Chapter-I
Introduction
CHAPTER I

INTRODUCTION

Stock market operations in India have undergone vicissitudes of far-reaching importance in the last decade. As a sequel to globalisation, and keeping in tune with the faster industrial development and growth in almost all sectors of the Indian economy, the stock market in India has absorbed the state of the art technologies in all its dealings. There has been a humongous increase in the volume of transactions because of the active role played by Foreign Institutional Investors (FIIs), Domestic Institutional Investors (DIIs) and by ever increasing investing public. Government regulations made from time to time by the Securities Exchange Board of India (SEBI) facilitate the smooth functioning of the stock exchanges and widening thereby the investor base stupendously.

The process of financial liberalization in the developing countries has brought about a vast change in their financial environment. Owing to the increased flow of funds from the developed countries as well as due to changes in the field of information technology, there has been a progressive integration of the emerging markets with the developed markets. The Indian markets are no exception to this phenomenon.

Globalization of financial market around the world has greatly stimulated the demand for and the supply of cross border capital flows. Hawawini (1994) points out that there is an increasing flow of funds from developing countries towards emerging markets like Latin American, Asian
and African markets and therefore these markets are becoming increasingly important in terms of portfolio management for institutional investors.

Opening up of Indian economy and the growing importance of stocks of different sectors of the economy especially those relating to information technology (I.T.) have contributed to the integration of Indian stock markets with the global stock exchanges. The Foreign Institutional Investors (FIIs) have come to play an active role in the stock market operations.

**Stock Exchange and Capital Formation**

It is self evident that capital formation is sine qua non for the economic growth and development of the country. Proprietor’s own funds, reliance upon long term debt from banks and financial institutions etc. would hardly touch the fringe of the financial requirements. Mobilisation of vast resources from the public by issue of shares is the only way out. Stock exchanges provide this facility. Many big corporate would have found it well neigh impossible to raise huge capital without stock market facilities. That stock exchanges facilitate capital formation a great deal needs no elaboration.

**Transition in the Indian Stock Markets - Capital Market Reforms**

Reforms in the capital market consist of reforms in the primary and the secondary markets.

**Primary Market Reforms**

One of the first and major reforms that took place in the capital market was the abolition of Capital Issues Controls and introduction of free pricing. Along with this came the regulations regarding disclosures to be made before going in for a primary issue, the liberalization of entry norms, stipulation of
eligibility norms for primary and secondary market intermediaries, specification of minimum promoter capital requirements, lock in period for the same, etc.

Besides the above reforms, the book-building route for initial public offer (IPO) share issue has increased in getting a higher price for shares issued and has thus increased the efficiency of the capital raising process. In anticipation of these reforms, the capital market started becoming a major source of finance for the corporate sector. However, the reform engine hit a major road block in that a scourge of scams had shaken the Indian markets in the last decade. Because of the scam there was tremendous loss of confidence in the stock market as many small investors had lost their hard earned savings which were invested in the share market. Many began to seek safer and greener pastures for their surplus money.

There was a shift of funds from equity to fixed income earning securities. This crisis of confidence in the stock market forced the regulators to become more conservative. Liberalization efforts had to wait before taking a final shape.

**Secondary Market Reforms**

The reforms in the secondary market have played a very important role in increasing the width and depth of the market. The major reforms that have taken place in the secondary market are those relating to trading system through electronic mode, dematerialization of securities, electronic clearing and settlement mechanisms, reforms in the carry forward and margin trading system and the introduction of new investment instruments.
Market oriented economic reforms began in 1991. As a result of financial liberalization, the administrative controls on bank credit and on the primary market for securities were relaxed. The role of capital markets in the economy began to assume importance. Establishment of Securities and Exchange Board of India (SEBI) and the creation of National Stock Exchange (NSE) by the Government of India were the other milestones in strengthening our capital market. They went a long way towards restoring the confidence of the investing public. The stock exchange market began to grow in size and depth.

Classification of Reforms Introduced

The reforms brought about a sea change in the Indian bourses. The reforms are encapsulated into three categories:

1. Institutional Reforms

As a part of the reform process, four new institutions were created.

(a) Securities and Exchanges Board of India (SEBI)

SEBI which was formed in 1988 gradually adopted many important roles in the area of policy formulation, regulation, enforcement and market development. SEBI vets every element of market design in India’s securities markets; attempts enforcement against problems such as market manipulations and payment crisis, and overseas the market intermediaries.

(b) National Stock Exchange (NSE)

At the behest of the Government of India, leading Financial Institutions set up the National Stock Exchange in November 1992. NSE is owned by
IDBI, UTI and other public sector institutions. NSE has brought the following key innovations in the way the market operates:

- Computerized order matching with strict price-time priority
- Usage of satellite communications with the help of VSAT.
- NSE is a limited liability company where brokers are franchised. Hence, NSE’s staff are free of pressure from brokers and are more effective in performing regulatory and enforcement functions.

(c) National Securities Clearing Corporation Ltd. (NSCCL)

NSCCL, a wholly-owned subsidiary of NSE incorporated in August 1995, was the first clearing corporation in the country to provide novation/settlement guarantee that revolutionized the very concept of settlement system in India. It was set up to build and sustain confidence in investing public as regards speedy clearing and settlement of securities; to promote and maintain short and consistent settlement cycles; to provide counter-party risk guarantee; and to operate a tight risk containment system. It carries out the clearing and settlement of the trades executed in the equities and derivatives segments of the NSE.

(d) National Securities Depository Ltd. (NSDL)

NSE, to promote dematerialization of securities, joined hands with UTI and IDBI in setting up the first depository in India called the “National Securities Depository Limited” (NSDL). The depository system eradicated the paper from the trading and settlement of securities, and was also able to get rid of the risks associated with fake/forged/stolen/bad paper. Dematerialized
delivery today constitutes almost 100 per cent of the total delivery based settlement.

2. Process and Service Reforms

(a) Nationwide Electronic Trading

Investors face a great deal of uncertainty and high transaction costs due to the involvement of brokers of different exchanges. With the advent of screen based trading system, i.e. online share trading, the investors have easy access to know everything about stock exchange operations. Sitting in their own places they can see on the computer screen the prices at which share are bought and sold, the quantity offered and bid at any moment, and with the click of mouse, they can buy shares or sell shares any moment at the price prevailing at that moment. Thus, the nationwide electronic trading system has so tremendously changed the mode of dealing in stock exchange operations that the investor base has widened to undreamt of level today.

(b) Central Counterparty

Unlike the floor trading system, anonymous trading greatly limits the scope for cartel formation and hence limits market manipulation. However, in doing so, it also eliminates the limited control over counterparty risk exercised by the traders. Hence, a central counterparty was established which assumes the counterparty risk of each member.

(c) Rolling Settlement

Earlier the Indian markets followed account period settlement. In July 2001, it was replaced by rolling settlement, trades are netted through the day, and all open positions at the end of the day are settled unlike account period
settlement. As a result, the systemic risk associated with investing in the market is reduced. Earlier the institutional investors were forbidden from entering into day trading and short selling contract. Now they are allowed to do so. As a result trade volume has multiplied many folds.

3. **Instrument Innovation**

The introduction of derivatives trading in India started with the advent of trading on index futures in June 2000. Within a year, trading in index option and trading stock in options commenced in June 2001 and July 2001 respectively. This was followed by trading in individual stock futures in November 2001. Before the introduction of stock futures, the maximum trading was seen in stock options. The volume of trade is heavy at present.

The ongoing transition of Indian stock market by breaking the protection barriers and a gamut of institutional reforms ensures the efficiency of Indian financial system. This development in the Indian capital market both in depth and breadth along with the increased awareness among the investors has increased the pressure on the companies to perform better consistently. The benchmark or parameter for valuing a company changes over time. The pioneer shareholders Wealth Maximization principle advocates carrying out any decision that increases the market value of shares.
Market Capitalisation

The term, 'Market Capitalisation' of a company refers to the number of its shares outstanding multiplied by its market price per share. Of the two factors (number of shares and market price of the share) the number of shares remains more or less constant except when the company issues bonus shares or goes to increase its share capital by initial public offer (IPO) or by its decision to split its shares. However in the case of bonus issue or share split, the market price will come down, not significantly affecting market capitalisation. But it will go up in deep course on account of other favourable parameters contributing to its enhanced profit margin. Generally speaking increase in the number of shares is not an annual feature.

But the other factors of market capitalisation, namely the market price is subject to daily variation even intraday fluctuation, causing change in the market capitalisation of the company. There are many and varied circumstances leading to southward or northward movement of share price. For instance, award of new contracts, government policy resulting in reduced tax burden, etc. will shoot up the share price of the beneficiary companies immediately after announcement. Similarly even the perceived fear or the spread of any rumour will cause sudden fall in the market prices of shares of particular companies.

Apart from what is happening at the home turf connected with the company, what takes place elsewhere in the world say failures of major banks or catastrophic fall of financial institutions in other countries send shock waves to our stock market. Uncertainty regarding stability of the key petroleum
producing countries in the Middle East undermining the upbeat market sentiment in the economy and stock markets of many countries is a case in point.

During stock market boom the prices of even penny stocks keeps on rising, thus widening market capitalisation even though there is no change in the fundamentals of the company.

In the backdrop of these factors, it can be concluded that market capitalisation is a changing phenomenon, the changes being caused more often by price movement than by the number of shares outstanding. However, daily change in the share price is like a passing cloud while a change in the fundamentals of the company has an impact over a long period of time. Therefore the present study is not concerned with these daily fluctuations observed in the stock exchanges as their impact is of a transient nature. However it makes a detailed analysis of the fundamentals of the company which have a bearing on market capitalisation.

**Valuation of a Company**

The common yardstick to measure the value of the company in this context is market capitalisation or more generally, the wealth created by a firm. Now-a-days market capitalisation has become a universally accepted indicator of business valuation. It represents the aggregate value of a company or stock. It is obtained by multiplying the number of shares issued at their current market price. However, the true value of a company cannot be ascertained from the market price of the share alone. The size of the company is represented by the number of outstanding shares (shares issued less the number of forfeited shares
not reissued). Market capitalisation by taking into account the current market price, which reflects the current value and the total number of shares which reflects the size, gives a clear picture of the market value of a company.

The success or failure of imperative decisions like mergers, acquisitions and takeovers has great impact on the value of a company. Similarly acceptance of new projects also has a bearing on its value. Thus, management takes any decision not only on the project’s viability but also on the changes it is expected to bring in the value of a company. The efficient performance of a company as reflected by its continued earnings results in better valuation of market capitalisation. Researchers also look at market capitalisation and compare it with the book value so as to assess the company’s future prospects.

The companies are classified into large cap, mid cap and small cap based on their market capitalisation. This classification allows researchers to gauge the growth versus risk potential. Historically large cap companies have experienced slower growth with lower risk. Meanwhile small caps have experienced higher growth potential and higher risk factor.

Market capitalisation is the main basis for determining the Index of the market. The overall stock market’s benchmark indices like SENSEX and NIFTY, and individual industry’s index like CNXIT and BSEIT basically represent the total market capitalisation of the companies in the concerned index. Index is calculated using the weighted aggregate of market capitalisation. Any increase or decrease of market capitalisation is reflected in the index. This index in turn affects the prices of most of the other stocks (non-index) traded in the exchange.
The growth of stock market is measured by its total market capitalisation. The boom or recession of an economy is reflected in the market capitalisation of the stock exchange. The size of the market capitalisation and its growth rate pose a major influence on the growth and development of the economy (Ologunde et al. 2006). Market capitalisation is the good indicator of the health of capital markets of an economy. This indicates not only investor's confidence, both domestic and international, but also the strength of their economies. As a consequence the common investors, the firms, dealers in stock market, researchers and policy makers of the Government are showing keen interest in market capitalisation.

**Importance of Market Capitalisation**

Market capitalisation is a market estimate of a company's value, based on perceived future prospects, economic and monetary conditions. Stock prices can also be moved by speculation about changes in expectations about profits or about mergers and acquisitions. Market capitalisation, often abbreviated to market cap, is a measurement of corporate size. The size and growth of a firm's market capitalisation is often one of the critical measurements of a company's success or failure. The term 'capitalisation' is sometimes used as a synonym of market capitalisation; more often, it denotes the total amount of funds used to finance the firm. Market capitalisation is a function of the price of a firm's stock and may not accurately reflect intrinsic value because of varying future expectations of the investors.

It is common for a firm's market capitalisation to exceed "book value" (shareholders' equity) because market prices tend to increase at a quicker pace
than earnings accumulate due to the value placed on expected future growth. Neither the nominal value nor the market price of the shares of the company is a pointer to the largeness or smallness of a company. Sometimes stock price is likely to misrepresent a company’s actual worth. This is because the size of shares outstanding is also a significant determinant of a company’s value.

**Different Types of Market Capitalisation**

- **Mega cap** - This group includes companies that have a market cap of $200 billion and greater. They are the largest publicly traded companies. Not many companies will fit in this category, and those that do are typically the leaders of their industries.

- **Big/large cap** - These companies have a market cap between $10 billion and $200 billion. Many well-known companies fall into this category. Typically, large-cap stocks are considered to be relatively stable and secure. Both mega and large cap stocks are often referred to as blue chips.

- **Mid cap** - Ranging from $2 billion to $10 billion, this group of companies is considered to be more volatile than the large and mega-cap companies. Growth stocks represent a significant portion of the mid caps. Some of the companies might not be industry leaders, but they are well on their way to becoming one.

- **Small cap** – In typically new or relatively young companies, small caps have a market cap between $300 million and $2 billion. Sufficient track records may not be available in small caps. Yet these small caps
companies have the possibility of greater capital appreciation but at the cost of greater risk.

➢ Micro cap - Mainly consisting of penny stocks, this category denotes market capitalisation between $50 million and $300 million. The upward potential of these companies as well as their downside movement is hard to predict. So they do not offer a safe investment. A great deal of thinking and deep analysis of various factors should precede investment in such shares.

➢ Nano cap - Companies having market caps below $50 million are nano caps. These companies are the most risky, and the potential for gain is quite often minimal or even negative.

Mutual funds are bound by certain requirements regarding investment in companies. A mutual fund may be asked to invest only in companies which exceed a minimum market capitalisation. For example, a fund that only invests in stocks of companies in the S&P 500 will require a very large market capitalisation.

Implications of Market Capitalisation

India is now among a few countries in the world whose market capitalisation exceeds GDP. Developed countries like the United States, United Kingdom and emerging markets like South Africa, Malaysia and Singapore are other countries whose market capitalisation exceeds their GDP figures. Further India has become the first among the Brazil, Russia, India and China (BRIC) countries whose market capitalisation exceeds GDP. The reasons behind
improved market performance are overall growth across all the sectors in the economy especially technology, infrastructure and financial sectors.

Besides this market is estimating high economic growth for the future and based on this, it expects better corporate performance in the future. Thus, increasing market capitalisation to GDP ratio indicates robust economic growth led by all-round business performance. This ratio also indicates a strong increase in the flow of funds from domestic as well as from foreign towards capital market.

Market capitalisation to GDP ratio is especially relevant for identifying major stock market bubbles or depressions, by looking beyond the individual company’s profitability. Just as price earnings ratio is an indicator of a company’s profit performance, market capitalisation to GDP ratio reflects the performance of the entire stock market.

**Information Technology Industry**

Generally industries have a major role to play in the economic development of a country. The industrial sector which possesses a relatively high marginal propensity to save and invest contributes significantly to eventual achievement of a self-sustaining economy. The Indian Information Technology (IT) industry has played a major role in placing India on the international map. This sector is amongst the fastest growing in the country. It grew from 150 million US Dollars in 1990-91 to a whopping 69.4 billion US Dollars in 2008-09. The industry was further expected to garner a revenue aggregate of 73.1 billion US Dollars in 2009-10. According to NASSCOM,
the share of I.T. Industry in GDP increased from 1.2 per cent in 1997-98 to 5.5 per cent of GDP in the financial year 2008-09.

The I.T. industry in India comprises software industry, information technology enabled services (ITES), and business process outsourcing (BPO) industry. Information technology essentially refers to the digital processing, storage and communication of information of all kinds. It can potentially be used in every sector of the economy. Indian I.T. industry has built up valuable brand equity for itself in the global markets. The total IT Software and Services employment has touched 2.20 million in 2008-09 as compared to 0.52 million in 2001-02. This represents a net addition of 1.68 million to the industry employee base since 2001-02. The indirect employment attributed by the sector is estimated at 8.0 million in 2008-09. This has created about 10.20 million job opportunities.

The Indian government has established a National Taskforce on I.T. with the avowed object of formatting a durable National I.T. Policy for India. To offer an authorized structure to assist electronic trade and electronic operations, Government enacted the I.T. Act 2000. Fifty-one Software Technology Parks have been developed by the Government for the promotion of I.T. Industry.

The I.T. industry in India has today become a growth engine for the economy contributing substantially to increase the GDP, urban employment and exports, and to achieve the vision of a “young and resilient” India. The market capitalisation of I.T. Industry plays a key role in the economy. Its contribution to the movement of index is unparalleled. Hence, the I.T. Industry
has been chosen for the study. The model for market capitalisation of I.T. Industry will be developed both at the firm and industry level.

**Statement of the Problem**

The robust growth of Information Technology Industry attracts the attention of investors, employees, government and stock market of our country. It’s contribution to the economic development is also remarkable. At the same time the boom or recession of this industry brings phenomenal changes in the Indian economy. What makes or mars the growth and value of information technology firms measured in terms of market capitalisation is a problem which requires a deep and analytical examination. This study is undertaken essentially to address this problem.

**Scope of the Study**

The value of a company is measured by its market capitalisation. The movement of market capitalisation decides the sectoral index of the I.T. sector like CNXIT Index and BSEIT Index. It also plays a key role in the benchmark index of the country like SENSEX and NIFTY. This study analyses and predicts the future movement of market capitalisation of I.T. Industry and also identifies the relationship between market capitalisation and internal factors of a firm’s performance. The macro factors of the economy, the aggregate market capitalisation of I.T. firms and the direction of relationship between them are analysed. It also provides a model to predict and control market capitalisation both at the firm and the industry level.
Objectives of the Study

1. To examine the trend and growth of the movement of market capitalisation of Indian Information Technology firms.

2. To analyse and identify the relationship between the firm’s financial performance and its market capitalisation.

3. To develop a model for the determinants of market capitalisation of Indian I.T. Industry.

4. To suggest methods for predicting market capitalisation for investors, firms, policy makers and stock market at firm level and methods to control market capitalisation at the aggregate industrial level.

Methodology

Firm-specific information and accounting data are obtained from the CAPITALLINE database. The share prices and market capitalisation information are obtained from the National Stock Exchange and Bombay Stock Exchange websites. Information relating to macro economic factors has been culled out from the Reserve Bank of India and SEBI websites. The sample Information Technology firms were chosen from BSE500 Index. BSE500 Index consists of 500 companies listed in the Bombay Stock Exchange of which 34 companies belong to Information Technology Industry. The companies with a life span of less than 8 years were not chosen for the sample. Thus, the final sample consists of 19 I.T. firms based on availability of data for 8 years:
**Table No. 1.1.1**

**Sample Information Technology Firms**

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Name of the firm</th>
<th>BSE Symbol</th>
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<tbody>
<tr>
<td>1.</td>
<td>CMC Ltd.</td>
<td>CMC</td>
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<tr>
<td>2.</td>
<td>GTL Ltd.</td>
<td>GLOTTEL</td>
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<tr>
<td>3.</td>
<td>Financial Technologies Ltd.</td>
<td>FINANTECH</td>
</tr>
<tr>
<td>4.</td>
<td>HCL Infosys Ltd.</td>
<td>HCLINF</td>
</tr>
<tr>
<td>5.</td>
<td>HCL Technologies Ltd.</td>
<td>HCLTEC</td>
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<td>6.</td>
<td>Hexaware Technologies Ltd.</td>
<td>APTECH</td>
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<tr>
<td>7.</td>
<td>ICSA India Ltd.</td>
<td>INNCOM</td>
</tr>
<tr>
<td>8.</td>
<td>Infosys Technologies Ltd.</td>
<td>INFTEC</td>
</tr>
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<td>9.</td>
<td>Infotec Enterprises Ltd.</td>
<td>INFENT</td>
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<td>10.</td>
<td>KPIT Cummins Infosys Ltd.</td>
<td>KPISYS</td>
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<td>11.</td>
<td>Mastek Ltd.</td>
<td>MASTEK</td>
</tr>
<tr>
<td>12.</td>
<td>Moser Baer India Ltd.</td>
<td>MOSBAE</td>
</tr>
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<td>13.</td>
<td>Mphasis Ltd.</td>
<td>BFLSOF</td>
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<td>14.</td>
<td>Oracle Financial Services Software Ltd.</td>
<td>IFLEX</td>
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<tr>
<td>15.</td>
<td>Polaris Software Lab Ltd.</td>
<td>POLSOF</td>
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<td>16.</td>
<td>Rolta India Ltd.</td>
<td>ROLIND</td>
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<tr>
<td>17.</td>
<td>Subex Ltd.</td>
<td>SUBSYS</td>
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<td>18.</td>
<td>Tata Elxsi Ltd.</td>
<td>TATELX</td>
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<tr>
<td>19.</td>
<td>Wipro Ltd.</td>
<td>WIPRO</td>
</tr>
</tbody>
</table>

*Source: Secondary data*
Period of the Study

The period of the study is 2001-02 to 2008-09. Since a number of developments like deregulation, restructuring and policy changes and amendment of I.T. Act have taken place during the study period, this period is considered to be apt for projecting the future trend of market capitalisation. This 8-year period of study is divided into 2 sub-periods of 4 years each. Period 1 is from financial year 2001-02 to financial year 2004-05, a period of post-liberalization growth. Period 2 is from 2005-06 to 2008-2009, a period of beginning of industrial recession during the post-liberalization phase. As far as time series analysis is concerned, ARIMA analysis has been made in terms of quarterly market capitalisation of the companies. As for industry analysis quarterly data have been considered.

Hypotheses of the Study

Stemming from objectives a series of hypotheses have been formulated, which are listed as follows:

1. There is no significant relationship between the selected firm performance variables like profitability ratios, risk factors, advertisement and R & D expenditure, solvency ratios, ownership ratios, growth and size of the I.T. firms and Market Capitalisation


3. Equity of Indian I.T. firms does not Granger cause the movement of Market Capitalisation of Indian I.T. Industry.
4. Market Capitalisation of Indian I.T. Industry does not Granger cause the movement of Equity of Indian I.T. firms

5. Liquidity of Indian I.T. firms does not Granger cause the movement of Market Capitalisation of Indian I.T. Industry.

6. Market Capitalisation of Indian I.T. Industry does not Granger cause the movement of Liquidity of Indian I.T. firms

Style of Reference

The reference has been arranged in accordance with prescription of MLA handbook for writers of research papers.

Statistical Tools and Methods

The data obtained for the study have been standardized and analysed to draw meaningful inferences on the factors determining market capitalisation by using simple statistical tools such as ratios, correlations and multiple regression test and advanced time series methods such as unit root test, co-integration tests and Granger Causality tests. The above analyses have been done by using the statistical software like SPSS and E-Views. The above statistical tests have led to the findings in the form of actual statements.

(i) Correlation Test

Correlation Test is a statistical tool used to measure the extent of relationship between the variables under consideration. The relation between the variables can be verified and tested for significance. This analysis is applied to know how the change in the value of one variable produces a change in the value of the other variable. Before analysing the results of regression analysis,
it is an implied condition to check the existence of multicollinearity or collinearity, the situation where two or more of the independent variables are highly correlated. If the pair-wise or zero order correlation coefficient between two regressors is high (excess of 0.8), multi-collinearity is a serious problem. (Gujarati 2006) The solution is to drop that variable and run regression analysis with the rest. Pearson correlation (r) is computed, and highly correlated variable is omitted in the study to avoid multicollinearity problem.

(ii) Multiple Regression Test

Multiple regression is a flexible method of data analysis that may be appropriate whenever a quantitative variable (the dependent or criterion variable) is to be examined in relationship to any other factor (expressed as independent or predictor variables). Relationships may be nonlinear, independent variables may be quantitative or qualitative, and one can examine the effects of a single variable or multiple variables with or without the effects of other variables taken into account (Cohen, Cohen, West, & Aiken, 2003). The relationship between the firm’s financial performance variables and firm’s market capitalization has been analysed through this test.

(iii) Unit Root Test

Time series analysis must be based on stationary data series for drawing useful inferences. Broadly speaking a data series is said to be stationary if its mean and variance are constant (non-changing) over time and the value of covariance between two time periods depends only on the distance or lag between the two time periods and not on the actual time at which the covariance is computed. The correlation between a series and its lagged values
are assumed to depend only on the length of the lag and not when the series started. This property is known as stationarity and any series obeying this is called a stationary time series. Augmented Dickey-Fuller (ADF) test has been carried out to test the stationarity of the time series variables at level and its first difference.

(iv) ARIMA Test

ARIMA model is a generalization of an Autoregressive Moving Average (ARMA) model. These models are fitted to time series data either to better understand the data or to predict future points in the series (forecasting). The model is generally referred to as an ARIMA\(( p,d,q)\) model where \( p, d, \) and \( q \) are integers greater than or equal to zero and refer to the order of the autoregressive, integrated, and moving average parts of the model respectively. ARIMA models form an important part of the Box-Jenkins approach to time-series modelling. A non-seasonal ARIMA model is classified as an "ARIMA\(( p,d,q)\)" model, where

- \( p \) is the number of autoregressive terms,
- \( d \) is the number of non-seasonal differences, and
- \( q \) is the number of lagged forecast errors in the prediction equation.

ARIMA analysis is used to individually analyse the market capitalisation of 19 sample I.T. firms. Quarterly data of market capitalization for the study period have been taken for the purpose of time series analysis. ARIMA time series models are used to obtain the post-sample forecast.
(v) **Cointegration test**

Cointegration is a statistical property of time series variables. If two or more series are individually integrated (in the time series sense) but some linear combination of them has a lower order of integration, then the series are said to be cointegrated. A common example is where the individual series are first-order integrated (I(1)) but some (cointegrating) vector of coefficients exists to form a stationary linear combination of them. The long term relationship between the variables market capitalisation, equity and liquidity has been analysed through this test.

(vi) **Granger Causality Test**

Granger causality is a statistical concept of causality that is based on prediction. According to Granger causality, if a signal $X_1$ "Granger-causes" (or "G-causes") a signal $X_2$, then past values of $X_1$ should contain information that helps predict $X_2$ above and beyond the information contained in past values of $X_2$ alone. Its mathematical formulation is based on linear regression modeling of stochastic processes (Granger 1969). The short term relationship between the variables has been analysed through this test and the direction of the causality is also identified.
Limitations of the Study

1. The study analyses firms in only one industry, viz. I.T. sector. The results of the study may not be applicable to other sectors since they are influenced by different micro and macro variables.

2. The outcome of the present projections is likely to vary because of other events beyond the control of the industry. The results of the study may hold good only when other things remain the same.

Scope for further Research

1. Market Capitalisation model can be applied for different sectors of the economy of a country.

2. The sectoral comparison can be made in a country using the model.

3. Market capitalisation model can be applied for industries across nations.

4. The comparison can be made between market capitalisation of a particular industry of a country with that of other country.

5. The comparison can be made between the overall market capitalisation of any two countries.

6. The same study can be repeated in the Information Technology industry using the model after a gap of three years from now.
Chapterisation

Chapter I - Introduction

The first chapter gives an introduction to market capitalisation and its importance, scope of the study, its objectives, period, methodology, hypotheses, limitations and chapterisation.

Chapter II – Review of Literature

The second chapter deals with the review of literature related to the topic.

Chapter III - An Overview of Indian I.T. Industry

The third chapter covers the growth of Indian I.T. Industry and its role in the development of Indian economy.

Chapter IV – ARIMA Analysis of Market Capitalisation of I.T. Firms

The fourth chapter analyses the market capitalisation data by using the statistical technique, ARIMA model. Based on the analysis quarterly prediction of market capitalisation has been done.

Chapter V – Micro Analysis of Market Capitalisation

The fifth chapter analyses the relationship between the firm’s performance and market capitalisation for the study period.

Chapter VI – Macro Analysis of Market Capitalisation

The sixth chapter analyzes the market capitalisation of I.T. Industry (Aggregate Market Capitalisation of I.T. firms) and macro economic factors for
long term and short term relationship through Cointegration analysis and Granger causality test.

Chapter VII - Summary of Findings, Suggestions and Conclusion

This chapter gives a summary of the findings of the present study. Conclusion has been drawn in the light of the findings and suggestions.
List of Abbreviations and operational definitions:

Some of the important abbreviations used in this dissertation and operational definitions are given below:

### a. Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADF Test</td>
<td>Augmented Dickey Fuller Test</td>
</tr>
<tr>
<td>AIC</td>
<td>Akaike Information Criteria</td>
</tr>
<tr>
<td>ARIMA</td>
<td>Auto Regressive Integrated Moving Average</td>
</tr>
<tr>
<td>CGTS</td>
<td>Compounded Annual Growth Rate on Sales Turnover</td>
</tr>
<tr>
<td>CGTA</td>
<td>Compounded Annual Growth Rate on Total Assets</td>
</tr>
<tr>
<td>DIIs</td>
<td>Domestic Institutional Investors</td>
</tr>
<tr>
<td>DPS</td>
<td>Dividend per Share</td>
</tr>
<tr>
<td>EPS</td>
<td>Earnings per Share</td>
</tr>
<tr>
<td>EQ</td>
<td>Equity</td>
</tr>
<tr>
<td>FIIs</td>
<td>Foreign Institutional Investors</td>
</tr>
<tr>
<td>GC</td>
<td>Granger Causality Test</td>
</tr>
<tr>
<td>I.T.</td>
<td>Information Technology</td>
</tr>
<tr>
<td>LIQ</td>
<td>Liquidity</td>
</tr>
<tr>
<td>M.P.</td>
<td>Market Price</td>
</tr>
<tr>
<td>M3</td>
<td>Money Supply</td>
</tr>
<tr>
<td>MCAP</td>
<td>Market Capitalisation</td>
</tr>
<tr>
<td>NASSCOM</td>
<td>National Association of Software and Services Company</td>
</tr>
<tr>
<td>P.E.R.</td>
<td>Price Earnings Ratio</td>
</tr>
<tr>
<td>ROCE</td>
<td>Return on Capital Employed</td>
</tr>
<tr>
<td>ROE</td>
<td>Return on Equity</td>
</tr>
<tr>
<td>ROTA</td>
<td>Return on Total Assets</td>
</tr>
<tr>
<td>SC</td>
<td>Schwarz Criterion</td>
</tr>
</tbody>
</table>
b. Operational Definitions

Market Capitalisation

Market capitalisation represents the aggregate value of a company or stock. It is obtained by multiplying the outstanding shares (shares issued less the number of forfeited shares not reissued) by their current market price.

Market Price

The force of demand and supply mainly determines the market price of a share. It is the balance struck between buyers and sellers. Mathematically it is calculated as:

\[ \text{Market Price} = \frac{(P_H + P_L)}{2} \]

Where \( P_H \) is the highest market price, \( P_L \) is the lowest market price during the year which relates to the ‘t’ period.

Equity

Equity refers to ownership. It is most often used as a synonym for common stock of a publicly traded company. It is the ownership interest in a corporation in the form of common stock. It also refers to total assets minus total liabilities, in which case it is also referred to as shareholder’s equity or net worth.

Time Deposit

Time Deposits (TD) is a part of money supply, which is not available for investment in marketable securities.
Liquidity

Market liquidity is defined as a residual of narrow money after subtracting of public borrowing. Savings in financial institutions are only investible funds and therefore they will not affect the liquidity. These investible funds will become sooner or later investment in shares or other securities.

Money Supply

In economics the money supply or money stock is the total amount of money available in an economy at a particular point in time. There are several ways to define "money," but standard measures usually include currency in circulation and demand deposits (depositors' easily-accessed assets on the books of financial institutions).

The different types of money are typically classified as "M"s. The "M"s usually range from M0 (narrowest) to M3 (broadest) but which "M"s are actually used depends on the country's central bank.

**M0** is referred to as the monetary base, or narrow money.

**M1**: represents currency in circulation plus demand deposits

**M2**: represents money and "close substitutes" for money.

**M3**: represents large time deposits, institutional money market funds, short-term repurchase and other larger liquid assets.