Chapter 1
INTRODUCTORY FRAMEWORK, REVIEW OF LITERATURE AND METHODOLOGY OF THE STUDY

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Chapter-1

Introductory Framework, Review of Literature and Methodology of The Study

1. Introduction

The service sector is increasingly accounting for a dominant share of the national output in the developed as well as the developing countries. The Twentieth Century has witnessed the most breath-taking development in science and technology, concern for human development and quality of life. First revolution in the field of communication and technology was globally referred to as “Information Technology Revolution”. The impact of Information Technology on the economy has been so pervasive and momentous that it is characterized as a second industrial revolution. Thus, the Information Technology (IT) has become the chief determinant of the progress of nations, communities and individuals. In the current phase of globalization, technology determines the international competitiveness. The famous economist Dr. Solo in his research paper (1957) revealed that 90 per cent increase in per capita output of USA during 1909-1949 was because of the technical change, manifesting the strong linkage existing between technological advancement and consequent improved quality of life of the people. Information Technology is hence quoted as “a magical technology, which combines the skillful hand with the reasoning mind.” Information Technology in today’s business ambience is the fastest growing industry in the world and is poised to become the large global industry. No other industry has had such a profound influence on government attention and business, with the exception of perhaps the defense industry. Whether it be...
flying on aircraft faster and better, or getting an accounting software to take care of the drudgery of repetitive work, IT has changed the way we live.³

Information technology for some times was used as synonymous to computer. But with the rapid advancement in various information delivery systems such as Radio, T.V. Telephone, Newspaper, fax and of course computer and computer network, information technology refers to the entire gamut of media and devices used to transmit and process information for use by various target groups in the society. IT has therefore, been rightly termed as Information and communication Revolution. With the advancement in IT, information is being regarded as the fourth factor of production along with the land, labour and capital. Information has, therefore, become an important and distinct input in production. Thus along with three sector model of primary, secondary and tertiary industries, a fourth sector information industry has emerged. According to Low (2000), “The activities of generating, processing, transmitting, disseminating, storing, archiving and retrieving information constitute information Industry”. Because of its very high positive impact on employment, wages, labour skills, productivity and research-all contributing to the economic growth of the country. IT is now treated as the “Strategic Industry”.⁴

In the knowledge economy, the raw material that matters is intellectual rather than physical. The knowledge economy implies shift in the geographical center from raw material and capital equipment to information and knowledge, especially in education and research centers and man-made brain industries. This new economy depicts the automation of labour-intensive manufacturing of service activities as well as growth in new service industries such as health care, e-learning, software production and multimedia entertainment.⁵The pervasive influence of IT is so strong that there is no sphere of human life in which it is not able to make a niche for
The new economy is thus creating high quality employment. It is reshaping the job market. Among the entire sectors at international level, Information Technology is millennium’s most sought after industry and holds paramount promises to proliferate in the modern era. India knows that International trade can make her fulfill the promise of accomplishing the projection of India vision-2020 and information technology is cardinal in making this dream a reality.6

The status quo at India’s IT in the world is quite impressive and reveals that one company i.e. Infosys Technologies Limited has become the flag bearer in this sector. Infosys provides consulting and IT services to clients globally. It provides solutions for a dynamic environment where business and technology converge. Infosys works with large global corporations and new generation technology companies to build new products or services and to implement prudent business and technology strategies in today’s dynamic digital environment. It has been witnessed that the phenomenal escalation of IT at global scenario, Infosys growth is quite remarkable and has wiped out the false perception that ‘no Indian company can became global’. The size of Infosys is a role model not only for those Indian companies entering in IT sector but also for other sectors.7

Evaluation of performance is widely used in society, parents evaluate their children, teachers evaluate their students whereas owners evaluate their organizations. In simple term, performance evaluation may be understood as the assessment of an organization’s performance in a systematic manner.8 Normally, the performance evaluation of any commercial undertaking is done with reference to its financial performance in terms of profitability and other related aspects.9 But in the case of Information Technology Industry, the traditional method of evaluation with reference to profitability alone is inadequate in view of socio-economic objectives and other responsibilities.
cast upon them. Physical performance evaluation is an important yardstick in gauging the performance of the industry. Taking into account the fact that IT Industry has to discharge a number of other socio-economic obligations, the performance of IT is being measured in terms of revenue earnings, foreign exchange through exports, employment generation and production under physical performance, whereas earnings per share, Net Profit, divided per share, debt-equity ratio, return on capital employed and return on net worth come under the roof of financial performance.10

2. Statement of the Problems

The advent of Information Technology Industry in the Indian economy has allotted berths to a number of noteworthy problems, which are briefly discussed as under:

It is incontrovertibly acknowledged fact that IT industry in India especially since the advent of New Economic Policy has transformed the Indian economy to service oriented economy. It is the IT sector, which has phenomenally grown contributing largely to the kitty of economy. Nevertheless, there is a lurking fear that IT revolution has brought unemployment among the unskilled. On the contrary, it has created employment among skilled and semi skilled.

In India, the domestic IT market is still under developed on account of the rural population being uneducated. However, the emphasis of government to make domestic IT are pervasive in rural areas in terms of providing computers to the local government departments as well as schools and colleges. The role of software Indian IT companies is very important in creating the supporting auxiliary infrastructure in terms of computer education in their multifarious uses.
(A). Literature Review on Varied Aspects of Performance Evaluation

Manuj, Hemant Kumar1 (1993) in his Ph.D thesis entitled “An Evaluation of the Statistical Properties of Financial Ratios”, describes that the financial ratios are used for a wide variety of purposes, including performance evaluation of firms, prediction of corporate events, and model building, etc. The usage of financial ratios, as a matter of fact, is based on certain assumptions regarding their behavior and properties. Researchers, in the past, have emphasized the importance of the statistical properties of financial ratios and have also conducted some empirical studies to test the same. However, an empirical study in Indian conditions has been prominently lacking in the area of statistical properties of financial ratios.

The study has very successfully come out with certain general results, applicable to the financial ratios in the Indian conditions, which may serve as a broad guide to the users of financial ratios. The application of financial ratios in developing of a sickness prediction model was done, taking into account the statistical properties of the ratios. Finally, it may be pointed out that the present study has concentrated on certain specific aspects of the properties of financial ratios and thus it appears to be of great help to the researchers, analysts, practitioners, etc. in the usage of financial ratios.

Hunt, Steven C.2(1995) in his research article titled, “A Review and Synthesis of Research in Performance Evaluation in Public Accounting” describes that the performance evaluation process is important to virtually all organizations since an entity's success often largely depends on recognizing, retaining. A number of unique characteristics of the public accounting environment make it essential that the performance evaluation system be well-designed and monitored. Large CPA firms
rate performance frequently. Generally an auditor is rated at the end of each engagement. Performance evaluation is an important part of the firm's control system since it can be used to determine how firm goals are met. Since performance evaluations are important determinants of rewards for achieving goals, research into performance evaluation in public accounting may identify improvements that can increase acceptance of the rating system.

This paper also provides a discussion of existing research in performance evaluation in public accounting. In the model, performance evaluation is viewed as a process consisting of four steps. The first step is the search for and attention to relevant information. The second step is categorization (organization of information in memory). The third and fourth steps, tabulation for categorized data and finally, application of suitable statistical tools or accounting ratios, as per nature of the data and types of evaluation. However, most prior researches in accounting have looked at the last step in the performance evaluation process, as the final judgment.

Altiok, Tayfur (1996) in his book titled, “Performance Evaluation of Manufacturing System” pointed out that the past two decades have seen a great deal of research into the stochastic modeling of production, manufacturing, and inventory systems for the purpose of improving their performance. This book provides an introduction to these techniques covering exact, approximate, and numerical techniques. The author has aimed to strike a balance between theoretical issues and the practical aspects of modeling manufacturing systems. It is based on operations research, using of varied statistical tools such as mean, C.V., S.D., and regression analysis to measure the performance appraisal of the concerned industry or firm.
Prasantha, Uma, Pravat, Rajesh and K. Momaya (1998) in their research paper titled, "Competitiveness Evaluation in Context of Emerging Industries- A Case of BASF", reveals that the competitiveness evaluation is very important for any effort of enhancement. While considerable knowledge exits about evaluation in context of matured industries, dynamics of competitiveness in context of emerging industries still remain fuzzy. An attempt has been made in this paper to share findings from a research in this important area.

Emerging industries of future may provide best opportunities for growth and competitiveness for many firms and industries. Efforts are being made to look at competitiveness of large chemical firms by first identifying key successful factor (KSF) in traditional industries and emerging segments such as nonmaterial. Preliminary comparison of four large chemical firms indicates that BASF is more competitive by sales revenue, profits and foreign exchange earnings. Attempts have been made to evaluate competitiveness of these firms on select specific criteria related to nanotech. The focus of the paper is on the case of BASF that seems to have focused on nanotech. The criteria of competitiveness in nanotech have been identified and sources for comparable data have been explored. Performance of these firms on the specific criteria has been evaluated.

Meyer, Marshall W. (2002) in his book titled, "Rethinking Performance Measurement: Beyond the Balanced Scorecard", deliberates that the performance measurement is in an uproar. The collapse of the internet bubble, the bankruptcy of Enron, and the erosion of confidence in the accounting profession have placed the problem of measuring the performance of the firm and of other kinds of organizations squarely in the public arena. Enron's bankruptcy, in particular, is a watershed event. On the surface, it raises the issue of how a firm reporting pre-tax
profits of $1.5 billion from the third quarter of 2000 through the third quarter of 2001 could file for bankruptcy the next quarter. The answers proffered so far are the expected: sharp if not fraudulent financial practices, cozy relationships with auditors and their consulting arms, even cozier relationships with Wall Street Analysts, and directors so dazzled by Enron's growth and generous directors' fees that they failed to exercise proper fiduciary responsibility.

But there remains an underlying problem so daunting that to raise it is almost heretical: can we accurately measure the performance of firms like Enron or, for that matter, any firm? Writer raises this question because the answer is not clear. For decades he has accepted that the performance of non-profit organizations like hospitals and universities is difficult to gauge. To be sure, performance measures for hospitals and universities abound (mortality/morbidity/acceptance/graduation rates, patient/student satisfaction, professional reputation), but most are unsatisfactory because they are incomplete or susceptible to deliberate distortion or both.

Until recently, firms have been privileged because the profit motive simplifies the measurements of their performance. Perhaps it once did. But no longer. As the Internet bubble, Enron, and the travail of the accounting profession have shown, metrics (e.g. pro forma earnings) and accounting practices (e.g. off-balance-sheet assets) now commonplace have obscured the performance of firms. But for managers simplicity has long since vanished.

Metrick, Andrew (2002) in his working paper of NBER titled, "Performance Evaluation in Financial Economics", explains that there are the key steps in performance evaluation (PE), a methodology central to the investigation of many
questions in financial economics. The seminal PE study, uses the classic Capital Asset Pricing Model (CAPM) as its benchmark and analyzes mutual funds for the next 25 years, most PE studies followed this same strategy. In the last ten years, though, researchers have developed many new models of benchmark returns and demonstrated their usefulness in PE studies of both investor performance and corporate finance. In this article, author illustrates some of these diverse applications with recent examples from his own work and with studies of investment newsletters, insider trading, and corporate governance. He then discusses a new approach to PE that allows fresh insights into the canonical mutual-fund topic. Notwithstanding recent improvements in PE methodology, it is still very difficult to detect abnormal performance in most applications. Thus, standard statistical tests (regression analysis) often may fail to reject a null hypothesis of "no abnormal performance", even when the true abnormal performance is economically large.

Innovations in PE methodology and applications to new problems are continuing at a rapid rate. In recent years, researchers have extended PE methods in several directions, including adjustments for predictable variation in benchmark expected returns, development of benchmarks that correspond to complex investment strategies used by hedge funds, and methods more closely tied to theoretical models of asset prices. While it will never be possible to specify a single "correct" model of benchmark expected returns, recent research demonstrates how to explicitly add model-based error into PE. These methodological advances, when combined with the explosion of new data sources, will allow a fresh perspective on many topics in financial economics.
Sur, Dr. Debasish (2004) in his research article entitled, "Application of Selected Financial and Social Measures in Performance Evaluation- A Case Study" describes some relevant quantitative and qualitative parameters to measure the financial and social performance of the selected company Hindustan Lever Limited (HLL). Author of the article also reveals that the most of firms and industry tests only financial performance to know the status of the enterprise, but it never should be the sole criteria to judge its status. There is very essential to analyze performance by considering financial, physical and social performance measures. Physical performance in terms of sales revenue from domestic and export market, foreign exchange reserve, contribution to exchequer, where as in financial performance in terms of ratios like NPR, DER, ROCE, EPS, DPS and EVA should be evaluate and it fulfill both economic and social objectives of the organization. In his research article, an attempt has been made to conduct case study of Hindustan Lever Limited, a leading MNC giant in Indian industry regarding its financial as well as social performance for the period 1990-1999.

Satta, Tadeo Andrew (2005) in his research paper titled, "Performance Evaluation of Three Small Firms in Tanzania" aims to shed light on performance evaluation of small firms with a view to assessing their potential for improving small firms' access to future growth. An integrated methodology based on five commonly used methodologies is formulated to evaluate the performance of the three small firms. This integrated methodology makes use of a number of selected performance indicators. Further research on performance evaluation of small firms could considerably extend the stock of knowledge in this area. Coverage of a longer period, which allows for the use of more data for the same evaluation indicators, might also produce a more robust set of results. Future research may also wish to focus on the
development of a methodology that contains fewer shortcomings in assessing the performance of small firms. The findings reported on in this paper consolidate the stock of knowledge on performance evaluation of small firms. The use of accounting (selected financial ratios) and organisational/institutional indicators (Sales revenue, export earnings and foreign investment) as a measure of performance evaluation strengthens the role accounting could play in the future in developing a standardised methodology for assessing the performance of small firms.

Sengupta, J. K. and Sahoo, B. K. (2005), in their book entitled, "Techniques of Evaluation of Productivity of Firms in a Growing Economy" reveals that the productivity and efficiency gains are central to the growth of firms in any industry. The industry growth depends on the markets and innovations in products and services and technology. The present volume discusses the various techniques for evaluating firm' performance and its impact on the industry evolution. Economic analysis has been integrated here with the techniques of management science and operations research, which are called 'Data Envelopment Analysis' (DEA). These techniques are useful to the managers and economic policy makers in designing optimal strategies and policies for improving productivity and performance.

The central focus on the applications side is to discuss the structure of efficiency gains or losses, the static and dynamic changes in performance and an economic evaluation of policy measures. The industries selected here include modern industries like computer, pharmaceuticals, banking and life insurance. The banking and life insurance sectors in India have been studied in some detail in order to evaluate recent policy measures adopted by the government by way of economic reforms.
The analytical models developed in this volume discuss in some details some of the following concepts (i) Financial Performance Evaluation (ii) Physical Performance Evaluation (iii) Social Performance Evaluation. Financial performance evaluation includes the various accounting ratios. Physical performance indicators includes sales revenue, export earnings, foreign investments, return to exchequer and employment generation etc, whereas, social performance evaluation includes donations for welfare activities and some other social philanthropic activities, which couldn’t termed in price.

In the succeeding paragraphs, a detailed but succinct review on IT is presented in order to identify the varied dimensions and aspects performance evaluation in IT industry.

References:


4- Prasantha, Uma, Pravat, Rajesh and K. Momaya (1998) “Competitiveness Evaluation in Context of Emerging Industries- A Case of BASF” GCabstract, Department of Management Studies (DMS), Indian Institute of Technology (IIT), Delhi, pp.43-49


Software products. Software piracy is most interspersed in India. Domestic producers are affected negatively in direct and indirect ways.

Most of the Indian IT companies are lagging behind in developing global distribution network to respond after-sales-services to their clients.

Standard infrastructure is one of the main hurdles in the promotion and development of Indian IT industry.

Besides these problems, the IT industry is growing splendidly in the post-liberalization era. The present study is thus an attempt to evaluate the performance of this flagship industry of Indian economy. In the following paragraphs an extensive review of literature is presented on the earlier studies related to different aspects of the IT industry in the post NEP era.

3. **Review of the Literature**

In the following paragraphs, a detailed account is furnished with regard to review of literature on the subject matter of performance evaluation and information technology industry. The review of the literature is distributed in two portions- (A) Varied Aspects of Performance Evaluation, and (B) Varied Aspects of Information Technology Industry.

**(B)- Literature Review on Varied Aspects of Information Technology Industry**

a. **Books**

Sah, S.L. (1999) in his book, "Information Technology" described that Information Technology is the synthesis of computers and communication networks. If information technology is the brain of hi-tech industry, telecom is the heart. The reach and power of telecom and IT outpace politics and even geographical boundaries. World Wide Web spans, across space and time to put cyber surfers in contact with each other. India is the sixth largest exporters of computer software in the world. This book covers the development of

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Inadequate cyber law is another problem to enforce copyright protection and security law, both at home and abroad. This is the most important reason for the insignificant market share of prepackaged Indian software products. Software piracy is most interspersed in India. Domestic producers are affected negatively in direct and indirect ways.

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3. Review of the Literature

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a. Books

Sah, S.L. 11 (1999) in his book, “Information Technology” described that Information Technology is the synthesis of computers and communication networks. If information technology is the brain of hi-tech industry, telecom is the heart. The reach and power of telecom and IT outpace politics and even geographical boundaries. World Wide Web spans, across space and time to put cyber surfers in contact with each other. India is the sixth largest exporters of computer software in the world. This book covers the development of
computers and communication system in India and abroad. New frontiers of Information Technology have also been described elaborately.

Baveja, Arun\textsuperscript{12} (2000) in his book "Introduction to Information Technology" advocated that the growth in electronic information begins to demand a new philosophy of the nature and function of information so also the activities of the information professional must, in this setting at least, change and adapt. No longer able to adopt custodial role in managing and organizing the materials and artifacts of information, the librarian or information scientist must adopt a facilitating strategy, aimed at creating the conditions for a user to negotiate the information sphere successfully.

Baveja, Arun\textsuperscript{13} (2000) in his book entitled, "Information Technology and Development," encouraged a critical debate on the role of information technology and the development process and to contribute to more informed decision-making concerning information technology development, adoption, transfer and utilization. The book is a vehicle for information exchange and sensitization on the growing gap between the developed and the developing world, the role of information technology in this process, and its impact on the excluded and included sectors of society, especially with reference to the current globalization trends.

Suri, R. and Diwan, Parag\textsuperscript{14} (2000) dealt with legal issues, concepts related with Electronic Commerce, Computing, Information superhighways etc. The book at length throws light on transformation of our society into information oriented, the concept of theft of information and data protection and the copyright issues pertaining to information technology. It also deals with issues of individual privacy and surveillances technology. The electronic commerce law dwells extensively on various issues, pertaining to electronic commerce transactions such as proposal agreement, contract, electronic fund transfer, digital signature etc. This book provides the exhaustive text of
Information Technology Act 2000, cyber related crime, IT cyber sites and important cases.

The study by Batra, B.B\textsuperscript{15} (2001) on "Information Technology Challenges and Opportunities" reflected that the twentieth century witnessed the rapidly accelerating advent of information technology. The electronic communications and news media have become commonplace and indispensable; computers have proliferated, becoming increasingly fast, powerful, small and cheap, so that now there is scarcely a human activity in which they are not to be found, bearing an increasing share of the burden of repetitive information processing. The study has logically discussed the challenges and opportunities of information technology in the new millennium.

The new technology revolution has shrunk the planet to a tiny global village advocates Fwernandes, Ashwin\textsuperscript{16} (2001) in his book entitled "Information Technology and Management". The modern society is leading to overall improvements in work, commerce, health, and entertainment though the fruitful facilities made by information technology.

Pohola, Matti\textsuperscript{17} (2001) in his book "Information Technology, Productivity, and Economic Growth: International Evidence and Implications for Economic Development" has concluded that the information technology revolution will change the world must stem from the basic premises that investment in IT has a visible impact on productivity and economic growth. By surveying previous studies and by presenting new micro- and macroeconomic evidences, this collection shows that in recent years the use of IT in the production of goods and services has had a strong influence on productivity and economic growth in industrial and in newly industrialized countries. Yet developing countries seem neither to have invested in IT nor benefited from such investments to the same extent as industrial countries.
There is concern that information is becoming a commodity, like income and wealth, by which countries are classified as rich and poor. The author has argued that investment in infrastructure, physical capital, and education is the key to economic development. This is an old policy prescription in the economics of development. What is new is the suggestion that the IT content of these investments should be high. The use of IT is so widely spread throughout the world economy that no single country can avoid investing in this technology if it wants to improve the standard of living of its citizens. Besides providing citizens with access to IT and to IT education and training, governments should promote participation in the information society, thus generating a sufficiently strong demand base for information products. By developing advanced applications of IT, and by becoming a model for the private sector, governments can alter worker, firm, and consumer attitudes, and lower their costs of adopting IT. The use of IT, not necessarily its production, is what matters for economic development.

Paliwal. P.K. and Balakrishnan (2001) in their book entitled, "Information Technology for the Next Millennium", demonstrated that burgeoning electronic publishing and resources made available via digital imaging facilities are replacing direct hard copy print resources. If the right decisions are not made to invest in building, the needed skills and technology infrastructure, some libraries will face even more serious problems in meeting their users' needs. It will be only a matter of time until all libraries will be forced to use resources beyond the traditional printed book and journal. The Society, as a whole, is becoming increasingly computer literate and more visually oriented. Some of the most important issues pertaining to information technology for the next millennium are thoroughly explained in this book.
Paliwal. P.K. and Balakrishnan (2001) in their book, "Contemporary Information Technology Scenario", have thrown light on a variety of core issues on contemporary scenario of information technology. In a world that has become more visually oriented, our education and information infrastructure must develop techniques to incorporate these changes. Information technology, through the meddling of computer technology with communications, digital imaging, and full motion video and sound, can be a powerful ally to improve education and thus improving skills for gainful employment.

Paliwal. P.K. and Balakrishnan (2001) in their book, "Current Scenario of Information Technology" have logically presented current scenario of information technology. Thus put forward their views that information science is an interdisciplinary science that investigates the properties and behavior of information, the forces that govern the flow and use of information, and the techniques both manual and mechanical, of processing information for optimal storage, retrieval and dissemination.

Nair, R. Raman (2003) in his book titled "Information Technology for Participatory Development", has presented the view that Information resource is going to play a key role in social, cultural and political progress as well as in productive and sustainable economic development. The ease and speed, with which new knowledge is produced, organized, packed, retrieved and disseminated through IT based systems and applied together with old knowledge our traditional libraries store, will be the strategic determinant in whether the country, state, a region, an institution or individual prosper or lag behind in the new services-based economy..

Ahmad, Ayaz (2003) in the book, "A Handbook of Information Technology," opines that Information Technology; though relatively, a new stream is as vast as a sea. It's perhaps the most relevant and most applied
among the disciplines, in currency, in the modern context. Further, it has earned new significance, in the wake of the new world order and the globalization. In today's world, each and every awakened individual has to be fully aware of what Information Technology is all about.

Mishra, R.C. 23 (2003) in his book entitled, "Information Technology and Poverty Reduction in South Asia" has deduced the inference that technological advances have been historically one of the crucial contributors to poverty reduction in both the developed and the developing world. Information technology has become an indispensable tool in the fight against world poverty. It provides developing nations with an unprecedented opportunity to meet vital development goals such as poverty reduction, basic health care, and education, far more effectively than before. Around the world, governments are launching ambitious information technology infrastructure initiatives, radically changing their communications policy frameworks and situating information technology at the heart of their development programmes and strategy. In this context, building technological capacity of the poor people is central to forging long–term solutions because technologies for development have not, cannot, and will not be supplied through the global marketplace alone. The book focused information, and communication technologies, and their potential benefits for the poor at a time when technological progress seems to be occurring at a bewildering pace. It notes that technology should be a focal point to improve economic welfare and reduce poverty.

John, S. Maria's 24 (2003) book on "Information Technology: Its Application on the Small Scale Industries Sector" mainly focused on the role of IT and its applications. It covered different aspects of IT such as E-Commerce, E-Banking, and Application of IT in the development of Entrepreneurship, especially SSI sector.
Shah, Beena\textsuperscript{25} (2003) in the book "Information Technology and Education: Vision and Prospects" viewed that if our society is assumed as hardware, then education must be considered as its software. Both are inter-related, their changes also influence each other. Now the world has come under the grip of a new phenomenal technology, called Information Technology (IT) or Information Communication Technology (ITC). Therefore, the influence of IT in all dimensions and domains of education is obvious. Application of IT is receiving increasing attention from researchers, service providers as well as from government in the educational arena. This book deals with all levels of education where the application of IT is feasible, i.e., primary to higher and professional education. Following an introduction to key themes and concepts, author represents a broad spectrum of disciplines and perspectives that review the conceptual basis for understanding and discussing application of IT in education. It also addresses critical issues such as ethics, policy, quality assurance and explores current emerging social and psychological issues related to IT and education.

Choure, Tapan and Shukla, Yogeshwar\textsuperscript{26} (2004) in their book entitled, "Information Technology Industry in India" takes stock of information technology industry in India. It gives account of rapid growth of the industry and its success on export fronts. There are details on two kinds of business being persuade—Information Technology consultancy and Business solutions. It is outlined in the book that challenges in front of industry are of two kinds attracting and retaining software professionals and warding off competition while keeping the costs low. There is also a threadbare discussion on the future prospects keeping in view the domestic and international markets.

Arora, Ashoka and Bansal, Shefali \textsuperscript{27} (2004) consider Information Technology (IT) as the most fascinating subject of the present. It helps people to handle vast amount of information in quickest possible times with great
clarity. It has witnessed an impressive growth recently with the introduction of Internet, E-commerce, Mobile commerce, Artificial Intelligence and Virtual Reality. Information Technology incorporates the technologies of electronics, computing, networking and telecommunications. Information technology refers to modern technology based on electronics and computing. Computers are an essential part of Information field now and everyday new areas of activities are being discovered. There is hardly any area in our society, where computers are not being used. They are used in homes, offices, schools, colleges, universities, nursing homes, hospitals, export industries, banks, railway stations, airports, research centers and many other organizations. As, most of the routine activities in today’s society are essential for everybody to learn Information Technology.

Srivastva, D.S. and Kumari, Sarita 28 (2004) in the book titled “Education and Information Technology Challenges” have put forward that the advent of virtual classrooms and video-desktop technologies promises interesting possibilities of teaching and learning at anyplace, anytime and anywhere. Today, a shift in education is becoming evident where more responsibility is being placed on the individual for his or her learning, instead of solely on the teacher. Subsequently the teacher’s role is also changing. Education is becoming lifelong learning and training process, developing transferable skills and knowledge that can be applied to competitive markets, where knowledge and information is being traded as a commodity. Countries are now realizing the economic potential and value of technology in education. The digital technologies challenge conventional conceptions of both teaching and learning methods and materials and, by reconfiguring how teachers and learners gain access to knowledge, have radical implications for conventional teaching and learning processes. To meet these challenges, education systems must embrace and implement technology into their schools.
Saxena, M.K’s (2004) book on “Information Technology Law: Concepts, Evolution & Enactments”, presents that the modern world has witnessed man wonderful inventions and Information Technology (IT) is one of them which has greatly influenced and changed the human mind and work style. It has radically changed the lives of many people. Communication of information through the use of computers has brought revolution in the information technology field. The sum total of all computer-based communications and data storage that is accessible through computer network has been termed as 'cyberspace'. Its largest manifestation is the Internet, a global computer network that now extends all over the world. This two volume set attempts to explore and discuss the various laws relating to information technology. What practical problems are there in computer communications? How various intellectual property rights such as copyright, patent, development contracts, EC directive, licensing norms developed and provide protection? What liabilities are there regarding defective software? Whether software is a product in terms of Sales of Goods Act? All these questions are investigated and discussed in the volume 1 of the set. Indian Telegraph Act and Reserve Bank of India Act are also included in this volume. Volume 2 of the set provides extensive coverage on laws relating to Information technology through inclusion of various Indian Acts. The domain of this volume encompasses Information Technology Act, cyber regulations appellate tribunal (procedure) rules, information, technology (certifying authorities) rules, telecom regulatory authority and information technology rules together with various related acts.

economic and social development of the region. The widespread use of information Technology, the tools and techniques for gathering, manipulating, analyzing and disseminating information which was made possible because of improvements in computer and telecommunication technology. The increased integration of computer and telecommunications technology exemplified by Internet and associated technologies has led to the increased globalization of the world economy.

Singh, Balram and Srivastava, Ashutosh\textsuperscript{31} (2004) in their book on "Information Technology and Dynamics of Rural Development" have sketched that Information Technology may be considered as the backbone of all social processes in the society. It may be stated that communication plays all-important role in the fulfillment of information needs of the people. It affects the mind of the people in such a manner that their thinking and idea which result finally into social change. In the present era of information technology, the role of communication has influenced the entire society and in a broad perspective it is flow of information of different communicating systems. The effective and developed system has become synonymous with modernity and economic growth. In this book, has been to study various dimensions and linkages of Information Technology and rural development. It has been sought to examine socio-economic transformation in the society due to Information Technology and to analyze the Governmental role for development of information technology.

Azad, R.R's\textsuperscript{32} (2005) book titled, "Global Trade in Information Technology", presented that the twentieth century has witnessed an exciting and exhaustive explosion in the arena of Information technology. The computers and communications have become integral part of our lives. The revolutionary changes and widespread availability of global information systems carry with them an assurance for generation and sharing of
information at a degree of complexity and pervasiveness that was unimaginable until recently. It has emerged one of the largest and fastest growing industrial sectors and an essential infrastructure for the 21st century. No-doubt, India seems to be sitting on a high technology boom but she is yet to move on from being a potential high-tech giant to an actual high rung player in the vast field of Information Technology. While there is full hope for supportive polity measures, at national and global level both, the book encompasses trade, industry development, markets, technology and strategies through collection of information, analysis, assessment of trends, forecasting of the global IT markets, technology infrastructure and IT production. The book examines the national and global policies and focuses on identification of major products, trade pattern, industry trends and evolution, developments in technology and opportunity for India's IT along with its growth in global trade.

Jairam, Sulabh\textsuperscript{33} (2005) in the book, "Dangers of Information Technology" has endeavored to put the answer related to IPR problems and individual privacy. Does it constitute a fundamental human right of a person? Though many would agree to yes but as the government organizations interact with the e-common man in the era of fast emerging communication technology, we see common man's privacy right being infringed more than ever. Who perceives it? Who cares about it? And has anybody ever cared to go rather deeper into the issue? The book throws light on the issues and digs deep into find many examples of privacy infringement and suggests the level to which it may be restored.

Granered, Erik\textsuperscript{34} (2005), in the book entitled, "Global Call Centers", has brought to fare few facts that there are 4.78 million works in call centers worldwide, and 2.82 million of them are in the US, offshoring is predicted to grow at 30 to 40 percent a year, and by 2015, 3.3 million jobs and $136 billion
in wages will move to countries such as India, China and Russia. Much of learning and education in India takes place through rote memorization. Widely held group believe are reinforced in this manner."

Goyal, Rakesh M.35(2005), in his treatise, "Demystifying Information Technology Act. 2000", has pointed out that fog covering IT law is so dense that even the IT Act has not been able to fully pierce it. It reveals that there is no provision in the IT Act to cover crimes such as social engineering, phishing, spoofing, ID theft, Spam, unsolicited mail, take services on the net by e-mail, connecting laptop or palmtop to hot spot without permission, stealing bandwidth, DNS attach, threatening e-mails, sniffer, decryptor, deliberate bugs, logic bombs, trapdoors, spyware, adware, Trojans, penetration testing and so on. CEO’s will benefit from the precautions that author outlines. There are only two escape routes when a crime is alleged: one, the person in charge can prove that it was committed ‘without his knowledge’, or two, he can show he has taken ‘due diligence’. The book discusses ISMS (Information Security Management System) a structured methodology to manage is security as per ISO 17799.

Shikarpur, Deepak’s36 (2005) book on “BPO Digest”, reveals that IT can do for India in the next ten years what oil had done to middle east in the seventies and later. If proper thrust is given to the infrastructure (Education, electricity, roads, bandwidth, water etc.) and the government sustains the liberalization of the economy, India will soon become a developed nation. BPO and low-cost and high equality solutions will ensure that India will become world’s back office for global service business.

b. Reports and Case Studies

Trivedi, Bhairav37 (1999) presented a comprehensive picture of Infosys' history, tracking the challenges of making it a global company when the Indian software industry was still taking shape. According to the author,
Infosys has to balance its momentum of growth while retaining the culture of a small company. Karnik, Kiran38,(2000) in his report titled “Software- Strong Growth Momentum” presented that more than half the fortune 500 companies already have relationship with Indian IT services providers, there are significant implications for Indian companies if they are to capture the full potential of the out sourcing trend.

Report of National Task Force on Information Technology39 (2000) was set up by the then Prime Minister Mr. Atal Bihari Vajpayee in May 1998, and the report was submitted in 2000. This was the first report on Software development containing information Technology Action Plan I in the form of 108 recommendations and was accepted and notified in the gazette of India dates 25.07.1998. The second integral part of the report is the matching policy framework for the IT hardware. The Government approved 84 recommendations, known as IT Action Plan II. ACCOCHAM40 (2001), India imported digit able media products to the extent of 45$ 198 million in 1996 when the applied tariff was 26 percent. This does not take into account e-commerce services, be they financial, travel, design, etc. but then internally we do not tax these directly and today we do not really account for these, as such advice or service conveyed through fax or phone in not taxed.

Annual Report of Infosys Technologies Limited41 (2001-02) highlights that the client expectations on quality cost, timeliness and service have increased, leading to margin pressure on service providers. Today, while there are several high-quality players in the Indian technology services industry, their strengths are limited to a subset of operating parameters. Technology services companies need to develop an industry defining business model. NASSCOM - Mckinsey Report42 (2002) elaborates on several growing sectors within the IT sector and identifies the opportunities for Indian companies in existing service lines and determines the key success
factor. It also outlines the agenda for the government and Nasscom to boost growth and employment in the country. Parasthasarthy, Anand (2003) report on “E-governance: Spreading IT, Too Thinly” presented that IT for All’ was the mantra coined in 1998 with a 10 years time span. But half way there, the legal framework is still not complete and only a handful of states have seen the benefits trickling down to the average citizen.

Choudhary, Ajay (2003) report on “Hardware – Driving Force for IT” demonstrated that without hardware expertise, the industry has no driving force nor can it enter the highly value-added arenas of technology.

Suresh, Kalpathi, S. (2003), report titled “IT Training – Lull before Next Boom” pointed out that with basic IT education gradually becoming a part of the formal education system. Private IT training is likely to become more specialized. Kumar, Sudha’s (2003) article in a survey on “IT Enabled Services – Segment With Promise” has put that after the IT services opportunity, IT enabled services opportunity has emerged as the single biggest and there has been a spate of activity in this area in the past 2-3 years. Parthasarthy, Anand (2003) in his report on “ITES – Services with a Cyber Mite” pointed that if software was the broadsword for Indian IT to cut a board swathe through the global market, the services sector has emerged as a rapier to pierce hidden new market.

Sivadas, R. (2003) advocates that the ITES space, akin to the software services arena, India faces competition especially from countries in the Asia-Pacific region, which enjoy many of the same advantages that India has. NASSCOM -KPMG HR Report (2003) has covered a vast and seemingly unconnected range of areas including human power requirements for R & D, IT services and IT enabled services.

Annual Report of Information Technology (2003-04) considers India as one of the most preferred destinations for sourcing software and ITES.
India in comparison to other low cost locations rank high in several critical parameters including, level of government support, quality of the labour pool, english language skills, cost advantages, project management skills, entrepreneurial culture, strong customer relationship and exposure to new technologies. This report has covered government initiatives, industry profile and human resource development in a very precise form. Annual Report of Infosys Technologies Limited\(^\text{52}\) (2003-04) emphasized on exceeding changing expectations, efficient business solutions, strategic global sourcing, next generation global delivery, building scalable resilience and nurturing values, managing risks.

This report shows the export has grown by 32 percent during the year, as against 39 percent in the previous year. Exports constituted 99 percent of total revenue as against 98 percent in the previous year. Profit after tax from ordinary activities was 26.12 percent of total revenue during 2003-04.

NASSCOM- HWEITT Total Reward Study\(^\text{53}\) (2004) is one of the largest surveys the Hewitt does in India in partnership with NASSCOM. The study focuses on providing in depth information and insights on compensation, benefits and practices in the IT and ITES industry and brings forth the linkage of key elements of the reward system to business results. It covered 108 organizations in this year. NASSCOM - QAI ITES- BPO Report\(^\text{54}\) (2004) shows that India based organizations are able to deliver at levels comparable to their international counterparts on parameters such as quality, customer satisfaction and people satisfaction.

NASSCOM’S Handbook Indian ITES-BPO Industry\(^\text{55}\) (2004) includes an overview of the Indian and worldwide ITES-BPO market-segment, manpower scenario in India and other emerging opportunities in ITES - BPO market segment. It also highlights some operational excellence issues such as infrastructure, real estate and facilities management challenges.
NASSCOM’S Strategic Review (2004) covered a comprehensive study result to Indian software and services export, Indian Domestic IT market, ITES-BPO Industry, Economics of global sourcing of services, software products, embedded software and technology services, country competitiveness, emerging Growth Areas, Internet and E-commerce, E-governance, India’s security environment, knowledge professionals, venture capital and private equity, telecom scenario in India, quality picture and India’s policy environment. Indian IT Industry-Learning from China: A Report of NASSCOM (2004) has put the record straight by preparing the first comprehensive report on Chinese IT market. This report outlines an agenda to sustain India’s competitive advantages in the software Industry. This report has been prepared from the data obtained from interviews from Chinese government officials, software companies in China, Chinese software professionals, websites, international technology research companies such as IDC a Gartner.

c. Articles from Journals/Periodicals/And Business Dailies

Lateef, A (1997) in his article titled, “Linking up with the Global Economy – A Case study of the Bangalore Software Industry” presented that IT is a symbol of globalization and in many ways its leading feature, e-commerce also represents its distinguishing feature i.e. where the extension of the international division of labour goes beyond international trade of geographic enclaves in different stages of the production chain.

International Trade Centre (1999), pointed out in its publication that ITA means progressing towards the zero duty regime in the phased manner – something that the country has already been doing from IT products. At the macro-economic level the agreement aims at reducing the cost of hardware – therefore, leading to a subsequent positive impact on the cost of service provisioning. Chandrashekhar, R. (2000) opines that the ICT revolution has
resulted in dramatic changes in employment patterns, skill-sets needed, and the range of opportunities for employment and economic advancement across the whole world opportunity will also go to those who understand and appreciate these emerging global trends in human resource requirements and prepare for them 62.

Chakraborty, Chandana and Jayachandran, C. 63 (2001), in their research paper, “Software Sector - Trends and Constraints” advocates that the Indian software industry lacks diversification in types of export and relies mainly on software services exports. It also suggests that while there exist significant opportunities for the industry to expand domestically and internationally, the realization of such expansion depends a major reforms in infrastructure planning and regulatory rules. Joseph, K.J. and Harilal, K.N. 64 (2001) in their paper titled “Structure and Growth of India’s IT Export” critically examine India’s performance in software exports, the implications of this boom on the availability of skilled management in other competing sectors and the possible threats to the sustained growth of software exports. The authors also suggest a proper incentive structure needs to be looked at, and the supply of technically skilled personnel enhanced. Most important of all, the diffusion of IT into other areas of the economy should be accelerated to help in the sustained growth of the sector. Verma, Ekta, 65 (2002) in his article “Technology-Enabled Services: Perspectives and Visions” pointed out that the computer sector seems to be in the forefront of using telecommunication links. In addition, their competition edge may be enhanced by management techniques, technical know how and innovation from the parent companies. These are the benefits derived from the foreign investment.

which, needs his views, to be adjusted to the new formats and requirements so that electronic fund transfer and credit card culture values set in India. Regulating the e-economic and IT teaching shops need to be addressed to in order to ensure standards and coordination between government and the private agencies.

Nath, Pradosh and Hazra, Amitava67 (2002) in their article titled “Configuration of Indian Software Industry” argued that the weakness of the Indian Software industry continues because of its weak linkages with the domestic manufacturing industry where rests the scope of critical software capability - the high skill/high risk/ high value embedded software segment that can flourish only with wide applications of microelectronics in the industrial products and process. Anandalingam, G. 68 (2003) editorial on “Information Technology Does Matter”, argues the widespread adoption of IT will really matter to the development of India. This will lead to enormous opportunities to manage, maintain and modify it. This article has given answer to the article “IT doesn’t matter” in the May 2003 issue of Harvard Business Review by the editor-at-large Nicholas Carr. Mr. Carr argues in his article that as IT has become more ubiquitous in companies, its value as a strategic resource has diminished.

Srinivasan, Priya69 (2003) in the article entitled “Will India Become the Software Products Factory for the World” believes that companies can cut two-thirds of engineering costs by working out of India. They are going to be looking for opportunities for the companies in which they have invested to move their engineering work offshore to India.

Chandrashekhar, C.P.’s 70 (2003) article on “ITES and Hard Facts” points out that India’s IT thrust in the past decade was in large measure based as the export of lower-end software and IT-enabled services, which was made possible by the availability of cheap labour. The challenge now is to sustain it.
4. Research Gap and Scope of the Study

Information technology in the nineties had significant growth around the world and in particular in India. IT has become a potent force in transforming social, economic and political life globally and without its incorporation it is difficult for countries or regions to develop if not to survive. IT Industry in India is flourishing at an accelerated rate and it is assumed that soon India will be a global IT superpower and flagship bearer in global IT industry. From the forgoing review of the studies on different aspects of IT industry, it peters out that there are dearths of studies focusing on the performance evaluation of IT industry in the post liberalization period.

This study is significant in terms of its scope, which encompasses the relevant aspects of performance evaluation of Indian IT industry in general, and Infosys in particular in the post- liberalization period (1991-2004) when many of the Indian IT firms were established and the government also embarked upon bringing out concrete plans and policies for the overall growth and development IT industry.

Applicability of Physical and Financial Performance Evaluation Model in Present Study

The study has adopted the universally recognized parameters of performance evaluation of Indian IT industry and Infosys. The study on the performance evaluation MODEL by Sur, Dr. Debasish (2004) on “Application of Selected Financial and Social Measures in Performance Evaluation- A Case Study” is found suitable and pertinent to adopt for the present study. The model is basically based on some relevant quantitative and qualitative parameters to measure the financial and social performance of the selected company Hindustan Lever Limited (HLL). The author is of the opinion that it is very essential to analyze performance by considering financial, physical and social
performance measures. Physical performance in terms of sales revenue from domestic and export market, foreign exchange reserve, contribution to exchequer, where as in financial performance in terms of ratios like NPR, DER, ROCE, EPS, DPS and EVA should be evaluated and it fulfills both economic and social objectives of the organization.

Thus the study takes the analogy of the above MODEL and hence takes into consideration the Physical and financial performances evaluation. It is an endeavor to make a holistic study of Indian IT industry by applying statistical tools to calibrate as to how Indian IT industry incorporated the attributes of global competitiveness. Infosys Technologies Limited is one of the cynosures of IT sector in India hence, a case study is undertaken to assess the performance of this company.

5. Objectives of the Study

The study has pursued the objectives as given below:

- To evaluate performance of Indian IT Industry in terms of total revenue from domestic and international market of software, hardware and ITES-BPO since the advent of economic liberalization.
- To assess the trends of FDI inflows in the software and hardware segments of the Indian IT industry.
- To analyze the position of employment generation by Indian IT industry in general and Infosys in particular.
- To measure the physical performance of Infosys Technologies Limited in terms of total revenue, revenue from exports as well as domestic market and foreign exchange earnings.
- To evaluate the financial performance of Infosys Technologies Limited in terms of NPR, DER, CR, ROCE, EPS, DPS and EVA.
To analyze the policy implications with regard to Indian IT Industry as well as Infosys
And finally, to come out with suggestions for Indian IT industry to sustain and maintain the global leadership in the IT Industry.

6. Hypotheses of the Study

The study has proceeded to set the objectives and to formulate the hypotheses based on the extensive survey literature on performance evaluation models viz-a-viz Indian IT industry and Infosys. The research gap has been identified to develop the appropriate variables and the same have been couched in terms of hypotheses to be tested:

1. H0. The null hypothesis assumes that the IT industry’s share in Indian exports is not increasing.
   
   H1. Failing to accept the null hypothesis will automatically lead to accept the alternative hypotheses.

2. H0. The null hypothesis presumes that FDI inflows in India are not functionally related to FDI inflows in Indian IT industry.
   
   H1. The alternative hypothesis would support that FDI inflows in India are functionally related to FDI inflows in Indian IT industry.

3. H0. The null hypothesis assumes that the exports revenue of Indian IT industry is not significantly contributing to the total revenue of Indian IT industry.
   
   H1. Rejecting to accept the null hypothesis will automatically lead to accept the alternative hypothesis signifying that export revenue of
Indian IT industry is contributing to the total revenue of Indian IT Industry.

4. H0. The null hypothesis assumes that the revenue from software is not significantly contributing towards the total revenue of Indian IT industry.

H1. Failing to accept the null hypothesis will automatically lead to accept the alternative hypothesis.

5. H0. The null hypothesis presumes that neither the domestic revenue nor do the exports revenue earnings from Software, Hardware and ITES-BPO segments have increased the total domestic revenue earnings and exports revenue earnings of Indian IT industry.

H1. The alternative hypothesis would support that the domestic revenue earnings as well as exports revenue earnings from Software, Hardware and ITES-BPO segments have increased the total domestic revenue earnings of Indian IT industry for the referred period.

6. H0. The null hypothesis assumes that Infosys is not contributing to the growth and development of IT industry in India in terms of revenue generation, exports revenue and employment generation.

H1. The alternative hypothesis would be that the Infosys is contributing to the growth and development of IT industry in India in terms of revenue generation, exports revenue and employment generation.

7. Research Methodology
4. Research Gap and Scope of the Study

Information technology in the nineties had significant growth around the world and in particular in India. IT has become a potent force in transforming social, economic and political life globally and without its incorporation it is difficult for countries or regions to develop if not to survive. IT Industry in India is flourishing at an accelerated rate and it is assumed that soon India will be a global IT superpower and flagship bearer in global IT industry. From the forgoing review of the studies on different aspects of IT industry, it peters out that there are dearth of studies focusing on the performance evaluation of IT industry in the post liberalization period.

This study is significant in terms of its scope, which encompasses the relevant aspects of performance evaluation of Indian IT industry in general, and Infosys in particular in the post- liberalization period (1991-2004) when many of the Indian IT firms were established and the government also embarked upon bringing out concrete plans and policies for the overall growth and development IT industry. The universally recognized parameters of performance evaluation are used to evaluate the performance of Indian IT industry and Infosys. Physical and financial performances are mainly taken into consideration. It is an endeavor to make a holistic study of Indian IT industry by applying statistical tools to calibrate as to how Indian IT industry incorporated the attributes of global competitiveness. Infosys Technologies Limited is one of the cynosures of IT sector in India hence, a case study is undertaken to assess the performance of this company.

5. Objectives of the Study

The study has pursued the objectives as given below:
To assess performance of Indian IT Industry in terms of revenue, exports of software, hardware and ITES since the advent of economic liberalization.

To measure the performance of Infosys Technologies Limited in terms of output, production, exports as well as net profit, EPS and DPS.

To analyze the policy implications with regard to Indian IT Industry as well as Infosys.

And finally, to come out with suggestions for Indian IT industry to sustain and maintain the global leadership in the IT Industry.

6. Hypotheses of the Study

The following hypotheses are formulated for test:

H01. The null hypotheses assume (i) that the IT industry’s share in Indian exports is not increasing, (ii) that FDI inflows in India is not functionally related to FDI inflows in Indian IT industry, (iii) that the Exports revenue of Indian IT industry is not significantly contributing to the total revenue of Indian IT industry (iv) and that the revenue from software is not significantly contributing towards the total revenue of Indian IT industry.

Failing to accept the null hypotheses will automatically lead to accept the alternative hypotheses.

H02. The null hypotheses presume that the six select Indian IT companies i.e. TCS, Wipro Technologies, Satyam Computers, HCL Technologies, I-Flex Solutions and Pentasoft Technologies are neither contributing towards the exports revenue nor do seem to be major contributors to total revenue of Indian IT industry. Rejecting to accept the null hypothesis will automatically lead to accept the alternative
hypothesis signifying that the six select Indian IT companies are contributing towards the exports and the total revenue of Indian IT industry during the period under reference.

H03. The null hypothesis presumes that neither the domestic revenue nor do the export revenue earnings from Software, Hardware and ITES-BPO segments have increased the total domestic revenue earnings and exports revenue earnings of Indian IT industry. The alternative hypothesis would support that the domestic revenue earnings as well as export revenue earnings from Software, Hardware and ITES-BPO segments have increased the total domestic revenue earnings of Indian IT industry for the referred period.

H04. The null hypothesis assumes that Infosys is not contributing to the growth and development of IT industry in India in terms of revenue generation, exports revenue and employment generation. However, the alternative hypothesis would be that the Infosys is contributing to the growth and development of IT industry in India in terms of revenue generation, exports revenue and employment generation.

H05. The null hypothesis suggests that the profitability and liquidity of Infosys Technologies Limited is not good enough as compared to profitability and liquidity of six select Indian IT companies in terms of Net Profit Ratio, ROCE and Current Ratio. Rejecting to accept the null hypothesis will automatically lead to accept the alternative hypothesis signifying that the profitability and liquidity of Infosys Technologies Limited is better than profitability and liquidity of six select Indian IT companies in terms of Net Profit Ratio, ROCE and Current Ratio for the period under review.
7. **Research Methodology**

An endeavor has been made in the present study to cull up relevant statistics from secondary source of information. The objectives have been set to analyze the performance evaluation of Indian IT Industry and Infosys pertaining to aspects of revenue earnings, foreign exchange through exports, and employment in all segments of IT i.e. software, hardware and ITES-BPO. The study has approached to make analytical study through the use of significant statistical tools and financial ratios.

**a. Sources of Information**

The data have been mainly collected from the Department of Information Technology, the Government of India; National Association of Software and Services Companies (NASSCOM) and Infosys Technologies Limited. The changes in the Acts, Amendments, Laws, Regulation and Taxation, regarding Information Technology have been incorporated through Bare Acts, Government Gazettes and Circulars, articles published in journals and periodicals, like Law weekly Times, News letter of Ministry of Law and Social Justices, the Government of India.

The Annual reports of the Department of Information Technology, NASSCOM, Infosys, National Task Force on IT, The Hindu-Survey of Indian Industries, Indian Council for Research on International Economic Relations (ICRIER) have been made good use of to study and analyze the problems, issues and challenges of IT industry in India.

Consolidated figures have been collected from journals and periodicals such as DATAQUEST, Business World, Business Today, Business India Yojana, Economic and Political Weekly, Voice & Data, Fact For You etc. The articles, write ups and abstracts of the prominent reports on Indian IT industry appearing in the Business dailies like The Business Line, The
Economic Times, The Financial Express, The Business Standard, The Hindustan Times, The Hindu and The Times of India have been thoroughly scanned to examine the IT related problems and issues critically and extensively.

b. Data Computation and Tabulation

Data related to IT Revenue, Export, production and Human Resource have been collected from primary and secondary sources. Some of the data have been compiled and collected to ensure the reliability of the measurement at maximum possible level. After collection of the data, they have been processed through computer software for application of relevant statistical tools, analysis and interpretation for arriving at the findings.

c. Financial Ratios

Financial Ratios are very powerful analytical tools for measuring financial performance of an organization. The ratio analysis helps the management to analyze the past performance of the firm and to make further projections. It is a process of comparison of one figure against another, which makes a ratio useful in identifying the strengths and weaknesses of the company’s operation. It is extremely helpful in providing valuable insights into a company’s financial picture. Ratios normally pinpoint a business strengths and weaknesses in two ways:

- Ratios provide an easy way to compare present performance with past
- Ratios depict the areas in which a particular business is competitively advantaged or disadvantaged through comparing ratios to those of other businesses of the same size within the same industry. The different ratios which have been used the study are briefly explained as under.
i. **Net Profit Ratio (NPR)**\(^{72}\)

This ratio indicates management's ability to operate the business with sufficient success not only to recover from revenues of the period, the cost of merchandise or services, the expenses of operating the business (including depreciation) and the cost of the borrowed funds, but also to leave a margin of reasonable compensation to the owners of providing their capital at risk. It essentially expresses the cost price effectiveness of the operation. A high value of this ratio reveals an advantageous position in the face of falling selling price, rising operating costs or declining demand for the product. A low value of it has the opposite implications.

\[
NPR = \frac{NPAIT}{Sales} \times 100
\]

ii. **Return on Capital Employed (ROCE)**\(^{73}\)

It indicates how well a company has used the long-term funds invested by the owners and creditors. The higher the ratio, the more efficient the enterprise is using its funds.

\[
ROCE = \frac{Profit}{Invested \text{ capital}} \times 100
\]

iii. **Return on Net worth (RONW)**\(^{74}\)

This ratio indicates how profitably the shareholders fund has been utilized by the enterprise. In other words, this ratio shows the degrees to which the firm is able to convert operating profit into an after tax profit that eventually the owners can claim.

\[
RONW = \frac{NPAIT}{Net \text{ worth}} \times 100
\]

(Net Worth = Equity Capital + Reserve and Surplus)
iv. **Earnings Per Share ( EPS)**

It measures the profit available to the shareholders on a per share basis. The flow of capital to the corporate entities under the present imperfect capital market conditions would be made on the evaluation of EPS. Investors lacking insight and detailed information about the prospect of the company would look upon the EPS as the best base to take their investment decisions. A higher EPS means better capital productivity.

\[
EPS = \frac{\text{NPAIT}}{\text{No. of Shares}}
\]

v. **Dividend Per Share (DPS)**

It shows the dividend paid to the equity shareholders on a per share basis. This ratio is a better indicator that the EPS measures what amount of exact profit is received by the equity shareholders.

\[
DPS = \frac{\text{NPATDp}}{\text{No. of Equity Shares}}
\]

vii. **Debt Equity Ratio (DER)**

It is a popular measure of the long-term financial solvency of an enterprise. It reflects the relative claims of creditors and shareholders against the assets of the concern. The higher the ratio, the greater is the financial risk associated with the company.

\[
\text{DER} = \frac{\text{Long term Debt}}{\text{Shareholders fund}}
\]

d. **Economic Valued Added (EVA)**

In order to overcome the limitations of accounting based measures of Financial Performance, Stern Steward & Co. a New York based advisory firm coined a modified concept of economic income in 1990 in the name of
company. It is the only performance parameter, which measures the creation of value for shareholders. Positive EVA implies that the company has been successful in creating value by utilizing its scarce resources in the most profitable way. On the other hand, negative EVA signifies that the company is a value destroyer.

\[ \text{EVA} = \text{Operating Profit} - \text{Tax} - \text{Cost of Capital} \]

**f. Statistical Tools Used Based on TAYFUR's Study**

The study is based on the prominent study by Altiok, Tayfur (1996) on "Performance Evaluation of Manufacturing System". This study provides an introduction to techniques covering exact, approximate, and numerical techniques. The author has aimed to strike a balance between theoretical issues and the practical aspects of modeling manufacturing systems. It is based on operations research, using of varied statistical tools such as mean, C.V., S.D., and regression analysis to measure the performance appraisal of the concerned industry or firm.

The present study takes into account the TAYFUR’s study for measuring the physical performance of Indian IT industry in general and Infosys in particular. The statistical tools used in the study are the Arithmetic Mean, Standard Deviation, Coefficient of Variance, Annual Growth, and Regression Analysis.

**i. Arithmetic Mean**

It has been calculated by summing all the observations in a batch and then dividing the total by the number of items involved, i.e.

\[ X = \frac{\Sigma X}{N} \]

Where, \( \Sigma X \) = Total value of the Observations

\( N \) = No. of Observations

**ii. Standard Deviation: (S.D.)**

\[(\sigma)\]
Economic Valued Added (EVA). EVA is a residual income measures that subtracts the cost of capital from the operating profits generated by the company. It is the only performance parameter, which measures the creation of value for shareholders. Positive EVA implies that the company has been successful in creating value by utilizing its scarce resources in the most profitable way. On the other hand, negative EVA signifies that the company is a value destroyer.

\[
EVA = \text{Operating Profit} - \text{Tax} - \text{Cost of Capital}
\]

**e. Statistical Tools Used**

For measuring the physical performance of Indian IT industry various statistical tools have been used according to the requirements and suitability. The statistical tools used are the Arithmetic Mean, Standard Deviation, Coefficient of Variance, Annual Growth, and Regression Analysis.

i. **Arithmetic Mean**

It has been calculated by summing all the observations in a batch and then dividing the total by the number of items involved, i.e.

\[
X = \frac{\Sigma X}{N}
\]

Where, \( \Sigma X \) = Total value of the Observations

\[ N = \text{No. of Observations} \]

ii. **Standard Deviation: (S.D.)**

The S.D. is a measure of the variation in the data that have been used to determine the percentage of data values that reside within any specified distance from their mean.

\[
\sigma = \sqrt{\frac{\Sigma (X-X)^2}{N}}
\]
Where, $X - X = \text{Deviation taken from the actual mean}$

$N = \text{No. Of observation}$

iii. **Coefficient of Variation (C.V.)**

The C.V. is a measure of relative variation. It expresses the standard deviation as percentage of arithmetic mean.

$$C.V. = \frac{\sigma}{X} \times 100$$

Where, $\sigma$ Standard Deviation

$X = \text{Mean of the observation}$

iv. **Regression Technique**

The most important technique used in the statistical analysis is the regression technique. It assumes a functional relation between the dependent and independent variables. If there is only one independent variable then the technique relevant is known as simple regression and if there are many independent variables then it is known as multiple regression. In this study, simple regression technique has been used. The single variable regression takes the linear form of functional relations like:

$$Y = a + bX$$

Where, $Y$ is the dependent variable,

$X$ is the independent variable,

$b$ is the slope of the straight line,

$a$ is the $Y$- intercept.

For the test of hypotheses the standard $t$-test is done to find out whether the coefficients and intercepts are statistically significant or not at 5% significance level. The regression estimators are tested by $F$-test at 5% level. The goodness of fit has been hypothetical by above 50%, as the rule in general
R square with higher value will indicate stronger dependence of dependent variable.

8. **Significance and Utility of the Study**

The growing performance of industry, sector and a firm is the result of interaction between a large number of technological, economical and political phenomena. The augmenting performance is rightly equated with economic progress compatible with social justice. The study has undertaken to assess the growth and development of IT industry in India in the post economic liberalization regime. The utility of the study related to performance evaluation IT industry and a case of Infosys can be seen from its enormous significance for the national economy. In the post-liberalization era, this industry has surfaced on the horizon of the economy as flagship industry. IT in India as well as the world over is now considered a magical hand, which shapes today's business world. In the fulfillment of cherished India Vision 2020, IT is contemplated as a cardinal force. The study identifies as to what are the problems facing IT industry in India and the means to tackle them to boost its performance in future for sustained global competitiveness.

9. **Conclusion**

In fine, Indian IT industry is a boon of liberalization and globalization. India has shown remarkable progress in the sphere of IT industry. In other words, Indian IT industry is fast shaping the destiny of global economy. The pre-dominance of IT industry in the last decade of the 20th century has attracted the attention of the corporate and government alike. Indian IT industry has the promise for tomorrow in terms of rising revenue, exports and huge employment generation. The next chapter of this study would deal with the business environment, evolution and revolution of Indian Information Technology Industry in India since economic liberalization.
10. References

5. Kothari’s Year Book on Business and Industry (2004), Kothari & Kothari Publication Division, Chennai, p. 72
6. Note Book of IT Promotion, Ministry of External Affairs, Government of India, p. xi
10. Ibid


41. Annual Report of Infosys Technologies Limited (2001-02), Electronic City, Husor Road, Bangalore
42. NASSCOM - Mckinsey Report (2002), New Delhi
50. NASSCOM-KPMG-HR-Report (2003), New Delhi
52. Annual Report of Infosys Technologies Limited (2003-04), Electronic City, Hosur Road, Bangalore, India.
53. NASSCOM-HWEITT Total Reward Study Results (2004), New Delhi
54. NASSCOM-QAI ITES-BPO Report (2004), New Delhi
55. NASSCOM’S Handbook Indian ITES-BPO Industry (2004), New Delhi
56. NASSCOM’S Strategic Review (2004), New Delhi
57. Indian IT Industry-Learning from China: A Report prepared by NASSCOM (2004), New Delhi
58. NASSCOM’s Strategic Review (2005), New Delhi


73. Ibid, p.268


75. Ibid, p.199


81. Ibid, pp.46-49