

## THE IMPACT OF CORPORATE GOVERNANCE ON WORKING CAPITAL MANAGEMENT EFFICIENCY: A QUANTITATIVE STUDY BASED ON PAKISTANI MANUFACTURING FIRMS

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### ABSTRACT

*Corporate world has felt the demise since the inception of corporate governance scandals which has subsequently questioned the performance of the corporate governance system. Afterwards, financial literature received greater paramount to analyze the corporate governance system in relation to different parameters of the firms. The study has attempted to extract good corporate practices which will provides useful information and intuition to equity investors, security analyst, policy maker and financial management consultant. This study uses regression and correlation techniques to investigate the impact of corporate governance on working capital management efficiency in manufacturing firms of Pakistan employing causal correlation research design and a sample of 62 manufacturing firms listed at Pakistan stock exchange for the period of 3 years from 2014-2016. The results show that audit committee, board size and gender effect improve utilization of the working capital.*

**Keywords:** Cash Conversion Cycle, Corporate Governance, Corporate Governance Index

### INTRODUCTION

Corporate governance (CG) has occupied explicit recognition in modern corporate world. The growth and stability of businesses is highly dependent upon corporate governance. Corporate governance has been defined as “Procedures and processes according to which an organization is directed and controlled. The corporate governance structure specifies the distribution of rights and responsibilities among the different participants in the organization such as the board, managers, shareholders and other stakeholders and lays down the rules and procedures for decision-making” (OECD, 2012).

In the last two decades, several corporate scandals such as those happened in case of Enron, WorldCom, Adelphia, Parmalat, Tyco etc. has materialized the role of corporate governance prominent. Due to such incidents, it has led to emerge various corporate governance laws like Sarbanes-Oxley act 2002 to block its way. Researchers and academia now check CG system with different parameters of the firms like profitability and growth etc. to make fair judgment about organizational resources.

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In today hyper-competitive and complex business environment where businesses are growing and expanding at fast pace, CG system has become very important. Other corporate decisions like the internationalization of firms, the strategy of foreign direct investment (FDI), the commitment to quality, the involvement of employees belong to middle level and first-line supervisory level in the corporate strategic planning, the management of risk and return, and a persistent forecasting in the future has challenged the performance of corporate governors. As a matter of fact, good corporate governance creates chances of improvement for their organization like attracting investors, creating competitive edge and efficient companies. It also creates accountability and boost up performance of those within/outside the organization. Good corporate governance creates fast economies which produce wealth or employment opportunities. In contrast to fast economies, slow economies where the corporate decision are too slow and often full of blunders eventually impede economic growth and makes the corporation stagnant and collapse by blocking investment. Gomez (2005) stated that “if business enterprises do not prosper, they will stagnant and collapse”.

Chief executive officer (CEO) and board of directors are the principals' decision maker within the corporation. Who takes most of the sensitive corporate decision including decision related to Accounts receivable (AR), Accounts payable (AP), purchasing stock (working capital) and others (capital budgeting). CEO and other top level management develop policies regarding working capital called working capital policies which influence the management of working capital (Gil & Bigger 2013). Thoroughly CG is comprised of a lot of mechanism's which includes board of directors, CEO duality, audit committee, board meeting and board size etc. which are central to the management of working capital (Gil & Bigger 2013). CEO duality and board size influence relative required level of cash balance Account receivable, Account payable and cash conversion cycle (Gil & Shah, 2012). CEO duality (CD) has a significant relationship with the maintaining of high cash level (Drobetz & Gruninger 2006). Small boards of directors are more prone to influence corporate decision as compared to large board of directors (Yermach 1996), (Lipton & Lorsch 1992). Cash conversion cycle (CCC) changes as changes in AR, AP, inventory (INV) and cash management occurs through working capital policy. Maintaining higher balance in cash through corporate policies would increase the opportunity cost, which implies non-utilization of Funds, creates agency problems and thus also creating difficulty in determining board perks (Gil & Shah 2012). CD is the prime factor in determining the efficiency of the working capital (WC) (Gill & Bigger 2013), however Gil and Matour (2011) findings suggested that both CD and Board size (BS) are prominent in ensuring overall firms profitability and shareholders' value.

The management of working capital is indispensable because while making short objectives; working capital management (WCM) is at the front door. WC resource are routinely used in the operations of the business and is defined as that investment made by the firm in short-term assets classifying as cash, marketable securities, inventory and accounts receivable (Brigham & Houston 2004). Among others components of the working capital cash are the most important one (Isshaq et al. 2009). Companies keep enough cash for variety of purposes namely for financing day to day operations, cash balance for speculative, compensating and precautionary motives, which thus indicates that keeping appropriate level of cash is indispensable for the survival of the firms

(Gill & Bigger 2013). Due to its variety of purposes liquidity management is of utmost concern for corporate governors while devising working capital policy for the firm (Rasaeian et al. 2010). Further companies also use different approaches to finance working capital requirement namely conservative approach, aggressive approach and matching approaches based on the business conditions and have an impact on firms' profitability and liquidity (Faiza Asghar 2013).

CCC is the main concept of working capital. It is one of the prime tool for evaluating company risk and return and liquidity management (Raheem Anser 2013). CCC affects the overall market value of the firms (Gentry et al 1990). Brigham and Houston (2004) define that CCC represent the total length of time between when the company buy inputs and make payment subsequently sell out the stocks and receive cash from debtors. CCC is central to the management efficiency because a good management structure accelerate productivity which leads to the efficient management of economic resources. According to Amarjit Gill, Nahum Biger and John Obradovich (2014) putting Independent directors on the board sufficiently utilized the economic resources by shorting the length of the CCC. In conjunction with resources utilization CCC enhance the profitability of the firm Tharshiga Murugesu (2013).

#### LITERATURE REVIEW

Pioneer study conducted by Nadiri (1969) using a model to estimate for the firm real cash holding balance, for which data was collected from US manufacturing firms for the period of 16 years taking from 1948 to 1964. In results, it was found that the demand for cash or requirement of cash balance increases as output increases. In the study of Gill and Biger (2013) “the impact of corporate governance on working capital management efficiency of American manufacturing firms” conducted for the time frame of 2009-2011 using a sample of 180 companies. the analysis was done through correlation and regression. The study used CEO tenure (CT), CD, Audit committee (AC), and BS to measure corporate governance and WCM was measured by AR, AP, INV, CCC, CH, and cash conversion efficiency. The study also used sales growth (SG), internationalization of firm (FI), firm size (FS) and sales growth as control variables. It was found that corporate governance does play important role in the management of working capital.

Dolatabadi, (2015), in their study “impact of corporate governance on the current assets management of the companies listed in Tehran stock exchange” the study used a sample size of 70 companies. CG mechanisms was CT, CD, BS and WCM was measured by AR, AP, INV, and CH. SG, FS and firm performance (FP) were used as control variables. In results, it was found that corporate governance does play important role in the management of working capital. Kajanathan, R. Achchuthan, S. in their study (2013), also studied the impact of CG on WCM using a sample size of 25 companies listed at Colombo stock exchange. The findings reveled that some of the mechanisms of the CG influence performance of the WCM.

Shamsaldin, J. Hossein, S. (2015), investigated “the relationship between the efficiency of WCM and corporate rule in Tehran stock exchange” using 115 companies as a sample size for the period of 2008 – 2013 and employing regression analysis technique. They found that small boards of directors are more effective as compared to large board of directors while making decision. Also, the findings of this research are in line with the

findings of previous studies (Gill & Mathur 2011; Gill & Shah 2012). Analyzing the relationship between corporate governance and working capital management efficiency on the basis of a sample consists of 42 firms listed in Nairobi security exchange, Kamau and Basweti (2013) found that corporate governance and working capital are significantly related to each other. Mansour, A, Seid, M. K. M. and Rahmatollah, M. (2015), conducted study on “The Effect of Corporate Governance Mechanisms on working capital management efficiency of corporations accepted in Tehran stock exchange” using a sample size of 75 companies. The study used a time frame taking from 2009 - 2014. Variables of the study were institutional ownership, CD and CT as independent variables and AR, AP, CCC, CR, and Cash Conversion Efficiency as dependent variables. The findings of the study revealed:

- That CD and Institutional ownership influence A/R, A/P, INV, CCC, CR.
- No influence on cash Conversion efficiency.
- CT influence CCC while no influence on cash conversion efficiency

### Conceptual Framework

Conceptual framework indicating flow of research activities is presented in

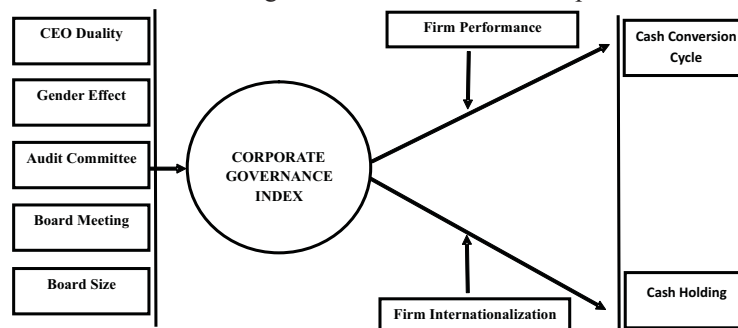


figure 1:

## METHODOLOGY

### Research design

This study has used casual correlation research design to study the behavior of firms displayed in panel data. Panel data is a suitable structure which enables the researchers to make statistical inferences about the population with greater accuracy. It enables the researchers to generalize their findings to the situation exist in practical business environment which subsequently increase the external validity of the research study. This type of research design is suitable to study CG influence on WCM efficiency of manufacturing firms in Pakistan.

### Data collection

This study collected raw data from SBP, SECP and company annual reports. For further processing, data have been arranged in excel and then analyzed in EViews and SPSS. Before running regression main assumptions of the regression has been satisfied namely

linear Relationship, Auto correlation, Multicollinearity, and Heteroscedasticity. Hypotheses of the study have been tested using T-test, F-test and P-value.

### **Sampling Techniques**

Under this study, probability sampling technique has been used followed by stratified random sampling technique. The sample size includes 62 companies listed on PSX for the period of 3 years taking from 2014-2016. Sample size represent up to 16% of population (Calculations provided in appendix 2). Pakistan stock exchange (PSX 100-Index) is a market capitalization based and Companies selected in the sample are most representative of the index having larger market capitalization.

### **Research hypotheses**

- H1:** There is a significant influence of CG on WCM efficiency.
- H2:** There is a significant influence of AC on WCM efficiency.
- H3:** There is a significant influence of BM on WCM efficiency.
- H4:** There is a significant influence of BS on WCM efficiency.
- H5:** There is a significant influence of CD on WCM efficiency.
- H6:** There is a significant influence of GE on WCM efficiency.
- H7:** There is a significant influence of CG on CH.

### **Econometric Models**

*Regression Model (1) =  $\alpha + \beta_1 CGI + FP + FI + \mu it$*

*Regression Model (2) =  $\alpha + \beta_1 ACit + \beta_2 BM + \beta_3 BS + \beta_4 CD + \beta_5 GE + FP + FI + \mu it$*

*Regression Model (3) =  $\alpha + \beta_1 CGI + FP + FI + \mu it$*

**Notes:**  $\mu it$ -error term;  $\alpha$ -is the y intercept;  $\beta$ -is the slope of coefficient

### **Measurements of Variables**

Details of variables used in the study and their measurement are provided in table 1.

**Table 1:** Variables and their measurement

Variables	Measurements
<b>Dependent Variables</b>	
Cash Conversion Cycle	Collection period + Inventory period – Payment period
Cash Holding	Log of Average Cash
<b>Independent Variables</b>	
Audit Committee	Value 5 if the members range is 5 and >, otherwise as mentioned by the scale
Board Meeting	Value 5 for 9 and >meetings, otherwise as mentioned by the scale
Board Size	Value 5 for 8-11 board members, otherwise as mentioned by the scale
CEO duality	Value 5 for CEO, otherwise 1 for CEO duality

Gender Effect	value 5 if the % of Gender is in between 41%-50%, otherwise as mentioned by the scale
<b>Control Variables</b>	
Firm Performance	Net income after tax / Revenue
Firm Internationalization	Value 5 for international firm, otherwise 1

### **Construction of Corporate Governance Index (CGI)**

For this study, CGI (Details provided in appendix 1) has been incorporated in which specific numeric numbers on a scale of 1-5 have been assigned to the five mechanisms of corporate governance which includes CD, AC, BM, GE, and BS. Value 1 is assigned to the variable if it has revealed lower effect, and value 5 is assigned to the variable if it has revealed higher effect. Similarly, this criterion has been used for all the variables. Consequently, the index has been calculated using the formula adopted from the study of Bhuiyan and Biswas (2007), as given in equation 1.

$$\text{Corporate Governance Index} = \frac{\text{Company Score}}{\text{Maximum Score}^*} \quad [\text{Equation 1}]$$

\* Maximum score is 25

## **RESULTS AND DISCUSSION**

### **Descriptive Analysis**

Descriptive statistics are presented in table2.

**Table 2:** Descriptive statistics

<i>Variables</i>	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. Deviation</i>
CCC	186	-345.5	551.9	35.302	105.5381
CH	186	7.7	17.9	12.247	2.1663
AC	186	20	80	42.043	7.061
BM	186	40	100	57.097	17.4654
BS	186	20	100	77.419	21.8547
CD	186	20	100	88.387	28.2571
G. E	186	20	100	29.892	18.7441
CGI	186	240	640	384.516	78.4239
FP	186	-668.5	763.4	2.29	80.4602
FI	186	1	5	1.946	1.7045
Valid N (list wise)	186				

**NOTE:** Total observation 62×3=186; AC- Accounts Receivable; AP- Accounts payable INV- Inventory; CCC - Cash Conversion Cycle; AC- Audit Committee; BM - Board Meeting;BS - Board Size; CD - CEO duality; GE - Gender Effect; CGI – Corporate governance index; FP - Firm Performance; FI - Firm internationalization. The original values of corporate governance are transformed to corporate governance index. CCC is used as a proxy for working capital in this research.

**Correlation Analysis**

Positive Relationship Between:

- CCC and CGI is positively correlated.
- CH and FI is positively correlated.

Negative/No Relationship Between:

- FP and CCC are not correlated.
- CH and CGI is insignificantly negatively correlated.
- FI and CCC are not correlated.

**Regression Analysis**

Regression and model results are presented in table 3 and 4 respectively.

**Table 3:** Regression results

<i>Assumptions</i>	<i>Test</i>	<i>Probability value for each Model</i>						
		<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>		
Auto correlation	Pesaran	0.8351		0.6374		0.3456		
Heteroscedasticity	Harvey	0.5638		0.2149		0.4996		
Multicollinearity	Tolerance(T)/VIF(V)	$\overline{T}$	$\overline{V}$	$\overline{T}$	$\overline{V}$	$\overline{T}$	$\overline{V}$	
		0.928	1.087	0.899	1.112	0.92	1.112	
		CGI, FP, FI	0.919	1.088	0.946	1.057	0.919	1.057
		AC, BM, BS, CD, GE	0.999	1.001	0.958	1.052	0.999	1.052
					0.831	1.203		
					0.828	1.207		
			0.889	1.136				
			0.942	1.061				

**Table 4:** Model results

<i>Model</i>	<i>Test</i>	<i>Chi- Sq. Statistics</i>	<i>P-value</i>	<i>Hypothesis</i>	<i>Result</i>
Model 1	Hausman	1.81367	0.6128	H <sub>0</sub>	Random Effect
Model 2	Hausman	3.72885	0.8104	H <sub>0</sub>	Random Effect
Model 3	Hausman	17.4319	0.0006	H <sub>1</sub>	Fixed Effect

**Hypotheses Testing**

Hypotheses testing involve testing underlying research theory. Table V given below show the results of the regression models. By looking at first hypothesis, the value of C is 0.236749 meaning that it causes almost 23% of variation in the dependent variable when all the independent variables effects are zero. The P-value of intercept is less than .05 meaning that this variation is statistically significant. There is a positive correlation between CCC and CGI. The coefficient of CGI is 4.654632 meaning that a change of 1% in CGI brings 4% variation in CCC. However, it is not statistically significant. Adjusted R<sup>2</sup> of the model is .809 meaning that it causes almost 81% variations in the dependent variable. F-statistics shows model overall fitness; the value of F-statistics is 12.871

which shows that the model is suitable for estimating population parameters. second, third, fourth, fifth and sixth hypotheses have been tested using second regression model. in the second model the Value of C is -90.99784 meaning that it causes 90% negative variation in the dependent variable when all the independent variables effects are zero. The P-value of intercept is more than .05 meaning that this variation is statistically insignificant. Coefficient of AC is 2.406677 meaning that a 1% change in AC brings 24% of variation in CCC and is statistically significant; Similarly, BM, BS, CD, and GE. The adjusted R-Squared of the model 2 causes 85% of variations in the dependent variable (CCC). The model is also statistically significant showing best fit and carrying a value of more than 4 (F-Statistic) which means that such model is appropriate for estimating population parameters. Adjusted R2 of the third model is .987 meaning that it causes 98% of variation in the dependent variable.

#### Model 5: Regression model results

Variables	Coefficient	Std.Error	T-Statistics	Prob
<i>CG impact on WCM (<math>R^2=.809</math>; Adjusted <math>R^2=.783</math>; F-statistics=12.871; Sig=0.035)</i>				
C	0.236749	0.10718	2.208859	0.0284
CGI	4.654632	6.50555	0.715487	0.4752
FP	-0.095558	0.06451	-1.481246	0.1403
FI	-64.56885	44.6648	-1.445631	0.1500
<i>AC,BM,CD,BS, GE Impact on WCM (<math>R^2=.854</math>; Adjusted <math>R^2=.717</math>; F-statistics=44.465; Sig=0.000)</i>				
AC	2.398023	0.30123	7.960672	0.0000
BM	0.054248	0.30783	4.176244	0.0603
BS	-0.170879	0.39513	-8.432464	0.0059
CD	0.282528	0.22853	1.236275	0.2187
GE	1.115436	0.45655	2.443198	0.0155
FP	-0.109712	0.05884	-1.864543	0.0639
FI	3.766379	4.20683	0.895299	0.3718
C	-120.7768	28.7064	-4.207321	0.0000
<i>CH impact on WCM (<math>R^2=.991</math>; Adjusted <math>R^2=.987</math>; F-statistics=226.421; Sig= 0.000)</i>				
C	0.000562	0.00043	1.312413	0.1919
CGI	0.000557	0.00033	1.670945	0.0973
FP	0.144358	0.02788	5.178019	0.0000
FI	11.74567	0.17395	67.52283	0.0000

#### Hypotheses testing summary

Table 6 summarizes the results of the null and alternate hypotheses

**Table 6:** Null and alternate hypotheses results

S.NO	H <sub>1</sub>	HYPOTHESIS	RESULT	TOOL
1	H <sub>1</sub>	CG impact on WCM efficiency	Rejected	Regression
2	H <sub>1</sub>	AC impact on WCM efficiency	Accepted	Regression
3	H <sub>1</sub>	BM impact on WCM efficiency	Rejected	Regression
4	H <sub>1</sub>	BS impact on WCM efficiency	Accepted	Regression
5	H <sub>1</sub>	CD impact on WCM efficiency	Rejected	Regression
6	H <sub>1</sub>	GE impact on WCM efficiency	Accepted	Regression
7	H <sub>1</sub>	CH impact on WCM efficiency	Rejected	Regression



This study was aimed at to determine the impact of corporate governance on working capital management efficiency collectively using CGI and individually by AC, BM, BS, CD, and GE. Also, cash holding as a main ingredient of the working capital used as a criterion variable and have been regressed by CGI; the findings are:

- Corporate governance index and working capital management are positively correlated; meaning that corporate governance improves utilization of the working capital.
- Audit Committee Impact Cash Conversion Cycle which means that AC improves working capital.
- Board meeting does not improve utilization of the working capital.
- Board size negatively impact working capital.
- CEO duality does not improve working capital.
- Gender effect significantly improves utilization of the working capital.

The findings of this study are consistent with the findings of the previous authors. The details of key findings are enlisted in the table 7 below.

**Table 7:** Key findings of the previous studies

Authors	Findings	Country
Gil and Biger (2013).	CG improve WCM	Canada
Dolatabadi, (2015)	CEO tenure, Board Size, CEO duality jointly improve A/R, A/P, INV and Cash Holding	Iran Sri Lanka
Kajananthan,R. Achchuthans (2013)	There is no significant mean difference between the level of WCME and CG practices such as BC, BM, and proportion of non-executive directors except board leadership structure	Sri Lanka
Gil and shah (2012)	Board size and CEO duality positively impact cash holding while negatively impact net working capital	Canada
Kamaz and Basweti (2013)	CG does not improve WCM	Kenya
Mansour,A. Seid Mirbakch, K,M. and Rehmatollah, M (2015)	CEO duality and institutional investors influence A/R, A/P, Stock,CCC, and Current Ratio CEO tenure influence CCC while no influence on cash conversion efficiency	Iran

### CONCLUSION

The purpose of the present study was to determine the impact of CG on WCM. In results, it is found that some corporate governance mechanisms improve utilization of the working capital. AC significantly impact CCC meaning that an increase in the number of AC's not only boost the efficiency of WC but also the efficiency and prominent role of accounting functions which thus ensure public confidence over the books of accounts of the firms. BS negatively impact WC, thus supporting past studies. Smaller board size should be encouraged to productively manage WC. GE which is the % quota of feminine gender on the board positively impact CCC meaning that more and more feminine gender should be encouraged to join the board for improvement in WC. such

action also implies and provides scientific justification to the concept “Equal Employment opportunities”. CD and BM does not impact CCC which means that CD and BM has nothing to do with the efficiency of WC. The resultant evidence on maximum points are consistent with the studies of (Gil & Shah 2012) and (Biger, 2013). Future research should seek to investigate the comparative impact of corporate governance on WCM between financial and non-financial firms. Important control variables should be added to the equation.

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**Appendix 1**

Construction of Corporate Governance Index

Audit Committee			
Rating Scale	Consideration	Assignment of Score	
1-5		Score	Years
		5	5&>
		4	4-5
		3	3-4
		2	2-3
		1	1-2
<p>Rating Criteria                      literature showed that greater the number of audit committee members enhances keeping of the books of account and develop outsiders trust</p>			
Board Size			
Rating Scale	Consideration	Assignment of Score	
1-5		Score	Board Members
		5	(8-10)
		4	(4-6)
		3	(6-8)
		2	(10-12)
		1	(>12)

**Rating Criteria**  
 literature showed that small board of directors should be encouraged because it brings rational decision making and effective communication.  
 Some studies suggested that a board size of 8-10 represent balance board  
 Evidence  
 yermack (1996), Lipton and Lorch 1992), Kyereboah-coleman (2007)

CEO Duality														
Rating Scale	Consideration	Assignment of Score												
1-5		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Score</th> <th style="width: 50%;">CEO Duality</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">CEO</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">_____</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">_____</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">_____</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">CEO+Chairman</td> </tr> </tbody> </table>	Score	CEO Duality	5	CEO	4	_____	3	_____	2	_____	1	CEO+Chairman
		Score	CEO Duality											
		5	CEO											
		4	_____											
		3	_____											
		2	_____											
1	CEO+Chairman													

**Rating Criteria**  
 Literature showed when the CEO and Chairperson are separate in terms of responsibilities they both allocate sufficient time, devotion and attention to their respective responsibilities.  
 There is a lot of studies supporting this argument

Gender Effect														
Rating Scale	Consideration	Assignment of Score												
1-5		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Score</th> <th style="width: 50%;">Gender Effect</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">(41%-50%)</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">(31%-40%)</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">(21%-30%)</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">(11%-20%-51%-60%)</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">(&lt;10%&amp;&gt;60%)</td> </tr> </tbody> </table>	Score	Gender Effect	5	(41%-50%)	4	(31%-40%)	3	(21%-30%)	2	(11%-20%-51%-60%)	1	(<10%&>60%)
		Score	Gender Effect											
		5	(41%-50%)											
		4	(31%-40%)											
		3	(21%-30%)											
		2	(11%-20%-51%-60%)											
1	(<10%&>60%)													

**Rating Criteria**  
 41%-50% represent balance on the board

Board Meeting														
Rating Scale	Consideration	Assignment of Score												
1-5		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Score</th> <th style="width: 50%;">Board Meeting</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">0-1</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">1-2</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">3-4</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">4-5</td> </tr> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">5&amp;&gt;</td> </tr> </tbody> </table>	Score	Board Meeting	1	0-1	2	1-2	3	3-4	4	4-5	5	5&>
		Score	Board Meeting											
		1	0-1											
		2	1-2											
		3	3-4											
		4	4-5											
5	5&>													

## Appendix 2

### Calculations for Determining the Sample Size

<i>S. n o</i>	<i>Sector name</i>	<i>No. of Companie s</i>	<i>%age in Total Population</i>	<i>Sampl e</i>	<i>%age in Total Sample</i>
1	Auto Mobile Assembler	12	3.05%	5	42%
2	Auto Mobile Parts &Acc	9	2.28%	2	22%
3	Cable & Electrical Goods	8	2.03%	2	25%
4	Cement	22	5.58%	4	18%
5	Chemicals	28	7.11%	3	11%
6	Engineering	18	4.57%	3	17%
7	Fertilizer	7	1.78%	2	29%
8	Food & Personal Care	21	5.33%	3	14%
9	Glass & Ceramics	11	2.79%	3	27%
10	Jute	3	0.76%	1	33%
11	Oil & Gas Exploration Co	4	1.02%	2	50%
12	Paper & Board	9	2.28%	2	22%
13	Pharmaceuticals	9	2.28%	2	22%
14	Power Gen & Distribution	19	4.82%	3	16%
15	Refinery	4	1.02%	2	50%
16	Sugar & Allied Industries	35	8.88%	4	11%
17	Textile Composite	56	14.21%	6	11%
18	Textile Spinning	87	22.08%	6	7%
19	Textile Weaving	24	6.09%	4	17%
20	Tobacco	3	0.76%	2	67%
21	Vanaspati & Allied Ind.	5	1.27%	1	20%
		<b>394</b>	<b>100%</b>	<b>62</b>	<b>16%</b>

<b>Required Data</b>		
1.	Confidence Level	95%
2.	Standard Deviation	4
3.	Standard Error	1
4.	Alpha Divide by 2	0.025
5.	Z-Score	1.96
6.	<b>SAMPLE SIZE</b>	<b>62</b>