CHAPTER - III
RESEARCH METHODOLOGY

Research methodology is the foundation of any research. It is collective term used for structured process of conducting a research. It may be understood as a science of studying how research is done scientifically. It consists of rationale of defining the research problem, formulation of hypothesis, adoption of particular method(s) for collecting the data and analyzing the data and similar other questions. Research methodology is a way to systematically solve the problem. The present chapter portrays the research methodology used in this research work. The study under consideration “Role of Information Technology in Corporate Governance” has been conducted by the application of two techniques for analyses, to examine whether IT and its applications play a critical role in corporate governance practices of companies.

3.1 RESEARCH DESIGN

The research design is a comprehensive master plan of the research study to be undertaken, giving a general statement of the methods to be used. It is the framework, a blueprint for the research study which guides the collection and analysis of data stating measurement procedures and sampling details. Present study has followed exploratory and conclusive research design to derive empirical results. It is exploratory in the sense that study tried possible insights that may help in identifying areas of further rigorous study, by adopting a method of survey of existing literature. It is conclusive in the sense that it tested hypotheses and insights and examined the relationships among defined variables. It is empirical in the sense that it is a data based research used to achieve meaningful conclusions that are capable of being verified by observation or experimentation. Two research methodologies, namely, meta-analysis (a statistical combination of results from two or more separate studies) and content analysis (a study to draw inferences on the basis of contents of recorded communications) have been implemented in two phases respectively; so as to achieve the study objectives.
3.1.1 OBJECTIVES OF THE STUDY

A. Objectives for Meta Analysis:

1. To synthesize results from completed studies to determine whether there is an empirical support for a relationship between information technology and its applications and Firm performance.

2. To synthesize results from completed studies to determine whether there is an empirical support for a relationship between corporate governance and Firm performance.

3. To synthesize results from completed studies to determine whether there is an empirical support to state importance of IT governance understanding and awareness for organizations to achieve a better alignment between business and IT so as to attain edge over competitors.

4. To contribute to the conceptualization of information technology for corporate governance.

B. Objectives for Content Analysis:

1. To construct the ITDI score.

2. To construct the CGDI score.

3. To assess the relationship between ITDI score of relative parameters and firms’ performance for the sample companies.

4. To assess the relationship between CGDI score of relative parameters and firms’ performance for the sample companies.

5. To examine the nature and strength of relationship between information technology and corporate governance metrics (i.e. IT and CG scores of relative parameters) among the sample companies.

6. To contribute to the conceptualization of information technology for corporate governance.
3.1.2 HYPOTHESES OF THE STUDY

A. Hypotheses for Meta Analysis:

1. IT has a general positive association with various measures of Firm performance and there is no significant difference among the results indicated by sample studies.

2. CG has a general positive association with various measures of Firm performance and there is no significant difference among the results indicated by sample studies.

3. IT governance mechanism has a general positive tendency for effective IT alignment so as to achieve competitive advantage and there is no significant difference among the results indicated by sample studies.

B. Hypotheses for Content Analysis:

1. There is no significant and strong degree of relationship between IT and firms’ performance.

2. There is no significant and strong degree of relationship between CG and firms’ performance.

3. There is no significant and positive association between IT and CG metrics.

4. There is no significant causal relationship between IT and firms’ performance.

5. There is no significant causal relationship between CG and firms’ performance.

6. There is no significant causal relationship between IT and CG metrics.

3.2 SCOPE OF THE STUDY

The study is an endeavor to provide insights on role of information technology in corporate governance. The same has been carried out under two-phase analysis, assuming and thus, revealing the importance of IT and CG for firms’ financial performance and also establishing inter-linkages between all the study variables. The first phase of the present study is confined to the studies which met inclusion criteria for meta-analysis under three categories: IT and Firm performance, CG and Firm performance, and level of understanding and awareness of ITG importance for
organizations with special focus on ITG key domains. The second phase, based on the content analysis, developed two indices, namely IT Disclosure Index (ITDI) and Corporate Governance Disclosure Index (CGDI), and has considered only NASSCOM member companies which are mainly IT and IT enabled companies as the subjects. Contents on websites of each of the sample companies have been inferred to achieve the objectives of the study. An attempt has been made to reveal the significance of IT in corporate governance, by categorizing the collected data into three categories: IT and firms’ performance, CG and firms’ performance, and IT and CG metrics interrelationships. Firms’ performance has been considered as equivalent to few selected financial parameters which have been taken into account for the financial year 2010-2011 only. Also, results synthesized from meta-analysis have been compared to the empirical results drawn in second phase of the study.

3.3 SAMPLE DESIGN AND SAMPLE SELECTION

In the first phase of the study, a sample of 44 studies in total has been taken under purposive sampling technique, with categorization of studies into three segments: (i) IT and Firm performance having a sample of 16 studies (ii) CG and Firm performance having a sample of 12 studies and (iii) level of understanding and awareness of ITG importance for organizations with special focus on ITG key domains having a sample of 16 studies. The selection of studies was guided by methodological inclusion and exclusion criteria. Since, application of IT for effective corporate governance mechanism can be termed as IT governance and due to non-availability of empirical studies regarding IT and CG relationships, studies emphasizing the importance of IT governance and its key five domains to attain competitive edge were considered for analysis.

In the second phase of the study, a sample of 169 NASSCOM members has been considered under purposive sampling technique. Though the size of universe was 1370 units only; but availability of limited data constrained the final selection to 169 units only. As the study is confined to IT and IT enabled companies, all sample units affiliated to NASSCOM were considered. The National Association of Software and Services Companies (NASSCOM) is a not-for-profit Indian consortium created to
promote the development of the country's IT (information technology) and business process outsourcing (BPO) industries.

3.4 DATA COLLECTION AND PREPARATION

Data collected can be categorized into two types: primary data and secondary data. Primary data is data that has not been previously published, i.e. the data is derived from a new or original research study and collected from the first hand source. Secondary data is not originated by the investigator himself but obtained from someone else's records. Heaton (1998) defines secondary analysis as ‘the use of existing data collected for the purposes of a prior study, in order to pursue a research interest which is distinct from that of the original work’. For the present study, secondary data has been collected to achieve the objectives of the study.

PHASE I:

Data Collection: Before collecting the requisite studies for undertaking meta-analysis, selection criteria form was developed which stated both the inclusion and exclusion criteria. Then computerized databases were searched with keywords defined beforehand. INFORMS and Sciencedirect were the main outlets for the given study that provided studies to constitute a fair number of sample studies. Numerous studies were tracked in scrutinizing process but only 44 studies in total could be considered for analysis. These studies were categorized into three segments: (i) IT and Firm performance constituting 16 studies (ii) CG and Firm performance with 12 studies and (iii) 16 studies for third aspect i.e. level of understanding and awareness of ITG importance for organizations with special focus on ITG key domains to attain competitive advantage.

Data Preparation: Data preparation was done by re-checking, coding and transcribing the selected studies. As a first step, all the selected studies were re-checked to confirm their selection criteria status to ensure consistency in selection procedure. After this, all studies were given the specific codes. Code book was prepared after sort listing the relevant studies. Code book encompassed details regarding the assigned codes to the selected studies. In transcribing the desired values from coded studies, values were fed directly into MS-Excel spreadsheets.
PHASE II:

Data Collection: As the second phase was confined to IT and IT enabled companies, only contents of NASSCOM member companies were considered. To collect the required data, two indices were developed; one for assessing the impact and orientation of companies’ for IT called “IT Disclosure Index” (ITDI) and other for assessing the conduct of companies’ regarding corporate governance practices called as “CG Disclosure Index” (CGDI). The ITDI dimensions are based on NASSCOM IT Users Awards, Evaluation criteria (NASSCOM, 2012) and Board Briefing, IT Governance Institute (ITGI, 2003). ITDI comprises five metrics including ITG (having six dimensions) with 64 sub-points in total. The five categories included: innovation and thought leadership, IT excellence in achieving business goals, scale of project and impact, strategic approach to IT implementation and IT governance. The second index, CGDI, categorized in four sections included: ownership structure and shareholder rights, financial and operational information, board and management structure and process, and business ethics and corporate responsibility. These four main sections were further classified in ten sub-categories with 130 statements in total. CG Disclosure Index is based on Standard & Poor’s: S&P ESG India Index Methodology (April, 2011). Validity and reliability are two fundamental elements in the evaluation of a measurement instrument. Prerequisites of the validity and reliability of the two indices framed in the study were ensured. Data collected for both indices was exposed to website disclosures of respective sample firms. To examine the relationship between ITDI and CGDI with firms’ performance respectively, data regarding firms’ financial performance was retrieved from Capitaline Plus for the financial year 2010-11. For the present study, thirteen indicators of financial performance for the financial year 2010-11 were taken into consideration. Financial performance measures considered include: rate of growth (%age) of sales, rate of growth (%age) of profit after tax, rate of growth (%age) of market capitalization, market price to book value, debt-equity ratio, current ratio, inventory ratio, debtors ratio, return on capital employed (%age), return on net worth (%age), earnings per share, dividend (%age) and price-earnings ratio. In the study, only financial aspects relating to Firm performance were taken into account.
**Data Preparation:** Same steps for data preparation were followed for second phase. Initially, all the shortlisted units were verified ensuring the availability and accuracy of financial data from Capitaline Plus for the financial year 2010-11. All the selected sample companies were assigned specific codes and disclosure scores on both indices of respective sample units were calculated. A dichotomous procedure was followed to score each of the disclosure items of both the ITDI and CGDI. Each company was awarded a score of ‘1’ if the company disclosed the concerned issue and ‘0’ otherwise, in the absence of any disclosure on a given issue. The net score of each company was found by adding all the individual scores of various sub-dimensions for each index respectively. Finally, value of scores of relative dimensions for both the indices and financial predictors’ values were fed directly into MS-Excel spreadsheets.

**3.5 DATA ANALYSIS AND PRESENTATION**

**PHASE I:**
In the first phase of the study, meta-analysis methodology developed by Neyeloff, et al. (2012) was followed. Neyeloff, et al. (2012) constructed a step-by-step guide to carry meta-analysis using both fixed effects and random effects models. For given study random effect model was used to assess the degree of homogeneity among selected studies under three dimensions: IT and Firm performance, CG and Firm performance, and ITG and its relative importance to attain competitive advantage. The homogeneity of variance assumption of random effect model was examined by determining the significance of the Q statistic, which provided an estimate of the degree of heterogeneity in the distribution. The Q statistic was calculated by comparing the error variances associated with each effect size and the significance is determined using a Chi-Square distribution. The distribution of primary effect sizes was also analyzed for skewness and kurtosis. The results thus derived from analysis were interpreted and presented though tables, bar charts and forest plots for respective dimensions. Forest plot is a convenient and intuitively easily understood manner of presenting effect sizes and their confidence intervals in a graphic manner. The overall summary effects for respective dimensions have been represented on the respective plots as a vertical line, highlighted by a diamond symbol. All the statistical results for phase I were computed in MS-Excel.
PHASE II:

In the phase II, content-analysis methodology was followed to derive the conclusions in purview of predefined objectives. The data so collected for phase II, was processed in Statistical Package for Social Sciences (IBM, SPSS-Version 19) and MS-Excel to derive conclusions. Analysis in phase II was supported by frequency distribution, correlation analysis, Multivariate-ANOVA and multiple regression analysis. In order to study the pattern and frequency of IT (impact and orientation) disclosures and CG disclosure practices of each of the sample company, weighted disclosure scores were calculated and presented by tables. Information Technology Disclosure Index (ITDI) was calculated using the following formula which provided weighted disclosure scores:

\[
\text{ITDI} = \frac{\text{Total Score Obtained by the Company}}{\text{Maximum Possible Score Obtainable by the Company}} \times 100
\]

Whereas, weighted disclosure scores of Corporate Governance Disclosure Index (CGDI) were calculated using the following formula:

\[
\text{CGDI} = \frac{\text{Total Score Obtained by the Company}}{\text{Maximum Possible Score Obtainable by the Company}} \times 100
\]

The value of ITDI and CGDI ranged between ‘0’ and ‘100’ where former reflects worst web disclosure and latter represents best disclosure regarding concerned issue. Besides, overall weighted scores sub-dimensions-wise disclosure scores were also computed and henceforth, presented in tabular form. In the study, to examine the relationship between IT and CG with Firm performance indicators respectively and also between IT and CG predictors, Pearson product moment correlation and multiple regression analysis were conducted. Pearson product moment correlation coefficients and multiple regression coefficients were calculated in order to identify any statistically significant relationships existing among various parameters defining Firm performance, IT orientations and CG practices. Moreover, Multivariate analysis of variance (MANOVA) was also undertaken to check the significance of the study predictors for respective outcomes, though the same was conducted on the
overall weighted scores of both indices and not on the sub-dimensions score values for Firm performance measures. It is because of the fact that study intended to investigate the overall relationships between predictors and outcomes, while highlighting the importance and contribution of each and every predictor independently for varied outcomes through multiple regression. The results so generated were interpreted and presented with the help of appropriate statistical tables.