CHAPTER 3

RESEARCH METHODOLOGY

This chapter presents the research design adopted for this study. It details out the methodologies used at various stages of research for the accomplishment of the defined research objectives.

Rationale of Study

The world is witnessing the adverse effects of environmental pollution and climate change. The growth of population is continuing to place unprecedented demands on the natural resources leading to competition for resources. The sheer scale and complexity of these challenges advocates a need to sensitize the society about sustainability. Although, a large number of governments and businesses have come together at global level to implement policies to control and offset these adversities by proposing frameworks for sustainability, yet, a lot needs to be done. The ethical underpinnings of sustainability are also strongly grounded in the business’ sensitivity towards a new model that integrates environmental and societal needs and concerns with its bottom-line.

A company needs to adopt a pragmatic approach to assess the need and impact of the sustainability concerns it faces. Although some research on Indian companies has been conducted in the past, to separately examine the status of disclosure practices in Corporate Governance and Corporate Social Responsibility, the concept of Corporate Sustainability has still not been well researched. There is still a dearth of studies which comprehensively and simultaneously examine performance of a company on all the three dimensions of sustainability – governance, environment and social concerns, and also on identifying the determinants of sustainability disclosures made by companies. This study responds to this gap.

Up until now, research has been predominantly focused/concentrated on understanding ‘Who’ drives corporate sustainability and ‘Why’ firms adopt sustainability, what are the advantages of aligning its products and processes with sustainability principles. This study focuses on the ‘What’ and ‘How’ of corporate sustainability. It aims at understanding ‘what’ an organization considers as being a
dimension of sustainability and ‘how’ it records and reports sustainability information to its stakeholders. It also endeavors to devise an objective mechanism or instrument to measure the level of sustainability information disclosures in quantitative as well as qualitative terms. An instrument that can assess and analyze a company’s impacts and contribution to the environment and society through its disclosures has undoubtedly become pertinent in recent times, a gap to which this study responds.

Literature also suggests that sustainability issues are becoming important in the board room discussions. Diversity on boards will encourage the board members to be more focused on long term goals to achieve sustainability. Presence of women on boards contributes to accomplish the objective of sustainability. It is also noted that most empirical research on board diversity to date has been mainly restricted to data from Norway and other Scandinavian countries, Australia, US and UK and there is a dearth of research on board diversity in Asia and particularly India. In this context, this study aims at understanding the state of women representation on Board of Directors of Indian listed companies and its possible implications on Corporate Sustainability.

The existing literature in presenting a case for putting more women on boards highlights the intangible as well as tangible benefits women presence on boards can bring to organizations. However, the different studies in this regard present mixed results with some studies finding a positive association between gender diversity on boards and the performance of a company while others finding a negative or no association between the two. Similar studies in Indian context are virtually non-existent. This study aims at investigating the possibility of such associations in a sample of Indian listed companies.

In concurrence with the assumption that sustainability requires a change in mindset, this research also aims at understanding the perceptions of directors about the presence and contribution of women on the Board of Directors and Corporate Sustainability. Although few director perception surveys have been undertaken around the world in the past, such surveys, in the Indian context are a rarity. In the past some researchers have limited such surveys to single gender respondents in the form of either all male surveys or all female surveys (Burke,
1995; Sheridan, 2001), thereby not providing the complete picture and limiting thorough analysis of the problem under investigation. This study tries to overcome these limitations and gaps through its Directors’ Perception survey with both men and women directors as its respondents (Hillman et al., 2002; Westphal & Stern, 2007; Nielsen & Huse, 2010a, 2010b). This permits complete analysis with useful comparisons in perceptions, expectations and recommendations coming from each category.

**Objectives**

This study has been undertaken with the following objectives in mind:

1. To study the corporate sustainability practices followed by Indian Companies.
2. To examine the status of gender diversity on corporate boards in Indian companies.
3. To examine the relationship, if any, between women presence on BOD and the three dimensions of sustainability i.e. economic performance, sensitivity towards societal issues and quality of environmental disclosures of a company.
4. To understand the perception of directors, men and women, about sustainability and the representation of women on boards.

**Hypothesis**

To study corporate sustainability practices through disclosures made in the annual reports, a Corporate Sustainability (CS) Index was developed and its scores used to test the following null hypotheses:

- **H0₁** There is no significant difference in CS disclosure practices of companies and their industry / sector classification.
- **H0₂** There is no significant difference in CS disclosure practices of companies and their size.
- **H0₃** There is no significant difference in CS disclosure practices of companies and their age.
For accomplishing the second objective of this study the status of gender diversity on corporate boards in the sample Indian companies was examined over the period of 6 years and a thorough analysis conducted in testing the following null hypotheses:

H0₄ There is no significant difference in gender diversity on boards of companies and their industry / sector classification.

H0₅ There is no significant difference in gender diversity on boards of companies and their size.

H0₆ There is no significant difference in gender diversity on boards of companies and their age.

To study whether there is a relationship between the representation of women on BOD and the economic, social and environmental sustainability the following three assumptions or null hypotheses were tested:

H0₇ There is no significant relationship between gender diversity on boards and the economic performance of a company.

H0₈ There is no significant relationship between gender diversity on boards and the sensitivity of a company towards societal issues.

H0₉ There is no significant relationship between gender diversity on boards and the quality of environmental disclosures of a company.

To understand the perception of directors, men and women, about sustainability and the representation of women on boards, the following hypotheses were tested:

H0₁₀ There is no significant difference in men and women directors’ awareness of the concept of Triple Bottom Line (TBL) and their identification of key drivers of Corporate Sustainability.

H0₁₁ There is no significant difference between men and women directors’ views on the importance and frequency on which the key sustainability issues feature on the boardroom agenda.

H0₁₂ There is no significant difference in the perception of men and women directors regarding the diversity on boards of directors.
H0_{13}  There is no significant difference in the perception of men and women directors regarding the qualifications, skills and competence that women bring on board.

H0_{14}  There is no significant difference in the perception of men and women directors regarding the opportunities for women’s appointment on Boards.

H0_{15}  There is no significant difference in the perception of men and women directors regarding the existence of stereotypes against women.

H0_{16}  There is no significant difference in the perception of men and women directors regarding the professional conduct of Board’s activities.

The details on the measures chosen and the techniques used for testing these assumptions are explained in detail in the section on methodology.

**Methodology**

**Sample & Sampling Techniques:**

To achieve the first and the second objectives of studying the corporate sustainability practices followed by Indian companies and examining the status of gender diversity on their Boards of Directors, a sample of companies listed on the BSE500 index were originally selected. BSE500 index was chosen as it represents nearly 93 per cent of the total market capitalization on Bombay Stock Exchange and it covers all 20 major industries of the economy (Sikand et al., 2013; BSE website). Also out of a total of 12176 directors on boards of 2086 BSE listed companies who had filled information till April 15, 2010, only 604 (5%) were women. This figure was 169 out of 3271 (5%) on BSE500 companies also. So again the sample frame was truly representative.

Given the long term nature of sustainability, a longitudinal study over a period of 6 financial years i.e. from 2006-2007 to 2011-2012 was undertaken for a useful and complete analysis. The year 2006-07 was chosen as the initial year for the study as in January 2006 the recommendations of the Narayan Murthy Committee (2004) constituted to assess the adequacy of corporate governance practices came into effect. The committee’s recommendations led to the revision of the Clause 49 of Listing requirements of SEBI (SEBI circulars, 2000, 2004 and 2006). So in
choosing the period for this study starting from 2006-2007 it was considered appropriate to assume that the sample companies would mostly comply with (atleast) all the mandatory requirements of Clause 49 (Kaur et al., 2009). This allowed the analysis of the reporting and disclosures made by the sample companies based on guidelines other than Clause 49.

From the original sample of BSE500 companies, 245 companies were eliminated as they were acquired / merged, delisted, liquidated or naturally replaced by the end of financial year 2011-12. 25 companies were further excluded as they had a reporting period other than the financial year (Bettman & Weitz, 1983; Sikand et al., 2013). By doing this same period of comparison and control of extraneous factors like economic and political environment etc. was ensured. After extensive efforts of collecting the 6 year data through annual reports, Capitaline Plus corporate database, Directors’ database and company websites, 45 companies, with missing data of one or more years, were further eliminated to derive the final sample which consisted of 185 companies (Sikand et al., 2013). Reporting and disclosure practices and status of gender diversity on boards of directors of these 185 companies (Annexure I) were studied over a period of 6 years. The relationship of women presence on BOD and the economic performance, social involvement and environmental concern of a firm was later studied for the same sample companies.

The final sample of companies represented 19 sectors. The Finance sector (17 per cent) makes up the largest group of companies, followed closely by industries such as Healthcare (10 per cent), Capital Goods (9 per cent) and Transport equipments (8 per cent).

All sample companies were later classified under two broad categories of ‘High Profile’ and ‘Low profile’ industries (Hackston & Milne, 1996). The first three sectors with the highest number of companies in the sample as mentioned above can also be classified as ‘Low Profile’ sectors (Hackston & Milne, 1996) as they represented industries with low consumer visibility, a low level of political risk (Roberts, 1992; Hackston & Milne, 1996), or low degree/intensity of competition. Transport equipments and Agriculture sectors classified under ‘High profile’ (Hackston & Milne, 1996) jointly contributed 14 per cent of total companies in
the sample. A total of 66.49 per cent (123 companies) companies in the sample represented ‘Low Profile’ sectors.

For understanding the perception of directors, men and women, as to the representation of women on boards and sustainability, a survey of directors was carried out.

Past research studies involving boards of directors, such as Sheridan (2001), Burgess & Tharenou (2002), Daily et al. (1999), Burke (1995), Holton (1995) and Mattis (1993) were carried out primarily focusing on views of only one gender – generally that of female directors, thereby not presenting a holistic picture or complete understanding of whether women’s and men’s perceptions are different (Sheridan & Milgate, 2005). A few and more recent studies have tried to overcome this limitation by exploring the perceptions and views of both men and women directors. These include Westphal & Stern (2007), Huse et al. (2009), Nielsen & Huse (2010a, 2010b), Hillman et al. (2002) and Ibrahim & Angelidis (2011).

This study carries out a Directors’ Perception Survey in the Indian context by using a sample of both men and women directors of BSE 500 companies. In 2010, out of a total of 12176 directors, 604 women directors on boards of companies listed on BSE were identified from the Directors’ Database – a database of directors of companies listed at Bombay Stock Exchange (BSE) and a corporate governance initiative of BSE. A similar status was found on BSE500 with 169 WOB out of a total of 3271 total directors, making the overall women representation on boards of directors approximately 5% of total directors.

Names of the directors were taken from the Directors’ Database and the company annual reports. The addresses of directors were obtained from the Ministry of Corporate Affairs database.

To have a reasonable sample for the study, all 169 Women directors (on BSE500) were taken in the sample and with an equal number of Men directors randomly selected, the initial sample was planned as having 338 respondents. So the technique of ‘Census’ was adopted for selecting Women and ‘Random Sampling’ was adopted for selection of Men into the sample for the perception study.
On further evaluation it was observed that mailing information was either not available or was partially available or there were visible/obvious errors in the addresses for 19 women directors, so they had to be excluded from the sample. Making the final sample of women directors = 150. So an equal number of Men directors were selected randomly, making the final sample of 300. The men directors whose addresses were not available or partially available or were incorrect were replaced with another male director, so that the sample does not fall below 300.

Sources of Data and Data Collection

This study made use of both – Primary and Secondary data for the purpose of accomplishing its objectives. Structured questionnaire was used to gather primary data from the sample directors. A corporate Sustainability Index (CSI) was developed for examining the extent and quality of sustainability disclosure practices of the sample companies. The survey questionnaire and the CSI were pre-tested for validity and reliability.

Secondary data was collected from audited Annual Reports filed with the Stock Exchanges, Sustainability Reports, company and stock exchange websites, Capital Market database ‘Capitaline Plus’, Directors Database, Ministry of Corporate Affairs and Registrar of Companies.

The type of secondary data that was used in the study included the information of companies listed on BSE and comprising BSE 500 companies, information of company mergers/acquisitions, liquidations, de-listing etc., information of board of directors of BSE 500 companies, financial information such as Profits before depreciation, interest and taxes (PBDIT), Profits after tax (PAT), Share Capital and Share Price data, Book value and market value of shares, Sales, Market Capitalization, Total assets etc. Further details of the data used along with its source are discussed along with every variable explained in the next section.

Annual reports were chosen as the most appropriate data source in the absence of other reliable and authentic secondary sources to study the environmental and social aspects of sustainability. Annual reports have been successfully used, over
other published documents, by many researchers in the past. Evidence was found regarding annual reports being used as a data source in studies of organizational behaviour and strategy (Arndt & Bigelow, 2000; Bettman & Weitz, 1983; Salancik & Meindl, 1984). They have been known to provide comparable sets of data (Bettman & Weitz, 1983; Arndt & Bigelow, 2000) for a broad sample of companies. Annual reports have been consistently used in research exploring issues related to sustainability (Bansal, 2005), especially disclosures related to environmental and social quality and their correlation with performance (Clarkson et al., 2008; Cormier et al., 2005; Hackston & Milne, 1996; Maignan & Ralston, 2002; Patten, 2002). Annual reports are a significant communication tool for general public and an instrument of impression management (Arndt & Bigelow, 2000). One concern in using annual reports as a data source has been the probability of inflation in the contents. However, as emphasized by Krut & Munis (1998), this may be dismissed on the grounds that companies can be held accountable for their commitments in these reports. Therefore content of the annual reports can be assumed to be reasonably accurate and reliable.

Content analysis was used to analyze the sustainability practices. In content analysis a script is codified based on some selected criteria (Weber, 1988). Subsequently, quantitative index or scales are derived on the basis of a scoring system and used for further analysis and inferences capable of replication (Krippendorff, 1980). Use of content analysis has been widely used and documented in literature as the most appropriate method to study and analyze the environmental and social performance of companies. Past studies on environmental and social disclosures such as Abbott & Monsen (1979), Bowman (1984), Guthrie & Mathews (1985), Guthrie & Parker (1990), Hackston & Milne (1996), Maignan & Ralston (2002), Patten (2002), Cormier et al. (2005) and Clarkson et al. (2008) as well as sustainability studies by Bansal (2005) and Galbreath (2011) used content analysis.

**Directors’ Perception Survey Questionnaire**

Substantial time and effort was invested in designing the survey questionnaire, constructing measurement scales and eliminating ambiguity. Questions in the
survey instrument were drawn after extensive and in-depth study of previous empirical and conceptual research work and literature. Inputs from the AIMA’s National Conference on ‘Developing Women Business Leaders: Agenda for Action’ held on January 20-21, 2012 and interaction with board of directors during and after the conference, inputs form preliminary personal interviews with the Registrar of Companies and some of the directors and senior management officials of companies, correspondence with authors of research papers and reports led to development of a clearer methodology. Expert opinions helped in removing ambiguities and helped improve the survey instrument leading to the final draft mailed for pre-testing.

Pretesting: Initially an 8 page questionnaire with 32 questions was designed after multiple iterations. The questionnaire was mailed, for pretesting, to 50 directors - 25 men and 25 women directors. To increase the response rate, a follow up / reminder was posted after 1 month of the initial posting of the questionnaires as done in other studies involving participation of corporate elites such as Directors, MDs/CEOs etc. A follow up or reminder has been documented to increase the response rate in similar studies in the past such as Burke (1995), Sheridan (2001) and Sheridan & Milgate (2005). These studies have documented one follow up for their surveys. A second reminder was sent two months after the initial posting (Westphal & Stern, 2007; Nielsen & Huse, 2010a). The pre-testing analysis was done on 16 questionnaires, 10 received from men and 6 received from women directors after the two follow ups.

Most of the questions were treated as categorical - nominal and ordinal, which were put to test using simple statistical tools. Four sub-scales were created by combining related statements from the 37 items or statements spread over two questions such that each one represented and measured one factor that influenced and explained the status of representation of women on boards of directors. These sub scales were named as – Qualifications, Skills & Competence, Opportunities, Stereotypes and Board Conduct. Some statements in these subscales were negatively framed and so have been reverse coded. The internal consistency of each of these scales was evaluated using Cronbach’s alpha. The α of 0.851, 0.758, 0.762 and 0.718 for each of the sub scales mentioned above was found to be
greater than 0.70 considered acceptable in literature, also because Cronbach’s alpha generally tends to be lower when working with reverse coded items.

Key modifications made, during iterations and discussions with experts as well as after pre-testing, included removal of the ‘Ranking’ scales by converting them either into rating (5 or 3 point Likert) or to categorical/nominal (tick one which is most appropriate) as ranks were missed in most of the cases and there were lot of missing values which would have been a problem at the time of analysis. The number of open ended questions was reduced from 3 to just 1, some non-strategic, non-response questions were deleted, and wording of some statements was improved and footnotes added at some places to remove ambiguity. Some multiple statement questions or scales were also pruned after running internal consistency tests.

A six page questionnaire with 20 questions (Annexure II) was finalized after pretesting. The same questionnaire was used for soliciting responses of men as well as women directors primarily on two categories: i) their understanding of corporate sustainability and ii) their perceptions about representation of women on boards.

The final questionnaire consisted of eight questions dedicated to assessing the perceptions of directors participating in the survey on corporate sustainability. Questions involved testing the awareness of respondents with respect to Triple Bottom Line concept, the stakeholders who drive sustainability, the most pressing sustainability issues of companies, constitution of separate CSR committees and Code of Conduct, the frequency with which sustainability issues form agenda of the board and the extent of involvement of men and women directors in strategic decisions involving the company.

The second aspect, that the questionnaire was designed to measure was the perceptions of men and women director respondents on the representation of women on boards. It involved questions regarding adequacy of diversity in general and gender diversity in particular, the factors promoting and inhibiting the representation of women on boards. It also examined the level of satisfaction of respondents with reference to - the way their companies operate, the discretion to deal with problems in own way and the opportunities to do creative work. Other
questions also evaluated the support for quotas for women on boards, trainings and other methods for improving gender diversity on boards.

The questionnaire also had seven demographic and general questions such as gender, age, education, experience, type of directorship held and annual income.

The final questionnaire was mailed to the randomly selected sample of men and women directors. The survey was kept ‘anonymous’ not requiring the respondents to disclose their identity or that of their company. This was done with an expectation of improving the response rate which was generally found to range between 30-40% in similar studies in the past. A cover letter elucidating the objectives of the survey along with a stamped self-addressed envelope was attached to each questionnaire and was mailed to the directors’ residential address listed in and obtained from the Ministry of Corporate Affairs database. A postcard follow-up was mailed after one month of the date of initial mailing (Burke, 1995, Sheridan 2001, Sheridan & Milgate 2005) and again after three months from the date of initial mailing.

Of the total 300 final questionnaires mailed, 96 responses were received making the response rate of 32%. 22% responses were received from women and 42% from men. This was considered reasonable and adequate considering the elite class of respondents involved.

**Variables and Models**

To operationalize the concepts of corporate sustainability and gender diversity and to meet the different objectives of this study a set of items and variables were required. The process of identification of variables was deeply grounded in theory.
Variables:

1. Social Involvement, Environmental Concern and overall Corporate Sustainability Scores:

The sensitivity towards societal issues and quality of environmental and overall corporate sustainability disclosures of a company were measured through an index constructed from a set of items which represented social involvement, environmental concern and governance and engagement of companies. These variables were labelled as Social Involvement Score (SIS), Environmental Concern Score (ECS) and overall Corporate Sustainability Score (CSS). The methodology adopted to derive these scores is explained below.

A Corporate Sustainability Index (CSI) along with decision rules was developed (Annexure III). The Index was developed through a systematic approach by identifying, quantifying and analyzing the number and nature of the components that made up the composite index based on theory, pragmatism or intuitive appeal (Bossel, 1999; Singh et al., 2009; Warhurst, 2002). The frameworks of World Business Council for Sustainable Development (WBCSD), the Global Reporting Initiative (GRI), the United Nations Global Compact (UNGC) Principles, Millennium Development Goals, the Equator Principles and International Finance Corporation’s Performance Standards on Social and Environmental Sustainability as well as its Environmental, Health and Safety (EHS) Guidelines formed the foundation for development of a sustainability reporting and assessment index (Annexure IV). All important aspects and indicators reflecting an organization’s commitment, performance and quality of information disclosed with regards to sustainability were included in the index. Composite indicators or categories were also selected based on the earlier researches and works of Abbott & Monsen (1979), Bansal (2005), Clarkson et al. (2008), Cormier et al. (2005), Davis-Walling & Batterman (1997), Dias-Sardinha & Reijnders (2001), Galbreath (2011), Gamble et al. (1995), Gray et al. (1995), Hackston & Milne (1996), ISO (1999), Kaur et al. (2009), Maignan & Ralston (2002), Morhardt (2001), Morhardt et al. (2002), Patten (2002), Waddock & Graves (1997), Westphal & Zajac (1998), Williams (1999) and Wiseman (1982). This resulted in deriving a
set of standardized indicators of corporate sustainability - governance, sensitivity towards societal issues and environmental integrity.

The CSI was designed to measure the extent and quality of sustainability disclosures of organizations— including both positive and negative contributions. The Index had three parts: (i) Governance and Engagement (GE) Indicators, (ii) Environmental Concern (EC) Indicators and (iii) Social Involvement (SI) Indicators. Table 3.1 presents the structure of Corporate Sustainability Index (CSI).

The first part of the index was related to aspects of governance and stakeholder engagement. This part assessed the extent and completeness, details of information regarding the governance structure of the organization including the composition, qualifications and expertise of the Board of Directors and its committees as well as mechanisms for linking their compensation to the performance of the organization. This part also assessed an organization on the approaches it adopted for stakeholder engagement and how it responded to their recommendations and concerns.

The second part of the CSI was related to the second dimension of sustainability i.e. environmental concern. It measured an organization’s effects on natural environment, including ecosystems, air, water and land. This part consisted of four categories – Environmental vision, strategy and management, Environmental performance indicators, Compliance and recognitions, and Environmental spending. Every category included different aspects and indicators which were scored based on the extent of disclosure in the annual reports. An organization’s environmental performance was measured in terms of efficiency in use of material, energy and natural resources as well as in terms of efforts made to minimize the harmful impacts of its activities on environment by controlling waste and pollution etc. It also included adherence to various environmental laws and codes and transparency in disclosing the amount spent on initiatives to protect the natural environment.

The Social Involvement part of the index assessed the impact and contribution of an organization on the society. It concerned with the third dimension of sustainability and consisted of five categories – Labour Practices, Human Rights...
Performance Indicators, contribution to community, Product Quality and Customer Satisfaction and Compliance & recognitions. It also included the measures taken by an organization to eradicate poverty, discrimination, child labour and corruption.

Each one of the categories included aspects and indicators which were scored based on the extent and quality of disclosure in the annual reports.

Table 3.1: Structure of Corporate Sustainability Index (CSI)

<table>
<thead>
<tr>
<th>Part</th>
<th>Category</th>
<th>Aspects</th>
<th>Indicators / Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governance &amp; Engagement (GE)</td>
<td>Governance</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Stakeholder Engagement</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total GE Score (GES)</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Environmental Concern (EC)</td>
<td>Environmental Vision, Strategy and Management</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Environmental Performance</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Compliance and Recognitions</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Environmental Spending</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total EC Score (ECS)</td>
<td>8</td>
<td>30</td>
</tr>
<tr>
<td>Social Involvement (SI)</td>
<td>Labour Practices</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Human Rights Performance Indicators</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Contribution to Community</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Product Quality and Customer Satisfaction</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Compliance and Recognitions</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total SI Score (SIS)</td>
<td>9</td>
<td>35</td>
</tr>
<tr>
<td>Total Corporate Sustainability Score (CSS)</td>
<td></td>
<td>19</td>
<td>80</td>
</tr>
</tbody>
</table>

Scoring system:

The methodology of designing the index overcomes the shortcomings of many previous systems by taking into consideration the extent and quality of actual disclosures made by an organization on various items in comparison with the expected level of disclosures from a responsible corporation.

Different scoring systems to measure environmental concern and social involvement had been adopted by researchers in the past. Some studies used variable scores for different items or indicators e.g. scores of ‘0’ and ‘1’ for some
topics, ‘0’ to ‘2’, ‘0’ to ‘3’ and even ‘0’ to ‘4’ for some topics (Davis-Walling & Batterman, 1997 and GRI, 2006). ‘0’ signified no reporting and score increased depending on the level and nature of detail of the narrative. The maximum score was representative of a comprehensive detail along with quantitative measure of a topic. Then there were studies by Bansal (2005), Galbreath (2011) and Westphal & Zajac (1998) which used a binary system of scoring using ‘0’ and ‘1’ where ‘0’ represented no indication of the item and ‘1’ represented some presence. Many similar studies in the past gave equal weightage to all items and used a scoring system of ‘0’ to ‘3’ for all items/topics, the most prominent of such studies being by Wiseman (1982) and ISO (1999). Wiseman Index and scoring system (Wiseman 1982) had been used by many researchers for almost over two decades with minor modifications by some yielding satisfactory results. Patten’s (2002) modified Wiseman index had scores of ‘0’ to ‘8’ for every item while, Cormier et al. (2005) used an index similar to Wiseman (1982) but scored each item on a scale of ‘1’ to ‘3’.

Considering that all items on the index may not be rated at the same levels in terms of completeness of disclosures by assigning points on a common fixed scale e.g. 0 or 1, 0 to 3, 1 to 3 etc., a system of variable scores for different items was adopted. This avoided any superficial and forced definition of a score on any item of the index. Out of a total of 80 items on the index, 45 items use up to three points each (Scale of 0 – 3) depending on the comprehensiveness of coverage, and 35 items worth two points each (Scale of 0 – 2). For the determination of the quality of information, the composite score is obtained by summing up the scores of all indicators in each category of the CSI. An equal weightage and importance is attached to all items. Therefore, companies analyzed with the index can achieve a minimum of ‘0’ points and a maximum of 205 points.

The scoring system treats the items more generically and comprehensively, therefore ensuring wider applicability amongst different kinds of companies and sectors. Explicitly laid out decision rules for scoring each item makes it less subjective and easy to replicate results.
Pre-test:

Since there was an element of subjectivity arising out of interpretation of the disclosures in annual reports and scoring each item on the index constructed for this study, pretesting of the initially constructed index was done for a small sample from the annual reports to be used for this study. A random sub-sample of twenty companies was selected for pretesting. Data was extracted from their annual reports, coded and scored on the index two academic experts separately (Hackston & Milne, 1996). Two rounds of pretesting were performed. These pretesting rounds and multiple iterations of the index, progressively achieved consensus on what constituted a good sustainability disclosure, and led to the finalization of the index. The final round scores were compared and tests were performed to ensure inter–rater reliability and internal consistency of the index.

The inter-rater reliability was tested using content analysis reliability measure Krippendorff’s α (Krippendorff, 1980; Hackston & Milne 1996). In the absence of any defined standard for establishing reliability of environmental and social disclosures using content analysis, 0.80 or better was found to be generally accepted level of inter-rater reliability (Guthrie & Mathews, 1985; Hackston & Milne, 1996). However, there are studies like by Wimmer & Dominick (1991) which suggest a Krippendorff’s α of 0.75 or better as acceptable. The reliability test indicated Krippendorff's α = 0.895 signifying 89.5% agreement between raters occurring above chance. As the inter-rater reliability score of α = 0.895 was found to be satisfactory, content analysis was later performed using the final index after modification resulting from the pretesting process.

For assessing the internal consistency of the items, Cronbach’s alpha coefficient (Cronbach, 1951) was computed. The results obtained from the composite CS Index with Cronbach’s alpha = 0.950 confirmed the reliability of the index. The Cronbach’s alpha values for all the three component parts of the index were above 0.70 thus ensuring the construct’s internal consistency and validity (Huang et al., 2012).

The score for every sample company based on the final index was computed for each year (2006 to 2011) separately and then a 6-year average was calculated.
The scores were normalized by converting them into their natural log figures for making them statistically comparable. Normalized scores were further adjusted by multiplying all scores by ten to obtain more visually manageable scores (Singh et al., 2009). These scores were used as dependent variables for further tests and accomplishing the objectives of the study.

2. Gender Diversity or Women on Boards:

Past studies have used different measures of gender diversity. Torchia et al. (2011) has used absolute number of women on board to measure gender diversity, whereas Bear et al. (2010) used Blau’s Index. Miller & Triana (2009) and Campbell & Minguez-Vera (2008) used two proxies to measure gender diversity – the Blau’s Index and ratio of women on boards. Carter et al. (2003) and Adams & Ferreira (2009) used a dummy variable to record the presence or absence of women on board and also used women’s ratio on the board to measure gender diversity. The percentage of women directors on board has also been widely used in other studies such as Shrader et al. (1997), Erhardt et al. (2003), Bonn (2004), Rose (2007), Lückerath-Rovers (2010), Nielsen & Huse (2010a; 201b) and Galbreath (2011).

This study uses two proxies as measures of gender diversity – (i) Blau’s Index and (ii) proportion of women directors on boards.

For a categorical or nominal variable like gender, Blau’s (1977) index of heterogeneity \((1 - \sum p_i^2\) is used, where ‘p’ is the proportion of members in a group and ‘i’ is the number of categories, in case of gender a total of two categories, across all groups. Miller & Triana (2009) explain that the values of the Blau’s index can range from a minimum of 0 to a maximum value that depends on the number of categories calculated by the formula \([(i-1)/i]\). So in case of gender diversity, an index value of 0 indicates complete concentration of group members in one category meaning complete homogeneity e.g. all board members are either male or all are female. The index value of 0.5 indicates perfect or the highest degree of heterogeneity or level of diversity representing perfectly gender balanced boards with 50% male and 50% female directors.
A six year average (2006-2011) figures were used to test the different hypotheses.

Data for women on boards, independent directors and total board size was taken from company annual reports, Directors Database – an online database as a part of Corporate Governance Initiative of BSE and Ministry of Corporate Affairs.

3. Economic performance

Based on an extensive literature review, evidence of a multitude of proxies for economic performance or the financial indicators of a firm’s performance was found which were used by prior researches with similar objectives. Economic impact was measured in terms of confidence of investors by Arfken et al. (2004) and Flynn & Adams (2004) and as reduction in transaction costs because of fewer protective devices by Hosmer (1995) and Galbreath (2011). ROA & ROI were used by Daily & Dalton (2003); Erhardt et al. (2003), ROA and ROE were used by Hackston & Milne (1996), Weber et al. (2005) Tobin’s Q and ROA by Carter et al. (2003, 2010). Tobin’s Q was also used by Rose (2007), Campbell & Minguez-Vera (2008) and Adams & Ferreira (2009), whereas revenues were used by Burke, 2000. Bonn 2004 measured economic performance in terms of ROE and Market-Book Value, which was also taken as a proxy of economic growth and used by Galbreath (2011). Clarkson et al. (2008) used Tobin’s Q and ROA in addition to leverage ratio and stock price volatility whereas Cormier et al. (2005) used stock market performance – Leverage and Market Return. Shrader et al. (1997) and Lückerath-Rovers (2010) used ROA, ROE and ROS as proxies for economic performance of a company.

ROA, ROE and Market-to-Book Value were used as measures of Economic performance and growth for the purpose of this study. The accounting measures - ROE and ROA report the operating efficiencies and also indicate how effectively the funds of investors are utilized for maximizing returns. The proxy of Market-to-book value was indicative of the future growth potential and performance of a firm.

(i) Return on Assets (ROA) is the total return on assets measured as a ratio of profits (before depreciation, Interest and taxes) and total assets.
ROA = Profit before Depreciation Interest & Taxes (PBDIT) / Total Assets

This formula correctly reports the operating efficiencies of firms and is useful for inter-firm comparisons as it is not influenced by varying capital structures. A higher ROA highlights better performance.

(ii) Return on Equity (ROE): Return on equity is a book value measure of shareholder value creation. This measure is also more relevant in the context of corporate governance and sustainability in that the task of the board is to get management to enhance shareholder value. This ratio exclusively measures the return on owners’ funds. This is a significant ratio from the point of view of the owners or equity shareholders.

\[ \text{ROE} = \frac{\text{Profit After Tax (PAT)}}{\text{Equity share capital}} \]

As in the case of ROA, a high ROE is considered a sign of good performance of a company.

(iii) The ratio of Market-to-Book Value is indicative of the future growth potential and performance of a firm.

All these variables/proxies were computed for each year (2006-2011) separately and then a 6-year average calculated and used to test the hypothesis. Data was obtained from Capitaline Plus, a secondary online database and company annual reports.

4. Sector Classification

Several prior studies in this domain have found sector or industry classification as a factor influencing the disclosure practices of companies. Hackston & Milne (1996) established a positive association between high and low profile industries and the measures of social disclosures adopted by them. The disclosures on social and environmental aspects have been found to be greater in companies categorized as ‘High-profile’ as compared to companies belonging to low-profile industries. Studies conducted by Patten (1991) and Roberts (1992) produced
similar findings. Patten (1991) attributes an industry’s political visibility as a key influencer of the kind of disclosures made by a company. According to him a company’s environmental and social disclosures are aimed at avoiding pressures and protests and tackling demands from advocates of social justice and interests. Dierkes & Preston (1977) and Kelly (1981) argue that companies in primary, secondary and specifically extractive sectors, whose activities affect the environment, tend to make more disclosures about the environmental impacts of their operations. On the other hand consumer-oriented and companies engaged in tertiary sector reveal more about their social concern with an objective to increase sales as well as to improve their reputation in the eyes of the stakeholders (Cowen et al., 1987). Social disclosures also appeared to have a very strong association with industry (Gray et al., 1995).

The sample companies in this study were categorized into 19 sectors. They were then following Hackston & Milne (1996) grouped into High and Low Profile sectors. Hence, the sector classification was represented by a dummy binary variable with ‘1’ for High profile sector and ‘0’ for Low profile sector. This was used to test the hypothesis that the sector to which a company belongs influences the extent and quality of corporate sustainability disclosures.

5. Size of Company

A number of past studies such as Kelly (1981), Trotman & Bradley (1981), Pang (1982), Belkaoui & Karpik (1989), Patten (1991, 1992) and Gray et al. (1995) have established a relationship between company size and the extent of disclosures especially about the environmental and social impacts of business operations.

Neu et al. (1998) and Scott (1994) found a positive association between company size and disclosure practices, a finding supported by more recent studies conducted by Cormier & Magnan (1999) and Cormier et al. (2005). This is strongly connected to the agency and legitimacy theory. Larger companies by virtue of their large scale of operations, make a greater impact on the environment and society (Cowen et al., 1987). They are also likely to have large number of
shareholders expecting complete information on the company’s impacts and steps to mitigate adversities. Large companies attract more stakeholder scrutiny (Fombrun, 1996; Suchman, 1995) and effectively use annual reports to communicate such information (Cowen et al., 1987). Hackston & Milne (1996) argue that a large ‘High-profile’ company, in terms of assets or sales, disclosed more information about its social and environmental impacts. However, for a ‘low-profile’ company, size-disclosure relationship did not hold true. Ng (1985) and Roberts (1992) also failed to establish any significant impact of company size on disclosure practices.

This study attempts to evaluate the potential association of company size on the extent and quality of disclosure practices of Indian listed companies.

Different methods to measure company size have been employed in previous studies e.g. sales was used by Trotman & Bradley (1981) and Kimberly (1976) and log of sales was used by Belkaoui & Karpik (1989) and Patten (1991). Average revenue over the four years of the study period was used by Roberts (1992). Waddock & Graves (1997) used total assets, sales and number of employees to quantify and measure company size. Some researchers used multiple measures for size in their studies such as Trotman & Bradley (1981) who used total assets along with sales as proxies to measure company size. Patten (1991) also used Fortune 500 rankings along with log vale of sales.

Reasons for choice of certain measures of company size over the others were not documented in literature and could not be ascertained, so two measures of size – market capitalization and total assets were used in this study. The natural log of total assets (Bansal, 2005; Clarkson et al., 2008) and the natural log of Market Capitalization (Hackston & Milne, 1996) were used as proxies for company size. The total assets and market capitalization values were transformed into their log values to achieve normal distributions (Cox & Snell, 1981).

6. Age of the organization

Age is calculated as the number of years since the establishment or incorporation of the company. The age of a company in the year 2012 was taken for the purpose
of the study. Based on previous studies, company age is assumed to be positively related with the quantity and quality of disclosures. As Roberts (1992) puts it, as a mature firm is more concerned about its reputation, it is expected to make more social responsibility disclosures as compared to young companies. For the purpose of this study Nat Log of Age in year 2012 was used for analysis.

7. Slack resources

Surplus resources are the funds available with the company to meet contingencies thereby easing the pressure on organizations in times of adversities (Bourgeois, 1981; Bansal 2005). Levinthal & March (1981) suggest that companies invest these surplus or idle funds to enhance their capabilities and thereby become better equipped to meet the challenges posed by the company’s external environment (Cheng & Kesner, 1997). Even in the specific context of sustainability, substantial amount of investments are required to critically analyze the company’s current performance on economic, social and environmental dimensions through elaborate audits as well as to develop and implement new technologies and systems. In this context, Bansal (2005) suggests that companies with extra financial resources tend to perform better. So, organizational slack helps firms to implement corporate sustainability initiatives.

Schuler (1996) and Bansal (2005) used the difference of current assets over current liabilities as a measure of extra liquidity and organizational slack whereas Net profits were used as a proxy for slack variable by Waddock & Graves (1997) and Galbreath (2011). Natural log of Net Profits was used as a proxy for slack resources for this study.

8. Board size

The total number of directors on board was taken as a measure of board size. Board size has known to influence company’s value in studies conducted by
Carter et al. (2003), Dalton et al. (1998) and Nielsen & Huse (2010a; 2010b). Natural log of board size was used for the purpose of analysis.

9. Board Independence:

Past studies have indicated that boards with outside/independent membership and representation act as better guardians of the interests of the society and the environment as compared to the executive directors on corporate boards (Ibrahim & Angelidis, 2011). Studies by Baysinger & Butler (1985) and Pearce & Zahra (1992) also suggest that companies that have boards with a higher percentage of outside directors perform better in comparison with companies which do not have independent boards.

Following Nielsen & Huse (2010a; 2010b), for the purpose of this study, Board’s independence was measured as a percentage of independent directors in the board composition.

Models and Analytical techniques to test various hypotheses

Multiple analytical techniques were used to find answers to the research questions. Specific to the type of data and the hypothesis to be tested, appropriate techniques were employed. Information collected was presented in the form of tables and charts for better understanding and inference. Descriptive statistics such as frequency distribution tables, percentage, mean and cross tabulation etc. were used for preliminary and basic level analysis of the status of corporate sustainability disclosure practices, the status of women on corporate boards of the sample companies and the responses of the directors who participated in the perception survey.

Comparisons of means were done between companies with High CSS and those with low CSS. The High CSS group consisted of companies which had a CSS score of over 1 standard deviation from the mean and the Low CSS group consisted of companies which had a CSS of over 1 standard deviation below the
mean. A similar comparison between two groups created on the basis of the level of gender diversity on their boards. Comparisons of means were also done between companies with no women on boards and those with more than one woman on their boards. Companies with one woman were ignored to control for tokenism. Student’s t-test was used for this purpose. ANOVA was also used to evaluate the differences in the perceptions of men and women directors regarding the factors that promote and inhibit the representation of women on boards. Chi-Square and the Fisher’s Exact tests were used to analyze responses on multiple questions using categorical and ordinal scales, in the perception survey to see if there was a significant difference between men and women directors.

Time Series Linear Trend analysis was used for forecasting the future women on boards of directors. Correlation and regressions models were used to test the relationship between various identified variables. Table 3.2 provides consolidated information on all the hypotheses, the variables and the analytical tools used to test these hypotheses.

Correlation tests were conducted between independent variables to evaluate whether the problem of multicollinearity existed. Correlations between dependent and independent variables including control variables were conducted to determine fitness of data for further testing through multiple regression models using 2-Stage Least Square (2SLS) method.

**Table 3.2: Summary of Analytical Framework of the study**

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Variables</th>
<th>Analytical techniques</th>
</tr>
</thead>
</table>
| H01 There is no significant difference in CS disclosure practices of companies and their industry / sector classification. | 1. Nat Log Corporate Sustainability Scores (CSS)  
2. Sector Classification - Industry Dummy | - Levene Statistic  
- ANOVA  
- Post Hoc tests – LSD method |
<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Variables</th>
<th>Analytical techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>H0_2</td>
<td>1. Nat Log Corporate Sustainability Scores (CSS)</td>
<td>- Comparison of Means between Cos with High CSS and Low CSS – using t-test</td>
</tr>
<tr>
<td>H0_3</td>
<td>1. Nat Log Corporate Sustainability Scores (CSS)</td>
<td>- Comparison of Means between Cos with High CSS and Low CSS – using t-test</td>
</tr>
<tr>
<td></td>
<td>2. Nat log Age</td>
<td></td>
</tr>
<tr>
<td>H0_4</td>
<td>1. Number of WOB</td>
<td>- ANOVA – companies with no WOB and with ≥ 2 WOB</td>
</tr>
<tr>
<td></td>
<td>2. Sector Classification</td>
<td>- Industry Dummy</td>
</tr>
<tr>
<td>H0_5</td>
<td>1. Number of WOB</td>
<td>- Comparison of Means – companies with no WOB and with ≥ 2 WOB – using t-test</td>
</tr>
<tr>
<td>H0_6</td>
<td>1. Number of WOB</td>
<td>- Comparison of Means – companies with no WOB and with ≥ 2 WOB – using t-test</td>
</tr>
<tr>
<td></td>
<td>2. Nat Log of Age</td>
<td></td>
</tr>
<tr>
<td>Forecast of number of WOB in future</td>
<td>Number of WOB</td>
<td>- Time Series Linear Trend analysis was used for forecasting the future women on boards of directors</td>
</tr>
<tr>
<td>H0_7</td>
<td>Refer Model in Figure 3.1</td>
<td>- Comparison of Means – companies with no WOB and with ≥ 2 WOB – using t-test</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Correlation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 2SLS Regression</td>
</tr>
<tr>
<td>Hypothesis</td>
<td>Variables</td>
<td>Analytical techniques</td>
</tr>
<tr>
<td>------------</td>
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</tr>
<tr>
<td>H0₈</td>
<td>There is no significant relationship between gender diversity on boards and the sensitivity of a company towards societal issues.</td>
<td>Refer Model in Figure 3.1 - Comparison of Means – companies with no WOB and with ≥ 2 WOB – using t-test - Correlation - 2SLS Regression</td>
</tr>
<tr>
<td>H0₉</td>
<td>There is no significant relationship between gender diversity on boards and the quality of environmental disclosures of a company.</td>
<td>Refer Model in Figure 3.1 - Comparison of Means – companies with no WOB and with ≥ 2 WOB – using t-test - Correlation - 2SLS Regression</td>
</tr>
<tr>
<td>H0₁₀</td>
<td>There is no significant difference in men and women directors’ awareness of the concept of Triple Bottom Line (TBL) and their identification of key drivers of Corporate Sustainability.</td>
<td>Responses to Questions 3 and 5 of the Directors’ Perception Survey - Descriptive Statistics - Cross Tabulation - Chi-Square - Fisher’s Exact test</td>
</tr>
<tr>
<td>H0₁₁</td>
<td>There is no significant difference between men and women directors’ views on the importance and frequency on which the key sustainability issues feature on the boardroom agenda.</td>
<td>Responses to Questions 13 of the Directors’ Perception Survey - Descriptive Statistics - Cross Tabulation - Chi-Square - Fisher’s Exact test</td>
</tr>
<tr>
<td>H0₁₂</td>
<td>There is no significant difference in the perception of men and women directors regarding the diversity on boards of directors.</td>
<td>Responses to Question 10 (i) &amp; (ii) of the Directors’ Perception Survey - Cross Tabulation - Chi-Square - Fisher’s Exact test</td>
</tr>
<tr>
<td>Hypothesis</td>
<td>Variables</td>
<td>Analytical techniques</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>H0\textsubscript{13}</strong> There is no significant difference in the perception of men and women directors regarding the qualifications, skills and competence that women bring on board.</td>
<td>Responses to Questions 11 and 12 of the Directors’ Perception Survey Qualifications, Skills &amp; Competence subscale scores</td>
<td>- Descriptive Statistics - Means and Standard Deviations - ANOVA</td>
</tr>
<tr>
<td><strong>H0\textsubscript{14}</strong> There is no significant difference in the perception of men and women directors regarding the opportunities for women’s appointment on Boards.</td>
<td>Responses to Questions 11 and 12 of the Directors’ Perception Survey Opportunities subscale scores</td>
<td>- Descriptive Statistics - Means and Standard Deviations - ANOVA</td>
</tr>
<tr>
<td><strong>H0\textsubscript{15}</strong> There is no significant difference in the perception of men and women directors regarding the existence of stereotypes against women.</td>
<td>Responses to Questions 11 and 12 of the Directors’ Perception Survey Stereotypes subscale scores</td>
<td>- Descriptive Statistics - Means and Standard Deviations - ANOVA</td>
</tr>
<tr>
<td><strong>H0\textsubscript{16}</strong> There is no significant difference in the perception of men and women directors regarding the professional conduct of Board’s activities.</td>
<td>Responses to Questions 11 and 12 of the Directors’ Perception Survey Board Conduct subscale scores</td>
<td>- Descriptive Statistics - Means and Standard Deviations - ANOVA</td>
</tr>
</tbody>
</table>

**Model to test Hypothesis H\textsubscript{07}, H\textsubscript{08} and H\textsubscript{09}:**

One of the objectives of this research was to study whether there was any relationship between women presence on Board of Directors and economic performance of a company, its sensitivity towards societal issues and the quality of environmental disclosures of a company.
Therefore, three dependent and one independent variable were identified. Based on past research, some “usual suspects” known to influence the disclosures and performance of a company were identified. So these were included as ‘control’ variables in the study besides the independent variable – Gender Diversity.

Figure 3.1: Model to test Hypothesis H₀₇, H₀₈ and H₀₉

Techniques for testing the Model

Regression analysis as well as comparisons of means was used to study the effect of gender diversity on boards and the corporate sustainability dimensions namely economic performance, social involvement and environmental concern. Each of the dependent variables was regressed against measures of gender diversity as per the following basic equations:

\[
\text{Economic Performance} = \alpha_0 + \alpha_1 \text{Gender Diversity} + \sum \alpha x + \varepsilon \quad \text{(A)}
\]

\[
\text{SIS} = \alpha_0 + \alpha_1 \text{Gender Diversity} + \sum \alpha x + \varepsilon \quad \text{(B)}
\]

\[
\text{ECS} = \alpha_0 + \alpha_1 \text{Gender Diversity} + \sum \alpha x + \varepsilon \quad \text{(C)}
\]

Where:

\( \alpha_0 \) – Constant

\( x \) – Control Variables
ε – Error term

Economic Performance - ROA, ROE and M-B Value were taken as measures of Economic Performance.

Gender Diversity - Proportion of Women on Boards and Blau’s Index of gender diversity were taken as measures of Gender Diversity.

SIS is the Log value of Social Involvement Score derived from CSI Index.

ECS is the Log value of the Environmental Concern Score derived from CSI Index.

Six year (2006-2011) average values were used for all Dependent and Independent variables.

Various control variables, shown in earlier studies to influence the dependent variables, are included in the model. They include:

Sector Classification – measured by a Dummy variable used for classifying all companies into ‘1’ – High Profile and ‘0’ Low Profile companies.

Company Size – measured by Nat Log of Total Assets, Nat Log of Market Capitalization and Nat Log of Net Sales.

Company Age – measured as Nat Log of Age of a company calculated in the year 2012.

Surplus resources – was measured by Nat Log of Adjusted Net Profits.

Board Size – measured as Nat Log of total number of directors on boards.

Board Independence – measured in terms of percentage of independent directors on boards.

Values of total assets, market capitalization, net sales, adjusted net profits, board size and board independence in the base year 2005 were used in the analysis.

Two Stage Least Square Method

Problem of endogeneity has been known to arise in past studies evaluating the link between board diversity and a company’s financial as well as social and environmental performance. Endogeneity arises in a situation when an independent variable could affect the dependent variable and at the same time the dependent variable could also affect the independent variable i.e. there exists a two ways or simultaneous relationship. This tends to make a clear cut differentiation between the dependent and the independent variables very difficult.
In such cases the use of Ordinary Least Square (OLS) regression analysis could provide biased results. To control for endogeneity, a simultaneous-equation model and 2-Stage Least Square (2SLS) Method was used (Carter et al., 2003).

**H0:** There is no significant relationship between gender diversity on boards and the economic performance of a company.

For testing hypothesis H0, the following systems of equations (1a, 1b and 2a, 2b), (3a, 3b and 4a, 4b) and (5a, 5b and 6a, 6b) were created for the three different measures of a company’s economic performance and the two measures of gender diversity.

\[ \text{ROA} = \alpha_0 + \alpha_1 \text{Prop. of WOB} + \alpha_2 \text{Sector classification} + \alpha_3 \text{Board Size} + \alpha_4 \text{Board Independence} + \alpha_5 \text{Company Size} + \alpha_6 \text{Surplus resources} + \alpha_7 \text{Company Age} \]  
(1a)

\[ \text{Prop. of WOB} = \alpha_0 + \alpha_1 \text{ROA} + \alpha_2 \text{Sector classification} + \alpha_3 \text{Board Size} + \alpha_4 \text{Board Independence} + \alpha_5 \text{Company Size} + \alpha_6 \text{Surplus resources} + \alpha_7 \text{Company Age} \]  
(1b)

\[ \text{ROA} = \alpha_0 + \alpha_1 \text{Blau’s Index value} + \alpha_2 \text{Sector classification} + \alpha_3 \text{Board Size} + \alpha_4 \text{Board Independence} + \alpha_5 \text{Company Size} + \alpha_6 \text{Surplus resources} + \alpha_7 \text{Company Age} \]  
(2a)

\[ \text{Blau’s Index Value} = \alpha_0 + \alpha_1 \text{ROA} + \alpha_2 \text{Sector classification} + \alpha_3 \text{Board Size} + \alpha_4 \text{Board Independence} + \alpha_5 \text{Company Size} + \alpha_6 \text{Surplus resources} + \alpha_7 \text{Company Age} \]  
(2b)

\[ \text{ROE} = \alpha_0 + \alpha_1 \text{Prop. of WOB} + \alpha_2 \text{Sector classification} + \alpha_3 \text{Board Size} + \alpha_4 \text{Board Independence} + \alpha_5 \text{Company Size} + \alpha_6 \text{Surplus resources} + \alpha_7 \text{Company Age} \]  
(3a)

\[ \text{Prop. of WOB} = \alpha_0 + \alpha_1 \text{ROE} + \alpha_2 \text{Sector classification} + \alpha_3 \text{Board Size} + \alpha_4 \text{Board Independence} + \alpha_5 \text{Company Size} + \alpha_6 \text{Surplus resources} + \alpha_7 \text{Company Age} \]  
(3b)
ROE = $\alpha_0 + \alpha_1$ Blau’s Index value + $\alpha_2$ Sector classification + $\alpha_3$ Board Size + $\alpha_4$
Board Independence + $\alpha_5$ Company Size + $\alpha_6$ Surplus resources + $\alpha_7$ Company Age

Blau’s Index Value = $\alpha_0 + \alpha_1$ ROE + $\alpha_2$ Sector classification + $\alpha_3$ Board Size + $\alpha_4$
Board Independence + $\alpha_5$ Company Size + $\alpha_6$ Surplus resources + $\alpha_7$ Company Age

MBV = $\alpha_0 + \alpha_1$ Prop. of WOB + $\alpha_2$ Sector classification + $\alpha_3$ Board Size + $\alpha_4$
Board Independence + $\alpha_5$ Company Size + $\alpha_6$ Surplus resources + $\alpha_7$ Company Age

Prop. of WOB = $\alpha_0 + \alpha_1$ MBV + $\alpha_2$ Sector classification + $\alpha_3$ Board Size + $\alpha_4$
Board Independence + $\alpha_5$ Company Size + $\alpha_6$ Surplus resources + $\alpha_7$ Company Age

MBV = $\alpha_0 + \alpha_1$ Blau’s Index value + $\alpha_2$ Sector classification + $\alpha_3$ Board Size + $\alpha_4$
Board Independence + $\alpha_5$ Company Size + $\alpha_6$ Surplus resources + $\alpha_7$ Company Age

Blau’s Index Value = $\alpha_0 + \alpha_1$ MBV + $\alpha_2$ Sector classification + $\alpha_3$ Board Size + $\alpha_4$
Board Independence + $\alpha_5$ Company Size + $\alpha_6$ Surplus resources + $\alpha_7$ Company Age

$H_{08}$ There is no significant relationship between gender diversity on boards and the sensitivity of a company towards societal issues.

For testing hypothesis $H_{08}$ the following two systems of equations (7a, 7b) and (8a, 8b) were created for the measures of a company’s Social Involvement (SI) represented by its Social Involvement Score (SIS).

$SIS = \alpha_0 + \alpha_1$ Prop. of WOB + $\alpha_2$ Sector classification + $\alpha_3$ Board Size + $\alpha_4$ Board Independence + $\alpha_5$ Company Size + $\alpha_6$ Surplus resources + $\alpha_7$ Company Age

Prop. of WOB = $\alpha_0 + \alpha_1$ SIS + $\alpha_2$ Sector classification + $\alpha_3$ Board Size + $\alpha_4$ Board Independence + $\alpha_5$ Company Size + $\alpha_6$ Surplus resources + $\alpha_7$ Company Age

(7a)

(7b)
SIS = \alpha_0 + \alpha_1 \text{Blau’s Index value} + \alpha_2 \text{Sector classification} + \alpha_3 \text{Board Size} + \alpha_4 \\
\text{Board Independence} + \alpha_5 \text{Company Size} + \alpha_6 \text{Surplus resources} + \alpha_7 \text{Company Age} \\
(8a)

\text{Blau’s Index Value} = \alpha_0 + \alpha_1 \text{SIS} + \alpha_2 \text{Sector classification} + \alpha_3 \text{Board Size} + \alpha_4 \\
\text{Board Independence} + \alpha_5 \text{Company Size} + \alpha_6 \text{Surplus resources} + \alpha_7 \text{Company Age} \\
(8b)

H_{09} \quad \text{There is no significant relationship between gender diversity on boards and the quality of environmental disclosures of a company.}

For testing hypothesis $H_{09}$ the following two systems of equations (9a, 9b) and (10a, 10b) were created for the measure of a company’s Environmental Concern (EC) represented by its EC score (ECS).

\text{ECS} = \alpha_0 + \alpha_1 \text{Prop. of WOB} + \alpha_2 \text{Sector classification} + \alpha_3 \text{Board Size} + \alpha_4 \\
\text{Board Independence} + \alpha_5 \text{Company Size} + \alpha_6 \text{Surplus resources} + \alpha_7 \text{Company Age} \\
(9a)

\text{Prop. of WOB} = \alpha_0 + \alpha_1 \text{ECS} + \alpha_2 \text{Sector classification} + \alpha_3 \text{Board Size} + \alpha_4 \\
\text{Board Independence} + \alpha_5 \text{Company Size} + \alpha_6 \text{Surplus resources} + \alpha_7 \text{Company Age} \\
(9b)

\text{ECS} = \alpha_0 + \alpha_1 \text{Blau’s Index value} + \alpha_2 \text{Sector classification} + \alpha_3 \text{Board Size} + \alpha_4 \\
\text{Board Independence} + \alpha_5 \text{Company Size} + \alpha_6 \text{Surplus resources} + \alpha_7 \text{Company Age} \\
(10a)

\text{Blau’s Index Value} = \alpha_0 + \alpha_1 \text{ECS} + \alpha_2 \text{Sector classification} + \alpha_3 \text{Board Size} + \alpha_4 \\
\text{Board Independence} + \alpha_5 \text{Company Size} + \alpha_6 \text{Surplus resources} + \alpha_7 \text{Company Age} \\
(10b)

\textbf{Conclusion:}

This chapter provided an overview of the methodology adopted to accomplish the objectives of this study. It provided the rationale of the study by identifying the research gaps in existing literature relating to corporate sustainability and gender
diversity. The appropriateness of the chosen period of study and the sample of companies was also highlighted. The chapter also explained in detail the methods used to operationalize and measure the concepts of corporate sustainability and gender diversity and the instrument (survey) developed to understand the perceptions of men and women directors. It presented the different hypotheses which when tested would help achieve answers to the research problems or objectives. Different variables, models and tools for analysis were identified for every hypothesis.