Conclusion and Further Research

CHAPTER 6

CONCLUSION

6.1 INTRODUCTION

The Indian software industry has the potential of becoming the largest and the most valued industry in the world. From network and application management they are gradually moving up on the value chain towards IT strategy and consultancy, garnering more and more contracts and clients all across the world. But a deeper look inside the Indian software companies gives a completely different picture. Many of the projects are marred with extended budget, inundate timelines and poor quality. Numerous studies have been conducted on the Indian software industry especially in relation to the outsourcing aspect of the software companies. Various dimensions such as cross-cultural, economic, socio-political and project specific dimensions have been quite vividly studied in the literature. On closely monitoring all the relevant literature in this field, it was found that not much of an exhaustive and structured work has been done on collaborating the project specific risk dimensions and the organization climate dimensions with respect to the overall success of the software project and the its three performance constructs namely budget, schedule and quality. Owing to this lacuna, this research aimed at intensely exploring the dimensions of project specific risks and organizational climate dimensions that contribute towards the success of the software projects. The study aimed at i) finding out the various risks affecting the software projects through secondary and primary data; ii) finding out the various organizational climate factors present in the Indian software companies; iii) proposing a model for identifying the factors that affect the a) project specific risks, b) success of the software project, and c) success of the three performance constructs namely budget, schedule and quality and iv) finally assessing the impact of these dimensions in real life through development of case studies. The study was carried out on thirty two software services companies identified randomly from the four major IT hubs of India over a span of two years which included data collection as well as analysis. The findings of the study are quite remarkable and have immense implications for the Indian software service industry. This chapter recaps the research
methodology, summarizes the objectives, states the implications of the research, and puts forward the future scope of the research.

6.2 RESEARCH METHODOLOGY

The research had three components and thus, a systematic and organized methodology was obtained for the same. A survey instrument was specifically designed to obtain the required information. Along with survey, structured interviews of project managers and senior management were also conducted to gauge the real life situations in the software projects. The sample for this study comprised of software professionals with a minimum of 4 years of experience and working in one of the thirty two companies located in one of the four major IT hubs in India. A sample size of 300 was taken for this study. Simple random sampling technique was used to gather data from the respondents. The questionnaire was intricately designed to tap the demographic variables including age, designation and experience of the respondents. It also gathered details about the project such as name, team size, total duration and the value of the project executed by the respondents. The instrument also contained questions relating to the overall success and the success of the three performance constructs; the project specific risks that impacted the success and the organization climate factors that were present during the execution of the project. Main data collection began in the month of July 2008. Statistical Package for the Social Sciences (SPSS) version 17.0 was religiously used for the statistical analyses. Various statistical tools were used to analyze data like descriptive statistics to quantitatively summarize the data; factor analysis to extract factors of project specific risks and organization climate; Duncan’s mean test to compare means of the dimensions across various categories; correlations to find out the relationship between two variables and regression to find out the determinants of a dependent variable. With the help of these tests, the data was successfully analyzed.

6.3 OBJECTIVES OF THE STUDY

The objectives of the research were the following:

1. To identify and rank the risks in software development projects based on secondary data.
2. To explore and analyze the dimensions of project specific risks based on primary data collected from field survey.

3. To identify and explore the dimensions of organization climate factors present in the Indian software companies based on primary data.

4. To investigate and propose a model for predicting the effect of the organizational climate dimensions and demographic characteristics on the software risk dimensions.

5. To investigate and propose a model for predicting the effect of the software risks and organizational climate dimensions on the overall success and the three performance constructs namely budget, schedule and quality of the software projects in India.

6. To validate the models by critically evaluating the causes of failure and success of real life software projects through case studies.

In the purview of these objectives, an extremely scrupulous and conscientious research was carried out on the Indian software companies. Listed below is the summarized finding of each of the objectives.

6.3.1 Objective 1: To Identify and Rank the Risks in Software Development Projects based on Secondary Data.

In order to gain a deeper insight into the software risks affecting the projects, an in-depth assessment of the secondary data was conducted. Scoring model was developed and extensively used to analyze the various risks highlighted in the secondary data. Extensive literature on software risks was studied in detail. Finally, using the ranking method, a comprehensive and exhaustive list of the top ten risks affecting the software projects was developed. These risks were identified from various researches conducted on identification and ranking of software risks. The list so developed is quite comprehensive and represents a global phenomenon as it encompasses a number of researches conducted in the past in various countries.

The top most risk affecting the software projects globally is miscommunication of the requirements, followed by lack of top management support and then lack of technical knowledge.
The correct set of requirements, top management support and technical knowledge are the pillars of software project, and without these the project is bound to get derailed. Therefore, these risks were identified as the three most important risk factors affecting the success of the project. Besides these, the other important risk factors impacting the success are inadequate user involvement, unclear scope or objectives, inadequate plans and procedures, lack of client responsibility and ownership, inaccurate estimation of schedule or cost, changing requirements and finally lack of project management methodology. Thus, the first objective was effectively achieved as it resulted in the identification of top ten risks affecting the software projects globally. The next objective aimed at exploring the dimensions of project specific risks affecting the software projects in India based on the primary data collection.

6.3.2 Objective 2: To Explore and Analyze the Dimensions of Project Specific Risks Based on Primary Data Collected from Field Survey.

The second objective was fulfilled with the help of a number of statistical analyses that included factor analysis, Duncan’s mean test and descriptive statistics. In order to identify and evaluate the project specific risk factors based on primary data, factor analysis was done. Principal component analysis was the method of extraction. The Kaiser rule was applied for extracting factors. Four factors were extracted viz. SRS Variability risk, team composition risk, control processes risk and dependability risk. A detailed analysis was done for each of these risk factors. The mean and standard deviation of the factors were computed in order to gauge the top most risks present in most of the software project. SRS variability risk was found to be the most important risk followed by dependability risk, team composition risk and finally control processes risk.

The next step involved comparing these dimensions across the various background variables namely designation and experience, and project characteristics variables namely team size, total duration and the value of the project in terms of dollars. All the four risk dimensions showed significant variances among the three designation levels. SRS variability, team composition, control processes and dependability risk were ranked highest by level 1 professionals. It is also interesting to note that the difference in perception about these factors was significant only in two
groups i.e. level 1 and level 2; and level 1 and level 3 and there was no significant difference between level 2 and level 3 respondents. Among the total experience variable, significant difference was found in the mean values of SRS variability risk, team composition risk, control processes risk and dependability risk dimension. All the four risks were ranked highest by E1 respondents, followed by E2 and then E3.

On comparing the risk dimensions among the various project characteristics the following was revealed. When the risk factors were compared among the three team sizes, none of the risk dimensions showed any significant differences in mean and standard deviation values between the three team size groups. Among the three categories of total duration, only team composition risk revealed a significant variance between the two categories that is between the project with duration of 10-19 months and projects with duration of more than 19 months. There was no significant variance in the risk dimensions among the three groups of the total value of the project. This means that the four risk factors namely SRS variability risk, team composition risk, control processes risk and dependability risk affect the software projects in a similar way irrespective of the value of the project.

6.3.3. Objective 3: To Identify and Explore the Dimensions of Organization Climate Factors Present in the Indian Software Companies Based on Primary Data.

For the fulfillment of the third objective, a series of statistical analyses were done. It began with factor analysis, followed by mean tests to compare the dimensions across various characteristics and ended with the descriptive statistics. In order to identify and evaluate the organization climate dimensions based on primary data, factor analysis was done. Principal component analysis was the method of extraction. The Kaiser rule for number of factors to extract was applied. All total 4 factors were extracted viz. high standards of work tasks, effective supervision, intrinsic supervision and role clarity. Descriptive statistics was computed for a better understanding of the four organizational climate dimensions. Intrinsic fulfillment showed the highest mean suggesting that the climate of intrinsic fulfillment was present in almost all the projects in the sample. This
was closely followed by role clarity, effective supervision and finally high standards of work tasks.

The dimensions of organization climate so formulated after the factor analysis were then compared among the various personal characteristics of the respondents chosen for the study and also among the various characteristics of the project handled by the respondents. On the basis of designation comparison, High standards of work tasks and effective supervision showed significant differences in mean and standard deviation values. High standards of work tasks was perceived more deeply by employees at level 1 (referred to as D1) and level 2 (referred to as D2) than compared to level 3 (referred to as D3) employees. In case of effective supervision, employees at lower levels perceived its impact more than employees at higher levels with level 2 employees having a highest mean and a significant difference among D1 v/s D2 and D2 v/s D3.

On comparing the dimensions across the three categories of total experience, only high standard of work tasks had an F value of 3.4, significant at 0.05 level. The difference was significant only between two groups i.e. between E1 (upto 9 years of experience) and E2 (10 to 14 years of experience); and E1 and E3 (more than 14 years of experience). E2 and E3 had no significant difference between them. The organizational climate dimensions were also compared among various project characteristics. On the basis of team size, only role clarity had significant differences in mean and standard deviation values between the three team size groups. Role clarity was ranked highest in the team size of less than 11 members. It is closely followed by T2 and then T3. On the basis of total duration comparison, none of the organizational climate dimensions showed any significant difference among the three duration groups. On comparing the organizational climate dimensions among the three value groups of the project, only role clarity emerged as having significant difference between V1 (upto 0.70 mn dollars); and V3 (more than 2.00 mn dollars), while the other three dimensions showed no significant difference suggesting that the high standards of work tasks, effective supervision and intrinsic fulfillment does not really differ when compared among various value groups.
6.3.4. Objective 4: To Develop a Regression Model for Investigating the Effect of the Organizational Climate Dimensions and Demographic Characteristics on the Software Risk Dimensions.

For the fourth objective, correlation and regression analysis was done. Dependent variables were the four project specific risk dimensions viz. SRS variability risk, team composition risk, control processes risk and dependability risk, while the independent variables were the two background variables viz. designation and experience and the four organization climate dimensions viz. high standards of work tasks, effective supervision, intrinsic fulfillment and role clarity. The correlation between the dependent variables and the independent variables revealed the following. Correlation revealed a highly significant relation between the demographic variables and the four risk dimensions. All the correlations were negative, which means that as the software professionals gain more experience and move higher in the ladder of designation, they perceive these risk factors to have less impact on the success. While on the other hand, out of four organizational climate dimensions only few dimensions showed a significant relation with the four risk dimensions. Out of which role clarity showed a significant negative correlation with two dimensions of risk namely SRS variability risk, and dependability risk while effective supervision show a significant positive correlation with one dimension that is dependability risk. The rest of the two climate dimensions namely the high standards of work tasks and intrinsic fulfillment did not show any significant relation with any of the dependent variables. To further strengthen the relation between the dependent and independent variables, regression analysis was conducted.

Stepwise regression was conducted keeping each of the four risk dimensions individually as dependent variables and organizational climate dimensions and demographic variables as independent variables. Designation, role clarity and effective supervision were the main variables that reduce the SRS variability risk. While the team composition risk is affected by the designation – a demographic variable and role clarity – a climate dimension. Furthermore, the regression analysis also revealed that control processes risk can be controlled by role clarity, high standards of work tasks and designation. Finally, regression analysis revealed that dependability risk is affected by designation, effective supervision, role clarity and high...
standards of work task. Thus, it can be clearly seen that the project specific risk dimensions can to a great extent be controlled and annihilated by open, free, trusting and effective organization climate.

6.3.5. Objectives 5: To Develop a Regression Model for Investigating the Impact of Software Risks and Organizational Climate Dimensions on the Overall Success and the Three Performance Constructs namely Budget, Schedule and Quality of the Software Projects In India.

To meet the fifth objective of the study, correlation and regression were done. The dependent variables included the overall success of the project, the budget performance, the schedule performance and the quality performance of the software project. While the independent variables included the four software risk dimensions viz. SRS variability risk, team composition risk, control processes risk and dependability risk and four organizational climate dimensions viz. high standards of work tasks, effective supervision, intrinsic fulfillment and role clarity.

The correlation between overall success and eight independent variables revealed very interesting finding. Out of the eight independent variables seven variables have significant correlations with the dependent variable that is success of the project. All the correlations of the risk factors with the success of the project were negative, while all the correlations are positive between the three organizational climate factors and success of the project. Only effective supervision – a climate dimension, did not show any significant relation with the overall success of the project. The correlation was also computed between the three performance constructs, risk dimensions and the organizational climate dimensions. The dependent variable as already mentioned above were the three performance constructs while the independent variables were the four risk dimensions and four climate dimensions. Here also all the risk dimensions showed significant negative correlations with all the dependent variables i.e. the budget, schedule and quality performance of the project. While on the other hand, out of four organizational climate dimensions only few dimensions showed a significant positive relation with the three success constructs. Out of which role clarity showed a significant positive correlation with all the three dependent variables namely
budget, schedule and quality. While effective supervision shows no relation with any of the three constructs.

After calculating the correlation, regression analysis was also conducted to reinforce the relationships. The overall success, budget performance, schedule performance and quality performance were put individually as dependent variable in the equation while the software risk and organizational climate factors were put as independent variables. The regression revealed very interesting findings. With the overall success as dependent variable, it was found that all the four risk factors affect the success of the project with SRS variability risk having the highest impact (beta value of -0.349**). Besides this, only one dimension of climate namely high standards of work task showed to have a positive influence on the success of the project. Thus, with the R square as 0.37 it can be easily stated that 37% of the project success gets affected by these factors.

The regression analysis was also conducted for strengthening the findings of correlation and for identifying the factors that affect the three performance constructs. The regression between budget performance as a dependent variable and software risk and organization climate dimensions as independent variables revealed, that budget performance gets affected by three organizational climate dimensions and one project specific risk dimension. Out of the three, two climate dimensions namely high standards of work tasks and intrinsic fulfillment positively affect the budget while effective supervision negatively affect the budget performance. Only one risk dimension namely team composition risk affects the budget performance of the project negatively. With the value of multiple R as 0.50 and R square - 0.26, 26% of the budget performance is affected by these factors.

The schedule performance gets affected by two project specific risk dimension and one organization climate dimension as revealed by the regression analysis. Team composition risk and control processes risk affect the schedule performance negatively while high standards of work tasks with a beta value of 0.165** positively affect the schedule performance of the project. With a multiple R as 0.41 and R square – 0.17, 17% of schedule performance is affected by these factors. Finally, the regression analysis between quality performance and the risks and
organizational climate dimensions revealed that the quality performance of the software project gets affected by one project specific risk dimension and one organizational climate dimension. While the role clarity in the organization positively influences the quality performance of the project, the team composition risk in the project affects it negatively.

Thus, on the basis of regression model it can be concluded that both the organizational climate dimensions and demographics play a very positive role in controlling and reducing the impact of risk on the software projects. Furthermore, both the project specific risk dimensions and the organizational climate dimensions influence the overall success of the software projects and the success of the three performance constructs of the project. Therefore, to ensure the success it is imperative to develop a healthy, open, trusting and free environment in the organization that will not only repress the various software risks impacting the success but will also ensure the successful completion and deployment of the project.

6.3.6. Objective 6: To Critically Evaluate the Causes of Failure and Success of Real Life Projects through Case Studies.

To critically evaluate the causes of failure and success of the real life software projects, the case studies were conducted. Two cases were conducted on the failed projects while the other two represented the success stories. The analysis of the four cases revealed very interesting findings.

In the first case the primary reason of the failure of the project was associated with the lack experience in handling the project coupled with ineffective supervisor. While the lack of experience in handling similar projects is a part of SRS variability risk, the supervision belongs to the organization climate dimension. Both these issues had a very negative impact on the motivation and commitment level of the team. Although the project was delivered with the acceptable quality yet, it failed on meeting both the schedule and budget performances of the project.

In the second case, the project failed primarily because of the wrong estimates made by the management. The management was too optimistic and too much depended on the performance of
the team which was still not formed. The schedules were excessively tight and the margins that the company was working on were too little. With no time to ramp up and bring harmony in the team, synchronization and the sense of ownership towards the project was nowhere to be found. The risks that this project faced were the risks of SRS variability and team composition. The only saving grace was the organization climate that prevailed during the execution of the project. Not only did the project have a strong support of the top management, the project manager was highly competent and skilled in bridging the gaps and increasing the productivity in the team. Although the project failed in terms of budget and schedule, the quality delivered was acceptable to the client and a long term relation was established with the client.

While in third and fourth case, the projects were successful because of the correct estimations and assessment made by the project manager regarding the budget, schedule, team, risks, requirements etc. Both the projects followed a well established project management methodology and had a well documented procedures and plans of executing the project. With the first step in right direction, the other factors followed the suit and both the project garnered full sponsorship from the top management and the client and skilled and highly committed team.

The detailed analysis of the four case studies revealed a number of lessons. The main causes of the failure of the projects as identified from the cases I and II were; lack of experience in handling the similar projects, inaccurate cost and timelines estimation, lack of top management support, an ineffective and poor supervisor, low morale and lack of commitment of the team towards the project. All these risks can be attributed to SRS variability and team composition risk which were found to be of immense importance in our findings related to the overall success of the projects. While the main factors that lead to the success of the project as identified from case III and IV were; complete ownership of top management and client, involvement of technically qualified and synchronized team, well laid out documentation and work breakdown structure and timely feedback and the freedom to the team. Most of these factors belong to effective supervision, role clarity and high standards of work tasks. In our findings, these factors have emerged as significant factors affecting the success of the project.
6.4 COMPARISON WITH THE PREVIOUS STUDIES

The identification of the project specific risk that affects the success of the software project along with the three performance constructs can be compared with the list of the top ten risks identified through secondary data analysis. As is quite clear from the regression analysis, the most important risk that affects the success of the project is SRS variability risk. This factor includes conflicting and continuous requirement changes, inaccurate requirement analysis, miscommunication of requirements, estimation errors, less or no experience in similar projects, inaccurate cost measurement, language and regional differences with client, delay in recruitment and resourcing and lack of client ownership and responsibility [15] [19] [22] [24] [25] [26] [42] [43] [125] [140]. Out of these risks, miscommunication of requirements (ranked 1), less or no experience in similar projects (ranked 3), changing requirements (ranked 9), estimation errors (ranked 6), lack of client ownership and responsibility (ranked 7), inaccurate cost measurement (ranked 8) feature in the list of top ten risks affecting the software projects globally.

The second important risk that affects the success of the software projects in India, is control processes risk followed by team composition and finally dependability risk. The control processes risk which includes poor documentation, poor code and maintenance procedures, insufficient testing and poor configuration control [51] [58] [140] [207] [208], does not feature in the list of the top ten risks identified through secondary data analysis. This means, that these risks may be more prominent in the Indian software projects than in the other countries. The third risk that impacted the success of the software projects in India was team composition risk which included lack of availability of domain expert, working with inexperienced team, team diversity, lack of commitment from the project team, low morale of the team, high level of attrition and lack of top management support [15] [24] [25] [26] [33] [34] [43] [45] [125] [128] [140]. Out of these, lack of top management support (ranked 2) appeared as one of the top ten risks affecting the software projects globally.

Lastly, in dependability risk which includes third party dependencies, inability to meet specifications and inadequate measurement tools for reliability [24] [26] [33] [125], none of the items appeared in the list of the top ten risks affecting the software projects identified through
secondary data analysis. One of the probable reasons may be that these risks might not be present or may be present but at higher ranks. This is also in analogy with the findings done in the present study as it appears to have with lesser impact on the success of the project. Also it does not affect any of the three performance constructs of the success, thus further strengthening the above statement. Figure 6.1 elucidates the above findings in a diagrammatic representation.

**Figure 1.2:** Analogy with the top ten risks identified through literature review

### 6.5 IMPLICATIONS OF THE STUDY

Based on the conclusions derived after the in-depth and comprehensive study, few implications can be made about minimizing project specific risks thereby ensuring the success of the software projects in India. Risk is basically any potential situation or event that could negatively affect a project’s ability to succeed and meet the three broadly acceptable parameters of success namely budget, schedule and quality. The organizations have been constantly working to mitigate these risks and provide quality software without affecting the budget and the schedule performances of
the project. CMM level 5, PCMM level 5, TL9000 and ISO 9001-2000 certifications are some of the steps taken by Indian software companies in this direction. Most of these certifications pertain to the process improvement and overall quality aspect of the project. These accreditations in the company formalize the overall software development lifecycle. Therefore, the usage of the correct methods can control the project specific software risk to a great extent. However, the correct procedure depends on the project manager and the team handling the projects.

The project risks start from the requirement gathering and analysis, how these risks are addressed is what really matters in the project. It’s a well known fact that the project manager along with his team is responsible for collecting the correct set of requirements and executing them. In between whatever threats or issues come they are handled by the manager. Therefore, the onus of the success of the project actually lies with the team handling the project. Even though everyone is aware of this, yet the organizations fail to address this key point. Most of the organizations treat their employees as replaceable assets. It is often observed that the link that connects the team, the organization and the client is project based rather than relationship based. Thus, the sense of ownership and commitment, which is the pedestal for a project’s success, gets diluted with attrition and discouragement. In this context, the present study is highly significant. It has not only unearthed the various risks impacting the success of the projects in India but has empirically proven how organizational climate can have a controlling effect on these risks. The study has also revealed that role clarity within the team, high standards of excellence, adequate tools and techniques, timely feedback and a facilitative leader within the project can go a long way in ensuring the success of the project. This dedicated study on project specific risk and success with respect to organizational climate unearthed a number of insightful and enriching findings that widened and supplemented the existing knowledge base. A number of recommendations have been drafted based on these findings, which are listed below:

1. **Training, mentoring, skilling and coaching** - Training and mentoring is important for unlocking the hidden potential, maximizing the performances and developing intellectual capital. Therefore, it is extremely important and must be aggressively followed in the organizations. Senior managers mentoring the leads and software engineers, top management
mingling with the fresh recruits and sharing their experiences informally, organizations sponsoring the courses of project management for future managers are few steps in this direction. Furthermore, with the development of advanced tools and techniques, the need of technical skills is slowly be replaced by the need for domain know-how. The analysis has also revealed that most of the projects fail due to lack of technical know-how. Therefore there is a need for providing trainings in the area of specialized domains so as to ensure success of the project.

2. **Investment in research** - yet another most crucial and highly ignored aspect in the organization is the investment in research. This is especially true for the small and medium sized organizations in India. Although, there has been a spurt of investments in R & D by large companies like Infosys, Wipro, Tech-Mahindra etc, however when compared with the global leaders the percentage is very small. Furthermore, investment in R&D is an instrument which helps the organizations in foreseeing the changes and in devising strategies and processes for adapting or influencing the change. This enables the companies in building a leadership position in leveraging the new technology for offering higher value in services. Investment in R & D also enables the companies in maintaining scalability, sustainability and mitigating project risks by finding innovative solutions. All this is very much needed in the Indian software companies which is now moving up on the value chain and entering into the domain of consultancy and providing end-to-end solutions to the client.

3. **Audit reviews** – one of the most effective methods of ensuring the success of the project is the incessant audit reviews at every stage of the project. Although this is present in most of the CMM level companies, this is not strictly followed. Most often it is seen as a burden and time wastage mechanism. Companies like IBM and HP are some of the companies that are rigorously following these methods and even appoint separate risk manager for critical projects. Though this is not possible for most of the companies in India, therefore, the onus of following the process in totality lies with the project managers. The managers must be enlightened about the importance of following these practices and must consider these as delivery excellence ingredient rather than as burden.
4. **Alignment of performance appraisals with training and presentations** – yet another interesting concept that companies can adopt is the alignment of performance appraisals of its employees with the trainings and presentations. This initiative will go a long way in ensuring the development of intellectual capital and maintaining sustainability by the organizations.

5. **Leadership programs** – while conducting interview, some of the top management executives of software companies in India, emphasized on the fact that India, though having a huge talent lacks immensely on the availability of good managers and leaders. Therefore, for the development of future leaders and managers, it is imperative for the organizations to identify the future leaders and managers and groom them by exposing them to various leadership programs. Infosys, Wipro, Mindtree consulting etc are some of the companies that have taken steps in this direction with the establishment of Infosys leadership institute and Wipro’s Leaders program.

6. **Establishment of career paths** – high level of attrition, low morale and lack of commitment from the team are some of the burning issues that the Indian software organizations are facing. Besides the work and supervisor, one of the major causes of this is the lack of well developed career path for the employees. Since the lower or middle management is not sure about what he/she aims to do in future, this leads of lot of uncertainty and results in dissatisfaction. To overcome these issues one of the most effective ways is to develop programs which clearly outline the career path of the employees. Infosys’s STAR Infoscion Program, Tech Mahindra’s MOULD (Mahindra’s Opportunity for You to Learn and Develop), WIPRO’s WIBGYOR- competency framework, is a step in this direction.

7. **Open communication**

   The project specific risks present in the software projects can be abrogated if there is a climate of free and open communication in the organizations and within the team. The software organizations need to move from climate of “bad news gets you killed” to a climate of reporting “bad news gets you rewards”. This is extremely crucial as this positive approach
will not only motivate the team members to perform and instill a sense of loyalty towards the organizations but also reduce many risks related to attrition, low morale and lack of commitment towards the project. Open communication in the organizations promotes innovation and provides an incentive to the employees to contribute positively towards the growth of the organization.

8. **Consultative environment**

The software project risks arise due to poor project management. It has been observed that an average experience of a project manager in India is 8-10 years this is less compared to their US counterparts with an average experience of 15-20 years. This means that while in US and other developed countries a person works on one technology develops an expertise in a particular technology and knows nitty-gritty of the technology, the project manager in India over a period of his experience has worked over different technologies and is not able to develop deftness in any technology. Furthermore, 7-8 years of experience is not sufficient of understand the nitty-gritty of the whole project including handling of a team. This is one of the major reasons of project failing on one or two parameters of success. To overcome this issue, it is imperative to have consultative climate where the employees are free to consult among themselves, the top management is easily accessible and there is a collaborative environment in the organization as a whole. All these can reduce various technological and team oriented issues that a novice project manager may not anticipate correctly. One of the primary risk that consultative environment can reduce is the lack of experience of handling similar projects which is the founding stone of the SRS variability risk in the software projects.

9. **Comprehendible roles and responsibilities**

Clarity in roles and responsibilities contribute in ameliorating success of the software project. Clarity in roles not only reduces the chances of missed opportunities, rework and delays, it also creates an atmosphere of certainty and predictability. Role clarity inoculates organizational commitment and job satisfaction. Role clarity is shown to have a direct impact on annihilating project risks in the software projects. Therefore, it is important that before the start of the project the project managers along with his team clearly answers the questions of
what, who, whom and where and accordingly delegate the responsibility. This is one factor which can reduce the risk of multiple point of contact and also help in reducing a number of team related risks.

10. Participative and facilitative leader

The success of the project is highly dependent on the type of leader. An autocratic leader who keeps his personal motives before the project and team is a doom for the project, while a participative and empathetic leader is a boon for the project. A pro-active manager not only anticipates the risks well in advance, also communicates the same to the management and the client while keeping the team members in loop. This not only ensures the loyalty and sense of ownership of the team towards the project, it also ensures the commitment of the top management and the client towards the software project. Therefore, the organizations must ensure that the managers in their company participate, facilitate and empathize with the team but at the same time do not micro-manage the individual team member’s tasks. All this can be achieved by providing proper training to the managers in the company.

6.6 LIMITATIONS AND SCOPE FOR FURTHER RESEARCH

The research study is limited to a few aspects. Firstly, the study has considered only the project specific risks and while assessing the risk factors and its impact on the success of the software projects. Secondly, only the seventeen organization’s climate attributes that emerged out after the discussion with 40 project managers during pilot study were considered while evaluating the various risk dimensions and the success. Thirdly, measuring attitudes of respondents is quite subjective. Although great care was taken for precision, yet there may be certain gaps which need to be rectified. Thirdly, the model needs to be tested on a larger dataset. With more than 500 software service companies of various specializations, sizes and turnover in India spread across the Indian sub-continent, dataset can be further increased to garner better results.

Further research can be conducted by adding a couple of facets to it. The study can be replicated by taking into account macro, micro and project specific risks affecting the Indian software
industry in totality. A comparative study on organization’s climate and its impact on risks and success can also be conducted between the large and small/medium sized software companies and on basis of the specializations. Further research can also be conducted by taking both the organizational climate and culture into account and studying their impact on risk factors and success of the software projects. Finally, impact of organization’s climate and risk on success constructs based on the perception of practitioners can also be gauged.