CHAPTER I

INTRODUCTION

This is the era of Information Technology (IT). The new millennium is dominated by technology in which the role of IT is paramount. IT is, in fact, shaping the world. With the increasing application of Internet, the role of this novel resource has become all the more important. No other invention has so comprehensively impacted the course of human history as IT. The world has now been turned into a global village; distance is dead and geography is history.

Within the IT industry, computers and especially software, are the critical components. Computers are, in fact, the drivers of IT in society. Globally, software has acquired predominance in the installed value of a computer system in all IT-advanced countries. It has been rightly remarked that computer software is currently the ‘lifeblood’ of business, industry, and government. This is the fastest growing and most profitable segment of the IT industry.

Computer industry has greatly contributed to the growth and globalisation of the Indian economy. Observers have predicted that India can now use the IT industry as a lever to emerge as an economic superpower, and make the 21st century as the Indian century. In this century of the mind, India has the rare opportunity to earn back its pride of place among the nations of the world, being a strong player in software which is a product of the mind.

The computer software industry has come to occupy an important position in India not only in the computer sector, but also in the electronics industry as a whole as well as in the overall industrial field, and GDP of the country. It is at present the engine of growth for the IT sector. In fact, India is being increasingly identified with software. The size and pattern of growth over the past decade or so indicate that the sector has acquired considerable stature and stability, and is going to dominate the Indian economy in future times. In this state and circumstances, it would be most appropriate to look into the real growth and structural transformation experienced by the sector, especially after the economic liberalisation.
OBJECTIVES

It is true that the computer software industry in India has been registering impressive growth rates, particularly through export. But, to what extent this growth rate has been real or substantial? Is there any major disproportion between the gross and net earnings out of software export which is, after all, the boom area in the sector? The increasing growth rates over several years could have impacted on the structural framework within the IT sector. So, along with analysing growth rates, it would be pertinent to analyse the structural break-up and transformations, if any, of the software sector. What have been the shifts in predominance of the components within the software sector, viz., services vs. packages, and the sub-components within these two categories? How this pattern is comparing with that of other IT-developed nations?

It is widely held that as India’s forte in the computer industry is software and not hardware, the Indian advantage in computer industry lies in nurturing the growth and potential of the software segment. It would be instructive to ascertain the substance of these arguments. What are the particular advantages and opportunities open to India in the software field? What are the factor endowments in favour of software vis-à-vis hardware? Would it be in the best interests of the nation to lay greater emphasis on software industry?

Along with these thrust areas for the study, the following aspects also shall be discussed, as part of the objectives for the present study:

(1) To examine the maturity of IT industry in India. Is there evidence of maturity in the Indian computer software sector? How does it compare with the position and trends prevailing in IT-developed countries, especially in terms of structure and prominence of various components? The parameters to be considered would be the predominant components of the industry, changing trends, supporting statistics that can promote the growth of software industry, etc.

(2) To examine the sustainability of present growth rate. Is the present growth rate of software sustainable in the long run, in the light of the changing focus and thrust taking place in the global software market? If not, what could be an appropriate growth strategy for the future?
(3) It is generally felt that there is lack of momentum in the growth of domestic software market vis-à-vis the steeper growth on the export front. What are the factors responsible for these discrepant growth rates? What should be the strategy to speed up the domestic growth of computer software in India?

(4) To look into the geographic concentration in the software industry. The IT industry, like most knowledge-based industries, is taken as an urban feature. What is the urban concentration exhibited by the industry in India? What are the particular factors favouring this?

(5) To analyse the pattern of R&D investment in the software industry. Being a knowledge-intensive industry, R&D is an imperative for this industry. What is the R&D performance of the Indian software firms? Is the spending too low as compared to that of other IT-developed nations?

(6) To identify any individual items or special areas of hardware where there is potential for India, and a strategy to strengthen these areas. It is true that the focus of present study is only on software. But software and hardware being integral parts of the computer industry, one cannot be studied in total isolation from the other. Moreover, it may be appropriate to ponder over an innovative growth strategy for the hardware segment by integrating it with software.

(7) To attempt an analysis of the performance of software industry. This has been done by looking at the industry from dimensions like labour productivity, technology, trade performance, marketing, and local linkage generation. Similar analysis, in brief, has been done for the hardware sector also, to arrive at a comparative rating of software versus hardware.

(8) To have an appreciation of the manpower position concerning the industry. Being knowledge-oriented, the software sector is basically manpower-intensive. Is the present manpower availability adequate to meet the needs and requirements of the industry? What are the specific manpower problems in the context of India, and what could be an appropriate strategy to ensure the requisite manpower in terms of skill and numbers?
(9) To examine the problems and issues related to the software industry. What are the specific handicaps or difficulties confronted by this sector for its further growth and expansion?

**HYPOTHESES**

The following hypotheses shall also be tested to achieve the aforesaid objectives:

(a) There is relative advantage for India in concentrating more on software and related activities than on hardware.

Various indicators to be considered for testing the hypothesis shall be size, rate of growth, factor advantages, export, relative contributions towards the total output of computer industry as well as electronics in general, and GDP. The relative share shall be arrived at by working out percentages, and growth rate through semi-log regression model.

(b) The growth of Indian software industry is dominated by the growth of software export.

The general perception is that the growth and boom in the Indian computer software industry is critically through export, and the domestic sector is relatively insignificant. The Indian software industry has been virtually termed as software export industry. This hypothesis shall be tested by comparing the size and growth of the export and domestic segments over a particular time frame, 1988-2000, as well as during the sub-periods 1988-91 and 1991-2000.

(c) The economic liberalisation of 1991 had a positive impact on the software industry.

It is generally held that the economic liberalisation of 1991 had a favourable impact on the growth of software industry. The veracity of this requires to be checked. For this, the software industry shall be perceived from all the three dimensions: overall, export, and domestic. Time frames to be considered shall be the same periods of 1988-2000, 1988-91, and 1991-2000, so as to compare the position of the industry preceding liberalisation with that after that as well as with the whole period. This could throw adequate light on the extent of variation in growth that emerged in the wake of
implementation of this new policy framework. The aspects to be subjected to study shall be mainly size of the industry in the different time periods as well as rate of growth.

(d) India's software export is determined by the unit labour cost of production, size of firms, foreign tie-ups, advertising intensity, technology import, R&D intensity, and age of firms. The Tobit model has been made use of to estimate the actual position.

METHODOLOGY and DATABASE

Other than that specifically mentioned above under different aspects of analysis, the relative share of the software sector vis-à-vis other major sectors of the electronics industry, and within the software sector that of the major individual items/components shall be ascertained by working out the percentage share. Growth rates during the overall period of 1988-2000 as well as for the sub-periods 1988-91 and 1991-2000 shall be arrived at by using the semi-log regression model. This time frame has been chosen since definite data pertaining to the software sector, especially domestic software, are available only since 1988, and most of the policy impact has also been worked out for this time period.

Time series data (all India) on all the major items of analysis, to the extent available, have been obtained from secondary sources. The same sources have been tapped for data pertaining to national parameters like export, GDP, foreign collaborations, etc. These data have been obtained mainly from the Department of Information Technology (DIT), Electronics and Computer Software Export Promotion Council (ESC), and other concerned Government Ministries/Departments. Relevant data available with the various industry associations like National Association of Software and Services Companies (NASSCOM), Manufacturers Association of Information Technology (MAIT), etc., and prominent publications like Dataquest, have also been made use of. Firm-level data have been procured from the Prowess database maintained by the Centre for Monitoring the Indian Economy (CMIE).

Since the data have been pooled from different sources, there could be minor differences in the data related to the same item from different sources. But this is not expected to be significant to vitiate the findings. Moreover, as far as possible, in any particular analysis, data from the same source alone have been utilized. Deflating the data has not been attempted in the absence of an appropriate price index. It must also be mentioned that software could be bundled with hardware, produced in-house by user
firms, or even pirated. The values of these categories have not been captured by the data used in the analysis, and hence there could be some under-estimation.

CHAPTERISATION

The chapterisation scheme for the study is as follows:

Chapter II: Information Technology Revolution

This chapter details the role and impact of IT, the information age and the importance of information, the emergence of knowledge era, Internet, etc. The relevance of IT for India, and the role of software within IT are also given focus.

Chapter III: Historical Perspective: Computer Hardware and Software

The coverage of this chapter comprises the origin and growth as well as latest trends of computer hardware and software, internationally and within India.

Chapter IV: Historical Perspective: Policy Regime

This chapter dwells on the evolution and present state of the policy regime in respect of the Indian computer industry, with focus on software. The major areas of mention are the NCP of 1984, software policy of 1986, NIP of 1991, STPs, Task Force Reports, etc.

Chapter V: India’s Software Industry – Growth, Present State, and Trends

The important discussions in this chapter pertain to the growth, present state and position as well as emerging trends of the software industry in India. Keeping in view the distinct nature and situation of packaged software, this has been given a special focus.

Chapter VI: India’s Software Industry – a Structural Break-up

A rigorous analysis of the industry structure, in terms of basic features/characteristics and activity-wise break-up, forms the core of this chapter. There is also a detailed coverage on the regional concentration or urban bias exhibited by the industry.

Chapter VII: Domestic Software

Thrust of this chapter is on the need for domestic software, its present neglect/weaknesses in India, size and growth, and basic structure.

Chapter VIII: Software Export

The highlights of this chapter are size and actual growth, STPs, latest export trends, structural features, foreign collaborations, etc.
Chapter IX: Computer Hardware Industry

The major planks of analysis in this chapter include dimensions of the hardware sector like size and growth, historical perspective, market structure, export, features/characteristics, and problems as well as proposed growth strategy.

Chapter X: Performance Indicators

The various indicators of performance in the software industry, viz., labour productivity, profitability, technology, trade performance, marketing, and local linkage generation, are brought out in this chapter. Similar parameters, in brief, have also been considered for the hardware sector.

Chapter XI: Determinants of Software Export—a Quantitative Assessment

This chapter analyses the major determinants of India’s software export, by using the Tobit model. The variables considered include the unit labour cost of production, size of the firm, foreign tie-ups, advertising intensity, technology import, R&D intensity as well as age of the firm.

Chapter XII: Manpower

The manpower requirements and availability, training, various initiatives under implementation, features of the manpower profile in India, issues involved, and recommended course of action form the core of this chapter.

Chapter XIII: Problems and Issues

The various problems and issues confronting the industry are looked into here, mainly from the following angles: general, manpower, infrastructural, external, structural, and financial.

Chapter XIV: Advantage India and Proposed Growth Strategy

The chapter at first attempts to have an appreciation of the advantages of software versus hardware sectors, particularly in the context of India, along with the limitations/constraints, to enable a proper perspective on the matter. In the light of this as well as the current state and structure of the industry, emerging trends and growth patterns, an appropriate growth strategy for the software sector suiting the present and future times, has been arrived at in this chapter.

Chapter XV: Summary and Conclusions

The basic findings and conclusions of the study form the coverage of this chapter.