Chapter 6- Presentation of Findings and Discussions

6.1 Overview

Chapter 1 provided an introduction to this research on the significant leadership style for project management of software development firms executed in Information Technology industry of Pune. It also presented the foundation for this dissertation by briefing the current scenario of IT projects, background of research, statement of the problem, justification for the study, research objectives and research questions, hypotheses developed for the study, methodology of research, assumptions of research, scope and limitations of the study.

Chapter 2 consisted of two segments. The first segment of the chapter presented a review of literature on the importance of leadership in organizations and leadership theories. It highlighted the leadership instrument that has been used for the research and its application and also discussed the critical success factors of the Project Implementation Profile (PIP). The second segment provided an introduction to information technology, evolution and definition of software, software industry of India, software development life cycle, project life cycle, managerial aspects of software project development and leadership in project management.

This review helped to locate gaps in the existing literature on leadership styles and project management of software development projects. After examining the literature from both the segments the following Major Issues/Research Questions have emerged which formed the base for this dissertation:

- **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 successful projects?
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额外 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?
Chapter 3 explored the variables (independent and dependent), built the conceptual framework for the study, developed the hypotheses based upon the research objectives and the gaps identified in the current literature: research questions and also presented an overall research framework for the study.

Chapter 4 explained the research perspective and the research paradigm. It justified the research methodology and highlighted the research approach to find the most dominant leadership style in successful, challenged and failed projects of software firms, augmentation effect of transformational leadership style over other leadership styles (transactional, passive/avoidant and technical), most effective leadership style at various phases of the project life cycle and also the dominant critical success factors of Project Implementation Profile (PIP) at various phases of the project life cycle. It presented the research design, procedure for determination of sample size and the tools used to determine the reliability and validity of the survey instrument. It also provided a description of the statistical tools which have been used in this research to interpret the results.

Chapter 5 analysed the data which have been collected through the questionnaires duly filled in by the project managers and his team members of successful, challenged and failed projects. The researcher distributed the questionnaire to 21 Project managers and 231 Project team members from three different projects (successful, challenged and failed) that were almost in their completion stage. After two months of data collection the researcher obtained feedback from 21 projects managers and 185 project team members. Therefore, the response rate was 100% in case of project managers and 80% in case of project team members. There were no missing answers found by the researcher in any of the 206 (21+185) questionnaires. As the answers were complete they were used for data analysis by SPSS version 21.0.

The purpose of this chapter is to present a brief account of the findings in relation to the hypotheses formulated. It analyses them one by one, in the light of previous research findings considering the theoretical and practical issues of the current study. It basically test the reliability of the proposed model based upon the result of the measurement instrument. It also presents the findings of the discussions/interviews with the senior/delivery managers of the selected software firms.
This part begins with an overview of this chapter in Section 6.1. Section 6.2, presents the restatement of the problem. Section 6.3 and Section 6.4 reflects the presentation of findings and discussions for research question 1 and research question 2 while Section 6.5 and Section 6.6 reveals the presentation of findings and discussions for research question 3 and research question 4. The presentation of findings and discussions for research question 5 and research question 6 are shown in Section 6.7 and Section 6.8 while the presentation of findings and discussions for research question 7 and research question 8 are highlighted in Section 6.9 and Section 6.10. Section 6.11 addresses the presentation of findings and discussions for research question 9 and Section 6.12 reports the findings and discussions/interviews with the senior/delivery managers of seven selected CMMI level 5 software firms. This is followed by a summary of this chapter in Section 6.13.

The diagrammatic presentation of the structure of Chapter Six, is shown in figure 6.1.

**Figure 6.1: Structure of Chapter 6**

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6.1 Overview of Chapter
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6.2 Restatement of the Problem
   ↓
6.3 Presentation of Findings and Discussions for Research Question 1
   ↓
6.4 Presentation of Findings and Discussions for Research Question 2
   ↓
6.5 Presentation of Findings and Discussions for Research Question 3
   ↓
6.6 Presentation of Findings and Discussions for Research Question 4
   ↓
6.7 Presentation of Findings and Discussions for Research Question 5
   ↓
6.8 Presentation of Findings and Discussions for Research Question 6
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6.2 Restatement of the Problem

Over the past several decades, the study of leadership has become increasingly important, specifically for modern and complex business organizations. The information technology industry is a rapidly changing industry. Despite prominent growth in this sector, it had faced various issues and challenges, over past several years due to attrition, difficulties in attracting new talents, knowledge management, effective project management, mentoring etc. So, the research tries to find out whether effective leadership style can be a solution for these problems.

The leadership styles under investigation were transformational, transactional and passive/avoidant. These leadership styles together, are termed as the full range of leadership styles, as proposed by Full Range Leadership Theory. Since, the research is carried out in software industry, therefore components of technical leadership were also added to the theory. The study aimed to examine the effect of leadership styles on the three leadership outcomes: project team members’ willingness to exert extra effort, project manager’s effectiveness and satisfaction with the project manager.

The objective is to add to the existing body of project management leadership research by investigating the type of leadership styles that are effective at various phases of the project life cycle and what critical success factors of the Project Implementation Profile (PIP) need to be
focused at various phases of the project life cycle by the project manager to increase the chances of project success. It investigates the augmentation effect of transformational leadership style over remaining leadership styles and also tries to find out whether transformational leadership is able to achieve outcomes beyond expectations along with proving the robust presence of critical success factors in successful rather than challenged and failed projects. Both self-perceived responses of the project manager and the subordinates-reported responses were used for analysis. In few cases, where large sample size is required, only the responses of the project team members were taken into consideration.

6.3 Presentation of Findings and Discussions for Research Question 1

- **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?

The answer to this question emerged from analysis of data from the survey which was based on the MLQ (5X-Short Form), using a five point rating scale (where, 5= Frequently if not always, 4= Fairly Often, 3= Sometimes, 2= Once in a while and 1= Not at all). In all the questions beginning from **Question No. 1-49**, the respondents were asked to indicate how frequently his/her project manager displays the behaviour described. The researcher used a **Friedman chi square test**, to find out whether there is 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.

Questionnaires were distributed to 77 project team members of 7 successful projects from seven CMMI level 5 software organisations and out of the total, 62 project team members responded. In case, of project managers, questionnaires were distributed to 7 project managers and the response rate was 100%. To find an answer to the above research question, the following null hypothesis was formulated.

**Null Hypothesis → Ho1:** Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) of the project managers (both self-perceived and subordinates-perceived) do not differ in magnitude with respect to successful projects.
The null hypothesis was tested by computing the $\chi^2$ statistic and $p$ values at a significance level of $\alpha = 0.05$. The results of the test statistic of the project team members and the project managers indicated that leadership styles (Transformational, Transactional, Passive/Avoidant and Technical) of the project managers (both self-perceived and subordinates-perceived) differ in magnitude with respect to successful projects, due to lower $p$ values than level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

The study results indicated that Transformational leadership is the dominant leadership style for successful projects. It was also observed that apart from the leadership styles, the leadership behaviours of the project managers also differ. In the opinion of the project team members, the top three leadership behaviours displayed by project managers of successful projects were: Intellectual Stimulation, Inspirational Motivation and Individualized Consideration while the project managers opine that, the top three leadership behaviours displayed by them were: Intellectual Stimulation, Individualized Consideration and Idealized Behaviour.

These findings differ with the results found by Thite (1997), where, in his study he found that project managers of successful projects consider themselves to be more transformational while their project team members consider their project managers, to be more technical than transformational. But, here, the researcher found that both, the project team members and the project managers have similar opinion about, the display of transformational leadership style in their project.

The results of the current research are in line with previous studies on middle managers (Carless, 1995; Keller, 1992; Beatty & Lee, 1992) and support Bass and Avolio’s (1990) and argument that transformational leadership is not confined only to top level managers.

Summary: Overall, there is a broad agreement in the opinion of project team members and project managers in the dominance of leadership style of successful projects. As both the project team members and project managers perceive that in their projects the display of transformational leadership is more. They both believe that technical leadership is also important like transformational leadership followed by transactional and passive/avoidant leadership behaviours. For passive/avoidant leadership both, project team members as well as project
managers, believe that management by exception (passive) is more than laissez faire leadership behaviour.

6.4 Presentation of Findings and Discussions for Research Question 2

- **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?

The answer to this question emerged from analysis of data from the survey which was based on the MLQ (5X-Short Form), using a five point rating scale (where, 5= Frequently if not always, 4= Fairly Often, 3= Sometimes, 2= Once in a while and 1= Not at all). In all the questions beginning from Question No.1-49, the respondents were asked to indicate how frequently his/her project manager displays the behaviour described. The researcher used a **Friedman chi square test**, to find out whether there is 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.

Questionnaires were distributed to 77 project team members of 7 challenged projects from seven CMMI level 5 organisations and out of the total, 63 project team members responded. In case, of project managers, questionnaires were distributed to 7 project managers and the response rate was 100%. To find an answer to the above research question, the following **null hypothesis** was formulated.

**Null Hypothesis → Ho2**: Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) of the project managers (both self-perceived and subordinates-perceived) do not differ in magnitude with respect to challenged projects.

The null hypothesis was tested by computing the \( \chi^2 \) statistic and \( p \) values at a significance level of alpha 0.05. The results of the test statistic of the project team members and the project managers indicated that leadership styles (Transformational, Transactional, Passive/Avoidant and Technical) of the project managers (both self-perceived and subordinates-perceived) differ in magnitude with respect to challenged projects, due to lower \( p \) values than level of significance (0.05), providing sufficient evidence to **reject the null hypothesis**.
The study results indicated that Transformational leadership is again the dominant leadership style for challenged projects. It was also observed that apart from the leadership styles, the leadership behaviours of the project managers also differ. In the opinion of the project team members, the top three leadership behaviours displayed by project managers of challenged projects were: Idealized Behaviour, Inspirational Motivation and Individualized Consideration while the project managers opine that, the top three leadership behaviours displayed by them were: Idealized Attributes, Idealized Behaviour and Intellectual Stimulation.

These findings differ with the results found by Thite (1997), where, in his study he found that project managers of unsuccessful projects consider themselves to be more technical along with their project team members, who also have similar opinion about their project managers. But, here, the researcher found that both, the project team members and the project managers have similar opinion about, the display of transformational leadership style in their project.

**Summary:** Overall, there is a slight difference in the opinion of project team members and project managers in the dominance of leadership style of challenged projects. Both the project team members and project managers perceive that in their projects the display of transformational leadership is more but lower as compared to successful projects (but in the opinion of project managers it is same due to hyped figures). According to project team members this is followed by transactional leadership, technical leadership and passive/avoidant leadership while in the opinion of the project managers transformational leadership is followed by technical leadership, transactional and passive/avoidant leadership behaviour. For passive/avoidant leadership the project team members, feel that laissez faire leadership behaviour is more than management by exception (passive) leadership behaviour while in the opinion of the project managers management by exception (passive) leadership behaviour is more than laissez faire leadership behaviour.

**6.5 Presentation of Findings and Discussions for Research Question 3**

- **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?
The answer to this question emerged from analysis of data from the survey which was based on the MLQ (5X-Short Form), using a five point rating scale (where, 5= Frequently if not always, 4= Fairly Often, 3= Sometimes, 2= Once in a while and 1= Not at all). In all the questions beginning from Question No.1-49, the respondents were asked to indicate how frequently his/her project manager displays the behaviour described. The researcher used a Friedman chi-square test, to find out whether there is 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.

Questionnaires were distributed to 77 project team members of 7 failed projects from seven CMMI level 5 organisations and out of the total, 60 project team members responded. In case, of project managers, questionnaires were distributed to 7 project managers and the response rate was 100%. To find an answer to the above research question, the following null hypothesis was formulated.

Null Hypothesis → Ho3: Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) of the project managers (both self-perceived and subordinate-perceived) do not differ in magnitude with respect to failed projects.

The null hypothesis was tested by computing the $\chi^2$ statistic and p values at a significance level of alpha 0.05. The results of the test statistic of the project team members and the project managers indicated that leadership styles (Transformational, Transactional, Passive/Avoidant and Technical) of the project managers (both self-perceived and subordinates-perceived) differ in magnitude with respect to failed projects, due to lower p values than level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

The study results indicated that there is a broad difference of opinion between the project team members and the project managers. It was observed that the project managers of failed projects have inflated their values. Therefore, the opinion of project team members is considered to be accounted for. Hence, it was inferred that Passive/Avoidant leadership is the dominant leadership style for failed projects. It was also observed that apart from the leadership styles, the leadership behaviours of the project managers also differ. In the opinion of the project team members, the top three leadership behaviours displayed by project managers of failed projects
were: Laissez Faire, Management by Exception (Passive) and Contingent Reward while the project managers opine that the top three leadership behaviours displayed by them were: Intellectual Stimulation, Individualized Consideration and Idealized Attributes.

**Summary:** Overall, there is a vast difference in the opinion of project team members and project managers in the dominance of leadership style of failed projects. The project team members perceive that in their projects, the display of passive/avoidant leadership (laissez faire greater than management by exception-passive) is more, followed by transactional, transformational and technical leadership behaviours while in the opinion of the project managers, they display more transformational leadership behaviour followed by transactional, technical and passive/avoidant leadership behaviour. Since, the opinion of the project team members and project managers differ so much, the opinion of the project team members is considered to be accounted for.

6.6 **Presentation of Findings and Discussions for Research Question 4**

- **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?

The answer to this question emerged from analysis of data from the survey which was based on the MLQ (5X-Short Form), using a five point rating scale (where, 5= Frequently if not always, 4= Fairly Often, 3= Sometimes, 2= Once in a while and 1= Not at all). In all the questions beginning from Question No.1-49, the respondents were asked to indicate how frequently his/her project manager displays the behaviour described. Question No. 50-58, measured the project leadership output scale. The researcher used Pearson Correlation for analysing the responses of project team members and Spearman Correlation for analysing the responses of project managers and found out whether there is 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.

Questionnaires were distributed to 231 project team members working on three different projects, out of them 80% responded. Thus, 185 project team members participated: 62 from successful, 63 from challenged and 60 from failed projects. In case of project managers, questionnaires were distributed to 21 project managers working on three different projects: 7 from successful, 7 from challenged and 7 from failed and the response rate was 100%. To find an answer to the above research question, the following null hypothesis was formulated.

**Null Hypothesis → Ho4**: There is no 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.

The null hypothesis was tested by computing the correlation coefficients and p values at a significance level of alpha 0.05. The results of the correlation coefficients of the project team members and the project managers indicated that there is 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 projects, due to lower p values than level of significance (0.05) for six out of ten items and two items being partially significant (p<0.1), thus, eight items providing sufficient evidence to reject the null hypothesis.

For challenged and failed projects, 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) was not found, due to p values exceeding the level of significance (0.05) and thus, does not providing sufficient evidence to reject the null hypothesis.
The null hypothesis was also tested by application of Spearman rho for the data set, based upon the responses of the project managers, but, as the sample size was very small (n=7) in all the three projects (successful, challenged and failed) maximum relationships were insignificant and hence no generalizations can be made. But, the correlation coefficients were meaningfully interpreted and were used to study the strength between the variables.

The study results indicate that there is similarity in the opinion of the project team members and project managers of successful projects. Both believe that, there is no perfect leadership style to make a project successful, but a combination of leadership styles are required to achieve desired outcomes. By carefully observing the successful projects, it can be learnt that, to make a project successful there should be at least moderate/strong presence of Transformational leadership followed by moderate/strong - Technical, weak - Transactional and very weak - Passive/Avoidant Leadership. Any change in this combination would surely lead to undesired results as can be seen in challenged (Technical leadership-moderate followed by very weak- Transformational, weak- Transactional and moderate- Passive/Avoidant Leadership) and failed projects (Technical leadership- very weak followed by very weak- Transformational, very weak- Transactional and strong- Passive/Avoidant Leadership). The project managers of challenged and failed projects, believe that the combinations of leadership style that they display in their projects are almost similar to successful projects, but as there is a vast difference in the opinion of the project team members and project managers, therefore the combinations shown by project managers in challenged and failed projects is whether actually being displayed by project managers is doubtful.

These findings differ to the results found by Thite (1997), where, in his study he found that project managers of successful projects display a combination of very strong Transformational leadership followed by strong Technical, strong/moderate- Transactional and weak Passive/Avoidant leadership. In unsuccessful projects, the combination is strong- Transformational leadership, moderate Technical leadership, strong/very weak Transactional leadership and strong- Passive/Avoidant leadership. According to him, in successful projects, for passive/avoidant leadership, management by exception (passive) is negative and totally rejected form of leadership but in this research study, a small proportion of management by exception (passive) leadership, displayed by the project managers of successful projects is bringing
positive results with the combined output scale and as the proportion is increased it is bringing negative results with the output as seen in challenged and failed projects. Therefore, this is a new finding over the previous researches.

The results are in line with the findings of Bass and Avolio’s (1990), who also believe that transformational leadership is associated more with successful project outcome followed by contingent reward and management-by-exception active.

**Summary:** There is certainly a relationship between integrated leadership styles (Transformational, Transactional, Passive/Avoidant and Technical) of project manager and combined project leadership outcomes, which is seen to be stronger, significant and perfect in terms of proportion in successful projects.

6.7 **Presentation of Findings and Discussions for Research Question 5**

- **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?

The answer to this question emerged from analysis of data from the survey which was based on the MLQ (5X-Short Form). The researcher used a two stage Hierarchical Linear Regression to predict 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. In the first block independent variables included were: Transactional, Passive/Avoidant and Technical Leadership while in the second block Transformational Leadership was added as a primary variable of interest. The analysis was based on the data collected from 185 (80% of 231) participants (project team members) from three different projects: 62 from successful, 63 from challenged and 60 from failed projects. To find an answer to the above research question, the following null hypotheses (separately for each outcome) were formulated.
i. **Null Hypothesis → Ho5a**: There is no 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.

The null hypothesis was tested by computing the F statistic and p values at a significance level of alpha **0.05**. The results of the test statistic of the project team members indicated that 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; p values being lower than the level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

ii. **Ho5b**: There is no 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.

The null hypothesis was tested by computing the F statistic and p values at a significance level of alpha **0.05**. The results of the test statistic of the project team members indicated that 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 and failed projects after transformational leadership is added to the model; p values being lower than the level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

*For challenged projects*, improvement in the predictive ability of the model (transactional, passive/avoidant and technical leadership predicting effectiveness of the project manager) after transformational leadership is added, *could not be predicted*; p values exceeding the level of significance (0.05) and thus, *does not* providing sufficient evidence to reject the null hypothesis.

iii. **Ho5c**: There is no 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.
The null hypothesis was tested by computing the F statistic and p values at a significance level of alpha 0.05. The results of the test statistic of the project team members indicated that 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 and failed projects after transformational leadership is added to the model; p values lower than the level of significance (0.05) for successful and p value less than 0.1 and 0.05 for failed projects, providing sufficient evidence to reject the null hypothesis.

For challenged projects, improvement in the predictive ability of the model (transactional, passive/avoidant and technical leadership predicting satisfaction with the project manager) after transformational leadership is added, could not be predicted; p values exceeding the level of significance (0.05) and thus, does not providing sufficient evidence to reject the null hypothesis.

Remarks: After analyzing the predictive ability of the model (transactional, passive/avoidant and technical leadership predicting all three project outcomes; subordinate’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, the study indicated that augmentation effect due to transformational leadership is seen mostly in successful projects as there is a strong presence of transformational leadership style for all the three project leadership outcomes. It is also observed that here, the effect of all the other leadership styles are suppressed once transformational leadership is added to the model and the augmentation in the outcomes scale is solely due to the presence of high transformational leadership, which significantly contribute towards achieving project success.

For challenged projects, only subordinate’s willingness to exert extra effort could be predicted, in which it was seen that there was higher technical leadership followed by passive/avoidant leadership and medium transformational leadership, therefore augmentation was not as high as seen in successful projects. For the outcomes like: project manager’s effectiveness and satisfaction with the project manager, the p values became greater than level of significance (0.05) and the models became insignificant, hence, the models are not able to predict the change in the effectiveness of the project manager and satisfaction with the project manager after adding transformational leadership to the model.
For **failed projects**, it is observed that technical leadership style is prominent as the β value is high in the absence and even in the presence of transformational leadership. Here, it is interesting to note that though augmentation in output is seen in failed projects, but as the presence of transformational leadership is very less in such projects therefore, the output is not as desired; whereby all project team members are not willing to exert extra effort to meet deadlines, they do not find their project managers to be effective and are not satisfied with him. Here, it is interesting to note that, though transformational leadership is very low, but still it is positive, significant in the outcome-project manager’s effectiveness. It is further noted that, adding a small proportion of transformational leadership is also bringing changes (increase) in the output scale, therefore the proportion of transformational leadership in such projects need to be increased which could definitely contribute towards better outcomes.

*These findings are similar to the results found by previous researchers, on augmentation hypothesis; Avolio & Bass, 2004; Avolio & Howell, 1992; Bass, 1985, 1999;* where, in their study they found that transformational leadership supplements transactional leadership (Howell and Avolio 1993). According to Judge and Piccolo (2004), ‘transformational leadership adds to the effect of transactional leadership and the positive effects associated with transactional leadership are the by-products of transformational leadership’. Also, in the presence of transformational leadership, transactional leadership has nothing new to add and therefore, its effects gets suppressed once transformational leadership is added to the model. *In this research, the augmentation effect of transformational leadership is not only measured over transactional leadership style but other leadership styles like: technical and passive/avoidant leadership styles were also been considered; accounting for all the three leadership outcomes, which is a new finding through this research over previous researches.*

**Summary:** To support the above findings, the mean value of the outcomes: subordinate’s willingness to exert extra effort, effectiveness of the project manager and satisfaction with the project manager in successful projects is compared with challenged and failed projects. It was observed that the mean value of project team members willingness to exert extra effort in successful projects was 4.27, followed by challenged projects 4.03 and failed projects 1.96. For effectiveness of the project manager the mean value for successful projects was 4.44, followed by challenged projects 4.12 and failed projects 1.99. For satisfaction with the project manager
the mean value for successful projects was 4.60, followed by challenged projects 4.33 and failed projects 2.01.

Therefore, it can be concluded that the increased value of mean was due to the presence of high transformational leadership which is contributing significantly towards increasing the output in successful projects. In challenged projects, the presence of transformational leadership style is there but not as prominent and significant as successful projects which lead to lower mean values of output than successful projects. In failed projects, the mean values for all the outcomes are very less, this is because of the dominance of other leadership styles than transformational leadership style, who are not contributing satisfactorily towards increasing the output.

6.8 Presentation of Findings and Discussions for Research Question 6

- **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?

The answer to this question emerged from analysis of data from the survey which was based on the MLQ (5X-Short Form). The researcher used statistical test: MANOVA to find out whether 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. The independent variable was Transformational Leadership, where: 1= High Transformational Leadership, 2= Medium Transformational Leadership and 3= Low Transformational Leadership. The dependent variables were: Project Leadership Outcomes: project team members’ willingness to exert extra effort, effectiveness of the project manager and satisfaction with the project manager.

The analysis was based on the data collected from 185 (80% of 231) participants (project team members) from three different projects: 62 from successful, 63 from challenged and 60 from failed projects. To find an answer to the above research question, the following null hypothesis was formulated.
Null Hypothesis \( \rightarrow \) Ho6: Mean values of project leadership outcomes (project team members’ willingness to exert extra effort, project manager’s effectiveness and satisfaction with the project manager) do not differ across high, medium and low Transformational leadership.

The null hypothesis was tested by computing the F statistic and p values at a significance level of alpha 0.05. The results of the test statistic of the project team members indicated that 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, due to lower p values than level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

A three group MANOVA, was conducted on three dependent variables (project team members willingness to exert extra effort, effectiveness of the project manager and satisfaction with the project manager). The Bartlett’s Test of Sphericity was statistically significant; p value was less than 0.001 indicating sufficient correlation between dependent variables. Box’s Test of Equality Covariance matrices was statistically significant (p value lower than 0.001) indicating that the observed covariance matrices of the dependent variable were unequal across independent variable groups, hence a Pillai’s Trace was employed to evaluate all multivariate effects. The Pillai’s Trace was significant at 5% level of significance.

The value for Pillai’s Trace was 0.941, \( f(6,362) = 53.567 \), P value = 0.000. Since Pillai Trace was significant, Univariate ANOVA was conducted on each dependent variable separately to determine the locus of statistically significant multivariate effect. Since, the impact of high, medium and low transformational leadership was on each dependent variable separately, we use Bonferroni corrected alpha level to avoid alpha inflation, we therefore divide alpha by number of dependent variables. Hence the new alpha \( \Rightarrow 0.05/3 = 0.016 \).

From Tests of Between Subjects Transformational Leadership and Error, it was seen that mean values of project team members’ willingness to exert extra effort \( [F(2,182) = 446.063, \ p \ value = 0.000] \), effectiveness of the project manager \( [F(2,182) = 882.800, \ p \ value = 0.000] \) and satisfaction with the project manager \( [F(2,182) = 532.154, \ p \ value = 0.000] \) differ across high, medium and low transformational leadership. Since, project team members’ willingness to exert
extra effort, effectiveness of the project manager and satisfaction with the project manager is significant, we referred to descriptive statistics to know more about this.

The study results indicated that for project team members’ willingness to exert extra effort, the projects with high transformational leadership (successful) has a mean of 4.27, medium transformational leadership (challenged) 4.03 and low transformational leadership (failed) 1.96.

For effectiveness of the project manager, the projects with high transformational leadership (successful) has a mean of 4.44, medium transformational leadership (challenged) 4.12 and low transformational leadership (failed) 1.99.

For satisfaction with the project manager, the projects with high transformational leadership (successful) has a mean of 4.60, medium transformational leadership (challenged) 4.33 and low transformational leadership (failed) 2.01.

These findings are similar to the results found by Molero, Cuadrado, Navas, and Morales (2007), in their study, where, they detected that there is an effect of high, medium and low transformational leadership on employees willingness to exert extra effort, leader’s effectiveness and satisfaction with the leader. They found that in high transformational leadership, employees are willing to expend extra effort, found their leader to be more effective and are more satisfied with their leaders than those employees who gave their leaders a lower score on transformational leadership.

Summary: Hence, it can be concluded that the project managers who display high transformational leadership, his project team members will be further willing to exert extra effort, will find their project manager’s to be more effective and are more satisfied with their project managers.

6.9 Presentation of Findings and Discussions for Research Question 7

- **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?
The answer to this question emerged from analysis of data from the survey which was based on the extended version of MLQ (5X-Short Form), using a five point effectiveness scale (where, 5= Extremely Effective, 4= Very Effective, 3= Effective, 2= Slightly Effective, 1= Not at all Effective). In Question No.59, the respondents were offered four leadership styles (Transformational, Transactional, Passive/Avoidant and Technical) and were asked to convey how effective these styles are during various phases (initiation, planning, execution, monitoring & control and closure) of the project life cycle.

The researcher used Friedman Chi Square Test to find out whether there is a difference in the effectiveness of the leadership styles (Transformational, Transactional, Passive/Avoidant and Technical) at various phases (initiation, planning, execution, monitoring & control and closure) of the project life cycle.

Questionnaires were distributed to 231 project team members from three different projects but only 80% of them responded. Thus, 185 project team members participated: 62 from successful, 63 from challenged and 60 from failed projects. In case of project managers, questionnaires were distributed to 21 project managers and the response rate was 100%. To find an answer to the above research question, the following null hypotheses (separately for each phase) were formulated.

i. Null Hypothesis → Ho7a: Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) do not differ in effectiveness (both self-perceived and subordinates-perceived) during initiation phase of the project life cycle (leadership styles have equal weights during initiation phase).

The null hypothesis was tested by computing the χ² statistic and p values at a significance level of alpha 0.05. The results of the test statistic of the project team members and the project managers indicated that 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), due to lower p values than the level of significance (0.05), providing sufficient evidence to reject the null hypothesis.
ii. **Null Hypothesis → Ho7b**: Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) do not differ in effectiveness (both self-perceived and subordinates-perceived) during planning phase of the project life cycle (leadership styles have equal weights during planning phase).

The null hypothesis was tested by computing the $\chi^2$ statistic and $p$ values at a significance level of alpha 0.05. The results of the test statistic of the project team members and the project managers indicated that 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), due to lower $p$ values than the level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

iii. **Null Hypothesis → Ho7c**: Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) do not differ in effectiveness (both self-perceived and subordinates-perceived) during execution phase of the project life cycle (leadership styles have equal weights during execution phase).

The null hypothesis was tested by computing the $\chi^2$ statistic and $p$ values at a significance level of alpha 0.05. The results of the test statistic of the project team members and the project managers indicated that 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), due to lower $p$ values than the level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

iv. **Null Hypothesis → Ho7d**: Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) do not differ in effectiveness (both self-perceived and subordinates-perceived) during monitoring and control phase of the project life cycle (leadership styles have equal weights during monitoring and control phase).

The null hypothesis was tested by computing the $\chi^2$ statistic and $p$ values at a significance level of alpha 0.05. The results of the test statistic of the project team members and the project managers indicated that 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), due to lower p values than the level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

v. Null Hypothesis → Ho: Leadership Styles (Transformational, Transactional, Passive/Avoidant and Technical) do not differ in effectiveness (both self-perceived and subordinates-perceived) during closure phase of the project life cycle (leadership styles have equal weights during closure phase).

The null hypothesis was tested by computing the $\chi^2$ statistic and p values at a significance level of alpha 0.05. The results of the test statistic of the project team members and the project managers indicated that 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), due to lower p values than the level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

Remarks: The study indicated that, the Friedman Chi Square Test was separately performed at each phase of the project life cycle. It can be seen that in the opinion of the project team members, Passive/Avoidant leadership has a mean rank of 3.68, Technical leadership 3.02, Transformational leadership 2.17 and Transactional leadership 1.12 while the project managers opine that Passive/Avoidant leadership has a mean rank of 3.74, Technical leadership 2.95, Transformational leadership 2.17 and Transactional leadership 1.14. Hence, it can be inferred that Passive/Avoidant leadership is the most effective leadership style for initiation phase of the project life cycle.

In the Planning Phase, from the Friedman rank’s table it was observed that in the opinion of the project team members, Technical leadership has a mean rank of 3.80, Transformational leadership 2.99, Transactional leadership 1.93 and Passive/Avoidant Leadership 1.27 while the project managers opine that Technical leadership has a mean rank of 3.79, Transformational leadership 3.12, Transactional leadership 1.88 and Passive/Avoidant Leadership 1.21. Hence, it
can be inferred that **Technical** leadership is the most effective leadership style for **planning phase** of the project life cycle.

In the **Execution Phase**, from the Friedman rank’s table it was observed that, in the opinion of the project team members, Transformational leadership has a mean rank of 3.74, Technical leadership 3.07, Transactional leadership 2.05 and Passive/Avoidant Leadership 1.13 while the project managers opine that Transformational leadership has a mean rank of 3.64, Technical leadership 3.21, Transactional leadership 2.14 and Passive/Avoidant Leadership 1.00. Hence, it can be inferred that **Transformational** leadership is the most effective leadership style for **execution phase** of the project life cycle.

In the **Monitoring and Control Phase**, from the Friedman rank’s table it was observed that in the opinion of the project team members, Transactional leadership has a mean rank of 3.81, Technical leadership 3.01, Transformational leadership 2.11 and Passive/Avoidant Leadership 1.08 while the project managers opine that Transactional leadership has a mean rank of 3.74, Technical leadership 3.07, Transformational leadership 2.19 and Passive/Avoidant Leadership 1.00. Hence, it can be inferred that **Transactional** leadership is the most effective leadership style for **monitoring and control phase** of the project life cycle.

In the **Closure Phase**, from the Friedman rank’s table it was observed that in the opinion of the project team members, Technical leadership has a mean rank of 3.80, Transactional leadership 3.08, Transformational leadership 2.01 and Passive/Avoidant Leadership 1.12 while the project managers opine that Technical leadership has a mean rank of 3.81, Transactional leadership 3.05, Transformational leadership 2.12 and Passive/Avoidant Leadership 1.02. Hence, it can be inferred that **Technical** leadership is the most effective leadership style for **closure phase** of the project life cycle.

*Turner and Muller (2005)*, supports the view of the researcher, suggesting that different project leadership styles are appropriate at different phases of the project life cycle.

The table 6.1, below summarizes the findings of the above research question.
Table 6.1: Summary of the Findings-Phases of the Project Life Cycle and most effective Leadership Style

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Phases of Project Life Cycle</th>
<th>Effective Leadership Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Initiation Phase</td>
<td>Passive/Avoidant Leadership</td>
</tr>
<tr>
<td>2.</td>
<td>Planning Phase</td>
<td>Technical Leadership</td>
</tr>
<tr>
<td>3.</td>
<td>Execution Phase</td>
<td>Transformational Leadership</td>
</tr>
<tr>
<td>4.</td>
<td>Monitoring and Control Phase</td>
<td>Transactional Leadership</td>
</tr>
<tr>
<td>5.</td>
<td>Closure Phase</td>
<td>Technical Leadership</td>
</tr>
</tbody>
</table>

**Source:** Developed for this research

**Summary:** Thus, it can be seen that both the project team members and project managers have similar opinion about the most effective leadership style at various phases of the project life cycle. It can be observed that the most effective leadership style at the *initiation phase* of the project life cycle is *Passive/Avoidant Leadership*, therefore, management by exception (passive) leadership behavior is recommended at this particular stage. At the *planning phase* the most effective leadership style is *Technical Leadership*. *Transformational Leadership* is most effective at the *execution phase* while *Transactional Leadership* emerged as the most effective leadership style at the *Monitoring and Control phase*. At the *closure phase* again *Technical Leadership* is considered to be the most effective leadership style.

### 6.10 Presentation of Findings and Discussions for Research Question 8

- **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?

The answer to this question emerged from analysis of data from the survey which was based on the extended version of MLQ (5X-Short Form), using a five point importance scale (where, 5=Extremely Important, 4=Very Important, 3=Important, 2=Slightly Important, 1=Not at all Important). In **Question No.60**, the respondents were offered ten factors from the Project
Implementation Profile (PIP) and were asked to convey how critical these factors are during various phases (initiation, planning, execution, monitoring & control and closure) of the project life cycle. The ten factors of the Project Implementation Profile (PIP) were: Project Mission, Top management support, Project schedule/plans, Client consultation, Personnel, Technical tasks, Client acceptance, Monitoring and feedback, Communication and Troubleshooting.

The researcher used Friedman Chi Square Test to find out whether there is a difference in the criticality 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.

Questionnaires were distributed to 231 project team members from three different projects but only 80% of them responded. Thus, 185 project team members participated: 62 from successful, 63 from challenged and 60 from failed projects. In case, of project managers, questionnaires were distributed to 21 project managers and the response rate was 100%. To find an answer to the above research question, the following null hypotheses (separately for each phase) were formulated.

i. **Null Hypothesis → Ho8a:** Factors of Project Implementation Profile (PIP) do not differ in criticality (both self-perceived and subordinates-perceived) during initiation phase of the project life cycle (factors have equal weights during initiation phase).

The null hypothesis was tested by computing the $\chi^2$ statistic and $p$ values at a significance level of alpha 0.05. The results of the test statistic of the project team members and the project managers indicated that 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), due to lower p values than the level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

ii. **Null Hypothesis → Ho8b:** Factors of Project Implementation Profile (PIP) do not differ in criticality (both self-perceived and subordinates-perceived) during planning phase of the project life cycle (factors have equal weights during planning phase).
The null hypothesis was tested by computing the $\chi^2$ statistic and p values at a significance level of alpha 0.05. The results of the test statistic of the project team members and the project managers indicated that 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), due to lower p values than the level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

iii. **Null Hypothesis $\rightarrow$ Ho8c**: Factors of Project Implementation Profile (PIP) do not differ in criticality (both self-perceived and subordinates-perceived) during execution phase of the project life cycle (factors have equal weights during execution phase).

The null hypothesis was tested by computing the $\chi^2$ statistic and p values at a significance level of alpha 0.05. The results of the test statistic of the project team members and the project managers indicated that 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), due to lower p values than the level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

iv. **Null Hypothesis $\rightarrow$ Ho8d**: Factors of Project Implementation Profile (PIP) do not differ in criticality (both self-perceived and subordinates-perceived) during monitoring & control phase of the project life cycle (factors have equal weights during monitoring & control phase).

The null hypothesis was tested by computing the $\chi^2$ statistic and p values at a significance level of alpha 0.05. The results of the test statistic of the project team members and the project managers indicated that 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), due to lower p values than the level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

v. **Null Hypothesis $\rightarrow$ Ho8e**: Factors of Project Implementation Profile (PIP) do not differ in criticality (both self-perceived and subordinates-perceived) during closure phase of the project life cycle (factors have equal weights during closure phase).
The null hypothesis was tested by computing the $\chi^2$ statistic and p values at a significance level of alpha 0.05. The results of the test statistic of the project team members and the project managers indicated that 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), due to lower p values than the level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

Remarks: The study indicated that, the Friedman Chi Square Test was separately performed at each phase of the project life cycle. In the Initiation Phase, from the Friedman rank’s table it was observed that in the opinion of the project team members, Project mission has a mean rank of 9.61, Client consultation 8.65, Communication 6.75, Monitoring and feedback 6.08, Top management support 5.92, Technical tasks 5.87, Project schedule/plans 4.98, Client acceptance 3.15, Trouble shooting 2.15 and Personnel 1.84 while the project managers opine that Project mission has a mean rank of 9.62, Client consultation 8.88, Communication 6.83, Top management support 6.19, Technical tasks 5.76, Monitoring and feedback 5.52, Project schedule/plans 4.71, Client acceptance 3.93, Trouble shooting 1.90 and Personnel 1.64. Hence it can be inferred that the top three critical success factors for initiation phase of the project life cycle are:

a) Project mission
b) Client consultation
c) Communication

In the Planning Phase, from the Friedman rank’s table it was observed that in the opinion of the project team members, Project mission has a mean rank of 9.53, Top management support 8.47, Client acceptance 7.50, Communication 5.43, Project schedule/plans 5.37, Monitoring and feedback 4.88, Technical tasks 4.68, Personnel 3.84, Client consultation 3.35 and Trouble shooting 1.95 while the project managers opine that Project mission has a mean rank of 9.71, Top management support 8.17, Client acceptance 6.86, Communication 5.86, Project schedule/plans 5.71, Technical tasks 5.14, Monitoring and feedback 4.74, Personnel 4.19, Client consultation 2.76 and Trouble shooting 1.86. Hence it can be inferred that the top three critical success factors for planning phase of the project life cycle are:

a) Project mission
b) Top management support  
c) Client acceptance

In the **Execution Phase**, from the Friedman rank’s table it was observed that in the opinion of the project team members, Project mission has a mean rank of 9.15, Personnel 8.90, Trouble shooting 7.29, Project schedule/plans 5.80, Technical tasks 5.30, Client consultation 4.55, Communication 4.13, Monitoring and feedback 3.85, Top management support 3.37 and Client acceptance 2.66 while the project managers opine that Project mission has a mean rank of 8.95, Personnel 8.76, Trouble shooting 6.86, Project schedule/plans 6.26, Technical tasks 5.74, Client consultation 5.17, Communication 4.48, Monitoring and feedback 3.95, Top management support 3.00 and Client acceptance 1.83. Hence it can be inferred that the top three critical success factors for **execution phase** of the project life cycle are:
   
   a) Project mission  
   b) Personnel  
   c) Trouble shooting

In the **Monitoring and Control Phase**, from the Friedman rank’s table it was observed that in the opinion of the project team members, Monitoring and feedback has a mean rank of 9.36, Technical tasks 8.05, Project mission 6.78, Trouble shooting 6.63, Communication 6.34, Client consultation 4.42, Top management support 3.71, Personnel 3.67, Client acceptance 3.05 and Project schedule/plans 2.99 while the project managers opine that Monitoring and feedback has a mean rank of 9.17, Technical tasks 8.05, Project mission 6.93, Trouble shooting 6.55, Client consultation 5.67, Communication 5.19, Personnel 4.55, Top management support 3.45, Project schedule/plans 2.88 and Client acceptance 2.57. Hence it can be inferred that the top three critical success factors for **monitoring & control phase** of the project life cycle are:
   
   a) Monitoring and feedback  
   b) Technical tasks  
   c) Project mission

In the **Closure Phase**, from the Friedman rank’s table it was observed that in the opinion of the project team members, Technical tasks has a mean rank of 9.52, Project mission 8.08, Client consultation 7.47, Client acceptance 6.62, Top management support 4.62, Communication 4.54,
Monitoring and feedback 4.20, Personnel 4.12, Trouble shooting 3.33 and Project schedule/plans 2.50 while the project managers opine that Technical tasks has a mean rank of 9.26, Project mission 8.62, Client consultation 7.14, Client acceptance 6.83, Communication 5.19, Trouble shooting 4.26, Monitoring and feedback 4.24, Top management support 3.79, Personnel 3.64 and Project schedule/plans 2.02. Hence it can be inferred that the top three critical success factors for **closure phase** of the project life cycle are:

a) Technical tasks  
b) Project mission  
c) Client consultation

*These findings are almost similar to the results found by Pinto and Prescott (1986)*, in their study, where they observed that at the initiation phase of the project life cycle the dominant critical success factors are project mission and client consultation and at the planning phase the dominant critical success factors are project mission, top management support, client acceptance. Project mission, trouble shooting, project/schedule and plans, technical tasks and client consultation are dominant at the execution phase while technical tasks, project mission and client consultation are dominant at the closure phase.

The table 6.2, below summarizes the findings of the above research question.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Phases of Project Life Cycle</th>
<th>Top three Critical Success Factor of the Project Implementation Profile (PIP):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rank (1)</td>
</tr>
<tr>
<td>1.</td>
<td>Initiation Phase</td>
<td>Project mission</td>
</tr>
<tr>
<td>2.</td>
<td>Planning Phase</td>
<td>Project mission</td>
</tr>
<tr>
<td>3.</td>
<td>Execution Phase</td>
<td>Project mission</td>
</tr>
<tr>
<td>4.</td>
<td>Monitoring and Control Phase</td>
<td>Monitoring and feedback</td>
</tr>
<tr>
<td>5.</td>
<td>Closure Phase</td>
<td>Technical tasks</td>
</tr>
</tbody>
</table>

**Source:** Developed for this research
Summary: From the above table, it can be seen that both, the project team members and the project managers have similar opinion about the criticality of the success factors of the Project Implementation Profile (PIP) at various phases of the project life cycle.

In the *Initiation Phase* of the project life cycle, the top three critical success factors are *Project Mission, Client Consultation and Communication* and in the *Planning Phase: Project Mission, Top management Support and Client Acceptance* are the top three critical success factors. *Project Mission, Personnel (High touch leadership & Management) and Trouble Shooting* are most important at the *Execution Phase* while *Monitoring and feedback, Technical Tasks and Project Mission* are considered highly important at the *Monitoring and Control Phase*. In the *Closure Phase, Technical Tasks, Project Mission and Client Consultation* are considered to be the top three critical success factors.

6.11 Presentation of Findings and Discussions for Research Question 9

- **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?

The answer to this question emerged from analysis of data from the survey which was based on the MLQ (5X-Short Form). The researcher used statistical test: **ONE WAY ANOVA** to find out whether 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. The independent variable was Project Type, where, 1= Successful Projects, 2= Challenged Projects and 3= Failed Projects. The dependent variable was: Composite score of Critical Success Factors of Project Implementation Profile (PIP). The ten factors of the Project Implementation Profile (PIP) are as follows: *Project Mission, Top management support, Project schedule/plans, Client consultation, Personnel, Technical tasks, Client acceptance, Monitoring and feedback, Communication and Trouble shooting*.

The analysis was based on the data collected from 185 (80% of 231) project team members from three different projects: 62 from successful, 63 from challenged and 60 from failed projects. To find an answer to the above research question, the following **null hypothesis** was formulated.
Null Hypothesis → Ho9: $\mu_1 = \mu_2 = \mu_3$

The null hypothesis was tested by computing the F statistic and p values at a significance level of alpha 0.05. The results of the test statistic of the project team members indicated that one of the mean values is different from the rest, due to lower p value than level of significance (0.05), providing sufficient evidence to reject the null hypothesis.

The test of Homogeneity of Variances was performed. Assumption of homogeneity of variance is supported. Levene’s statistic (2,182) =1.18, p value = 0.307. The ANOVA of the composite critical success factors showed p value (0.000) lower than level of significance (0.05), therefore the null hypothesis was rejected. Hence, it was concluded that the three projects differ with respect to composite critical success factors.

The study results indicated that successful projects has a mean score of 3.19, challenged projects 3.03 and failed projects 3.08. Hence, it can be concluded that critical success factors are more prevalent in successful than challenged and failed projects.

To find out whether the differences in mean scores of successful, challenged and failed projects is mere a coincidence or not, a Post hoc test was conducted.

It was observed that the p value for successful projects was significant (0.000). However, by comparing the mean scores of challenged and failed projects the p value was 0.052 (insignificant), which indicated that the occurrence of higher mean score in failed projects than challenged projects is just by chance.

Summary: Therefore, it can be concluded that there is a robust presence of critical success factors in successful projects in comparison to challenged and failed projects. It can further be concluded that in successful projects, there is better clarity of project mission, top management is more supportive, a well-laid-out and detailed specification of the individual action plan is available, client consultation is considered important throughout the project, better management of personnel through high touch leadership and management, enhanced availability of technical resources, boosted client acceptance and satisfaction, enriched monitoring and feedback and communication throughout the project and availability of contingency plans in the form of trouble shooting mechanism in order to handle unexpected crises and deviations from plan.
6.12 Presentation of Findings and Discussions/Interviews with Senior/Delivery Managers

In order to understand IT organizations more effectively and to gain an insight into the views of the senior management about project leadership, therefore before finalizing the research design and the questionnaires, the delivery managers of all seven CMMI level 5 software organizations registered with NASSCOM Pune were approached for a discussion/interview. Out of the total, seven only three of them responded for the interview.

The following table 6.3 summarizes the issues raised and the feedback obtained through the personal discussion:

<table>
<thead>
<tr>
<th>Issues Discussed</th>
<th>Feedback Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the designations of human resources that are actually engaged in software project development?</td>
<td>The development of software projects are carried out via project teams consisting of software architects, business analysts, testers and developers led by a project manager.</td>
</tr>
<tr>
<td>What is the average size of project team members in a project of average size?</td>
<td>In an average size project, the average size of project team members is 12, including a project manager.</td>
</tr>
<tr>
<td>What is the typical organization structure of an IT firm?</td>
<td>The project team members are answerable to the project manager who reports to the delivery manager. The delivery manager reports to the VP business unit who ultimately reports to the CEO.</td>
</tr>
<tr>
<td>What is the average size of a software project life cycle?</td>
<td>The average size of a project life cycle is approximately six to eight months.</td>
</tr>
<tr>
<td>Most of the software companies cater to the needs of various sectors like banking, finance, manufacturing etc. and provide solution in wide array of technologies like Java, SAP, Oracle,</td>
<td>To handle this kind of complexity the organizations are divided into Vertical Business Units (VBU) and Horizontal Competency Units (HCU). The VBU heads report to the Chief Executive Officer of the company. Each VBU and</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Microsoft etc.; therefore how this complexity is addressed in the organization?</td>
<td>HCU has the task of new software development projects and the maintenance of existing software.</td>
</tr>
<tr>
<td>What is the criteria to select the software development model for the project?</td>
<td>The selection of a relevant and an effective software development model is one of the key factors in determining the success or failure of a software company. Key factors that influence the decision are the type of product being created, time restraints, and the resources available to support the chosen model.</td>
</tr>
<tr>
<td>What are the software models preferred by your firm?</td>
<td>The two most preferred models considering the present scenario are the Waterfall Model and Agile Development Model.</td>
</tr>
<tr>
<td>How crucial is the role of software project manager in a project and also in the organisation?</td>
<td>The role of a software project manager is extremely important and valued. He has the task of planning, execution and closure of the project. He is the person who is responsible for attaining project objectives, building the project requirements and managing the constraints of the project management triangle, like cost, time and scope. He represents the company before the clients and bridges the gap between project team and the client. He also plays a critical link in the hierarchy between management and project team members.</td>
</tr>
<tr>
<td>What are the possible and the recommended methods of collecting data on the project performance?</td>
<td>Data on project performance can be obtained through customer feedback and periodical reviews of the management. Periodic appraisal of the project performance by the management is the most acceptable option.</td>
</tr>
<tr>
<td>How many projects are in their completion stage?</td>
<td>Currently, approximately 40% of the projects are in their completion stage.</td>
</tr>
</tbody>
</table>
What is the criteria to decide a successful, challenged and a failed project?

Project performance is basically measured on the basis of deadlines, cost effectiveness, technical efficiency, scope and overall satisfaction. On a scale of 5, a project which gets in the range of 4-5 on each factor is considered to be a successful project, while a project which gets in the range of 3-4 and 1-3 on each factor is considered to be challenged and failed project.

What is the best possible way to collect data on leadership style from project managers and their project team members, particularly, between interview and survey questionnaire methods?

Project managers and his team would be reluctant to spend their time participating in interviews due to their busy schedule. Questionnaires can be administered, but they need to be convinced.

What is your feedback on the proposed questionnaire in terms of its length, structure, language, coverage of leadership behaviours, outcomes, project life cycle and critical success factors?

Questionnaire should not take more than 10-15 minutes per person and participants should be given the freedom to fill it up at their convenience. The respondents will be pleased if the questions are short and easy to understand. The current questionnaire appears to be satisfactory in all the prescribed parameters.

**Source:** Developed for this research

Based on the above feedback, several changes were made to the research design and questionnaire. To emphasize the confidentiality of data, several personal questions were deleted along with the questions related with company name and project size, to make it difficult to identify the actual source. The proposal to interview the project managers and team members apart from conducting the survey was also dropped as that would have required considerable time from the respondents, therefore they were not convinced for it.

The fundamental task of the software firms is to meet the needs of various sectors like banking, finance, manufacturing etc. and provide solutions in wide array of technologies like Java, SAP, Oracle, Microsoft etc., this is shown with the help of figure 6.2 below.
**Figure 6.2: Division of IT firms into Vertical Business Units (VBU) and Horizontal Business Units (HCU)**

<table>
<thead>
<tr>
<th>Vertical Business Units (VBU)</th>
<th>Banking and Finance</th>
<th>Automotive</th>
<th>Insurance</th>
<th>Travel and Logistics</th>
<th>Health care</th>
<th>Telecom</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainframes</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>SAP</td>
<td>*</td>
<td>*</td>
<td>*</td>
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<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Java Technologies</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Microsoft Technologies</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Oracle Applications</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Networking</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Databases</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

* Source: Developed for this research

* Defines varied projects and activities with combinations of different industrial sectors and technologies

**Interpretation:** To manage the complexity related with projects and various allied activities (development and maintenance), the IT firms are divided into Vertical Business Units (VBU) and Horizontal Competency Units (HCU). The head of each VBU reports to the Chief Executive Officer (CEO) of the company. Each VBU and HCU has the task of new development projects and the maintenance of existing software.

The development projects are carried out via project teams consisting of software architects, business analysts, testers and developers led by a project manager. The organization structure of typical IT firms is presented through figure 6.3, below:
Interpretation: It can be from the above figure that the CEO of the firm holds the highest designation below whom the VP Business Unit work. The delivery managers of software development and maintenance & support activities are answerable to their respective VP Business Unit. The project managers report to their delivery managers and below him a project team, comprising of project architects, business analysts, developers and testers work for the project.
6.13 Summary

Thus, to summarize this chapter highlighted a detailed presentation of findings and discussions of the results of the data, how the data were analysed and the results of the analysis. It also discussed how the findings from the current study align or diverge from findings of previous research studies in the literature review. It was hypothesized in the study that the leadership styles differ in magnitude with respect to successful, challenged and failed projects which was proved accordingly. It was also hypothesized that there is a significant relationship between integrated leadership style of the project manager and the project leadership outcomes in successful, challenged and failed projects. To test these, first the project team members ratings on project managers of successful, challenged and failed projects with regard to their leadership behaviours and their outcomes were analysed. Then, these ratings were compared with the self-ratings of project managers to examine the extent of agreement between the two.

Thereafter, the increase in the predictive ability of the model (transactional, passive/avoidant and technical) predicting all the three leadership outcomes after adding transformational leadership to the model was measured and the augmentation effect of transformational leadership was proved. It was also verified that the project managers who display high transformational leadership in their projects, their project team members are more willing to exert extra effort, they considered their project manager to be more effective and are more satisfied with their project managers.

Further, based upon the responses of the project team members and project managers, it was verified that different leadership styles are required at different phases of the project life cycle and also the dominance of critical success factors of the Project Implementation Profile (PIP) also vary according to various phases of the project life cycle. Thus, finally the proposed model was tested and proved, for its reliability based upon the results of the measurement instrument. Thereafter the summary of findings and discussions/interviews with the senior/delivery managers was also presented explaining the complexity and organization structure of an IT firm.

The next chapter will present the final conclusion for the research study, recommendations for future research, contribution to the body of knowledge and limitations for the current study.