IT RELATED REFORMS IN INDIAN STOCK MARKETS – A STUDY

Dr. C K Hebbar*.
Mr. Sandeep S Shenoy**.
*Department of Commerce, University College Mangalore University,
**Department of Commerce, ManipalUniversity, Manipal

ABSTRACT

The Indian capital market has witnessed major reforms in the 1990s and thereafter. The Government of India and SEBI has taken a number of measures in order to improve the working of the Indian stock exchanges and to make them more progressive and vibrant. Initially the BSE was the main exchange, but after the setting up of the NSE and the Interconnected Stock Exchange of India Limited (ISE) reach of stock exchanges have spread across the country. Modelled along the lines of the NASDAQ market of USA, Over the Counter Exchange of India (OTCEI) setup in 1990 introduced many novel concepts to the Indian capital markets such as screen-based nationwide trading, sponsorship of companies, market making and scriplesstrading. The emergence of Securities and Exchange Board of India (SEBI) as the supreme capital market regulator showed India's commitment to come across as a strong economic force, through establishing market best practices of enhanced corporate disclosure and increased investor protection. Information technology has also played a vital role in the transformed growth of the Indian capital market. This paper tries to identify and understand the IT reforms that have transformed the functioning of the capital market and also the impactof these reforms on the stock markets in India and across the globe.

Keywords: Information Technology, Reforms, Capital Market

Introduction:

Economic environment of a nation is largely characterized by the efficient mobilization and usage of financial resources. A favourable economic environment attracts investments, which in turn influences the development of the economy. The quantity and quality of assets in a nation at a specific time is one of the essential criteria for the assessment of economic development. Assets in an economy is broadly divided according to their characteristics into Physical, Financial and intangible assets. Financial assets help the physical assets to generate activity. Financial assets have specific properties like monetary value, divisibility, convertibility, reversibility, liquidity and cash flow that distinguish it from physical assets. These properties of financial asset led to the emergence of financial markets. Specific financial markets are evolved to cater to the unique needs of the financial instruments introduced.

In this respect financial markets can be classified on the basis of the nature of instruments exchanged in the economy. On the basis of the nature of financial instruments the financial market is broadly classified as Money Market, Capital Market, derivatives market, Insurance market and forex market. In order to make a financial market more efficient and viable one, the financial system of the country plays a greater role. Financial system of a country acts as channel in efficient distribution of funds from surplus units to deficit units. Efficient Financial systems are indispensable for speedy economic development. The more vibrant and efficient the financial system in a country, the greater is its efficiency of capital formation. The process of capital formation in the country is dependent upon the investment policies and efficient operations of financial intermediaries. The financial intermediaries facilitate the flow of savings into investments by overcoming the geographical and technical barriers. As we know investment is the activity that commits funds in any financial/physical form in the present with an expectation of receiving additional return in the future. So investment is an activity that is undertaken by those who have savings. But all savers are not necessarily investors basing upon the motive behind the savings. The expectation of return is an essential characteristic of investment. In this respect the role of financial intermediaries has become immensely important, since they can help in channelizing the surplus funds from an economy to the deficit units leading to development and growth of the economy at large.

Global Stock Market Scenario

The growth of stock markets in emerging nations has been one of international finance's biggest stories. The long-term returns of developing market equities have firmly outpaced those offered by developed markets. In addition, capitalization ratios — stock market capitalization as a share of GDP — in emerging economies have risen significantly in the last decade. Developing stock markets were hit particularly hard by 2008's financial crisis, but showed their resilience by bouncing back. Today, returns have nearly recovered to pre-crash levels. The emerging equity

markets have expanded and their remarkable progress relates to the broader economic growth these markets have enjoyed over the last 25 years. As developing nations' equity markets become increasingly integrated with the developed world's financial mechanisms, we look to a possible future where emerging markets are increasingly stable, but unable to offer the returns of a decade ago. Technology has contributed to a bang and a crash at the Stock Markets across the globe and created an invisible world where billions of pounds changes hands in milliseconds.

Few of World's leading stock exchanges are detailed below:

New York Stock Exchange (NYSE) - Headquartered in New York City. Market Capitalization (2013, USD Billions) – 14,242; Trade Value (2011, USD Billions) – 20,161.The largest stock exchange in the world by both market capitalization and trade value. NYSE is the premier listing venue for the world's leading large- and medium-sized companies. Operated by NYSE Euronext, the holding company created by the combination of NYSE Group, Inc. and Euronext N.V., NYSE offers a broad and growin array of financial products and services in cash equities, futures, options, exchange-traded products (ETPs), bonds, market data, and commercial technology solutions. Featuring more than 8000 listed issues it includes 90% of the Dow Jones Industrial Average and 82% of the S&P 500 stock market indexes volume.

NASDAQ OMX - Headquartered in New York City. Market Capitalization (2011, USD Billions) - 4,687; Trade Value (2013, USD Billions) – 13,552.Second largest stock exchange in the world by market capitalization and trade value. The exchange is owned by NASDAQ OMX Group which also owns and operates 24 markets, 3 clearinghouses and 5 central securities depositories supporting equities, options, fixed income, derivatives, commodities, futures and structured products. It is a home to approximately 3,400 listed companies and its main index is the NASDAQ Composite, which has been published since its inception. This Stock market is also followed by S&P 500 index.

London Stock Exchange - Headquartered in London. Market Capitalization (2011, USD Billions) – 3,266; Trade Value (2013, USD Billions) – 2,871.Located in London City, it is the oldest and fourth-largest stock exchange in the world. The Exchange was founded in 1801 and its current premises are situated in Paternoster Square close to St Paul's Cathedral. It is the most international of all the world's stock exchanges, with around 3,000 companies from over 70 countries admitted to trading on its markets. The London Stock Exchange runs several markets for listing, giving an opportunity for different sized companies to list. For the biggest companies exists the Premium Listed Main Market, while in terms of smaller SME's the Stock Exchange operates the Alternative Investment Market and for international companies that fall outside the EU, it operates the Depository Receipt scheme as a way of listing and raising capital.

Tokyo Stock Exchange : Headquartered in Tokyo. Market Capitalization (2011, USD Billions) – 3,325; Trade Value (2011, USD Billions) – 3,972.Third largest stock exchange market in the world by aggregate market capitalization of its listed companies. It had 2,292 companies which are separated into the First Section for large companies, the Second Section for mid-sized companies, and the Mothers section for high growth startup companies. The main indices tracking Tokyo Stock Exchange are the Nikkei 225 index of companies selected by the Nihon KeizaiShimbun, the TOPIX index based on the share prices of First Section companies, and the J30 index of large industrial companies. 94 domestic and 10 foreign securities companies participate in TSE trading. The London Stock Exchange and the Tokyo Stock Exchange are developing jointly traded products and share technology.

Shanghai Stock Exchange - Headquartered in Shanghai. Market Capitalization (2011, USD Billions) – 2,357; Trade Value (2013, USD Billions) – 3,658.It is the world's 5th largest stock market by market capitalization and one of the two stock exchanges operating independently in the People's Republic of China. Unlike the Hong Kong Stock Exchange, the SSE is not entirely open to foreign investors. The main reason is tight capital account controls by Chinese authorities.

The securities listed at the SSE include the three main categories of stocks, bonds, and funds. Bonds traded on SSE include treasury bonds, corporate bonds, and convertible corporate bonds. The largest company in SSE is PetroChina (market value – 3,656.20 billion).

Indian Stock Market Scenario

The Indian financial sector is in a process of rapid transformation. Reforms are continuing globally as part of the overall structural reforms aimed at improving the productivity and efficiency of the economy in the highly competitive world. The role of an integrated financial infrastructure is to stimulate and sustain economic growth. The US$ 28 billion Indian financial sector has grown at around 15 per cent and has displayed stability for the last several years, even when other markets in the Asian region were facing a crisis. This stability has come through the resilience that the In-country system and the finance companies have built over these years. The financial sector has kept pace with the growing needs of corporate and other borrowers. Banks, capital market participants and insurers have developed a wide range of products and services to suit varied customer requirements.

Due to technological development in the last few years, the physical transaction with more paper work is reduced. Now paperless transactions are increasing at a rapid rate. It saves money, time and energy of investors. Thus it has made investing safer and hassle free encouraging more people to join the capital market.

The opening up of the economy has increased the flow of Foreign Direct Investment (FDI) and has put India on the global map, as a new-age economic force to reckon with. The increased level of sophistication in the market has been duly supported by increasingly complex instruments like derivatives and other structured products. While, the global meltdown has made us aware of the perils of sophisticated markets, the learning has been to follow a path of caution while maintaining a steady pace.

Few leading stock exchanges in India are detailed below:

Bombay Stock Exchange (**BSE**) is an Indian stock exchange located at Dalal Street, Kala Ghoda, Mumbai,Maharashtra, India. Established in 1875 and is considered to be one of Asia's fastest stock exchanges, with a speed of 200 microseconds and one of India's leading exchange groups and the oldest stock exchange in the South Asia region. Bombay Stock Exchange is the world's 10th largest stock market by market capitalization at $1.7 trillion as of 23 January 2015. More than 5,000 companies are listed on BSE.

The **OTC Exchange Of India (OTCEI)**, also known as the Over-the-Counter Exchange of India, is based inMumbai, Maharashtra. It is India's first exchange for small companiesas well as the first screen-based nationwide stock exchange in India.OTCEI was set up to access high-technology enterprising promoters in raising finance for new product development in a cost-effective manner and to provide a transparent and efficient trading system to investors.

OTCEI is promoted by the Unit Trust of India, the Industrial Credit and Investment Corporation of India, the Industrial Development Bank of India, the Industrial Finance Corporation of India, and other institutions, and is a recognized stock exchange under the SCR Act.

Inter-connected Stock Exchange Ltd. (**ISE**)started its operation in 1998 in Vashi, Mumbai. It is a national-level stock exchange, providing trading, clearing, settlement, risk management and surveillance support to its trading members. It has 841 trading members, who are located in 18 cities. These intermediaries are administratively supported through the regional offices at Delhi, Kolkata, Patna, Ahmedabad, Coimbatore andNagpur, besides Mumbai.

The ISE is promoted by 12 regional stock exchanges namely at Bangalore, Bhubaneshwar, Chennai, Cochin,Coimbatore, Guwahati, Indore, Jaipur,Mangalore, Magadh and Vadodara. The participating exchanges of ISE have 4,500members and listed securities. It is a stock exchange of stock exchanges,members of the stock exchanges being traders on the ISE.

National Stock Exchange (NSE)isa state-of-the art exchange, with sophisticated technology to improve trading practices and reduce unethical dealings, supported by a strong legal framework and technological base to strengthen the governance structure and has been the highlight of the Indian capital market in the last decade. The advent of technology to the Indian stock markets

has been largely attributed to the National Stock Exchange (NSE). NSE introduced the screen based trading and settlement system, supported by a state-of-the –art technology platform.

Role of SEBI

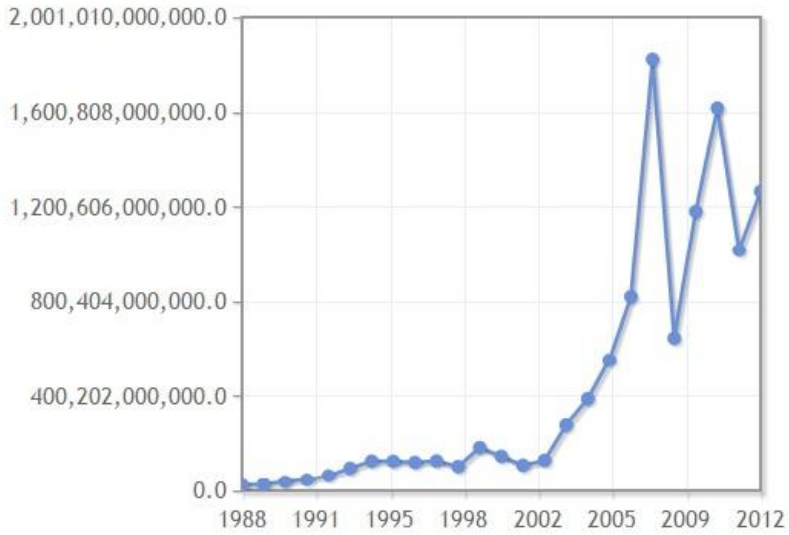
The emergence of Securities and Exchange Board of India (SEBI) as the supreme capital market regulator showed India's commitment to come across as a strong economic force, through establishing market best practices of enhanced corporate disclosure and increased investor protection. To fulfil the commitment to adopt global best practices and bring about more transparency to the capital markets functioning, SEBI also assumed the responsibility of monitoring the markets and stock exchanges. A significant step towards that initiative was the launch of the Integrated Market Surveillance System (IMSS) in 2006. The IMSS equipped the regulator to identify doubtful market activity. The IMSS's primary objective is to monitor the market activities across various stock exchanges and market segments including both equities and derivatives. IMSS collects and analyses data not only from the stock exchanges but also from National Securities Depository, Limited. (NSDL), Central Depository Services (India) Limited. (CDSL), clearinghouses, and clearing corporations. The RBI introduced the electronic funds transfer system, "The Reserve Bank of India National Electronic Funds Transfer System" (referred to as "NEFT System" or "System").

The objective of the system is two-fold. First, is to establish an electronic funds transfer system to facilitate an efficient, reliable, secure and economical system to funds transfer and clearing in the banking sector throughout India. Second, is to relieve the stress on the paper based funds transfer and clearing system.

The value for Market capitalization of listed companies (current US$) in India was $1,263,340,000,000 as of 2012. Over the years, the value for this indicator has fluctuated between $1,819,100,000,000 in 2007 and $23,600,000,000 in 1988.

Market capitalization (also known as market value) is the share price times the number of shares outstanding. Listed domestic companies are the domestically incorporated companies listed on the country's stock exchanges at the end of the year. Listed companies does not include investment companies, mutual funds, or other collective investment vehicles. Data are in current U.S. dollars

Fig 1.2.1 Indian Stock Market capitalisation 1988-2012



Source: Standard & Poor's, Global Stock Markets Factbook and supplemental S&P data.

In the light of the above stock market developments in India and Abroad , the study focusses on reforms related to infusion of Information technology in the Indian stock markets.

Research Methodology

Objectives:

- To identify and understand the IT Reforms in Indian Stock Market.
- To understand the impact of ITreforms on Stock markets in India and across the Globe.

Scope:

- Indian Capital market has seen tremendous growth post liberalization with implementation of new reforms and strengthened Regulatory policies. IT reforms has also led to major transformation with respect to increased participants. The study focuses on IT reforms in Indian Stock market and impactof IT reforms in Indian and select Global Stock Markets.

Limitations:

The data is secondary in nature, primary data may bring in more dimensions and improve the quality of the analysis.

IT Reforms and Developments in Indian Stock Market

The key to success in providing capital markets solutions is not simply investment and customer centricity, but a focus on key structural changes in the industry. Out of the financial crisis came a common consensus that capital markets must exist in a more tightly controlled risk management environment to avert the calamitous events of the recent past. With this school of thought has emerged a sharper focus on innovation and technology in bringing changes to the industry. Only by incorporating the latest technological advances and partnering with capable enterprise software providers will leading industry figures acclimatise to always-complex and often-disruptive changes to the financial services sector.

Stock exchanges today have to rely increasingly on information technology to stay competitive in delivering services. This is primarily because of newer trading channels used for communicating and transacting like Internet and On-line security trading.

The IT department of NSE employs 150 IT professionals forming a third of its total staff strength. The exchange has invested close to Rs.400 Crores in computers, software and communication equipment. It is therefore recognized as one of "Top IT User" organizations.

In line with global trends NSE is structured and operates much like an information technology company. It has the largest VSAT network in this part of the world with a huge and complex web of hardware and software. It has a detailed disaster recovery site that mirrors all operating systems. The NSE has set up its own Internet Webster, which is visited daily by four Lakh persons

Stock Exchange Technology

The modern stock exchange technology does not need the traditional type of brokers to match investors' orders as they used to do on the physical-trading floor. The automated Trading screens can match buy and sell orders without the intervention of brokers. Today brokers are needed only for settlement responsibilities. NSE introduced a nation-wide VSAT driven screen based trading system.Operations commenced in Mumbai and rapidly spread all over India. NSE today offers investors trading facilities in over 280 cities and town through 4000 terminals. For the first time NSE introduced in India screen based trading with automated matching.

The system conceals the identity of the parties to an order or trade. This help better functioning of the market as disclosures of identity would put most members at a disadvantage. The trading system operates on price time priority. This means given the same set or orders, the orders that come first receive priority in matching. When an order does not find an immediate match in remains in the system and is displayed to the whole market, till a fresh order comes in or the earlier order is modified or cancelled. The market screens at any point of time give the members

complete information on the total order depth in a security, the high price, the low price, the last traded price and other related information.

Nationwide Trading Facility

Nationwide Trading system of NSE has immensely benefited investors in all places, which do not have a stock exchange nearby. Earlier their orders took three days for confirmation. This time lag is now a thing of the past, as the orders and prices are visible and instantly available to all investors across the country, representing a dramatic change in investor access and protection. This has served to unify the earlier fragmented market into a single national order book, bringing with it unprecedented increases in liquidity and transparency.

Risk Containment Measures -Investors freed from Counterparty Risks

NSE introduced risk containment measures like mark to market margins, exposure limits etc., bringing enormous safety to fast growing and changing electronic market.

NSE has introduced the concept of a clearing corporation, by which the counterparty risk of each member is taken by NSCC and the financial settlement guaranteed by the Corporation. Counterparty risk is being guaranteed through the tight risk management system and an innovative method of on-line position monitoring and automatic disablement. NSE introduced this system of automatic disablement to control grave risks. Under this system each broker of NSC is given a limit up to which he can trade. This limit is fixed in relation to the money he deposits with NSC or its clearing corporation. This money can be cash or pledge of securities or Bank Guarantee. Currently the limit is 8.5 times the money deposited.

The trading system works in such a way that the broker gets warning messages after he crosses 70% of his trading limit and the moment he reaches 100% of his limit NSE computer disconnects all his terminals from the system so that he cannot trade further. He is allowed to trade again only when he brings additional deposits or authorise NSC to reduce his trades either by selling or buying on his behalf.

Today our country has an advanced trading system which is a fully automated screen based trading system. This system adopts the principle of an order driven market as opposed to a quote driven system. i) NSE operates on the 'National Exchange for Automated Trading' (NEAT) system. ii) BSE operates on the „BSE"s Online Trading" (BOLT) system

Order Management in Automated Trading System:

The trading system provides complete flexibility to members in the kinds of orders that can be placed by them. Orders are first numbered and time-stamped on receipt and then immediately processed for potential match. Every order has a distinctive order number and a unique time

stamp on it. If a match is not found, then the orders are stored in different 'books'. Orders are stored in price-time priority in various books in the following sequence: Best Price, Within Price, by time priority. Price priority means that if two orders are entered into the system, the order having the best price gets the higher priority. Time priority means if two orders having the same price are entered, the order that is entered first gets the higher priority.

Order Matching Rules in Automated trading system:

The best buy order is matched with the best sell order. An order may match partially with another order resulting in multiple trades. For order matching, the best buy order is the one with the highest price and the best sell order is the one with the lowest price. This is because the system views all buy orders available from the point of view of a seller 25 and all sell orders from the point of view of the buyers in the market. So, of all buy orders available in the market at any point of time, a seller would obviously like to sell at the highest possible buy price that is offered. Hence, the best buy order is the order with the highest price and the best sell order is the order with the lowest price. Members can proactively enter orders in the system, which will be displayed in the system till the full quantity is matched by one or more of counter-orders and result into trade(s) or is cancelled by the member. Alternatively, members may be reactive and put in orders that match with existing orders in the system. Orders lying unmatched in the system are 'passive' orders and orders that come in to match the existing orders are called 'active' orders. Orders are always matched at the passive order price. This ensures that the earlier orders get priority over the orders that come in later.

Order Conditions in Automated Trading System: A Trading Member can enter various types of orders depending upon his/her requirements. These conditions are broadly classified into three categories: ⎫ Time Related Condition ⎫ Price Related Condition ⎫ Quantity Related Condition ⎫

Time Conditions

a) **Day Order** - A Day order, as the name suggests, is an order which is valid for the day on which it is entered. If the order is 26 not matched during the day, the order gets cancelled automatically at the end of the trading day.

b) **GTC Order** - Good Till Cancelled (GTC) order is an order that remains in the system until it is cancelled by the Trading Member. It will therefore be able to span trading days if it does not get matched. The maximum number of days a GTC order can remain in the system is notified by the Exchange from time to time.

c) **GTD** - A Good Till Days/Date (GTD) order allows the Trading Member to specify the days/date up to which the order should stay in the system. At the end of this period the order will get flushed from the system. Each day/date counted is a calendar day and inclusive of holidays.

The days/date counted are inclusive of the day/date on which the order is placed. The maximum number of days a GTD order can remain in the system is notified by the Exchange from time to time.

d) **IOC** - An Immediate or Cancel (IOC) order allows a Trading Member to buy or sell a security as soon as the order is released into the market, failing which the order will be removed from the market. Partial match is possible for the order, and the unmatched portion of the order is cancelled immediately. ⎫

Price Conditions

a) **Limit Price/Order** – An order that allows the price to be specified while entering the order into the system.

b) **Market Price/Order** – An order to buy or sell securities at the best price obtainable at the time of entering the order. 27

c) **Stop Loss (SL) Price/Order** – The one that allows the Trading Member to place an order which gets activated only when the market price of the relevant security reaches or crosses a threshold price. Until then the order does not enter the market. A sell order in the Stop Loss book gets triggered when the last traded price in the normal market reaches or falls below the trigger price of the order. A buy order in the Stop Loss book gets triggered when the last traded price in the normal market reaches or exceeds the trigger price of the order.

E.g. If for stop loss buy order, the trigger is 93.00, the limit price is 95.00 and the market (last traded) price is 90.00, then this order is released into the system once the market price reaches or exceeds 93.00. This order is added to the regular lot book with time of triggering as the time stamp, as a limit order of 95.00 ⎭

Quantity Conditions:

a) **Disclosed Quantity** (DQ)- An order with a DQ condition allows the Trading Member to disclose only a part of the order quantity to the market. For example, an order of 1000 with a disclosed quantity condition of 200 will mean that 200 are displayed to the market at a time. After this is traded, another 200 is automatically released and so on till the full order is executed. The Exchange may set a minimum disclosed quantity criteria from time to time.

b) **MF - Minimum Fill (MF)** orders allow the Trading Member to specify the minimum quantity by which an order should be 28 filled. For example, an order of 1000 units with minimum fill 200 will require that each trade be for at least 200 units. In other words there will be a maximum of 5 trades of 200 each or a single trade of 1000. The Exchange may lay down norms of MF from time to time.

c) **AON** - All or None orders allow a Trading Member to impose the condition that only the full order should be matched against. This may be by way of multiple trades. If the full order is not matched it will stay in the books till matched or cancelled. Note: Currently, AON and MF orders are not available on the system as per SEBI directives.

IT Reforms and their impact on Stock Markets in India and Abroad

Research studies have investigated different aspects of relationships between investment in IT and some variables like outcome and financial performance, organizational structure, cost reduction and etc. Henry and Weber (2002) indicated that extensive investments in technology will lead to proper trading and quick execution that consequently results less variability in prices, more limited domain of supply-demand and remarkable augmentation in number of exchanges. They concluded about investment in IT and its application in Mendelson mechanism of financial market's exchanges and others in 1989, that exchange mechanism is effective on price behavior and totally, electronic mechanisms of exchanges, reduce the variability of financial markets.**Toronto stock exchange** before IT was not an important market, but after IT it reached 3rd place of North America in dollar value. Main advantage of full electronic exchange is not only reduction of exchange costs but reduction of problems also related to human failures (William, Maurice & Pagano 1997). **New York stock exchange** has used IT for supporting its market share by exchange improvement, efficiency enhancement, more labor productivity and demand reduction of physical space (Henry, Wonseok , Simon & Weber 2002).

Just before the introduction of automated trading , the average number of daily trades at the **London Stock Exchange** was 20,000, amounting to about £700m worth of shares changing hands. After the introduction of automated trading the figure went up to a daily average of 59,000 trades a few months later. In 1987 the London Stock Exchange was transacting as much business in a month as it did in a whole year before 1986, with an average daily value of £1bn. In 2007, the average daily number of shares traded was 566,000, with an average daily value of £16.6bn. These figures would be impossible to reach without technology that can reduce the time taken to complete a deal and handle massive volumes.

Since 1997, **Iran stock exchange** put the application of IT in its plans, which we can refer to repair of exchange hall, supplying hardware requirements includes different types of computers, printers, scanners, modems and etc., launching auto answer telephone system of stock exchange in order to be informed of industry and other companies of stock exchange, use of outstanding calculator software, EPS, stock rate controlling, hanging a graphical table for clients' implementation. Some instances of advanced IT application (include internet, intranet, extranet) in Iranstock exchange during 2000 to 2001 are mobilization of administration system and stock exchange secretariat by internal electronic network or administrative IT that prevents

information spreading in the organization and more healthiness of market and speeds up administrative tasks in addition to time and paper savings. Electronic newspaper establishment named "PayaameBours" simultaneously presents latest news of stock prices, supply-demand with stock exchange hall, and also has various news and informative sections. Database and stock exchange integrated network news establishing in order to communicative coverage with all accepted companies and coverage of news transmission tasks in local exchanges halls from this way foreign exchanges establishing and facility mobilization -includes essential hardware and special software preparing, are some of the stock exchange attempts for advanced IT application. Investors in these markets are facing more exchange disadvantages, and the motivation for company information spreading will be reduced (Amihud&Mendelson 1988).Potential IT can change both stock outcome instability and trade volume. If IT spreads the stock demand-supply, price and volume information quickly, it is highly probable that dealer's (investor) reaction to information would have been shifted to prices, instantly. If prices fluctuate in stable levels rapidly, instability may grow particularly when information has been input to market. The IT effect index is the number of exchanges volume unit (VOL) before and after IT. Trade volume is caused by business cash, exchange fluctuation and business information that all of them are affected by IT. Main aspects results in these conditions are wide access and market efficiency improvement. More investors in advanced exchanging systems will notice effects of information, otherwise; fluctuation factors will be in much less cost than previous system (that limits the accessibility to occurred orders information in market). Investor would invest better on his/her information and consequently prices would reflect a big amount of information with higher probability (Black 1986, Kyle 1985).Sato (1992) suggests that, cash will be reduced by IT because order flow are mostly the result of human interactions in exchange hall. He says that instability is caused by unexpected increasing and decreasing of prices and those exchangers use their formation of hall boards don't understand the reasons of these fluctuations.

Stock markets are increasinglyusing technology to operation smoothing, commercial and service activities, service development and improvement, risk reduction decreasing the cost of deals. These institutions transfer and distribute the risk by using service information networks facilities, more efficiently. Network establishing has been developed by reaching one of the important IT goals: quick and communal access to information resources. News transmission highways, internet, is one of the most efficient and useful computer networks in the world that many different activities can be performed in it and it has many facilities. According to National Association In Capitalization (NAIC) comment, private investors rate the internet in the first place as a source of information for investing, because people can study annual reports of companies and analysis of analyst, adopt specifications stock, goods and etc., and engaged in business operations by visiting different websites.

Technological inventions has always been a major reason behind the transformation in the Indian Capital Markets. It has impacted on the increase in number of participants, increased quantity in trading and daily turnover and also hereby resulting in the increased market capitalization.

The below data shows the changes in volume of transactions in lasttwo decades.

Table 4.1 Stock market data of NSE 1990s and 2015

Source: www.nseindia.com

Month/ Year	No of co.s listed*	No. of co.s permitted*	No. of co.s available for trading*	No. of trading days	No. of securities traded #	No. of trades (lakh)	Traded Quantity (lakh)	Turnover (In crs)	Average Daily Turnover (In crs)	Average Trade Size	Demat Securities Traded (lakh)	Demat Turnover	Market Capitalisation (In crs)
													Current Month
Mar-15	1,733	4	1,544	21	1,776	1612	1,90,047	3,97,903	18,948	24,678	1,90,047	3,97,903	99,30,122
Feb-15	1,719	4	1,530	20	1,755	1584	2,04,018	3,92,718	19,636	24,795	2,04,018	3,92,718	1,02,12,614
Jan-15	1,718	4	1,546	21	1,774	1610	1,90,136	3,83,872	18,280	23,847	1,90,136	3,83,872	1,01,00,218

Month/Year	No of co.s listed*	No. of co.s permitted*	No. of co.s available for trading*	No. of trading days	No. of securities traded #	No. of trades (lakh)	Traded Quantity (lakh)	Turnover (In crs)	Average Daily Turnover (In crs)	Average Trade Size	Demat Securities Traded (lakh)	Demat Turnover	Market Capitalisation (In crs)
1996-1997	550	934	1,484	250	--	264	1,35,561	2,94,503	1176	1,11,895	--	--	4,19,367
1995-1996	422	847	1,269	246	--	66	39,912	67,287	276	1,01,950	--	--	4,01,459
1994-1995	135	543	678	102	--	3	1391	1805	17	60167	--	--	363350

Way Forward

Indian Economy is the tenth largest economy in the world by nominal GDP and the fourth largest by purchasing power parity (PPP). Following a strong economic reform post-independence socialist economy, the country's economic growth progressed at a rapid pace, as the LPG policy was implemented in 1991 for international competition and foreign investment. Despite fast economic growth, India still faces massive income inequalities, high unemployment and malnutrition.

The financial services industry is in a period of transition globally. Regular market shifts, fierce competition, and technological developments are ushering in unprecedented changes in the global financial services industry. Organizations in this highly competitive and increasingly regulated industry will especially need to focus on making themselves more:

- Adept to face increasing transaction volumes, regulation and the integration of previously disparate global markets
- Agile at identifying and managing risk •
- Optimized in both business & technology, operationally efficient •
- Financial professionals with knowledge of Business/Industry and technical competence

To enhance their competitive advantage in this changed environment, financial services institutions are increasingly harnessing senior executives with right knowledge of business/ industry and technical competence, who can spearhead new business initiatives with better IT Technologies to provide superior customer offerings and streamline internal processes. Today's dynamic marketplace demands that financial services sector emphasize on technologically advanced, feature-rich solutions, that can operate in real-time and with the highest degree of precision and reliability.

In today's competitive world business and technology are inseparable. Better technology leads to faster business execution and higher operational efficiency. Which in-turn leads to customer retention and growth in both top line and bottom line. This is applicable to capital markets business more than any other.

In the capital markets business, competitive edge is directly derived from effective use of technology. In this industry the rates in many asset classes change every second or at times even faster. Equities transactions for instance are aiming at a sub-milli second transaction window. The round trip from the trading application to the exchange and back should be executed in less than a milli-second by ultra-low latency applications. This cannot be achieved without cutting-edge technology infrastructure.

Fundamentally technologists in capital markets space are faced with the following type's challenges in case of Equities Markets: Technology challenge of developing, supporting an enhancing low latency applications. Co-location of servers for faster execution of trades and smart order routing applications (which route the order to the exchange where the probability of execution would be highest at the best price) provide a glimpse into the way technology is moving in this business.

Conclusion

The Indian capital markets have witnessed a transformation over the last decade. India is now placed among the mature markets of the world. Key progressive initiatives taken by the Indian market institutions has been the depository and share dematerialization systems that have enhanced the efficiency of the transaction cycle, Replacing the flexible, but often exploited, forward trading mechanism with rolling settlement, to bring about transparency, Corporatisation of stock exchanges etc. Indian capital markets have rewarded Foreign Institutional Investors

(FIIs) with attractive valuations and increasing returns. Many new instruments have been introduced in the markets, including index futures, index options, derivatives and options and futures in select stocks.

To summarize, capital markets technology is at a very critical juncture in India where the capital markets are evolving and so is the technology shaping the future of this business. Presence of global players i.e. the FIIs and the global investment banks will make it imperative for the local players to scale up the technology to keep pace with the business requirements

References

1. Ansari, Mohd. Shamim. 2011. Impact of Sub-Prime Crisis on India: An Empirical Analysis. In Proceeding of Global Financial Crisis: Issues, Concern and Challenges for India and Emerging Market Economies,74–84
2. Gupta L C(1992), *Stock Exchange Trading in India : Agenda for Reform*, Society for Capital Market Research and Development, Delhi, p. 123
3. Bart Hobijn & Boyan Jovanovic, 2000. "The information technology revolution and the stock market: preliminary evidence," Proceedings, Federal Reserve Bank of San Francisco, issue Apr.
4. Bart Hobijn&BoyanJovanovic, 2000."The Information Technology Revolution and the Stock Market: Evidence," NBER Working Papers 7684, National Bureau of Economic Research, Inc.
5. Ross Levine, 1997. "Financial Development and Economic Growth: Views and Agenda," Journal of Economic Literature, American Economic Association, vol. 35(2), pages 688-726, June.
6. Levine, Ross, 1996. "Financial development and economic growth : views and agenda," Policy Research Working Paper Series 1678, The World Bank.
7. Singh, Ajit& Singh, Alaka&Wiess, Bruce, 2000."Information Technology, Venture Capital and the Stock Market," Accounting and Finance Discussion Papers 00-af47, Faculty of Economics, University of Cambridge.
8. Amihude Y., and H. Mendelson (1988) "Liquidity and Asset prices: Financialmanagement implications" Financial management, pp 5-15
9. Black F. (1986) "Presidential address: Nise" Journal of finance, Vol. 41, pp 529-544
10. Freund C. and et al., (1997) "Market efficiency before and after the introduction of electronic trading at the Toronto stock exchange" Review of financial economics Vol. 6, No. 1, and pp29-56
11. Henry C., & et al. (May 2002) "Information Technology and the New York stock exchange-strategic resources from 1982-1999" CIS working paper, pp 1-43
12. Kyle A. (1985) "Continuous auction and Insider trading", Econometric, Vol. 53, pp1315-1335

13. Sato M. (1992) "Tokyo Equity market- Its development and policies" Pacific-Basin Capital Markets Research, Vol. 3

14. www.sebi.gov.in
15. www.rbi.org.in
16. www.imf.org
17. www.bseindia.com
18. www.world-stock-exchanges.net
19. www.nseindia.com