DEVELOPING A FRAMEWORK FOR EFFECTIVE IT PROJECT MANAGEMENT AND BEST HR PRACTICES

By

S. M. Imran Haider Naqvi

NATIONAL UNIVERSITY OF MODERN LANGUAGES ISLAMABAD

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By

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ABSTRACT

The existing framework of Project Management advises project managers to exercise nine knowledge areas. These are management of the project’s Scope, Time, Cost, Quality, HR, Communication, Procurement, Risk and Integration. It suggests entertaining these nine knowledge areas in five processes that are initiating, planning, executing, controlling and closing the project. The knowledge on HR Management (HRM) declares fourteen functions that this study identified applicable to Project Management. The literature stresses that managing all these knowledge areas determines project’s outcome. The literature further indicates that nine knowledge areas are not equal in priority and HRM is not given the needful precedence. The study perceived that it is not pragmatic for a project manager to perform the nine knowledge areas and all the applicable functions of HRM efficiently.

From Jan 2005 to Jan 2008, this study discovered that in the IT industry of Islamabad – Rawalpindi, Pakistan, project managers were assigned neither all the nine knowledge areas nor all the applicable functions of HRM. The study observed that projects suffered where HRM was underestimated. Can the quality in practice of HRM make or break projects? If yes, what minimum functions of HRM should be assigned to a project manager to benefit projects? Further, how can the project manager’s role for precise number of knowledge areas be defined? The study assumed that precise and well-defined role of a project manager in terms of the nine knowledge areas and HRM can make the existing framework for Project Management more adoptable. For this purpose integrating the literature and the real practices in the selected IT industry this study identified and selected five HRM functions as independent variables (IVs) keeping project result as dependent variable (DV). The IVs include selecting right person, assigning workload, setting timelines, communication and monitoring performance. This study hypothesized that the result of specific IT/Telecom project is correlated with and regressed by the quality in the practice of the mentioned HRM functions.
Utilizing a valid and reliable instrument the study collected data for a stratified sample of 70 heterogeneous IT/Telecom projects from the selected 24 IT/Telecom organizations. Employing frequency & descriptive statistics, Pearson’s correlations, regression and PLS regression the analyses were conducted. All the selected IVs were found correlated with project result. Individually no IV regressed project result but collectively they all regressed the DV. The study substantiated its hypotheses based on results of regression and PLS regression. It inferred that good quality practice of all the selected HR functions paves success for IT/Telecom project while their substandard practice will lead project to suffering. The conclusion of the study is applicable on the IT projects of large scope and team size with well-defined type provided all the other knowledge areas for project management are exercised with necessary equilibrium. Based on results this study declares that a project manager should perform at least these five functions of HRM. The study designed templates to help project managers performing these HR functions. The mentioned results and findings from the IT industry about the knowledge areas enabled this study reshaping the existing framework for Project Management. It contributes that project manager better be set responsible only for the management of scope, time, cost, HR and communication for projects while quality, risk and procurement for projects better be managed at organization level. Project manager should consider HRM, Communication and technology the driving tools for managing other knowledge areas.
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LIST OF ABBREVIATIONS

This study used the following abbreviations:

3I’s – Initiation, Interest and Imagination
AOA – Activity on Arrow
AAP – Affirmative Action Plan
BAM – Business Activity Monitoring
COMs – Comfort, Competence and Commitment
CPM – Critical Path Method
DMAIC – Define, Measure, Analyze, Improve and Control
DV – Dependent Variable
EEO – Equal Employment Opportunity
EMV – Expected Monetary Value
GIGO – Garbage In Garbage Out
HF – Human Factors
HR – Human Resource/s
HRD – Human Resource Development
HRM – Human Resource Management
HRP – Human Resource Planning
IEEE – Institute of Electrical and Electronic Engineering
ISO – International Standardization Organization
IT – Information Technology
IV – Independent Variable
MS – MicroSoft
MUS – Montana University System
NPD – New Product Development
PERT – Program Evaluation and Review Technique
PDM – Precedence Diagramming Method
PM – Performance Monitoring
PMI – Project Management Institute
PMP – Project Management Professional
PS – Project Success
QL – Quantitative Workload
RFP – Request for Proposal
RFQ – Request for Quotation
SC – Stakeholder Communication
Telecom – Telecommunication
TL – Timelines
WBS – Work Breakdown Structure
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To my beloved father who advised thought provoking inputs
that helped me in initiating and completing this study.
CHAPTER 1

INTRODUCTION

Background of The Study

A project is a temporary endeavor undertaken to create some unique product or service; it could be of any nature like scientific (electrical, mechanical, civil, chemical, medical etc.), social, entrepreneurial etc. Project Management is the application of knowledge, skills, tools and techniques to project activities in order to meet project’s requirement. Project Management is recommended to be a practice of nine knowledge areas. These knowledge areas are the management of Scope, Time, Cost, Quality, Risk, Procurement, Communication, Human Resource (HR) and Integration of all. The first four knowledge areas (Scope, Time, Cost and Quality) are ranked primary functions whereas the other four areas (Risk, Procurement, HR and Communication) are declared secondary functions of Project Management. The ninth knowledge area ‘Project Integration Management’ is considered vitally important for guiding how to practice effectively the mentioned eight knowledge areas simultaneously. Every knowledge area dictates practice of some predefined activities/functions to the project manager in order to manage and lead the projects effectively. These knowledge areas are recommended to be exercised in five processes that are initiating, planning, executing, controlling and closing (Project Management Institute [PMI], 2004; Schwalbe, 2004; Dinsmore, 1990).

Project Management declares HR Management its sub function ranking it secondary. Lou and Associates (2002) acknowledged the fact that during the real practices of Project Management, HR Management was the knowledge area that was usually given less precedence than what it actually deserves. On the other hand, HR Management is a vast subject that is given primary importance for large business organizations and enterprises. Human Resource Management (HRM) is the effective
selection and utilization of employees to best achieve the goals and strategies of the organization (Cascio, 1995; BerNardinad and Russel, 1993). The knowledge of HR Management in general recommends minimum sixteen functions of HR Management for managing any team or organization that are described in Chapter 2. The study took initiative to understand both the subjects that are; Project Management and HR Management for learning how many functions from HRM the Project Management currently adopts as well as needs to adopt and for learning the existing frameworks recommended for Project Management and HR Management.

The knowledge of Project Management seems to be in the attempt of adopting maximum number of HRM functions. In this context, lengthy theories relevant to motivation and various HR concerns are generally explained. Project managers are provided more theories and less about precise number of functions of HRM that they should readily adopt and apply. A recent study illustrates that the lack of engagement between Project Management literature and personnel/HR literature on the role of project managers in the project-based organizations adversely affects the objectives of the projects (Clark and Colling, 2005). Clark and Colling (2005) concluded that specific and precise practices of HR should be incorporated from the HR literature into Project Management literature for both the benefits of employees as well as the project led organizations. Brewster, Hegewisch and Lockhart (1991) identified the practices in budgetary approach; recruitment policies; pay and benefits policies; training policies and evaluation; contract and working hours flexibility; industrial relations and response to the market important for managing projects. Although the literature declared, HR Management practices important for Project Management but it does not specify precisely the minimum number of the HR activities that a project manager should adopt for ensuring good project result. Identifying certain HR policies important for Project Management is not adequate to guide project manager about HR Management. Project managers are usually not the policy makers. Most project managers are just followers of the HR policies that already exist. Where literature is expected to provide details, it should also guide about the precise number of HR activities that a project manager should undertake while leading project. For this reason, literature can be optimized such that it provides the project managers the information on the minimum number of functions of HR Management that should at least be incorporated for projects.
Further, the literature on Project Management clearly stresses on exercising all the above mentioned nine knowledge areas ensuring good quality practices. Eve (2007) demonstrated how large investments are not benefited when individual elements (knowledge areas) of the Project Management are exercised without synchronization treating each separately. In summary, all the nine knowledge areas are considered the job role of a project manager.

Knowledge is optimized through its practice over time. Moreover, practices of the knowledge and its relevant theory generally have variation in real life. For these facts, the study did not restrict only to the literature on Project Management and HR Management. It further considered the practices of the IT project managers working in the IT industry of Islamabad and Rawalpindi, Pakistan as the third source of knowledge relevant to both the selected subjects through observing and collecting data about their practices. This study perceived that the mentioned third source of knowledge could be useful in identifying the precise number of functions of HRM that a project manager should exercise for ensuring effective Project Management in real practices. What HR functions the project managers in the selected industry adopted and applied remained the primary concerns of this non-contrived ex-post defacto study. The study observed variations in the real practices of project managers in the selected industry from the practices suggested in the literature.

In context of exploring variations between suggested and actual practices, the study realized that project managers needed not to be proficient in exercising all the nine knowledge areas as well as all the functions of HR Management that this study identified in the literature. The study explored that selected industry believed in delegating and assigning limited number of knowledge areas and HR functions in the job description of a project manager. In this context, this study explored that IT projects remained successful despite not exercising all the functions and knowledge areas recommended for Project Management in the literature. Simultaneously, IT projects reportedly suffered for various reasons and one prominent reason was substandard quality in the practice of certain HR functions. It is therefore rational to explore how the existing knowledge on Project Management could be optimized in the context of HR Management. Identifying the precise number of HR functions that a project manager must perform and defining an effective and easy mechanism for
performing these functions may be a key to achieve the necessary optimization in the existing body of knowledge on Project Management. Further, exploring variations in the suggested and real practices of the existing framework of the nine knowledge areas for Project Management may also be helpful in identifying how this existing framework could be made more pragmatic.

The preliminary exploration in the selected IT industry reinforced that adopting all the knowledge from the literature on HR Management is necessary for Project Management but not necessarily by the project manager. In simple words, adopting generalized HR Management practices are not adequate for Project Management. The practices in the local IT industry indicate that only specific functions of HR Management should be adopted while managing projects. Question arises, exactly what specific functions of HR Management the project manager should adopt? Similarly, how a project manager could manage projects by adopting limited role in terms of the nine knowledge areas? As the literature remains answerless to these questions, this gap in literature and real industry practices demands an ex post defacto study that targets bridging the mentioned gap by integrating the practices of real practitioners and existing literature.
Problem Identification

Preliminary investigation revealed that in actual practices of Project Management undertaken for managing IT projects in the local industry of Islamabad and Rawalpindi, Pakistan, project managers invested more energy in practicing identified primary functions (Scope, Time, Cost and Quality). This study further observed that the secondary functions (HR, Communication, Risk and Procurement) of Project Management were not given due attention. A major reason for negligence towards the exercise of secondary functions was that IT project managers used to find it difficult to maintain balance in application of all (nine) knowledge areas of Project Management. In this context, the least privileged knowledge area among the four secondary knowledge areas was reported to be HR Management especially in organizations where IT projects had been suffering.

The study discovered that IT project managers were not proficient in practicing all the knowledge areas of Project Management and the functions of HR Management in the selected industry. In the selected sample, explained in Chapter 3, near half of the subjects (project managers and team) were found not well acquainted with all the nine knowledge areas considered essential for effective Project Management. More than half of the subjects that were qualified in Project Management remained more inclined to the practice of primary knowledge areas and neglected the good practice of secondary knowledge areas. It was further learnt that industry did not believe in utilizing a project manager for all the recommended nine knowledge areas.

HR Management was discovered to be an underestimated knowledge area of Project Management in software houses where project results were reported unsatisfactory. These facts indicate that one reason behind the failure of considerable number of IT projects in the selected sample was substandard practice of HR Management and the other knowledge areas during Project Management in January 2006 to May 2007. Simultaneously one reason behind the success of number of IT projects in the same time period was good quality practice of limited HR functions as well as knowledge areas by the project managers.
Although more than half number of the selected subjects (project managers) were formally trained or certified on Project Management, but the mentioned negligence towards the secondary knowledge area (HR Management) was still committed. The study realized that in the relevant literature an easy and effective framework for HR Management that not only enlists precise number of HR functions that a project manager should undertake in a particular order but also guarantees their smooth and easy practice, could be appended in the knowledge of Project Management. Further, this study realizes that project manager’s role can be limited to certain knowledge areas instead of all the nine knowledge areas. Therefore, this study interprets that the existing framework for HR practices recommended for Project Management is required to be improved.
Problem Statement and Research Questions

IT Project managers in 15 companies were not found proficient in performing the necessary HR Management while managing their IT projects. Based on investigations conducted within selected 24 software houses and Telecom companies serving IT industry in Islamabad and Rawalpindi, Pakistan and the literature following shortcoming in the existing body of knowledge of Project Management was identified as the problem statement:

**Problem Statement**

Existing literature about IT Project Management does provide frameworks for HR and Project Management. However, these frameworks do not specify the precise number of the minimum HR functions that a project manager must practice and further do not provide an easy mechanism to exercise the functions of HR in effective manner. Further, in context of the nine knowledge areas a project manager is declared responsible for all of them whereas actual industry practices indicate that project manager’s role can be restricted to limited knowledge areas.

**Research Questions**

The main question of interest for this study is, what functions of HR are precisely required for effective Project Management? The study further intends learning from industry practices what knowledge areas should be delegated to project managers and how all the nine knowledge areas should be overall performed for projects?

Identifying the essentially required HR functions and the knowledge areas that should be delegated to the project manager by exploring the literature and observing the real practices in the selected IT industry will likely provide solutions for the mentioned problem and questions. The mentioned gap in suggested theory and observed practices signifies the need to design such a framework for Project Management that could specify the precise number of HR functions and knowledge areas incorporating maximum applicable knowledge so that project managers are enabled to perform effective Project Management while being responsible for well defined and precise HR functions and knowledge areas.
Objectives of Study

This study sets the following objectives:

1. To test whether quality of the practice of HR Management while managing any IT project affects the project’s result. It is required to highlight the impact of the substandard quality practice as well as good quality practice of the selected HR functions on heterogeneous IT projects in quantitative manner.

2. To improve the existing framework for HR Management needed for Project Management such that it could help project managers by mentioning precise number of minimum essential functions of HR Management explaining an easy and effective manner to exercise them.

3. To optimize the existing framework for Project Management by integrating the existing bookish knowledge and the real rational practices of Project Management in the selected IT industry such that project manager’s pragmatic role required for practicing the nine knowledge areas gets recognized.
Developing Theoretical Framework

Practices observed in the selected IT industry, as described in Chapter 2, indicate that through limited and specific functions of the Human Resource Management a project manager can play vital role in determining the project’s result. Moreover, Decenzo and Robbins (2002) guides that a well-defined function assigned to the project manager can enable him practice multiple number of HR activities/tasks. For this reason, this study identified the following five HR functions as independent variables from the literature reviewed:

1. Allocating task/s to the right person (team member)
2. Deciding rational quantitative workload on team members
3. Setting rational timelines for each and every team member
4. Establishing stakeholders communication plan
5. Monitoring performance

As the current study intended to measure the impact of the selected HR functions on the outcome of IT project while performing them during Project Management, it selected Project Result/Outcome as the dependent variable for its theoretical framework.

The study selected the mentioned five independent variables because these five variables (HR functions) could encompass maximum number of functions of HR Management and further the convention in the IT industry. Secondly, they certainly had to be performed during Project Management for any IT project. Following description explains the rationale for selection of each independent variable identified from literature:
1. Allocating Task to ‘The Right Person’ covers HRP, Staffing, EEO, Compensation Management, HRD and Analyzing Team Member’s Skills and Talent.

2. Setting Rational Deadlines for each Team Member covers Time Management for HR and job (activity) definition/designing, motivating team members and stress management.

3. Establishing Stakeholders Communication Plan covers Employee Relations (Including Conflict Resolutions, Managing Diversity and Synergy), Team Motivation, Utilizing Software (Technology) and involving end-users for learning project’s needs, scope, constraints, boundaries and satisfaction of client as well as team. This study kept the scope of this independent variable only to the bidirectional inter-team communication especially between subordinate and supervisor as project manager is directly responsible for this and can address HR issues like Conflict Resolutions, Managing Diversity and Synergy through the same function. Further, the selected software houses considered inter-team communication a primary aspect of the stakeholder communication.

4. Deciding Rational Quantitative Workload for Team Members covers HRP, workload management, motivating team members and stress management.


The study did not entertain the Health & Safety Insurance function of HR Management. It is logical, as the selected IT industry of Islamabad and Rawalpindi, Pakistan had adopted the culture of assigning the task of insurance of health, safety and security of their employees at the work environment to their HR and/or Administration department only.

This study further did not include the identified variable Planning the Reward Structure for the fact that in the selected industry this function of HR was considered
reserved for only the top management especially the owners. Project managers during the entire life cycle of project were not required to define or even advise the reward structure. The software houses used to follow a predefined reward structure for compensating its employees on annual basis while project managers could maximum provide their input through performance monitoring and conducting appraisals at the year-end. Therefore, planning reward structure is not any HR Management function that project managers need to exercise for their projects in the selected IT industry. For retaining an employee who intends resigning but required by the industry for its projects, salary revisions were reported to be a frequently adopted solution. However, this task was also not delegated to project managers in the selected software houses.

Similarly, the study did not directly include the variables conflict resolution and mediation approach as in the selected IT industry these functions were required to be performed by the project managers on need basis. Further, HR department of the software houses were reported to be responsible for resolving personal conflicts, while work conflicts could be resolved by project managers through inter team communication that this study has already included. Moreover, it was not pragmatic to define or design any form or document for conflict resolution and mediation in the selected software houses.

The perceived relations (dependency) between the selected independent and dependent variables are graphically presented in the Theoretical Framework in the next section of this Chapter. Literature supporting the derived theoretical framework is provided next to it.
Theoretical Framework

Based on the literature and the practices learnt from the selected IT industry, the study selected variables of interest as described above. The study conceptualized the theoretical framework depicted in the Figure 1.1. The purpose of this theoretical framework is to test the correlation between the quality of the practice of the identified precise five HR functions and the result of the project for which the project manager exercises these five HR functions.

**Figure 1.1**

<table>
<thead>
<tr>
<th>HR Practices (IV)</th>
<th>Project Result/Outcome (DV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Allocating task/s to the right person (team member) (E1)</td>
<td>1. Stayed within budget (E1)</td>
</tr>
<tr>
<td>2. Deciding rational quantitative workload on team members (E2)</td>
<td>2. Stayed within time allocated (E2)</td>
</tr>
<tr>
<td>3. Setting rational timelines for each and every team member (E3)</td>
<td>3. Great organizational benefits (E3)</td>
</tr>
<tr>
<td>4. Establishing stakeholders communication plan (E4)</td>
<td>4. User satisfaction (E4)</td>
</tr>
<tr>
<td>5. Monitoring performance (E5)</td>
<td>5. Other benefits (E5)</td>
</tr>
</tbody>
</table>

As stated earlier relevant literature emphasized that for every job of project, most appropriate person must be assigned the responsibility. In order to deliver the greatest value to customers, organizations should prioritize its internal IT projects and assign tasks to the most appropriate people (LePrevost & Mazur, 2005). In another, relevant study factor analysis revealed that the important success factors for projects could be grouped under four categories that are comfort, competence of team, commitment,
and communication between stakeholders. These four factors abbreviated as COMs (Nguyen, Ogunlana and Lan, 2004). COMs reinforced the perception of this study that for project success competent team members and communication among the stakeholders of the project are the two significant determinants.

Margerison (2001) conducted a study to help teams so that team members can assess the objectives, priorities, time management allocations and performance. Margerison (2001) suggested that there should not be misplaced overemphasis on individual competence levels; rather adequate attention should be paid to team competency for ensuring success of any project. Margerison (2001) contributed that individual competencies needed to be seen in context of what a team required to perform well. In summary, he advised forming team of people who were properly qualified, experienced and proactive.

Competency singularly is not enough for performing job successfully; rather it requires core skills in the person. A relevant study tried to address the issue of defining right person in dealing with concepts like ‘competence’ and ‘core skills’, and suggested a need of a coherent, grounded concept of occupational competence to replace the relative deficiencies which these concepts represented (Mansfield, 2004). The study interpreted that a right person was the one having both competency as well as core skills. The measures of core skills could be relevant education and work experience while the competency in the person can be assessed through his personality. This study therefore included selecting the right person for project as an independent variable as shown in Figure 1.1. For having interpreted the mentioned literature and practices in the industry, this study operationalized the right person as the person with relevant qualification, adequate work experience and personality matching the project work as mentioned in the Figure X in Annexure 2.

How much workload and time the team members of any project are required to invest are the critical factors that need to be addressed. In a recent study, even to make an engineering project based group successful, for low rated jobs like janitorial services (dusting, sweeping and cleaning etc.) it was found critical to determine how much time and effort should be invested by each individual for performing his job effectively (Wilde, 1994). Rational quantity of workload was extremely significant for
ensuring quality performance from employee during project while excessive workload may be counter productive. A relevant research conducted in Sweden learnt that for downsizing the overall workload on workers increased by 20 percent. Resultantly although organizational and individual variables remained stable over long time, sick leave increased dramatically and was higher than the routine (Lindberg and Rosenqvist, 2005). The study indicates that maintaining work at the cost of the health of employees is not a good HR practice. The quantity of workload on any employee working on a project must be challengingly appealing, motivating and rational. Lindberg and Rosenqvist (2005) further suggested that workload for employee must ensure an affordable level of positive stress because it keeps the employee motivated enough to continue work with due commitment; that was one of the factors for success in projects as discussed in the literature review. Figure X in Annexure 2 describes the operationalization of the relevant independent variable.

Quantity of workload singularly cannot ensure the performance level that guarantees success of team working on projects unless rationality in the timelines is ensured. A study revealed that Kimberly Clark [KC] (1997) was struggling to build market share in Europe, despite its strong presence in UK. By 1998, the mentioned company failed in Europe issuing a profit warning for identified four key weaknesses with Project Management in Europe: a lack of standards and discipline; unclear management roles and lines of authority; the setting of unclear objectives and unrealistic timelines for team members (KC, 2002). This study therefore interpreted that like quantitative workload for project team members, timelines must also be rational, challenging and motivating. Please consult Figure X in Annexure 2 for details of the operationalization of this variable.

‘Communication is the key to success’ ~ a wise saying which professionals often believe in. Literature relevant to Project Management emphasizes that project for its success requires effective communication among its stakeholders during all its phases. Given a low level of electronic system and process integration, the frequency of personal contacts made a significant contribution in explaining success variance. The quality of inter team communication and trust are particularly important in the case of a high degree of electronic linkage. Enhancement of team spirit is more conducive to success in larger groups. Ensuring frequent personal contacts and clarifying goals,
tasks and responsibilities, respectively contributed significantly in explaining success variance in large projects, but not in small ones. In projects with a great degree of task novelty (exploration), trustful frequent, regular and in time structured communication became particularly an important determinant of the project success (Heinz, Baga, Gebert and Kearney, 2006).

A research conducted on 59 project teams from 57 hospitals discovered that members of high-cooperation teams were more likely to communicate informally; spend time in brainstorming; exchange project-related information; receive performance feedback; positively evaluate the status of their project; and have positive feelings about their participation on the project team. Cooperation levels were higher when team leaders clearly explained project objectives and team member responsibilities; team leaders confronted lesser conflicts among team members and worked to resolve those conflicts; team members clearly understood project objectives, responsibilities and rewards; and team members did not have reservations about the project and its outcomes. Results of the study being discussed suggested that in some groups, active involvement by senior managers negatively affected cooperation levels. This result might reflect deference in some groups to the authority of senior management (Gent, Parry E. and Parry E., 1998).

Based on findings in literature this study included stakeholder communication of project team members as another independent variable. The study operationalized this variable based on the factors that how well structured and frequented stakeholder communication is exercised by the leader of the project as elaborated in Figure X in Annexure 2.

Wier (2001) mentioned clearly that performance of the team members of any project was the ultimate determinant of project’s result. Hence, performance monitoring was one of the key human resource functions that needed attention. The study targeted to measure the impact of frequent and qualitative performance monitoring of team members of a project on to project’s result. Therefore, performance monitoring was kept as the fifth element of the independent variable in Figure 1.1 and operationalized based on degree of frequency and quality as described in Figure X in Annexure 2.
Based on the literature and findings from the selected IT industry this study observed that functions of HR Management (independent variable) essentially required for effective Project Management that a project manager should exercise are precisely the followings:

1. Selecting right person
2. Setting Workload for team members of project
3. Setting Timelines for team members of the project
4. Establishing stakeholder communication
5. Monitoring performance of project team

This study selected project result/outcome as the dependent variable as shown in Figure 1.1. The literature advises that for success a project requires effective management of nine knowledge areas of Project Management described earlier in Chapter 2. Operationalizing project success is challenging as it varies based on project type and requirements. This study has presented and discussed views of different experts in this context in the literature discussed in Chapter 2. A relevant study viewed project success of a project as a function of the interaction among project characteristics, project procedures, Project Management strategies, project-related participants, project work atmosphere and project environment (Lam, Chan A. and Chan D., 2004). Another recent research on the industries of Japan and Israel viewed project success to be accomplishment of project within allocated cost, well in time ensuring great benefits to its users and organization (Zwikael and Globerson, 2006).

Based on the literature and further discussion provided under the topic of Measurement provided in Chapter 3 of this thesis, the study interpreted project outcome/result having two possible dimensions; successful (D1) and/or suffering (D2) in terms of the combination of the following elements:

1. Accomplished within allocated budget (E1)
2. Accomplished within allocated time (E2)
3. Ensures end user’s satisfaction (E3)
4. Ensures good organizational benefits (E4)
5. Ensures other kinds of benefits like more lessons learnt, CMMI certification achieved (E5)

Figure X in Annexure 2 further elaborates the theoretical framework. The theoretical framework depicted in Figure 1.1 guides that this study intends to test and measure what would be the effect of the quality of practice with which the selected five HR functions (independent variables) are performed while managing any project onto the overall project outcome/result in terms of every mentioned element of project result. Further, this study also intends to test and measure the correlation of each HR function with project result/outcome. Next, the study presents its hypotheses.

**Delimitation**

The study interpreted that all the functions of HRM identified and discussed in the Chapter 2 are applicable to project management. However, the study clarifies that for establishing the theoretical framework it has specifically focused on the HR functions that a project manager can adopt during the project life cycle. Further, it has kept the scope of the selected independent variables up to the extent to which the project manager’s role is required.

In terms of the nine knowledge areas this study focuses only on the HRM in terms of collecting data empirically. Rest of the knowledge areas will be interpreted through consulting the literature and observing the real practices in the selected IT industry that are described in Chapters 2. Recommendations made by this study in Chapter 5 relevant to knowledge areas other than HRM are solely based on the observations and real practices of the mentioned subjects.
**Development of Hypotheses Statements**

Based on the theoretical framework given in Figure 1.1 and Figure X in Annexure 2 this study hypothesized that the project outcome of any kind of project was a function of the quality of the practice of all the selected elements of mentioned HR functions collectively provided all other knowledge areas are addressed properly. The study further hypothesized that quality of the practice of each selected element of the HR Management individually was correlated to the project result. The study presents its hypotheses as under:

H1. The greater the practice of assigning tasks to the right person (Job to right person), better will be the prospects for Project Success (PS).

H2. If timelines for team members (TL) are set more rationally then chances for Project Success (PS) are greater.

H3. The better the Stakeholder communication (SC), the greater are the chances for Project Success (PS).

H4. The more rational the quantitative workload (QL) of assignments on each team member, better the prospects for Project Success (PS).

H5. The better the performance monitoring (PM), the chances for Project Success (PS) will be greater.

H6. The better the quality of practice of all selected HR functions, the greater are the prospects of Project Success (PS).

In summary, hypotheses in the study are derived from literature that substandard HR Practices during IT Project Management may lead to ineffective Project Management while good standard HR practices may lead project to success. This study has presented hypotheses testing and its results in Chapter 4.
Significance of Study

Among the selected publications and literature given in Chapter 2, consensus was seen on the fact that HR Management required for any project was the knowledge area that was often given least significance during practice of Project Management (Lou and Associates, 2002). In spite of the fact that HR Management is a significant domain of Project Management, the project managers mostly skip or move through it quickly.

This proposed study is highly significant for being first of its kind with reference to the IT Industry of Pakistan. The scope of the study encompassed not only testing the hypotheses but it intends to optimize the knowledge for the IT Project Managers that can facilitate them while practicing essential HR Management needed for Project Management as well as the knowledge areas recommended for project management adopting well defined role.

Existing literature supports that for successful projects only management of knowledge areas that is scope, time, cost and quality management should be considered primary whereas management of HR is secondary. However, this study explored the fact that in real practices of IT Project Management, the secondary knowledge area HR Management played an important role like that of the four primary knowledge areas of Project Management in leading project result to success or suffering.

The study is significant as it intends to learn what rank and precedence HR Management deserves as it discovered that IT projects suffered as well as remained successful for the quality of practices in HR Management during project life cycle. It is further significant as it intends to derive an improved framework for HR Management for Project Management that ensures easy and effective practice of specific functions of HR Management and limited number of the knowledge areas that should be assigned to a project manager. Indeed a well-defined job description specifying a clear role limited to manageable tasks guarantees better performance and efficiency.
CHAPTER 2

DESCRIPTION OF KNOWLEDGE, LITERATURE REVIEW AND INDUSTRY PRACTICES

This Chapter first presents the summary of Project Management analyzing it in context of HR Management. Then it presents HR Management analyzing how Project Management is associated with HR Management’s functions. Terms associated with both the subjects in are defined in Annexure 1 (Glossary). Next, it presents its findings from literature to share what functions of HR Management are applicable to Project Management. At the end of this Chapter the study presents the findings from the selected IT industry about HR Management and Project Management explaining what and how the specific HR functions are considered applicable to Project Management, to whom they are assigned and how the nine knowledge areas for Project Management are managed.

For developing the theoretical framework, this study consulted the existing knowledge of the subjects Project Management and Human Resource Management from relevant publications. For this purpose, the study perused a range of existing books, magazines and websites (for e-books) about the two mentioned subjects. This Chapter first describes the summary of the description of Project Management, then that of the Human Resource Management and later the literature from relevant studies and practices in the local IT industry of the identified variables.

used by the authors of the selected sources as majority imitated PMI’s (2004) nine knowledge areas, relevant key terms and subheadings for explaining knowledge of Project Management. For this reason, the study summarized the knowledge it learnt about Project Management from the mentioned sources in its own words. The main headings and subheadings however were adopted from PMI (2004) and Schwalbe (2004) respectively. This study cited references as and where the study adopted the idea of any of the authors in the form of definitions or figures given in their books.

Next for learning what Human Resource Management is and describing its summary, the study mainly selected Cascio (1995), BerNardinad and Russel (1993), Kossen (1993), Pattanayak (2002), Anderson and Coauthors (2003), Cole (2001), Jain and Saakshi (2005), Khan (1997), Saini and Khan (2000), Decenzo and Robbins (2002) and Desimone, Werner and Harris (2002). In the mentioned publications on Human Resource Management, the study again found the challenge of managing same key terms/headings for the topics of Human Resource Management used by multiple authors. As this study found same definitions of terms/functions of HR in the various selected sources certain references were repeated. Hereafter the study presents summary of Project Management.
Description of Project Management

Project Management is the application of knowledge, skills and tools required to manage any project (PMI, 2004).

Project Life Cycle

A project is meant to yield some product that could be any tangible good or intangible services or software. To lead project to successful end, project managers are required to learn and follow the Project Life Cycle while performing the activities required for Project Management. As per various publications that this study consulted, Project Life Cycle is a collection of project phases. Each phase intends to deliver pre-defined deliverables at its accomplishment. Schwalbe (2004) summarized the phases of Project Life Cycle well in the graphical manner that this study adopted as Figure 2.1.

Figure 2.1

![Figure 2.1](Adopted from: Schwalbe, 2004)

It is clear from Figure 2.1 that Schwalbe (2004) explains that the initial two phases of project life cycle as Project Feasibility while the last two are categorized as Project Acquisition. Project Feasibility comprises of Concept and Development of project work whereas Project Acquisition consists of Implementation and Close-Out.
Concept mainly involves initial work like brainstorming the required idea, cost needed to be incurred and details of tasks to be undertaken. Management Plan, Preliminary Cost Estimate and 3 – Level WBS are recommended to be the primary deliverables of this phase. Under Project Feasibility, Development is the next phase that demands project managers to work out Project Plan, Budgetary Cost Estimate and more detailed WBS, preferably up to level 6 as recommended in Figure 2.1. Project Acquisition demands carrying out the due work for project and is known as Implementation. Wrapping up the project work after achieving the targeted outcome is Close-Out. Actual work done, actual cost incurred and actual performance are the three main achievements of the phase Implementation as shown in Figure 2.1. Close-out occurs when project work gets accomplished; customer provides his/her acceptance and project team feels satisfied for having learnt new lessons. The study declares the details of each mentioned deliverable in Figure 2.1 out of its scope. However, it has entertained the key terms like WBS and cost management related terms in the next sections of this Chapter.

For effectively managing any project, throughout the Project Life Cycle the project manager has to utilize the human as well as machine resources available to his project. As machines are also dependent on human resources for their usage, it is mainly the human resources that drive the project. This study therefore perceives human resources the fundamental driving force required for the success of any project. It is therefore important to understand how a project manager should manage the human resource during the entire Project Life Cycle.

**The Project Management Process**

Literature advises to view and practice Project Management as a process. A process is the series of actions directed toward a particular result (PMI, 2004). With consensus, the authors whose publications this study selected declared that the process of Project Management comprises of the following five actions where each of them further demands specific subtasks:
1. **Initiating the project:** This process is to define business and user needs, scope, boundaries and Rough Order Magnitude (ROM) of the project work and objectives or target of the project that are intended to be achieved (Heldman, 2001). Although project manager is considered the human resource responsible for initiating any project, but it is not possible without top management’s interest and support.

2. **Planning the project:** This process targets defining and documenting the project plan that addresses every knowledge area, as it should relate to project at that point in time. A comprehensive project plan is not the one that is lengthy but the one that effectively caters all the knowledge areas (Cleland, 1999). Preparing a project plan is project manager’s primary job for which s/he depends on both the available technology and human resources to the project. The study understands that mainly planning is the first Project Management process from where the project manager needs to incorporate the Human Resource Management.

3. **Executing the project:** To carry out project work by establishing coordination between the project stakeholders and all other resources according to the plan. Execution is the process where the efforts made by every human resource are measured in terms of the tangibles produced and intangibles performed (Kerzner, 2001). The targeted results of this phase are expected to be achieving the milestones in time within the allocated budget. For the project manager, this study finds execution a real art of managing human and machine resources together under the constraints of budget, time, scope and various external factors.

4. **Monitoring and controlling the project:** This process ensures that project team members achieve the project objectives and produce all deliverables as per predefined quality standards following the project plan. This is the only process that initiates in the beginning of Project Life Cycle and lasts until its close out (Schwalbe, 2004). For monitoring the performance of human and machine resources, the works performed and
the outputs produced are the indicators that a project manager should focus. This study finds monitoring and controlling human resources an HR function that needs to be performed throughout the Project Life Cycle for all its processes.

5. **Closing the project:** It refers to formalizing acceptance of some project phase and ending it efficiently by finalizing its documentation, products and their implementation and training for the end user’s. Lessons learnt are another important byproduct. Project manager effectively closes a project only when rich standards for closing project are adopted. Ensuring conformance to standards during closing is as important as it is during planning phase. As machine resources cannot close projects, it is only the human resources that could perform this process. (PMI, 2004; Schwalbe, 2004). The study therefore interprets that human resources are required to be utilized until the end of the project.

Figure 2.2 summarizes the order in which the five mentioned Project Management processes should be performed and how they could be overlapped or run parallel.

**Figure 2.2 – Project Management Processes**

![Project Management Processes](image)

(Adopted from: Schwalbe, 2004)

Next, the study describes each process in a brief manner based on its understanding from various sources it selected.
The Project Initiation is an activity that is needed for delivering a Project Charter and Project’s Preliminary Scope (Schwalbe, 2004). Project Charter is a form or template that documents project’s title, start date, finish date, budgetary information, name and brief profile of the project manager, objectives of the project and approach recommended for its management with well defined roles and responsibilities of the necessary team (Vysochi, Beck and Crane, 2000). Scope Statement of any project is a document used to develop and confirm a common understanding of the quantitative work involved in creating the products of the projects and processes used to create them (Cetro, 1999). This is how Project Initiation process addresses the knowledge area of Project Integration since the beginning of the project life cycle. The study further understood that scope statement of any project triggers the need of performing Human Resource Planning and relevant time and cost management right after the initiation of the project. In a new environment or organization, this process may trigger SWOT analysis.

Project Planning is the most critical process and it is compulsory for the project manager to exercise planning for all the nine knowledge areas of Project Management described in next section of this Chapter. Completeness, accuracy and rationality in planning the Scope, Time, Cost, Quality, HR, Risk, Procurement, Communication and Integration for any project are the keys to project success (PMI, 2004). Project planning requires project managers to make decisions for what deliverables relevant to each knowledge area must be planned and prepared. Planning deliverables for all areas generally includes Work Breakdown Structure (WBS), Gantt Chart, Resource Sheet and Histograms, Network Diagram, Estimated Budget Statement etc. The details of these deliverables of the planning process would be provided under the description of each knowledge area in the upcoming section. For this purpose employing software meant for Project Management like MS Project 2003, Primavera etc. is not only considered useful; rather, their use is strongly recommended for producing effective project plan. Planning for all the knowledge areas is a real challenge, but adequate knowledge of Project Management, experience in relevant field and competency of the project manager make it easy for the project managers to plan well. The study understood that planning for all the knowledge areas is equally important in the mentioned process.
Project Executing requires acquiring/forming and mobilizing the human and machine resources to carry out work as per the project plan. For IT projects, execution process includes conducting, leading and managing phases of Product Life Cycle like analysis, design, development, testing, debugging etc. (Kerzner, 1999). Simultaneously the execution process demands undertaking the Quality Assurance that is performed by skilled and experienced quality assurance staff or department in liaison with the project manager. Quality Assurance should be performed for IT projects as a Recurring Task that is performed repeatedly as per predetermined times and schedule for all phases of product life cycle. Further, during execution the distribution of the relevant information among all stakeholders, especially project team members, is declared a key to progressive growth and project success. Project manager is rendered responsible at this stage to keep appropriately frequent and regular flow of necessary information, which indicates that a project manager needs to perform extensive communication during project’s execution involving all the stakeholders especially the project team. Execution process demands procurement of the necessary tangibles that the project requires which leads project manager take cost related decisions. The deliverables of execution process are tangible and intangible outcomes of the work performed, definitive cost and expense statements and overall performance reports about each phase of product life cycle. The study interprets that communication management and performance monitoring are the two key HR functions based on which project managers usually execute their projects.

Project Monitoring and Controlling is the process that begins right from Project Initiation and lasts until the project ends. Like project planning, project monitoring and controlling is the second process that obliges project manager to address all the nine knowledge areas (Maylor, 2002). In simple words, controlling project means mitigating or even eliminating the probabilities for Scope Creep, Cost Expansion, Schedule Extension, Compromise on Quality Standards, Conflicts among Stakeholders, Compromise on Performance, Ineffective Risk Management and Contract Administration. Like controlling, Quality Assurance is another recurring task for projects requiring longer time span. Utilizing Tracking Gantt Chart through MS project 2003 or Primavera is suggested to be an easy and effective tool for keeping track of project’s progress. To conduct controlling effectively, project managers require support of the top management, regular and proper cash flows, skilled staff for
quality assurance of all technical works that project requires and the products that the
project produces, pretty good experience of handling projects, in depth knowledge of
the relevant discipline and affairs that affect project and a commanding and leading
personality. It must also be remembered that good planning will automatically enable
project managers to control effectively. It means prerequisite for effective controlling
is effective planning. Another fact is that machine and technology resources make
controlling structured for the project managers. Monitoring performance of human
resources is also an important aspect of this process, which indicates that projects are
not controlled unless the mentioned function of Human Resource Management is
employed.

Project Closing is the formal wind up of the project activities on reaching the product
creation and/or reaching due deadline. This process first intends to interpret the end
user’s formal acceptance and/or concerns about the newly developed solution
(Software). Simultaneously, it addresses finalization of the product’s finishing and
documentation. Documentation of the product is again a recurring task that gradually
advances towards accomplishment by adding material at the end of every phase of the
project (PMI, 2004). A summary of lessons learnt is a major deliverable of this
process. Performance review is another activity that could also be documented as a
second deliverable. Contract closure is the final stage of this process that is achieved
through stakeholder communication. Benefiting from the successful accomplishment
of a project for either signing a new contract with end users or renewing some
previous contract is not part of closing. However, if signing new contracts or
renewing existing contracts is practiced at the closing of any successful projects, it
should not be considered as an essential milestone for the finishing project. All the
mentioned activities for closing projects require utilization of human resources until
the end of the project. This is how effective Human Resource Management needs to
be continued until the project’s end.
The Nine Knowledge Areas of Project Management

PMI (2004) in its publication “Project Management Book of Knowledge (PMBOK) Guide” advises the project managers to practice essentially the nine knowledge areas while performing the five suggested processes for their projects. This study adopted the summary of the nine knowledge areas from PMI (2004) in the Table 2.1 to provide association of each process of Project Management with each knowledge area in a precise manner.

Table 2.1

<table>
<thead>
<tr>
<th>KNOWLEDGE AREA</th>
<th>INITIATING</th>
<th>PLANNING</th>
<th>EXECUTING</th>
<th>MONITORING &amp; CONTROLLING</th>
<th>CLOSING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Integration Management</td>
<td>Develop project charter, Develop preliminary project scope statement</td>
<td>Develop project management plan</td>
<td>Direct and manage project execution</td>
<td>Monitor and control project work, Integrated change control</td>
<td>Close project</td>
</tr>
<tr>
<td>Project Scope Management</td>
<td>Scope planning, Scope definition, Create WBS</td>
<td></td>
<td></td>
<td>Scope verification, Scope control</td>
<td></td>
</tr>
<tr>
<td>Project Time Management</td>
<td>Activity definition, Activity sequencing, Activity resource estimating, Activity duration estimating, Schedule development</td>
<td>Schedule control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Cost Management</td>
<td>Cost estimating, Cost budgeting</td>
<td></td>
<td></td>
<td>Cost control</td>
<td></td>
</tr>
</tbody>
</table>

(Adopted from PMBOK, Guide 2004, p 69)
<table>
<thead>
<tr>
<th>KNOWLEDGE AREA</th>
<th>INITIATING</th>
<th>PLANNING</th>
<th>EXECUTING</th>
<th>MONITORING &amp; CONTROLLING</th>
<th>CLOSING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Quality Management</td>
<td>Quality planning</td>
<td>Perform quality assurance</td>
<td>Perform quality control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Human Resource Management</td>
<td>Human resource planning</td>
<td>Acquire project team, Develop project team</td>
<td>Manage project team</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Communications Management</td>
<td>Communications planning</td>
<td>Information distribution</td>
<td>Performance reporting, Manage stakeholders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Risk Management</td>
<td>Risk management planning, Risk identification, Qualitative risk analysis, Quantitative risk analysis, Risk response planning</td>
<td></td>
<td>Risk monitoring and control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Procurement Management</td>
<td>Plan purchases and acquisitions, Plan contracting</td>
<td>Request seller responses, Select sellers</td>
<td>Contract administration</td>
<td>Contract closure</td>
<td></td>
</tr>
</tbody>
</table>

_PMBOK® Guide 2004, p. 69_
Hereafter this study describes each knowledge area essential of Project Management in a summarized manner to help project managers learn existing form of knowledge relevant to Project Management. The study adopted the titles of these knowledge areas from PMI (2004) because all the selected publications were imitating the titles and words of PMI (2004) for describing the nine knowledge areas. The study adopted the subheadings relevant to each knowledge area from Schwalbe (2004) for finding them best style for description of knowledge. Definitions of associated terms have been taken from various authors. Description of each knowledge area is summarized by this study.

1. Project Scope Management

Scope refers to all the work involved in developing the products of the projects and the processes used to achieve them. In simple words scope is meant to define and control what is and what is not included in the project (Schwalbe, 2004). For effective scope management following activities are recommended:

i. **Initiation:** A formal beginning of the project for committing the organization to begin a project or continue to the next phase of a project. A Project Charter should be prepared at the end of this stage (PMI, 2004).

ii. **Scope Planning:** It is recommended for developing documents to provide the basis for future project decisions, including criteria for determining if a project or phase has been completed successfully. Literature of Project Management recommends defining Work Breakdown Structure (WBS) that at least contains the Summary Tasks. A Work Breakdown Structure (WBS) is a deliverable oriented grouping of the work in form of tasks that defines total scope of the project (Kerzner, 1999). Figure 2.3 shows an example of WBS for an IT project developed by using MS Project 2003. In WBS, a Summary Task is the task under which further sub tasks are to be included. For constructing WBS, approaches like mind mapping, analogy approach, top-down approach and bottom-up approach are recommended to be
employed by the project managers. The definitions of each are provided under Annexure 1 (Glossary).

iii. **Scope Definition:** This activity should target subdividing the major project deliverables into more manageable smaller components. This is achieved by using decomposition of the summary tasks of WBS. A minimum of Level – 3 to Level – 6, detailed WBS is recommended for comprehensive Scope Definition (PMI, 2004). Project Managers are advised to utilize software tools like MS Project 2003 or Primavera for this purpose. Using software for such purpose makes editing of the WBS easier. It is recommended that project managers should evaluate the WBS repeatedly until they reach to an optimum form of it.

iv. **Scope Verification:** This is required for formalizing acceptance of the project scope, sometimes by customer sign-off (Cetro, 1999). In this regard, communication among all the stakeholders is extremely important. First, all the team members who are responsible for decision making for the project should be involved in verifying the scope of the project. For example, project manager should involve system analyst, designers and quality assurance staff essentially. Once the project team reaches consensus about the detailed WBS then it must be verified again by involving the sponsors and real end users. Later the finished scope statement should be communicated to the team members as and when required. Therefore, scope verification is such a process that incorporates utilization of skilled human resources.

v. **Scope Change Control:** It is rendered significant activity for controlling changes to project scope. Scope Creep is the issue that is major threat to most IT projects. Scope Creep refers to the fact that project scope gradually increases as it advances towards its end (Maylor, 2002). This usually happens for inappropriate and ineffective communication among the stakeholders of the project. It is therefore declared to be the responsibility of the project manager to ensure that scope of the project does not become prey
to any creeping for ineffective communication with stakeholders. Some 
times, in spite of taking possible necessary measures the scope of the project 
has to be enhanced or overhauled due to unforeseen reasons. For example, 
the CEO of the organization for whom the IT project is being undertaken 
might get changed. The new CEO might be keen to get the attendance 
records of the employees automated as well while as per the former CEO the 
project scope was limited to automating the accounts department only. 
Under such situation, project managers must ensure that the plans for triple 
constraints (Scope, Time and Cost) for project are updated and approved. 
Project managers should remain flexible enough to welcome any rational 
change in project’s scope provided it does not affect the schedule and 
budget. On the other hand, if the cost and time are affected then such change 
must not be entertained without updating the project charter and contract 
with the sponsors (Schwalbe, 2004).

This study interprets that scope verification is the stage where interaction with 
humans occurs in form of stakeholder communication. Therefore, the study finds 
project scope management a result of communication of the project managers and 
the selected members of his team with the sponsors and the end users. Any 
mistake in stakeholder communication can adversely affect the scope statement of 
the project. The mentioned fact indicates that since the very first recommended 
knowledge area of Project Management, the Human Resource Management 
function stakeholder communication plays a vital role. Therefore, the study 
identifies stakeholder communication a driving tool for accomplishing project 
scope management with good or substandard quality.
Figure 2.3 (Work Breakdown Structure)

(Figure 2.3a Designed by Researcher)

**WBS in Table View**

1.0 Concept
   - 1.1 Evaluate current systems
   - 1.2 Define Requirements
     - 1.2.1 Define user requirements
     - 1.2.2 Define content requirements
     - 1.2.3 Define system requirements
     - 1.2.4 Define server owner requirements
   - 1.3 Define specific functionality
   - 1.4 Define risks and risk management approach
   - 1.5 Develop project plan
   - 1.6 Brief Web development team

2.0 Web Site Design
3.0 Web Site Development
4.0 Roll Out
5.0 Support

(Figure 2.3b Adopted from Schwalbe, 2004)

**WBS in Tree View**

Figure 2.3 in its first half displays the WBS in text form. Like **1.0 Concept** is called the summary task. 1.1. to 1.6 are the subtasks of the summary task 1.0. 1.2.1 to 1.2.4 are the further subtasks of task 1.2, which means that for accomplishing the task 1.2 all its mentioned subtasks shall have to be performed in the order they are listed. This is how all tasks 1.0 to 5.0 can have their subtasks as many as the project requires. The collection of all these tasks should constitute the complete scope of the project that will come into existence only when project manager collects all the requirements, constraints and problems relevant to the project by effective communication with stakeholder/s. In a WBS, the tasks must be listed in the appropriate order they ought
to be performed. For example if task 2.0 happens to be a prerequisite of task 3.0 then task 2.0 better be listed before 3.0. In the second part of Figure 2.3 Schwalbe (2004) has provided a conventional tree view of the WBS in which level 1 describes summary tasks, level 2 describes subtasks of the first summary task from the left ‘Concept’ and level 3 presents the subtasks of tasks in level 2. This view is called Organization Chart View and as it takes usually more space, it is usually not adopted for making entire WBS. It is just preferred when focusing certain task/s is needed. Employing software like MS Project 2003 or Primavera makes WBS handling smooth and therefore it is highly encouraged.

2. **Project Time Management**

This knowledge area involves the processes required to ensure timely completion of a project. The time required for IT project varies from project to project. Achieving timely accomplishment of any project is a vital hallmark of project’s success but it is not easy and simple to achieve. It depends on the followings:

i. **Activity Definition:** This requires identifying the specific activities that the project team members and stakeholders must perform to produce the project deliverables. Activity is also called task (Young, 2002). In fact, when WBS is defined, the tasks are defined and decomposed at that stage. Making WBS automatically covers scope as well as time management for the project.

ii. **Activity Sequencing:** This requires identifying and documenting the relationship between project activities. Mostly project tasks are always interdependent with each other. Finish-to-Start, Start-to-Start, Start-to-Finish and Finish-to-Finish are the four relations through which interdependency among tasks is recognized and defined (Heldman, 2001). For example for any IT project, the Design Task can never be initiated unless the Analysis is finished. Means relation between Analysis and Design is Finish-to-Start. Generally, it is accomplished by using some software like MS Project 2003 or Primavera by making a Gantt Chart for the project. Gantt Chart provides a
standard format for displaying the project schedule by listing project tasks and their corresponding start and finish dates. Figure 2.4 shows an example of Gantt Chart for an IT project developed using MS Project 2003. A WBS of level 3 must have been defined before making the Gantt Chart for any project. Making a network diagram is an alternate way of sequencing activities. A Network Diagram is a schematic display of the logical relationship among or sequencing of project activities/tasks (Cleland, 1999). Activity on Arrow (AOA) and Precedence Diagramming Method (PDM) are two different techniques of making a network diagram. Details relevant to drawing network diagram are not being included here for preciseness. However, Figure 2.5 shows an example of Network Diagram for an IT project developed by using MS Project 2003.

iii. **Activity Duration Estimation:** It refers to estimating the number of work periods that are needed to complete individual activities. A Three Point Estimate is recommended for estimating the time or duration for any project activity. It includes an optimistic, most likely and pessimistic estimate for every task (Kerzner, 2001b). For example for the task of preliminary analysis a project manager may find 10 days as most optimistic time, 13 days most likely time while 16 days as pessimistic time. Experience, vast observation and in depth technical knowledge are hallmarks that guide project managers in estimating realistic and rational durations. Employing Three Point Estimates approach for each task helps in applying PERT. PERT is the abbreviation of Program Evaluation and Review Technique. PERT is a network analysis technique used to estimate project duration when there is no high degree of uncertainty about the individual activity duration estimates. PERT uses probabilistic time estimates using following formula:

\[
\text{PERT Weighted Average} = \frac{\text{Optimistic Time} + 4 \times \text{Most Likely Time} + \text{Pessimistic Time}}{6} \quad \text{(Schwalbe, 2004; PMI, 2004)}
\]
Again using any software like Primavera or MS Project 2003 makes this easy and less time consuming. Activity duration estimation is associated with HR Management as it determines the timelines and workload to be set and distributed among the project team members.

iv. **Schedule Development:** It refers to analyzing activity sequencing, activity duration estimates and resource requirement to create the project schedule. Generally, a Gantt Chart is preferred for this. Practically project manager sequence and develop schedule while making Gantt Charts using MS Project 2003 or Primavera type of software.

v. **Schedule Control:** It refers to controlling and managing changes to the projects schedule. The outcomes of this activity usually include details of the requested changes, recommended corrective actions/orders, schedule updates etc. A heuristic for avoiding schedule stretching is to keep rational slack (float) for all activities while setting duration for each activity. Slack or Float is the amount of time an activity may be delayed without delaying a succeeding activity. Reviewing Critical Path occasionally is another good monitoring practice for controlling schedule. Critical Path Method (CPM) is a network diagramming technique used to predict total project duration. Critical Path for a project is a series of activities that determines the earliest time by which the project can be completed (Heldman, 2001). It is always the longest path in the network diagram that has least amount of slack or float. Using Project Management software for employing CPM makes it easy and quick for project managers (Schwalbe, 2004). Schedule control incorporates monitoring human resources performance for avoiding any delays.

Based on the researcher’s personal practices and observations the study found Human Resource Management and Time Management for project interdependent. The quality of these activities with which they are defined, sequenced and then assigned to the human resources for the project affects the performance of human resources. This resultanty affects the project’s progress and outcome. Therefore Project Time Management although appears to be dealing with project’s tasks, but in fact it is the
knowledge area that manages time for human resources in form of work hours, timelines, deadlines and targeted milestones. Project Time Management encompasses time requirements of both the tasks as well as human resources. That is how project manager incorporates Human Resource Management through Time Management.

*Figure 2.4 (Gantt chart)*

(Designed by the Researcher in MS Project 2003)
Figure 2.4 exhibits the Gantt Chart. In the first part of Figure 2.4 on the left side under title Task Name, the fictitious tasks are enlisted as A, B, C and so on. The right side of the same part of Figure 2.4 exhibits the Calendar, under which bar charts explain how many days each task will require. Like task A is scheduled on Monday June 2, 2002 while C is scheduled from Monday June 02, 2002 to Wednesday June 04, 2002. The arrows originating from one bar and pointing at the bar of other task represents the dependency between tasks. Like arrow between bar for task A and bar for task D indicates that task D can be started only when A has been accomplished. This is how task A is interpreted to be a prerequisite task for task D, while tasks B and C can be started parallel to task A. This is how the Gantt Chart not only enlists WBS, schedule of tasks but also the relationship between tasks.

The second part of the Figure 2.4 presents Gantt Chart of a real example containing WBS, schedule for tasks and dependencies. The tasks in bold font are the summary tasks having subtasks. Their schedule bars are also highlighted differently. Like task 1 is Initiating that has subtasks 1.1 Select Project Manager to 1.3 Develop Project Charter scheduled from Jan. 04 to Jan. 18 and linked with each other in Finish to Start relationship.

Figure 2.5 exhibits Network Diagrams, an alternate approach of presenting project task schedule and their dependencies. In the first part, Figure 2.5 presents the Precedence Diagramming Method (PDM) of the network diagram. In this tasks A, B and C are shown parallel to convey the meaning that these tasks could be initiated simultaneously. Task A at its end shall trigger task D, task B shall trigger E and F simultaneously on its accomplishment while task C shall lead to task G. It is further interpreted that tasks D, E, F and G shall all be started simultaneously as they are not predecessors of each other. Task H cannot be initiated unless both D and E get accomplished. Task G shall cause processing of task I while J the final task could be initiated only when tasks H, I and E get accomplished. The PDM network diagram in the box of each task also mentions their title, ID in the WBS, scheduled dates for start and finish, total duration the task requires and relationship with next and parallel tasks. In the software MS Project if project manager finalizes only the WBS and then set its schedule forming Gantt Chart, PDM Network Diagram is automatically presented.
Figure 2.5 in its second part exhibits the alternate Activity on Arrow (AOA) method of forming Network Diagram. In this conventional approach, tasks and their durations are shown as labels on arrows. Every arrow represents an action/task that needs to be performed for the project while a node (Circle with number) shows the stage after and before task/s. In Figure 2.5 node 1 represents initiation of the project that triggers tasks A, B and C simultaneously. Performing tasks A, B and C shall lead project to three independent parallel stages/nodes with numbers 2, 3 and 4 respectively. For triggering task G, stage 4 will be adequate whereas task D and E require both stages 2 and 3 to be achieved and so on. This is how AOA approach of network diagram expresses the flow of project life cycle through tasks and their different stage. In Figure 2.5, the assumed project requires eight nodes in ten tasks from A to J.

Another advantage of AOA network diagram is that it helps project managers identifying and performing the Critical Path Analysis. As already mentioned a Critical Path happens to be the longest path on AOA network diagram with shortest slack. In the given example, the Critical Path for the assumed project happens to be B to E to H to J with length 16. Means this path contains the most critical tasks required to accomplish the project fulfilling maximum needs. It further indicates that nodes numbering 1, 3, 5, 6 and 8 are critical for project success. In other words, a Network Diagram helps project managers identifying the tasks that should be given top priority and which stage of project happens critical. Critical Path analysis can be done using PDM Network Diagram as well.

The drawback of network diagram is that it does not exhibit milestones for the project. Milestones are exhibited using Gantt Chart. For this reason utilizing both the approaches that are, Gantt Chart and Network Diagram remain beneficial during the project life cycle. Gone are the days when project managers where required to draw these essentials manually as latest software make it an activity of certain minutes only provided project manager has defined a comprehensive WBS with proper timelines set for tasks and preferably for human resources as well. These figures that this study has contributed are based on a very simple fictitious project so that understanding the concept remains simple. It is true that these figures for actual IT projects are usually extremely complex, lengthy and difficult to interpret in routine practices.
3. **Project Cost Management**

This knowledge area includes the processes required to ensure that a project team completes a project within an approved budget. The project manager is required to ensure that cost estimates for their projects are realistic. This requires following processes:

i. **Resource Planning:** Determining what resources (people, equipment and materials) and what quantities of each resource should be used to perform project activities (Anderson and Coauthors, 2002). To achieve this objective,
a resource sheet is prepared by the project managers using some Project Management related software. Figure 2.6 shows an example of Resource Sheet for an IT project developed by using MS Project 2003. Resource planning incorporates human resource planning function of Human Resource Management for costing the project.

ii. **Cost Estimating:** Developing an approximation or estimate of the costs of the resources needed to complete the project. First of all, this requires project managers to have in depth knowledge of the cost issues like Cash Flow Analysis, Tangible Cost and Benefits, Intangible Cost and Benefits, Direct Cost, Indirect Cost, Sunk Cost, Contingency Reserves etc. Next project manager should be aware of types of cost estimates like ROM, Budgetary Estimate and Definitive Estimate (Heldman, 2001). To calculate cost estimate and prepare Cost Management Plan techniques like Analogous Estimate, Bottom-up Estimate and Parametric Modeling must be known to the project manager. The definition of each term mentioned is provided in under Annexure 1 (Glossary). Figure 2.7 shows an example of Cost Estimate for an IT project. Cost estimate has to cater the compensation management done for human resources. Hence, to estimate cost, human resource compensation management is incorporated along with pricing of other resources.

iii. **Cost Budgeting:** Allocating the overall cost estimate to individual work items to establish a baseline for measuring performance. This is done during project planning and execution stage. A baseline is the original project plan along with approved changes. A Cost Baseline is a time phrased budget that project manager uses to measure and monitor cost performance (Tobis I. and Tobis M., 2002). Project manager must ensure that actual budget must not get more than planned budget. The outcome of this process is the definitive cost estimate. Usually project manager accomplishes this task in liaison with the finance and accounts department of large organization. This task further requires communicating the allocated budget to all the concerned team members who are to manage project cost affairs. This is how budgeting
requires communication management that this study views as a human resource functions.

iv. **Cost Control:** It refers to controlling changes to the project budget especially when escalating. For this project manager must be cognizant with the terms like Earned Value, Planned Value, Actual Cost, Cost of Variance, Schedule Variance Cost Performance Index (CPI) and Schedule Performance Index (SPI) for calculating Earned Value Management (EVM) (Cleland, 1999). The definition of each mentioned term is provided under Annexure 1 (Glossary). Project Management software makes it easy for project managers to compute the EVM for monitoring project cost and budget. Cost control requires in time communication with all concerned stakeholders, which is again a human resource function (Schwalbe, 2004).

**Figure 2.6 (Resource Sheet)** (Designed by researcher in MS Project 2003)

Figure 2.6 is the contribution of researcher solving a case study that Schwalbe (2004) had mentioned in her book. On the left side of Figure 2.6 column ‘Resource Name’ enlists names of available human resources and tasks assigned to them. The column Work mentions the total hours a human resource has to invest in the project for specific tasks assigned. On the right side, Figure 2.6 presents the calendar mentioning
number of hours to be invested in each month. Project manager may design such Resource Sheet manually, but it can be effectively done using software like Primavera or MS Project or MS Excel etc. A comprehensive resource sheet is the one providing details of all the human resources and quantitative workload assigned to them in terms of hours or days or months. Generally recommended practice is to assign only 7 to 8 hours per day however certain projects demand a quantitative workload of even 12 hours per day as well. Project manager needs to follow the relevant legal policies and organizational norms in this regard.

In fact an effective Resource Sheet is result of effective HRP, stakeholder communication and team formation that are core functions of HR Management that project manager has to perform with diligence and extreme care as they could make or break the project. A Resource Sheet determines the cost of project as well in terms of expenses the project has to incur essentially. Hence including rate per hour or per day for every human resource is strongly recommended while finalizing Resource Sheet.

Figure 2.7 has been adopted from Schwalbe (2004) for helping project managers how they should prepare Cost Estimation Model for their projects. Indeed from project to project, parameters and numerical figures shall vary while preparing cost estimate. Schwalbe (2004) guides to consider project’s objectives, scope, assumptions and CBA with IRR the key elements for preparing cost estimate. The values of these parameters shall certainly be different for different IT projects. Project manager better considers Figure 2.7 just a template for Cost Estimate. In the second part of Figure 2.7 the numerical figures explains the cost of software, hardware, accessories and staff required by a project in three years 1995 to 1997. Schwalbe (2004) has presented all figures in $. She prepared the given model using MS Project 2003 while it could be done using MS Excel as well. Figures in parenthesis are in fact negative figures. When Total Cost figures are compared with figures for Net Cost Saving for the sample project, the net savings are increasing in an accrued manner. This indicates that in the given example project was in accrued profit after certain years and its IRR was computed to be 35% for NPV $0 based on the formula:

$$NPV = (t=0 \text{ to } N) \sum Ct / (1+r)^t = 0$$

Ct is the cash flow, t is time and r is rate or return. IRR is achieved where NPV gets 0.
Project manager usually prepares the cost estimate in liaison with top management and financial experts. It therefore requires strong communication, interpersonal and analytical skills. Communication and interpersonal skills are HR Management activities that integrate HRM with Project Cost Management.

Figure 2.7 (Cost Estimation) (Adopted from: Schwalbe, 2004)

Project Cost Estimate Model

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
<td>Install a suite of off-the-shelf financial applications software that will enable more timely information for management decision making, provide easier access to data by the ultimate end user and allow for cost savings through productivity improvements throughout the company.</td>
</tr>
<tr>
<td>Scope</td>
<td>Oracle financial applications will replace the core financial systems and include:</td>
</tr>
<tr>
<td></td>
<td>General Ledger</td>
</tr>
<tr>
<td></td>
<td>Fixed Assets</td>
</tr>
<tr>
<td></td>
<td>Operations Report</td>
</tr>
<tr>
<td></td>
<td>Accounts Payable</td>
</tr>
<tr>
<td></td>
<td>Accounts Receivable</td>
</tr>
<tr>
<td></td>
<td>Project Accounting</td>
</tr>
<tr>
<td></td>
<td>Project Management</td>
</tr>
<tr>
<td>Assumptions</td>
<td>Oracle’s financial applications provide:</td>
</tr>
<tr>
<td></td>
<td>Minimal customization</td>
</tr>
<tr>
<td></td>
<td>No change in procurement systems during accounts payable implementation</td>
</tr>
</tbody>
</table>
| Cost/Benefit Analysis &
  Internal Rate of Return (IRR) | BSR was broken down into a three-year cash outlay without depreciation. Costs are represented in thousands. Capital and expenses are combined in this example. |

Example of Cost Estimate

<table>
<thead>
<tr>
<th>Category</th>
<th>FY95 ($000)</th>
<th>FY96 ($000)</th>
<th>FY97 ($000)</th>
<th>3 Year Total ($000)</th>
<th>Future Annual Costs/Savings ($000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oracle/PM Software (List Price)</td>
<td>992</td>
<td>500</td>
<td>0</td>
<td>1492</td>
<td>0</td>
</tr>
<tr>
<td>60% Discount</td>
<td>(595)</td>
<td>(595)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oracle Credits</td>
<td>(397)</td>
<td>0</td>
<td></td>
<td>(397)</td>
<td></td>
</tr>
<tr>
<td>Net Cash for Software</td>
<td>0</td>
<td>500</td>
<td></td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Software Maintenance</td>
<td>0</td>
<td>90</td>
<td>250</td>
<td>340</td>
<td>250</td>
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<tr>
<td>Hardware &amp; Maintenance</td>
<td>0</td>
<td>270</td>
<td>270</td>
<td>540</td>
<td>270</td>
</tr>
<tr>
<td>Consulting &amp; Training</td>
<td>205</td>
<td>320</td>
<td>0</td>
<td>525</td>
<td>0</td>
</tr>
<tr>
<td>Tax &amp; Acquisition</td>
<td>0</td>
<td>150</td>
<td>80</td>
<td>230</td>
<td>50</td>
</tr>
<tr>
<td>Total Purchased Costs</td>
<td>205</td>
<td>1330</td>
<td>600</td>
<td>2135</td>
<td>570</td>
</tr>
<tr>
<td>Information Services &amp; Technology (IS&amp;T)</td>
<td>500</td>
<td>1850</td>
<td>1200</td>
<td>3550</td>
<td>0</td>
</tr>
<tr>
<td>Finance/Other Staff</td>
<td>200</td>
<td>900</td>
<td>580</td>
<td>1770</td>
<td></td>
</tr>
<tr>
<td>Total Costs</td>
<td>905</td>
<td>4170</td>
<td>2380</td>
<td>7455</td>
<td>570</td>
</tr>
<tr>
<td>Savings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mainframe</td>
<td>(101)</td>
<td>(483)</td>
<td>(584)</td>
<td>(597)</td>
<td></td>
</tr>
<tr>
<td>Finance/Asset/PM</td>
<td>(160)</td>
<td>(1160)</td>
<td>(1320)</td>
<td>(2320)</td>
<td></td>
</tr>
<tr>
<td>IS&amp;T Support/Data Entry</td>
<td>(88)</td>
<td>(384)</td>
<td>(472)</td>
<td>(800)</td>
<td></td>
</tr>
<tr>
<td>Interest</td>
<td>0</td>
<td>(25)</td>
<td>(25)</td>
<td>(103)</td>
<td></td>
</tr>
<tr>
<td>Total Savings</td>
<td>(349)</td>
<td>(2052)</td>
<td>(2401)</td>
<td>(3820)</td>
<td></td>
</tr>
<tr>
<td>Net Cost (Savings)</td>
<td>905</td>
<td>3821</td>
<td>328</td>
<td>5054</td>
<td>(3250)</td>
</tr>
<tr>
<td>8 Year Internal Rate of Return</td>
<td>35%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. Project Quality Management

The knowledge area is essential to ensure that the project will satisfy the needs for which it was undertaken. It involves three main processes as under:

i. Quality Planning: includes identifying which quality standards are relevant to projects and how to satisfy those standards. Quality planning for software stresses on to improving functionality, performance, system outputs, reliability and maintainability of the product (software). Functionality is the degree to which a system performs the functions it is made for. Performance addresses how well a product (software) serves the customer. System output refers to how good and user-friendly are the input and output layouts of software. Reliability is the ability of software to perform expected work even under non-trivial circumstances. Maintainability addresses the ease in keeping software running with minimum hassle (Cole, 2001). Project managers should plan high quality standards of all the mentioned four dimensions for the software they are trying to develop through their projects. Incorporating pre-existing well tested and reputed software quality standards like standards from ISO, IEEE etc. is recommended. Project managers plan quality in liaison with the quality management department communicating the needful. Effectiveness in communication is hence required to ensure good quality planning for any project. Quality planning can further affect the cost of the project. Hence, it is a sensitive function. Project manager has to consider the end-user’s or sponsor’s demand in this regard as well.

ii. Quality Assurance: involves periodically evaluating overall project performance to ensure the project will satisfy the relevant quality standards through Benchmarking and/or Quality Audit. This is in fact a recurring task that is performed during the entire life cycle of the project. Benchmarking generates ideas for quality improvement by comparing specific project practices or product traits to those of other projects or products within or outside the performing organization. Quality Audit is a structured review of
specific quality management activities that help identifying how lessons
learned could improve performance on current or future projects (Cetro,
1999). Utilizing a Tracking Gantt Chart, reviewing status of tasks in terms of
completion and quality of work done and items produced are the common
approaches employed by the project managers. Quality assurance is
considered more important than usual days; software houses are having a
separate Quality Assurance and Control department responsible for
monitoring the on going projects under different project managers. Project
manager needs to liaise with Quality Assurance departments through
effective and timely communication management. It is recommended to be
undertaken through structured, accurate and timely information exchange in
form of appropriate documentation. Interacting with human and machine
resources is the key to get this work done.

iii. **Quality Control**: Involves monitoring specific project results to ensure
that they comply with the relevant quality standards while identifying ways
to improve overall quality. Quality control techniques are very many. Pareto
Analysis, Statistical Sampling, Using Six Sigma Principles (DMAIC),
Control Charts, Testing, Fishbone Diagram Approach and Abiding by ISO
Standards, etc. are most famous quality control techniques. For improving
quality, leadership and proper understanding of the concept of Cost of
Quality must be known to the project managers. The definition of each term
mentioned is provided in Annexure 1 (Glossary) (Schwalbe, 2004; Kerzner,
1999). Quality control occurs through utilizing software as well as
communication with concerned stakeholders that usually involves team
members. Monitoring the performance and output of each individual team
member is further required for assuring good quality control for the project.

The study finds project quality management a knowledge area exercised mostly
through the human resource functions stakeholder communication and
performance monitoring.
5. **Project Human Resource Management**

This includes the processes required to make most effective use of the people involved in the project. It caters for all stakeholders like; sponsors, customers, project team members, support staff, suppliers etc. From Project Management perspectives following three activities of HRM are considered significant (Schwalbe, 2004):

i. **Organization Planning:** Is about identifying, assigning and documenting project roles, responsibilities and reporting relationships. Making organization charts and using Responsibility Assignment Matrices are common techniques for the mentioned purposes. Figure 2.8 shows examples of organization chart and resource histogram for an IT project.

ii. **Staff Acquisition:** Is getting the required human resources assigned to and working on the project. This leads to Resource Assignment, which is achieved through Resource-Loading and Resource Leveling. Resource Loading refers to the amount of individual resources an existing schedule requires during specific time periods. Resource Leveling is a technique for resolving resource conflicts by delaying tasks (Dinsmore, 1990). Making and utilizing a resource histogram through some Project Management software is always good while doing such job.

iii. **Team Development:** Is building individual and group skills to enhance project performance. This is usually achieved through training those who could be beneficial for the project. For this optimum feasible training method has to be recommended by the project manager (Schwalbe, 2004). For this purpose, determining personalities of the human resources is also required. Mostly this is a challenging task for IT project managers who had never been taught any psychology or HR related material.

The study shall discuss Schwalbe’s (2004) framework limitations later in this Chapter.
Figure 2.8 (Adopted from: PMI, 2004)

Resource Histogram

Organization Chart

Responsibility Matrix
Figure 2.8 exhibits Resource Histogram, Organogram and Responsibility Matrix one after another. A Resource Histogram is technically a bar chart summarizing the utilization of human resources of different discipline serving project. The given Figure 2.8 that is adopted from PMI (2004) indicates quantitative number of human resources managed for various affairs for projects like programming, technical writing etc. between Jan to Jun. Preparing such histogram is very difficult if done manually. In software like Primavera and MS Project once the Resource Sheet and Task Assignments have been accomplished by the project manager these software automatically provide the Resource Histogram in different views. Therefore employing such software make HRM for projects smooth and effective. A histogram in fact is a yardstick to measure the quality of practice in HRP, team formation and utilization without which measuring performance of project manager in HRP is not easy.

In the next portion, Figure 2.8 exhibits sample Organogram. This shall vary from organization to organization and project to project. Project managers better understand the hierarchy of his organization in the initial stage and consider it variable as project may require any change in the hierarchy any time. Organogram are useful to interpret the reporting relationships for the project teams, therefore it should also be shared with the project team. HRM functions HRP, team formation, setting reporting relationship and communication hierarchy (Employee Relationship) and performance management are interpreted to be associated with this activity that projects require.

In the end, Figure 2.8 exhibits Responsibility Matrix that presents the summary of the assignment of tasks in WBS and relevant human resource or departments. R represents Responsibility which does not demand doing an action but in fact getting it done by subordinates or sub-departments. P represents Performing unit who should conduct an action/task. A Responsibility Matrix is an outcome of HRM functions HRP, team formation, assigning quantitative workload to team members, etc. Usually Responsibility Matrix is shared with all the team members to clarify who should do what. To optimize Responsibility Matrix, Resource Histogram is considered a handy tool and therefore project manager should utilize both. First Responsibility Matrix is developed and later it is optimized using Resource Histogram.
6. Project Communication Management

This knowledge area is meant to ensure timely and appropriate generation, collection, dissemination, storage and disposition of project information. It is accomplished through following four processes:

i. **Communications Planning:** Determining the information and communication needs of the stakeholders: who needs what information, when will they need it, and how the information be given to them (Gray and Larson, 2003). Using technology and pre-made templates for Stakeholder Communication Analysis are highly recommended for this purpose.

ii. **Information Distribution:** Making information available to project’s stakeholders in a timely manner ensuring good standards of formatting information. Using technology like Intranet or Internet etc. saves lots of time by distributing information quickly. Securing and controlling access to project information is another major concern under this process.

iii. **Performance Reporting:** Collecting and disseminating performance information, which includes status reports, progress measurement and forecasting. This requires a proper schedule for performance review and discussion as well as effective monitoring during the project life cycle. Status reports and progress reports describe what has been achieved or done, while the forecasts predict future project status (Cetro, 1999).

iv. **Managing Stakeholders:** It requires generating, gathering and disseminating information to formalize phase or project completion. Usually a Kickoff Meeting is conducted at the beginning of project and of its every phase in which all stakeholders are involved to discuss project status. Managing conflicts is another aspect of this process. Confrontation, compromise, smoothing (mediating), forcing and withdrawal are different approaches recommended for conflict management. Confrontation requires project manager to directly face conflict using a problem-solving approach.
that allows affected stakeholders to work through their disagreements. Through Compromise project manager uses a give-and-take approach to resolve conflict. By Smoothing, project manager de-emphasizes or avoids areas of differences and focuses only on areas of agreements. Forcing is sort of win-lose approach to resolve conflict. Withdrawal also demands withdrawing from an actual or potential disagreement. For an IT project manager conflict resolution is challenging part (Schwalbe, 2004; Gray and Larson, 2003).

The description of project communication management indicates that this knowledge area involves Human Resource Management functions including conflict management and employee relation and reporting. The study further learnt that this knowledge area is triggered since the beginning of the project life cycle and exercised until the end of the project for managing different knowledge areas especially managing quality, risk, procurement, time and HR for the project. The study therefore finds it rational that projects are managed through timely, accurate, precise and structured communication with stakeholders using technology resource.

7. Project Risk Management

This knowledge area is meant for minimizing potential risks, while maximizing potential opportunities for ensuring beneficial payoffs in optimum manner (PMI, 2004). “Planning risk response (2005)” is essential for projects of all type. It employs following processes:

i. Risk Management Planning: documents the procedures for managing risk throughout the project. It usually demands Contingency Plan, Fallback Plan and Contingency Reserves. Contingency Plan comprises of predetermined actions that the project team will take if an identified risk event occurs. Fallback Plans are developed for those risks that have a high impact on project objectives and they affect project adversely if attempts to reduce the risk are not effective. Contingency Reserves are provisions held
by the project sponsor or organization to reduce the risk of cost or schedule overruns to an acceptable level (Heldman, 2001). Project managers are supported by risk management department for this necessary activity. This involves communication with stakeholders and assigning tasks to capable team members for accomplishing the risk management plan. For small projects or small organizations, project managers have to prepare risk management plan himself.

ii. **Risk Identifications:** Determining which risks are likely to affect the project and documenting the characteristic of each. Risks of all types must be considered. Market risk, financial risk, technology risk, people risk and structure/process risk all must be explored. Brainstorming, interviewing, Delphi Technique (to derive consensus among risk finders) are the techniques recommended for risk identification. A Risk Register is the outcome of risk identification that documents the results of various risks management processes in a tabular way (Andreson and Coauthors, 2002).

iii. **Qualitative Risk Analysis:** Analyzing risks and prioritizing their effects on project objectives. Using probability/impact matrix or chart is a recommended approach.

iv. **Quantitative Risk Analysis:** Measuring the probability and consequences of risks and estimating their effects on project objectives. For this Decision Tree, Expected Monetary Value (EMV), Monte Carlo Analysis and Sensitivity Analysis techniques are recommended (PMI, 2004). The definition of each term mentioned in bold is provided in Annexure 1 (Glossary).

v. **Risk Response Planning:** “Planning risk response (2005)” is taking steps to enhance opportunities and reduce threats to project objectives. It categorizes risks as negative and positive risks. For negative risks, risk avoidance, risk acceptance, risk transference and risk mitigation are the recommended approaches (Cleland, 1999). While for positive risks, risk
exploitation, risk sharing and risk enhancement are recommended. The definition of each term mentioned is provided in Annexure 1 (Glossary).

vi. **Risk Monitoring and Control:** Monitoring known risks, identifying new risks, reducing risks and evaluating the effectiveness of risk reductions throughout the life of the project. Risk reassessment, risk audits, variance and trend analysis, reserve analysis, status meetings, periodic risk reviews are the tools and techniques to perform the said function (Cleland, 1999; Young, 2002; Schwalbe, 2004). Details of these are readily available in extant literature.

Usually project managers are supported by risk management and quality management departments for the aforementioned tasks for project risk management. The study interprets that all the project manager has to do is to ensure effective and timely liaison with the concerned department. Therefore, for project managers interpersonal skills and oral and written communication skills are essential for accomplishing risk management. Risk Management further requires strong analytical and quantitative skills and relevant experience. The role of Human Resource Management for Project Risk Management is hence involved in form of communication with stakeholders within the team of the project.

**8. Project Procurement Management**

Includes the processes required to acquire goods and services for a project from outside suppliers and vendors (PMI, 2004; Young, 2002). It depends on the following processes:

i. **Procurement Planning:** Determining what to procure and when. Project managers commonly need to take a Make-versus-Buy Decision in this regard. It requires analyzing Make-Versus-Buy comparisons, types of contracts, time and material constraints, per unit price, vendor’s reputation, selection of vendor etc. A Procurement Plan is the outcome of this step (Kerzner, 2001).
ii. **Solicitation Planning:** Documenting product requirements and identifying potential sources for procuring the goods project work requires. Documentation in good and structured format should be adopted (Vysocki, Beck and Crane, 2000). Documentation should be precise and less time demanding so that minimum man hours are needed to produce the needful.

iii. **Solicitation:** It refers to obtaining quotations, bids, offers or proposals as appropriate. Usually Request for Quotations (RFQ) and Request for Proposal (RFP) are sent to potential vendors (PMI, 2004). Advertisement of project needs using various media is a common approach for this purpose. The project manager must ensure that advertising remains within the allocated budget of the project.

iv. **Source Selection:** It connotes choosing among the potential suppliers. The selecting criteria may vary from project to project and organization to organization. Project managers must ensure that the best source is selected.

v. **Contract Administration:** It refers to managing the relationship with the supplier/vendor. Outputs of this process should be the contract documentation, requested changes, recommended corrective actions/orders and updates to organization (Gray and Larson, 2003). Administration of contract requires a continuous monitoring of the vendor’s performance. For ease project managers better delegate this task to one of the team members which means the preferred approach for administrating contract with vendor is to delegate this task to right person in the team so that project manager can concentrate on other necessary tasks of the project.

vi. **Contract Close-Out:** It refers to the completion and settlement of the contract, including resolution of any open items. Outputs of this process are closed contracts and updates to organization (Schwalbe, 2004). Closing contract requires thorough monitoring of the service or goods provided. It further requires paying off the contractor as per the agreement. This task
therefore incorporates communication, human resource utilization and cost related decisions.

The study interprets that Project Procurement Management extensively depends on communicating and managing internal as well as external stakeholders of the project and monitoring their performance through contract administration. The study hence finds it a knowledge area exercised through the human resource functions stakeholder communication, performance monitoring and time management for stakeholders.

Literature relevant to Project Management advises IT project managers to practice all the mentioned knowledge areas essentially in an integrated manner maintaining rational equilibrium. Therefore, the ninth vital knowledge area is called the Integration Management that is responsible for guiding when to apply any of the eight knowledge areas, to what extent and how (PMI, 2004). The Integration Management happens to be a challenge for the project managers. However, literature seems to make integration management smooth and easier by making this knowledge area structured and user friendly in the following manner:

9. Project Integration Management

This knowledge area involves coordinating all of the knowledge areas throughout a project life cycle to ensure that all elements come together at the right time to complete a project successfully (PMI, 2004; Maylor, 2002). It has following three main processes:

i. Project Plan Development: involves putting the results of other planning processes into consistent, coherent document – the project plan.

ii. Project Plan Execution: Involves carrying out the project plan by performing the activities included in it. This function is exercised through communicating with stakeholders, monitoring their performance keeping time and workload assigned as yardsticks.
iii. **Integrated Change Control:** Involves coordinating changes across the entire project. This function is not often required and depends on communication with stakeholders (Tobis I. and Tobis M., 2002; Schwalbe, 2004).

Generally, Integration Management advises the project managers to manage any IT project by following the abovementioned Project Management process and project life cycle.

Having presented the summary of Project Management knowledge this study has learnt the involvement of HR Management within the nine knowledge areas, the processes necessary for Project Management, the key terms recommended for Project Management and association of each process of Project Management with HR Management. Keeping this knowledge as the baseline the study took the initiative of exploring the actual practices of the project managers in the IT industry of Islamabad – Rawalpindi to find how these knowledge areas are practiced in reality. In this context, the study presents its findings later in this Chapter. The overall exercise of all the nine knowledge areas is considered to be a challenging activity for the project managers while initiating, planning, executing, controlling and closing IT projects. Literature therefore declared it important to practice a well-formatted association between process and the nine knowledge areas during Project Management practices. As mentioned in the background in Chapter 1, the study discovered that the four secondary knowledge areas were not practiced effectively. As one of the underestimated areas was reported to be HR Management for projects, therefore the study decided to learn the detailed knowledge on HR Management next.

In the literature, so far HR Management has been presented as a sub-function for Project Management. It is true that HR Management is considered a full-fledged separate subject in the academia and also in various industries including IT. It is further evident that all the nine knowledge areas recommended for Project Management are exercised through functions of Human Resource Management mainly including HRP, planning and conducting stakeholder communication, time and workload management and performance monitoring as indicated above. However
as HR Management consists of much more functions than the functions identified for Project Management, the study found it necessary to get an overview of the existing general knowledge of HR Management from its particular sources explaining HR Management as an independent subject for organizations/businesses. The study found it necessary to compare the knowledge of HR Management presented under Project Management’s sources with the knowledge of HR Management presented in its own specific sources before finalizing its theoretical framework. For this purpose, next this study presents summary of the HR Management knowledge. Later at the end of this Chapter the study shares functions of HR Management recommended by the literature and adopted by the industry.
**Description Of The Human Resource Management**

**Human Resource Management (HRM)** is the effective selection and utilization of employees to best achieve the goals and strategies of the organization (Cascio, 1995; BerNardinad and Russel, 1993).

For effectively practicing HRM for any organization and project following functions are suggested in various books related to HRM:

1. **Human Resource Planning (HRP):** The activities are used to predict how changes in management strategy will affect future human resource needs working in an organization or for a project (Kossen, 1993). HRP is the first function from where Human Resource Management initiates in organizations as well as for projects. During Project Planning process, a project manager has to perform HRP effectively. S/he has to take decisions like how many human resources the project requires, how much workload is to be assigned to each human resource, how much time should be provided to each task given to human resource and assessing the team’s capacities and skills for making decisions relevant to training and developing.

2. **Staffing (Recruitment and Selection):** The activities that are meant for timely identification of potential applicant for some projects (Recruitment) and then assessing and evaluating applicants in order to make a team for the project (Pattanayak, 2002; Andreson and Others, 2003). Staffing comes first right after HRP in projects. Staffing is the most sensitive function of HR Management as it is vulnerable to being personalized. Right persons for the job cannot be acquired when staffing is personalized by those who practice it. Selecting people on merit is the key to recruit and select the right people for the project at the stage of project initiation or planning.
3. **Equal Employment Opportunity (EEO):** These activities are meant to fulfill the legal and moral responsibilities through prevention of discriminatory policies, procedures and practices while hiring, training, appraising and compensating employees working for any project (Cole, 2001). EEO is observed during staffing. However, for certain projects it may be difficult to remain unbiased towards gender, regional and other factors. Like in Pakistan if an IT project requires a graphic designer to invest over time even during nights for producing the due outcome in time on daily basis, female candidates cannot be preferred. Observing EEO during staffing is hence subject to the merit the project manager defines for the project. Cultural, religious and regional artifacts and the nature of work further determine the percentage up to which EEO can be adopted for projects as well as organizations. Like, if the project work requires moving in between a five story building up and down through stairs only, especial persons on wheel chair cannot be preferred for this task.

4. **Compensation Management:** This function is meant to establish and maintaining an equitable wages structure and benefits or reward package for the teams serving any project/organization to ensure healthy motivation and retention (Jain and Saakshi, 2005). For projects, this function is exercised at the time of staffing new resources, promoting existing resources for their past performance and deciding about the rewards to be given in form of bonuses on achieving given targets. Project manager may not be the final authority in this regard however, his/her recommendations are necessary. Compensation management incorporates many different kinds of aspects including financial and legal aspects. Usually these tasks for organizations and their projects are planned and performed by HR departments, while project manager just liaises with the departments to do the needful that is his/her responsibility. Whoever may be responsible for this HR function, for project team members in time compensation in form of motivating reward is utmost important.
5. **Employee Relations:** This function of HRM is meant to establish a communication system through which team members can share their problems, grievances and concerns (Khan, 1997; Saini and Khan, 2000). Communication for the project has to be managed since the beginning to the end among the stakeholders in appropriate manner by the project manner. Employee relation in its connotation in HR Management knowledge is a very vast topic however for projects, the study views it applicable in form of stakeholder communication for catering information exchange, conflict management, requirement and problem identification and monitoring performance for ensuring correct practices.

6. **Industry Relations:** This includes activities meant to establish a liaison with market to remain updated with its demands and standards regarding HR (Kaila, 2003). For Project Management know how of the market standards of technical as well as human resource related practices, standards and norms are essential. However, while managing a project utilizing the relations in relevant industries are usually required more for project quality, procurement and risk management. As the study has not selected project quality, procurement and risk as variables of interest, it limits itself to interpret role of industry relations in HR Management for projects. Industry relations for staffing play vital role for projects in identifying and providing human resources with skill set that the project requires.

7. **Health, Safety and Security Insurance:** All the activities and measures that seek to promote a safe and healthy work environment (Saini and Khan, 2000). Ensuring a healthy, safe and secure work environment is necessary for projects. Projects managers may not be made responsible for this human resource function but for ensuring retention and motivation of the staff, project work environment must incorporate this function of HRM.
8. **Human Resource Development (Training and Development, Organizational Development and Career Development):** A set of multiple activities meant to ensure that organization’s or project’s team members have the skills, competencies and knowledge to meet current and future work related demands. This is also known as Team Development (Kaila, 2003). Mainly human resource development is categorized into three sub functions that are Training and Development (TD), Organizational Development (OD) and Career Development (CD). Training is meant for updating team members with necessary skills that they need for performing day to day tasks while Development targets preparing team members in such that they get long term benefit from the skills and knowledge provided. OD encompasses micro and macro level change management for any organization. CD covers management of the professional cadre an individual can and may like to rise through while serving an organization for long term (Desimone, Werner and Harris, 2002). Project Management mostly requires trainings. As technology changes rapidly, new projects demands learning and acquiring skills for using and managing latest technologies. Therefore, project team members have to be in a dynamic on going learning process. Project managers are not required to be trainers essentially. However, a project manager is expected to identify the training needs of his team members and getting them trained well in time and in budget through appropriate means and approach. As most projects happen time critical, on job training is a common training approach utilized for saving time. This approach however requires adequate risk management by the project manager.

9. **Performance Management and Appraisal:** A secondary function of HRM for establishing and maintaining accountability throughout the project life cycle for ensuring quality and keeping team members committed as well as motivated. Performance monitoring and performance appraisal are two different functions. Performance monitoring is a controlling activity for making team members learn from their mistakes by identifying the gaps in their strength that need to be addressed while
performance appraisal is meant for ensuring reward for the achievements and performance (Decenzo and Robbins, 2002). Projects during their life cycle may not necessarily need appraising the staff members but monitoring for necessary corrections is an essential activity for project managers. Monitoring the performance of the team and getting it corrected as required ensure smooth progress of the project work. However, method of monitoring has its impact on the motivation and commitment of the employees. Monitoring should be done in a manner that staff remains adequately motivated and positively stressed to work. Performance appraisals may be held at the accomplishment of the project as the norms and policies of the organization permit. Reward and appreciation of the work performed, automatically drives team members towards next task.

10. **Job and Organization Design:** Entertains activities concerned with definitions of the jobs or tasks required for project, departments and interdepartmental relations (Cascio, 1995). Project managers need to design job for each post required for the project during the project planning process while performing HRP. Organizational design may not be project manager’s responsibility. Knowledge of Human Resource Management distinguishes job design from HRP but in projects, these two functions may be performed together during planning phase. This study therefore views job design a succession phase of HRP for projects.

11. **Research and Information System:** This term refers to make use of technology to assist in managing human resources in an effective manner (Kossen, 1993). This is adopted by utilizing a Human Resource Information System (HRIS) for managing HR for any organization. As Human Resource Management is variable in different organization, HRIS has to be customized as per the culture, norms, needs, policies and procedures of an organization. Therefore in the market there exists too few general purpose HRIS. Project managers may employ the services and benefits of any available HRIS for their project for performing as many functions of HRM as supported by the HRIS. Software like Primavera and
MS Project 2003 however provide adequate support for project related HR affairs.

12. **Conflict Resolution:** To manage difference of opinions, views, approaches and personalities among the team members or departments engaged in one project / business (Andreson and Coauthors, 2003). Projects inherit conflict of interest as well as work conflicts. Project managers are required to tactfully deal work conflicts utilizing them an opportunity to bring or adopt necessary change for the projects. Conflict management triggers People Management, which is known as the most challenging management. Project managers better avoid that extreme situation which demands people management for resolving conflicts by managing people instead of tasks. Communication is incumbent for managing any type of conflict. Projects and conflicts may run parallel and key to successful Project Management is tactful conflict management through effective communication and interpersonal relations.

13. **Diversity Management:** To provide a conducive work environment for any project or organization where team members can work with ease, comfort and commitment in spite of being diversified in terms of skill sets, potentials, gender, race, sects and backgrounds (Cole, 2001). Team formation is the important activity that project managers have to perform during project planning phase based on the decisions they have taken related with HRP and Job Design as discussed earlier. Team formation involves managing diversity in team members especially based on their skills sets. Effective diversity management is the key to build a good team for the project. However, it is challenging. Knowing the weaknesses, strengths and personalities of the available staff members is necessary for the project managers for managing diversity effectively. A heuristic approach is to pair or group people compatible in their personalities. Pairing or grouping different people strong and weak at one skill set may also be a solution for training the weak people provided their personalities are compatible. Effective diversity management in team formation for
project happens to be the key to synergy in the organization or project work.

14. Motivation: The psychological process that causes the arousal, direction and persistence of voluntary actions that are goal directed, (Desimone, Werner and Harris, 2002). Motivation is the intrinsic driving force inside a psyche that commits him/her to perform. This intrinsic stimulus can be triggered through extrinsic events. Project managers have to be the oscillator of such events through out the project life cycle for keeping their teams committed to project work. Appreciation, correcting the mistakes amiably, stressing on the need of tangible achievement are the non-financial tools to motivate. Promising financial rewards and bonuses is another well tested approach to stimulate motivation in the team. However, promising financial rewards must be exercised in line with the policies and procedures of the organization by the project manager.

It is suggested that the overall above mentioned fourteen HR functions can be covered by iteratively performing four major activities for any organization or project. The four activities are HR Staffing, HR Maintenance, HR Motivation and HR Training (Decenzo and Robbins, 2002). However, same four activities have been declared as the goals or objectives of HR Management. From this fact, the study interpreted that the aforementioned fourteen functions of HRM are applicable to Project Management and they can be exercised under limited titles. Before refining the titles for the mentioned functions for optimizing the existing body of knowledge of HRM for Project Management, the study consulted various publications relevant to its topic for learning what HR Management functions are typically recommended for Project Management in the literature. Later this study presents its findings it collected through observing the practices of the IT project managers in the local industry of Islamabad and Rawalpindi, Pakistan for interpreting what precise number of HR functions Project Management should incorporate.
Literature Review – Identifying HR Functions Recommended for Project Management

The study discusses the variables of HRM applicable to Project Management in order of their precedence.

Human Resource Planning

Human Resource Planning (HRP) activities are used to predict in what way the changes in the management strategy will affect future human resource needs (Desimone, Werner and Harris, 2000). HRP is considered first primary function of the Human Resource Management for organizations as well as for their projects. Hess (2006) in his study on Six Sigma Black Belt declared appropriate HRP significant for project success. While several factors could drive a project towards the success or failure, the experienced project managers cited resource planning or allocation of resources as the greatest driver of success for large projects. Hess (2006) did not recommend restricting to HRP rather he suggested to effectively plan materials and technology for people as well. In particular HRP played a critical role in meeting project cost and cycle time objectives; therefore it could make or break a project. While there were number of reasons that a project could fail, successful project execution often depended on adequate and timely management of human resources. HRP should result in a clear picture about number and kind of required human resources for project and the baselines for relevant time and cost.

Resource allocation is a phase-based process that is key feature to be considered when selecting a project portfolio management solution for any new product development (NPD) projects (Stolovitsky, 2006). Workload distribution among HR is crucial for project success which is achievable through effective HRP. Human Resource Planning (HRP) becomes more challenging in cases of project portfolio management (Consult Annexure 1 Glossary for portfolio management). Impact of technology demands practices relevant to HRM for Project Management in an advanced and automated manner. Another study emphasized on using the internet and software for
HRP, Project Management and employee training (Natansohn, Reed and Others, 2001).

Heldman (2001) suggested perform HRP at the planning stage of any project. He further asserts not to compromise on quality of workforce. Adequate number of skilled workers essential for every project should be worked out precisely before executing the project work. Heldman (2001) stated that HRP is not limited to hiring only rather this function of HRM has its significance for all other functions of HRM like compensation and reward, training and development, transferring and promoting employees, downsizing and rightsizing etc. Heldman (2001) advised project managers to rightly size their teams performing wise HRP. Awareness of the number and nature of tasks that a project shall require are considered the foundations to perform effective HRP. Assigning tasks appropriately to right people is only possible when HRP is performed mapping task requirements and the skills and capabilities of HR with each other.

Job is usually a set of tasks or activities. To assign workload to team members of any project, defining and designing tasks/activities for the projects is the utmost important HRP activity. In the existing body of knowledge definition of job/activity is considered to be a subtask of Project Time Management (Schwalbe, 2004). However assigning task to human resources is an HR Management activity. (See Project Time Management given in Chapter 2). A minor mistake in activity/task definition for IT or any other project may lead project to failure. This must be performed with care while undertaking HRP for the project (Vysocki, Beck and Crane, 2000). It is totally the project manager’s responsibility and obligation to perform this task. Using software tools for this purpose reduces the probability of committing errors (Cetro, 1999).

**Recruitment and Selection (Staffing)**

While managing projects after HRP the vital HR activity, a project manager has to perform or at least participate in, is to recruit and/or select the right person for every task of project. For appropriate selection project manager must be aware of the potentials, skills and shortcomings of the team members available to him/her. This
indeed demands strong interpersonal and leadership skills in the project manager. In case recruitment is required it gets a bit challenging for project managers. Project managers have to make decisions like when, where and who will be recruited? Literature suggested that project managers should perform recruitment wherever it could add value to the business (Martinez, 2002). That is recruitment could be performed for project any time during its life cycle.

Kerzner (1999a) stressed that recruitment and selection for projects should be performed right after knowing the project scope. Project scope should be considered the baseline to determine how many and what type of resources a project shall require. The budget of a project may also restrict the type of resources. Therefore budget of a project better be defined after analyzing the hiring needs. Kerzner (1999a) declared effective team formation a challenge for project managers as building a team is the HR function that involves various indirect costs and uncertainty. Unavailability of right resources can be the biggest challenge for project managers while staffing whereas identifying right person among available candidates is another art which is learnt through experience and leadership practices.

Theories related to Equal Employment Opportunities (EEO) suggest abiding by Affirmative Action Plan (AAP) during recruitment and selection. AAP restricts any sort of discrimination (like gender biased etc.) during recruitment, selection and practicing all other functions of HR Management. Further, it suggests taking care of weak people who deserve opportunity for getting polished (Decenzo and Robbins, 2002).

Sharing his experience of hiring for projects Young (2002) advised that hiring should be done considering the nature of project’s tasks. Usually projects do not give ample time to the project managers to afford experimenting weak people. Hiring on merit is therefore strongly recommended where the merit is defined based on the complexity of project work. Young (2002) informed that in actual practices of hiring for projects maintaining gender balance and no discrimination are ideal and bookish terminologies. Young (2002) further shared that ensuring impartial and unbiased hiring is a challenge for project managers. This study interprets from Young (2002) that theories and their practices in terms of HRM have differences in reality.
Selecting The Right Person for Project

Identifying, selecting and utilizing the most appropriate persons for the job is a key to form a competent team for projects that could ensure success. Wier (2001) in his article emphasized the importance of good quality HR in the following three points:

- A project manager should always get innovative employees for the project.
- Use professionals who know their subject.
- Project manager better keep the team size small but of high quality.

Wier (2001) stressed on hiring right persons, appropriately sizing the team and effective utilization of HR in the project. This study interprets that Wier (2001) finds innovative people knowing their subjects useful for projects. Assessing knowledge of subjects is easier but assessing innovative skills of a candidate is not simple. It is really a challenge for project managers to assess how much a person is innovative. Simultaneously it is also true that only certain tasks of projects shall require innovative skills. Wier’s (2001) view of keeping the team size concise but of high quality connotes thrifty approach. However a small team size may become a challenge for project manager in situations where staff goes on unannounced leave for sickness or unexpected circumstances. Therefore this study perceives that adequate team size of high quality ensuring contingency for non-trivial circumstances will be wise approach in Project Management.

Tribune (1998) stressed on selecting only the right person for organization and their projects. When a project needs hiring, finding skilled people currently performing the functions that a project requires in the geographic area where project is to be performed is encouraged. Prescreening candidates and then calling them up to ask a series of pre-arranged questions to determine the skills in them that the project demands is a common practice. A selector should discover the information about candidate’s education and employment history and further should make them aware of the job prospects. The study interprets that Tribune (1998) declares skilled and experienced people the right persons for the job provided they are currently updated with that work as well as the work environment or region. However, Tribune (1998)
does not directly recommend assessing compatibility of personality with the organization’s culture and nature of project’s work during selection. Identifying right person based on the proficiency in skills and running experience are although two primary parameters that help project managers in selection and team formation but not confirming compatibility in personality with project’s work can cause challenges in form of conflicts, vulnerable retention and increased turnover in the end. Matching personality with work is however a challenge during selection. Liaison with psychologists for this purpose shall further be an expensive and time demanding solution. Project managers therefore should be able to assess personalities.

Downing (2006) described the attributes of the best person for the job. She asserted that before delegating tasks, a project manager should choose the best person for each and every task considering the following parameters:

1. Does the short listed candidate have the knowledge to do the job well?
2. Will the employee grow from the experience?
3. Will it help to make him or her more valuable in the team?
4. Does this employee share the values and perspectives of the organization in his/her mindset and personality?
5. Do the employees have the three “I's” — initiation, interest, and imagination?

Downing (2006) did not recommend delegating the authority and responsibility to a person who cannot move forward independently. Like Tribune (1998), Downing (2006) has entertained job knowledge and experience for selection. However, in her contribution she has acknowledged entertaining personality and competency or potential of a candidate. This is how the study finds Downing’s (2006) recommendations more comprehensive. However, it is very challenging to assess mindset, personality, values one person shares and competency in form of initiative, interest and imagination. It is also true that all project’s tasks may not need a person to be initiative and imaginative, but sharing values, interest and compatibility in mindset & personality with work culture and nature are always desirable during selections of high quality.


Diversity Management and Team Formation

Projects are further affected by the diversity among team members. Therefore, diversity management is a critical HR issue while building team for project and leading that team with harmony. A project manager while forming and leading team of human resources should play a critical role in ensuring that members of his/her team meet their goals before turning over operations to local management especially where team members are diversified in their skills, strengths and background (Frank, 2002). Best utilizing the diversity in the skills of the available human resources is the art of forming an effective team for the project. Frank (2002) declared paring or grouping compatible members the key to form an effective team. This study perceives that for a specific task of project team members compatible in terms of skills and personalities better be paired or grouped. A project manager should pair such members who could benefit from each other’s skills and potentials instead of racing with each other. Race and competition among members of same task better be avoided and competition among persons, pairs or groups undertaking different tasks could be encouraged for accelerating project’s progress. Frank (2002) declared effective team formation the toughest challenge for project managers. An effective team is the one that concentrates on the work to be done focusing on what to produce instead of counter productive personal and work conflicts. Forming such a team requires lot of insight and vision in project managers for which usually structured approaches are missing in the literature. Frank (2002) further acknowledged that at a post team formation stage project manager’s leadership ability matters a lot for project success, as it is difficult to form an ideal team that works without any leader.

Compensation and Reward Management

In any business and project, prosperity and success are the result of motivated teamwork and synergy. Compensation management is suggested to be a useful tactic for ensuring motivation among team members. Competitive salaries as per market rate and reward structure are the most common tools used for motivating employees. However for synergizing team members appealing compensation management and reward structures are not adequate. This requires good interpersonal and leadership
skills in the project manager (Naseem, 2003). As IT has almost provided solutions for all kinds of business functions, for the convenience of project managers, software have been developed which help them in performing compensation management. Roberts (2003) inferred adopting software for performing compensation management and reward structure a key to streamline these HR activities. This study interprets effective leadership and market compatible compensations and rewards structures as keys to ensure long term retention of useful resources, mitigating probable turnover, synergy and cohesiveness among team members and project objectives. For all such HRM functions or issues no structured framework exists so far. Naseem (2003) further declares communication of a project manager with his/her team members the tool to ensure good leadership and synergy. What Frank (2002) and Naseem (2003) suggested are equally important and demand effective communication between project manager and his/her team through out the project life cycle for ensuring success of a projects.

**Career Growth and Leadership**

Besides enjoying one's work, what do employees look for in prospective companies? These are fair play, recognition of merit and opportunities for vertical growth. Companies that ensure the mentioned factors for their employees through innovative HR practices prove to be winners. These, in return, earn from the best effort, loyalty and a long term relationship with their employees (Preeti and Ajita, 2002). IT projects do provide rising opportunities to skilled workers. However how well it is managed and highlighted by the project manager, affects the project. This requires project manager to demonstrate effective interpersonal and leadership skills. Despite being very rational Preeti and Ajita (2002) did not pay attention to the fact that the pyramid structures of companies provide limited opportunities for vertical growth. Fair play and recognition of merit in terms of performance and on job attitude can be appreciated through oral and written communication by the project manager. However ample growth opportunities cannot be provided to all employees. A certain kind of plateau is incumbent in the career of every professional. Managing plateau on the team members through effective compensation and reward structure and appealing communication is a challenge for project managers.
Managing Time, Workload, Communication and Stress for HR

Time Management is considered the primary function of Project Management (Schwalbe, 2004). Time Management for HR is incumbent while managing projects. Stating that Time Management is not a sub function of HR Management is correct. However when a project manager decides issues like duty hours for each team member and timelines etc. s/he in fact performs Time Management for human resources. (Schwalbe, 2004) acknowledged that projects get heavily affected by quality of Time Management associated with HR. Appropriate and rational demand in terms of timelines from each team member and effective attendance monitoring are the two essential HR related Time Management functions on which most projects depend. Time Management even affects Cost Management for its projects. A recent study in USA revealed that ARAMARK Corp., the Philadelphia-based services company had reportedly economized the cost of its projects by marking time and monitoring attendance of its labor (Robb, 2004). Where profit oriented sponsors of projects seek managing time in a manner to cut cost, HR oriented leaders should ensure that timelines specified for team members by the project manager remain motivating, challenging and achievable. Setting inappropriate timelines can spoil the retention of team in the long run. This study therefore interprets that Time Management for a project is a critical function when being managed for HR. Time Management should entertain both the capacity of existing human resources as well as needs of project’s tasks for which it is being done. Mapping capacities of human resources and tasks nature during Time Management likely enhance team motivation and commitment. Early accomplishment of a project should not be desired through over burdening human resources.

Time management for IT project demands defining quantitative workload for team members of projects within the time frame permitted for the project. Quantitative workload on any team member affects performance. In a combined study Glaser, Tatum and associates (1999) proved that magnitude of the quantitative workload on employee and his performance are highly dependent. They proved an indirect relation between workload and performance with stress as an intervening variable. Further,
they proved a significant 3-way interaction between workload, social support, and time. Hence, workload, stress and performance are interrelated and affect the performance of the team members, which in consequence can affect project’s result. An affordable degree of stress on employee must exist. Such stress is usually called Constructive Stress. Negative stress adversely affecting the employee’s performance is called Disruptive Stress. Approach in management of time and workload for projects determine stresses of both types on team members. Disruptive stress should be avoided. If time and workload are constraints, social and moral support from the project manager can mitigate disruptive stress on employees. This study perceives that it is very challenging for a project manager to schedule a project in such a manner that every member of his team remains fully utilized with affordable constructive stress. Using software for Project Time Management is strongly recommended for this purpose (Schwalbe, 2004). However, despite using software a lot of intellectual throughput has to be invested by the project manager for avoiding all sorts of disruptive stress on his team and getting all the project’s tasks within given time and budget. Forming a team of adequate size, retaining them throughout the project life cycle and using software remain helpful in planning effective Time Management.

Maylor (2002) stressed to use PERT approach for Time Management for every task as well as human resource in routine practices of Project Management for ensuring rational and appropriate Time Management.

A website suggested avoiding the following, “management practices to reduce the triggers of disruptive job stress (2006)”, by:

1. Continuous imposition of unreasonable demands on subordinates
2. Refusal to give employees reasonable discretion to own their work
3. Rejecting employee’s concerns over workload and deadline
4. Pushing unnecessarily tight deadlines as a force-feeding technique

This study perceives that project manager needs to create a work environment where rational and useful inter-team communication supports and promotes not only discussion on work related issues but also human related issues, like feeling overloaded, grievance for facing plateau etc. A project manager is expected to lead the team adopting effective two way non-coercive communication. The project
manager is further expected to be such a guide and facilitator for his team that every team member finds it safe and appealing to approach the project manager.

MacDonald (2003) explored strong correlations among workload, stress and performance. She discovered that workload construct has emerged from extensive, task-specific research on the capacities and limitations of the human information processing system; it reflects the perceived margin between task demands and an individual's capacity for coping stress. Workload in the human factor psychology was demonstrated to be a key determinant of stress and fatigue levels among employees performing repetitive tasks. Timelines set by project managers for team members and quantitative workload cause stress. This stress must remain appealing or otherwise the project progress can suffer. Therefore time and workload management are critical activities relevant to HR Management that project managers should perform carefully. What MacDonald (2003) contributed in terms of Stress Management is complex but extremely significant for HR performance, motivation, retention and commitment to project’s objectives. During routine practices of Project Management, Stress Management is exercised in managing time and workload for the human resources. This study has already considered Time Management as one function for HR. The contribution of MacDonald (2003) supports the perception of this study that Time and Workload Management affect the performance of HR and therefore they should be dealt with care by the project managers considering them HR functions.

Leger-Hornby and Bleed (2006) guided how Time Management can make the life and performance of team members effective. Effective Time Management leads to controlling the work ensuring better productivity. Managing time as employees and managing time as supervisor are two main important dimensions in this context. For managing time as a project team member creating a rational schedule and following that schedule as much as possible is important. Once the routine is in momentum, employee can see how long it actually takes to do something and become better at predicting schedule for future tasks. For this, an employee better adopts a time-management strategy like making and using lists of things to do. This list should enable to collect things that demand attention, processing them, organizing the results, reviewing options, and doing the needful in time. For managing time as supervisor respecting the subordinates is the first important principle. Holding short meetings
only when necessary, defining and providing the agenda, getting the minutes of the
meeting and preferring open door policy are the hallmarks of good Time Management
as per Leger-Hornby and Bleed (2006).

The aforementioned guidelines can be helpful for the project managers in performing
better Time Management. However, to this study the contribution of Leger-Hornby
and Bleed (2006) seems operational in scope as it only mentions how to use list of to
do things and hold meetings. Leger-Hornby and Bleed (2006) did not entertain the
challenge to project managers in Time Management. The challenge in practicing
effective Time Management for IT projects happens to be the uncertainty attributed
with projects. Use of Project Management related software is a key solution to
practice Time Management in a structured manner coping uncertainty through the
approach of PERT (See Annexure 1 Glossary). Another challenge to project managers
is to effectively communicate the Time Management they have done for their projects
to all the concerned stakeholders. Using software for making appropriate Gantt Chart
remains handy but still effective Time Management requires more efforts in terms of
communication than simply making Gantt Chart public to stakeholders.

Stakeholder Communication

Communication is the key to success. Stakeholder Communication Management is
considered a full-fledged knowledge area essential for Project Management
(Schwalbe, 2004; PMI 2004). A website revealed that ‘Project Management is central
to businesses today’, (2005) and remains effective only when there is an effective
communication and team management. When correct and timely information does not
flow freely, in a well structured manner, the team becomes less efficient and the
processes start to degrade that affects project’s outcome adversely. Establishing
reporting hierarchy between the team members of any project is an essential HR
practice. Where it is necessary for project progress, it simultaneously addresses
employee’s relations and motivation as well. Therefore, effectiveness in Stakeholder
Communication Management is critical for project’s success. Project manager
therefore has to define and implement communication framework that updates team
members with details like what information will be generated when, where, by whom
and to whom it must reach and at what time. Further, it encompasses scheduling and conducting routine meetings with team as well as with the stakeholders. Even a minor mistake in communication planning can lead project to chaos. HR Management information systems can help track and distribute information throughout the organization (Desouza and Amuza, 2003). This study perceives that Stakeholder Communication Management is the HR function that drives the entire project throughout its life cycle. Communication is the function that drives all other HR functions as well as knowledge areas from initiation of a project until its close out. From HR perspective, inter-team communication enables the project manager to address HRP, monitoring performance, maintaining synergy and motivation, issues related to stress and grievances, retention, compensation and reward, conflicts etc. This study interprets that the quality and effectiveness in communication is the basic HR function through which a project manager can make or break the project.

**Conflict Management and Mediation**

Conflict Resolution and Avoidance are the HR relevant challenges that most projects address. Cummiskey (2004) gives so much importance to Conflict Resolution that he defined Project Management to be the process of resolving conflicts throughout the life cycle of construction and development. It is also the process of avoiding conflicts. Large business organizations employ a full-time staff to manage the constant flow of renovations and modernizations that are imperative to keep pace within the competitive modern world. This is reportedly done so that when it's time to plan and build large and innovative infrastructures that enable companies undertaking large scale professional projects bring resources, skills and structure from in-house to form the right team for ensuring the project success through avoidance of the expected conflicts. From the contribution of Cummiskey (2004), this study interprets that conflicts are unavoidable during Project Management. To resolve them effectively organizations had better employ experts qualified in managing unstructured heterogeneous types of conflicts. This study however finds Cummiskey (2004) not distinguishing between work and personal conflicts as suggested by Tobis I. and Tobis M. (2002). Schwalbe (2004) although contributed various approaches for managing conflicts, she accepted that impact of work conflict is usually positive for
projects in comparison with that of personal conflicts. Project managers are usually declared responsible for all types of conflicts. Managing conflicts is further acknowledged to be challenging for project managers.

Mediation is declared to be the key to resolve conflicts. Mediation was predicted to make its significant role as a solution to conflicts because it was likely to increase the measurable benefits it could ensure, like better morale and productivity, as well as overall savings in time and money. As mediation approach demands project managers to possess good advocacy and negotiation skills, it is a challenging HR practice for them. However, conflict managers should ensure that conflicts result in good deals and in the best interest of all stakeholders (Ford and McPherson, 2002). Mediation is indeed a key to resolve various conflicts but this study perceives that mediation, as a solution may not be applicable in all cases of conflicts. Inter-team communication can certainly be an approach to address work conflicts where mediation may not be a solution as exaggerated by Ford and McPherson (2002). However reaching a win-win situation through wise and effective communication with conflicting stakeholders is always desirable. A project manager may not be the right person to resolve certain conflicts as they may require intervention of the top management, sponsors and external entities. For this reason, this study finds making a project manager solely responsible for all sorts of conflicts that may arise and affect the ongoing project not any rational and pragmatic approach that the existing literature endorses. However, this study perceives that a project manager can avoid work conflicts through effective communication and consistently monitoring the performance of project’s work.

**Performance Monitoring and Management**

Performance Monitoring is recommended to be the HR Management function through which team motivation as well as performance can be addressed effectively. Thompson (2004) studied Business Activity Monitoring (BAM) and explored that BAM could bring significant business value in the world of technical data provided its justification is derived from business management improvements. The most important claim for BAM was that it could fundamentally alter the way businesses reacted to threats and opportunities.
In fact every project is a business activity therefore what Thompson (2004) proved for Business Activity Monitoring is equally applicable for project. However, projects are evaluated by measuring the performance of the teams working on it. Advocating this reality Jakovljevic (2003) concluded that what started out as a set of applications to manage customers' projects better, astutely allocated staff and monitor their utilization had become an important foundation for coordination of the full ranged business activities for ensuring success. This inference guides project managers to allocate and monitor their teams effectively. To perform it, project managers must first understand what monitoring is? Monitoring is a process that assesses the quality of internal control performance over time. A control system needs to be monitored to ensure that it continues to operate effectively as intended. Without continual and effective monitoring, a control process may fall into a state of despair or not be executed altogether (Strub and Lucas, 2003). This study perceives that monitoring the work of a project in a consistent structured manner can certainly bring value. Project team must be aware that their efforts are being monitored consistently by their leader (project manager) not only for possible corrections at the nick of time when required but also for recording performance that would be set as the base for awarding the annual increments and bonuses. Fairness in such monitoring shall certainly play as a cohesive force binding team members with the project’s cause for long term. Using software for monitoring project’s work is further useful and strongly recommended Cleland (1999). The study further distinguishes performance monitoring form performance management that is broader in connotation and application. The study learnt that in context of Project Management the literature emphasizes on performance monitoring instead of performance management. Therefore the study does not entertain details of performance management.

Wier (2001) emphasized on well scheduled, frequent and regular progress monitoring of the project work and resources. Effective way to control a project is the continuous measurement of progress of its work and the teams working on it; compare that progress against the plan and then adjust the development parameters to correct any deviation from the plan. What Wier (2001) advised is possible when appropriate software are utilized for monitoring purposes. Project manager is the right person for this job. However depending on size of team and load of monitoring work a separate
unit for progress monitoring may also be established that reports to project manager and helps him in maintaining consistent monitoring. This study interprets that the ultimate goal of monitoring performance should be identifying and triggering the required corrective actions and keeping the project team motivated instead of causing negative stress among team members.

**Motivation**

Motivating a project team is another objective of HR Management that is critical to project success. To manage and motivate the team members more effectively Wier (2001) emphasized the role of project managers and team leaders by suggesting multiple ways in his study. He stressed on making workers the good workers by encouraging them with significant financial incentives, oral/written words that boost morale, fair and respectful treatment, value the life of employees beyond the project’s work place and promising appealing performance rewards while monitoring their performance. Further in context of motivation an online article emphasized on ensuring the following elements to create the work environment which ensures a motivated team for project:

1. A clear purpose
2. A challenge
3. Fellowship
4. Responsibility
5. Personal growth

Motivation is a psychological trait which revolves around awareness, direction and persistence (Robbins and Michael, 1999). This study perceives that staff can be stated motivated when they are aware of their job role in the project, they have been directed towards well defined objectives of the projects that they must achieve and they are compensated in a manner that binds them with the project’s objectives for the long run. Job role and knowledge of objectives are provided to the employees through communication while long term commitment with the project is achieved through compensation. However this study further acknowledges that for winning long term
commitment of an employee mere appealing compensation is not adequate. The study acknowledges that the six elements suggested above (Anonymous, 2006) play vital role. Challenge, responsibility, opportunities for growth and solid leadership are significant for motivation. Clear vision or purpose certainly helps professionals deciding what they exactly intend to do. This study interprets that all these prerequisites for motivating project team are addressed through the quality with which a project manager manages and monitors the workload, timelines, communication and overall project’s progress.

Motivation is categorized as intrinsic and extrinsic. Intrinsic motivation depends on the mindset and genes of a person while extrinsic motivation can be triggered through numerous stimuli (Schwalbe, 2004). It is always preferred to hire intrinsically motivated staff for projects who love their job. However staff can be motivated extrinsically. Leadership, communication, compensation, designing job role, non-financial benefits and facilities, timely recognition of the work performed, growth opportunities and training and development are the common stimuli for extrinsically motivating staff (Khan, 1997). This study perceives that designing job role is addressed through workload management. Timely recognition of work performed requires communication and leadership. Compensation of financial and non-financial benefits and rewards are finalized at the time of hiring and performance appraisals. Training and development is another stimulus for extrinsic motivation that project requires before execution phase. A project manager in an organization may not be authorized to perform all these functions of HRM. This study perceives that project managers can trigger extrinsic motivation among his/her team through leadership and communication all the time. For triggering extrinsic motivation through compensation, promotion and training and development a project manager may have to wait for the right event. Training and development is the stimulus that a project manager may conduct himself and hence it is more adoptable.

**Human Resource Development**

Training and Development (TD) is a fundamental function of Human Resource Management for Human Resource Development (HRD). Training and Development
activities in HR Management are concerned with assisting employees to develop up-to-date skills, knowledge and abilities (Decenzo and Robbins, 2002). IT professionals face the challenge of ever improving (changing) technology. This demands them to remain on their toes for remaining updated all the times for accomplishing any IT project successfully. IT Project managers, therefore, ought to keep their teams updated all the time which is expensive both in terms of cost and time. Project teams constantly face a barrage of new software products and associated technologies that need learning time for delivering products while working on IT projects. Hecht (2002) advised a solution to create a structured, repeatable process for evaluating technology solutions evaluating the vendors whether they train the resources on the new technology products they provide for the project. This study learnt that on job training is risky but quick approach of getting project team ready for work. Formal training methods require ample time in the project schedule. Hecht (2002) reported that in real World IT project managers usually face challenge of accomplishing the projects in too tight schedule to get their teams trained. Therefore, skilled, experienced and well developed resources are preferred during hiring who know their subject and job well. Getting skilled team is again a challenge for project managers. Large projects sometimes can afford training and development cost and lengthy schedule but for time critical IT projects already trained and developed resources are preferred. This study perceives training and development essential but adoptable only where budget and schedule of the project and circumstances permit.

**Health and Safety of Human Resources**

For achieving success in project as well as in any other business, ensuring health, safety and security of employees are the top most important HR Management concerns. Jack-Marshall [JM] (2006) was an organization that followed the policy to highlight the importance of the health, safety and security for its employees to achieve success in its projects. JM (2006) advised that project manager, as team leader must ensure health, safety and security for his /her team members whether they were working in the office environment or in the field. This study perceives that health, safety and security must be given top priority as it helps in retaining human capital. This function of HRM should be performed for all employees at an organization and
not merely teams of certain projects. The study acknowledges the fact that it may not be rational to overburden project manager by assigning this function as it could be delegated to relevant HR professionals.

**Selected Frameworks of HRM**

For HR Management during project life cycle frameworks for guiding project managers do exist mentioning what functions of HRM to be adopted. Next, this study discusses two frameworks for practicing HR Management required for managing projects. First framework is the one that entertains limited HR functions while the second endorses maximum HR functions for Project Management. This study first discusses the contribution of Pastore and Ware (2004). The outcome of the mentioned publication summarizes what HR functions a project manager should perform to ensure project’s success, which Pastore and Ware (2004) analyzed quantitatively. This study adopted their outcome in the form of the following Table 2.2:

**Table 2.2 – HR Functions for Project Managers**

<table>
<thead>
<tr>
<th>Human Resources Management During Project Management</th>
<th>Practicing</th>
<th>Effectiveness</th>
<th>Difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use leadership development programs</td>
<td>79%</td>
<td>3.49</td>
<td>3.04</td>
</tr>
<tr>
<td>Compensate and reward IT employees and managers based on the performance of the IT organization (cost performance, product quality, customer satisfaction and so on)</td>
<td>56%</td>
<td>3.47</td>
<td>2.89</td>
</tr>
<tr>
<td>Conduct talent gap analysis</td>
<td>53%</td>
<td>3.43</td>
<td>3.27</td>
</tr>
<tr>
<td>Employ forced ranking</td>
<td>42%</td>
<td>3.32</td>
<td>3.24</td>
</tr>
<tr>
<td>Employ HR officer for IT</td>
<td>29%</td>
<td>3.42</td>
<td>3.12</td>
</tr>
</tbody>
</table>

(Adapted from: Pastore and Ware, 2004)
Pastore and Ware (2004) suggested that HR practices for projects include certain limited functions of HR Management. They found more than 50% weights given to leadership development, compensating employees and talent gap analysis while forced ranking stands at 42% only. It must be good and rightly applicable for the scenario in which Pastore and Ware (2004) conducted their research. However, this study finds it inadequate as the latest knowledge of HR Management emphasizes the practice of over ten functions that this study has defined in Chapter 2 of this thesis. In fact, the framework of Pastore and Ware (2004) emphasizes only on three main functions of HR Management that are Leadership, Compensation & Reward Management and Talent Gap Analysis focusing on team’s skills and abilities that leads to forced ranking. This is how this framework does not address rest of all the other functions recommended for effective HR Management in the literature. Further, it does not specifically guide in what order the mentioned HR functions should be adopted and performed.

The next framework that this study found worth discussing is the one suggested by Schwalbe (2004). She described HR practices needed for Project Management as the set of three main categories of activities: Organizational Planning, Resource Allocation and Leading Team. Organizational Planning is considered to be the set of functions like team building by selecting and assigning tasks to right persons, job designing, HR relevant Time Management, defining hierarchy of the organization and establishing reporting links (communication management). Resource Allocation in terms of HR means managing distribution and monitoring of quantitative load to each team member including overtime. Leading Team means a lot, like training and counseling, motivating, planning and implementing compensation and reward schemes, monitoring performance, conflict management, ensuring health and safety for HR, providing vertical growth opportunities, role management, ensuring retention, mitigating turnover etc.

Apparently, this framework for HR Management for Project Management covers all most all the functions of HR Management. However Schwalbe’s (2004) framework despite being very comprehensive and detailed, is described in an extremely theoretical manner and it does not precisely guide what minimum HR functions should be assigned to a project manager. It discusses more theories about leading and
motivating, staffing, recognizing team’s skills and potentials to form team, conflict management etc. Nevertheless, how to keep a balance between so many HR functions when practiced simultaneously could have been added to this framework. The reality is that it is neither easy nor practical for the project managers to adopt Schwalbe’s (2004) framework. Instead of providing and discussing almost all HR functions and relevant theories addressing precisely the minimum number of HR Management functions that project managers could perform in the real industry is expected. In summary, this study finds Schwalbe’s (2004) framework very comprehensive but not easy to apply. The study is interested in learning how a pragmatic framework for HR Management could be contributed for project managers working in the selected IT industry. For this purpose, the study explored the IT industry to learn the running practices of HR Management by the project managers as well as their organization. The study describes its findings after discussing what project success is.

Learning the Definition of Project Success

Project success is the target of every project. However success of a project is not limited to a single connotation. Usually IT professionals consider project success achieved when a project gets accomplished within stipulated time and budget fulfilling end user’s requirements.

A relevant website revealed that organizations adopting a, “formal Project Management methodology (2006)”, have considerable competitive advantage over those which do not follow a formal approach. The mentioned website enlisted the advantages that this study directly quotes as under:

1. Reduced time-to-market and time-to-profitability, both key factors for any organization, develop products through their projects.
2. Ensure predictable schedules for profit and product delivery.
3. Offer more effective ways to prioritize, allocate and monitor resources.
4. Demonstrate a commitment to excellence to your customers, your employees and other stakeholders.
This study finds the aforementioned guidelines for Project Management helpful for interpreting what the project success is. These guidelines indicate that project success could be a mix of the magnitude of the profitability and the times estimated for delivery of the products to the customers and return on investment. The study perceives that profitability may not be a primary concern for project managers who are not sponsoring the projects. However meeting timelines should be a primary concern for project managers to avoid cost overrun. This study identifies timing and profitability as two parameters for measuring the project success out of which timing happens a major responsibility of the project managers in most of cases and further a factor that could affect profitability.

Another web source of knowledge on Project Management suggested, “Ten key points to ensure and measure project success (2006)”. The selected website stressed on ensuring the followings:

1. Building a good team
2. Defining roles and responsibilities
3. Define processes and methodologies
4. Structured way to document and manage requirements
5. Using the right metrics to measure success or failure
6. Paying attention to the details
7. Defining formal and informal communication channels
8. Prototyping before scaling the project
9. Initially keeping all these parameters simple
10. Ensuring an exit strategy or a contingency plan.

This study does not find the aforementioned parameters suitable for operationalizing the project success. These guidelines are certainly good for Project Management but they do not help in measuring the project success in quantitative terms. The study has further discussed each of the mentioned points in the next section comparing it with the running practices of perceiving project success and Project Management in the selected IT industry.
Aaron, Dov, Ofer and Alan (2001) declared project success achievable by declaring Project Management a strategic activity but complex. Traditionally project is perceived successful when it meets time, budget, and performance goals. However project success is not just meeting time and budget. The objective of their study was to develop a multidimensional framework for assessing project success, showing how different dimensions mean different things to different stakeholders at different times for different projects. Given the complexity of this question a combination of qualitative and quantitative methods and two data sets were used. Their analysis identified four major distinct success dimensions for operationalizing it that were; (1) project efficiency, (2) impact on the customer, (3) direct business and organizational success, and (4) preparing for the future. The method of Aaron, Dov, Ofer and Alan (2001) seems more customer focused and futuristic to this study. It is rational as it targets reviewing what project has yielded consequently. This study finds determining the project’s efficiency challenging as it requires a complete view of the entire life cycle of the project. Impact on the customer could be interpreted through feedback about the products or services the project delivered. Direct business and organizational success could be measured in terms of the profit and relationships with clients that any organization earns after completing a project. Preparation for future could be measured through documentation of the project and lessons learnt by the team. The study may incorporate the mentioned parameters for operationalizing project outcome after learning real industry practices in Pakistan.

Considering project as a set of jobs Montana University System [MUS] (2006) described five Job Success Factors that include: Expertise, Interaction with Others, Continuous Improvement & Customer Focus, Resourcefulness & Results, and Leadership. This study perceives that MUS (2006) explained the project success in five factors that are in fact the prerequisites for project success. They are indeed not adequate to explain what project success is in quantitative manner. Conventionally the IT industry does not measure project result in terms of preliminaries or prerequisites for success. Project success is believed to be measured in terms of the tangibles and/or intangibles produced by the project. Therefore this study does not find the parameters suggested by MUS (2006) adequate for interpreting and measuring project success.

Farthing (2006) views project success in a collection of the following parameters:
1. Clearly defined objectives
2. Clear plans
3. Distinct milestones
4. A proficient team
5. Adequate risk management
6. High quality standards and controls
7. Regular progress monitoring

The study again finds Farthing’s (2006) seven points just preliminaries for the project success and not adequate parameters to quantify what project has actually produced. In perception of this study these parameters are more helpful for project execution instead of measuring the outcome of project. Therefore the study may not entertain these parameters for operationalizing the project outcome after confirming from the real relevant practices in the selected IT industry.

The study perused the suggestions of various authors to reach to an appropriate operationalization of the project outcome. Finally, it adopted the operationalization approach of Standing, Guilfoyle and coauthors (2006) for measuring project success as mentioned in Chapter 3 and provided in Annexure 3.
Variables Identified From Literature

From the literature reviewed, this study identified the following independent variables (functions of HR management) which affected the dependent variable project result:

1. Human Resource Planning
2. Recruiting and Selecting right person for the job
3. Managing Diversity in team
4. Planning and implementing Compensation Management
5. Planning and implementing Reward Structures
6. Time Management for HR
7. Work Load Management
8. Stress Management
9. Utilizing Project Management related Software
10. Communication Management
11. Conflict Resolution and Mediation
12. Performance Monitoring/Management
13. Managing Motivation
14. Training & Development
15. Health, Safety and Security Care
16. Existing framework of HR Management for Projects

The study believed that knowledge exists in the practice of people who apply it and it can be optimized through practice. With this belief before shaping the theoretical framework, the study visited twenty four software houses to learn from the running practices of HRM for Project Management by the IT project managers in the mentioned industry. The study not only adopted the approach of going in the field for identifying the gaps that reportedly existed, but it further intended to learn that what minimum number of functions in practice of HRM can encompass maximum number of HRM functions recommended in the bookish knowledge as described above. Next, the study presents its findings it learnt from the industry for finalizing its theoretical framework.
This study entertained Project Management practices in the IT industry of Islamabad and Rawalpindi as third source of knowledge. Therefore, it is important to discuss the identified practices in the industry prior developing the theoretical framework. From July 2005 to May 2007 out of the selected 24 software houses selected for this study, in 15 software houses project managers were found aware of only the quality standards for evaluating software they developed and not with the quality standards required for managing HR effectively. At the selected software houses, software engineers used to get promoted to the rank of project manager for their long work experience, good performance in software engineering and potential, even without any certification or formal qualification in Project Management.

Publications on the topic of HR Management for Project Management with reference to Pakistan were not available in adequate numbers. In fact, no explicit research had been made until now for studying the impact of HR practices on IT Project Management with reference to IT industry in Pakistan. Therefore, preliminary investigation was conducted on IT industry operating in Islamabad and Rawalpindi region through interviewing selected group of IT experts. The study initially visited 66 software houses engaged in IT and Telecom projects and later selected 24 out of them based on details provided in Chapter 3. The investigation indicated that IT projects depended on the quality of HR practices that were performed for their success. This study interviewed IT professionals in the selected organizations using various questions that were not limited to the 10 questions mentioned questionnaire titled ‘Questionnaire for Interviewing IT Professionals’ in Annexure 3. The IT professionals informed that IT projects suffered because of ineffective utilization of HR by associated project managers from the problems like scope creep, schedule extensions/delaying and cost overrun etc. The IT professionals further acknowledged that project remained successful for good HR practices as well (See Chapter 4 for statistical figures). The IT professionals informed that HR Management was not just one factor on which project outcome was dependent as projects were affected by and rated on many other parameters not linked with HR. Nevertheless, they acknowledged
that standard of HR Management practice for projects did play a role in the successful accomplishment of projects as one significant parameter.

This study does acknowledge that other reasons play role in leading any IT project to suffering or success. However, the study focused only on HR practices as these were reported to be among the vital factors that led IT projects to either success or suffering in this selected industry. Not formally trained or certified IT project managers, was identified to be one reason that caused negligence towards necessary HR Management. The second significant reason was that even trained and certified IT project managers were found more inclined towards management of the issues related to first three primary knowledge areas that is scope, time and cost. Only quality management was next in queue that was practiced at successful software houses. This usually happened when IT project manager possessed inadequate or incomplete (little) knowledge and experience of the other four knowledge areas. The HR policies of software house were another vital factor that affected the predilections of a project manager. Another reason was that the existing literature about HR Management for Project Management does not provide such a framework that ensures project managers could easily practice essentially required precise number of activities suggested for HR Management while managing their projects. An impact of these identified causes is that IT sector of our country is lagging behind in competition with rest of the world in engineering quality software.

From the selected IT industry of Islamabad – Rawalpindi, Pakistan IT project managers and IT professionals apprised this study of the existing practices of Project Management and relevant HR Management in the selected industry. As the researcher happened part of the IT industry as being an HR and Project manager at Averox Pvt. Limited, the relevant practices and norms in the industry were also well known to the study in advance. Next, the study shares the facts it learnt from the selected industry through its observation and interviews of the IT experts about all the variables that it identified in the literature.
About Human Resource Planning

Preliminary investigation about local IT industry working in Islamabad and Rawalpindi, Pakistan indicated that IT professionals Rauf (personal communication, August 4th, 2005) and Mateen (personal communication, August 14th, 2005) complained of being overloaded at software houses with the projects that were reported suffering. While Rubab (personal communication, April 28th, 2006) the Database Analyst at DB Enterprise was not at all satisfied with the HR planning and practices in the mentioned organization. These facts indicate that quality of HRP while managing projects by the project managers was required to be improved. On the other hand in the software houses where projects were reported successful, adequate team size and minimum demand for late sitting or overtime was reported to be factors motivating and committing its employees for long term. Further entertaining career growth of an individual employee was reported to be a key factor of effective HRP. Software houses not ensuring this in their HRP practices were reportedly facing retention problems for which projects suffered.

About Recruitment and Selection:

Practices observed in local IT industry of Islamabad and Rawalpindi, Pakistan, revealed that in the selected software houses project managers used to conduct recruitment at the planning stage of their projects. The selected software houses followed principals of EEO and AAP by offering internship to fresh graduates of either gender. However, for critical projects only experienced and skilled team members were selected on merit that was defined based on the requirements of the projects. Moreover, for projects that demand late sittings or traveling off shore, females were not preferred.

It was observed that with in the selected local IT industry of Islamabad – Rawalpindi, Pakistan project managers Ahmad (personal communication, August 27th, 2005), Zaidi (personal communication, September 13th, 2005) and all others that were interviewed were conscious about choosing the appropriate persons for the IT projects. Identifying and selecting above par IT professionals was reported to be the
top priority of all the software houses that were selected. For this purpose the reputation of the institution from where the candidate had graduated and relevant work experience were considered primary parameters during staffing. However formation of team and sizing team was an aspect where this study did not observe any proficiency in the project managers within the software houses where projects were reported to be suffering.

With reference to the selected IT industry, this study observed that project managers used to incorporate the first and third points suggested in Downing’s (2006) five points mentioned on page 70. Points 2, 4 and 5 were also considered if required. Like for jobs of any Graphic Designer for any IT project in the mentioned industry the experience of the candidate was used to verify that the candidate has good initiative, imagination and keen interest in the job.

**About Using Software for Project Management and HR Management**

Zahra (personal communication, September 19th, 2005), Hassan (personal communication, September 19th, 2005) and Latif (personal communication, October 27th, 2005) informed that project managers in the IT industry selected by this study were found accustomed of using the latest software available for Project Management like MS Project 2003 but not any specific for HR management as generic tools in form of HRMS were not yet available to industry.

**About Managing Conflicts during Projects:**

Although the literature stressed on conflict management but project managers in the selected IT industry were not responsible for personal conflicts. Naqvi (personal communication, November 13th, 2005), Iqbal (personal communication, December 12th, 2005), Daud (personal communication, January 8th, 2006) and Ahmad (personal communication, January 22nd, 2006) informed that conflict management of personal conflicts was a responsibility of the HR departments of the software houses. Project managers however were made responsible for resolving only the work conflicts related to their project. Conflict resolution hence was not found a primary function for
project managers in the industry, as it was undertaken on need bases only. Moreover, in the IT industry mediation was reported to be the role of HR department and not of the IT project managers unless the case required. Hence, mediation was not reported to be assigned to any IT project manager as a task of his/her project.

**About Managing Diversity in Team:**

Unlike international IT industries, the selected local IT industry had very few expatriates as programmers and IT professionals. However, IT professionals did come from different backgrounds in terms of experience, families, universities and regional cultures. Javed (personal communication, February 12th, 2006), Shamim (personal communication, February 12th, 2006) and Noman (personal communication, February 17th, 2006) apprised this study that software houses and Telecom organizations mitigated the probable diversity related debates through their policy of not discussing political, regional and religious difference during the working hours in the office premises and/or through official technology resources. It was further learnt that selected software houses believed in utilizing each employee based on his/her domain of expertise. Therefore, project managers were responsible to take much care of the skill set of the available staff while forming team and assigning tasks. Nevertheless, project managers were reportedly conscious and careful while forming teams for the projects they did not find it easy to pair or to group people with compatible personalities in a team to mitigate the probable conflicts among the team members.

**About Managing Communication for Projects:**

It was reported that in the selected software houses communication relevant to projects occurred through emails in an unstructured and agile approach. Based on the contribution of Desouza and Amuza (2003), this study views communication management an integral part of HR Management needed for Project Management. The study preferred including communication management only up to the scope of inter team information flow but named it stakeholder communication, as this title remained easier for the IT professionals who were interviewed. The project managers
and the teams this study interviewed acknowledged the importance of communication management for both the project as well as the team.

**About Compensation Management, Reward Structures for Motivating Team and Synergy:**

Project managers Iqbal (personal communication, March 20th, 2006), Jamshed (personal communication, March 16th, 2006) and Jabbar (personal communication, March 27th, 2006) reported that in the selected industry project managers were not authorized for defining compensation and reward structure for their team members. It was reported to be the domain for HR departments. Project managers were just consulted while hiring someone for his/her project. However, final decision in this regard was reported to be of the Head of HR or the owner of the software house. This trend was not adopted only in software houses where owner used to play the role of the project manager as well. Therefore, project managers were found abiding by the typical HR policies and rules relevant to wages structures of the IT organizations in this regard. For this reason, project managers did not need to define any compensation and reward structure exclusively. Project managers were however responsible for providing their recommendations for their team members at the time of annual appraisals in the selected software houses in form of the amount of bonus and percentage or number of increments that any employee deserved. Compensation management and definition of reward structure hence reported to be the less required practice by the project managers in the selected IT industry. However, IT experts in the mentioned industry did emphasize that projects desperately need effective compensation management and encouraging reward structure, but these tasks were neither handed over to project managers nor they wanted to take its responsibility as HR departments and/or owners of the selected software houses used to be responsible for these essential tasks.

**About Time, Workload and Stress Management for Project Team:**

Experts in the selected IT industry acknowledged that cost of IT projects and performance of team get affected by the time management performed for the HR. IT
professionals were reported overloaded especially near deadlines of the projects. It was reported that the imposed over-stress affected the health but not the project’s progress. Stress management is associated with Time and workload management for project as it affects the employee’s performance that determines project progress. IT professionals Rafique (personal communication, March 10th, 2006), Ismail (personal communication, April 9th, 2006) and Mateen (personal communication, April 11th, 2006) informed that in their field weakness in eyes, losing walking and running stamina and cardiac problems were common. Therefore rationality in time and workload management was acknowledged as an essential HR practice by the team members that were interviewed. In summary, the study observed room for improvement in the exercise of defining, designing and distributing workload for project team members by the project managers.

**About Training and Development of Project Team Members:**

To get hold at the emerging IT technology, project managers in selected IT industry working at Islamabad and Rawalpindi, Pakistan were found motivating their team members to get updated mostly through On-Job Self Learning and also through formal training approaches where budget of the project permitted. Regardless of what approach of training and development is best for any project, it is considered the responsibility of the project manager to get his/her team members trained on the latest software, skills and abilities that the project demands, before the project reaches its execution phase. In case on job training is not feasible then the industry reported that the project managers first analyzed the skills that the project demanded and later they communicated the training needs to the HR department who was then responsible for arranging the formal training. Usama (personal communication, April 4th, 2006) and Sajad (personal communication, May 19th, 2006) reported that project manager was reported not responsible for anything more than the mentioned for any formal training and development of the team members except for very rare cases where the project manager was a trainer as well. However where on job training happened feasible, project managers were still reported not required to coach or mentor the new comers as they used to delegate this task to their subordinates.
About Performance Monitoring and Management:

This study learnt that project managers in the selected successful software houses were bound to report the progress about the work of the project and its advancement towards preset milestones (Jawad and others, personal communication, 2006). Progress of the team members was also assessed through meeting the deadlines; that is accomplishing given assignment in time. Means the importance of progress monitoring was well acknowledged in the selected successful software houses. On the other hand software houses where projects were reportedly suffering, no frequent and structured performance monitoring was observed. Performance monitoring was however such a function that was typically considered a task of the project manager in the industry.

About Motivating Project Team:

Experts in the selected software houses acknowledged the importance of ensuring team motivation. In the selected industry encouraging compensation salaries were reported to be the primary factor for keeping teams motivated. Project managers in the local IT industry working in Islamabad and Rawalpindi, Pakistan, were not formally trained to value the tactics suggested by Wier (2001) for motivating teams. However it never meant that project managers never motivated teams. Farooq (personal communication, April 18th, 2006) reported that in the successful software houses other than promising performance rewards and compensation packages that was a function restricted to HR department or owners of the selected software houses, project managers used to value and exercise praising and appreciating work of their team members based on their experience. And about the software houses where projects were reported to have suffered, team motivation was not well taken care of.

About Health, Safety and Security of Project Team:

As per Sheikh (personal communication, May 12th, 2006) and Hadi (personal communication, May 17th, 2006) in the selected IT industry, the project managers were needed not to invest much effort in ensuring health, safety and security.
Software houses and Telecom organizations had established such environment that ensured conformance with good HR policies ensuring health, safety and security of all their staff. Hence, safety and security were such functions of HR Management that were already given considerable attention in the industry. However, it is well interpreted that no project could reach success if this essential function of HR Management is not practiced. During the investigation, this study did not receive any complaint of sub-standard approach about this function in the mentioned IT Industry of Pakistan. Formal hospitalization coverage through insurance schemes for employees working at IT Industry was not provided by all software houses that were selected. However, this fact did not find any critical obstacle on the way to project success. Providing medical facilities was a primary responsibility of HR department at software houses and putting it onto IT project managers was not considered rational in the selected industry.

**About Project Success in Local Industry:**

The facts and figures that this study observed and collected from the selected IT industry working in Islamabad – Rawalpindi, Pakistan indicate that project managers did not consider points 3, 4, 5, 7, 9 and 10 on page – 86 necessary for defining project success. The study next discusses implication of these points in the selected industry that it learnt through observation as well as interviewing the IT experts in the industry.

Point 3 on page 86, define processes and methodologies, was not believed to be job for IT project managers in the selected industry. Selected software houses believed in hiring a certified professional expert in defining processes as per ISO and CMMI standards. Project managers were supposed to follow the processes defined by the department naming Management Representative (MR). However the study further learnt that lack of care for point 7, relevant information about defined processes was not communicated to project managers in a formal manner. Further project managers preferred managing projects by employing agile approach. Although the word agile seemed an excuse for covering unstructured approach or avoiding structured processes for Project Management in the mentioned industry, but this study
discovered that the agile approach to Project Management remained useful in most cases. Like Averox and Pi Sigma were the software houses that earned high profits despite following agile approach for Project Management during 2005 and 2006. Hence this study considers point 3 not essentially required to be assigned to the project managers and further not needed for operationalizing the project success.

Point 4 on page 86, structured way to document and manage requirements, was also believed not to be any job of the project managers. The selected software houses had technical writing departments for this purpose responsible as well as obliged to document every project as per the well defined standards and predefined templates. Standards and templates were again reported to be designed by Management Representative department, and not project manager. However, only senior project managers were indeed consulted while defining standards and designing relevant templates, but all project managers were not required to be consulted. Therefore this study found this practice of the mentioned industry rational that documentation of the projects is not a job for project managers in the selected software houses only and not any essential aspect for measuring project result.

About point 5 on page 86, using the right metrics to measure success or failure and 7, Defining formal and informal communication channels, the project managers in the selected software houses found not following any stipulated and well structured mechanism. Success or failure was usually reportedly to be linked with getting work done in time and in budget with good feedback from end user about the product or service provided. Further communication was reported to be managed through emails and chatting software. The study found it rational as it remained in conformance with the agile approach for Project Management. However the study observed that software houses where formal templates for communication between staff were used had an edge over those where communication was managed in an agile manner. Like in LMKR every software developer had to fill a daily activity report on a half page form whereas in EVamp simple emails and chatting software were used. Although these practices were rational based on the size of the mentioned organizations, but still LMKR had gained many competitive advantages due to formal practice of communication. So these practices recommended in the literature were found useful for Project Management but not necessary for measuring project result in the industry.
About point 9 on page 86, keeping all these parameters simple initially the study found selected industry practically exercising this point as they used agile approach as a preference for keeping it simple. However it is a fact that the selected software houses declared themselves as learning organizations and they believed in reemploying an approach that had benefited them in their previous experience. Means agile never meant haphazard in any software house that this study selected. Agile in fact meant previously tested and flexible enough to be altered as required. Hence the study finds the recommendation in literature keeping the approach simple, useful for the project managers. As this has already been acknowledged by the industry, the study does not find it essential to evaluate this variable essentially. Moreover ease in the approach was not stated to be any quantitative determinant of the project success by the industry.

About point 10 on page 86, ensuring an exit strategy or a contingency plan, in the selected industry it was not believed to be any task for project managers responsible for IT projects. Mainly owners and finance departments were reported to be responsible for contingency planning. However project manager is responsible for this task under the context of risk management. As risk management is not any variable of interest of this study, therefore this study does not discuss this point any further.

For IT projects in Pakistan the Five Job Success Factors set by MUS 2006 were indeed found beneficial but conventionally the selected industry was reported not to measure project success in terms of these five parameters recommended by MUS 2006.

Experts in the selected IT industry did not agree to all the seven dimensions presented by Farthing (2006) for measuring the project success. The study observed that experts in the selected industry used to measure project success not in terms of any point suggested by Farthing (2006) in his study.

The selected IT industry overall declared project success as getting the project done such that it meets customer requirements in time, budget ensuring long term benefits
to organization. Project managers in successful software houses attributed various other intangible attributes to project success like lessons learnt, earned reputation etc.

**About The Nine Knowledge Areas:**

Next in context of the overall Project Management the researcher of this study observed and experienced as being a Project Manager, HR Manager and Management Representative (MR) in the mentioned industry, that all the nine knowledge areas recommended for project management were considered significant and applicable. However assigning all the knowledge areas to a single individual was not considered a rational practice. The role of project manager was learnt to be limited to practicing the knowledge areas of project scope, time, HR and stakeholder communication. The knowledge area of cost management was observed and experienced to be exercised by the top management of the software houses, their financial experts and project managers. The knowledge area of quality management for project was solely delegated to independently working software/product quality assurance department in the software houses that were large and had earned rich repute for being certified in quality standards set by ISO and CMMI. For the knowledge area Risk Management in no selected software house, this study found any established and experienced department for risk management. The mentioned IT industry as a whole was found at an embryonic stage in terms of risk management for the IT projects. Risk management was however observed to be performed by the sponsors of the project that were usually not the project managers. The knowledge area Procurement Management was found not delegated to the project manager at all in the selected IT industry. In this context, this study learnt that procurement management was assigned to the departments of administration and/or network support. These departments used to manage the procurement for the software house as well as for the projects in liaison with top management, stakeholders and the concerned project managers. In this regard, the study further learnt that for certain projects explicit procurement was not required, as software house had already invested in its establishment the facilities that certain projects required. That is how the study learnt that all the knowledge areas recommended by PMI (2004) for project management were applicable to project management but they may not be necessarily declared the job description or role of a
project manager alone. The study realized that restricting project manager’s role to limited number of the knowledge areas will guarantee better performance and efficiency. The study found it more rational, wise and pragmatic to delegate the knowledge areas to different departments.

Project managers Ilyas and Fahad (personal communication and continuous observation, 2006 to 2008) were responsible for an extremely important IT project titled Provisus. Earlier they had outperformed on a similar project titled Provident. Therefore, they were being relied on blindly. They spent over a year on Provisus that was a Telecom project costing over PKR 2 million per annum. They presented the interfaces and promo of Provisus in an international software exhibition held in France. There Vodafone invited them to install and test Provisus in Vodafone’s laboratory in London. After getting this excellent opportunity, both Ilyas and Fahad (personal communication and continuous observation, 2006 to 2008) started presenting lame excuses to avoid installation and testing at Vodafone. As result, the organization replaced them with project manager Siddiqui (personal communication, 2007 – 2008) without sacking the two project managers. Simultaneously Software Quality Manager Gillani (personal communication, 2007-2008) was hired to conduct quality assessment of Provisus. Both Siddiqui and Gillani (personal communication and observation, 2007 – 2008) apprised the management that Provisus had only been accomplished up to promo level and its backend was not strong enough to be tested at Vodafone. The study does not find mentioning rest of the details relevant to its title. It is true that the software house as a whole interpreted not to delegate Project Quality Management to the project manager who is in charge of any project. Resultantly the software house went through a structural change in which Software Quality Department was set to report to SVP Product Development instead of project manager.

This study similarly observed that project manager A. Khan (personal communication and observation, Oct 2007 – Jan 2008) was eager to conduct a Telecom project in different unsafe and war affected areas of Afghanistan. Project manager A. Khan (personal communication, Oct 2007 – Jan 2008) and Project Director T. Khan (personal communication and observation, Oct 2007 – Jan 2008) even visited various areas of Afghanistan to prepare feasibility of the said project and declared it
extremely profitable. The management of software house initially accepted the feasibility and initiated the project for Roshaan Telecom Operator in Afghanistan. Within two months, the project started suffering due to unpredictable flight delays and cancellations, bomb blasts in certain cities of workplace and the unexpected return of foreign stakeholders to their homelands. The software house learnt the lesson to establish a separate independent department of Risk Management for assessing feasibilities of all the future projects prior initiating them based on project managers report. That software house resultantly brought structural change in its hierarchy and department.

The facts that this study observed and experienced especially from Dec. 2006 to Jan. 2008 reinforced the interpretation that all knowledge areas better not be delegated to the project manager individually as stated in the existing framework for IT Project Management.
CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

Methodology

Study Setting

This is a correlational study conducted in the field (Non-Contrived manner). It targeted studying the performance of the IT project managers exercising selected HR management functions for their IT projects in the selected software houses and Telecom companies managing heterogeneous IT projects within the twin cities Rawalpindi and Islamabad of Pakistan, from Jul. 2005 to Jun. 2007.

Extent of Researcher’s Interference

As it is an ex-post de facto study researcher’s interference remained minimum to get unbiased and reliable data. However, during data collection for mitigating the probability of Garbage-In-Garbage-Out (GIGO), researcher’s interference remained necessary in following cases:

1. For filling the fields in the questionnaire 1 (provided under Annexure 3) used for this study with titles ‘Project Title’, ‘Project Type’, ‘Project Status’, ‘Project Duration’, ‘Software House/Organization’ and designation of the person who was to fill the rest of the questions about the selected independent and dependent variables. This was essential, as IT professionals in the mentioned IT industry remained careless in filling the mentioned fields of the questionnaire during the initial surveys. For this reason researcher had to request the concerned IT professionals of the software house/organization to
provide the data about the above mentioned fields for each and every selected IT project in sample before handing over the set of questionnaires to the team members of that IT project.

2. For getting the questionnaire refilled by the team members who filled questionnaire either carelessly (that is; kept on filling without concentrating on questions) or committed mistakes like double entries or no entry for any question in the questionnaire.

**Population**

The study set its population to be the groups of at least four IT professionals or more, undertaking considerable IT projects of different types and scopes within the selected software houses and telecom companies working within the cities of Islamabad and Rawalpindi, Pakistan. The study identified and selected its population based on the seven factors described next. As the data was collected in between March 2006 until May 2007, the study selected the IT projects that were accomplished recently; that is from Jan 2006 to Jun 2007. This was done to ensure most true and accurate figures (data) about IT projects. It got necessary for the reason that it was not possible to find accurate data about any project that had been accomplished before the mentioned time range because IT professionals remembered their recent projects better than those they had performed in the past.

To calculate the population size during the period Jan 2006 to Jun 2007 twenty-four (24) well-reputed software houses and telecom organizations working within Rawalpindi and Islamabad of Pakistan were identified and selected out of 66 companies visited during initial survey. Their details are provided in Table 3.4 in Annexure 6. From the selected 24 software houses or IT/Telecom companies, a total number of 85 IT projects were identified and selected for meeting the following seven conditions/factors completely:

1) IT Projects were heterogeneous in terms of project type/nature, project scope and team size.
2) Duration of IT Project must be at least one month or more and its due date of accomplishment was not beyond Jun 2007.

3) The scope of IT Project required a team size of minimum four or more human resources.

4) The IT Project had been properly documented.

5) Organization or software house was willing to provide data/information about IT Project/s.

6) Minimum four team members who worked on selected project that had been or was likely accomplished within Jan 2006 to Jun 2007 were available at the time of data collection for providing data about that project.

7) IT Project was reported to be affected by the quality of Human Resource Management at work environment by the project manager either positively or adversely.

Only 85 heterogeneous IT projects could be identified and selected from March 2006 to May 2007 in the selected 24 software houses and telecom companies meeting the aforementioned seven conditions. NCR, Elixir and Oratech were among the software houses that provided no information about their IT projects although they had potential subjects as described by their staff.

Variability in the selected population was very high. This fact indicated that a large sample size would have to be studied. Table 3.1 describes the quantitative values of different types of projects in the identified population.
Table 3.1 – Types of Selected IT Projects

1. Number of IT Projects of type ERP in selected population = 20
2. Number of IT Projects of type Database in selected population = 21
3. Number of IT Projects of type Telecom in selected population = 23
4. Number of IT Projects of type Others in selected population = 21

Total number of IT Projects in selected population = 85

Unit of Analysis

Groups of minimum four IT professionals that had worked on the selected accomplished IT projects as explained above essentially in different roles. The study ensured that one of the members in each selected group had been the Project Manager or at least Team Leader of the IT project responsible for building and leading the team for the project by exercising Human Resource Management functions.

Sampling Design

The study adopted Stratified Random Sampling. For this study as the size of identified and selected population was 85, for achieving 99% confidence with minimum possible error value in results, a sample size of 70 projects was selected ensuring presence of all the selected different types of IT projects (Sekaran, 2000). Table 3.2 provides the quantity of each selected type of the IT projects:

Table 3.2 – Type of IT Projects in Sample

1. Number of IT Projects of type ERP in sample = 14
2. Number of IT Projects of type Database in sample = 09
3. Number of IT Projects of type Telecom in sample = 22
4. Number of IT Projects of type Others in sample = 15
5. Number of IT Projects of type Hybrid in sample = 10

Total number of IT Projects in Sample = 70
The details of IT Projects included in sample of 70 are provided under Table 3.5 in Annexure 6.

The sample size 70 for a population of 85 was derived using following formula

\[ n = \frac{(K^2 S^2)}{\xi} \]

Where

- \( n \) = Sample Size
- \( \xi = K S_x \)
- \( K \) = Confidence Level
- \( S_x = \) Standard Error
- \( S = \) Standard Deviation (Sekaran, 2000)

**Time Schedule**

Although the time awarded for this study was set as June 2005 to June 2009, the researcher had started visiting the selected IT industry since Jan. 2005. The researcher collected facts as being an external member of the IT industry until Nov. 2006. Since Dec. 2006 to Jan. 2008, the researcher remained active part of the selected industry as being an internal entity in the capacity of a Project Manager and Head of HR. This period remained the best for practicing the knowledge gained and collecting the data and facts.

The data for this research was collected in between March 2006 to May 2007. As this study selected only the IT projects of different categories that had been or planned to be accomplished between Jan 2006 to Jun 2007, it was conducted as a cross-sectional study (Sekaran, 2000). Since Jun 2007, onwards the researcher concentrated energy in compiling the thesis.
**Approach for Conducting Data Analysis**

This study adopted the approach suggested by Sekeran (2000) in her book to perform the analysis of data that is described as under:

1. Validity tests to validate the instrument (Questionnaire) (Provided in same Chapter under next sections).
2. Finding Cronbach’s Alpha for measuring reliability of questionnaire (Provided in same chapter under next sections).
3. Calculating Frequency Distributions of the data.
4. Measuring Descriptive Statistics like Minimum, Maximum, Mean, Standard Deviation and Variance as the scale was Interval Scale.
5. Calculating Pearson Correlations Matrix minimum up to 1 or 2 tailed for testing hypotheses.
6. For testing Hypotheses, the study further applied regression based on each value of demographic variables project type, project scope and team size one by one. This is how the study tested the hypotheses applying regression 16 times on various sets of variables using SPSS 11.5, which could yield results of eleven cases only (Sekeran, 2000).
7. To test the overall model of this study Partial Least Square Regression was employed to verify the model. Partial Least Square Regression is an alternate technique for getting Structural Equation Modeling that was run using ‘Smart PLS 2.0 M3’ software on the data of this study.
8. To verify the results of regression tests, Pearson’s Correlations test and Co-linearity Diagnostic Analysis were conducted using SPSS.
Measurements

Adopting/Forming Questionnaires

This study formulated the first instrument (questionnaire) provided under Annexure 3 with title, ‘Questionnaire for Collecting Data for PhD Study’, based on the literature reviewed for this study. This questionnaire comprises of three sections.

Section 1 of this instrument is meant to collect demographic information about the selected IT projects including Project Title, Start Date, Scheduled End Date, Actual End Date, project type, project scope and information related to the person filling it like qualification of the team member, role in Project etc.

Section 2 of this questionnaire was titled ‘Measuring HRM Practices’ and it consisted of five questions meant for collecting data about the independent variables of this study using 5 values Interval Scale. This section was formulated by merging questions about each independent variable from five different pre-tested instruments available in different existing research articles/studies whose details are as under:

1. Question 1 under section 2 of this instrument was adopted from the study of Hackney and Kleiner (1994) for measuring that every task of IT project was assigned to the right person meant for that task.

2. Questions 2 and 4 under section 2 of this instrument were formulated based on parameters suggested in the studies by Eskildson with coauthors (2004) and Neill (2005) respectively. Questions 2 and 4 are respectively meant for measuring the deadlines set for each team member for every task of the IT project and the quantitative workload assigned to them.

3. Question 3 under section 2 of this instrument was adopted from the study of Pitt, Berthon, Robson and Mathew (2000) for measuring that during entire project life cycle the stakeholder communication remained up to the mark.
4. Question 5 under section 2 of this instrument was derived from the study of Dean and Kiu (2002) for measuring how frequent and well the performance monitoring was performed during entire project life cycle.

Section 3 of this questionnaire is titled Measuring Project’s Outcome/Result and it consists of one question meant for collecting data about the dependent variable of this study using 5 values Interval Scale. This section was formulated by directly adopting a question about Project Result from the study of Standing, Guilfoyle and coauthors (2006).

The study tested validity and reliability of the first instrument it derived. The validity and reliability measures for the first instrument are discussed next after the description of second instrument.

The second instrument (questionnaire) that is provided under Annexure 3 with title, ‘Questionnaire For Interviewing IT Professionals’, was formed based on the general practices recommended for IT project management provided in this thesis in its Chapters 1 and 2. This second questionnaire was not designed to collect any data for statistical analysis, but to collect facts about the population, sample and practices of IT professionals in the selected companies by interviewing them following a set of standard questions. The second instrument simply presents the minimum questions that the researcher utilized to extract facts about relevant practices at the selected software houses. In reality, the researcher did utilize more questions than the ten questions mentioned in this second instrument. However, these ten questions were necessarily used for ensuring uniform approach for finding facts in all the selected organizations. These ten questions were also not asked from each member in the selected group. The questions were asked only from the project manager or the senior most members. Physically this second questionnaire was not at all distributed among the subjects. The researcher just kept it during interviews as list of questions that should be asked. The information gathered through this second instrument is summarized in Tables 3.4 and 3.5 given in Annexure 6.
**Verifying Validity of the Instrument**

Decenzo and Robbins (2002) described validity is the proven relationship of a selection device to some relevant criterion. A website guided that, “validity may be tested in form of Content, Construct, Criterion, Concurrent and/or Predictive (2006)”, which depends on the case or situation that is being dealt. Definitions of these terms are provided under Annexure 1 (Glossary), however, the validity types applicable to this study are defined underneath as well.

Analyzing the nature of this study, Content Validity was found applicable for testing the validity of first instrument (Questionnaire) given under Annexure 3.

**Content Validity of The Instrument (First Questionnaire):**

Content validity determines whether the questionnaire adequately measures the concept (Sekaran, 2000). The questionnaire designed and used for this study with the following considerations:

1. First, it contained at least one question about each independent as well as dependent variable of this study that is extracted from literature from a pre-tested instrument. It further contained adequate fields for collecting data relevant to demographic aspects that the study required for analysis.

2. Second, the terms for each variable were formulated based on 5-point Interval Scale.

3. Third, the 5-point Interval Scale used for each term was coded appropriately as explained next under the topic ‘Coding of Data’ in this Chapter. The coding approach used by this study ensured addressing possible scenarios for all the independent as well as dependent variables.
Later the researcher consulted the advisor for examining it in terms of content validity. The supervisor rendered the instrument valid in terms of content validity. It was further confirmed by consulting couple of experts with the permission of the supervisor.

**Testing Reliability of Instrument Using Split-Half Analysis:**

As it was a correlational study, the questionnaire designed and used by this study was assessed in terms of convergent validity considering the following aspects:

1. After having the questionnaire designed, the study conducted a pilot study by collecting data about initial 20 projects.

2. The study considered section 2 of the instrument as one questionnaire giving data about independent variables and section 3 as the second questionnaire for dependant variable applying split-half analysis.

3. The study by merging the results of the two sections organized the data in SPSS sheet following its approach mentioned under next sections titled Verification of Data, Coding of Data, Editing Data and Categorizing Data.

4. The study applied the analysis approach as mentioned above and found the results reliable and correlated. The reliability measure of this instrument was found better than the instruments from which this study extracted it. Further, the result of Pearson correlation was better as compared with that of the instruments from which this study adopted different terms of this questionnaire.

5. The study therefore interpreted that the instrument was valid in terms of split half reliability test.
Testing Reliability of Instrument Using Cronbach’s Alpha

SPSS 11.5 was used to calculate the Cronbach’s Alpha Coefficient in order to determine how reliable the first instrument was over the data the study collected. Before applying Cronbach’s Alpha Reliability Measure, it was ensured that all items (independent variables) measuring the dependent variables were in the same direction; i.e., no negatively worded items were included from the questionnaire. The results generated by SPSS version 11.5 for reliability analysis is shown under following Table 3.3:

### Table 3.3 – Reliability of The Instrument

<table>
<thead>
<tr>
<th>Number of Cases</th>
<th>Number of Items</th>
<th>Value of Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>29</td>
<td>.9539</td>
</tr>
</tbody>
</table>

The Table is generated based on following formula:

\[
R_{tt} = \frac{n}{n-1} \left( SD^2_t - \sum SD^2_i \right) / SD^2_t
\]

Where:

- \( R_{tt} \) = Reliability coefficient of the test
- \( n \) = number of items in the test
- \( \sum (SD^2_i) \) = The sum of variance of item scores.
- \( SD^2_t \) = Variance of scores on the test.

The study interprets that the measuring instrument (questionnaire) was highly reliable (Alpha > 0.7) (Sekaran, 2000; Cooper and Schindler, 2003).

Data Collection Methods

Primary approach was to use two mentioned questionnaires in Annexure 3 to collect data about IT projects and personal interviews of the mentioned subjects respectively. Observing the documentation of selected IT project was secondary approach for the reason that software houses as per policy kept the documentation of their projects confidential.
Seventy (70) heterogeneous IT projects differing in terms of project type, scope and team size were identified and selected as explained above. For each IT project, the mentioned questionnaire was distributed to all the team members engaged in that project. This was practiced because from multiple opinions about every single IT project more realistic and true figures were likely to be achieved. Minimum researcher’s interference was incumbent to get the questionnaire refilled under cases where any team member/s filled the questionnaire without care. Table 3.5 in Annexure 6 provides the details of sample of size 70.

**Measures Observed For Collecting Realistic Data**

The study adopted following measures to ensure that only realistic data in acceptable form could be captured:

1. First, the team members of every project were requested not to share their answers with each other. Moreover, no filled questionnaire by any team member was made public to any other team member of same as well as different projects by the researcher.

2. No incompletely filled/answered questionnaire was included. For example if any team member skipped any question, s/he was requested to answer every question essentially. However, the blank Project Titles were accepted only for those projects for which software houses/Telecom organizations declared security and privacy concerns in advance.

3. No filled questionnaire with multiple answers for same question by same team member was accepted.

4. Proper instructions were clearly written in the header of the questionnaire (that is before the questions) about “How to Fill the Questionnaire?”
Verification of Data

Through this step, the study intended to interpret about every selected project whether it was a Successful Project or Suffering Project due to Good and Substandard HR Practices respectively. To achieve this purpose the following approaches of coding and editing the collected data were employed for only those sets of questionnaires that passed through the above mentioned data acceptability checks/measures.

Coding of Data

5 – Point Interval Scale was used for coding the weights given to all the independent variables of this study. Means to measure every independent variable following integer codes were assigned to measure how much good or bad they were performed:

- 5 for Performed Best
- 4 for Performed Above Average
- 3 for Performed Average
- 2 for Performed Below Average
- 1 for Performed Poor

For measuring all the elements of the dependent variable again 5 – Point Interval Scale was used with the following codes:

- 5 for Project Accomplished Very Successful
- 4 for Project Accomplished Successful
- 3 for Project Accomplished Averagely
- 2 for Project Accomplished a Little (More Suffering)
- 1 for Project Not At all Accomplished (Highly Suffering)

For measuring the demographic variables Project Type, Project Scope and Project Team Size different Nominal scales were used as shown in the questionnaire provided in Annexure 3.
**Editing of Data**

Using SPSS 11.5, the average of answers was calculated of a minimum four (4) team members and maximum seven (7) for questions relevant to each independent as well as dependent variable. This is how the study extracted one set of answers for each project and hence derived 70 sets of average data for heterogeneous projects. Consult Annexure 5 for reviewing the relevant data sheet.

**Categorization of Data**

The data set extracted for 70 heterogeneous IT projects was categorized based on the following demographic information:

1. Project Type (Telecom or Database or ERP or Other or Hybrid)
2. Project Team Size (4 or 5 or 6 or 7 team members)
3. Project Scope
   i. Small Scope (Requiring one month time to 3 months)
   ii. Large Scope (Requiring 3 months time to 6 months)
   iii. Very Large Scope (Requiring 6 months time to 1 year)
   iv. Extra Large Scope (Requiring more than year)

This categorization was performed so that regression test on each different category could be applied to interpret effectiveness of selected HR functions for different kinds of IT projects.
Challenges in the Study

Following challenges made this study more interesting:

1. Software houses and telecom organizations working in IT industry, Islamabad and Rawalpindi, Pakistan, as per policies were bound not to let the cat out of bag about IT projects to any person who had not been a stakeholder of those projects. Therefore, collecting data about IT project was most interesting challenge. For this purpose, first the consent of the top management of the selected software houses/Telecom Companies was achieved. Oratech, Elixir and NCR did not provide any information about their projects. However, IT professionals working in these companies agreed that quality of HRM functions practiced in their work environment by their project managers did affect IT projects.

2. Data about running IT projects were easily known to the IT professionals but data about IT projects accomplished in past were not remembered by the IT professionals very well. As the study is a cross sectional study, it included only the IT projects whose timeframe was scheduled between Jan 2006 to Jun 2007 since it was the most recent recallable period for IT professionals. As a second precaution, the study requested the selected subjects to consult the documentations of all the selected IT projects before filling the questionnaire. In reaction to this demand, the subjects were reluctant as they were too busy to re-open archived records of IT projects. To cope the issue the subjects were given as much time as they demanded so that they could consult the archived records before providing any data about the accomplished projects. This approach caused lot of delay in collecting data and required lot of patience as well.

3. Software houses and telecom companies were inclined to provide information only about the projects that remained successful as per this study. It was very challenging to extract correct information about IT projects that had suffered because of substandard HR practices, as most software houses and telecom
companies were reluctant to permit exploration of their mistakes. Secondly, certain software houses were ready to provide data without mentioning the title of IT projects, like LMKR, DPS and Makabu. The reason for hiding the titles of even successful projects was declared the strict policy of secrecy and privacy especially for those projects that were accomplished for sensitive defense organizations. For this reason, the study had to accept data without getting the field Project Title filled in the questionnaire projects out of the 70. The study accepted and included such title less IT projects data only if the type, scope, team size and results of such projects were not kept hidden. Second, the study found no objection in accepting data for IT projects without title, as it was not required for analyzing the data of that project using SPSS 11.5.

4. Next accurate data collection was another challenge to this study. Over 16 subjects for different projects simply filled the questionnaire without care, like IT professionals in Netsol, GulfNet, DPS and EVamp. For all such cases, this study requested the relevant subjects to refill new copies of questionnaire. This caused delay in data collection and non-cooperative attitudes of the concerned IT professionals.

The study presents Tables 3.4 and 3.5 in Annexure 6. These tables have been generated based on information collected through interviewing IT professionals working in the IT industry of Islamabad and Rawalpindi, Pakistan.
CHAPTER 4

THE DATA ANALYSES, RESULTS AND DISCUSSION

Introducing Variables As Used in SPSS

Frequency distributions were calculated for all the variables in this study using SPSS Version 11.5. Results of frequency distribution are shown from Table 4.2 onwards. Data from a sample of 70 projects were collected from 260 different respondents. Table 4.1 describes variables the study selected along with the weight of each. As sample size was 70, it is being found with every variable. Table 4.1 describes the titles this study gave to each variable that described as under:

*RightPersonIV1* – Represents the independent variable Assigning project tasks to right person

*TimeLinesIV2* – Represents the independent variable Setting rational timelines for team members

*StakeholderCommIV3* – Represents the independent variable Stakeholder communication plan

*WorkLoadIV4* – Represents the independent variable Assigning workload for team members

*PerformanceMonitoringIV5* – Represents the independent variable Monitoring performance of team members

*ProjectResultDV* – Represents the dependant variable project result/outcome

<table>
<thead>
<tr>
<th>Tables 4.1 – Project Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>Missing</td>
</tr>
</tbody>
</table>

120
## Analysis of Frequencies

**Frequency Table and Chart for Independent Variable: Assigning Task to Right Person**

### Table 4.2 – Right Person (Independent Variable 1)

<table>
<thead>
<tr>
<th>Values between 1 to 5</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Right Person for Job</td>
<td>1.33</td>
<td>1</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>1.67</td>
<td>1</td>
<td>1.4</td>
<td>1.4</td>
<td>2.9</td>
</tr>
<tr>
<td>Less Right Person for Job</td>
<td>2.33</td>
<td>2</td>
<td>2.9</td>
<td>5.7</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>7.1</td>
<td>7.1</td>
<td>12.9</td>
</tr>
<tr>
<td>2.67</td>
<td>3</td>
<td>4.3</td>
<td>4.3</td>
<td>17.1</td>
</tr>
<tr>
<td>Right Person for Job</td>
<td>3.33</td>
<td>5</td>
<td>7.1</td>
<td>7.1</td>
</tr>
<tr>
<td>3.67</td>
<td>7</td>
<td>10.0</td>
<td>10.0</td>
<td>37.1</td>
</tr>
<tr>
<td>More Right Person for Job</td>
<td>4.33</td>
<td>23</td>
<td>32.9</td>
<td>32.9</td>
</tr>
<tr>
<td>4.67</td>
<td>8</td>
<td>11.4</td>
<td>11.4</td>
<td>91.4</td>
</tr>
<tr>
<td>Most Right Person for Job</td>
<td>5.33</td>
<td>6</td>
<td>8.6</td>
<td>8.6</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>
To formulate and interpret Table 4.2 this study utilized following codes for different possible values of the independent variable RightPersonIV1:

- Not Right Person for Job as 1
- Less Right Person for Job as 2
- Right Person for Job as 3
- More Right Person for Job as 4
- Most Right Person for Job as 5

The above mentioned frequencies Table 4.2 and Figure 4.1 revealed that out of the selected 70 IT projects of different types 17.1% IT projects had substandard HR practices while 82.9% had good HR practices for the independent variable Assigning Tasks to Right Person. Value 3.0 is interpreted as Right Person for the job. Lesser the value than 3.0, more inappropriate the selection and utilization of right person for the project job. On the other hand more the value towards 5.0 more the use of right person for the project job. These quantitative figures indicate that in the selected sample majority of the projects were supported with right persons for their tasks.
**Frequency Table and Chart for Independent Variable: Setting Time Limits for Human Resources**

Table 4.3 – Time Lines (Independent Variable 2)

<table>
<thead>
<tr>
<th>Values between 1 to 5</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor Time Management for HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.33</td>
<td>5</td>
<td>7.1</td>
<td>7.1</td>
<td>7.1</td>
</tr>
<tr>
<td>1.67</td>
<td>3</td>
<td>4.3</td>
<td>4.3</td>
<td>11.4</td>
</tr>
<tr>
<td>Improvable Time Management for HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.33</td>
<td>6</td>
<td>8.6</td>
<td>8.6</td>
<td>21.4</td>
</tr>
<tr>
<td>2.67</td>
<td>4</td>
<td>5.7</td>
<td>5.7</td>
<td>27.1</td>
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<tr>
<td>Satisfactory Time Management for HR</td>
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</tr>
<tr>
<td>3.33</td>
<td>12</td>
<td>17.1</td>
<td>17.1</td>
<td>52.9</td>
</tr>
<tr>
<td>3.67</td>
<td>5</td>
<td>7.1</td>
<td>7.1</td>
<td>60.0</td>
</tr>
<tr>
<td>Good Time Management for HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.33</td>
<td>9</td>
<td>12.9</td>
<td>12.9</td>
<td>88.6</td>
</tr>
<tr>
<td>4.67</td>
<td>2</td>
<td>2.9</td>
<td>2.9</td>
<td>91.4</td>
</tr>
<tr>
<td>Excellent Time Management for HR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.00</td>
<td>6</td>
<td>8.6</td>
<td>8.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
To formulate and interpret Table 4.3, this study utilized following codes for different possible values of the independent variable TimeLinesIV2:

- Poor Time Management for HR as 1
- Improvable Time Management for HR as 2
- Satisfactory Time Management for HR as 3
- Good Time Management for HR as 4
- Excellent Management for HR as 5

The above-mentioned frequencies Table 4.3 and Figure 4.2 revealed that out of the selected 70 IT projects of different types 27.1% IT projects had substandard HR practices while 72.9% had good HR practices for the independent variable Setting Deadlines for Team Members (Human Resources). Value 3.0 is interpreted as Satisfactory Time Management for HR. Lesser the value than 3.0 more inappropriate the time management for HR. On the other hand, more the value towards 5.0, better the time management for HR. So for 72.9% of the selected IT projects, project managers planned effective time management for the team members.
Frequency Table and Chart for Independent Variable: Stakeholder Communication Management

Table 4.4 – Stakeholder Communication (Independent Variable 3)

<table>
<thead>
<tr>
<th>Values between 1 to 5</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor Stakeholder Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.33</td>
<td>2</td>
<td>2.9</td>
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<td>2.9</td>
</tr>
<tr>
<td>1.67</td>
<td>4</td>
<td>5.7</td>
<td>5.7</td>
<td>8.6</td>
</tr>
<tr>
<td>Improvable Stakeholder Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.33</td>
<td>6</td>
<td>8.6</td>
<td>8.6</td>
<td>17.2</td>
</tr>
<tr>
<td>2.67</td>
<td>5</td>
<td>7.1</td>
<td>7.1</td>
<td>24.3</td>
</tr>
<tr>
<td>Satisfactory Stakeholder Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.33</td>
<td>3</td>
<td>4.3</td>
<td>4.3</td>
<td>32.9</td>
</tr>
<tr>
<td>3.67</td>
<td>4</td>
<td>5.7</td>
<td>5.7</td>
<td>42.9</td>
</tr>
<tr>
<td>Effective Stakeholder Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.33</td>
<td>13</td>
<td>18.6</td>
<td>18.6</td>
<td>61.5</td>
</tr>
<tr>
<td>4.67</td>
<td>17</td>
<td>24.3</td>
<td>24.3</td>
<td>85.8</td>
</tr>
<tr>
<td>Most Effective Stakeholder Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>5.7</td>
<td>5.7</td>
<td>91.5</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
To formulate and interpret Table 4.4 this study utilized following codes for different possible values of the independent variable StakehldeCommIV3:

- Poor Stakeholder Communication as 1
- Improvable Stakeholder Communication as 2
- Satisfactory Stakeholder Communication as 3
- Effective Stakeholder Communication as 4
- Most Effective Stakeholder Communication as 5

The above-mentioned frequencies Table 4.4 and Figure 4.3 revealed that out of the selected 70 IT projects of different types 28.6% IT projects had substandard HR practices while 71.4% had good HR practices for the independent variable Stakeholder Communication. Value 3.0 is interpreted as satisfactory stakeholder Communication. More the value towards 5.0, better the stakeholder communication for project is. Whereas values becoming lesser and lesser than 3.0, indicated that stakeholder communication for project requires more improvement. For 71.4% of the projects in selected sample, project managers maintained satisfactory communication.
**Frequency Table and Chart for Independent Variable: Setting**

**Quantitative Work Load for Human Resources**

Table 4.5 – Workload (Independent Variable 4)

<table>
<thead>
<tr>
<th>Values between 1 to 5</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor Workload Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.33</td>
<td>1</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>1.67</td>
<td>4</td>
<td>5.7</td>
<td>5.7</td>
<td>7.1</td>
</tr>
<tr>
<td>Improvable Workload Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.33</td>
<td>3</td>
<td>4.3</td>
<td>4.3</td>
<td>14.3</td>
</tr>
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<td>2.67</td>
<td>5</td>
<td>7.1</td>
<td>7.1</td>
<td>21.4</td>
</tr>
<tr>
<td>Satisfactory Workload Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.33</td>
<td>11</td>
<td>15.7</td>
<td>15.7</td>
<td>45.7</td>
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<tr>
<td>3.67</td>
<td>2</td>
<td>2.9</td>
<td>2.9</td>
<td>48.6</td>
</tr>
<tr>
<td>Effective Workload Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.33</td>
<td>14</td>
<td>20.0</td>
<td>20.0</td>
<td>95.7</td>
</tr>
<tr>
<td>Most Effective Workload Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.3</td>
<td>3</td>
<td>4.3</td>
<td>4.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
To formulate and interpret Table 4.5, this study utilized following codes for different possible values of the independent variable WorkLoadIV4:

- Ineffective Workload Management as 1
- Improvable Workload Management as 2
- Satisfactory Workload Management as 3
- Effective Workload Management as 4
- Most Effective Workload Management as 5

The above-mentioned frequencies Table 4.5 and Figure 4.4 revealed that out of the selected 70 IT projects of different types 21.4% IT projects had substandard HR practices while 78.6% had good HR practices for the independent variable Setting Quantitative load on Team Members. Value 3.0 is the indicator of satisfactory quantitative workload management. Lesser the value than 3.0 more the improvement required for quantitative workload management for HR of projects. On the other hand more the value towards 5.0 more effective the quantitative workload management. In the selected sample 78.6% project were benefited for satisfactory workload management for its team members.
## Frequency Table and Chart for Independent Variable: Performance Monitoring of Human Resources

**Table 4.6 – Performance Monitoring (Independent Variable)**

<table>
<thead>
<tr>
<th>Values between 1 to 5</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ineffective Performance Monitoring</td>
<td>1</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>1.50</td>
<td>3</td>
<td>4.3</td>
<td>4.3</td>
<td>5.7</td>
</tr>
<tr>
<td>Improvable Performance Monitoring</td>
<td>6</td>
<td>8.6</td>
<td>8.6</td>
<td>14.3</td>
</tr>
<tr>
<td>2.50</td>
<td>6</td>
<td>8.6</td>
<td>8.6</td>
<td>22.9</td>
</tr>
<tr>
<td>Satisfactory Performance Monitoring</td>
<td>13</td>
<td>18.6</td>
<td>18.6</td>
<td>41.4</td>
</tr>
<tr>
<td>3.50</td>
<td>6</td>
<td>8.6</td>
<td>8.6</td>
<td>50.0</td>
</tr>
<tr>
<td>Effective Performance Monitoring</td>
<td>19</td>
<td>27.1</td>
<td>27.1</td>
<td>77.1</td>
</tr>
<tr>
<td>4.50</td>
<td>8</td>
<td>11.4</td>
<td>11.4</td>
<td>88.6</td>
</tr>
<tr>
<td>Most Effective Performance Monitoring</td>
<td>8</td>
<td>11.4</td>
<td>11.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
To formulate and interpret Table 4.5, this study utilized following codes for different possible values of the independent variable PerformanceMonitoringIV5:

- Ineffective Performance Monitoring as 1
- Improvable Performance Monitoring as 2
- Satisfactory Performance Monitoring as 3
- Effective Performance Monitoring as 4
- Most Effective Performance Monitoring as 5

The above-mentioned frequencies Table 4.6 and Figure 4.5 revealed that out of the selected 70 IT projects of different types 22.9% IT projects had substandard HR practices while 78.1% had good HR practices for the independent variable Performance Monitoring. Value 3.0 is interpreted as satisfactory performance monitoring. Lesser the value than 3.0 lesser the good practice of performance monitoring for projects, whereas more the value towards 5.0 better the performance monitoring. So for overall 22.9% of 70 projects remained deprived from satisfactory practice of performance monitoring.
**Frequency Table for Dependent Variable: Result of Project**

**Table 4.7 – Project Result (Dependent Variable)**

<table>
<thead>
<tr>
<th>Values between 1 to 5</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Badly Failed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>1.4</td>
<td>1.4</td>
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<tr>
<td>1.50</td>
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<td>1.4</td>
<td>1.4</td>
<td>2.9</td>
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<tr>
<td>1.67</td>
<td>4</td>
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<td>1.83</td>
<td>2</td>
<td>2.9</td>
<td>2.9</td>
<td>11.4</td>
</tr>
<tr>
<td>Project Failed</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.17</td>
<td>2</td>
<td>2.9</td>
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</tr>
<tr>
<td>2.50</td>
<td>6</td>
<td>8.6</td>
<td>8.6</td>
<td>30.0</td>
</tr>
<tr>
<td>2.83</td>
<td>3</td>
<td>4.3</td>
<td>4.3</td>
<td>34.3</td>
</tr>
<tr>
<td>Satisfactory Project Completion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.17</td>
<td>3</td>
<td>4.3</td>
<td>4.3</td>
<td>41.4</td>
</tr>
<tr>
<td>3.33</td>
<td>1</td>
<td>1.4</td>
<td>1.4</td>
<td>42.9</td>
</tr>
<tr>
<td>3.50</td>
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</tr>
<tr>
<td>3.67</td>
<td>4</td>
<td>5.7</td>
<td>5.7</td>
<td>50.0</td>
</tr>
<tr>
<td>3.83</td>
<td>2</td>
<td>2.9</td>
<td>2.9</td>
<td>52.9</td>
</tr>
<tr>
<td>Effective Project Completion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.17</td>
<td>12</td>
<td>17.1</td>
<td>17.1</td>
<td>84.3</td>
</tr>
<tr>
<td>4.33</td>
<td>3</td>
<td>4.3</td>
<td>4.3</td>
<td>88.6</td>
</tr>
<tr>
<td>4.67</td>
<td>3</td>
<td>4.3</td>
<td>4.3</td>
<td>92.9</td>
</tr>
<tr>
<td>4.83</td>
<td>1</td>
<td>1.4</td>
<td>1.4</td>
<td>94.3</td>
</tr>
<tr>
<td>Excellent Project Completion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.83</td>
<td>1</td>
<td>1.4</td>
<td>1.4</td>
<td>94.3</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
To formulate and interpret Table 4.7 this study utilized following codes for different possible values of the dependent variable ProjectResultDV:

- Project Badly Failed as 1
- Project Failed as 2
- Satisfactory Project Completion as 3
- Effective Project Completion as 4
- Excellent Project Completion as 5

The above-mentioned frequencies Table 4.7 and Figure 4.6 revealed that of the selected 70 IT projects of different types 34.3% IT projects suffered for substandard HR practices while 65.7% remained successful for good HR practices. 3.0 is interpreted as the threshold value for at least satisfactory completion of project. Lesser the value than 3.0 closer the project result to failure is. On the other hand more the value towards 5.0, better the accomplishment of project. These figures indicate that about 46 projects remained successful while 24 suffered in the selected sample due to quality of HR practices.
Descriptive Statistics

Descriptive statistics like maximum, minimum, means, standard deviations and variance were obtained for the 5 points interval-scaled independent and dependent variables. The results are shown in the following Table 4.8:

**Descriptive Statistics**

<table>
<thead>
<tr>
<th>Table 4.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>RightPersonIV1</td>
</tr>
<tr>
<td>TimeLinesIV2</td>
</tr>
<tr>
<td>StakeHolderCommIV3</td>
</tr>
<tr>
<td>WorkLoadIV4</td>
</tr>
<tr>
<td>PerformanceMonitoringIV5</td>
</tr>
<tr>
<td>ProjectResultDV</td>
</tr>
</tbody>
</table>

Table 4.8 exhibits the following facts

Variance of RightPersonIV1 (0.804) is lower than its Standard Deviation (0.89653), which indicates that most respondents remained close to the mean for this variable. The mean value is 3.8571. This implies that for the selected sample 70 IT projects the variable Assigning Task of Project to Right Person was performed with an average quality (more than 3.5 and standard deviation < 1.0). This implies that in the selected industry project managers were conscious about selecting the right person for their projects. As the study operationalized right person as qualified, experienced and compatible personality for project, the results indicate that the selected software houses used to identify right person based on the mentioned traits. As 66.6% projects remained successful for good HR practices (Table 4.7) for following the mentioned approach of identifying the right person for job, the study finds defining right person based on relevant and compatible qualification, experience and personality the hallmark for good staffing for the projects.
Variance of TimeLinesIV2 (1.058) is bit greater than its Standard Deviation (1.02879) that indicates that most respondents did not remain close to the mean for this variable. The mean value is 3.3857. This implies that for the selected sample of 70 IT projects the variable TimeLinesIV2 was performed with a quality under average rating (mean less than 3.5 with standard deviation > 1.0) (Sekaran, 2000; Cooper and Schindler, 2003). This implies that in the selected industry project manager required to improve their skills of managing and assigning timelines to the team members. This indicates that the level of motivation, challenge and rationality in the timelines assigned to the team members was overall improvable in the industry. 34.3% projects out of a sample of 70 (Table 4.7) were reportedly affected overall.

Variance of StakeHolderCommIV3 (1.220) is greater than its Standard Deviation (1.10445) that indicates that most respondents did not remain close to the mean for this variable. The mean value is 3.5. This implies that for the selected sample of 70 IT projects the variable StakeHolderCommIV3 was performed with a quality less than the average (mean is 3.5 with standard deviation > 1.0) for overall 70 projects in the selected sample. This implies that stakeholder communication required to be improved in the selected industry. Table 4.4 has already indicated that for 28.8% projects the stakeholder communication practices were substandard.

Variance of WorkloadIV4 (0.772) is slightly less than its Standard Deviation (0.87860), which indicates that most respondents remained close to the mean for this variable. The mean value is 3.5143. This implies that for the selected sample of 70 IT projects the variable WorkloadIV4 was performed with an above average quality practice (more than 3.5 and standard deviation < 1.0). This indicates that the workload management for the projects in the selected sample was overall appropriate in the industry. It indicates that the team members were assigned tasks that were challenging, motivating and rational (compatible to their skill set) adequately.
Variance of PerformanceMonitoringIV5 (1.040) is slightly higher than its Standard Deviation (1.0197) that indicates that most respondents did not remain close to the mean for this variable. The mean value is 3.4929. This implies that for the selected sample of 70 IT projects the variable PerformanceMonitoringIV5 was performed with quality less than average rating (mean less than 3.5 with standard deviation > 1.0) (Sekeran, 2000; Cooper and Schindler, 2003). Hence project managers could have performed better monitoring in the industry for the over projects. This gap in the performance monitoring indicates that project managers were not frequently reviewing the performance of the team members compromising on the quality.

Variance of ProjectResultDV (1.087) is higher than its Standard Deviation (1.04259) that indicates that most respondents did not remain close to the mean for this variable. The mean value is 3.3929. This implies that for the selected sample of 70 IT projects the dependant variable ProjectResultDV had rating a bit lower than average success (Standard Deviation > 1.0). Result of Project (the dependant variable) is found close to Satisfactory Completion (mean above 3.0). However, its standard deviation is greater than 1.0 in comparison with that of the HR functions (the independent variables) Timelines for HR, Stakeholder Communication and Performance Monitoring. This study therefore, interprets that among the selected HR functions (independent variables) as quality of performance in three mentioned HR functions remained slightly below average, these caused the Project Result to be slightly below Satisfactory level of completion. However, as quality of performance for Right Person Selection and Workload Management HR functions remained above average, the Project Result got a mean greater than 3.0. This indicates that each selected HR function impacts the Project Result in terms of the quality with which they are overall performed during the project life cycle.
Hypotheses Testing

This study formulated six hypotheses mentioned in Chapter 1. To test each hypothesis the study employed following three approaches:

1. Pearson Correlation

2. Regression

3. Partial Least Square Regression (Alternate approach for Structured Equation Modeling)

It is mentioned in Chapter 3 that this study type was co-relational. For this reason to learn and confirm the correlations between independent and dependent variables, Pearson coefficient of correlation was measured using SPSS 11.5. Next this study applied regression between five independent and one dependent variables based on different values of the demographic variables project type, project scope and team size using SPSS version 11.5. The study utilized regression for two reasons. First is to test the sixth hypothesis of this study that could not be tested and substantiated using Pearson coefficient of correlation. Second is to learn the impact and relative importance of each and every independent variable onto project result. Last this study utilized Partial Least Square Regression to verify the substantiation of its overall model covering all six hypotheses using “Smart PLS 2.0 M3” software.

In summary this study substantiated its first five hypotheses using Pearson coefficient of correlation while the sixth hypothesis got substantiated using regression analysis. Later this study verified the substantiation of all six hypotheses applying Partial Least Square Regression. The results of regressions based on various demographics variables and their respective analyses are given after the description of Pearson correlation in this Chapter.
Measuring Inferential Statistics
(Calculating Pearson Correlations)

The Pearson Correlation matrix was obtained for the five point interval-scaled five independent variables (selected HR functions) and one dependent variable (Project result/Outcome) using SPSS 11.5. It is shown in Table 4.9 after its relevant discussion.

Note that in every bi-variate correlation the value of Pearson coefficient in the range of values 0.4 to 0.7 has been used to interpret the correlations among variables as slight to Strong (High) provided P Value is not greater than 0.05 (Sekaran, 2000; Cooper and Schindler, 2003). As per Table 4.9 this study has interpreted the following facts:

‘Assigning Task to Right Person’ is perceived to be fairly correlated with Project Result (Pearson coefficient = 0.625 and P < 0.000 in Table 4.9). In Chapter 1 the study presented the hypothesis number H1 stating the more the practice of assigning tasks to the right person (Job to right person), the greater the prospects for Project Success (PS). As Table 4.9 shows that the two mentioned variables are fairly correlated; therefore, the study interpreted that project result is dependent on to ‘Assigning Task to Right Person’. Thus the study substantiates the mentioned hypothesis number H1.

Setting Deadlines is discovered to be fairly correlated with Project Result (Pearson coefficient = 0.610 and P < 0.000 in Table 4.9). In Chapter 1 the hypothesis number H2 stated if timelines for team members (TL) were set more rationally, greater were the chances for Project Success (PS). As Pearson correlation between the two variables under discussion is fair this indicates that the project result (dependent variable) is dependent on to ‘Setting Deadlines’. Thus the study substantiates the mentioned hypothesis number H2.

Table 4.9 indicates that Stakeholder Communication and Project Result are highly correlated (Pearson value = 0.718 and P < 0.000 in Table 4.9). According to
hypothesis number H3 presented in Chapter 1 better the Stakeholder communication (SC), greater the chances for Project Success are (PS). As Pearson correlation between the two variables under discussion is very high it indicates that project result highly depends on better quality of stakeholder communication. Thus the study substantiates the mentioned hypothesis number H3.

Table 4.9 further reveals that Quantitative Workload and Project Result are highly correlated (Pearson value = 0.670 and P < 0.000 in Table 4.9). Hypothesis number H4 was presented in Chapter 1 stating more rational the quantitative load (QL) of assignments on each team member, greater are the prospects for Project Success (PS). A high value of Pearson correlation indicates that project result highly depends on rationality in the quantitative workload on employees. Thus the study substantiates the mentioned hypothesis number H4.

Table 4.9 indicates that Performance Monitoring and Project Result are strongly correlated (Pearson Correlation = 0.723 and P < 0.000 in Table 4.9). Hypothesis number H5 in Chapter 1 stated more the regularity and quality in performance monitoring (PM), more the chances for Project Success (PS). A high correlation indicates that project result highly depends on performance monitoring. Thus the study substantiates the mentioned hypothesis number H5.

From the above-mentioned discussion about Table 4.9 it is noted the result (success or suffering) of IT project depends more on quantitative workload, managing stakeholder communications effectively and monitoring performance of team members. Simultaneously result (success or suffering) of IT project is fairly coupled with selecting right persons for project tasks and setting the timelines for them during the entire project life cycle. This interpretation helps in perceiving that the hypothesis number H6 mentioned under Chapter 1 is also logical that states better the quality of practice of all selected HR functions, greater the prospects of Project Success (PS) will be. However, before substantiating the hypothesis number H6 the study found it more rational to test it using regression.

Table 4.9 further indicates that the independent variables are also positively correlated with each other with different magnitude of correlations. Like RightPersonIV1 is
slightly correlated with TimeLinesIV2, StakeHolderCommIV3 and PerformanceMonitoringIV5 (Pearson Correlation >= 0.4 and P = 0.000) and not correlated with WorkLoadIV4 (Pearson Correlation <= 0.4 and P = 0.000). Similarly all the independent variables are slightly correlated with each other (Pearson Correlation >= 0.4 and P = 0.000 in Table 4.9) except that of RightPersonIV1 with WorkLoadIV4. This implies that the independent variables that this study selected are also slightly correlated with each other. It indicates that if right persons are selected, timelines, stakeholder communication and performance monitoring are automatically going to be better for the project. Although the study did not target proving correlation between the independent variables, but the correlations between the overall five HR functions reinforces the model of the study which is yet to be tested using regression analysis. Nevertheless WorkLoadIV4 is not correlated with RightPersonIV1 but it is significantly correlated with all the other independent variables and therefore this fact renders it considerable.

Table 4.9 by providing slight correlations among the independent and dependent variables of this study indicates that the model of the theoretical framework of the study is constituted using logically related independent variables. This finding is the first essential result based on which the hypothesized model of this study in form of the theoretical framework gets eligible to be tested using regression analysis for further confirmation of the impact of HR management functions on the project’s result. Further no two independent variables are strongly correlated that indicates the Co-linearity among the independent variables likely to be acceptable. However to confirm it the study applied Co-linearity Diagnostic test using SPSS for assuring that regression is applicable on the data. The regression analysis is discussed next after Table 4.9 and the Co-linearity Diagnostic is discussed after the result of regression Table 4.20.
# Pearson’s Coefficient of Correlations

**Table 4.9**

<table>
<thead>
<tr>
<th>Pearson’s Coefficient of Correlations</th>
<th>RightPersonIV1</th>
<th>TimeLinesIV2</th>
<th>StakeHoldersCommIV3</th>
<th>WorkLoadIV4</th>
<th>Performance MonitoringIV5</th>
<th>ProjectResultIVDV</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RightPersonIV1</strong></td>
<td>1</td>
<td>.476(**)</td>
<td>.514(**)</td>
<td>.397(**)</td>
<td>.498(**)</td>
<td>.625(**)</td>
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<tr>
<td>Pearson Correlation</td>
<td></td>
<td></td>
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<tr>
<td>Sig. (2-tailed)</td>
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</tr>
<tr>
<td><strong>TimeLinesIV2</strong></td>
<td>.476(**)</td>
<td>1</td>
<td>.443(**)</td>
<td>.565(**)</td>
<td>.410(**)</td>
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<tr>
<td>Pearson Correlation</td>
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<tr>
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<td>.000</td>
<td>.000</td>
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<td><strong>StakeHoldersCommIV3</strong></td>
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<td>.443(**)</td>
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<td>.587(**)</td>
<td>.702(**)</td>
<td>.718(**)</td>
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<tr>
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<td>.000</td>
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<tr>
<td><strong>WorkLoadIV4</strong></td>
<td>.397(**)</td>
<td>.565(**)</td>
<td>.587(**)</td>
<td>1</td>
<td>.616(**)</td>
<td>.670(**)</td>
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<td>Pearson Correlation</td>
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<tr>
<td><strong>Performance MonitoringIV5</strong></td>
<td>.498(**)</td>
<td>.410(**)</td>
<td>.702(**)</td>
<td>.616(**)</td>
<td>1</td>
<td>.723(**)</td>
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<td>Sig. (2-tailed)</td>
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<tr>
<td><strong>ProjectResultIVDV</strong></td>
<td>.625(**)</td>
<td>.610(**)</td>
<td>.718(**)</td>
<td>.670(**)</td>
<td>.723(**)</td>
<td>1</td>
<td>70</td>
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<tr>
<td>Pearson Correlation</td>
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<tr>
<td>Sig. (2-tailed)</td>
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<td>.000</td>
<td>.000</td>
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</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).**
Regressions Results Based on Project Types

*Regression Table for Project Type Database*

Coefficient, Standard Error in Parenthesis, t-value in brackets and P-Value in italic

Table 4.10

<table>
<thead>
<tr>
<th></th>
<th>Constant</th>
<th>Right Person (IV1)</th>
<th>Time Lines (IV2)</th>
<th>Stakeholder Communication (IV3)</th>
<th>Work Load (IV4)</th>
<th>Monitoring Performance (IV5)</th>
<th>R Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.519</td>
<td>0.251</td>
<td>0.270</td>
<td>0.258</td>
<td>-0.171</td>
<td>0.494</td>
<td>0.895</td>
<td>16.318</td>
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<td></td>
<td>(0.607)</td>
<td>(0.458)</td>
<td>(0.338)</td>
<td>(0.343)</td>
<td>(0.558)</td>
<td>(0.715)</td>
<td></td>
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<tr>
<td></td>
<td>[-0.855]</td>
<td>[0.547]</td>
<td>[0.798]</td>
<td>[0.750]</td>
<td>[-0.306]</td>
<td>[0.692]</td>
<td></td>
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<tr>
<td></td>
<td>0.441</td>
<td>0.613</td>
<td>0.469</td>
<td>0.495</td>
<td>0.775</td>
<td>0.527</td>
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<td>0.009</td>
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</table>

Table 4.10 is the result of running regression between all the five independent variables (HR functions) that this study selected, with the dependent variable project result/outcome for only those types of projects that were database related. The overall analysis indicated that collectively all the five HR functions (independent variables) significantly affected the result of IT projects of type Database (P < 0.05, F = 16.318, R² > 0.7 and Standard error < 1.0).

The results in Table 4.10 indicate that individual β coefficients for all the independent variables remain positive except that of independent variable number 4 the Workload (β = -0.171). This implies that the project result of IT projects of type database is positively correlated with all the independent variables but not dependant with the independent variable Workload.

Further Table 4.10 reveals the relative importance of each independent variable through its respective t value. For project result of IT projects of type database, independent variable number 2 Time Lines has highest relative importance (t = 0.798) whereas the Workload was not found significant(t = -0.306) (Sekaran, 2000; Cooper and Schindler, 2003).
Table 4.10 further clarifies that the impact of all the independent variables are individually not significant on the project result of project type database (P > 0.05). However, the collective role of all the five independent variables plays a vital role in the determination of project outcome of IT project of type database (P = 0.009).

Thus from the above mentioned discussion the study interprets that its hypothesis number H6 stating the better the quality of practice of all selected HR functions, the greater the prospects of Project Success (PS) is applicable for the IT projects of type database. Thus the study considers hypothesis number H6 substantiated for IT projects of type database. The study interprets that the impact of each independent variable individually is not significant (P > 0.05) but their collective quality practice holds good significance for project success.
**Regression Table for Project Type ERP**

Coefficient, Standard Error in Parenthesis, t-value in brackets and P-Value in italic

**Table 4.11**

<table>
<thead>
<tr>
<th></th>
<th>Constant</th>
<th>Right Person (IV1)</th>
<th>Time Lines (IV2)</th>
<th>Stakeholder Communication (IV3)</th>
<th>Work Load (IV4)</th>
<th>Monitoring Performance (IV5)</th>
<th>R Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-1.810</td>
<td>0.327</td>
<td>-0.21</td>
<td>0.336</td>
<td>0.704</td>
<td>0.031</td>
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<td>(0.487)</td>
<td>(0.268)</td>
<td>(0.424)</td>
<td>(0.331)</td>
<td>(0.565)</td>
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</tr>
<tr>
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<td>[-1.450]</td>
<td>[0.671]</td>
<td>[-0.079]</td>
<td>[0.793]</td>
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<td>0.78</td>
<td>0.958</td>
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</tbody>
</table>

Table 4.11 is the result of running regression between all the five independent variables (HR functions) that this study selected with the dependant variable project result/outcome for only those types of projects that were ERP related. The overall analysis indicated that collectively all the five HR functions (selected independent variables) significantly affected the result of IT projects of type ERP (P < 0.05, F = 12.138, R² = 0.835 and Standard error < 1.0).

The results in Table 4.11 indicate that individual β coefficients for all the independent variables remain positive except that of independent variable number 2 the Timelines (β = -0.21). Thus it is evident that project result of IT projects of type ERP is positively correlated with all the independent variables. However, it is not strongly dependent onto independent variable Timelines.

Table 4.11 clarifies that the impact of all the independent variables are individually not very significant on to the project result of project type ERP (P > 0.05). However, the collective role of all the five independent variables plays a vital role in the determination of project outcome of IT project of type ERP (P = 0.004).

Table 4.11 reveals the relative importance of each independent variable through its respective t value. For project result of IT projects of type ERP, independent variable Workload has highest relative importance (t = 2.125) whereas the independent
variable Timelines remained insignificant \( t = -0.079 \) (Sekaran, 2000; Cooper and Schindler, 2003).

From the above mentioned discussion the study interprets that its hypothesis number H6 stating the better the quality of practice of all selected HR functions, the greater the prospects of Project Success (PS) are applicable for the IT projects of type ERP. Thus the study considers hypothesis number H6 substantiated for IT projects of type ERP. However the impact of each independent variable individually is not significant but their collective practice makes them useful.
Regression Table for Project Type Telecom

Coefficient, Standard Error in Parenthesis, t-value in brackets and P-Value in italic

Table 4.12

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
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<td>0.376</td>
</tr>
<tr>
<td>Right Person</td>
<td>0.203</td>
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<td>0.119</td>
</tr>
<tr>
<td>Time Lines</td>
<td>0.066</td>
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<td>0.64</td>
</tr>
<tr>
<td>Stakeholder Communication</td>
<td>0.242</td>
<td>1.326</td>
<td>0.202</td>
</tr>
<tr>
<td>Work Load (IV4)</td>
<td>0.093</td>
<td>0.638</td>
<td>0.532</td>
</tr>
<tr>
<td>Monitoring Performance (IV5)</td>
<td>0.507</td>
<td>2.557</td>
<td>0.020</td>
</tr>
<tr>
<td>R Square</td>
<td>0.812</td>
<td>19.947</td>
<td>0.000</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.12 is the result of running a regression across all the five independent variables (HR functions) that this study selected with the dependant variable project result/outcome for only those types of projects that were related to Telecom. The overall analysis indicates that collectively all five HR functions (independent variables) very much affect the result of IT projects of type Telecom (P < 0.05, F = 19.947, R² > 0.7 and Standard error < 1.0).

The results in Table 4.12 indicate that individual β coefficients for all the independent variables remain positive. Thus it is apparent that project result of IT projects of type Telecom is positively correlated with all the independent variables.

Further Table 4.12 reveals the relative importance of each and every independent variable through its respective t value. For project result of IT projects of type database, independent variable number 5 Performance Monitoring has highest relative importance (t = 2.557) whereas the least important independent variable for such IT projects happens to be Timelines (t = 0.476).

Table 4.12 further clarifies that the impact of all the independent variables is individually not significant on to the project result of project type Telecom (P > 0.05). However, the collective impact of all the five independent variables play extremely vital role in the determination of project outcome of IT project of type Telecom (P = 0.000) (Sekaran, 2000; Cooper and Schindler, 2003).
Thus from the above-mentioned discussion the study interprets that its hypothesis number H6 stating the better the quality of practice of all selected HR functions, the greater the prospects of Project Success (PS) are applicable for the IT projects of type Telecom. Thus the study considers hypothesis number H6 substantiated for IT projects of type Telecom. The impact of each independent variable individually is not significant for project result but it is their collective exercise that makes all of them useful for the project success.
Regression Table for Project Type Other

Coefficient, Standard Error in Parenthesis, t-value in brackets and P-Value in italic

Table 4.13

<table>
<thead>
<tr>
<th>Constant</th>
<th>Right Person (IV1)</th>
<th>Time Lines (IV2)</th>
<th>Stakeholder Communication (IV3)</th>
<th>Work Load (IV4)</th>
<th>Monitoring Performance (IV5)</th>
<th>R Square</th>
<th>F</th>
</tr>
</thead>
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<tr>
<td>-2.520</td>
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<td>0.600</td>
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<td>0.026</td>
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<td>5.599</td>
</tr>
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</table>

Table 4.13 is the result of running a regression on all five independent variables (HR functions) that this study selected with the dependant variable project result/outcome for only those types of projects declared others. Here other means IT projects not of the types that have been mentioned so far and whose type was specifically unique like 3 Dimensional Graphic. The overall analysis indicates that collectively all the five HR functions (independent variables) significantly affect the result of IT projects of type ‘other’ (P < 0.05, F = 5.599, R² = 0.622 and Standard error < 1.0).

The results in Table 4.13 indicate that individual β coefficients for all the independent variables remain positive. Thus results show that IT projects of type ‘other’ are positively correlated with all the independent variables.

Further Table 4.10 reveals the relative importance of each independent variable through its respective t value. For project result of IT projects of type database, independent variable number 3 Stakeholder Communication has highest relative importance (t = 2.118) whereas the least important independent variable for other types of projects remained the Performance Monitoring (t = 0.117).

Like various types of project Table 4.13 clarifies that the impact of all the independent variables is individually not very significant on to the project result of project type others (P > 0.05). However, the collective role of all five independent
variables plays a vital role in the determination of project outcome of IT project of type others (P = 0.013) (Sekaran, 2000; Cooper and Schindler, 2003).

From the above mentioned discussion the study interprets that its hypothesis number H6 stating the better the quality of practice of all selected HR functions, the greater the prospects of Project Success (PS) is applicable for IT projects with specific type called “other” in this study. Thus, the study considers hypothesis number H6 substantiated for IT projects of type “other”. The impact of each independent variable individually is not significant. However the exercise of all the independent variables is found significant for the project outcome of the projects of type “Others”.

Regression Table for Project Type Hybrid

Coefficient, Standard Error in Parenthesis, t-value in brackets and P-Value in italic

Table 4.14

<table>
<thead>
<tr>
<th>Constant</th>
<th>Right Person (IV1)</th>
<th>Time Lines (IV2)</th>
<th>Stakeholder Communication (IV3)</th>
<th>Work Load (IV4)</th>
<th>Monitoring Performance (IV5)</th>
<th>R Square</th>
<th>F</th>
</tr>
</thead>
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<tr>
<td>-1.679</td>
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<tr>
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<td>0.894</td>
<td>0.073</td>
<td>0.115</td>
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</tbody>
</table>

Table 4.14 is the result of running regression between all the five independent variables (HR functions) that this study selected with the dependent variable project result/outcome for only those types of projects that categorized as hybrid. Here hybrid means IT projects of multiple types together. The overall analysis indicated that collectively all the five HR functions (independent variables) had no significant impact on to the result of IT projects of type hybrid (P = 0.060), (F = 5.609) and (R² > 0.7). It is clear from Table 4.14 that the significance of each independent variable individually is further not significant on to the project result of hybrid projects (P > 0.05). Thus, from the above mentioned discussion the study interprets that its hypothesis number H6 stating the better the quality of practice of all selected HR functions, the greater the prospects of Project Success (PS) is not applicable for the IT projects of type ‘hybrid’. Thus, the study does not substantiate hypothesis H6 for IT projects of type ‘hybrid’ only.

The results in Table 4.14 indicate that individual $\beta$ coefficients for all the independent variables remain positive except that of independent variable number 3 the stakeholder communication ($\beta = - 0.025$) and independent variable number 5 performance monitoring ($\beta = - 0.688$). Thus this study interprets that project result of IT projects of hybrid type is positively correlated with the independent variables number 1, 2 and 4. Simultaneously project result of hybrid projects is not a function of the independent variables stakeholder communication and performance monitoring.
Further Table 4.14 reveals the relative importance of each and every independent variable through its respective $t$ value. For project result of IT projects of hybrid type, independent variable number 2 Time Lines has highest relative importance ($t = 2.648$) whereas the least positively important independent variable happens to be Right Person ($t = 2.174$). Simultaneously, stakeholder communication and performance monitoring do not possess any relative importance for determining the result of hybrid type of project (Sekaran, 2000; Cooper and Schindler, 2003).
Regressions Based on Project Scope

Regression Table for Project Scope Small (1 to 3 months period)

Coefficient, Standard Error in Parenthesis, t-value in brackets and P-Value in italic

Table 4.15

<table>
<thead>
<tr>
<th>Constant</th>
<th>Right Person (IV1)</th>
<th>Time Lines (IV2)</th>
<th>Stakeholder Communication (IV3)</th>
<th>Work Load (IV4)</th>
<th>Monitoring Performance (IV5)</th>
<th>R Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>-6.380</td>
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<td>0.116</td>
<td>0.861</td>
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<td>1.788</td>
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<td>(0.258)</td>
<td>(0.191)</td>
<td>(0.446)</td>
<td>(0.205)</td>
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</tr>
<tr>
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<td>[0.564]</td>
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<td></td>
</tr>
<tr>
<td>0.070</td>
<td>0.058</td>
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<td>0.293</td>
<td>0.629</td>
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</tbody>
</table>

Table 4.15 is the result of running regression between all the five independent variables (HR functions) that this study selected with the dependant variable project result/outcome for only those IT projects that had small scope (1 to 3 months). The overall analysis indicates that collectively all the five HR functions (independent variables) do not significantly affect the result of IT projects with small scope (P > 0.05), (F = 9.653) and (R² > 0.861). It is further clear from Table 4.15 that the impact of each independent variable individually is not significant on to the project result of project of small scope (P > 0.05). Thus this study interprets that its hypothesis number H6 stating the better the quality of practice of all selected HR functions, the greater the prospects of Project Success (PS) is not applicable for the IT projects of small scope (P > 0.05).

The results in Table 4.15 indicate that individual β coefficients for three independent variables remain positive while it is negative for independent variables Time lines (β = -0.078) and Workload (β = -0.632). Thus the project result of small scope IT projects is positively correlated with all the independent variables except that of Timelines and Workload.
Further Table 4.15 reveals the relative importance of each and every independent variable through its respective t value. For project result of IT projects of small scope, independent variable number 1 Right Person has highest relative importance (t = 3.981) whereas the least positively important independent variable happens to be Performance Monitoring (t = 0.564) (Sekaran, 2000; Cooper and Schindler, 2003).
**Regression Table for Project Scope Large (3 to 6 months period)**

Coefficient, Standard Error in Parenthesis, t-value in brackets and P-Value in italic

<table>
<thead>
<tr>
<th>Constant</th>
<th>Right Person (IV1)</th>
<th>Time Lines (IV2)</th>
<th>Stakeholder Communication (IV3)</th>
<th>Work Load (IV4)</th>
<th>Monitoring Performance (IV5)</th>
<th>R Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.743</td>
<td>0.422</td>
<td>0.308</td>
<td>0.273</td>
<td>0.089</td>
<td>0.056</td>
<td>0.620</td>
<td>8.833</td>
</tr>
<tr>
<td>(0.699)</td>
<td>(0.184)</td>
<td>(0.134)</td>
<td>(0.200)</td>
<td>(0.196)</td>
<td>(0.203)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[-1.062]</td>
<td>[2.293]</td>
<td>[2.297]</td>
<td>[1.362]</td>
<td>[0.456]</td>
<td>[0.274]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.301</td>
<td>0.033</td>
<td>0.033</td>
<td>0.189</td>
<td>0.654</td>
<td>0.787</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.16 is the result of running regression between all the five independent variables (HR functions) that this study selected with the dependant variable project result/outcome for only those IT projects that had large scope (3 to 6 months). The overall analysis indicates that collectively all the five HR functions (independent variables) significantly can affect the result of IT projects with large scope (P < 0.05), (F = 8.833), (R² > 0.620) and (Standard error < 1.0). It is clear from Table 4.16 that the impact of the independent variables individually is not significant on to the project result of project of large scope (P > 0.05) except that of Right person and Timelines (P <0.05). However, the collective role of all the five independent variables play extremely vital role in the determination of project outcome of large scope IT project (P = 0.000).

The results in Table 4.16 indicate that individual β coefficients for all the five independent variables remain positive. Thus this study interprets that project result of large scope IT projects is positively and strongly correlated with all the independent variables.

Further Table 4.16 reveals the relative importance of each and every independent variable through its respective t value. For project result of IT projects of large scope, independent variable number 2 Timelines has highest relative importance (t = 2.297) whereas the least positively important independent variable happens to be Performance Monitoring (t = 0.274) (Sekaran, 2000; Cooper and Schindler, 2003).
From the above mentioned discussion the study interprets that its hypothesis number H6 stating the better the quality of practice of all selected HR functions, the greater the prospects of Project Success (PS) are applicable for the IT projects of large scope. Thus the study substantiates its hypothesis number H6 for IT projects of large scope. The impact of independent variables 1 (Right Person) and 2 (Timelines) individually is very high but that of other independent variables are not significant. Further as the relative importance of all five independent variables remained high, the study interprets that for IT projects with large scope all its six substantiated hypotheses are applicable.
Regression Table for Project Scope Very Large (6 to 12 months period)

Coefficient, Standard Error in Parenthesis, t-value in brackets and P-Value in italic

Table 4.17

<table>
<thead>
<tr>
<th>Constant</th>
<th>Right Person (IV1)</th>
<th>Time Lines (IV2)</th>
<th>Stakeholder Communication (IV3)</th>
<th>Work Load (IV4)</th>
<th>Monitoring Performance (IV5)</th>
<th>R Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.079</td>
<td>0.051</td>
<td>0.027</td>
<td>0.125</td>
<td>0.632</td>
<td>0.281</td>
<td>0.818</td>
<td>15.346</td>
</tr>
<tr>
<td>(0.698)</td>
<td>(0.259)</td>
<td>(0.203)</td>
<td>(0.272)</td>
<td>(0.269)</td>
<td>(0.258)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[-0.114]</td>
<td>[-.195]</td>
<td>[0.136]</td>
<td>[0.458]</td>
<td>[2.351]</td>
<td>[1.089]</td>
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<td></td>
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<tr>
<td>0.912</td>
<td>0.849</td>
<td>0.895</td>
<td>0.656</td>
<td>0.038</td>
<td>0.299</td>
<td></td>
<td></td>
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</table>

Table 4.17 is the result of running regression between all the five independent variables (HR functions) that this study selected with the dependent variable project result/outcome for only those IT projects that had very large scope (6 to 12 months). The overall analysis indicates that collectively all the five HR functions (independent variables) significantly can affect the result of IT projects with very large scope (P < 0.05), (F = 15.346), (R² > 0.818) and (Standard error < 1.0). It is clear from Table 4.17 that the impact of all the independent variables individually is not significant on the project result of project of very large scope (P > 0.05) except that of Workload (P < 0.05). However, the collective role of all the five independent variables play extremely vital role in the determination of project outcome of large scope IT project (P = 0.000).

The results in Table 4.17 indicate that individual β coefficients for all the five independent variables remain positive. Thus this study interprets that project result of large scope IT projects is positively and strongly correlated with all the independent variables.

Further Table 4.17 reveals the relative importance of each and every independent variable through its respective t value. For project result of IT projects of large scope, independent variable number 4 Workload has highest relative importance (t = 2.351) whereas the least positively important independent variable happens to be...
Performance Monitoring (t = 1.089). The study further learnt that for very large scope IT projects, independent variable 1 Right Person is individually not important (t = -0.195) (Sekaran, 2000; Cooper and Schindler, 2003).

From the above mentioned discussion the study interprets that its hypothesis number H6 stating the better the quality of practice of all selected HR functions, the greater the prospects of Project Success (PS) are applicable for the IT projects of very large scope. Thus the study substantiates its hypothesis number H6 for IT projects of very large scope. The impact of all independent variables individually is not high except that of Workload, but they all are relatively important for the result of project of very large scope except the right person. Thus the study interprets that for IT projects with very large scope all its six substantiated hypotheses are applicable.
Regression Table for Project Scope Extra Large (More than a year)

Coefficient, Standard Error in Parenthesis, t-value in brackets and P-Value in italic

Table 4.18

<table>
<thead>
<tr>
<th></th>
<th>Constant</th>
<th>Right Person (IV1)</th>
<th>Time Lines (IV2)</th>
<th>Stakeholder Communication (IV3)</th>
<th>Work Load (IV4)</th>
<th>Monitoring Performance (IV5)</th>
<th>R Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-1.115</td>
<td>0.106</td>
<td>0.096</td>
<td>0.399</td>
<td>0.516</td>
<td>0.151</td>
<td>0.697</td>
<td>9.741</td>
</tr>
<tr>
<td></td>
<td>(0.770)</td>
<td>(0.185)</td>
<td>(0.218)</td>
<td>(0.184)</td>
<td>(0.286)</td>
<td>(0.238)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>[-1.448]</td>
<td>[0.575]</td>
<td>[0.442]</td>
<td>[2.166]</td>
<td>[1.807]</td>
<td>[0.632]</td>
<td></td>
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<tr>
<td></td>
<td>0.170</td>
<td>0.574</td>
<td>0.665</td>
<td>0.048</td>
<td>0.092</td>
<td>0.537</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.18 is the result of running regression between all the five independent variables (HR functions) that this study selected with the dependant variable project result/outcome for only those IT projects that had extra large scope (more than a year). The overall analysis indicates that collectively all the five HR functions (independent variables) significantly can affect the result of IT projects with very large scope (P < 0.05, F = 9.741, R² > 0.697 and Standard error < 1.0). It is clear from Table 4.18 that the impact of all the independent variables individually is not significant on to the project result of project of very large scope (P > 0.05) except that of Stakeholder Communication (P < 0.05). However the collective role of all the five independent variables play extremely vital role in the determination of project outcome of extra large scope IT project (P = 0.000).

The results in Table 4.18 indicate that individual β coefficients for all the five independent variables remain positive. Thus the project result of large scope IT projects is positively and strongly correlated with all the independent variables.

Further Table 4.18 reveals the relative importance of each and every independent variable through its respective t value. For project result of IT projects of extra large scope, independent variable number 3 Stakeholder Communication has highest relative importance (t = 2.166) whereas the least positively important independent variable happens to be Timelines (t = 0.442) (Sekaran, 2000; Cooper and Schindler, 2003).
From the above mentioned discussion the study interprets that its hypothesis number H6 stating the better the quality of practice of all selected HR functions, the greater the prospects of Project Success (PS) are applicable for the IT projects of extra large scope. Thus the study substantiates its hypothesis number H6 for IT projects of extra large scope. The impact of all independent variables individually is not high except that of Stakeholder Communication, but they all are relatively important for the result of project of extra large scope. Thus the study interprets that for IT projects with extra large scope all its six substantiated hypotheses are applicable.
Regressions Based on Team Size That Performed Project

Regression Table for Project Team Size 4

Coeficient, Standard Error in Parenthesis, t-value in brackets and P-Value in italic

Table 4.19

<table>
<thead>
<tr>
<th>Constant</th>
<th>Right Person (IV1)</th>
<th>Time Lines (IV2)</th>
<th>Stakeholder Communication (IV3)</th>
<th>Work Load (IV4)</th>
<th>Monitoring Performance (IV5)</th>
<th>R Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.540</td>
<td>.163</td>
<td>.294</td>
<td>.309</td>
<td>.237</td>
<td>.081</td>
<td>.732</td>
<td>19.028</td>
</tr>
<tr>
<td>(.530)</td>
<td>(.196)</td>
<td>(.120)</td>
<td>(.332)</td>
<td>(.181)</td>
<td>(.166)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[-1.018]</td>
<td>[.834]</td>
<td>[2.449]</td>
<td>[2.441]</td>
<td>[1.307]</td>
<td>[.489]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>.318</td>
<td>.411</td>
<td>.021</td>
<td>.021</td>
<td>.0202</td>
<td>.629</td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.19 is the result of running regression between all the five independent variables (HR functions) that this study selected with the dependent variable project result/outcome for projects where team size was 4. The overall analysis indicates that collectively all the five HR functions (independent variables) significantly affect the result of IT projects where team size is 4 (P < 0.05, F = 19.028, R² > 0.7 and Standard error < 1.0) (Sekeran, 2000; Cooper and Schindler, 2003).

The results in Table 4.19 indicate that individual β coefficients for all the independent variables remain positive. Thus this study interprets that project result of IT projects where team is minimum 4 is positively correlated with all the independent variables.

Further Table 4.19 reveals the relative importance of each and every independent variable through its respective t value. For project result of IT projects of type database, independent variable number 2 Timelines has highest relative importance (t = 2.449) whereas the least important independent variable happens to be Performance Monitoring (t = 0.489).
Table 4.19 further clarifies that the impact of three out of five independent variables is individually not significant on to the project result where team size is 4 (\( P > 0.05 \)). Stakeholder Communication and Timelines have however, significant impact individually (\( P = 0.021 \)). Further the collective role of all the five independent variables plays a vital role in the determination of project outcome of IT project of type database (\( P = 0.00 \)).

Thus, from the above mentioned discussion the study interprets that its hypothesis number H6 stating better the quality of practice of all selected HR functions, greater the prospects of Project Success (PS) are applicable for the IT projects where team size is 4. Thus the study considers hypothesis number H6 substantiated for mentioned IT projects. Although the impact of each independent variable individually is not very high but their relative importance makes them considerable. Further as the relative importance of all independent variables remained positive, the study is confident that all its substantiated six hypotheses are applicable for IT projects with team size 4.
Regression Table for Project Team Size 5

Coefficient, Standard Error in Parenthesis, t-value in brackets and P-Value in italic

Table 4.20

<table>
<thead>
<tr>
<th>Constant</th>
<th>Right Person (IV1)</th>
<th>Time Lines (IV2)</th>
<th>Stakeholder Communication (IV3)</th>
<th>Work Load (IV4)</th>
<th>Monitoring Performance (IV5)</th>
<th>R Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.491</td>
<td>.152</td>
<td>.061</td>
<td>.094</td>
<td>.290</td>
<td>.525</td>
<td>.794</td>
<td>20.3</td>
</tr>
<tr>
<td>(.604)</td>
<td>(.138)</td>
<td>(.132)</td>
<td>(.155)</td>
<td>(.148)</td>
<td>(.181)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[-.812]</td>
<td>[1.101]</td>
<td>[.463]</td>
<td>[.611]</td>
<td>[1.956]</td>
<td>[2.897]</td>
<td></td>
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</tr>
<tr>
<td>.426</td>
<td>.284</td>
<td>.648</td>
<td>.548</td>
<td>.065</td>
<td>.009</td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.20 is the result of running regression between all the five independent variables (HR functions) that this study selected with the dependant variable project result/outcome for projects where team size was 5. The overall analysis indicates that collectively all the five HR functions (independent variables) significantly affect the result of IT projects where team size is 4 (P < 0.05, F = 20.30, R² > 0.7 and Standard error < 1.0).

The results in Table 4.20 indicate that individual β coefficients for all the independent variables remain positive. Thus, this study interprets that project result of IT projects where team is minimum 5 is positively correlated with all the independent variables.

Further Table 4.20 reveals the relative importance of each and every independent variable through its respective t value. For project result of IT projects of type database, independent variable number 5 Performance Monitoring has highest relative importance (t = 2.897) whereas the least important independent variable happens to be Timelines (t = 0.463) (Sekeran, 2000; Cooper and Schindler, 2003).

Table 4.20 further clarifies that the impact of four out of five independent variables is individually not significant on to the project result where team size is 5 (P > 0.05) except than that of Performance Monitoring. However the collective role of all the
five independent variables plays a vital role in the determination of project outcome of IT project of type database \((P = 0.00)\).

Thus, from the above-mentioned discussion the study interprets that its hypothesis number H6 stating better the quality of practice of all selected HR functions, greater the prospects of Project Success (PS) are applicable for the IT projects where team size is 5. Thus the study considers hypothesis number H6 substantiated for mentioned IT projects. Although, the impact of each independent variable individually is not very high but their relative importance makes them considerable. Further as the relative importance of all independent variables remained positive, the study is confident that all its substantiated six hypotheses are applicable for IT projects with team size 5 and above.

**Interpretation of Regression Tests**

Tables 4.10 to 4.20 already indicate that every single independent variable happens insignificant for project outcome, but if all the independent variables were employed, project outcome was found to be function of the quality with which these independent variables are practiced. This implies that the correlation among the selected independent and dependent variables gets significant only if hypothesis H6 remains substantiated which stated that the better the quality of practice of all the selected HR functions, the greater the prospects of Project Success. The study hence interprets that through regression substantiation of its hypotheses H1 to H5 are subject to the substantiation of its hypothesis H6. If H6 is applicable for any given project, all other hypotheses remain applicable like in all cases except projects of type Hybrid (Non Unique) and Small Scope. On the other hand if hypothesis H6 remains unsubstantiated, all other hypotheses from H1 to H5 automatically get rejected. Next the study verified its interpretation of regression results through employing Pearson’s Correlation between selected independent variables and factors of Project Outcome, using PLS Regression and finally the Co-linearity Diagnostic Test of its model,
Verifying Interpretation of Regression Results

**Pearson’s Correlations between Selected HR Functions (Independent Variables) and Each Element of the Outcome of Project (Dependant Variables)**

Table 4.21

<table>
<thead>
<tr>
<th>Correlations</th>
<th>RightPerson IV1</th>
<th>TimeLinesIV2</th>
<th>StakeHoldsCommIV3</th>
<th>WorkLoadIV4</th>
<th>Performance MonitoringIV5</th>
<th>ProejctinBudget</th>
<th>ProejctinTime</th>
<th>ProjectOganizational Benefit</th>
<th>ProejctUserSatisfaction</th>
<th>OtherAspects1</th>
<th>OtherAspects2</th>
</tr>
</thead>
<tbody>
<tr>
<td>RightPersonIV1</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>.476</td>
<td>.514</td>
<td>.468</td>
<td>.520</td>
<td>.579</td>
<td>.579</td>
<td>.480</td>
<td>.579</td>
<td>.644</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.001</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
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<td>70</td>
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</tr>
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<td>Pearson Correlation</td>
<td>.476</td>
<td>1</td>
<td>.443</td>
<td>.565</td>
<td>.410</td>
<td>.529</td>
<td>.507</td>
<td>.527</td>
<td>.515</td>
<td>.525</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
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<td>.000</td>
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<td>.000</td>
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<td>.711</td>
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<td>WorkLoadIV4</td>
<td>Pearson Correlation</td>
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<td>.548</td>
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<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
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<td>.410</td>
<td>.702</td>
<td>.616</td>
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<td>.588</td>
<td>.595</td>
<td>.863</td>
<td>.672</td>
<td>.811</td>
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<td>.000</td>
<td>.000</td>
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<td>.000</td>
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<td>.000</td>
<td>.000</td>
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<td>ProjectinBudget</td>
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<td>.000</td>
<td>.000</td>
<td>.000</td>
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<td>.480</td>
<td>.507</td>
<td>.565</td>
<td>.716</td>
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<td>.621</td>
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<td>.633</td>
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**Correlation is significant at the 0.01 level (2-tailed).**

As the results in Tables 4.10 to 4.20 of the regression analysis based on different demographics proved that the conceptualized model of this study is applicable for mostly the projects with large scope, large team size and unique type without having any independent variable significant singularly. This implies that all the five independent variables are necessary for project management and singularly anyone of them has no significant regression on project outcome despite being correlated. To
verify this further the study considered it necessary to test the correlation between all the single elements of the dependent variable project result with each independent variable again. This micro level analysis of correlation was necessary to confirm the importance of the independent variables in single capacity in terms of correlation and not regression. Table 4.21 summarizes the following correlations between each element of outcome/result of project and the selected HR functions as follow:

1. Project outcome in terms of project within budget is loosely coupled with assigning project tasks to right person (Pearson’s value > 0.4 and Pearson’s value < 0.7 and P =0.000).

2. Project outcome in terms of project within budget is slightly correlated with setting rational time lines for human resources working on project (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P =0.000).

3. Project outcome in terms of project within budget is slightly dependent on maintaining regular and effective stakeholder communication (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P =0.000).

4. Project outcome in terms of project within budget is slightly correlated with setting quantitative workload on the team members of the project (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P =0.000).

5. Project outcome in terms of project within budget is slightly correlated with regular performance monitoring of the team members of the project (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P =0.000).

6. Project outcome in terms of project within allocated time is slightly correlated with assigning project tasks to right person (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P =0.000).

7. Project outcome in terms of project within allocated time is slightly dependent on setting rational time lines for human resources working on project (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P =0.000).
8. Project outcome in terms of project within allocated time is loosely correlated with maintaining regular and effective stakeholder communication (Pearson’s value > 0.4 and Pearson’s value < 0.7 and P = 0.000).

9. Project outcome in terms of project within allocated time is slightly correlated with setting quantitative workload on the team members of the project (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P = 0.000).

10. Project outcome in terms of project within allocated time is slightly correlated with regular performance monitoring of the team members of the project (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P = 0.000).

11. Project outcome in terms of organizational benefits is considerably correlated on assigning project tasks to right person (Pearson’s value > 0.6 and Pearson’s value < 0.7 and P = 0.000).

12. Project outcome in terms of organizational benefits is slightly correlated with setting rational time lines for human resources working on project (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P = 0.000).

13. Project outcome in terms of organizational benefits is slightly correlated with maintaining regular and effective stakeholder communication (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P = 0.000).

14. Project outcome in terms of organizational benefits is slightly correlated with setting quantitative workload on the team members of the project (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P = 0.000).

15. Project outcome in terms of organizational benefits is considerably correlated with regular performance monitoring of the team members of
16. Project outcome in terms of more user satisfaction is loosely correlated with assigning project tasks to right person (Pearson’s value > 0.4 and Pearson’s value < 0.7 and P =0.000).

17. Project outcome in terms of more user satisfaction is slightly correlated with setting rational time lines for human resources working on project (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P =0.000).

18. Project outcome in terms of more user satisfaction is highly correlated with maintaining regular and effective stakeholder communication (Pearson’s value > 0.7 and P =0.000).

19. Project outcome in terms of more user satisfaction is considerably correlated with setting quantitative workload on the team members of the project (Pearson’s value > 0.6 and Pearson’s value < 0.7 and P =0.000).

20. Project outcome in terms of more user satisfaction is considerably correlated with regular performance monitoring of the team members of the project (Pearson’s value > 0.6 and Pearson’s value < 0.7 and P =0.000).

21. Project outcome in terms of other benefits is slightly dependent on assigning project tasks to right person (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P =0.000).

22. Project outcome in terms of other benefits is fairly correlated with setting rational time lines for human resources working on project (Pearson’s value > 0.5 and Pearson’s value < 0.7 and P =0.000).
23. Project outcome in terms of other benefits is highly correlated with maintaining regular and effective stakeholder communication (Pearson’s value > 0.7 and P = 0.000).

24. Project outcome in terms of other benefits is considerably correlated with setting quantitative workload on the team members of the project (Pearson’s value > 0.6 and Pearson’s value < 0.7 and P = 0.000).

25. Project outcome in terms of other benefits is considerably dependent on regular performance monitoring of the team members of the project (Pearson’s value > 0.6 and Pearson’s value < 0.7 and P = 0.000) (Sekaran, 2000; Cooper and Schindler, 2003).

Figure 4.7 summarizes the correlations between each independent variable with every element of dependent variable based on Pearson Correlation values. A solid arrow-line means considerable correlation whereas dashed arrow-line represents weak correlation in Figure 4.7.
Figure 4.7 – Presenting Pearson’s Correlation among Variables

Legend
Dashed Line means weak correlation.
The thicker the line, the stronger the dependency/correlation
Weight of correlation is given on its respective line

(Designed by Researcher using MS Words and SPSS)
This study operationalized its selected dependent variable Project Outcome/Result using following elements as depicted under Figure 4.7, Annexure 2 (operational definition) and theoretical framework under Chapter 1.

Project Result/Outcome is a combination of being:

1. Accomplished within approved budget;
2. Accomplished within allocated time;
3. Guarantees higher end-user satisfaction;
4. Great organizational benefit (like reputation etc.); and
5. Other benefits (like long term clientele etc.)

Accomplishing any project within the approved budget is usually the primary target of project managers in industry. Figure 4.7, Table 4.21 and points 1 to 5 (Page 164) indicate that the project result of any IT project for getting accomplished within the approved budget is slightly correlated with four selected independent variables of this study excluding the first (selecting right person). This implies that the quality of practice of all the five selected independent variables, provided under Table 4.1, of this study affects accomplishing an IT project within approved budget.

It is significant for project success to achieve the product it targets in the allocated time. Points 6 to 10 explaining Table 4.21 (Pages 164 - 165) and relevant portion of Figure 4.7 indicate that any IT project for getting accomplished within allocated time is slightly correlated with four independent variables this study selected excluding the Stakeholder Communication. With Stakeholder Communication this success factor of the project is loosely coupled but not too weak to be neglected. Hence the point 6 to 10 indicate that to accomplish any project within allocated time, the four independent variables play more significant role while for this factor Stakeholder Communication is not essentially required when all other four are performed with good quality.
Other than saving cost and time, organizations intend to gain much organizational level benefits like improved reputation, long term clientele, winning competitive edge in the market etc. Next from the points 11 to 15 explaining Table 4.21 (Page 165) and the relevant aspect in Figure 4.7 indicate that for gaining organizational benefits through accomplishing any IT project, selecting the right person for project’s tasks and regular monitoring of performance play more important role. The remaining three independent variables affect the factor organizational benefits while being slightly correlated. This implies that for organizational benefits that any software house intends to achieve through accomplishing any of its IT project, it should ensure good quality practice of the five selected HR functions during the life cycle of that project.

User satisfaction is a major hallmark of measuring any project’s success. Figure 4.7, Table 4.21 and relevant points 16 to 20 (Page 166) indicate that to achieve user’s satisfaction through the end product of an IT project, other than first independent variable Right Person, rest of all the four HR functions that this study selected play important role. Workload management and monitoring performance are more correlated in this regard. End users are usually not aware who is doing the project’s task, hence a weak correlation between Right Person and User Satisfaction seems logical. A weak correlation of one variable with one factor does not imply that it is useless as this independent variable is important for other factors of the project success. Therefore it is wise implying that the overall quality of practice of all five HR functions (selected independent variables) plays significant role in ensuring user’s satisfaction by accomplishing IT project for them.

Software houses did target other benefits through project outcome like further contracts from same client and joint venture with competitive leaders in the industry for future projects. Table 4.21, relevant aspect in Figure 4.7 and points 21 to 25 (Pages 166 - 167) indicate selecting right person for project’s tasks and setting timelines for the resources are slightly correlated while the other three are fairly correlated with achieving other benefits from the projects. The magnitude of the correlations is although not same for all the independent variables, but none is weakly correlated. Hence all the five HR functions of HR selected as independent variables play a vital role ensuring gain of other benefits for the organization.
From the above mentioned discussion it is evident that the selected independent variables are correlated with different elements of the project outcome in different magnitude. If one independent variable is weakly correlated with one factor, it is fairly correlated with another project success factor like Stakeholder Communication. The inconsistent magnitudes of correlation between independent variables and the factors based on which Project Outcome (dependent variable) has been operationalized, prove the originality and genuineness of the figures. It is very pragmatic that all the factors are not equally correlated with all the five independent variables. Independent variables are correlated up to the weak, fair, considerable or strong magnitudes with various factors of project success. However the overall project success is correlated with all the five independent variables as proved through Table 4.9.
Verification of Model Through PLS Regression

As the results of regression analysis and its interpretation remained complex and variable from case to case, to ensure the validity of the model this study utilized Partial Least Square (PLS) Regression using Smart PLS 2.0 M3 software. Partial Least Square Regression is an alternate technique for replacing Structural Equation Modeling. Figure 4.8 shows the results of Partial least Square Regression.

**Figure 4.8**

Legend for Figure 4.8

- The yellow rectangles show the variables this study selected
- The blue oval show the result of PLS regression (R Square)
- t value on arrow highlights the significance of the connection

Figure 4.8 demonstrates that in the suggested model of this study all the independent variables (HR Functions) significantly regress Project Result (PLS Regression > 0.7 and t value positive in cases).
Figure 4.8 indicates the following results:

1. Elements Complete Education (cev1), Personality Matching Project (pmpv1) and Prior Work Experience (pwev1) constituted the independent variable Right Person (rpiv1) significantly (PLS R Square = 1.000 and t values for all mentioned variables positive).

2. Elements Challenging (Chalgv2), Motivating (motv2) and Rational (ratinlv2) constructed the independent variable Time Management (Timgtiv2) significantly (PLS R Square = 1.000 and positive t values for all elements).

3. Elements Structured (structv3) and Timely (timev3) constituted the independent variable Stakeholder Communication (stcommiv3) significantly (PLS R Square = 0.948 and t value for all elements positive).

4. Elements Challenging (Chalgv4), Motivating (motv4) and Rational (ratinlv4) constructed the independent variable Workload Management (wliv4) significantly (PLS R Square = 0.882 and positive t values for all elements).

5. Elements Frequent Performance Monitoring (fpmv5) and Qualitative Performance Monitoring (qpmv5) constituted the independent variable Performance Monitoring (pmiv5) significantly (PLS R Square = 0.942 and all relevant t values positive).

6. Dependent variable Project Result (prdv) was well constituted by all its elements In Budget (inbudgdv), In Time (intimdv), Organizational Benefits (obenfitdv), User Satisfaction (usatifdv), Others (othersdv) and (others2dv). (PLS R Square = 0.942 and all relevant t values positive). Further the HR functions all the independent HR functions together regressed project result significantly (PLS Regression = 0.843 and t value = 0.971).

From the Figure 4.8 the study interprets that its proposed model of five selected independent variables of HR Management significantly regressed the result of projects without differentiating them based on any demographic variable. Thus the study finds it logical that the result of any type of IT projects depends on the quality with which the five selected HR functions are performed.
Verification through Step Wise Regression (Co-Linearity Diagnostic Test)

The results of the regression analysis in Tables 4.10 to 4.20 indicated that individually no independent variable selected by this study, regressed the project outcome (dependent variable) significantly. However in all the cases excluding that of project with small scope and type hybrid project outcome was significantly regressed by the set of all the five selected independent variables of this study. This fact gives rise to the probability of high co-linearity among the independent variable. If this is true then the model of this study should not be accepted.

The study has already verified and confirmed through the result of Pearson Correlation in Table 4.9 that its five independent variables are slightly correlated. Whether this weak correlation among them declares this model void or not, is an interesting question. To confirm it, the study did not restricted its analysis to Pearson Correlation, rather it opted Step-Wise Co-linearity Diagnostic Test using SPSS of the data of the projects in the selected sample to verify its perceived model. Although it has been proven through PLS Regression analysis that the perceived model of the study is logical and acceptable, but Step-Wise Co-linearity Diagnostic Test was in fact applied to verify the interpretation that individually the independent variables are not significant unless all are employed to manage the human resources for the project. As result of Co-linearity test SPSS generated Tables 4.22 to 4.25 that are given and discussed next in this Chapter. The study next explains how SPSS tested the Co-Linearity among the independent variables of this study.

To verify the results and interpretation, SPSS subdivided the perceived model of five independent variables of this study into four sub models numbering them as model 1, 2, 3 and 4 as depicted in Table 4.22 keeping the project outcome as the dependent variable. Table 4.22 shows the followings:

1. In the sub model number 1, SPSS tested only the regression of independent variable PerformanceMontoringIV5 on project result.
2. In sub model 2, SPSS tested the regression of PerformanceMontoringIV5 and TimeLineIV2 on the project result.

3. In sub model 3, SPSS tested the regression of PerformanceMontoringIV5, TimeLineIV2 and StakeHoldeCommIV3 on project result.

4. In sub model 4, SPSS tested the regression of PerformanceMontoringIV5, TimeLineIV2, StakeHoldeCommIV3 and RightPersonIV1 on project result.

That is how SPSS tested the regression the independent variables on the project result (dependent variable) in different sets.

Tables 4.22 and 4.23 show that in sub model 1 the independent variables PerformanceMonitoringIV5 as being a single predictor, regressed the project outcome significantly \((P = 0.000)\) but not strongly \((R^2 < 0.7, F > +1 \text{ and } df >= +1)\). In sub model 2 the predictors PerformanceMonitoringIV5 and TimeLinesIV2 regressed the project outcome significantly \((P = 0.000)\) and fairly \((R^2 = 0.641, F > +1 \text{ and } df >= +1)\). This implies that sub model 2 reinforces the interpretation of the results of Tables 4.10 to 4.20 as two independent variables together have regressed better than a single variable. Then in sub model 3 three predictors PerformanceMonitoringIV5, TimeLinesIV2 and StakeHolderCommIV3 regressed the project result significantly \((P = 0.002)\) and more strongly \((R^2 = 0.675, F > +1 \text{ and } df >= +1)\). Sub model 3 further strengthens the interpretation of the study that individually single selected independent variable has weak regression while in set of two or more their regression gets stronger on project result. Finally sub model 4 proves that the four predictors PerfromanceMonitoringIV5, TLimeLineIV2, StakeHolderIV3 and RightPersonIV1 in a set of four best regressed the project outcome \((R^2 = 0.697, F > +1 \text{ and } df >= +1)\).
### Table 4.22
**Model Summary**

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<th>df2</th>
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a. Predictors: (Constant), PerformanceMonitoringIV5
b. Predictors: (Constant), PerformanceMonitoringIV5, TimeLinesIV2
c. Predictors: (Constant), PerformanceMonitoringIV5, TimeLinesIV2, StakeHolderCommIV3
d. Predictors: (Constant), PerformanceMonitoringIV5, TimeLinesIV2, StakeHolderCommIV3, RightPersonIV1

### Table 4.23
**Result of Regressions in Different Models**

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da. Predictors: (Constant), PerformanceMonitoringIV5
b. Predictors: (Constant), PerformanceMonitoringIV5, TimeLinesIV2
c. Predictors: (Constant), PerformanceMonitoringIV5, TimeLinesIV2, StakeHolderCommIV3
d. Predictors: (Constant), PerformanceMonitoringIV5, TimeLinesIV2, StakeHolderCommIV3, RightPersonIV1
e. Dependent Variable: ProjectResultDV
Table 4.24

Coefficients

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</table>

a. Dependent Variable: ProjectResultDV

Table 4.24 shows the significance and importance of each independent variable of this study that SPSS selected in sub models 1 to 4 for testing Co-Linearity Diagnostic. The results in Table 4.24 imply that for sub model 1 the predictor PerformanceMonitoringIV5 had strong significance (P = 0.000) and importance (t > +2 and B positive). For sub model 2 the included predictors PerformanceMonitoringIV5 and TimeLinesIV2 had very high significance (P = 0.000) and importance (t > +2 and B positive). Similarly in Table 4.24 for sub model 3 and 4 the included predictors respectively had great significance (P = < 0.5) and importance (t and B values >= +2).
Finally Table 4.25 exhibits the Co-Linearity Diagnostic results for all the sub models that SPSS processed. For sub model 4, Table 4.25 indicates that the selected predictors had acceptable degree of cohesiveness (Eigenvalue < 1 and Condition Index < 15 for all the predictors). Similarly for all the sub models the predictors had an acceptable degree of cohesiveness and correlation that is not too high to affect their regression on the dependent variable (ProjectResultDV). This implies that the interpretation of this study of the result of regression Tables 4.10 to 4.20 was accurate. The study hence interprets that individually its selected independent variables can not regress the project result significantly but as a set of five functions necessarily performed by the project manager, they shall determine the project result.
CHAPTER 5

CONCLUSION, RECOMMENDATIONS AND CONTRIBUTION

This Chapter first summarizes the findings and then presents the conclusion of this study. Next in this Chapter, the study contributes how the existing frameworks for both Project Management and its relevant HRM can be improved in a pragmatic manner.

Summarizing The Findings

Based on data analyses discussed in Chapter 4 this study learnt that out of the selected sample of 70 heterogeneous IT projects, 24 remained victim of problems like scope creep (where scope gets bigger and bigger) and schedule delays or extensions, which further caused cost overrun due to substandard HR Management practices of the selected five HR functions. Simultaneously the study discovered that 46 IT projects remained successful in terms of scope, time and cost fulfillment due to effective and rational practices of the five selected HR functions (Table 4.7, Chapter 4).

The study discovered that behind the success of the 46 IT projects, one certain reason was the effective performance and good practice of Human Resource Management by their project managers while managing their projects. Such project managers practiced effective HR Management for being part of an environment where good Human Resource Management was highly appreciated following quality standards while managing projects.

Tables 4.2 to 4.8 in Chapter 4 indicate that quality of practice in Selecting Right Person and Assigning Workload remained appropriate while that of Stakeholder
Communication, Setting Timelines for Resources and Monitoring Performance required improvement in the IT industry for the selected sample of IT projects.

In nine out of eleven results for regression tests provided in tables 4.10 to 4.20 given in Chapter 4 the impact of each individual HR function selected by this study as an independent variable remained insignificant in most cases varying randomly based on project type, scope and team size. However, the collective practice of all the selected five independent variables regressed project outcome significantly for projects of large scope, team size and well defined type. The results in the Chapter 4 further indicate that the selected independent variables did not carry equal importance and degree of correlation for the result of project. Overall Performance Monitoring, Stakeholder Communication and Workload on Team Members are found strongly correlated with the result of a project than that of Setting Time Lines and Selecting Right Person (Table 4.9 and Figure 4.7, Chapter 4).

The study observed that the project managers, who managed 46 projects successfully, were not assigned all the nine knowledge areas in their software houses. The study further observed that for the 24 projects that suffered all the nine knowledge areas were not properly addressed by the respective project managers neither individually nor by their organizations. For the 46 successful projects all the nine knowledge areas were observed to be exercised but not by the individual project manager. The study learnt that project managers of successful projects were utilized to concentrate on Scope, Time and Cost of project while Quality and Procurement for projects were managed by the organizations through relevant experts or departments. The selected industry was found new at Risk management by this study. Further, HRM and Communication were the two knowledge areas that were assigned to project managers with limited scope of responsibilities.
Conclusion

Based on the data analyses and relevant discussion given in Chapter 4, the study concludes that the result of heterogeneous IT Projects, whose type is unique (not hybrid) and scope is large enough to demand minimum 3 months with at least a team size of 4 people, depends on the quality with which the following five functions of Human Resource Management are incorporated by the project manager:

1. Assigning Project Task to Right Person
2. Setting Rational Deadline for Project Team Members
3. Quantitative Workload assigned to Project Team Members
4. Project Stakeholder Communication
5. Performance Monitoring of Project Team Members

The study concludes that the degree to which each selected independent variable is co-related and influences the project result, varies without any predictable uniformity based on the type, size and scope of the project under results for regression.

The study identifies the above mentioned five independent variables as the minimum number of HR functions that a project manager should perform during project life cycle. Individually each of the above mentioned five HR Management function has no significant role on the result of project as different magnitude of impact on the result of various types of IT projects differing in scope, team size and type was received. This indicates that using only one or few of these functions will not ensure any good result of the project unless all these five HR functions are adopted and performed with good quality practice.

In summary, the study concludes that the quality of practice of the identified five essential HR functions during project life cycle of heterogeneous types of IT project, affects the outcome/result of that project. Good quality practice of all the selected five HR functions is one factor that paves the path towards project success while their practice of substandard quality can lead project to difficulties. For this reason, the conclusion is that HR Management for Project Management is recommended to be
considered as a driving force for Project Management instead of viewing it a secondary function.

With this conclusion, the study does not mean at all that quality of practice of the identified five essential HR functions is a panacea for project success. The study considers and declares it just one essential factor that certainly impacts project result provided rest of all the knowledge areas described in Chapter 2 are exercised with necessary equilibrium ensuring good quality in their practice.

In context of the nine knowledge areas constituting the existing framework of Project Management the study concludes based on its observations that the role of a project manager is recommended to be limited to the knowledge areas of Scope, Time and Cost that s/he should manage through HRM and technology resources. Based on observations the study concludes that the knowledge areas of Risk, Quality and Procurement are recommended to be managed at organization level by the relevant experts or departments for all projects.
Contribution of the Study

The study identifies its selected five HR functions as the minimum requirement for managing human resources essential for effective Project Management. The study perceives that in order to ensure effective Project Management that ascertains project success, minimum five (5) HR functions are required to be practiced following good quality standards at right time by the IT project managers. The study presents the identified five HR functions with improved titles as under:

1. Right Person for All Project Tasks
2. Rational Workload on Team Members
3. Rational Timelines for Team Members
4. Regular Stakeholder Communication
5. Regular Performance Monitoring

Rest of all the functions of HRM that are applicable to projects are recommended to be delegated to the HR department of a software house and should be performed in liaison with the project manager as and when required. This will enable a project manager to perform efficiently for having well defined role in terms of HRM and minimum workload. However, this study acknowledges that based on the culture of organization or demand of the project more than these five HRM functions may be delegated to a project manager if project requires. Next, the study explains the advantages of entertaining its identified five HR functions.

Right Person for All Project Tasks is practiced only when the project manager performs rationally the functions HRP, Staffing, EEO, Compensation Management and Diversity Management of HRM. This is how the study ensured covering five HR Management functions recommended in Chapter 2 through assigning a single task to the project manager. The study made the practice of selecting right person structured through designing relevant templates given in Annexure 4. The ultimate goal of this function should be the formation of an effective team that is best utilized as per the diversified skills and strengths of the members that the project demands.
Rational Workload on Team Members and Rational Timelines for Team Members address the functions Job Design, Diversity Management, Stress Management and Motivation of the team members. As these activities vary from project to project and declared challenging, the study tried to structure their practice through designing certain templates given in Annexure 4. The ultimate outcome of these two tasks should be correctly identified workload rationally distributed among diversified team members without overstressing any one quantifying the time lines that best serve the project’s objectives.

Regular Stakeholder Communication has been kept specifically for addressing inter-team communication during project life cycle. However, the actual connotations associated with the Stakeholder Communication are indeed very many. Stakeholder Communication covers all sorts of communication with the stakeholders of the project like sponsors, end users, team members, opponents and those who would be affected by the project. This study confined its scope to inter-team communication for the reason that project manager is directly responsible for the performance of his team and not for the sponsors, opponents and end users. Through Regular Stakeholder Communication, the study is confident that the HR Management functions Employee Relations, Coaching and Training HR, Conflict Resolution, Motivation and Performance Monitoring (given in Chapter 2) can be effectively addressed. Therefore, the study has viewed Stakeholder Communication an HRM related task instead of dealing it as a separate knowledge area during practice. The ultimate purpose of structuring the Stakeholder Communication is to ensure timely flow of correct information to all team members to mitigate work conflicts, enhance regularized performance monitoring and strengthen team motivation and spirit. To ensure a regularized structured Stakeholder Communication the study has contributed three different templates provided in Annexure 4 that are described later in this Chapter.

Regular Performance Monitoring shall cover Performance Management, Diversity Management, Motivation, HRD and Stress Management. The purpose of this HR task is to find gaps in the planned and actual performances of individuals through evaluating the running work. It shall certainly affect motivation of and stress on the team members through the approach of the project manager for interpersonal relations. As a byproduct, this function may trigger HRD activity as well. To structure
the monitoring this study contributes certain templates in Annexure 4 that are described later in this Chapter.

This is how these five identified HR functions cover maximum out of the fourteen functions of HR Management defined in Chapter 2. The four HRM functions that are not covered under these five identified HRM activities are the Industry Relations, Health Safety and Security Insurance, Organizational Design and Research & Information System. During Project Management, industry relations of project manager can be helpful but usually projects do not demand this function. The study in Chapters 1 and 2 has already mentioned that Health, Safety and Security Insurance and Organizational Design are not considered functions to be assigned to the project managers as they are typically assigned to HR department of the software houses.

The study identified sixteen variables applicable to Project Management in Chapter 2. By identifying the above mentioned five HR functions the study provides a scheme for applying twelve activities of HR Management in a structured manner out of the sixteen variables identified in Chapter 2. Out of those sixteen functions of HRM, the study extracts and recognizes following twelve necessarily required practices for effective Project Management with simple titles as under:

1. Human Resource Planning
2. Staffing
3. Equal Employment Opportunity
4. Compensation Management
5. Diversity Management
6. Stress Management
7. Job Design
8. Motivation
9. Employee Relations
10. Human Resource Development
11. Performance Management
12. Conflict Resolution
The study in summary recommends project managers to exercise the minimum five identified HR functions identified as this automatically leads them entertaining and performing twelve HRM activities identified and recommended from the literature given in Chapter 2. As this is a challenge for project managers to make the practices structured and precise, for this purpose the study structures the identified functions of HR as a Framework of Five HR Functions. The study supports its applicable Framework of Five HR Functions with eight templates that it has designed following the industry standards for applying the relevant knowledge.

**Applicable Framework of Five HR Functions**

The aforementioned five HR functions are the five independent variables this study selected with improved and more rational titles to emphasize their effective application. This study named the set of these five HR functions ‘The Framework of Five HR Functions’ to manage human resources essentially needed to ensure effective Project Management by the project managers. The ‘Framework of Five HR Functions’ is meant to make the HR Management structured and smooth for project managers. For helping project managers, the study has further summarized the knowledge relevant to these five HR functions in form of the eight templates imitating industry norms. All a project manager has to do is to utilize only eight (8) Templates that this study designed and provided in Annexure 4. These templates are discussed next.

It is acknowledged by this study that the above mentioned twelve activities of HR Management are important for performing effective HR Management for any project that is being managed in any organization. The rationale behind the ‘Framework of Five HR Functions’ for project managers is to provide them a well-defined and structured approach for addressing twelve HR Management activities only by performing five tasks. The study made it structured by designing templates given in Annexure 4. These templates will likely enable the project managers performing twelve necessary HRM functions only through five tasks provided the guidelines this study recommends are adopted. This is how ‘Framework of Five HR Functions’ relieves project managers from learning detailed literature on the subject of HR
Next, the study describes the templates it has designed following industry standards.

Nevertheless, this study focused only on the IT projects it is confident that the suggested ‘Framework of Five HR Functions’ for HR Management is equally applicable in the Project Management of any technical project because it has been concluded by studying heterogeneous IT projects without negating any knowledge area recommended by PMI (2004) for all types of projects. Further, the knowledge on Project Management that this study adopted was not specifically meant for IT Projects only. As PMI (2004) presents its suggested framework for all sorts of projects, therefore, the contribution of this study is applicable to all sorts of general projects as well.

A distinguishing merit of ‘Framework of Five HR Functions’ for HR Management essentially required to ensure effective Project Management, is that it does not impose any additional burden onto the project managers. It is true because Framework of Five HR Functions advises the project managers to perform only the essential practices while performing HR Management for their projects that are required to be employed to lead the project to success parallel to the practice of other knowledge areas. It is further subject to the fact that the five HR functions are performed by adopting the guidelines and eight templates contributed by this study next in this Chapter. The ‘Framework of Five HR Functions’ targets ensuring that the project manager’s practice of HR Management during Project Management paves path to project success.

**The Eight Templates**

In order to ensure that project managers follows a structured, smooth and minimum time taking approach for exercising the five identified essential HR Management functions necessary to achieve project success the study designed following eight Templates given in Annexure 4. The proper usage of each template is explained within the respective recommendation for each suggested HR function next in this Chapter.
1. Template 1 – A is for Employment Planning for Project (For structuring HRP for project). The purpose of this template is to enable a project manager to incorporate Responsibility Assignment Matrix (RAM) so that s/he can derive the necessary HRP information, which the project requires. The prerequisite for this template is a WBS (Schwalbe, 2004). The result of using this template is targeted to be a clear picture explaining how many human resources are available to the project, how these available resources could be best utilized for different tasks in WBS and how many more human resources shall have to be hired and trained. This is how rational decision making relevant to staffing and team formation can be practiced.

2. Template 1 – B for Job/Task Analysis for Project is for structuring Workload Management and Compensation Management (Decenzo and Robbins, 2002). This template in fact summarizes the conventional approach advised for job analysis. It enables the project manager to define the job description for any position that is of concern, specify the required qualification and skill set for that position and set the job worth of the position. This is how a project manager can decide about workload and compensation for any position in a structured manner. For convenience, a project manager may prefer utilizing this template for the summary tasks instead of each sub task. However, it shall depend on the complexity and requirements of the project.

3. Template 2 for Schedule for Recruitment is for structuring the hiring (Decenzo and Robbins, 2002). This template shall enable the project manager to define a proper schedule for hiring mentioning the criteria for short listing and selecting candidates for all the vacant positions that a project may trigger. Defining the mentioned criteria shall enable project manager delegating the short listing of resumes (recruitment) to any subordinate or other department easily. It shall further enable all the stakeholders involved in hiring learn the standard to be adopted while selecting human resources. The mentioned schedule shall bind all the stakeholders fulfill the task of hiring in time.
4. Template 3 is for Exploring KSA of Existing Workforce and Training Need Assessment (Jain and Saakshi, 2005). This template is meant for structuring the Selection of Right Persons for all the tasks and the Diversity Management while forming a team. It enables the project manager to explore the skills and abilities of his/her human resources, especially those who are new and have not been utilized earlier. It shall further prime the training needs of human resources for accomplishing the projects. Project manager after having utilized this template should be able to take decisions like which resource fits for which task of the project, who should be recommended for what type of training, how people with different skill sets be best utilized by peering or grouping in clusters.

5. Template 4 is for Schedule for Stakeholder Communication that is meant to structure Stakeholder Communication during the project life cycle (Schwalbe, 2004). Ideally, a project manager at the planning stage is required to predict all necessary meetings and possible interactions that team as well as stakeholder shall require during project life cycle. Predicting this much is indeed challenging. Template 4 enables a project manager plan as many events of communication as required by the project specifying most suitable mode of communication, agenda, required or desired participants, venue and expected time and date. The idea behind designing this template is to encourage project manager to schedule all possible communication event at the planning stage of the project and make it public in advance to all those who are concerned. This shall certainly help in synchronizing the thoughts and efforts of the stakeholders that will mitigate probable conflicts.

6. Template 5 is for Report from Subordinate. Its purpose is structuring Stakeholder Communication and Performance Monitoring. Frequent and structured reporting from subordinates is an indicator of smooth execution of project work. To ensure this subordinates are to be advised to utilize the mentioned template on weekly or monthly or on any frequency so that progress of project work as well as of the individual can be monitored
through a structured and regular approach. Further, this template shall automatically document all communication that occurs in result of inter-team coordination.

7. Template 6 is for Information/Inquiry from Super-Ordinate. It has been designed to structure Stakeholder Communication and Performance Monitoring for all the events that require a project manager to initiate any special query to his/her team members about progress. Its purpose is not limited to inquiring the subordinates at all, as it shall help project manager in advising the subordinates as required. Further, this template shall automatically document all communication that occurs in result of inter-team coordination.

8. Template 7 for 360 Degree Performance Measurement is designed for structuring Performance Monitoring and Appraisal (Decenzo and Robbins, 2002). The knowledge on 360-degree approach was made the foundation for designing it. It is understood that 360-Degree approach for performance management may not be applicable to all the organizations and their projects. However, this study selected this approach as it enabled addressing all possible and desirable modes of performance management, like performance review by immediate supervisor, by peers, by the end users for whom the project is being done and by the employee itself. The study designed it in four segments titled Card # 1 to 4 respectively. A project manager may utilize or customize even one card as applicable for his project for performance review. The study just declares it an example while project manager may append further Key Performance Indicators (KPI) as required by the project for performance review. Recording the performance review of each team member at the end of project is a desirable HR practice for which this template shall help project managers.

9. Template 8 is meant for Personality Assessment so that Diversity Management while Staffing and Team Formation gets structured and easy for the project managers. The study here finds it useful to summarize the knowledge it gained about personality assessment based on which
Template 8 was designed for helping the project managers who usually have not studied psychology.

a. In context of personality description Myers-Brigs Type Indicator (MBIT) states that the personality of any human can be interpreted as a set of the following opposite traits/types where each type contributes in making the personality of an individual with different magnitude:

   i. Extrovert versus Introvert (E/I)
   ii. Sensationnel versus Intuitive (S/N)
   iii. Thinking Oriented versus Feeling Driven (T/F)
   iv. Judgment Biased versus Perception Biased (J/P)

It is not logical to say that if a person is extrovert, s/he has zero magnitude/degree of the type introvert. Similarly, it is not logical to say that if a person is more Feeling Driven, s/he does not or cannot think. As these opposite types (traits) simultaneously contribute in making any individual’s personality with different degrees indeed, the challenge for a project manager is to determine the quantitative value of the degree to which each trait contributes in building an individual’s overall personality especially in the prevailing circumstances and environment (Briggs and Peter, 1995).

b. Just recognizing and quantifying the personality types is not adequate for understanding the personality of an individual. Human being is a social creature. Therefore, social style of one’s personality is required to be interpreted as well. Social style of an individual’s personality helps in determining the degree of assertiveness and of responsiveness of that individual. David Merril Social Type categorizes human personality into four behavioral profiles or zones. The four zones, also called social styles of ones’ personality, are Analytical, Driver, Amiable and Expressive. It further describes that humans are perceived as behaving primarily, in one of the four zones based on their
assertiveness, responsiveness, background and training (Robbins and Michael, 1999). These zones are depicted in Figure 5.1.

i. Figure 5.1 (Adopted from Robbins and Michael, 1999)

These eight Templates have been designed to ensure that project managers perform quality HR Management even without having studied the literature relevant to HR Management. Each Template is of maximum one to two pages. It means it is very concise in size and less time demanding. Templates are recommended to ensure the quality application of the Five HR functions identified and emphasized by this study. Project managers using these eight Templates during the project life cycle at right time as guided in the upcoming guidelines for each function can achieve effective application of the minimum required five essential functions of HR Management. This is how it helps in paving path to project success through structured HR Management practices.

It is to clarify that this study just focuses on ensuring the practice of HR Management effective during Project Management. If mistakes are committed in the application of other necessary knowledge areas like scope, cost, time, quality and risk, quality practice of HR Management singularly cannot ensure project success at all. As the scope of this study is meant to improve HR Management for projects, the abovementioned eight Templates are designed to ensure easy, smooth, less time demanding and structured application of essential five HR functions only. The five selected functions in fact cover twelve activities of HR Management as explained.
earlier. The study asserts that good utilization of the set of its designed Templates will ensure structured and fast application of the identified HR functions that are found necessary for project success. Further, the study declares these templates only the baseline for structuring the application of five HR functions. A project manager may optimize or customize the templates as required by the project or his/her organization if required. In case any template demands customization for any project, these templates will still facilitate IT project managers in order to design a better form or template than these. For organizations where similar templates are already in use for the stated purpose, adopting these templates remains optional provided the project manager practices the five identified functions of HRM ensuring good quality.
Recommendations for Selecting Right Persons for a Project

This study found that 12 projects in the sample set of 70 had problems because of not assigning tasks to the right person (Table 4.2, Chapter 4). In conclusion, the study has substantiated hypothesis H1 for certain projects. It stated that the success of an IT Project depends on assigning tasks to right person. It means to safeguard project from problems like Scope Creep, Schedule Delays and resultantly Cost Overrun, every task of the project is required to be assigned only to the most right person that ultimately forms effective team.

The Framework of Five HR Functions suggests that allocating tasks of project to team members is mainly accomplished through the HR activity called Staffing (Recruitment and Selection) but in this context, project manager has to perform Human Resource Planning (HRP), Compensation & Reward Management and EEO simultaneously. All these functions of HR Management are essential for acquiring and forming a good team for project that consists of the right person for each task (Decenzo and Robbins, 2002). Selection of right persons for forming project team is required to be performed essentially before the project reaches its execution phase. Therefore, it is recommended that this function be performed during and latest by the mid of the Project Planning Phase.

As per the Framework of Five HR Functions, building project team requires the following three steps through which the functions HRP, EEO and Compensation Management of HR Management should be practiced effectively:

1. Recruitment
2. Selection
3. Team Formation (Cascio, 1995), (BerNardinad and Russel, 1993)

Recruitment is the process of discovering potential job candidates (Desimone, Werner and Harris, 2002). Recruitment can be performed in number of ways that includes the Internal Search, Employee Referrals/Recommendations, External Search through Advertisements, Employment Agencies, Executive Search, Schools, College &
Universities, Professional Organizations, Unsolicited Applications and Cyberspaces

Recruiting by Websumes.

**Suggested Guidelines for Recruitment**

The Framework of Five HR Functions suggests that project managers are required to accomplish the following steps well before the Project Planning Phase:

- First Perform Employment Planning and Job Analysis (which is one aspect of HRP) to reach the followings:
  - The number of jobs/tasks required for the current project preferably with their due sequence of execution. It is recommended to make at least second level WBS for this using software like MS Project 2003 or Primavera
  - Job Specifications of each Job
  - Job Evaluation (To finalize decision about the compensation and reward management)
  - The number of human resource/s that the job requires
- Perform recruitment well before the execution of the project utilizing any approach that fits within available resources

The study observed that in routine practices HR departments of certain selected software houses kept on recruiting just for updating the database of resumes of potential candidates they might require for future projects. Project managers simply liaise with HR departments for recruitment as and when required. The study appreciates such practices as it further reduces the burden of a project manager.
Suggested Algorithm for Recruitment

To provide ease to project managers for performing effective recruitment, the Framework of Five HR Functions presents and suggests the following algorithm for team formation:

1. Perform Employment Planning and Job Analysis by following both Templates # 1 A & 1 B provided in Annexure 4.
2. Define/set a deadline for accomplishing recruitment which is required for accomplishing recruitment at least 2 to 3 weeks before the project’s execution (Use Template # 2 for Scheduling Recruitment provided in Annexure 4).
3. Acquire the resumes or websumes at least 15 days before the deadline for the recruitment through any approach of recruitment.
4. Define criteria for short-listing the resumes or websumes considering the results of Job Evaluation that you have already performed. For example, for recruitment of Java programmers a project manager may set the criteria as resumes or websumes with minimum 2 years experience of Java programming in J2EE.
5. Short list candidates preferably without any nepotism and without being gender biased so that AAP remains observed (consult definition of AAP in Annexure 1).

The relevant terms like Employment Planning etc. have been defined in Annexure 1 (Glossary). Please note that the recommended Templates are just meant to provide an idea to the project managers how they can structure the HR function of recruitment. Project manager may edit the suggested Templates to customize them according to their respective needs if required. Even if recruitment is being delegated to HR Department of an organization, project manager is required to liaise with that department.
Suggested Guidelines for Selection

Next stage in staffing is selection of right candidates. This can ensure forming the competent team required for the project. To improve selection procedure the Framework of Five HR Functions suggests the followings:

1. Define the selection criteria for every job based on the ranking of that job as per job evaluation right after accomplishing recruitment. For example for selecting a Java Programmer the project manager may employ the approach as Initial Screening through CVs, Designing and Conducting Technical Test, Interviewing Candidates who score acceptable results and finally Offering the Job.

2. Establish a committee or board for selection and update them with the selection criteria. This saves the project from becoming a one-man show. It is rational to ensure that selection is not delegated to only an individual in a single department.

3. Schedule different phases of the defined selection criteria setting appropriate deadlines such that it necessarily finishes within Project Planning Phase.

4. Conduct Selection as per schedule for all the jobs.

5. Abide by the AAP and EEO principles during the interviews (provided in Annexure I).

6. Select at least two or three best performing candidates for every job. Call the top scorer and have the rest stand by.

7. Offer a financial reward to the selected candidate that not only keeps him/her motivated and committed but also remains affordable within the project’s approved budget. However, if project manager finds some candidate really useful for the organization in the long term while s/he is asking more than what the project budget permits, such candidate should be either motivated to work for the current project at available offer with promise for increments in future or otherwise if possible project budget may be revised. Role of HR department shall be critical in such matters.
and all the stakeholders are expected to avoid personal conflicts during selection.

For both steps of recruitment and selection, Affirmative Action plan (AAP) however, advises to keep soft consideration for weak and unskilled staff as well (Decenzo David and Robbins, 2002). In this context, this study suggests that as first priority train the weak and/or unskilled selected staff provided time and budget of the project permits. Otherwise engage them within a team of skilled and experts where they could be assigned low priority tasks, which they perform under the guidance of seniors. This is how if they are polished, they could be utilized in future projects, or else they should be offered a golden handshake in a positive manner.

**Suggested Guidelines for Team Formation**

Diversity management is a challenge during team formation. To form the project team, first prefer to pair and/or group compatible employees. Then prefer to allocate tasks to a person compatible with his/her personality. This is likely to mitigate various probable conflicts. Indeed, it is bit difficult to assess and correctly recognize the personalities of the team members/employees in the beginning. However, in order to form a team of compatible people this study advises to identify and recognize the personality traits of every team member before pairing or grouping them together in a team especially before assigning them project tasks. If project manager already knows his team members strengths and personalities, no specific processing is required at all. However, if the project manager is managing new members, s/he is required to assess their strengths and personalities. The study contributes Template 3 and Template 8 for skills identification and personality-type assessment respectively. The study further declares usage of these templates optional for the project manager. The study perceives that project manager should utilize these templates only if s/he is dealing with new members.

As identifying personality types is complex, this study contributes its designed Template # 8 provided in Annexure 4 that is meant for personality assessment of the employee in quantitative manner. Template # 8 assists project managers in measuring the quantitative value of the degree to which each personality trait contributes in
constituting a personality. It will enable a project manager in assessing the Myers-Briggs Type Indicator (MBIT) of the personality in quantitative figures as described earlier. Template # 8 further assists project managers in measuring the quantitative value of the degree to which a person is Driver, Expressive, Analytical or Amiable. Project managers are just required to utilize Template # 8 before finalizing the team formation as well as the task allocation. It is recommended to ensure that team required for the project is formed, trained and mobilized by the middle of the Project Planning Phase.
Recommendations to Improve Assigning Realistic Workload to Project Team Members

For certain selected projects the study-substantiated hypothesis – H4 proving that project success is a function of quantitative workload assigned to its team members. In the sample set of 70 IT projects, fourteen (14) projects had problems as result of excessive workload on the team members (Table 4.5, Chapter 4). To help project managers assign a rational and motivating quantitative workload to their workforce, the study contributes the followings:

1. Provided right team for project has been built/selected both in term of its size and members, project managers is required to use any Project Management software like MS Project 2003 or Primavera to assign the workload.

2. View the Resource Histograms before finalizing the quantitative workload on members. Try to reach a situation where Resource Histograms show no red lines (over allocated symbols) for any of the human resource. Indeed this is ideal to plan such allocation. If realistically it is not being gained through any means, then perform Resource Leveling using mentioned software. This is how a project manager can do effective Human Resource Planning (HRP) in terms of managing quantitative workload (For definitions consult Annexure 1 (Glossary)).

3. Preferably, hire as many human resources as needed. To make a rational solution the WBS will help a project manager while the available project budget might be a constraint. However, under non-trivial circumstances if less number of human resources have to be utilized for conducting any project then:

   a. Compensate the overloaded human resources either through overtime schemes or performance based bonuses
   b. Relax their timings (wherever possible).
4. Ideally, a human resource should be used only for one project. However, when for compulsion a human resource is required to be utilized for multiple projects simultaneously, then the timelines for different projects are required to be stretched in such a manner that human resource finds sufficient time to concentrate on the given tasks one at a time.
**Recommendations to Improve Timelines for Project Team Members**

As per books of Project Management, setting deadlines is an activity of Project Time Management. However, this study simultaneously views it as an essential HR function needed for Project Management as it involves utilizing human resources. Literature of Project Management further explains structured and well-tested approaches for time allocation like Three Point Estimates, Slack, CPM, and PERT as discussed in Chapter 2.

The result of the analysis of hypothesis H2 for certain selected projects proved that project success depends on setting deadlines for tasks assigned to team members. The data collected about selected sample size indicates that eighteen (18) (Table 4.3, Chapter 4) IT projects had problems because of irrational deadlines set by their respective project managers or staff.

To improve managing timelines for project tasks and human resources this study suggests that:

1. Project managers is required to calculate time for each task of project using Three Point Estimate and CPM (PERT) without any compromise. For this purpose, software like MS Project 2003 or Primavera are recommended to be adopted. (For PERT please consult Chapter 2 and Annexure 1)

2. Project managers are required to recognize the skills and potentials of both the newly recruited as well as the existing human resource. Project manager may use Template #3 in Annexure 4 for the purpose that this study has designed for their convenience in this regard.
Recommendations to Improve Stakeholder Communication

In the books of Project Management, Stakeholder Communication is considered an independent knowledge area as Project Communication Management. However, this study identified it as an essential function of project Human Resource Management.

The data collected and analyzed indicates that twenty-one (21) IT projects in the selected sample had problems for ineffective stakeholder communication during the projects (Table 4.4, Chapter 4.4). The study substantiated hypothesis H3 that proves the project success is a function of effective stakeholder communication for the selected projects.

Stakeholder communication is exercised through inter-team meetings/reporting and stakeholders meetings. Providing no schedule for Inter-Team Communication (meeting/reporting) to team members with well-defined format for any weekly or monthly reports cannot guarantee effective inter-team that a project requires.

The study has identified Stakeholder Communication as a key to manage and lead HR throughout the project. Therefore, it contributes the following guidelines for the project managers in this context:

1. Project manager is required to provide inter-team communication as well as a stakeholder communication schedule during the Project Planning Phase. For this purpose, they can utilize the Template 4 provided in Annexure 4. It is suggested that inter-team communication should be scheduled as weekly or monthly or at least near (two weeks to) milestones. For project to project, the required frequency of inter-team communication can certainly vary. Stakeholder communication could occur less frequently. Preferably, the beginning and/or the end of every phase are appropriate time periods for scheduling meetings among all the stakeholders. The study asserts to use Template 4 for this purpose and make it public at the Project Planning phase so that all stakeholders are synchronized.
2. Inter-team communication can occur both through meetings as well reporting to seniors through emails etc. A balance is use of both the approaches is recommended. For example, meetings near milestones with reporting at every month or weekend could be adequate for a project needing six months time with 4 to 5 milestones. However, project managers are required to decide about the frequencies of inter-team communication considering the project’s length, complexity and team’s strengths. As too many meetings remain counter productive, frequency of inter-team meeting is recommended to be appropriately set.

3. For meetings select venue and timings that remain suitable to all the team members. Project manager should entertain gender, cultural and regional limitation in this regard. Like in Pakistan, it is recommended that females should not be forced to attend late night inter-team meetings.

4. It is recommended to set weekly, monthly or other appropriate frequency for reporting. Manual reports can be used but software reports are recommended to be preferred where applicable. Project managers may utilize Templates # 5 & 6 for Report from Subordinate and Information from Super-Ordinate respectively that are provided in Annexure 4 ensuring simple paper work and proper documentation of activities performed. This shall further help in monitoring performance.

5. Project manager is required to use appreciating and reforming approach while communicating with his/her team both in oral and written modes. Appreciating the work of team members boosts motivation and avoids disruptive stress. Overall a project manager is recommended to be such a facilitator for his/her team that every team member finds it appealing to approach the project manager for all work as well as personal issues. Simultaneously project manager is advised to ensure in a polite and friendly manner that there exists an acceptable level of stress on each member, which keeps him/her motivated enough to stay committed with the assigned tasks.
Recommendations to Improve Performance Monitoring

For the selected projects hypothesis H5 was substantiated acknowledging that project success is a function of effective performance monitoring. Fifteen (15) IT projects in selected sample set were found to have problems for ineffective performance monitoring and management (Table 4.6, Chapter 4).

For most cases, the immediate supervisor is the right person to monitor the performance of human resources. Infrequent and irregular performance monitoring should be avoided. Organization culture usually demands conducting performance appraisal once per year. Such culture may lead to a habit of infrequent and irregular performance monitoring and measurement during the entire year. This is how employees and their immediate supervisors often believe that not all seasons are meant for performance monitoring and measurement because they find energies being concentrated for performance only during end of annual session. Further, most IT projects usually impose situations like now or never upon team members working on different tasks of the project. Therefore, it is perceived that no explicit performance monitoring is required. Consequently, no formal performance is especially recorded even if the job was successfully accomplished within stipulated critical time.

The Framework of Five HR Functions of this study suggests the following recommendations for improvement in terms of performance management:

1. During the project life cycle, performance monitoring is required to be held consistently through reporting either weekly or monthly or as per any other schedule that best suits the project. In this regard, project manager is required to ensure that too much and too frequent documentation is not imposed on team members, as it is always counter productive. Project manager can advise their team members to utilize Template # 5 in Annexure 4 for this purpose.

2. For every project, performance monitoring should be held and recorded during as well as at the end of every project. It should not be
postponed for the annual performance appraisal of employees. Performance appraisal for processing increments and rewards may be sufficient once per year but monitoring, measuring and recording the performance is required to be an ongoing activity during the life cycle of all projects. The study has designed Template # 7 provided in Annexure 4 to conduct Performance Appraisal using 360 degree approach provided it is applicable to project or organization. Project manager may customize this template appending more KPIs if required.

3. The Framework of Five HR Functions further suggests that even for all the situations demanding now or never performance is required to be recorded. Indeed, it may not be financially feasible for organizations/software houses to provide rewards or incentives for each achievement by team members earned during every now or never situation but recording performance for appreciating it even later is highly significant for boosting and maintaining a good level of motivation.

4. It is recommended not to monitor performance by direct and pre announced observations while a team member is on job because it is likely to enhance disruptive stress. The Framework of Five HR Functions defends its view of minimum observation as most IT project’s tasks require creative and innovative work which requires a programmer, designer etc. to be mentally free from any sort of tension.

5. Use of software for project Management (like MS Project 2003) is recommended preferably in a networked environment to update and track the completion of every task by a team member. If a networked facility cannot be employed then at least project manager is required to use some software to update and track the completion of tasks. This approach directly helps in tracking and mapping the performance of HR and project work.
6. It is recommended that project manager advises the immediate supervisors in his team to provide the performance details of their subordinates near deadlines for each milestone or at the middle of the project life cycle or when any phase ends or at least at the end of the project.

7. Project manager is required to use appreciating and reforming approach while monitoring performance of the team members. Appreciating the work of team members boosts motivation and avoids disruptive stress. Simultaneously project manager is required to ensure in a polite and friendly manner that there exists an acceptable level of stress on each member, which keeps him/her motivated enough to stay committed with the assigned tasks.
Impact of Framework of Five HR Functions onto Existing Body of Project Management Knowledge

The Framework of Five HR Functions simplifies the existing body of Project Management knowledge by merging the two of its secondary knowledge areas: ‘Project Human Resource Management’ and ‘Project Communication Management’. Through its 4th function that is Regular Stakeholder Communication, the Framework of Five HR Functions declares Project Communication Management as one of the essential functions required for Project Human Resource Management. Without deleting or making any portion of existing body of knowledge about Project Communication Management obsolete, the Framework of Five HR Functions suggests that project communication is one of the tools necessary to perform the Project Human Resources Management effectively.

By merging the two secondary areas of Project Management, it is not intended to reduce the knowledge areas suggested for Project Management in terms of quantity; i.e., Project Management is viewed as the practice of following nine knowledge areas as guided in various relevant books and other knowledge sources:

Primary Knowledge Areas

1. Project Scope Management
2. Project Time Management
3. Project Cost Management
4. Project Quality Management

Secondary Knowledge Areas

5. Project Human Resource Management
6. Project Communication Management

7. Project Procurement Management

8. Project Risk Management

Integrating All Above Through

9. Project Integration Management (See Chapter 2 for details)

This study essentially declares that it is an obligation of project managers of any field to remain updated with latest necessary literature relevant to each knowledge area even though s/he may not be assigned all the knowledge areas in real practices of Project Management.

Through the Framework of Five HR Functions, the study intends appending the following improvements or additions in the existing framework of overall Project Management:

1. Theoretically, this study agrees that there are four secondary knowledge areas (HR, Communication, Risk and Procurement) for Project Management. However, the study discovered that they are only three while being practiced. This is true because by deriving the proposed Framework of Five HR Functions, this study discovered that in the actual practice of Project Management, when Project Communication Management is practiced; in fact the project manager is practicing the functions of Human Resource Management called Employee Relations, Performance Management, Diversity Management, Conflict Resolution, HRD, Motivation, Staff Retention etc. The fourth function of the Framework of Five HR Functions, that is Regular Stakeholder Communication, can sufficiently address issues like flow of accurate and timely information among team members as per defined hierarchy, conflict and diversity management, stakeholder participation and motivation, fact-findings etc. provided they are performed as per the given guidelines. This is how the
Framework of Five HR Functions guarantees simplification in the practice of knowledge areas needed for Project Management without reducing them in quantity.

2. By defining and proposing the Framework of Five HR Functions, this study provides a solution to the problem in the existing body of knowledge of Project Management and of Human Resource Management that did not provide any structured framework to ensure addressing and practicing minimum number of functions necessary for effective HR Management. This study asserts that if the proposed Framework of Five HR Functions is practiced as per given instructions/recommendations, overall twelve functions of HRM mentioned in the beginning of this Chapter certainly get practiced for ensuring effective HR Management. This is how the study has identified the precise role of a project manager in terms of HRM while managing the project.

Overall, this study contributes to improve the existing body of knowledge of Project Management, which is not limited to helping project managers in the field of IT only. The study is confident that the identified and proposed Framework of Five HR Functions can be applicable for the Project Management of heterogeneous types of IT as well as other technical projects.
Adoptable Paradigm Suggested For IT Project Management
(Integrating Running Practices in IT industry and Literature)

Based on the facts observed and learnt from industry, discussions with project managers, the knowledge learnt from literature as mentioned in Chapter 2 and results derived and analyzed by this study in Chapter 4, it presents its vision in the form of the following Framework for Project Management given in Figure 5. 2. The study declares it pragmatic, practical and realistic as it has been envisioned based on practices in the selected industry without altering the quantity of nine knowledge area of Project Management as described in Chapter 2.

Figure 5.2 (Designed and Contributed by Researcher)

Managing at least Five HR Functions using Technology and may be the eight Templates or similar:
1. Right Person for every Project Task
2. Rational Workload
3. Rational Timelines
4. Regular Communication
5. Regular Performance

Manage Scope, Time and Cost (By project manager) and Manage Quality, Risks and Procurement essentials for any Project at organization level (Set of templates from www.kathyschalbe.com may be useful)

Outcome of Project in terms of
1. Financial Aspect
2. Clientele
3. Organizational Repute
4. Other Benefits
The improved framework for Project Management depicted in Figure 5.2 intends to provide a pragmatic way for managing all the nine knowledge areas (primary as well as secondary) of Project Management for any type of IT project. In this context, the study recommends that project manager is required to be made responsible for only five knowledge areas that are Project Scope Management, Project Time Management, Project Cost Management, Project HR Management and Project Communication Management. It is recommended to delegate the remaining knowledge areas that are Project Quality Management, Project Risk Management and Project Procurement Management to independently functioning departments in the software house at organization level. Project manager at the most should only be required to provide his/her necessary input about the three knowledge areas recommended to be delegated to independent departments during the project life cycle. This is how the study contributes a precise job description for the project manager clarifying that project manager’s role in Project Management should be limited only to the identified five knowledge areas while organization should be responsible for the other three knowledge areas as mentioned. The study asserts that as a whole all the nine knowledge areas recommended by PMI (2004) are required to be practiced at organization level that is undertaking any IT project and should not be considered solely the job of a project manager. The study asserts that within the organization project manager’s role is recommended to be limited to five knowledge areas as identified above for him/her while the relevant experts in the organization should practice other knowledge areas.

As per this study’s contribution and recommendation project manager is required to initiate, plan, execute, control and close any project focusing on project Scope, Time and Cost based on the knowledge this study summarized in Chapter 2 through managing human resources and necessary communication. The study perceives that the mentioned three primary knowledge areas can be effectively exercised by the project manager adopting “The Framework of Five (5) HR Functions” that this study has derived and recommended and the latest relevant technology (e.g. software like MS Project 2003 and relevant machine resources). Therefore, the study contributes that Project Human Resource Management should not be considered secondary anymore rather it should be considered a driving force for running any project ensuring good communication and using latest technology software.
This study perceives that the exercise of these functions as guided and the use of technology resources will give rise to the practice of all the other knowledge areas of Project Management as intervening variables during project life cycle especially during project planning, execution and control phases. A project manager is required to manage these intervening variables (knowledge areas recommended to be assigned to project manager as well as assigned to independent departments) in such a manner that the knowledge of the Project Management that this study summarized in Chapter 2 remains best applied. To ensure effective Project Management, this study advises the following algorithm for Project Management:

1. Essentially employ the software for Project Management like Primavera or MS Project 2003 or equivalent

2. Define scope of the project and get it approved. In this context a project manager is required to brainstorm and refine at least 3-Levels WBS for the project using the mentioned software such that the WBS best covers the followings;
   a. The defined scope of project
   b. All the five processes of Project Management (consult Chapter 2).
   c. For IT projects all necessary stages of Software Development Life Cycle (SDLC).

3. Prepare project schedule in form of Gantt Chart using the software that best fulfills the scope of the project.

4. At planning phase of project, select right person to form the right team for the project. Later using the suggested software, append in the WBS and Gantt Chart the assignment of the project tasks to the team members. Adjust the timelines in the schedule of tasks such that human resources do not get over as well as under utilized using tools like Responsibility Matrix, Resource Histogram etc. (Figure 2.8, Chapter 2)
5. This study recommends that management of project Quality, Risk and Procurement be delegated to relevant departments/experts in the organization if exist. Project manager is recommended to only liaise with these departments during planning, execution and control phases. This study does not recommend assigning the management of the knowledge areas quality, risk and procurement solely to project manager in the IT industry unless it is a compulsion. In case the project manager needs to plan and manage the mentioned knowledge areas, it is recommended that s/he seeks advice from relevant consultants who are specialists of these knowledge areas.

6. Documentation of all the nine knowledge areas as well as all essentials for projects should also not be solely done by the project manager. Their documentation should be done based on inputs of the project manager and the relevant departments to whom these knowledge areas are delegated following the quality standards adopted by the software house by a fully functional department of Technical Writing.

7. Perform the cost management. For this purpose, it is recommended that a project manager uses software and preferably relevant templates available on above mentioned Internet link in Figure 5.2 to perform Project Cost Management as summarized in Chapter 2. It is advised to get the Project Cost Management performed in liaison with top management and financial experts in the organization, like CEO, CFO etc. Although cost management is the primary area, this study recommends that planning this knowledge area be initiated immediately after the scope is approved and it is recommended to be finalized only after having planned and documented all the knowledge areas properly. A project manager in certain software houses/organization may also not be made responsible for Project Cost Management depending on its culture. In such cases project manager is however required to be aware of the cost details of a project.

8. Project manager gets his plans for all knowledge areas approved from the management.
9. Communicate the approved plans about each knowledge area, WBS, project schedule (Gantt Chart) and all other essentials like reporting schedules etc. with the team before executing the project to ensure consensus of opinions and best understanding of the requirements, constraints, targets and deadlines. Once a consensus is reached, initiate the execution of the project.

10. From initiation to closing of the project and especially during execution, perform controlling consistently utilizing the software technology, essential techniques like Critical Path Analysis and monitoring performance of the human resources. Project manager may utilize Templates 4, 5 and 7 for this purpose if applicable.

11. Communicate in time and in an effective manner with each stakeholder as observed necessary while monitoring the execution to manage any change and/or correction as required by the project. One may utilize the relevant templates designed by this study for formal paper work. This will help the on going project deliver in a timely fashion. Documenting progress should be an ongoing activity that an independent department should do as per the routine inputs of project manager and departments engaged in project as already suggested. A project manager is required to ensure that every necessary project related communication is documented.

12. Once the project objectives are achieved, close it as planned following organizational norms and legal documentation. Later effectively, consolidate the lessons learnt relevant to each knowledge area for better performance in future projects. Ensure that feedback is taken for the dimensions mentioned in Figure 5.2 of the outcome of a project to learn from mistakes and prepare for future.

This study is confident that adopting the above mentioned guidelines will certainly guarantee a successful outcome of any project in terms of financial, clientele, organizational repute and various other benefits. The outcome of any project always
yields lessons to be learnt for improving entire Project Management for future projects related to the management of HR, Scope, Time, Cost, Quality, Risk and Procurement for projects. Hence, this study suggests project managers to adopt the aforementioned pragmatic approach for managing their projects as Figure 5.2 depicts. The project manager should collect feedback about all the aspects of project success and utilize that to improve future practices.

This improved framework of IT Project Management is not negating any knowledge area and HR function/s stated applicable to project management in the existing literature and frameworks. The achievement and contribution of this study is to distinguish most essential knowledge areas and HR functions that should be assigned to a project manager in context of the local IT industry. That is how job role of a project manager gets limited and restricted to identified knowledge areas and specific HR functions. Rest of all the knowledge is applicable as and when required and should be practiced by the various departments of an organization and not the project manager individually. This is how this study contributes how entire existing knowledge can be applied to Project Management completely and effectively.

**Opportunities for Further Research**

The improvements recommended by this study indeed can be further tested although it is based on running practices in the IT industry of Islamabad-Rawalpindi, Pakistan. This is how this study opens many opportunities for researchers of upcoming generations to conduct further research for testing its recommendations as well as testing impact of knowledge areas other than HR Management required for Project Management.
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ANNEXURE 1

GLOSSARY

(Definitions of Relevant Terms)

1. Activity
   a. An element of work, normally found on the WBS, that has an expected duration, cost and resource requirements. Also called Task.

2. Actual Cost
   a. The total of direct and indirect costs incurred in accomplishing work on an activity a given period, formally called the actual cost of work performed (ACWP).

3. Analogy Approach
   a. Creating a WBS for new project by using a WBS of a similar accomplished project as a starting point.

4. Analogous Estimate
   a. A cost estimating technique that uses the actual cost of a previous, similar project as the basis for estimating the cost of the current project, also called top-down estimates.

5. Bottom – Up Approach
   a. Creating a WBS by having team members identify as many specific tasks related to the project as possible and then grouping them into higher-level categories.
6. Bottom – Up Estimate
   a. The original estimate used to allocate money into an organization’s budget.

7. Budget at Completion (BAC)
   a. The original total budget for a project.

8. Budgetary Estimate
   a. A cost estimate used to allocate money into an organization’s budget.

9. Career Development
   a. An ongoing process by which individuals progress through a series of stages each of which is characterized by a relatively unique set of issues, themes and tasks. It involves Career Planning and Career Management.

10. Career Management
    a. Involves taking the necessary steps to achieve that plan and generally focuses more on what the organization can do to foster employee career development.

11. Career Planning
    a. Involves activities performed by an individual often with the assistance of counselors and others to assess his skills and abilities in order to establish a realistic career plan.

12. Cash Flow Analysis
    a. A method for determining the estimated annual costs and benefits for a project.

13. Category Scale (Used in questionnaire)
    a. Uses multiple items to elicit a single response. This uses nominal scale.
    For example, what knowledge areas are favorites of Project Manager?
       i. - Scope -Time -Cost -Procurement
14. Coaching HR
   a. Involves treating employees as partners in achieving both personal as organizational goals.

15. Compensation Management
   a. Activities meant to establish and maintaining an equitable wages structure and benefits or reward package for the teams serving any project/organization.

16. Conflict Resolution
   a. To manage difference of opinions, views, approaches and personalities among the team members or departments engaged in same project.

17. Contingency Reserves
   a. Amount included in cost estimate to allow for future situations that may be partially planned for (sometimes called Known Unknowns) and is included in the project cost baseline.

18. Control Chart
   a. A graphic display of data that illustrates the results of a process over time.

19. Cost Management Plan
   a. A Document that describes how cost variance will be managed on the project.

20. Cost Performance Index (CPI)
   a. The ratio of earned value to actual cost; can be used to estimate the projected cost to complete the project.

21. Cost of Quality
   a. The cost of conformance plus the cost of non-conformance to the standards. Cost of non-conformance is always negative.
22. Cost of Variance (CV)  
a. The earned value minus the actual cost.

23. Counseling HR  
a. Techniques that are used to help employees deal with personal problems that may interfere with the achievement of goals of professional jobs.

24. Critical Path  
a. The series of activities in a network diagram that determines the earliest completion of the project. It is the longest path through the network diagram and has least amount of slack or float.

25. Decision Tree  
a. A diagramming analysis technique used to help select the best course of action in situations in which future outcomes are uncertain.

26. Definitive Estimate  
a. A cost estimate that provides accurate estimates of project cost.

27. Dependent Variable (DV)  
a. The variable of primary interest to researcher. Also called Criterion Variable. Like in this study, it Project Outcome/Result.

28. Development HR  
a. Activities have a longer-term focus on preparing for future work responsibilities while also increasing the capacities of employees to perform their current jobs.

29. Direct Cost  
a. Costs that can be directly related to producing the products and services of the projects.
30. Diversity Management
   a. To provide a conducive work environment for any project where team members can work with ease, comfort and commitment in spite of being diversified in terms of gender, race, sects and backgrounds.

31. Earned Value (EV)
   a. The percentage of work actually completed multiplied by the planned cost, formally called the budgeted cost of work performed (BCWP).

32. Earned Value Management (EVM)
   a. A project performance measurement technique that integrates scope, time and cost data.

33. Effective Management for IT Project
   a. Is considered to be maintaining equilibrium while integrating the eight variables (scope, cost, time, quality, human resources, risk, procurement and communication), technical aspects, technological issues and all possible extraneous variables in order to accomplish successful project.

34. Element
   a. Is a single member of the population.

35. Employment Planning
   a. Process of determining an organization’s and/or project’s human resource needs.

36. Employee Relations
   a. Activities meant to establish a communication system through which team members can share their problems, grievances and concerns.

37. Equal Employment Opportunity (EEO)
   a. The activities meant to fulfill the legal and moral responsibilities through prevention of discriminatory policies, procedures and practices
while hiring, training, appraising and compensating employees working for any project.

38. Expected Monetary Value (EMV)
   a. The product of the risk event probability and the risk event’s monetary value.

39. Extraneous Variable (EV)
   a. That affect the over fish bone diagram but not part of it. Like Business trends in IT affects all variables in the fish bone diagram without being part of it.

40. Fishbone Diagram
   a. Diagram that trace complaints about quality problems back to the responsible production operations or root cause, also called Ishikawa Diagram.

41. Gantt Chart
   a. A standard format for displaying project schedule.

42. Health, Safety and Security Insurance
   a. Activities seek to promote a safe and healthy work environment.

43. Human Resource Development (HRD)
   a. Human Resource Development comprises of Training and Development, Organizational Development and Career Development): Activities are meant to ensure that organizational or project team members have the skills, competencies and knowledge to meet current and future job demands. Some time also written as Team Development.
44. Human Resource Planning
   a. The activities are used to predict how changes in management strategy will affect future human resource needs working in an organization or for a project.

45. Independent Variables (IV)
   a. The one that influences the dependent variable in either a positive or a negative way. Like in this study Human Resource Management is an independent variable for effective management of IT projects.

46. Indirect Cost
   a. Costs that are not directly related to the products or services of the projects, but are indirectly related to performing the project.

47. Industry Relations
   a. Activities meant to establish a liaison with market to remain updated with its demands and standards regarding HR.

48. Information Technology (IT)
   a. Is a contemporary term that describes the combination of computer technology (hardware and software) with telecommunications technology (data, image and voice networks).

49. Intangible Cost or Benefits
   a. Costs or benefits those are difficult to measure in monetary terms.

50. Internal Rate of Return (IRR)
   a. The discount rate that result in an NPV of zero for a project.

51. ISO 9000
   a. A quality system standard developed by the International Organization for Standardization (ISO) that includes a three-part, continuous cycle of planning, controlling and documenting quality in an organization.
52. Job Analysis  
a. Provides information about jobs currently being done and the knowledge, skills and abilities that individuals need to perform the jobs adequately.

53. Job Evaluation  
a. Specifies the relative value of each job in the organization.

54. Job Description  
a. A written statement of what the jobholder does, how it is done and why it is done.

55. Job and Organization Design  
a. Activities concerned with definitions of jobs or tasks required for project and interdepartmental relations.

56. Job Specifications  
a. Statements indicating the minimal acceptable qualifications incumbents must possess to successfully perform the essential elements of their jobs.

57. Leadership  
a. Is the use of non-coercive influence to direct and coordinate the activities of a group toward accomplishing a goal.

58. Likert Scale (Used to form first questionnaire)  
a. Is designed to examine how strongly subjects agree or disagree with statements on a 5-point scale. For example, Skills of project manager may be weak at any one knowledge areas of project management –

59. Management
   a. Is the process of designing and maintaining an environment in which
      individuals, working together in groups, efficiently accomplish
      selected aims.

60. Milestone
   a. A significant event on the project schedule with zero duration.

61. Mind Mapping
   a. A technique that can be used to develop WBS by using branches
      radiating out from a central core idea to structure thoughts and ideas.

62. Moderating Variable (MV)
   a. That has a contingent effect on the independent variable relationship.
      Like in this study, Technical management affects both Human resource
      management and Project Management.

63. Monte Carlo Analysis
   a. A risk quantification technique that simulates a model’s outcome many
      times, to provide a statistical distribution of the calculated results.

64. Numerical Scale (Used to form questionnaire)
   a. In this scale numbers on 5-point to 7-point scale are provided with
      bipolar adjectives at both ends. For example, if project manager is HR
      oriented, subordinates remain
      i. Extremely Motivated 7 6 5 4 3 2 1 Extremely Demotivated

65. Organization Behavior (OB)
   a. Can be defined as the understanding, prediction and management of
      human behavior in organizations.
66. Organization Development
   a. The process of enhancing the effectiveness of an organization and the well-being of its members through planned interventions that apply behavioral science concepts.

67. Parametric Modeling
   a. A cost estimating technique that uses project characteristics (parameters) in a mathematical model to estimate project costs.

68. Pareto Analysis
   a. Identifying the vital few contributors that account for most quality problems in a system.

69. Performance Management and Appraisal
   a. Activities for establishing and maintaining accountability throughout the project life cycle for ensuring quality and keeping team members committed as well as motivated.

70. PERT
   a. Program Evaluation and Review Technique – network analysis technique to estimate project duration when there is a high degree of uncertainty about the individual activity duration estimates.

71. Planned Value (PV)
   a. That portion of the approved total cost estimate planned to be spent on an activity during a given period, formally called the budgeted cost of work scheduled (BCWS).

72. Population
   a. Refers to the entire group of people, events or things of interest that the researcher wishes to investigate. For example, all the products made by a bakery might be population a study to ensure quality of all products.
73. Population Frame
   a. Is a listing of all the elements in the population from which the sample is drawn.

74. Primary Source
   a. Are individuals, focus groups, panels of respondents specifically set up by the researcher and from whom, options specifically issues from time to time or unobtrusive sources.

75. Product Life Cycle
   a. The sequence of phases to develop some product.

76. Project
   a. Is a time bound endeavor undertaken to create a unique product or service. In this study, the word project connotes projects relevant to Information Technology.

77. Project Charter
   a. Is a document that documents project title, start date, finish date, budget information, project manager, project objectives, approach and roles and responsibilities.

78. Project Life Cycle
   a. Is a framework of all phases of a project? Generally includes
      i. Project Initiation: To define Business needs an project scope and objectives
      ii. Project Planning: To prepare project plan that define each knowledge area as it relates to project at that point in time
      iii. Project Execution: To carry out project by establishing coordination between people and other resources according to plan
      iv. Project Controlling: Ensures that project team meets the project objectives
v. Project Closing: Formalizing acceptance of some phase or project and ending it efficiently

79. Project Management
   a. Is the application of knowledge, skills, tools and techniques to project activities in order to meet project’s requirement. In this study project management connotes management of IT projects only.

80. Project Manager
   a. The person responsible for managing project throughout the project life cycle.

81. Project Portfolio Management
   a. In which organizations group and manage projects as a portfolio of investments that contribute to the entire enterprise’s success.

82. Quality
   a. Conformance to requirements and fitness for use.

83. Ratio Scale
   a. Not only measures the magnitude of the difference between two points on the scale but also taps the proportions in the differences. It is most powerful scale because it has a unique zero origin and subsumes all the properties of all other scales.

84. Research & Information System
   a. To make use of technology to assist in managing human resources in an effective manner.

85. Risk
   a. The probability /possibility of loss.

86. Risk Acceptance
   a. Accepting the consequences provided a risk occurs.
87. **Risk Avoidance**  
a. Eliminating a specific threat or risk, usually by eliminating its causes.

88. **Risk Enhancement**  
a. Changing the size of an opportunity by identifying and maximizing key drivers of the positive risk.

89. **Risk Exploitation**  
a. Doing whatever you can to make sure the positive risk happens.

90. **Risk Mitigation**  
a. Reducing the impact of a risk event by reducing the probability of its occurrence.

91. **Risk Sharing**  
a. Allocating ownership of the risk to another party.

92. **Risk Transference**  
a. Shifting the consequence of a risk and responsibility for its management to a third party.

93. **Rough Order Magnitude (ROM)**  
a. A cost estimate prepared very early in the life of a project to provide a rough idea of what a project will cost.

94. **Sample**  
a. A sample is a subset of population. It comprises some members selected from it. For example if 2 slices of bread have been chosen to test quality out of the bread with 25 slices, 2 slices are the sample.

95. **Sampling**  
a. Is the process of selecting a sufficient number of elements from the population, so that a study of the sample and an understanding of its
properties would make it possible for researchers to generalize such properties to the population elements.

96. Scale
   a. Is a toll or mechanism by which individuals are distinguished as to how they differ from one another on the variables of interest in some study? Scales are of four types Nominal, Ordinal, Interval and Ratio. As this study needs Ration Scale, only that has been provided in the glossary.

97. Schedule performance index (SPI)
   a. The ratio of earned value to planned values can be used to estimate the projected time to complete a project.

98. Schedule Variance (SV)
   a. The earned value minus the planned value.

99. Scope
   a. Refers to all the work involved in creating the products of the projects and processes used to create them.

100. Sensitivity Analysis
    a. A technique used to show the effects of changing one or more variables on an outcome.

101. Six Sigma
    a. A comprehensive and flexible system for achieving, sustaining and maximizing business success that is uniquely driven by close understanding of customer needs, disciplined use of facts, data, statistical analysis and diligent attention to managing, improving and reinventing business processes.
102. Slack
   a. The amount of time a project activity may be delayed without delaying a succeeding activity or the project finish date. Also called Float.

103. Staffing
   a. Staffing comprises of Recruitment and Selection: The activities that are meant for timely identification of potential applicant for some projects (Recruitment) and then assessing and evaluating applicants in order to make a team for the project.

104. Stapel Scale (Used to form template 8)
   a. It simultaneously measures both the direction and intensity of the attitude toward the items under study. For example
   b. State how would you rate your project manager’s abilities with respect to each of the characteristics mentioned below
      
      1. +3          +3
      2. +2          +2
      3. +1          +1

   c. Adopting Modern Tech. Resistance to Change in Scope
      
      1. -1          -1
      2. -2          -2
      3. -3          -3

105. Stratified Sampling
   a. Is one type of probability sampling in which population is first divided into meaningful segments, thereafter subjects are drawn in proportion to their original numbers in the population.

106. Subject
   a. Is the single member of the sample.

107. Sunk Cost
   a. Money that has been spent in the past.
108. **SWOT Analysis**
a. A process of determining organization’s or project’s strengths, weaknesses, opportunities and threats.

109. **System Development Life Cycle**
a. Is a framework for describing the phases involved in developing information system.

110. **Tangible Cost or Benefits**
a. Cost or benefits that can be easily measured in any currency.

111. **Technical Management for IT Project Management**
a. It involves employing and applying effective criteria and methods for manipulating issues related to costing, scope defining, time management and all other knowledge areas on which project depends. In depth awareness of latest tools and techniques with experience contribute in making project manager effective.

112. **Technology Management for IT Project Management**
a. Refers to decision making related with questions like what, when, where and how much about the hardware and software on which the project depends. Sound knowledge, observations and experiences about latest technologies are supportive for project managers.

113. **Testing**
a. Evaluating software by using it or by evaluating its code.

114. **Top – Down Approach**
a. Creating a WBS by starting with the largest items of the project and breaking them into subordinate items.
115. Training HR
   a. Involves providing employees the knowledge and skills needed to do a particular task or job and this may attempt attitude change as well.

116. WBS
   a. Work Breakdown Structure defines project work and is a deliverable-oriented document that defines the total scope of the project
On the bases of literature reviewed and practices in the selected IT industry provided in chapter 2 of this dissertation in this study the independent variables (IV) mentioned in Theoretical Framework given under chapter 2 are operationally defined in the following manner:

HR Practices (IV)

- Good Quality Practices (D1)
- Substandard Practices (D2)

In this study both dimensions of HR Practices are measurable in terms of following elements extracted from the literature review given under chapter 1. In this study each element is measurable in the scale mentioned before it.

Allocating task/s to the right person (E1): Operationalized to measure whether project manager assigned tasks of projects to qualified, experienced and skilled person with personality compatible with project work and team or not. See question 1 under section 2 of the first instrument/questionnaire provided under Annexure 3 that was formulated using 5 point Interval Scale to measure this element

Setting deadlines for each team member (E2): Operationalized to measure whether the deadlines that the project manager set were motivating, challenging and rational? Check question 2 under section 2 of the first instrument/questionnaire
provided under Annexure 3 that was formulated using 5 point Interval Scale to measure this element

*Establishing stakeholders communication plan (E3)*: Operationalized to measure how much in time, frequent and structured the project stakeholder’s communication was made by the project manager. Consult question 3 under section 2 of the first instrument/questionnaire provided under Annexure 3 that was formulated using 5 point Interval Scale to measure this element

*Deciding quantitative workload on team member (E4)*: Operationalized to measure how much motivating, challenging and rational were the workload assigned to team members by the project manager? Check question 4 under section 2 of the first instrument/questionnaire provided under Annexure 3 that was formulated using 5 point Interval Scale to measure this element

*Monitoring Performance (E5)*: Operationalized to measure how frequently and qualitatively the team member’s performances were monitored by the project manager? Check question 5 under section 2 of the first instrument/questionnaire provided under Annexure 3 that was formulated using 5 point Interval Scale to measure this element

In this study the Project Management is operationalized in form of the dependent variable (DV) Project Result/Outcome. This DV is operationally defined with its dimensions and elements as under:

Project Result/Outcome (DV)

- Successful (D1)
- Suffering (D2)

In this study both dimensions of Project Result/Outcome are measurable in terms of following elements extracted from the literature review and practice learnt from industry given in chapter 2.
a. Stayed within budget

b. Stayed within time allocated

c. Had great organizational benefits

d. Had high user satisfaction

e. Other benefits

Question # 6 under section 3 of the instrument/questionnaire provided under Annexure 3 was formulated based on this operational definition using 5 point Interval Scale to measure the mentioned variable.

The next Figure X that is prepared by the researcher describes the operational definitions of all the variables of interest that this study derived from literature and utilized to formulate a questionnaire for data collection.
Figure X

HR Practices
- Good Quality (E1)
- Substandard (D2)

Selecting Right Person (E1)
1. Qualified
2. Experienced
3. Compatible Personality

Setting Timelines for HR (E2)
1. Motivating
2. Challenging
3. Rational

Establishing Stakeholder Communication (E3)
1. Frequent
2. Structured
3. In Time

Setting Workload for HR (E4)
1. Motivating
2. Challenging
3. Rational

Monitoring Performance (E5)
1. Qualitative
2. Frequent

Outcome/Result of Project
- Successful (D1)
- Suffering (D2)

Accomplished in Budget (E1)
Accomplished in Time Allocated (E2)
Higher User Satisfaction (E3)
Great Organizational Benefits (E4)
Other Benefits (E5)

HR Practices
- Good Quality (E1)
- Substandard (D2)
ANNEXURE 3

INSTRUMENTS

(Questionnaire for Collecting Data for PhD Study)

**Study Title:** Developing Framework for HR Practices Functions Needed for IT Project Management

**Section 1 (General Information about Selected Project)**

Project Title (please fill):

___________________________________________________________________________________________

Project Type (please mark):

1. Telecom/Networks
2. Database Related
3. ERP Related
4. Others___________

Project Status (please mark):

Recently Accomplished (within past 1 year) Yes/No

Start Date/s (Essential): ______________________

Due Finishing Date/s (Essential): ______________

Actual Finish Date (Essential): _________________
Name of Team member (Optional): _____________

Designation/Role (Essential):___________________

Work Experience (Specify Duration):

Programming: ________________________________

Analysis:____________________________________

Designing: ___________________________________

Others: ______________________________________

Education (Final Degree only):

Degree/s:____________________________________

Certification/s: _______________________________

Others: ______________________________________

Software House/Organization
(ESSENTIAL):_______________________________
Instructions to Fill Questionnaire

This study tends to test the effects of Selecting Right Person for forming project team, Assigning Realistically Manageable Deadlines and Workload to team members, Maintaining Timely Flow of Relevant Information among stakeholders and Regular Performance Monitoring of team members onto the outcome of any IT Project. Please select/tick only and only one option to answer every question and provide true figures.

Legend

This instrument uses the following 5 Interval scale

5 - Strongly Agree
4 - Agree
3 - Neither Agree Nor Disagree
2 - Disagree
1 - Strongly Disagree
Section 2 (Measuring HRM Practices)

For the mentioned project

1. I was assigned task/s for possessing relevant

   Complete Education  1 2 3 4 5
   Prior Work Experience  1 2 3 4 5
   Personality Matching Project  1 2 3 4 5

2. The Deadlines (final dates to accomplish task) assigned to me were

   Motivating  1 2 3 4 5
   Challenging  1 2 3 4 5
   Rational  1 2 3 4 5

3. The Exchange of Relevant Information (Stakeholder Communication) from my super-ordinate and/or subordinates had been

   In Time  1 2 3 4 5
   Well Structured  1 2 3 4 5
   Frequent  1 2 3 4 5

4. For the project under study the Quantitative Workload of Tasks assigned to me were

   Motivating  1 2 3 4 5
   Challenging  1 2 3 4 5
   Rational  1 2 3 4 5
5. Performance Monitoring of the team members for this project affected project outcome positively for

<table>
<thead>
<tr>
<th>Qualitative</th>
<th>1 2 3 4 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequately Frequent</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

Section 3 (Measuring Project’s Outcome)

6. Please rate the outcome of the mentioned project on the following criteria for IT project success (and please add any other criteria you can think of)

a. Stayed within budget 1 2 3 4 5
b. Stayed within time allocated 1 2 3 4 5
c. Had great organizational benefits 1 2 3 4 5
d. Had high user satisfaction 1 2 3 4 5
e. Others: please specify _____________ 1 2 3 4 5
f. Others: please specify _____________ 1 2 3 4 5
g. Others: please specify _____________ 1 2 3 4 5
QUESTIONS FOR INTERVIEWING IT PROFESSIONALS

(Instrument 2 only for Structuring Interviews)

For interviewing the subjects following questions were essentially asked

1. In what types of IT projects your software house/organization is engaged in?
   a. Telecom/Networking
   b. ERP
   c. Database Related
   d. Others _______________________

2. Give the number of each type of IT projects that your organization has undertaken since Dec. 2005 to date (Jun 2006 maximum)
   a. Telecom/Networking ___________
   b. ERP ___________
   c. Database Related ___________
   d. Others ___________

3. To attain the rank/designation of project manager/s at your organization, following is required
   a. PMP Certification
   b. IEEE Certification of Project Management
   c. Only work experience with same organization
   d. Work experience with any organization
   e. Other _______________________

4. Project managers working at this organization had studied formal project management in their final degree or recent refreshers course
   a. Yes
   b. No

5. Project managers working at your organization are aware of the practices recommended for HRM
a. Yes  
b. No  
c. A Little

6. Significance given to HRM while managing IT projects at this software house is
   
a. High  
b. Moderate/Normal  
c. Low

7. Do IT projects in your organization face any of the followings:
   
a. Scope Creep  
b. Schedule Delays/Extensions  
c. Cost Overrun  
d. Other___________  
e. None of the above

8. Are substandard practices of HRM functions is one among many reasons of the abovementioned problems under question 6 in your honest opinion
   
a. Yes  
b. No  
c. No Idea

9. The number of IT projects that have been adversely affected by problems mentioned under question six for substandard HRM is _________ (If not zero, please provide details)

10. The number of IT projects that have been goodly affected by effective HRM practices is _________ (If not zero, please provide details)
ANNEXURE 4

PROPOSED TEMPLATES FOR IMPROVING HR PRACTICES DURING PROJECT MANAGEMENT

(CONTRIBUTION OF THIS STUDY)
**TEMPLATE 1 --A**

**Employment Planning For Project**

Project Title:

Guidelines: You must have developed at least 2 – Level WBS before using this template for your project. Preferably you should have developed the Gantt chart (Schedule) for your project as well. Use MS Project or Primavera software to easily make WBS and Gantt chart for your project. Fill a blank Responsibility Assignment Matrix (RAM) for your Project as given in the following example. Put R for the Human Resource who is responsible for the sub task, P for the one who performs and RP for the one who performs as well as responsible. Don’t put any thing for Summary task as well for Mile Stones. Add as many columns and rows as needed. Take care that the project may not exceed approved cost and time while adding columns for HR. Using this template should enable the project manager to quantify number of HR needed for any project by deciding who does what in for the project.

<table>
<thead>
<tr>
<th>HR with Availability→</th>
<th>HR 1 (Like PM – Available)</th>
<th>HR 2 (Like Analyst – Available)</th>
<th>HR 3 (Like Software Designer – To be Hired)</th>
<th>HR 4 (Like Software Developer – Available)</th>
<th>HR 5 (Like Software Quality Tester – To Be Hired)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed WBS↓</td>
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</tr>
<tr>
<td>1. Initiating</td>
<td></td>
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</tr>
<tr>
<td>1.1 Kickoff meeting</td>
<td>RP</td>
<td></td>
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</tr>
<tr>
<td>1.2 Develop project</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Charter signed (Mile</td>
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<tr>
<td>Stone 1)</td>
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<tr>
<td>2. Planning</td>
<td></td>
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<tr>
<td>2.1 Develop project</td>
<td></td>
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<tr>
<td>plans</td>
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<tr>
<td>2.2 Review project</td>
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<tr>
<td>plans</td>
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<tr>
<td>(Mile Stone 2)</td>
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<tr>
<td>3. Executing</td>
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<tr>
<td>3.1 Analysis</td>
<td>R</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3.2 Design</td>
<td>R</td>
<td>R</td>
<td>P</td>
<td></td>
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<tr>
<td>3.3 Implementation</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>(Mile Stone 3)</td>
<td>R</td>
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<tr>
<td>4. Controlling</td>
<td></td>
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</tr>
<tr>
<td>4.1 Report performance</td>
<td>R</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>4.2 Control changes</td>
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<tr>
<td>5. Closing</td>
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<tr>
<td>5.1 Prepare final</td>
<td>R</td>
<td>P</td>
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<tr>
<td>project report</td>
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<tr>
<td>5.2 Present final</td>
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<tr>
<td>project</td>
<td></td>
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<tr>
<td>5.3 Project completed</td>
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<tr>
<td>(Final Mile Stone)</td>
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</tr>
</tbody>
</table>

Now compute the followings

1. Number of Summary Tasks in WBS of Project: ________
2. Number of Sub Tasks in WBS of Project: ________
3. Number of HR required for this project: ________ (As many as columns you use)
4. Number of available HR: ________
5. Number of HR to be hired: ________

(This is the answer to employment planning)
Job/Task Analysis For Project

Project-Title: _______________________________________________________________________________

Task Name in WBS: _________________________________________

Task Number in WBS: __________

Job Description:

What the task/job holder has to do:

____________________________________________________________________________________

(Fill like s/he has to do coding using ASP.Net)

How to perform the job:

____________________________________________________________________________________

(Fill like s/he has to use Visual Studio.Net by working 8 hours within software house premises)

Why to perform this job/task:

____________________________________________________________________________________

(Fill like as the project is of dynamic web site development that needs server side scripting in ASP.Net)

Job Specifications:

Knowledge and Skills (Strengths) required for mentioned task (You may tick more than one):

1. Analytical
2. Database Designing
3. Graphic Designing
4. Programming
5. Testing
6. Quality Assurance
7. Technical Writing
8. Communication
9. Others: ________________________________________________

Due qualification for the mentioned task:

____________________________________________________________________________________

(Fill like any/specific certification in ASP.Net or Bachelor Degree in IT covering .NET as subject etc.)

Due Experience for the mentioned task:

_________________________________________________________________________

(Fill like 1 year hands on experience in Server side scripting with any tool preferably with ASP.Net)

Job Evaluation:

Financial Worth of the mentioned task (Fill in terms of money):

For task mentioned competitors in market pay:

For task mentioned approved budget for project has: ______________

For task mentioned the salary/incentive should be: ______________

Non – Financial Worth of the mentioned task:

1. Executive Scale (like planning project, costing project etc.)
2. Middle Management Scale (like analysis, Design, Coding etc.)
3. Operational Scale (like documenting letters etc.)
4. Further lower Scale (like printing documentations, counting procured hardware, labeling materials etc.)
# Schedule for Recruitment

**Project Title:**

__________________________

**Deadline for Acquiring Resumes:** ______________________

**Deadline for CV Short Listing:** ______________________

(Take no more than 2 to 3 days)

**Deadline for Scheduling Selection:** _____________________

**Guideline:**
Add as many rows as the number of jobs vacant and set criteria for each job preferably separately.

<table>
<thead>
<tr>
<th>For the Job/Post</th>
<th>CV Short Listing Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Like Software Developer (Java)</td>
<td>Like CV with 2 or more years of programming experience with Java and at least bachelor degree in computing</td>
</tr>
<tr>
<td>....</td>
<td>....</td>
</tr>
</tbody>
</table>
**TEMPLATE 3**

**Exploring KSA of Existing Work Force**

**And Training Need Assessment**

Name of Employee: 
_____________________________________________________________________________

Designation of Employee: 
_________________________________________________________________________

Date: _________________________

Guidelines:
K stands for Knowledge that means employee is aware of the subject while s/he may not be able to perform it
S stands for Strength/Skill that means employee is having commendable experience of performing the subject very well
A stands for Ability that means employee is capable of performing what s/he knows but has not experience of worth considering experience of doing that job
Make all your existing work force fill this template to get what they know, what they have done, what they are capable of doing and what they prefer to do

<table>
<thead>
<tr>
<th>Field/Work/Department/Job</th>
<th>Relevant Certification/Degree/Work Experience</th>
<th>Level of Expertise</th>
<th>Training Need</th>
<th>Preference Choice in Career Path</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2. Skill</td>
<td>2. Formal Training needed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Ability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Scheduling</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
<tr>
<td>Project Costing</td>
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<tr>
<td>System Analysis</td>
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<td></td>
</tr>
<tr>
<td>Designing Databases</td>
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<tr>
<td>Designing Interfaces</td>
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<tr>
<td>Designing GUI</td>
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<tr>
<td>Programming</td>
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<tr>
<td>Software Testing</td>
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<tr>
<td>Etc.</td>
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<td></td>
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</tr>
</tbody>
</table>
## Template 4

### Schedule for Stakeholder Communication

**Project Title:**

---

**Guidelines:**
Fill as directed during project’s planning phase. Add as many rows as needed.

<table>
<thead>
<tr>
<th>Event/Occasion</th>
<th>Mode of Communication</th>
<th>Agenda</th>
<th>Participants</th>
<th>Venue</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Like One week before first Mile Stone</td>
<td>1. Meeting</td>
<td>Like Finalizing Project Scope, Time and Cost</td>
<td>1. All Stakeholders</td>
<td>Like Sponsor’s Environment or In Office etc.</td>
<td>Like 2:00 pm to 3:00 pm on 30/06/2006 etc.</td>
</tr>
<tr>
<td></td>
<td>2. Teleconferencing</td>
<td></td>
<td>2. All team members</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Video Conferencing</td>
<td></td>
<td>3. Selected Members: (Mention names)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Emailing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Chatting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Informal Telephonic Talk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**TEMPLATE 5**

**Report from Subordinate**

Project Title: _______________________________________________________________________________

From: ____________________________________________

To: ____________________________________

Date: ____________________________________________

Time: __________________________________

Guidelines:
Direct all team members to fill this template essentially either weekly or monthly or as best suits to your project. However remember that too much documentation may decelerate progress. Add as many rows as needed.

<table>
<thead>
<tr>
<th>Task</th>
<th>Progress</th>
<th>Issues (If Any)</th>
<th>Suggested Remedies/Required Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Like Analysis under Execution (Task number 14)</td>
<td>Like 50% accomplished</td>
<td>Like End user is non-technical or Nil</td>
<td>Like Let us use prototyping for analysis or Nil</td>
</tr>
<tr>
<td>....</td>
<td>....</td>
<td>.....</td>
<td>....</td>
</tr>
</tbody>
</table>


**TEMPLATE 6**

**Information/Inquiry from Super-ordinate**

Project Title: _______________________________________________________

From: _____________________________________________________________

To: _______________________________________________________________

Date: _____________________________________________________________

Time: _____________________________________________________________

Guidelines:
Direct all super-ordinates in your team to use this template when needed. However remember that too much documentation may decelerate progress. Add as many rows as needed.

<table>
<thead>
<tr>
<th>Issue/Inquiry/Information</th>
<th>Instructions or Suggested Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Like Client Site Validation Check is missing in file X</td>
<td>Code Client Site Validation Check using Java Script for all fields in file X no later than 23/07/2006</td>
</tr>
<tr>
<td>....</td>
<td>....</td>
</tr>
</tbody>
</table>
TEMPLE 7

360 Degree Performance Measurement Proforma

Project Title: _______________________________________________________________________________

Name of Employee: _________________________________

Designation: _______________________________________

Role on mentioned project: _________________________

Date: ____________________________________________

Time: __________________________________

Guidelines:
This performance measurement performa consists of four Evaluation Score Cards to be filled by Immediate
Supervisor, peers, customers/end users and team member himself. Print each Evaluation Score Card for each
Evaluator on separate page so that it remains hidden from other Evaluators during performance measurement
process. Means what Immediate Supervisor fills should not be public for what customer fills for any team member
during evaluation. Later sum all sub – totals awarded by each evaluator to get final score of every team member
out of 60.

Evaluation Score Card # 1 by Immediate Supervisor

Score for meeting deadlines
5 – Excellent
4 – Very Good
3 – Satisfactory
2 – Improvable
1 – Below Standard

Score for quality of service/product produced
5 – Excellent
4 – Very Good
3 – Satisfactory
2 – Improvable
1 – Below Standard

Score for technical KSA
5 – Excellent
4 – Very Good
3 – Satisfactory
2 – Improvable
1 – Below Standard

Score for reaction under pressure
5 – Excellent
4 – Very Good
3 – Satisfactory
2 – Improvable
1 – Below Standard

Score for overall job behavior and attitude with subordinates and/or super-ordinates
5 – Excellent
4 – Very Good
3 – Satisfactory
2 – Improvable
1 – Below Standard

Sub –Total Points awarded by Immediate Supervisor: _____/25

Evaluation Score Card # 2 by Peers

Score for behavior and attitude with peers during teamwork for project
5 – Excellent
4 – Very Good
3 – Satisfactory
2 – Improvable
1 – Below Standard

Score for technical KSA
5 – Excellent
4 – Very Good
3 – Satisfactory
2 – Improvable
1 – Below Standard

Sub –Total Points awarded by Immediate Supervisor: _____/10

Evaluation Score Card by # 3 by End User/Customer

Score for understanding end user’s needs
5 – Excellent
4 – Very Good
3 – Satisfactory
2 – Improvable
1 – Below Standard

Score for making end users understand one’s point/view
5 – Excellent
4 – Very Good
3 – Satisfactory
2 – Improvable
1 – Below Standard

Score for reaction under pressure
5 – Excellent
4 – Very Good
3 – Satisfactory
2 – Improvable
1 – Below Standard

Sub –Total Points awarded by Immediate Supervisor: _____/15

Evaluation Score Card # 4 by Team Member (Self)

Score for achievements gained
5 – Excellent
4 – Very Good
3 – Satisfactory
2 – Improvable
1 – Below Standard

Score for addition in KSA
5 – Excellent
4 – Very Good
3 – Satisfactory
2 – Improvable
1 – Below Standard

Sub –Total Points awarded by Immediate Supervisor: _____/10

Net Total Points: ________/60 (Add all sub – totals)
Note:
This template consists of two pages only. First page contains questionnaire for those whose personality is to be learnt. Second page contains the guidelines for the one who is to interpret the personalities.

Name of Employee: _________________________________

Designation: _______________________________________

Date: ____________________________________________

Guidelines:
If you find yourself more inclined towards mentioned indicator in any question tick more positive value. Contrarily if you find yourself disliking the mentioned indicator in any question tick more negative value.

In my true opinion I give following weights to the mentioned

Personality’s Type Indicators
A. 3, 2, 1 (Getting energized for being in people) –1, -2, -3
B. 3, 2, 1 (Getting energized for intrinsic motivation) –1, -2, -3
C. 3, 2, 1 (Collecting information through observation & practices) –1, -2, -3
D. 3, 2, 1 (Receiving information through imagination & thoughts) –1, -2, -3
E. 3, 2, 1 (Handling situations logically & objectively) –1, -2, -3
F. 3, 2, 1 (Handling situations personally & emotionally) –1, -2, -3
G. 3, 2, 1 (Accepting and meeting deadlines seriously) –1, -2, -3
H. 3, 2, 1 (Wishing flexible deadlines) –1, -2, -3

Personality’s Style Indicator
I. 3, 2, 1 (Striving for task completion) –1, -2, -3
J. 3, 2, 1 (Pushing peers & subordinates onto work) –1, -2, -3
K. 3, 2, 1 (Encouraging peers & subordinates onto work) –1, -2, -3
L. 3, 2, 1 (Considering benefits of whatever is faced) –1, -2, -3
M. 3, 2, 1 (Team work) –1, -2, -3
N. 3, 2, 1 (Handling situations logically & objectively) –1, -2, -3
O. 3, 2, 1 (Affiliation with peers & subordinates) –1, -2, -3
Guidelines for Evaluator (Project Manager):

1. Don’t share this page with those whom you ask to answer the first page
2. Follow the given table to assess and recognize personality type and style of every person who has filled the given questions before finalizing team formation and task allocation for your project

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Personality Type/Style</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Extrovert (Type)</td>
<td>Those who get energies from other people. Such people are more suitable for tasks like project management, analysis, leading teams etc.</td>
</tr>
<tr>
<td>B</td>
<td>Introvert (Type)</td>
<td>Those who get energized from inside themselves. Such people are more suitable for tasks like programming, testing software, designing software etc.</td>
</tr>
<tr>
<td>C</td>
<td>Sensational (Type)</td>
<td>Those who accept any information for finding real observations, experiences &amp; solid evidences. Such people are more suitable for tasks like managing &amp; leading projects &amp; analysis, quality assurance, testing software etc.</td>
</tr>
<tr>
<td>D</td>
<td>Intuitive (Type)</td>
<td>Those who depend on their imaginations, notions etc. Such people are more suitable for tasks like programming, algorithm making, designing etc.</td>
</tr>
<tr>
<td>E</td>
<td>Thinking Oriented (Type)</td>
<td>Those who take judgments logically &amp; objectively. Such people are more suitable for management, analysis of project’s tasks</td>
</tr>
<tr>
<td>F</td>
<td>Feeling Oriented (Type)</td>
<td>Those who take judgment emotionally or personally. Such people are more suitable for creative and innovative works</td>
</tr>
<tr>
<td>G</td>
<td>Judgment (Type)</td>
<td>Those who take the job seriously and try to meet standards and deadlines. Such people are acceptable for all sort of project’s tasks</td>
</tr>
<tr>
<td>H</td>
<td>Perception (Type)</td>
<td>Those who intend to do job in relaxing manner. Such people may not be suitable for time and cost critical tasks of project</td>
</tr>
<tr>
<td>I &amp; J</td>
<td>Drive (Style)</td>
<td>Those who are task and result oriented. Such people are good for being team leads, project managers and like.</td>
</tr>
<tr>
<td>K, L, M &amp; O</td>
<td>Expressive (Style)</td>
<td>Those who are people oriented and change/innovation lovers. Such people perform well when used as vision setter, mission setters, leaders etc.</td>
</tr>
<tr>
<td>E &amp; I</td>
<td>Analytical (Style)</td>
<td>Those who try to accomplish tasks seriously &amp; interpret matters logically and objectively. Such people are more good for analytical works</td>
</tr>
<tr>
<td>F, M &amp; O</td>
<td>Amiable (Style)</td>
<td>Those who are people oriented. Such people perform well when used at subordinates positions or even at team lead positions under work environment where theory y or z of motivation is applicable</td>
</tr>
</tbody>
</table>
ANNEXURE 5

THE SPSS (11.5) DATA SHEET
ANNEXURE 6

Table 3.4 (Summarizes the details of selected organizations)

<table>
<thead>
<tr>
<th>Sr. #</th>
<th>Software House OR IT/Telecom Organization</th>
<th>Quantity of IT Projects in terms of selected types</th>
<th>Number of Projects Identified &amp; Selected From Jan 2006 to Jun 2007</th>
<th>Certified Project Manager</th>
<th>HRM Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AKSA, Ground Floor, STP, Islamabad Pakistan (Project Based Company)</td>
<td>ERP = 0 Database = 3 Telecom = 0 Other = 2</td>
<td>5 Yes</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ultimus, Gulistan Colony, Rawalpindi, Pakistan (Product Based Company)</td>
<td>ERP = 1 Database = 0 Telecom = 0 Others = 0</td>
<td>4 Projects for 1 ERP Product Yes</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Alcatel, H8, Islamabad, Pakistan (Project Based Company)</td>
<td>ERP = 0 Database = 0 Telecom = 7 Others = 0</td>
<td>7 No</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mobilink, Islamabad, Pakistan (Telecom Project Based Company)</td>
<td>ERP = 0 Database = 0 Telecom = 3 Others = 0</td>
<td>3 No</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Paktel, Offices in Rawalpindi and Islamabad (Telecom Project Based Company)</td>
<td>ERP = 0 Database = 0 Telecom = 3 Others = 0</td>
<td>3 No</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>NLC, Islamabad, Pakistan (Project Based Company)</td>
<td>ERP = 0 Database = 0 Telecom = 2 Others = 0</td>
<td>2 No</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Nokia, Islamabad, Pakistan (Telecom Project Based Company)</td>
<td>ERP = 0 Database = 0 Telecom = 2 Others = 0</td>
<td>2 No</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>DPS, Ground Floor, STP, Islamabad, Pakistan</td>
<td>ERP = 2 Database = 0 Telecom = 0</td>
<td>6 (1 project was of dual types) No</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>#</td>
<td>Company Name</td>
<td>Type</td>
<td>Address</td>
<td>ERP</td>
<td>Database</td>
</tr>
<tr>
<td>----</td>
<td>--------------------------------------</td>
<td>--------------------------</td>
<td>--------------------------------</td>
<td>------</td>
<td>----------</td>
</tr>
<tr>
<td>9</td>
<td>Hi QU Systems, 3rd Floor, STP, Islamabad, Pakistan</td>
<td>Project Based Company</td>
<td>Hi QU Systems, 3rd Floor, STP, Islamabad, Pakistan</td>
<td>ERP = 1</td>
<td>Database = 0</td>
</tr>
<tr>
<td>10</td>
<td>ISF, 3rd Floor, STP, Islamabad, Pakistan</td>
<td>Project Based Company</td>
<td>ISF, 3rd Floor, STP, Islamabad, Pakistan</td>
<td>ERP = 0</td>
<td>Database = 3</td>
</tr>
<tr>
<td>11</td>
<td>Netsol Technologies, 3rd Floor, STP, Islamabad, Pakistan</td>
<td>Project Based Company</td>
<td>Netsol Technologies, 3rd Floor, STP, Islamabad, Pakistan</td>
<td>ERP = 0</td>
<td>Database = 2</td>
</tr>
<tr>
<td>12</td>
<td>Knowledge Platform, 4th Floor, STP, Islamabad, Pakistan</td>
<td>Project Based Company</td>
<td>Knowledge Platform, 4th Floor, STP, Islamabad, Pakistan</td>
<td>ERP = 0</td>
<td>Database = 2</td>
</tr>
<tr>
<td>13</td>
<td>Enterprise DB, Ground Floor, STP, Islamabad, Pakistan</td>
<td>Project Based Company</td>
<td>Enterprise DB, Ground Floor, STP, Islamabad, Pakistan</td>
<td>ERP = 0</td>
<td>Database = 1</td>
</tr>
<tr>
<td>14</td>
<td>EVamp &amp; Saanga, 3rd Floor, STP, Islamabad, Pakistan</td>
<td>Project Based Company</td>
<td>EVamp &amp; Saanga, 3rd Floor, STP, Islamabad, Pakistan</td>
<td>ERP = 0</td>
<td>Database = 2</td>
</tr>
<tr>
<td>15</td>
<td>Makabu, 4th Floor, STP, Islamabad, Pakistan</td>
<td>Project Based Company</td>
<td>Makabu, 4th Floor, STP, Islamabad, Pakistan</td>
<td>ERP = 0</td>
<td>Database = 3</td>
</tr>
<tr>
<td>16</td>
<td>Gulfnet, 4th Floor, STP, Islamabad, Pakistan</td>
<td>Project Based Company</td>
<td>Gulfnet, 4th Floor, STP, Islamabad, Pakistan</td>
<td>ERP = 1</td>
<td>Database = 2</td>
</tr>
<tr>
<td>17</td>
<td>NCR, G-9, Islamabad, Pakistan</td>
<td>Project Based Company</td>
<td>NCR, G-9, Islamabad, Pakistan</td>
<td>ERP = 0</td>
<td>Database = 0</td>
</tr>
<tr>
<td>18</td>
<td>LMKR, 3rd Floor, Evacuee Trust Building, Islamabad, Pakistan</td>
<td>Project Based Company</td>
<td>LMKR, 3rd Floor, Evacuee Trust Building, Islamabad, Pakistan</td>
<td>ERP = 1</td>
<td>Database = 0</td>
</tr>
<tr>
<td>No.</td>
<td>Company</td>
<td>Location</td>
<td>Type</td>
<td>ERP</td>
<td>Database</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------</td>
<td>----------------</td>
<td>--------------------</td>
<td>-----</td>
<td>----------</td>
</tr>
<tr>
<td>19</td>
<td>Elixir, 2nd Floor,</td>
<td>Islamabad,</td>
<td>Product Based</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>STP, Islamabad,</td>
<td>Pakistan</td>
<td>Company</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Product Based</td>
<td></td>
<td>Company)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Oratech, 1st Floor,</td>
<td>Islamabad,</td>
<td>Project Based</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>STP, Islamabad,</td>
<td>Pakistan</td>
<td>Company</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Project Based</td>
<td></td>
<td>Company)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>PTCL, Islamabad,</td>
<td>Pakistan</td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>CISCO System Pvt, Ltd.</td>
<td>Islamabad</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Ltd, Islamabad</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Abacus Consulting</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>24</td>
<td>Averox Pvt. Ltd,</td>
<td>Islamabad</td>
<td></td>
<td>12</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 3.5 enlists details of the selected sample size of 70 IT projects.

<table>
<thead>
<tr>
<th>Sr. #</th>
<th>Project Title &amp; Type</th>
<th>Software House</th>
<th>Team Size</th>
</tr>
</thead>
</table>
| 1     | Title: Upiter  
Type: MLM (Others) | AKSA, Ground Floor, STP, Islamabad Pakistan | 4 |
| 2     | Title: Time Express System  
Type: Database Related | AKSA, Ground Floor, STP, Islamabad Pakistan | 4 |
| 3     | Title: BAM Ports – Customized Reports in Shared Points  
Type: ERP | Ultimus, Gulistan Colony, Rawalpindi, Pakistan | 4 |
| 4     | Title: SAP Flobot (Ultimus Integration With SAP)  
Type: ERP | Ultimus, Gulistan Colony, Rawalpindi, Pakistan | 4 |
| 5     | Title: PTCL (Fixed Lines)  
Type: Telecom/Networking | Alcatel, H8, Islamabad, Pakistan | 5 |
| 6     | Title: NSS Core Development  
Type: Telecom/Networking | Mobilink, Islamabad, Pakistan | 5 |
| 7     | Title: BSS Role Out Phase II  
Type: Telecom/Networking | Paktel, Offices in Rawalpindi and Islamabad | 5 |
| 8     | Title: Defense (Hidden Title)  
Type: Telecom/Networking | NLC, Islamabad, Pakistan | 5 |
| 9     | Title: PTCL NGN Multan  
Type: Telecom/Networking | Alcatel, H8, Islamabad, Pakistan | 5 |
| 10    | Title: IT Infra Structure Upgrade  
Type: Telecom/Networking | Alcatel, H8, Islamabad, Pakistan | 5 |
| 11    | Title: DNX Expansion 2004  
Type: Telecom/Networking | Alcatel, H8, Islamabad, Pakistan | 5 |
| 12    | Title: BSS Role Out Phase II  
Type: Telecom/Network | Paktel, Offices in Rawalpindi and Islamabad | 5 |
| 13    | Title: BSS Roll Out  
Type: Telecom/Networking | Nokia, Islamabad, Pakistan | 5 |
| 14    | Title: Mobilink GPRS Installation  
Type: Telecom/Networking | Mobilink, Islamabad, Pakistan | 5 |
| 15    | Title: Hidden Title  
Type: Others (Electronic Document Processing) | DPS, Ground Floor, STP, Islamabad Pakistan | 4 |
| 16    | Title: Hidden Title  
Type: Others (J2EE related) | DPS, Ground Floor, STP, Islamabad Pakistan | 4 |
| 17    | Title: Hidden Title  
Type: Others (J2EE related) | DPS, Ground Floor, STP, Islamabad Pakistan | 4 |
| 18    | Title: Hidden Title  
Type: ERP | DPS, Ground Floor, STP, Islamabad Pakistan | 4 |
| 19    | Title: eAd Manager  
Type: ERP | Hi QU Systems, 3rd Floor, STP, Islamabad Pakistan | 4 |
| 20    | Title: esm 7.0  
Type: ERP | Hi QU Systems, 3rd Floor, STP, Islamabad Pakistan | 4 |
| 21    | Title: 10 WEB  
Type: ERP | Hi QU Systems, 3rd Floor, STP, Islamabad Pakistan | 6 |
| 22    | Title: E Services Manager  
Type: ERP & Database | Hi QU Systems, 3rd Floor, STP, Islamabad Pakistan | 7 |
| 23    | Title: Media Plan Project (MPP) | ISF, 3rd Floor, STP, Islamabad Pakistan | 5 |
24. Title: UK Post Code Checker
   Type: Database Related
   ISF, 3rd Floor, STP, Islamabad, Pakistan

25. Title: Call in Recorder (CIR)
   Type: Database Related/Telecom
   ISF, 3rd Floor, STP, Islamabad, Pakistan

26. Title: XYZ Coaching Course Website
   Type: Others (Learning Management System)
   Netsol Technologies, 3rd Floor, STP, Islamabad, Pakistan

27. Title: Telecom Billing System
   Type: Database & Telecom
   Netsol Technologies, 3rd Floor, STP, Islamabad, Pakistan

28. Title: Quiz Authoring System
   Type: Database Related
   Knowledge Platform, 4th Floor, STP, Islamabad, Pakistan

29. Title: Enterprise DB (Front End)
   Type: Database
   Enterprise DB, Ground Floor, STP, Islamabad, Pakistan

30. Title: Enterprise DB (Database Engine)
    Type: Database
    Enterprise DB, Ground Floor, STP, Islamabad, Pakistan

31. Title: Content Management System
    Type: Web Site/Database
    EVamp & Saanga, 3rd Floor, STP, Islamabad, Pakistan

32. Title: Hidden Title
    Type: Web Site/Database
    EVamp & Saanga, 3rd Floor, STP, Islamabad, Pakistan

33. Title: Mobilink Website
    Type: Others (Web Site)
    EVamp & Saanga, 3rd Floor, STP, Islamabad, Pakistan

34. Title: Hidden Title
    Type: Others (Graphics)
    EVamp & Saanga, 3rd Floor, STP, Islamabad, Pakistan

35. Title: Travel Planning & Management
    Type: ERP
    GulfNet Pakistan (Pvt) Ltd., 4th Floor, STP, Islamabad

36. Title: Collections
    Type: ERP
    GulfNet Pakistan (Pvt) Ltd., 4th Floor, STP, Islamabad

37. Title: Open ERP (Sales Module)
    Type: ERP
    GulfNet Pakistan (Pvt) Ltd., 4th Floor, STP, Islamabad

38. Title: Shipping and Billing Module
    Type: ERP
    GulfNet Pakistan (Pvt) Ltd., 4th Floor, STP, Islamabad

39. Title: VBCMs Umrah Booking Contract Management System
    Type: Database (Web Site)
    Pixel Soft through GulfNet Pakistan (Pvt) Ltd., 4th Floor, STP, Islamabad

40. Title: CYGNET Travel Suite
    Type: Database (Web Site)
    CYGNET through GulfNet Pakistan (Pvt) Ltd., 4th Floor, STP, Islamabad

41. Title: Hidden Title
    Type: ERP
    LMKR, 3rd Floor, STP, Islamabad, Pakistan

42. Title: Benedict Engineering
    Type: ERP
    LMKR, 3rd Floor, STP, Islamabad, Pakistan

43. Title: Hidden Title
    Type: Database
    Makabu, 4th Floor, STP, Islamabad, Pakistan

44. Title: Hidden Title
    Type: Database
    Makabu, 4th Floor, STP, Islamabad, Pakistan

45. Title: Knowledge Repository
    Type: Others Web Service
    ISF, 3rd Floor, STP, Islamabad, Pakistan

46. Title: Desktop Toolbar
    Type: Others Web Related
    ISF, 3rd Floor, STP, Islamabad, Pakistan

47. Title: Dynamic PDF Catalogue
    Type: Others Web Related
    ISF, 3rd Floor, STP, Islamabad, Pakistan

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<table>
<thead>
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<th>Title: Script Rewriter</th>
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