a computer.

**Application Software:** It is used to accomplish tasks other than just running the computer system. Application software helps in accomplishing specific user oriented tasks.

**Project:** According to the definition offered by Cleland and Kerzner, in, A Project Management Dictionary of Terms, “A project is a combination of human and non-human resources pulled together in a temporary organization to achieve a specified purpose”.

It may also be defined as a temporary endeavour undertaken to create a unique product, service, or result.

**Information Technology Project:** A project where the prime project activity centres on information technology or computing activities to deliver a business requirement.

**Project Life Cycle:** The phases that connect the beginning of a project to its commercial closure.

**Project Management:** Project Management is the set of proven principles, methods and techniques for effective planning, scheduling, controlling and tracking of desirable activities that help to establish a sound historical basis for future planning of projects. According to Project Management Institute (2008), Project management is the disciplined use of processes, tools and techniques that leads to the accomplishment of specific set of objectives which are constrained by time and cost.
According to Johnson (1999), Project management is a process that spans the full life cycle of project from inception to completion. It is the application of knowledge, skills, tools and techniques to project activities to meet project requirements.

**Software Project Management:** It is a practical application of scientific knowledge in the design and construction of computer programs and the associated documentation required to develop, operate and maintain them. Software Project Management's aim is basically the production of a software that meets quality requirements, is delivered on time, within budget and satisfies end users requirements.

**Project Management Professional (PMP):** An individual who has met specific education and experience requirements set forth by the Project Management Institute, has agreed to adhere to a code of professional conduct and has passed an examination designed to objectively assess and measure project management knowledge. In addition, a PMP must satisfy continuing certification requirements or lose the certification.

**Project Management Organization (PMO):** An organizational unit to centralize and coordinate the management of projects under its domain.

**Project Manager:** According to Project Management Institute (2008), a project manager is the individual with overall responsibility for managing the project, also responsible for guiding the project towards the achievement of the desired objectives.

**Project Performance:** Project performance refers to the assessment of a project at its completion.

**Project Success:** According to Project Management Institute (2008), project success is being defined, as balancing the competing demands for project quality, scope, time and cost as well as meeting the varying concerns and expectations of the project stakeholders. The relative success or failure of the project is assessed by the senior/delivery manager of the respondent organisations are measured on the following parameters:

- **Deadlines:** The degree to which the project was completed on schedule.
- **Cost Effectiveness:** The degree to which the project was completed within budget.
- **Technical Efficiency:** The degree to which the project's specified quality requirements were satisfied.
- **Scope Effectiveness**: The degree to which the project scope was well defined to meet the end user's requirements effectively.
- **Overall Satisfaction**: The degree to which the product was able to provide satisfaction to the stakeholders and the end users.

**Critical Success Factors (CSFs)**: According to Boynton and Zmud (1984), CSFs are those few things that must go well to ensure success of an undertaking and must be given special and continual attention to bring out high performance.

**Leadership Effectiveness/Success**: The effectiveness/success of the leader is measured by the leaders themselves (self-perception) and the team members of the project (subordinates perception) on the following parameters:
- Ability of the project manager (leader) in representing his/her group to higher authority,
- Ability of the leader in meeting the job-related needs of his/her subordinates,
- Ability of the leader in meeting the requirements of the organisation, and
- The overall effectiveness of the group.

**Leadership Satisfaction**: The satisfaction with leadership based on self and subordinate perception are measured in terms of:
- Satisfaction with the leadership abilities of the project manager, and
- Satisfaction with the methods of leadership used by the project manager in getting his/her group’s job done.

**Information Technology**: Information Technology (IT) can be defined as ‘the hardware and software that is used to collect, transmit, process, and disseminate data (symbols) in an organisation’. It is a term used to describe technologies that hold, produce, manipulate, store, communicate or disseminate information. IT is related to computer communications, networks and information systems that enable exchanges of digital objects.

Information Technology includes all matters concerned with design, development, installation and implementation of information systems and applications.

**Project Team**: According to Project Management Institute (2008), the members of a project team are an interdependent collection of individuals who work together towards a common goal and who share responsibility for specific outcomes of the project. The dedicated
resources assigned to a project, which include the project leader, functional team leaders, technical and consulting support. Usually they belong to different groups, functions within the organization and are assigned to activities for the same project.

**Project Team Member or Team Member:** The project team member or simply team member is the person who reports directly or indirectly to the project manager and who is responsible for performing project work as a regular part of their assigned duties.

**Project Sponsor:** Typically a high-ranking manager who champions and supports a project.

**Failed Project:** A failed project is a project that is cancelled prior to completion or delivery and has never been used.

**Risk Management:** Includes the processes concerned with conducting risk management planning, identification, analysis, responses and monitoring and control on a project. These processes are updated throughout the project.

**Scope Management:** Includes the processes required to ensure that the project includes all the work required to complete the project successfully.

**Schedule:** The planned dates for performing scheduled activities and the planned dates for meeting scheduled milestones.

**Triple Constraint:** A framework for evaluating competing demands. The triple constraints is often depicted as a triangle where one of the sides or one of the corners represents one of the parameters being managed by the project manager or project team. In project management, these parameters are time, scope (performance) and cost.

**Phase:** The term phase refers to groups of activities. Project Management Institute (PMI) refers to ‘project phase’ as a collection of logically related project activities usually ending with completion of a major deliverable. In software project management a ‘phase’ is a collection of related activities or tasks that produce a deliverable or work product.

**Work Breakdown Structure (WBS):** A deliverable-oriented hierarchical decomposition of the work to be executed by the project manager or project team to accomplish the project objectives and create the required deliverables.
**Organizational Culture**: The organizational culture is a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid and therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems.

**Capability maturity model (CMM)**: A framework which describes the evolutionary stages of project management systems. It describes the principles and practices underlying software process maturity. It is intended to help software organizations improve the maturity of their software process in terms of an evolutionary path from adhoc chaotic process to mature, disciplined software processes.

The CMMI consists of a group of key practices which are divided into various levels representing the stages that organizations should go through on the way to becoming ‘mature’. The SEI has defined a rigorous process assessment method to appraise how well an organization satisfies the goals associated with each level. The assessment is supposed to be led by an authorized lead assessor.

**PERT Chart**: Program Evaluation and review Technique (PERT) chart depicts task, duration and dependency information. Each chart starts with an initiation mode from which the first task/tasks originates. If multiple tasks begin at each time, they are all started from the mode or branch out from the starting point.

**CPM Chart**: In Critical Path method (CPM) chart the critical path is indicated which consists of that set of dependent tasks (each dependent on the preceding one) that together take the longest time to complete.

**GANTT Chart**: The Gantt chart is a horizontal bar chart developed as a production control tool in 1917 by Henry C. Gantt, an American engineer and social scientist. Frequently used in project management, a Gantt chart provides a graphical illustration of a schedule that helps to plan, coordinate and track specific tasks in a project.

**Company (in present research)**: According to the framework of the research study, the term 'company' is used to denote the private software organizations.

**Body Shopping**: Individual software professionals are found suitable for employment by foreign company.
**Offshore software development**: Software development in Indian land.

**Onsite software development**: It refers to sending software developers to work at the clients premises by an Indian company for a specific job.

*Avolio & Bass (2004), the experts on Full Range of Leadership Model defines the following as:*

**Motivation**: According to Stone (2005), it is the internal state that can cause the staff to engage in particular behaviours, or a set of factors that lead staff to behave in certain ways.

**Multifactor Leadership Questionnaire**: MLQ (5X-Short Form) is a leadership instrument available in a validated form which contains 45 items for organisational survey and research purposes and for the preparation of individual leader reports.

**Transactional Leadership (TS)**: This type of leader, displays behaviours associated with constructive and corrective transactions. This style defines expectations and promotes performance to achieve these levels.

**Contingent Reward (CR)**: It is providing others with assistance in exchange for their effort, discussing in specific terms who is responsible for achieving performance targets.

**Management by Exception- Active (MBEA)**: This means focusing attention on irregularities, mistakes, exceptions and deviations from standards. MBEA concentrates full attention on dealing with mistakes, complaints and failures.

**Passive/Avoidance Behaviour**: This means avoiding specifying agreements, not clarifying expectations and not providing goals and standards to be achieved by followers.

**Management by Exception- Passive (MBEP)**: This is referred as failing to interfere until the problem becomes serious and waiting for things to go wrong before taking action.

**Laissez-Faire Leadership (LF)**: Leader avoids getting involved when important issues arise and also avoids making decisions.

**Transformational Leadership (TF)**: This type of leadership is a process of influencing, in which leaders change their associates awareness” of what is important, and move them to see themselves and the opportunities and challenges of their employment in a new way.
Idealised Influence-Attributes (IA): Here, the leader instils pride of association in others and goes beyond self-interest for the good of the group.

Idealised Influence-Behaviours (IB): In this, the leader always talks about important personal values and beliefs and emphasises the importance of having a strong sense of purpose.

Individualised Consideration (IC): In this, the leader spends time teaching and coaching and also helps to develop the strengths of the subordinates.

Inspirational Motivation (IM): The leader here, always talks optimistically about the future and also talks enthusiastically about what needs to be accomplished.

Intellectual Stimulations (IS): The leader re-examines critical assumptions to question whether they are appropriate and always seeks differing perspectives when solving problems.

Hybrid Leadership (Hybrid T/T): Combination of Transformational Leadership and Transactional Leadership.

Willingness to exert extra effort: The leader gets others to do more than what they expected to do and heightens others desire to succeed.

Effectiveness of the leader: Here, leaders are effective in meeting others job-related needs and they are effective in representing their group to higher authorities.

Satisfaction with the Leadership: Leaders here, use methods of leadership that are satisfying and they work with others in a satisfactory way.

1.14 Assumptions of the Study

This study was based on the following assumptions.

1. An assumption in this study was that transformational leadership theory was applicable to the study of software professionals.

2. It was assumed that the Transformational, Transactional, Passive/Avoidant and Technical Leadership factors as well as the outcomes like: extra effort, satisfaction and effectiveness were able to measure the performance of software professionals.
3. The assumption was that the extended version of MLQ (5X Short Form) survey was able to measure Transformational, Transactional, Passive/Avoidant and Technical leadership behaviours in the software industry, effective leadership style and dominant critical success factors at each phase of project life cycle.

4. It was assumed that software professionals that responded were able to evaluate fairly, honestly and objectively the skills of their project managers. It was also assumed that the software professionals would not be fearful of providing their opinions in the survey.

5. This study assumed that the respondents of software companies of Pune were representative of the software population as a whole of India.

1.15 Scope of the study
As already indicated in the previous sections, that this research mainly deals with significant leadership style of software project managers involved in software development projects. It also analyses the type of leadership style required at each phase of the project life cycle and the dominant critical success factors at each phase.

However, since this area is quite broad this sections aims to provide clarification on the extent of the current research. The scope of the study is bounded by three main characteristics as schematically shown in Figure 1.3.

![Figure 1.3: Scope of the study](image-url)

Source: Developed for this research
In terms of geographical coverage this study is dedicated to one single country i.e. India and one single city of India; Pune. Only those CMMI level 5 companies are chosen for participation which are registered with NASSCOM Pune. With this segregation all categories of software companies can be covered for the survey, i.e large, medium and small.

Software development industry comprises of the second boundary of research scope. This specific section excludes any other types of projects carried out in other industries. Only software project managers and his team members comprising of project architects, business analysts, software developers and testers who work in these companies participated in the survey. None of the interviews or questionnaire surveys were conducted in other industries.

In addition, different leadership styles, their significance and impact on outcomes were found out by exploring the existing literature on project leadership. The different phases of the project life cycle and critical success factors of Project Implementation Profile (PIP) were studied from the existing literature on project management aspects as they were the main focus area of the study.

Thus, overall the research is limited to identification of most suitable leadership style to be executed by software project managers to determine project success as well as finding out the most significant leadership style required at each phase of the project life cycle along with finding out the dominant critical success factors at each phase. Therefore, current research makes an effort to identify the most significant leadership style which has the highest impact on software development project success in India; Pune.

1.16 Limitation of this Study
The study included the following limitations.

⇒ One of the limitations of the research is that although the number of team members working on a project, educational qualification, experience, project size and budget could be same across the software firms, still the software giants like: Infosys, Wipro, TCS were not considered for the study, as obtaining data from software giants would have been problematic.

⇒ The perspectives of the project team members is an inherent limitation, due to their concern or fear that providing, negative input during the survey could have negative effects on their job.
⇒ The perspectives of the project managers is also an inherent limitation, due to their tendency to inflate their ratings and not openly share their outlook.
⇒ The researcher evaluated the different leadership styles of software project managers in relation to project success but other important aspects like the impact of gender or culture on the leadership style was ignored.
⇒ Open ended questions are not included in the questionnaire on the request of the delivery manager, so that respondents do not give any comments/suggestions in writing.
⇒ Finally, there are perhaps other limitations that have been ignored.

1.17 Summary

This chapter has presented the foundations of this dissertation and presented an overview of the research. The software development industry is a ‘sunshine’ industry of India, as it is contributing towards generation of employment and increasing the Gross Domestic Product (GDP) and thus boosting the economy of the country. The leaders or project managers hold a very important position in the organization, as they have to coordinate with all the stakeholders. They have to control and lead their staff to achieve the organization’s goals. Therefore, there leadership style plays a very crucial role towards encouraging and increasing the morale of the team members. The research tries to find out the significant leadership style to be executed by the project manager to achieve desirable project outcomes. Furthermore, the research focuses on the type of leadership techniques to be implemented at each phase of the project life cycle and the dominant critical success factors at each phase.

The following Chapter is divided into two parts. The first part provides a review of the literature on leadership and management, leadership theories and leadership styles, leadership instrument and critical success factors of Project Implementation Profile (PIP). The second part provides a review on an introduction to information technology, evolution and definition of software, information technology industry and software development industry of India, concepts of project management, project management life cycle, software development life cycle, methodologies for quality assurance etc. It also identifies the research gaps leading to generation of the research questions.