CHAPTER VII

SUMMARY OF FINDINGS, SUGGESTIONS AND CONCLUSION

7.1 Introduction

Business success in today's challenging and competence based global marketplace demands agility and the ability to rapidly transform its business structure, strategy and process to cope up with the changing environment. Change is omnipresent in every type of organization or business and adds complexity to projects. Trends in the last decade towards globalization and market rationalization, as well as economic volatility, have accelerated this rate of business change in a fast pace requiring every business to be alert with solutions for every possible contingencies. In this chapter an attempt has been made to briefly summarize the thesis and to give concrete suggestions on the basis of findings.

BEML as a case study in the Indian context reveals from the data analysis, the exigencies of any organization in managing complex projects, the adaptability and the excellence in performing and applying its Project Management Practices in today’s globalization era. The Findings from the data analysis has been summarized below followed by suggestions and scope
for future studies. The analysis and findings throws light on the requirements of an effective Project Management System, setting the example of BEML.

7.1a **Operational Performance:**

It was found that there has been a phenomenal and consistent growth in sales at 164.03 percent in the year 2009-2010 from 50.86 percent in the year 2004-05; A 96% increase in the value of production from the year 2004-05 to the year 2009-10. A decline in Exports during 2008 and 2009 was due to the effect of global recession.

7.1.b **Financial Performance**

There has been a remarkable increase in Profit After Tax, from 6 crores to 222.85 crores, an increase of 36.1 percent in the year 2010 from the year 2000. Networth increased to 193 percent from the year 2004-05 to 2009-10. Also observed an increase in foreign exchange earnings from Rs. 39.09 crore (0.14 percent) to Rs. 133.91 crore (2.42 percent) i.e., an increase of 2.28 percent. The Earnings Per share (EPS) has shown a tremendous increase from Rs.7.10 to Rs. 64.56 during the period 2002-03 to 2008-09.
7.2 Personal Factors

The percentage analysis on the distribution of respondents based on their Designation, of Managers and Assistant Managers, working in BEML, Bangalore was found to be 33.3% and 66.7%.

The Work experience of the respondents showed that 66.7% of the respondents have more than 20 years of experience in Project Management, 21.4% have an experience between 10 to 20 years and 11.9% respondents have an experience below 10 years.

7.3 Project Management Practices Currently Followed

1. With respect to the Project Management Practices followed in the organization presently the study reveals that majority of the respondents 41 (97.6%), have responded positively, agreeing to the statement ‘Long duration projects face unforeseen contingencies’, 37 (88.1%) of the respondents have agreed that changes are required in the current PMS and 28 (66.7%) have supported the statement that lean techniques are periodically applied.

2. More than 50% of the respondents have conformity with all the practices followed in BEML, by giving a positive response on the current PMS
3. Regarding the statement ‘Conduct of research and due diligence is done on a continuous basis’, 50% of the respondents have not agreed with the statement which implies that the requirement of Research is impetus for its growth and development.

4. It is concluded that, some of the opinions like ‘The current organizational structure requires changes’, ‘Long duration projects face unforeseen contingencies’, and ‘Lean techniques are periodically applied’ has a higher level of positive response and the questions pertaining to Quality certifications, Conduct of research and due diligence done on a continuous basis, and relief against anxiety and other problems in managing the project have observed a higher percentage of negative response.

7.4 Traditional Project Management System:

1. 30 (71.4%) of the respondents have agreed that the Traditional Project management system does not suit the projects undertaken currently.

2. Approving this statement, 23 (54.8%) of them have stated that the reason being due to the complexity of the project
implementation, and 17 (40.5%) of them have given a reason that the projects undertaken are too dynamic in nature.

3. 40 (95.2%) have suggested that it is because of the nature of complexity of the projects there is the necessity of adopting the latest technologies in Project Implementation along with the updations of PMS, to facilitate sustenance in its business.

### 7.5 Project Planning

1. Majority of the respondents have strongly agreed, on the project planning exercise applied, before initiation of the project.

2. 50% of the respondents have agreed, that suggestions from team members are accepted in application of the current PMS.

3. Majority of the respondents have also agreed on the effectiveness of Collaborative estimation of cost and time in managing the project.

4. It is concluded that all the necessary inputs relating to the project planning stage has been prudently followed with the required communication and feedback among the team members to enable an effective initiation of the project.
7.6 Project Identification:

1. Around 57.1% of the respondents have agreed that research on exploring of prospective customers has been done in continuous basis.

2. 52.4% of the respondents agree that the existing customer base fulfill the existing production capacity meeting the company’s optimum sales.

3. Regarding the competency mapping, only 16 (38.1%) of the respondents have disagreed that it is done on a continuous basis.

4. It is concluded that Project identification is not a major problem for the company due to the sustained demand and accomplishment of the projects suiting to the customer’s requirements.

7.7 Project Development:

1. 28 (66.7%) of the respondents agree that the morale of the team members are kept intact over the period of accomplishment of the PMS
2. 28 (66.7%) agree that the core competency of the organization is the expertise and the professional skill of the team members enhancing the Project Management System in their organization.

3. Similarly 26 (61.9%) of the respondents agree on the periodical performance analysis adopted in the current PMS.

4. It is concluded that the Project Development is strongly built on the edifice of expertise and the professional skills of the team, periodical performance analysis, and the morale of the project management team kept intact during the entire process of PMS.

7.8 Risk Management

1. 27 (64.3%) of the respondents agreed that, urgent projects disrupt the cost and availability of resources.

2. 22 (52.4%) of them have agreed that risk management techniques and tools has been thoroughly examined in the PMS

3. 19 (45.2%) of them have agreed that Team members fatigue overtime, losing interest in the project.
4. Risk is associated with outdated practices due to updated technology. It is found that 17 (40.5%) of the respondents agree that the project once completed no longer meets the current business needs and 14 (33.3%) have consented that there exists lack of confidence in time and cost estimates.

5. It is observed from the analysis that there are risks to be managed relating to lack of support and cooperation among the team members, change of business objective during the course of the project, and the constraints on cost and time estimates.

7.9 Project Execution, monitoring and control:

1. 30 (71.4%) have agreed that the project is updated whenever necessary during the course of PMS.

2. 27 (64.3%) have agreed on identification of gaps are done on a continuous basis through review of the process and the improvements to be made wherever necessary.

3. 24 (57.1%) have agreed that risk management techniques are thoroughly examined and duly applied.
4. 25 (59.5%) of them agree, that the real execution time is always close to the planning schedule so as to avoid undue delays.

5. In toto, the project monitoring, control and execution are diligently followed keeping in view updation of project whenever necessary, inevitable changes promptly effected, review on the work carried out and technology upgradation which becomes inevitable for timely completion of PMS.

7.10 Personal Decisions in Administering the Project

1. Regarding the control measures adopted in managing the projects 25(59.5%) of them have been neutral in their response and 15(35.7%) of the respondents have felt that the control measures are stringent.

2. 24(57.1%) of the respondents felt that the communication and human resource management is satisfactory.

3. 22(52.4%) of the respondents have stated that the feedback from the clients on completion of the project is very satisfactory and 16(38.1%) have felt that the clients were moderately satisfied.
4. 22 (52.4%) stated that there exists a very healthy relationship whereas 18 (42.9%) have felt that the relationship among the team-mates is manageable with minor differences.

5. 26 (61.9%) have stated that disruption in implementing projects occurs very rarely and 14 (33.3%) have suggested that it occurs very often.

6. 21(50%) have stated that conflicts in planning negligibly arises and 18 (42.9%) have felt that it arises very often.

7. 24(57.1%) have stated that the execution period involved in completing the project is normally achieved and 16(38.1)% have stated it is not achieved in time due to some constraints and only 2(4.8%) of them have stated that it has been achieved before the specified scheduled time.

8. Hence it is observed that the personal decisions of majority of the respondents have been in consensus with the existing PMS except for a few of them having a disagreement at a negligible level.

7.11 Time, Cost and Resources

1. 17 (40%) of the respondents have felt that the Actual Cost of the projects are generally higher than the estimated cost and 14 (33.3%) has opined that the cost achieved was as per the estimations done.
2. 26 (61.9%) have felt that the availability of resources and raw materials is stable, 14 (33.3%) have stated that there is scarcity of resources and raw materials due to delayed in supply of materials but which occurs due to variations of supply and demand.

3. 23 (54.8%) of the respondents have stated that there is continuous supply of materials from vendors.

4. Majority have responded that the projects have been completed within the scheduled time.

4. It is concluded that the time, cost and resources have been kept under control to the maximum extent and dealt has rarely occurred.

7.12 Project Improvement Issues

1. 30 (71.4%), have opined that the Process Re-Engineering is continuously adopted during the project implementation process.

2. 24 (57.1%) of them have stated that, assessment of customer’s satisfaction, it is done after completion of every project and 13 (31%) of them have felt that it is done at regular intervals.
3. 17 (40.5%) have stated that efficiency and productivity has increased due to modernization, mechanization and skilled manpower.

7.13 Executives, Perception and Personal Profile:

1. The chi-square was used to test the relationship of the personal factors with the PMS factors;

The hypothesis developed on the designation of respondents with their PMS decisions. It is construed that the designation of the respondents has significant influence on the decisions relating to Time, Cost and Resources that it is generally higher than the estimated cost. In case of other factors like Level of interest in managing the projects; Control measures in managing the project; The communication and human resource management; Feedback from the clients on closure of the project; The relationship between the project team members; Execution period involved in completing the project, it does not have any significant influence.

2. In case of the hypothesis tested on the Experience of the respondents influencing their PMS Decisions, it was found that the experience of the respondents has no significant
influence on their PMS decisions except for the communication and human resource management decision and continuous administering of Process re-engineering.

7.14 Average Score Analysis

1. Personal factors and Project Planning: It is concluded that the respondents irrespective of their cadre and experience have a high level of agreeability towards the variables, ‘Suggestions from the team members are invited during the planning stage’; ‘Problems anticipated in the current project is shared among the team’; ‘List of activities are defined and assigned to each individual’, than others relating to Project Planning.

2. Personal Factors and Project Identification: It is concluded that the respondents irrespective of their cadre and experience have a high level of agreeability towards the variables, ‘Research on prospective customer requirement is continuously explored’ and ‘The competency mapping is done in a continuous process’ than others, relating to Project Identification.

3. Personal Factors and Project Development: It states that the respondents irrespective of their cadre and experience have a high level of agreeability towards ‘Training programs help to
share knowledge and improve the skills’; ‘The expertise and professional skill is the core competency of the organization’ and ‘Performance analysis is done periodically for timely completion of project’ than others, in relation to Project Development.

4. Personal Factors and Risk Management: It is found that the respondents irrespective of their cadre and experience have a high level of agreeability towards ‘Urgent projects disrupt the cost and available resources’ and ‘The risk management techniques and tools has been thoroughly examined’ than the others, in relation to Risk Management variable.

5. Personal Factors and Project Execution, Monitoring and Control: It is found that the respondents irrespective of their cadre and experience have a high level of agreeability towards ‘The project is updated whenever necessary’ and ‘Review on the progress made, achievements done and the needs to be improved is done’ than the others, in relation to the variable, Project Execution, Monitoring and Control.
7.15 **Perception about adoption of Project Management Practices**

Perception about adoption of project management practices: concludes that in majority of the aspects the proportion of respondents towards ‘following’ the project management practices in the organisation is significantly higher than others.

7.16 **Significance of Project Management System:**

To find the relationship between the variables ‘Project Planning’, ‘Project Identification’, ‘Project Development’, ‘Risk Management’ and ‘Project Execution, Monitoring and Control’ using ‘t’ test, it is found that all the variables except Risk Management have significant correlation with the other variables at 5 percent level. It is concluded that there exists significant inter correlation between Project Planning, Project Identification, Project Development, Risk Management and Project Execution, Monitoring and Control under the Project Management System.

Relationship between PMS and Executives’ Perceptions: The multiple regression analysis is carried out between the dependent variable (total score of the respondents on all the independent variables) and the independent variables such as Project Planning, Project Identification, Project
Development, Risk Management, and Project Execution, Monitoring and Control, by introducing one independent variable after each stage.

The result shows that the Project Planning explains a maximum of 76.5% on the dependent variable PMS.

Grouping of PMS variables through factor analysis: The factor analysis using extraction method of ‘Principal Component Analysis’ under ‘Varimax Kaiser Normalisation Rotation Method’, was employed not only for Factor Reduction but also to identify the important factors.

7.17 **Factor analysis- project planning**

1. It is found, that the eight factors considered for Project Planning can be categorized under two groups such as:

   **Group 1 – Prelims of PMS**
   **Group 2 – Ecology Effect**

7.17.a. **The Prelims of PMS:** The Prelims of PMS are the factors in Project Planning namely, ‘Before starting the project a professional exercise of planning has been made’; ‘Suggestions from the team members are invited during the planning stage’, ‘problems anticipated in the current project is shared among the team, to elicit Solutions’; ‘List of activities are defined and assigned to each individual for smooth Execution’; ‘Collaborative estimation of cost and time is more effective in planning process’; ‘The
critical path of the project is examined in detail to ease the complexity in the schedule’.

7.17.b **The ecology Effect:** refers to the variable, ‘The environmental issues relating to the project does not arise’

7.18 **Factor analysis - project development:**
2. It is found from that the seven factors considered for ‘Project Development’ can be categorized under two groups such as;

   **Group 1 – Navigation of PMS and**
   **Group 2 – Role Priority**

7.18.a **The Navigation of PMS factors are,** ‘The project team’s morale remains intact until the completion of the project’; ‘The strategic objectives are well defined’; ‘Training programs help to share knowledge and improve the skills’, The expertise and professional skill is the core competency of the organization, ‘Performance analysis is done periodically for timely completion of project’.

7.18.b **The Role Priority factors are,** ‘Project manager’s role is more about team leadership than project management’ and ‘A part of the work is outsourced’.

7.19 **Factor analysis – Risk management**
3. The seven factors considered for Risk Management can be grouped under two categories such as;

   **Group 1 – Deviations in PMS**
   **Group 2 – Updation of PMS**
7.19.a. **The Deviations in PMS factors are**, ‘Lack of team members support and cooperation’; ‘Team members fatigue overtime, losing interest in the project’; ‘On completion of the project, it may end up that the project, no longer meets the current business needs’ and ‘The business objective might change during the course of the project’

7.19.b **The Updation of PMS factors are**, ‘Lack of confidence in time and cost estimates among the team members’; ‘Urgent projects disrupt the cost and available resources’; ‘The risk management techniques and tools has been thoroughly examined’

7.20 **Factor analysis – project execution monitoring and control**

4. It is found, that the ten factors considered for Project Execution, Monitoring and Control is categorized under three groups such as;

- **Group 1 – Appraisal of PMS**
- **Group 2 – Social Exchange**
- **Group 3 – Reporting Mechanism**,

7.20.a. **The factors of ‘Appraisal of PMS’ are** ‘The real execution time is very close to the planned schedule so as to avoid serious delays’; ‘Review on the progress made, achievements done and the needs to be improved is done’; ‘Technology upgradation is done periodically to keep pace with the competition’; ‘Before initializing the project a professional exercise of
planning has been made’; ‘The control process starts from the initial stages of the project’.

7.20.b The ‘Social Exchange’ factors includes, ‘The project is updated whenever necessary’; ‘The inevitable changes done during the implementation process does not affect the project’s health’; ‘Informal communication and social exchange helps to enhance team work’

7.20.c The ‘Reporting Mechanism’ factors are, ‘Requirements of clients are validated in detail and changes required is authorized by the client’; ‘Control over the execution of the project is limited to supervisions and basic reports’.

7.21 SUGGESTIONS

The research study done in BEML explored the viability and the agility of the Project Management Practices followed and applied in the successful completion of the Projects. The Projects undertaken was found to be complex requiring much dexterity, professionalism, intelligence, skill, capability and competence of all those involved in the Projects. BEML’s success lay in their skilled manpower and effective team management. The Executives’ perceptions portray their ability in applying the Project Management Practices to orchestrate an efficient, effective and successful project from initiation to close. It was found that the smooth rendering of Project Management Practices in BEML has helped to achieve not only  

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phenomenal growth in its business over the period but also ensured utmost customer satisfaction. From Researcher’s point of view a few suggestions has been laid down, though observed a flawless PMS applied in BEML;

- As project management continues its progression, professionals require the latest information on the changes in project management. Access to state-of-the-art information is necessary to understand the increasing integration of project and the organizational strategy, and is vital to the continued advancement of the project management profession.

- Exploring new viable techniques and its effectiveness strengthening its Research and Development Department will help in a longer way.

- Supply chain management and business process outsourcing have also impacted organizational effectiveness and attitude on managing projects. BEML with an effective Centralized Trading Division can uphold to international standards

- Innovative theories, trends and challenges discovered through investigating allied disciplines of project management have important implications and allocations in the future of project management for achieving the golden triangle (project deadline, budget and output) in the project management
processes, skills and knowledge paradoxical to actual practice considered as the building blocks of project must be more properly defined.

In spite of its success, the organization can improve on a few areas for instance, enhancement of production capacity or setting up of additional Business Units, improvement and training in lean management techniques, research and development and focus on Process re-engineering.

7.22 CONCLUSION

To conclude, it is found that the existing Project Management Practices of BEML followed in implementing the complex projects has been successfully managed over six decades. The upgradation of technology, modernization and the skilled manpower have all been the contributing factors for its sustenance and growth. From the data analysis made out of the responses of the Project managers, it could be understood that there has been 100% utilization of Productivity, due to the orders procured well in advance. Moreover, the time, cost and resources have not been a constraint for completion of the projects, as there have been timely procurement of resources not hindering the production process. The Quality sustenance has been maintained which has been another reason for its growth and development.
7.24 Scope for Further Research

Many studies, both domestic and global, have been done on Project overruns, Project Financing, Variations and reasons on Project Cost Estimations, Project Scheduling etc. It is suggested that, research on ‘Project Management Practices’ can be explored further on the following areas:

- Earned Value Management in Complex Projects
- Effective lessons learnt on Post Project Reviews for upgradation of PMS
- Understanding Corporate Strategies through Project Management
- Emotional Intelligence in managing Projects
- Efficiency in Decision –making within the various Project Teams
- Leadership styles applicable to the needs of different Projects
- Exploring the complexity of Projects and suitability of Project Management Practices

To conclude, the endeavor on exploring the applicability of Project Management System for effectiveness and efficiency for successful completion of projects in any organization is a never ending task and studies in this area adds more inputs and value towards the upgradation for any organization.