CHAPTER III – RESEARCH METHODOLOGY

3.0 Preview

This chapter discusses the research methodology that has been chosen for this study. Research classification overview has been presented and the methodological assumptions are explored, focusing on all aspects related to the theoretical framework. Research questions are developed, research methods are described and evaluated keeping in mind the usefulness regarding the research study and its nature. Following this, data collection techniques used for this research are discussed. Research in Competency Based Performance Measures / Management (CBPM) field stems from the area of Human Resource Management (HRM).

This chapter describes the research framework, questionnaire creation, sample size determination and pilot study. It also introduces the research methodology adopted including research methods and sample selection criteria, analyses, the research findings and points out the research constraints. It ends by evolution of Hypotheses.

3.1 Research Design

Competence is context-specific, it is evaluated through some performance criteria, and it is something that the individual “is”. Competence is more than skills or knowledge: it includes the person’s motives (or value judgments), traits, and self concept.

Performances measures are tools used to follow-up the past performance in an organization, predict the level of future performance, and accomplish improvements in performance. Competency based performance evaluates large sets of capabilities and knowledge which can significantly improve organizational productivity to a much greater extent than just doing a job using an existing skill set. The approach of this research is to study business performance of Information Technology (IT) companies through a balanced set of measures that are derived from the goals of the organization.
Hence, this researcher has utilized Causal Research Design, wherein the changes in Independent Variable (Competency Based Performance Measures - CBPM) are responsible for changes in Dependent Variable (Business Performance – BP).

3.2 The Research Problem

Competence is “the potential to succeed in a situation” including judgments about the context, goals, sufficiency of skills and knowledge, and expected performance. Competence, therefore, is in tight relationship with performance: it is needed to accomplish superior performance repeatedly in a particular context or situation.

Jobs have been changing at a rapid pace over the past 20 years; competency-based performance management is becoming more useful than the historical skill-based, transactional process. The nature of work is changing from single-skilled jobs to multi-skilled jobs, from repetitive tasks to problem-solving tasks, from individual work to teamwork, and from functional specialization to collaboration.

Taking a look at the ways in which work is changing, it is necessary for the organization to move from skill-based performance to competency based performance. Besides, performances measures are tools used to follow-up the past performance in an organization, predict the level of future performance, and accomplish improvements in performance.

Traditional performance measurement systems rely on financial accounting measures, e.g. revenue growth rate, return on investment, market share, and unit costs. Competency-based performance evaluates large sets of capabilities and knowledge which can significantly improve organizational productivity to a much greater extent than just doing a job using an existing skill set. The most common type of historical job (the individual repetitive job) is going away and the organization has an increasing need for competency-based evaluations.

Hence, the following key research questions have been developed to further explore and clarify what the actual research problem is concerned with. The research questions as identified are:
1. Whether competency based performance management model has an impact on individual performance? If yes then How much?
2. Whether competency based performance management model has an impact on Managerial performance? If yes then How much?
3. Is competency based performance management model better than traditional human capital measures (practices)?
4. Will competency based performance management model help the organization in better performance? If yes then how much?
5. What are the critical elements (factors) of competency based performance management model?

3.3 Statement of the Problem

In the backdrop of earlier discussions, and as there has not been any work on Competency Based Performance Measures and their linkage to Business Performance in IT sector, the researcher has attempted “A study of Relationship between Business Performance and Competency Based Performance Measures in select IT companies in Pune.”

3.4 Objectives of the Study

As is evident from literature review, competency-based performance measures /management (CBPM) is an absolute essential for organizations. It helps in resolving the business performance (BP) management related issues. The current research work is intended to get practical insights into CBPM and BP relationship at an individual, managerial and at organizational level. The current research work is therefore intended:

1) To study the impact of competency based performance measures on individual performance
2) To investigate the impact of managerial performance based on competency as against traditional human capital measures
3) To correlate the competency based capability’s relationship to performance of an organization as a strategic business unit.

4) To investigate whether the impact of CBPM on Business Performance is significant

5) To investigate whether each element of CBPM will have similar impact on Business Performance

6) To investigate whether impact of CBPM on each element of Business Performance parameters is equal

3.5 First set of Hypotheses

Based on the above objectives, first 3 set of Hypotheses were formulated as follows:

**Hypothesis H1:**
Competency based performance measures (management) are positively related to an individual’s performance.

**Hypothesis H2:**
Competency measures (management) have strong relationship with managerial performance than traditional human capital measures.

**Hypothesis H3:**
Competency based performance measures (management) are positively related to business performance.

3.6 Research Framework for the Study

An attempt has been made to study the linkage of CBPM to BP in IT sector companies. Following research framework (Diagram 3.1) has been developed to study the relationship between CBPM and BP. CBPM has five major elements or activities as indicated in Diagram 3.1 viz.
a) Defining competencies of an individual
b) Competency-based employee recruitment and selection
c) Competency-based training and development
d) Competency-based performance appraisal, and
e) Competency-based employee rewards.

Defining and managing these five elements or activities is very critical for deriving desired performance.

The consolidated Business Performance Parameters as shown in Unified Matrix of Business Performance (as mentioned in Literature Review) have been discussed with senior executives of IT companies, HR Consultants and advisors. It is found that few parameters are considered critical while assessing the Business Performance by the IT companies. As per their recommendation 8 parameters (grouped in 4 categories) are considered for this study.

These 8 Business Performance Parameters as considered by IT Companies are summarized below:

Table 3.1 Business Performance Parameters

<table>
<thead>
<tr>
<th>Financial</th>
<th>Customer related</th>
<th>Internal process</th>
<th>Learning &amp; growth</th>
</tr>
</thead>
</table>
| 1. Cost Reduction  
2. Revenue Growth | 1. Market Share  
2. Customer Satisfaction | 1. Innovation  
2. Project Delivery | 1. Employee Retention  
2. Employee Productivity |

The Business Performance dimensions in the hypothesized model are presented in diagram 3.2.

This model does not rule out the impact of other resources and processes within the organization. It shows one possible way of explaining how CBPM is related to BP.
3.7 Scope of the Study

The study is confined to Competency Based Performance Measures / Management (CBPM) in IT industry. The major elements or activities of CBPM viz. Defining competencies of individual, Competency-based employee recruitment and selection, Competency-based training and development, Competency-based performance appraisal, and Competency-based employee rewards have been taken into consideration for the study. The study covers all IT companies i.e. Small and Medium Businesses and MNCs irrespective of number of sites and locations.

The following points describe the scope of the present research:

1. The scope of the present research is restricted to the study of Competency Based Performance Management (CBPM) in IT industry in Pune.
2. This study focuses on impact of CBPM on Business Performance, i.e. it covers the perception aspects of CBPM.
3. This research studies whether CBPM has an impact on BP and in case if CBPM has the impact to what extent it will impact the BP.
4. Pune region is considered for study. All the IT companies falling in the geographical area in and around of Pune are considered for this study.
5. An attempt is made to identify the critical elements of CBPM which have more impact BP.
6. The study does not cover the practically aspects of implementation of CBPM in IT industry.
7. Any other factors which may influence the BP are outside the scope of study.
3.8 Selection of Research Method and Justification

The section below gives a justification for selecting a research method for the study:

3.8.1 Empirical vs. Non-empirical

An empirical research involves observation and direct fact-finding about issues related to the topic concerned. Observation is the oldest method used by man in the scientific investigation. However, guided and controlled observation has replaced the ancient form of unaided visual observation. Non-empirical methods are those that focus on ideas, frameworks and speculation rather than on observation.

Empirical research methods have now been accepted by the HR field and practitioners. Therefore, it is one of the reasons to adopt an empirical research method. As this research investigates relationship between CBPM and BP, a non-empirical research method based on ideas and speculations may not be regarded as valid research approach. As identified in Chapter II – Review of Literature, there has been a number of empirical research papers published with a focus on CBPM. Thus, the empirical line is a valid direction for this study.

3.8.2 Qualitative vs. Quantitative

Qualitative research has a history in the social sciences. It has been found useful for studying social and cultural phenomena. Within the qualitative research, a number of different research methods are available. In the last twenty years, qualitative research has gained acceptance in the academic rigour of HR discipline. Qualitative research in the HR field has become relevant for researchers to understand the inter-relationship of various parameters. Qualitative research requires the researcher to grasp a wide range of concepts and meanings for data collection.

Quantitative research, on the other hand, is derived from the natural sciences, where the research data is usually in the form of precise numbers that have been collected according
to the clear defined steps. Quantitative methods are usually used for testing hypotheses and they include defined processes that often use numbers and statistics in order to derive research results.

Qualitative research is used to explore and understand extent of impact of relationship. Normally, it generates non-numerical data. Quantitative research generates numerical data or data that can be converted into numbers. For example the number of organizations that have implemented CBPM model. These two research methods have been combined for this research study.

Therefore, both qualitative and quantitative research methods have been deliberately chosen, as the researcher has investigated impact of CBPM model on BP. To understand the degree of impact, Likert’s scaling technique has been used.

3.9 Research Process

The Research Process consisted of following:

3.9.1 Designing of Sample

The whole group of IT Companies from which the sample is to be selected is technically called as Universe or Population. Designing of sample has been carried out in the following manner:

- Definition of the Sample
- Characteristics of Sample
- Sampling Method
- Testing of Validity, Reliability and Representativeness of Sample
- Comparison of Sample with Ideal Sample:
- Sampling and Non-Sampling Errors
- Sample Size
- Source List
3.9.2 Definition of Sample

Based on the literature and subject matter of the research, the population definition is as under:

1) All IT Companies falling in Pune region – including the IT parks and Maharashtra Industrial development Corporation (MIDC) areas in and around geographical boundaries of Pune are considered as population for the study.

2) Pune region consists of Pune City, Pimpri-Chinchwad, Hinjewadi, Talawade, Pirangut, Chakan, Rajagurunagar, Sanaswadi, Ranjangaon, Dehuroad, Talegoan, and Khed Shivapur. All the IT companies located in these places are considered as sample.

3) All Software Product companies, IT Engineering companies, Tools and R&D services companies, IT-Enabled Services/BPO companies, Hardware companies (Hardware, Security, Network Design, Data Communications), IT Services companies (Internet Service Providers, System Integrators, Software Services providers, Data Mining, Warehousing and Processing firms) are considered as sample for this study.

4) Maximum two responses have been obtained from one organization. The second response may be from a different location of the same company or by an employee working at a different level (lower, middle or top management) within the company.

5) There are small proprietary and partnership firms providing IT services to many companies. Such firms are not considered as respondents.

6) There are freelance consultants who are providing independent IT services to various companies. Such freelance consultants are not considered as respondents for this study.

3.9.3 Characteristics of Sample

The characteristic features of sample are as follows:

1) All the permanent employees e.g. Officers, Middle Managers and Senior Management executives are considered as respondents.
2) Within the Technical team e.g. Principal, Team Lead, Project Associate, Technical Head, Programmer Analyst, Technical Head, Project Associate, System Engineer, Technical Writer, Process Executive, Process Specialist, Consultant, System Engineer, Technology Analyst, Lead Intra Engineer, Project Manager, Project Lead, Developer, Development Manager, Head Technology and Head Offshore are considered as respondents.

3) Within the Functional team e.g. Accounts and Finance Head, Marketing and Sales Head, Inventory Head, Procurement Head and Project Head are considered as respondents.

4) HR Practitioners, Consultants and Advisors are not considered as respondents.

5) Trainees, Contract employees and temporary staff are not considered as respondents.

3.9.4 Sampling Method

IT is growing sector in India. The number of companies is growing every month. Therefore, practically, it is not possible to have the exact number of companies at any given point of time. The researcher points out that this is an ‘Indefinite Universe’.

The data has been collected by random sampling method and then samples are classified as per classification of IT verticals viz. Software Products, IT Engineering, Tools and R&D services, IT Enabled Services (ITES) / Business Process Outsourcing (BPO) services, Hardware and IT services. It has been ensured that samples represent all the IT industry verticals.

3.9.5 Testing of Validity, Reliability and Representativeness of Sample

Validity: Validity is divided into inner validity and outer validity. Inner validity is achieved if the survey used actually measures what is meant to be measured. Furthermore, outer validity is reached when the empirical study is coherent with the reality.
Following Analysis (Testing) is done to analyse validity:

a. Expert validity
b. Criterion validity
c. Construct validity

a) Expert validity: Experts from IT companies, HR Practitioners, consultants and advisors assessed the designed research framework and questionnaire (instrument). Few sample filled questionnaires were used to assess the validity of instrument as well as research framework. The contents were found to be okay and acceptable to the sample population.

b) Criterion validity: The measures are found to be consistent with what is already known and what is expected.

c) Construct Validity: The Construct (performance parameters and CPBM) are valid. This has been cross-verified with experts from IT companies.

This survey contains relevant questions related to performance impact which are measured. The sample reflects the reality, and therefore researcher strove to get results, which were coherent with the reality.

Reliability and Representativeness of Sample:

The survey research is well suited research which ensures relevance of study of CBPM on Business performance. Reliability means the degree to which statements (performance parameters) are based on a careful observation of reality, rather than on accidental circumstances regarding measurement instruments or the researchers’ own biases as people being personally involved. The researcher took several measures to ensure adequate levels of reliability for this research. ‘Unified Matrix’ has been prepared to construct performance parameters (Refer Chapter 2). Unified Matrix has been prepared to limit personal biases by employing as many independent perspectives and sources of data as possible in an iterative process of data collection, analysis, reflection and synthesis.
3.9.6 Comparison of Sample with Ideal Sample

An ‘Ideal Sample’ has been prepared with help of IT company experts with their practical experience. The first step is to convert feedbacks into sample as follows:

Steps for Converting Primary Data into Research Sample

a) Collection of feedback by personal interview and discussion.
b) Checking the correctness and completeness of the feedback.
c) Segregating the feedbacks which may not be related to IT industry.
d) Validating the feedbacks according to sample definition

e) Converting feedbacks into ‘Samples’
f) Preparing the list of samples using the MS Excel sheet

Secondly, the feedbacks are again cross-checked with the ‘Ideal Sample’ for the overall reliability and representativeness.

The following diagram shows the process of converting response into research sample:

Diagram No.3.3 - Process of converting response into Research Sample
After satisfying conditions of reliability and representativeness feedback is treated as ‘Research Sample’. These Research Samples are used for further analysis and interpretation.

3.9.7 Sampling and Non-Sampling Errors

Appropriate steps have been taken to minimize sampling errors at the time of designing the questionnaire, data collection and converting feedbacks into sample. In addition to this, many control points have been developed in classification, tabulation, analysis and interpretation of data. Hence, non-sampling errors have zeroed down with the help of MS Excel and SPSS software.

3.9.8 Sample Size

Number of IT companies is increasing day by day. The total figure is dynamic. Hence, the sample size has been determined based on an informed guesstimate of number of companies, which has been obtained by discussions with Industry Associations, IT experts and Consultants. A figure of 1400 IT companies in and around Pune is taken as on March 31, 2013, since the primary survey was undertaken in April, May and June 2013.

Yamane T. (1967) provides a simplified formula to calculate sample sizes, which provides proportionately more information for a relatively small population. This formula was used to calculate the sample size in the current research study, and is shown below.

\[
N = \frac{N}{1 + N(e)^2}
\]

A 95% confidence level and P = 0.5 are assumed.

Where “n” is the sample size, “N” is the population size (1400 in this case), and “e” is the level of precision (0.05 in this case since confidence level is taken at 95%). When this formula is applied to the above sample, we get Equation:
\[ n = \frac{1400}{1 + 1400(0.05)(0.05)} = 311 \]

While the Questionnaire was circulated to 400 respondents, 313 valid responses were received, which are just more than the calculated value of “n” as above.

### 3.9.9 Source List

The target is to study IT companies in Pune geography. IT Directory Pune 2009 was obtained from Mahratta Chamber of Commerce, Industries and Agriculture (MCCIA), Pune. A list of IT companies was prepared. ([http://www.mcciapune.com/publication-details/Information-Technology/22.aspx](http://www.mcciapune.com/publication-details/Information-Technology/22.aspx), accessed on 1st March 2013).

Additionally, the list of IT companies was obtained from the following:

1) IT Software Companies in Pune List  
([http://www.pune.ws/in/?list=it_software_companies](http://www.pune.ws/in/?list=it_software_companies))

2) List of companies in Pune ([http://www.fundoodata.com/companies-in/pune-I7](http://www.fundoodata.com/companies-in/pune-I7))

3) A-Z Software Companies in Pune ([http://www.itdatahouse.com/A-Z/Pune/Pune_Software_Companies_S_1.htm](http://www.itdatahouse.com/A-Z/Pune/Pune_Software_Companies_S_1.htm))


The information obtained from IT forums, software user groups and software vendors have also become more useful for the study. Following steps were taken to prepare the source list:

1) Collecting the contact details with email addresses from the IT forums and directories.

2) Validation of the addresses for avoiding repetitions.

3) Updating the status of visits, feedbacks and sending acknowledgement letters.

It is important to note that there is no published data available regarding the number of companies falling under each vertical i.e. Software Products, IT Engineering, Tools and R&D services, ITES/BPO, Hardware and IT services in IT industry in Pune.
3.10 Questionnaire

The questionnaire has been framed on the basis of objectives of the study. The questionnaire is written in English. All questions are close-ended with multiple-choice options. To ensure that a comprehensive list of items had been included in the questionnaire, the work of previous researchers was reviewed. Research framework used by earlier researchers was also considered.

As per research objectives, the questionnaire covers the topics such as impact of CBPM on an individual’s performance, managerial performance and its impact on Business Performance.

3.10.1 Questionnaire Design

1) Literature review was done to locate empirical studies done in the area of CBPM & BP. Information on competency based performance measures / management and business performance was obtained from the Internet, books and magazines.

2) Elements of CBPM and BP parameters were identified from earlier empirical studies.

3) While segregation of competencies relevant to IT sector was done based on similar studies conducted in Egypt, Thailand and India (as detailed in Literature Review); grouping of BP parameters was carried out through a unified matrix (as detailed in Literature Review).

4) Further narrowing down of 21 competencies and 8 BP parameters was done by discussions with Industry Associations, Senior Professionals from IT sector, HR Practitioners and Consultants. This was done to cross-check validity of sample on the basis of Criterion (for IT sector) and Construct (performance parameters and CBPM).

The shortlisted 21 competencies are as follows: Drive for Results, Process management, Functional Expertise, Personal Effectiveness, Ability to Influence, Innovation, Team Effectiveness, Customer Service, Self Development Orientation, Analytical Thinking, Physical Ability, Knowledge, Aptitude, Motivation, Communication, Leadership,
Managerial Ability, Negotiation Skill, Personal Values, Social Skills, Technical Competence.

5) Questionnaire was designed based on above competencies and 8 BP parameters as mentioned earlier (Section 3.4). Scaling Technique has been applied for each question and business performance parameters. Likert Scaling Technique was used to rate the criticality. A few demographic questions were added to the existing questions like IT industry vertical, number of employees. Questions were arranged in logical sequence. Ambiguous and personal questions were avoided. Meaning and accuracy of the questions were checked thoroughly.

6) Pre-testing of Questionnaire: Designed questionnaire was sent to IT companies for pre-testing. The sample of organizations to which questionnaire was sent was a perfect representation of actual sample – e.g. Wipro- IT services, Infosys- Software Products and IT services. Total 10 feedbacks were received. Experts suggested some changes to the questions in terms of traditional measures versus CBPM, arranging the questions sequentially etc. These changes suggested by experts in the field were incorporated. The questionnaire was redrafted. Further refinement was made and emphasis was given on following points:
   a) Size of questionnaire,
   b) Appearance,
   c) Clarity and
   d) Sequence of questions

7) Pilot Study: Redesigned questionnaire was sent to 100 IT companies. 70 feedbacks were received from them. Based on this feedback, the reliability and representativeness of questionnaire was checked and some unnecessary questions were deleted to simplify the questionnaire. Chi-square test, ANOVA Test and Factor Analysis was conducted on the pilot data. Based on these pilot study feedbacks, the relationship between research questions, objectives and first 3 set of hypotheses was properly established. Research methodology was confirmed. Some corrections were made in the questionnaire to build
proper relationships. The final questionnaire was thus made ready (please refer to Annexure 1: Questionnaire)

8) Summated Rating Scale (Likert Scaling)

In the Questionnaire Five Point Summated Rating scale known as Likert Scale was used to measure the degree of impact. That is, 5 indicates high impact and 1 indicates low impact. The impact levels are described below:

1) Unnoticeable Positive Impact
2) Nominal (small) Positive Impact
3) Average Positive Impact
4) High Positive Impact
5) Extremely High Positive Impact

Respondents were asked to rate each question. The option of ‘NA’ (Not Applicable) was not given to the respondents and all the questions were made mandatory.

Question No. 1 deals with impact of CBPM on an individual’s work performance. The extent of impact is measured with Likert’s 1 to 5 scale (1 is lowest and 5 is highest). Question No. 2 deals with impact of CBPM on managerial work performance compared with traditional measure. The extent impact is measured with Likert’s 1 to 5 scale (1 is lowest and 5 is highest). Question 3 deals with Impact of CBPM on Business Performance. The extent impact is measured with Likert’s 1 to 5 scale (1 is lowest and 5 is highest).

Competency Based Performance Measures have five major elements viz. Defining competencies, Competency-based employee recruitment and selection, Competency-based training and development, Competency-based performance appraisal, and Competency-based employee rewards. The impact of these elements on business performance is studied in question number 4.
Apart from questions related to objective and hypothesis some general questions like Type of Company (to classify into IT vertical) and number of employees of the company were added.

3.11 Research Strategy and Data Collection

This section discusses the research strategy and details of the data collection techniques used for this research study.

3.11.1 Research Strategy

This research uses sample survey approach. The researcher, in this study, utilizes specialized techniques and the data to support or reject theories (hypothesis). The researcher has collected the primary data by himself from the IT companies and no secondary data was used for this study.

The primary data has been collected by the researcher through a Questionnaire Schedule, in a Direct Personal Interview and Discussion method.

The interviews were conducted in person, and both a ‘structured’ and an ‘informal’ interview methods were used. In the structured part of the interview the interviewees were asked about the CBPM in which they had participated and respondents were asked to fill up the Questionnaire. After this, a less formal interview was conducted. In the less formal section of the interview, the questions focused general impact of CBPM on Business Performance.

This structured approach kept the interview highly focused. Secondly, the variation between interviews could be minimized. The informal interview helped the researcher in correlating the answers given in structured questionnaire, arriving at the conclusion of correctness and completeness. Many respondents explained the CBPM model comprehensively. The researcher could thus get insights from employees in the organizations and their reporting authorities, who were part of CBPM.
3.11.2 Data Collection

The researcher has collected the primary data by himself from the IT companies and no secondary data was used for this study. The data was collected through Questionnaire Schedule in a Personal Interview. The surveyed sample included 400 Pune based IT organizations, out of which 205 companies responded (listed in Annexure 2) with a total of 313 respondents. Following table shows the details of responses received.

Details of Primary survey response are summarized below:

Table No. 3.2 Response details

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars of Responses</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Population Size (number of companies)</td>
<td>1400</td>
</tr>
<tr>
<td></td>
<td>OUT OF THIS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Questionnaire circulated (respondents)</td>
<td>400</td>
</tr>
<tr>
<td>3</td>
<td>Valid Responses Received (205 companies)</td>
<td>313</td>
</tr>
<tr>
<td>4</td>
<td>No response – since Organization policy is not permitting</td>
<td>45</td>
</tr>
<tr>
<td>4</td>
<td>Response rejected – since Incomplete response</td>
<td>42</td>
</tr>
</tbody>
</table>

3.11.3 Data Classification into IT Industry Verticals

Experts have divided the IT sector into following five groups / verticals for the purpose of analysis. The same classification has been taken for present research study. Total 313 respondents participated in the survey and contributed towards Competency-based Performance Measures / Management (CBPM) Study. The following Table shows classification of IT sector verticals and vertical-wise participation:
### Table No 3.3 Vertical-wise respondents

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Vertical</th>
<th>Details</th>
<th>Number of Respondents who participated in research study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Software Products</td>
<td>Variety of Software Products</td>
<td>107</td>
</tr>
<tr>
<td>2</td>
<td>IT Engineering and R&amp;D services</td>
<td>IT Engineering, Tools and Research &amp; Development services</td>
<td>49</td>
</tr>
<tr>
<td>3</td>
<td>ITES/BPO</td>
<td>IT-enabled services / Business Process Outsourcing services</td>
<td>43</td>
</tr>
<tr>
<td>4</td>
<td>Hardware</td>
<td>Hardware, Security, Network Design, Data Communications</td>
<td>42</td>
</tr>
<tr>
<td>5</td>
<td>IT services</td>
<td>Internet Service Provider, System Integrator, Software Services, Data - Mining, Warehousing &amp; Processing</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>313</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### 3.12 Data Analysis Techniques

The analysis proceeded as follows. Firstly, collected data was compiled, classified, tabulated and presented with the help of MS Excel. Then, statistical analysis was done with the help of SPSS software. Finally, Interpretive Structural Modeling (ISM), Path analysis and Factor Analysis techniques have been applied to understand the relationships between the performance variables. Following section describes these techniques in detail:
3.12.1 SPSS Software

For analysis, Statistical Package for the Social Sciences (SPSS), developed by SPSS Inc. standard version, release 13 had been used. SPSS was selected as it supports the researcher in the possibility to link data towards theory in an efficient way.

3.12.2 Interpretive structural Modeling (ISM)

Interpretive structural modeling (ISM) is a well-established methodology for identifying relationships among specific items or variables, which define a problem or an issue. Therefore, in this research, these variables have been analyzed using the ISM approach, which shows the interrelationships of the performance variables, and their driving power and dependence.

3.12.3 Structural Equation Model (SEM)

Structural Equation Modeling (SEM) technique is used for building and testing statistical models. Following two techniques have been used in SEM:

1. **Path analysis** has been done to provide estimates of the magnitude and significance of hypothesized causal connections between performance variables.

2. **Factor Analysis** has been used to examine the pattern of inter-correlations between the performance variables, and determines whether there are subsets of factors (variables) that correlate highly with each other but that also show low correlations with other subsets.

3.13 Expected Research Outcomes and Constraints

This section discusses the expected research outcomes. It also introduces some research constraints that have been identified for this research study.

3.13.1 Practical Outcomes

The practical outcomes of the research involve an improved understanding of impact of CBPM on Business Performance within the IT industry. The impact is seen from
individual, managerial and organizational perspective. Organizations that are using CBPM model can get the better understanding and may extend this model to all the divisions and projects. Organizations that are not using CBPM model may think of using it. CBPM models have been found to be complex in nature, based on previous research. The present study can thus help to establish some key areas that need attention in CBPM model in IT organizations.

3.13.2 Theoretical Outcomes

It has been found from many research projects and thorough literature review that no research on CBPM has been conducted prior to this research study. Further, no research was focused on IT industry in Pune region. Thus, this research will add to the growing body of knowledge on CBPM in IT industry.

3.13.3 Research Constraints

Following are the few research constraints identified with this research study:

- Lack of earlier research regarding CBPM in IT sector companies.

- This research study primarily focuses only on IT industry and no other sector companies have been considered. Out of 400 responses 313 valid feedbacks were received.

- Organization’s policy prohibits sharing of CBPM information with the researcher. This limits the accessibility to the researcher.

- Decision of using CBPM model depends upon size of organization. Large organizations have gone for CBPM approach. Small and Medium businesses have not gone for it. Understanding of CBPM model will be poor in these companies.
3.14 Framing of Hypotheses
Since the objective of this study is to systematically study the relationship between CBPM and Business Performance in IT industry, this researcher conjectures that organizations will derive best results by adopting CBPM model. This conjecture has been elaborated and framed in the form of next set of 2 Hypotheses, in addition to first set of 3 Hypotheses. The 5 Hypotheses as summarized below:

**Hypothesis H1:**
Competency based performance measures (management) are positively related to an individual’s performance

**Hypothesis H2:**
Competency measures (management) have strong relationship with managerial performance than traditional human capital measures

**Hypothesis H3:**
Competency based performance measures (management) are positively related to business performance

**Hypothesis H4:**
The impact of each element of CBPM (i.e. defining competencies; recruitment and selection; training and development; performance appraisal and employee reward) is equal on Business Performance.

**Hypothesis H5:**
The impact of CBPM on each Business Performance parameters (i.e. Cost reduction, Revenue Growth, Market share, Customer satisfaction, Innovation, Project Delivery Process, Employee retention and Employee productivity) is equal.
3.14.1 Hypotheses linkage with Questionnaire

1) To test the first, second and third hypothesis which comprises of relationship study in the IT organizations, ‘Yes’ or ‘No’ type of questions have been designed. To measure the extent of impact Likert’s scale 1 to 5 has been used for these questions.
2) To test fourth and fifth hypotheses, last question has been designed, which gives a multidimensional outcome wherein it studies the linkage of elements of CBPM with elements of Business Performance. To measure the extent of impact Likert’s scale 1 to 5 has been used for this question.

3.15 Conclusion

This chapter outlined the research approach that was adopted for this research study. The aim of this chapter is to examine the validity of the CBPM found in the literature. Based on the research articles covered in the previous chapters, hypotheses and research model were developed. Qualitative and quantitative approaches have been selected for this research problem. A sample survey method has been selected as the most appropriate research method. The data collection technique used is questionnaire schedule in a personal interview method.

The focus of the study is IT organizations. T-test and descriptive statistics were used to analyze the data. Interpretive Structural Modeling (ISM) has been used to identify relationships among specific items or factors, which define a problem or an issue.

The current research is an attempt to improve understanding of relationship / impact of CBPM on BP, which is among the growing number of CBPM research studies.
Diagram 3.1 Research Framework of Competency Based Performance Management (CBPM)

1. Competency-based Human Resource definition
2. Competency-based employee recruitment and selection
3. Competency-based training and development
4. Competency-based performance Appraisal
5. Competency-based employee rewards
Diagram 3.2 CBPM impact on Business Performance in a hypothesized model

Independent Variable (CBPM)
- CB competency planning
- CB recruitment & select.
- CB training and development
- CB performance Appraisal
- CB employee rewards

Dependent Variable (BP)
- Cost reduction
- Revenue Growth
- Market share
- Customer satisfaction
- Innovation
- Project Delivery Process
- Employee retention
- Employee productivity
- Financial
- Customer
- Intl. Business Process
- Learning and Growth