सत्यमेव जयते

REPORT OF THE COMPTROLLER AND AUDITOR GENERAL OF INDIA

UNION GOVERNMENT
NO. 11 (COMMERCIAL) OF 1991

CMC LIMITED

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P R E F A C E

The report on C.M.C. Limited was prepared by an Audit Board consisting of the following Members:
S/Shri

A.C.Tiwari	Deputy Comptroller and Auditor General(Commercial)-cum-Chairman,Audit Board from 1st May, 1990 to 7th June,1991.
P.K.Sarkar	Deputy Comptroller and Auditor General(Commercial)-cum-Chairman,Audit Board from 8th June, 1991 till date.
Ananda Shankar	Principal Director of Commercial Audit and Ex-officio Member, Audit Board-I, Bombay from 1st June 1990 till date.
Vijay Kumar	Principal Director of Commercial Audit and Ex-officio Member, Audit Board-I, New Delhi from 3rd July,1990 till date.
D.R.Taneja	Director (Retd.) Regional Computer Centre,Chandigarh-Part-time Member.
Dr.R.K.Dutta	Project Co-ordinator,National Centre for Medium Range Weather Forecasting, Department of Science and Technology,New Delhi-Part-time Member.

2. The Report was finalised by the Audit Board after taking into account the discussions held with the representatives of the Company and Department of Electronics in December, 1991.

3. The Comptroller & Auditor General of India wishes to place on record his appreciation of the work done by the Audit Board and, in particular, the contribution made by the non-official members.

[illegible]

The report on C.M.G. [illegible] was prepared by an Audit Board consisting of the following members: [illegible]

[illegible]	Deputy [illegible] Auditor General [illegible] Chairman, Audit Board [illegible] June, 19[illegible].
[illegible]	Deputy [illegible] Auditor [illegible] Audit Board from [illegible]
[illegible] Chakkar	Principal Director of Commercial Audit and Ex-officio Member, Audit Board, [illegible]
Vijay Kumar	Principal Director of Commercial Audit and Ex-officio Member, Audit Board, New Delhi [illegible]
[illegible]	Director [illegible] Regional [illegible] Centre, [illegible]
Dr. [illegible] Datta	Project [illegible] for [illegible] Department [illegible] Technology [illegible]

[illegible] realised [illegible] December, 19[illegible].

2. The Comptroller [illegible] wishes to place on record [illegible] work done by the Audit Board [illegible] contributions made by the non-official members.

OVERVIEW

I. Till 1975, only two foreign firms were operating in India in the field of Computer maintenance. In order to have indigenous capabilities in the field of Computer maintenance, the Computer Maintenance Corporation of India Limited was incorporated on 26th December, 1975, as a fully owned Government Company under the Companies Act, 1956, with its Registered Office at Secunderabad. During succeeding years, the Company expanded its range of activities to turnkey contracts, development of software systems, setting up of communication network and education and training. In order to reflect the range of its activities, the name of the Company was changed to CMC Limited effective from 27th August, 1984.

(Para 1)

II. The authorised and paid up capital of the Company as on 31.3.1991 was Rs.35 crores and Rs.15.15 crores respectively.

(Para 3.1.1)

III. The loans received from the Government of India to the tune of Rs.16.13 crores were outstanding as on 31.3.1991. The Company failed to repay the loan instalments to Government on due dates and provided for penal interest amounting to Rs.25.64 lakhs, Rs.47.98 lakhs, Rs.67.94 lakhs and Rs.89.51 lakhs during 1987-88 to 1990-91 respectively. The Company has not paid to Government interest amounting to Rs.8.41 crores which was due on 31.3.1991.

(Para 3.1.2 and 3.1.3)

IV. There is progressive increase both in the number of Computer systems maintained by the Company and revenue earned therefrom.In 1984-85,the Company had

1.INTRODUCTION

1.1 Till 1975, M/s. International Business Machines (IBM), U.S.A. and International Computers Limited (ICL), U.K. were the only firms operating in India, in the field of Computer maintenance. Though these firms were operating in the country since long, they contributed very little to stimulate significant capability in this area. They made no attempts to disseminate maintenance information and expertise on a broader basis amongst the users and no attempt was made to support maintenance research based on local conditions. In order to have an organisation which would have total support capabilities in the field of computer usage, as also to ensure that Computer users in India would be delinked from foreign manufacturers, the Computer Maintenance Corporation Ltd. was incorporated on 26th December 1975 as a fully owned Government Company under the Companies Act, 1956, with its Registered Office at Secunderabad, Andhra Pradesh.

1.2 In November, 1977 the Company offered its services to all users of IBM equipment (consequent on IBM's decision to cease its support-operation in India from 1st June, 1978), and entered into a Memorandum of Understanding with IBM under which IBM agreed to sell all spares, stores and tools lying in India at a total cost of Rs.3.80 crores. The Company has the proposed objective of making significant contribution in the rapid introduction and proper utilisation of information technology in core sectors of country's economy to achieve self reliance in the high technology applications of Computer systems and communications (as distinct from routine data processing).

1.3 In order to reflect the wide range of its services provided to Computer users in India, the name of the Company was changed to CMC Limited effective from 27th August, 1984.

2.OBJECTS

2.1 The main objects for which the Company is established are :

(i)To plan, co-ordinate and implement the national effort on Computer repair and maintenance including maintenance of sub-systems, peripherals to Computer system and gearing up of indigenous capabilities to ensure a high degree of availability of Computer information processing machinery and related equipments at optimum efficiency.

(ii)To develop infrastructure for improved maintainability of Computer and maintenance management and also indepth maintenance schedules for electronic data processing equipments in use.

(iii) To undertake the processing, conversion, fabrication manufacture and production of particular categories of electronic and allied goods as may be directed by the Union Government from time to time.

(iv)To carry out research and development of software test instruments and associated equipments relevant to maintainability of Computers and to conduct training on all aspects of Computer and allied equipments maintenance.

(v)To render consultancy service on hardware selection, installation and maintenance and other allied activites for Computer Systems on turn key basis,and

(vi)To provide support on systems application and diagnostic software development.

2.2 As of December, 1991 the range of activities of the Company included :

- Research and Development
- Supply of hardware and software products
- Facilities management
- Environmental engineering
- Installation and Commissioning of systems
- Hardware maintenance
- Systems Consultancy
- Software development
- Systems engineering
- Data Communication and Computer networks
- Education and Training programmes
- Turn key Projects
- Bulk procurement and sale of imported peripherals
- International operations.

2.3 Pursuant to the recommendations of the Committee on Public Undertakings(COPU) in their 38th Report (6th Lok Sabha), the Government of India (BPE) requested (May 1979) all Ministries to advise the public enterprises under their administrative control to frame their Micro objectives consistent with the broad objectives spelt out in the Government of India industrial policy statement, to facilitate realistic and meaningful evaluation by the Parliamentary Committee and the Government.

2.4 The Ministry stated (November 1991) that the micro objectives of the Company were spelt out in the Company's Seventh and Eighth Plan documents and detailed performance criteria were agreed upon in a Memorandum of Understanding entered into between CMC and Department of Electronics (DOE).

3.CAPITAL STRUCTURE

3.1.1 Initial investment in the shape of equity capital amounting to Rs.15 lakhs was contributed by Government of India in December 1975 which was augmented from time to time.The paid up capital was Rs.15.15 crores as on 31.3.1991 against the authorised capital of Rs.35 crores.

3.1.2 The Government of India also sanctioned long term loans from time to time, aggregating Rs. 21.59 crores (including interest free loan amounting to Rs.5.49 crores sanctioned in 1987-88) to end March, 1991, out of which Rs.1.11 crores was repaid by the Company; Rs.4.35 crores was converted into equity capital (in January 1981 Rs.2.35 crores and in April 1984 Rs.2 crores), leaving a balance of Rs.16.13 crores as on 31.3.1991. In addition, the Company also received from Government interest free loans from time to time for its Research and Development projects aggregating Rs.166 lakhs to end of March, 1991 out of which an amount of Rs.42.50 lakhs is due for repayment.

3.1.3 The Company failed to repay the loan instalments on due dates and provided for penal interest amounting to Rs.25.64 lakhs, Rs.47.98 lakhs, Rs.67.94 lakhs and Rs. 89.51 lakhs during the year 1987-88 to 1990-91 respectively as per the terms and conditions of sanction of such loans. The penal interest amounting to Rs.20.93 lakhs (Rs.16.43 lakhs for 1986-87 and Rs.4.50 lakhs in 1987-88) due to default in repayment of loan was not paid by the Company in view of moratorium on loans amounting to Rs.350 lakhs sanctioned by the Government of India in March, 1988. The Company has not paid interest amounting to Rs.8.41 crores which is due as on 31.3.1991.

3.1.4 The Ministry stated (November, 1991) that CMC had requested for enhancement of authorised capital from Rs.15 crores to Rs.35 crores in 1986 and also for conversion of loan into equity to the extent of Rs.13 crores. Subsequently, CMC did not pay loan instalments and interest thereon, as it had applied for increase in paid-up capital from Rs.15.15 crores to Rs.21 crores through conversion of loan and the same was stated to be under process in the Department. The Ministry further stated that CMC had proposed (i)to repay the balance of accrued interest over a period of five years in equal instalments during Eighth Plan period and (ii)to pay the current interest as and when it fell due.

3.2 Grants-in-aid received from the Government of India.

3.2.1 The Government of India had sanctioned Grants-in-aid amounting to Rs.154.75 lakhs upto 31.3.1991 for purchase of assets/equipments and incurring other incidental expenditure for Research & Development projecets.

3.2.2 The Company also received revenue grants amounting to Rs.503.94 lakhs upto 31.3.1991.

3.2.3 The Company is not maintaining separate Grants-in-aid accounts as required by the terms governing the grants which stipulates maintenance of separate accounts and reporting to Government the interest earned. The grants received are not kept in a separate bank account but are mergedwith the Company's funds. The unspent balance and interest earned thereon are utilised for working capital without any approval of the Government.

4.ORGANISATIONAL SET-UP

4.1 The overall control and management of the Company is vested in the Board of Directors comprising a maximum of 10 Directors appointed by the Government. As on 31.3.1991, the Board consisted of a full time Chairman & Managing Director, two full time Directors in-charge of Field Engineering Operations and systems and R&D respectively and seven part-time Directors.

4.2 The Management of the Company is carried on by the Chairman & Managing Director with the assistance of two Directors in-charge of Field Engineering and Systems and R&D and one Executive Director in-charge of Finance, 5 Vice Presidents and 4 General Managers.

5.CORPORATE PLANS

5.1 In September 1980, the Company had drawn up its Corporate Plan relating to the period 1980-85, with a view to providing for a complete range of services to Computer users both in India and abroad.

5.2 The Corporate Plan envisaged a total expenditure amounting to Rs.25.71 crores for (i)Fixed Assets (Rs.12.50 crores), (ii)Working Capital (Rs.12.56 crores) and repayment of loans (Rs.0.65 crore). The Company received Government assistance of Rs.8.88 crores only (inclusive of Rs.2.35 crores of loans converted into equity) during plan period and generated internal resources amounting to Rs.15.84 crores for meeting the plan expenditure.

5.3 During the Seventh Five Year Plan (1985-90) the specific goals set for the Corporation, inter-alia,included the following:-

(i)To play a catalytic role in creating a climate of Computer awareness within the country which ensures receptiveness to new changes and motivates people to innovate and experiment so as to maximise the gains from the modern technology.

(ii)To successfully implement Indonet and demonstrate India's approach to Computer network and develop packages and on line applications relevant to our country.

(iii)To create a Technology and Information bank relating to the frontiers in technology.

(iv)To make concentrated efforts towards exporting software, specialised projects and undertake technical consultancy abroad.

(v) Use innovative methods and strategies to optimise cost of spares.

(vi) To constantly endeavour through R&D efforts to promote application having special impact to improve quality of life of the society.

5.4 The Seventh Five Year Plan (1985-90) drawn up by the Company in October, 1984 envisaged funds requirement of Rs.261.80 crores for meeting capital expenditure of Rs.179 crores and working capital of Rs.82.80 crores. For this purpose, the Company expected financial support of Rs.111 crores from the Government of India by way of share capital (Rs.70.50 crores) and loans (Rs.40.50 crores) and Rs.93.75 crores was to be met from internal resources and the balanace of Rs. 57.05 crores as borrowings from financial institutions and commercial banks. The projects included in Seventh plan viz. R&D and E&T Complex (planned expenditure Rs.10.75 crores), Office building (Rs.17.75 crores), Indonet Project (Rs.42.50 crores) were delayed for various reasons and therefore necessity of resource mobilisation for planned expenditure was not felt by the Company.

5.5 The Company stated (June, 1990) that the original plan profile was accepted to be in tune with national needs and priorities of the DOE and the Planning Commission and a deliberate decision was taken to mobilise requisite funds from all resources without pruning down the plan size.During the first four years of the plan,as three major projects viz. Indonet (planned expenditure Rs.42.50 crores), R&D and E&T Complex (planned expenditure Rs.10.75 crores), Bombay Office Complex (Rs.17.75 crores) did not come up for full implementation due to delays caused by various reasons,the need to bridge resource gap was not felt.

5.6 Since the Company did not formulate its planned objective with reference to the resource availability and realistic assessments of the completion schedule for the projects, the various plan targets in financial and physical terms cannot be evaluated in terms of achievements thereagainst.DOE, however, proposed to give an amount of Rs.61 crores (Rs.30 crores as equity and Rs.31 crores as loans/grants) and indicated that financial support of Rs.45 crores would be available from the Department of Banking (Rs.40 crores) and Railways (Rs.5 crores) for various jobs undertaken by the Company. The Planning Commission finally approved a budgetary support of Rs.20 crores only.

5.7 Apart from the financial targets, the Corporate Plan also set certain goals to achieve accelerated technical advancement. The details of goals and achievement thereagainst are as under :

Goals	Achievements
1. Import substitution programme	
Ambitious programme for local development of sophisticated strict-tolerance spare-parts such as segments, brushes, printed circuit boards and gears.	The consumption of imported spares constituted 89% even at the end of the year 1989-90. The Company did not pursue the programme for indigenisation.
2. To encourage & promote indigenous industry in the manufacture of Computers.	No such indigenous manufacturer of Computers was promoted.

3. Intensive pursuance of export market for software products and technical services requirements abroad.	There is no significant achievement in respect of this goal as can be seen from Para 10.1.1.

5.8 The Ministry stated (November 1991) that in the obsolescence prone industry like Computers, indigenisation had to be confined only to items which could be used for a long time, despite changes in technologies. A selective approach for local development of mechanical and electro-mechanical spares was made and indigenisation in respect of these parts was achieved to a great extent.

6.PERFORMANCE ANALYSIS

6.1.1 The Corporate Plan for Seventh Plan period (1985-86 to 1989-90) envisaged marked increase in its activities with the estimated earnings at Rs.851.00 crores compared to the Sixth Five Year Plan target of Rs.60.22 crores. During the Seventh Plan Period the thrust areas of its activities were Turnkey Project, INDONET, Software Consultancy and Computer Centre, Site Consultancy, Education and Training, Canalisation of Imports and Exports. However, the Company was unable to raise the tempo of its activities to the desired levels and consequently there was perceptible scaling down of annual targets in respect of these thrust areas. The table below gives particulars of targets set in Seventh Plan and annual targets for 1985-86 to 1990-91 and achievements thereagainst.

Table No.I

(Rupees in lakhs)

Activity	VIIth Plan	1985-86 Annual Targets	1985-86 Actual	1986-87 Annual Targets	1986-87 Actual	1987-88 Annual Targets	1987-88 Actual	1988-89 Annual Targets	1988-89 Actual	1989-90 Annual Targets	1989-90 Actual	1985-90 Annual Targets	1985-90 Actual	percent age of actuals to Annual Targets	1990-91 Annual Targets	1990-91 Actual
Maintenance Service	19200	1145	1334	1700	1477	1800	1802	2000	2367	2700	3004	9345	9984	107	3300	3554
Turnkey Project	8955	975	1105	1500	2563	3200	3018	4500	5806	6400	6859	16575	19351	117	7350	8400
Special Products	4300	200	126	800	249	600	151	400	341	300	424	2300	1291	56	350	420
Supply of Peripherals	23100	600	1069	1000	732	1200	969	1000	622	300	240	4100	3632	89	200	154
Environmental Engineering Services	2800	250	362	450	980	1000	663	800	588	1000	851	3500	3444	98	800	636
System and Software Consultancy	18775	350	143	500	240	800	404	500	380	600	630	2750	1797	65	650	799
Education and Training	1280	30	72	100	120	150	165	250	200	220	237	750	794	106	150	136
Other Revenue	6690	100	46	150	92	250	114	550	239	500	202	1550	693	45	900	103
Total	85100	3650	4257	6200	6453	9000	7286	10000	10543	12020	12447	40870	40986	100	13700	14202

Note :The planned and budgeted figures for other revenue include revenue from exports and exports revenue actually realised (discussed in detail in Chapter 10) was included in respective activities.

6.1.2 During the Seventh Five Year Plan, the Company could not achieve its targets for any of its activity except Turnkey projects and Environmental Engineering Services, though the Company could achieve to a large extent its targets set out in its annual plans.

6.1.3 The Ministry stated (November 1991) that the Seventh Plan targets were projected on the basis of certain assumptions.The major assumption was a budgetary support of Rs.111 crores.But only Rs.20 crores was given as budgetary support.While the VII Plan was not revised on the basis of actual budgetary support, the annual plans were revised.

6.1.4 Audit Board enquired (December, 1991) that when systems support and systems integration was included in the Seventh Plan, why was CMC not engaged in development of systems software in the country.

6.1.5 The Ministry stated (December, 1991) that since there was a variety of Computer systems in vogue and it was considered impracticable for CMC to develop such systems software.It had, therefore, restructured itself for development of application software. It was further stated that Government proposed to spend about Rs.4.5 crores for development of UNIX based software with CMC as the nodal agency.

6.2 Maintenance Services

6.2.1 One of the main objectives of the Company is to plan, co-ordinate and implement the national effort on Computer repairs and maintenance and gearing-up indigenous capabilities to ensure high degree of Computer availability. The Company, which took over from IBM from June 1978 the functions of extending maintenance support, also concluded agreements with other foreign manufacturers. As on 31.3.1991, it had 971 systems belonging to 41 manufacturers under its maintenance support. The details of the systems under maintenance for last seven years ended 31.3.1991 and revenue earned therefrom are given in the following table :

Table No.II

(Revenue: Rupees in lakhs)

	1984-85		1985-86		1986-87		1987-88		1988-89		1989-90		1990-91	
Manufacturer	No of systems	Revenue	No of systems	Revenue	No of systems	Revenue	No of systems	Revenue	No of systems	Revenue	No of systems	Revenue	No.of systems	Revenue
International Business Machine(IBM)	70	449	67	371	65	296	36	246	31	237	30	303	33	380
Burroughs	19	66	20	84	23	111	24	149	32	166	32	200	33	210
Control Data Corporation	3	70	3	74	4	85	6	112	8	98	9	119	9	152
Cli Honeywell Bull	6	22	8	39	12	62	12	74	12	99	12	99	13	100
Digital Equipment Corporation	125	171	153	264	180	295	218	380	296	567	334	799	357	1060
Hewlett Packard	82	42	127	86	156	145	161	177	185	196	232	218	224	260
International Computers Limited	6	32	6	43	6	46	6	56	5	41	4	37	3	30
Prime	6	13	8	14	8	21	8	35	10	34	10	34	9	33
Robotron	2	18	2	14	2	20	2	22	2	11	1	4	1	4
Univac	8	37	8	44	9	65	9	80	15	153	16	246	17	260
Others	72	149	72	244	140	263	175	390	223	352	243	601	272	644
Total	399	1069	474	1277	605	1409	657	1721	819	1954	923	2660	971	3133

6.2.2 There is a progressive increase in the number of Computer systems maintained by the Company, which stood at 971 at the end of 1990-91. This proliferation was due to the large numbers of Computers with different systems which were allowed to be imported during recent years. The Company was the only designated agency for rendering maintenance services. The Company was successful in maintaining system availability of imported Computers installed at 156 locations at more than 97% of Computer time during 1990-91.

6.2.3 Audit Board enquired (December,1991) why,for developing healthy competition, CMC had not off-loaded its maintenance work in favour of other organisations/firms where capacity existed for undertaking such a job.

6.2.4 The Ministry clarified (December, 1991) that the revenue from maintenance of imported systems undertaken by CMC accounted for only 20% of total maintenance revenue of the country and though the aspect of off-loading had received Government's attention, the same was given up in order to avoid migration of CMC's trained personnel and also on commercial considerations. The Ministry, however, felt that by efflux of time the monopolistic position enjoyed by CMC would get eroded due to introduction of the new industrial policy of the Government.

6.2.5 There are two types of maintenance contracts entered into by the Company with its customers viz. (i) Comprehensive maintenance contracts and (ii) Skills (Labour only) contracts where the spare parts are provided by customer or, when provided by the Company, are charged separately. Per call service is a casual type of service provided to customers who have neither of the two above contracts with the Company.

6.2.6 The Management has not laid down any guidelines governing fixation of maintenance charges. The field offices send proposals to Corporate Office, for fixing annual maintenance charges usually comprising of (a) certain percentage of c.i.f. cost of the system towards consumption of spares, (b) inventory carrying cost assumed at about 9% of the value of inventory worked out at c.i.f. cost, (c) manpower cost on the basis of estimated manhours required for maintenance of system, (d) cost of training personnel spread over for a period of 2 to 4 years and (e) 15% margin towards profit. However, in many cases the annual maintenance charges proposed by the field offices were found to have been revised by the Corporate Office without indicating any reasons. There is also no system of collecting data and monitoring cost of maintenance vis-a-vis revenue realised.

6.2.7 Though the maintenance services accounts for about 25% of its total income and the activity is spread throughout the country, the Management has not been preparing proforma accounts showing the actual cost incurred and income realised from this activity for different years. When the Ministry called for such information, the Management furnished the activity-wise provisional working results for 10 months periods ending 1987 and 1988 (April to January), as indicated below:.

Table No.III

(Rupees in lakhs)

	April 1986 to Jan. 1987	April 1987 to Jan. 1988
<u>Revenue</u>	1125	1310
<u>Expenses</u>		
Manpower	250	264
Establishment (including media consumables)	288	310
Spares consumption	252	260
Obsolescence	50	58
Interest	51	36
Depreciation	21	20
Total	912	948
Profit	213	362
Percentage of profit over cost.	23	38

6.2.8 The Company revised the maintenance charges for customers with effect from 1.4.1987 resulting in general increase of charges by 20 to 25 per cent over previous rates. While working out the revised charges, the Company had not studied the cost of maintenance of various systems, taking into account inventory carrying cost, manpower cost, training and spares etc. The Company had also not applied the revised rates uniformly to all customers operating the same system. In respect of certain customers, even though revised maintenance charges were intimated to them, the revision was not implemented and the customers were billed at pre-revised rates.

6.2.9 The Management had stated (June 1990) that for all IBM systems, the maintenance charges were raised by 25% of the existing charges and for all non-IBM systems by 20% of the existing charges where contracts were signed prior to 1.4.1984.

6.2.10 The Ministry stated (November, 1991) that (a) CMC would not work out cost of maintenance of each Computer system as it was of the view that increase in input costs should be spread uniformly, since maintenance agreements were akin to insurance policies; (b) in order to broadly compensate the increase in input costs, the maintenance charges were increased based on the then prevailing market conditions. It was further stated that only 12 customers out of 500 on whom notice of revision of charges was served, did not pay the revised maintenance charges and those customers belonged to Government bodies/sectors.

6.2.11 The contention of the Company that the maintenance charges were revised from 1.4.1987 in respect of all non-IBM systems, the maintenance contracts for which were signed prior to 1.4.1984 only is not correct, as the Company had revised the maintenance charges in respect of Indian Telephone Industries Limited, Bangalore, for their NAS 6630 system at Mankapur (Uttar Pradesh) though the original contract of maintenance was signed only on 14.9.1986.

6.2.12 When the Audit Board observed that it was not happy to note that CMC did not have a MIS for monitoring system-wise cost of maintenance, the Ministry stated that the Company would maintain detailed type-wise records of the cost of maintenance from 1.4.1992.

6.3 Turnkey Projects

6.3.1 The Company undertakes contracts on turnkey basis which includes services such as selection and procurement of Computer system, site preparation, installation, software development and testing and commissioning of the Computer systems. The Table No.I would indicate that there has been substantial growth in this activity. However, the profit earned from this activity could not be ascertained as the Company has not compiled proforma accounts for each of its activities. An attempt was made to link up turnkey jobs with the cost of materials and the results are given in the following table :

Table No.IV

Year	No.of turnkey jobs undertaken by the Company	Revenue	Material cost	Percentage of contribution to revenue
			(Rs. in lakhs)	
1985-86	25	1105.19	957.72	13.3
1986-87	51	2563.29	2313.20	9.8
1987-88	84	3017.68	2034.14	32.6
1988-89	90	5805.89	5071.73	12.6
1989-90	114	6858.63	5683.35	17.1

6.3.2 The Company has not laid down any pricing policy indicating rate of returns on turnkey jobs nor any guidelines for acceptance of jobs below the margin.

6.3.3 It would be seen from the above table that the percentage of contribution to revenue during 1985-86 to 1989-90 ranged from 9.8% to 32.6%. In the absence of job-wise cost records, the profitability of individual turnkey jobs could not be ascertained.

6.3.4 The Ministry stated (November, 1991) that a cost estimate was prepared for each component of turnkey project and a consolidated quotation was submitted to the customer after providing for a reasonable margin towards contribution.

6.3.5 The following table indicates the major turnkey projects executed by the Company.

Table No.V

Sl.No.	Name of the Project.	Project Year	Brief Description and Utility.
1.	Impress	1984-85	Software facilitating railway reservation developed.
2.	Trams-Bhilai	1987-88	Maintaining of wagon movement in Bhilai Steel Complex to expedite wagon turn around.
3.	Mediterranian Games Management	1987-88	Software for managing the Syrian Games.
4.	Human Resources Management for Sultanate of Oman	1988-89	Human Resources Management system for the Diwan Royal Government of the Sultanate of Oman.
5.	Container terminal Management.	1989-90	Software developed for Port Management system for Jawahar Lal Nehru Port Trust,Nhava Sheva Bombay.
6.	Data Acquisition system for Gevra coal mines.	1989-90	Software developed for open coal mines at Gevra for optimum utilisation of dumper fleets and its monitors drilling machine engaged in mining operation.
7.	London underground	1990-91	Scheduling of trains in London underground
8.	African Games Management System	1991-92	Software package for Games Management executed at Cairo

6.3.6 A review of the cases of Turnkey jobs executed by the Company (by Southern Region, Madras), however, revealed a case where the Company agreed for turn key computerisation at Anglo French Textile Limited, Pondicherry, at Rs.25 lakhs over the price of Rs.28.79 lakhs originally estimated (February 1987) thereby giving a price advantage to the customer to the extent of Rs.3.79 lakhs.

6.3.7 The Ministry stated (November, 1991) that it was a maiden project executed by CMC for a State Government Undertaking in Pondicherry involving development of software expertise for textile industry and hence should be viewed as a case of penetrating into a new business area.

6.3.8 Such a conscious decisions to operate at a loss should be kept on record in Public Sector Undertakings.

6.4 Canalisation/SUPER

6.4.1 Under the Government's Import-Export Policy 1983-84, the Company was designated as the canalising agency for import and distribution of certain electronic items viz. floppy drives, winchester drives, Dot Matrix and Line printers. This service was to be made available to all manufacturers of computer peripherals in India, who would not otherwise be able to avail of the benefit of bulk discount on these basic peripherals. In 1985-86, the bulk procurement and supply of peripherals and their canalisation through the Company was stopped as a result of the change in Government policy. However, the Company had formulated a scheme (1985-86) named as Project 'SUPER',for bulk purchase and supply of computer peripherals for the benefit of the computer users. The scheme envisaged the procurement and sale of peripherals of the following four types.

(i) Placing of orders on OEM Suppliers on behalf of customers and other formalities like opening of letter of Credit etc. will be done by the customer.

(ii) Sales to parties for whom prior contracts committing supply of peripherals were entered into.

(iii) Sale of parties from stock i.e. price fixed in anticipation of sale.

(iv) High sea sales.

6.4.2 The details of purchases and sales of peripherals during 1983-84 to 1990-91 under Canalisation/SUPER scheme were as under :

Table No.VI

(Rupees in Lakhs)

Year	Opening Stock	Purchases	Closing Stock	Sales	Trading Profit
1983-84	-	83.72	9.10	83.26	8.64
1984-85	9.10	499.78	45.96	530.83	67.91
1985-86	45.96	964.31	71.67	1069.06	130.46
1986-87	71.67	648.96	46.49	731.93	57.79
1987-88	46.69	953.54	108.18	969.43	77.38
1988-89	108.18	582.03	103.09	621.58	34.46
1989-90	103.09	200.53	67.58	264.01	27.97
1990-91	67.58	181.32	*76.23	184.39	11.72

* Excluding Rs.0.37 lakh written off.

6.4.3 This trading activity was significantly profitable to the Company.

6.5 Environmental Engineering Services

6.5.1 The services rendered by the Company under this activity includes all the jobs connected with furnishing, air-conditioning civil works, electrical works, etc. and these works are executed through sub-contractors. The Company prepares details of items to be executed and selects the sub-contractors who perform actual jobs under the technical supervision of the Company. These jobs are highly profitable in view of the fact that the margin available to the Company is more than 35% which would be substantial for recovery of its expenses on supervision and other overheads. The exact profit derived from this activity was, however, not ascertainable because the cost of manpower, travel expenses and other overheads had not been computed job-wise. In the reports submitted to the DOE for the 10 months periods ended January 1987 and January 1988, the Company had furnished certain details which would indicate that margin available is 4 to 5 times the aggregate cost of manpower and other expenses as can be seen from the following table :

Table No.VII

	April 1986 to Jan.1987	April 1987 to Jan.1988
	(Rupees in lakhs)	
1.Revenue	565	570
2.Expenses on Sub-contracting.	410	445
.Contribution	155	125
.Manpower	12	13
.Establishment	22	9
Interest	N.A.	N.A.
Depreciation	N.A.	N.A.
Profit	121	103

6.5.2 Interest and depreciation are not applicable, as the Company receives advance from the customer for these jobs and no machinery is utilised.

6.5.3 A review of some of the jobs undertaken during 1986-87 indicated that the revenues realised from the customers is very substantial as compared to cost of site preparation jobs which were executed through sub-contractors. These cases are cited in the following table :

Table No VIII

(Rupees in lakhs)

Name of the customer (Region)	Total revenue earned	Cost of work done by sub-contractor	Percentage of margin of the Company of work done by sub-contractor
1.Army Headquarters(NR)	22.38	16.17	38
2.National Hydro Power Corpn. Ltd. (NR)	65.32	48.43	35
3.Punjab national Bank (WR)	3.29	2.05	60
4.Statistical Technique and Quality Control,Mohali (NR)	22.10	16.24	36
5.Chittaranjan Locomotive Works (ER)	23.32	14.94	56
6.Maharashtra State Small Industries Development Corporation Ltd. (WR)	4.79	3.18	51
7.Andhra Bank (SR)	3.95	2.64	50
8.Regional Engineering Centre (Durgapur)(ER)	9.00	6.56	37
9.Geological Survey of India (SR)	12.15	8.66	40
10.Syndicate Bank (WR)	5.26	3.89	35
11.Indian Oil Corporation Ltd.Assansol(ER)	8.87	6.83	30

6.5.4 It may be seen from the table that the margins earned over the cost of work executed varied from 30% to 60%. As no specific estimates of costs and profits were prepared for submission of quotation and as the specific pricing policy followed in submission of quotations was not on record, it was not possible in audit to compare and ascertain the performance with reference to estimates or pricing policy.

6.5.5 A further analysis of the table indicates that the margins earned on the jobs completed within a year ranged from 40% to 60% and in respect of jobs completed within 2 to 3 years it ranged from 30% to 38% only. Though the manpower and establishment cost would be more in respect of the jobs extending beyond one year the actual profit earned on those jobs normally should not be lower. This indicates an adhocism in charging for jobs, possibly, following the principle "what the market can bear."

6.6 Systems and Software Consultancy

6.6.1 This is one of the major areas of the Company's activities. 558 software engineers were engaged in system and software consultancy representing 25% of the total manpower. The activities under this head includes development of software packages to suit customer requirements and networking their operations using Network established under INDONET and other Computer Centres.

6.6.2 Though considerable resources of manpower and machinery are engaged for carrying out these jobs, activity-wise performance report submitted to DOE for the 10 months period ended January 1987 and January 1988 gives the aggregate performance of System and Software Consultancy together with Education and Training and Exports. The following table indicates the comparative position of the total revenue and expenses vis-a-vis revenue realised from System and Software Consultancy and Education and Training and Exports.

Table No.IX

(Rs. in lakhs)

	April 1986 to January 1987			April 1987 to January 1988		
	Total of all activities	Systems including E&T	Percentage of col.(2) over col.(1)	Total of all activities	Systems including E&T & Exports	Percentage of col.(2) over col. (l)
	1	2	3	1	2	3
Revenue	3875	220	5.7	4710	560	11.9
Expenses						
Manpower	570	162	28.4	730	244	33.4
Establishment (including media consumables)	690	197	28.6	830	281	33.9
Spares consumption	260	-	-	290	-	-
Obsolesence	50	-	-	58		-
Sub-contracts for Environmental Engineering Services	410	-	-	445	-	-
Material cost of Equipments	1705	-	-	2139	125	5.8
Interest	76	14	18.4	95	44	46.3
Depreciation	82	35	42.7	90	37	41.1
Total	3843	408		4677	731	
(+)Profit/(-)Loss	(+)32	(-)188		(+)33	(-)171	

6.6.3 It may be seen from the above table that the considerable losses were sustained in this activity. The expenses on manpower, establishment and depreciation was quite disproportionate to the revenue earned for the period of 10 months in the year 1986-87 and 1987-88.

6.6.4 The Ministry stated (November, 1991) that Systems and Software Consultancy Group supported CMC's overall functional capabilities and was associated with (a) Systems and Consultancy jobs (b) Maintenance and development of software for INDONET (c) Turnkey projects and (d) Export assignments. The Ministry further explained that (i) the manpower, establishment and other costs of the group were normally accounted together whereas the revenue of above activities was booked separately, (ii) the revenue in other activities, particularly turnkey projects, rose considerably and (iii) it was not possible for the Company to separate the cost element in turnkey projects, for systems and software activities and show it alongwith Systems and Software revenue.

6.6.5 When the Company is able to identify and allocate different elements of expenditure relating to the system and software development of turnkey projects, the revenue portion of system and software development of turnkey project should also be allocated to this activity to ascertain correctly the working results of this activity. The existing system of accounting needs improvement.

6.6.6 A review of the following software consultancy jobs revealed deficiencies in the execution of the contracts.

6.6.7 Loss in the contract for processing of Examination Papers

(a) The Company entered into an agreement (December 1987) with Jammu & Kashmir Government for examination processing work at Rs.6 per candidate or Rs.8000/- for examination whichever was higher.

(b) Similarly, the Company also entered into an agreement with University of Delhi for examination processing work at a total minimum amount of Rs.92,500.

6.6.8 The Company earned a revenue of Rs.3.38 lakhs on the above jobs, where as, as per Computer log book, booked time was worth Rs.7.13 lakhs (Rs.2.41 lakhs plus Rs.4.72 lakhs) for executing the above jobs, indicating a loss of Rs.3.75 lakhs.

6.6.9 The Ministry stated (November, 1991) that these jobs were accepted on marginal cost basis as it was proposed to use Computers at Delhi for the third shift. As regards tariff rate, the machine does not dintinguish between jobs done under various shifts. This reply is not convincing. Even the contentions that these jobs were undertaken on marginal breakeven basis is not borne out by the facts.

6.6.10 Revenue from net working operations is contributed by various Computer systems installed under project INDONET, which is separately discussed under Para 7 on Major Projects.

6.7 Education and Training

6.7.1 In order to develop trained and skilled personnel for various Computer systems, the Company conducts various types of courses viz. entry level/introductory courses, sectoral/ specialised courses and customer request courses in major cities.This is a laudable activity.Education and Training programmes conducted and the revenues earned by the Company during the last seven years ended March 1990 are as under :

Table No.X

Year	No.of courses	No.of participants	Revenue earned (Rs.in lakhs)	Average revenue per participant (Rupees)
1983-84	59	1250	13.23	1058
1984-85	123	2460	31.08	1263
1985-86	284	5867	72.56	1237
1986-87	430	9450	119.99	1270
1987-88	450	9500	165.23	1739
1988-89	460	9800	200.59	2047
1989-90	475	10200	237.38	2327

6.7.2 The number of participants trained each year from 1986-87 to 1989-90 is impressive.The fees charged for these courses cover the cost of (a) conducting the course, (b) course material, (c) lunch, (d) light refreshments and (e) Computer time.Here too, the Management has failed to compile income and expenditure accounts to ensure that the income earned had not fallen short of expenditure incurred on this activity.

7.MAJOR PROJECTS

7.1 Project INDONET

7.1.1 The Company forwarded (September 1982) to Department of Electronics, a proposal to set up a project called INDONET (Integrated NationalData Processing and Data Communication Facility) involving a capital outlay of Rs.4 crores which was approved by Government in January 1983.

7.1.2 The project envisaged the following main objectives :

(1) Establishment of network of Computer centres accessible from remote parts of the country so as to deliver benefits ofinformation resource management to a wider section of users.

(2) Providing computing facilities for :

(a)development of export of software;

(b)specialised application packages in the areas of engineering design, management, science, energy and Computer networking;

(c)distributed information system;

(d)training of Computer professionals;

(e)development of microprocessor-based concentrators, nodal processors and network control processors.

7.1.3 Against the approved cost of Rs.4.00 crores (accorded by the DOE in January 1983), the Company received from Government Rs.200 lakhs (in September 1983 Rs.75 lakhs and March 1984 Rs.125 lakhs).But due to considerable delay in according approval for import of the Computer systems till April 1985, there was steep escalation in the revised cost which went up to Rs.850 lakhs (including cost of Computer system approved for import from IBM at an FOB cost of US $ 2.85 millions). The increase in cost is analysed in the table given below:

Table No.XI

(Rupees in lakhs)

S.No.	Elements of Cost	Original Cost	Revised Cost
1.	Computer Hardware and Software	360.00	561.68
2.	Site preparation	30.00	100.00
3.	Media	10.00	-
4.	Expansion to existing systems for net working operations	-	49.61
5.	Training	-	25.00
6.	Spares test equipment	-	105.12
7.	Contingencies	-	8.59
	Total	400.00	850.00

7.1.4 The increase in cost was mainly due to the following:

(a) Increase in exchange rate from Rs.9.50 per US dollar in November 1982 to Rs.12.60 in June 1985;

(b) Expansion required for existing systems at Delhi and Hyderabad;

(c) Increase in customs duty from 25% to 60% and

(d) Inclusion of cost of training, spares and test equipments not provided for in earlier project proposal. The Company while revising project cost, had neither specified the number of Computer centres to be established for network systems accessible from remote parts of the country nor had prepared any estimate as to the number of Computer users who will be benefitted from the network system.

7.1.5 While seeking approval of the Ministry for the revised project cost (Rs.850 lakhs), the Company anticipated a profit of Rs.21 lakhs in the first year of operation i.e. 1986-87, a pay back period of 7 years with an internal rate of return at 12.9%.

7.1.6 The project became operational from January 1986. Revenue and Expenditure after implementation of project, year-wise, to end of 1989-90 are as follows:-

Table No. XII

(Rupees in lakhs)

	January 1986 to March 1987		1987-88		1988-89		1989-90	
	Plan	Actuals	Plan	Actuals	Plan	Actuals	Plan	Actuals
A.Revenue earned								
(a)Operations	389	266	467	386	350	340	600	513
(b)Grants (subsidy from DOE for P&T lines)	50	58	50	58	50	88	75	95
(c)Turnkey services-Internal use	-	25	-	214	234	282	325	365
Total	439	349	517	658	634	710	1000	973
B.Expenditure								
Manpower	102	222	107	255	112	240	300	351
Establishment	151	191	163	216	101	300	330	345
Depreciation	54	51	54	42	54	125	125	125
Media/consumables	70	117	74	130	96	128	160	180
Interest	85	85	82	68	75	60	75	75
Total	462	666	480	711	438	853	990	1076
(+)Profit/(-)Loss	(-)23	(-)317	(+)37	(-)53	(+)196	(-)143	(+)10	(-)103

7.1.7 The project sustained a loss of Rs.317 lakhs in its first year of operations (15 months) mainly due to 117.6 per cent excess over planned manpower cost and excess in other areas whereas revenue realisations accounted for only 68.4 per cent of the planned income. The loss for the subsequent three years i.e. 1987-88 to 1989-90 amounted to Rs.299 lakhs against estimated profit of Rs.243 lakhs. Thus, the Company failed to achieve the anticipated internal rate of return of 12.9 per cent as indicated to the Ministry while seeking approval of the revised project cost.

7.1.8 The reasons for excess of expenditure over planned estimates were not analysed. It could be seen from the above table that the income assumed towards internal use of INDONET facilities for Turn key jobs during 1987-88 to 1989-90 constituted a sizeable portion of the total revenue earned over the budget (Rs.861 lakhs earned as against Rs.559 lakhs budgeted).

7.1.9 The project report envisaged that INDONET facilities would be available to the Computer users in the remotest areas. However, the INDONET operated only from 9 cities which was inadequate for a network system, covering a large number of multi-locational organisations.

7.1.10 The Ministry stated (November, 1991) that (i)the INDONET was a pioneering project in India ushering in a new technology and was intended to bring in a totally new culture in Indian scene. The project cost increased to Rs.8.5 crores over a couple of years owing to factors like increase in exchange rate, increase in customs duty, etc. in addition to the time taken for project appraisals, approvals, planning and technical aspects; (ii)the project plan had expected much quicker market response for INDONET and in practice, but it took a longer time to settle down and (iii)in addition, major efforts were launched in projects viz. On Line Parts Inventory Control System, Electronics Mail, Internal Information System, etc. for management of enterprises and the benefits of those packages came directly to CMC management and were not reflected in the revenues.

7.1.11 Audit Board observed that the INDONET was a high cost service to the users due to the high rentals the Company had to pay to the Department of Telecommunications for the lines through which their service was provided to the customers and in view of this, enquired whether CMC proposed to discontinue that service.

7.1.12 While agreeing with the Audit Board's views about the high cost of the service, the Ministry stated that INDONET was not a failure and should not be judged only by its profitability as it was also introduced for developing the data communication culture in the country. The Ministry was hopeful that it would pick up gradually as it was a value added service and would become financially viable in course of time,especially if satellite facilities were made available at economic cost.

7.2 Project INTERACT

7.2.1 A project sponsored by the United Nations Development Project (UNDP) called "International Education and Research for Application of Commputer Technology (INTERACT)", was entrusted (April, 1981) by the Government of India to the Company as the implementing agency.

7.2.2 The project INTERACT aims at developing and transferring among the participating developing countries technical know-how in systems integration and engineering of small Computer-based systems dedicated to applications which are essential to build-up and support development-oriented activities such as railways, power systems, etc.

7.2.3 The Company spent a total amount of Rs.87.95 lakhs on these projects.

7.2.4 In April, 1985 the UNDP Project evaluation mission expressed its satisfaction over the outcome of the project in each of the three sub projects viz. (i)Power System Management (emphasis on monitoring and control of transmission system), (ii)Railway Freight Management (emphasis on Yard operations) and (iii)Meteorology image processing of data from satellites.

7.2.5 Assets in the form of Plant and Machinery, Office Equipment and Vehicles worth Rs.87.67 lakhs were received by the Company as gift from UNDP under this project.

7.3 **Project for construction of (a) Research & Development and Education & Training Complex at Hyderabad and (b) Office Complex at Bombay**

7.3.1 Between March 1984 and November 1988 the company received from Government an amount of Rs.300 lakhs by way of share capital and Rs.933 lakhs as loans for executing its projects for setting up of Research & Development and Education & Training (R&D and E&T) Complex at Hyderabad, and the Office Complex at Bombay.

7.3.2 R&D and E&T Complex at Hyderabad

The Company acquired by August 1980, land measuring about 75 acres near Hyderabad for locating the integrated complex for R&D and E&T activities, from the Government of Andhra Pradesh at a cost of Rs.4.50 lakhs. The Company also spent an amount of Rs.1.81 lakhs upto Devember, 1981 towards development of site.

7.3.3 The R&D Complex Committee selected M/s.Patel & Grover in November, 1982 and they were requested to quote charges for preparation of DPR, bearing in mind that in case the project was not ultimately approved by Government, the work might not be taken up. In December, 1982 the architects quoted a fee of Rs.1.5 lakhs for preparation of DPR payable in three instalments of Rs.50,000 each. Thereafter, a series of meetings took place regarding the scope of the DPR. In December, 1984 the architects made a presentation on the conceptual designs of the project, to enable them to finalise the DPR. The work done upto that stage involved costs towards preparation of miniature models and other presentation material. There was no progress on this work thereafter. Ultimately, the architects were paid Rs.75,000 in full and final settlement for the work done by them as they were not finally entrusted with the work.

7.3.4 As per the Project Report approved by the Company in December, 1986, it was projected to be completed by August, 1989, at a total cost of Rs.950 lakhs. The benefits expected from this project included (i) ultimate savings of average annual rent outflow of Rs.1.95 crores and (ii) increase in the trained and skilled personnel for various Computer systems with a projected revenue earnings of Rs.82 lakhs in 1985-86 to Rs.688 lakhs in 1989-90 from E&T activities.

7.3.5 The investments in R&D and benefits arising out of these investments by way of revenue earning and fulfilment of other objectives like training of manpower had not been brought out in the Project Report.

7.3.6 The construction of the R&D Complex did not commence till March 1990 as the approval from the Government of Andhra Pradesh for conversion of land from conservation zone to institutional zone was received in May, 1988. Thereafter the Company had to obtain the approval of plans from Hyderabad Urban Development Authority (HUDA) which was sought in June, 1988 and received in October, 1988. Further, objection against the construction of the project was initially expressed by the National Airports Authority who had their VOR station near the project site.They had issued provisional clearance in June, 1990 and final no objection certificate in August, 1990.

7.3.7 Thus, the land which was acquired in August 1980 for the construction of R&D Project was finally cleared for use for construction in August 1990 only.

7.3.8 The project cost which was estimated at Rs.9.50 crores in December 1986 based on price index obtaining in October, 1985 was reassessed by the architect at Rs.21 crores. The entire project was further reviewed by the Steering Committee in February, 1990 taking into account constraints of finance and functional requirements by reducing building area from 325000 sq.ft. to 221390 sq.ft. by deleting (i) hostel and dining hall and (ii)provision for utilisation of non-conventional energy and alternate methods of cooling for building which was found to be non-viable by the architect. The project cost assessed in February 1990/October 1990 amounted to Rs.17.13 crores. The details of escalation in project cost due to various reasons are given below:

	As per DPR (December,1986)	**Revised Project Cost (October,1990)**
Area	325000 sq.ft.	221390 sq.ft.
Project cost	Rs. 950.00 lakhs	--
Project cost for reduced area	Rs. 647.14 lakhs	Rs.1713.00 lakhs
Increase in project cost		Rs.1065.86 lakhs

7.3.9 The increase in project cost was due to:

(i) Delays in obtaining approvals from various authorities which took approximately 3 1/2 years (December, 1986 to May, 1990) during which cost index for building materials and labour increased resulting in increase of cost by Rs.490.30 lakhs.

(ii) Expenditure on additional items like development of landscape for maintaining greenery in the unoccupied area of nearly 65 out of 75 acres and enhancing national environments and construction of road for which additional expenditure of Rs.180.26 lakhs was estimated.

(iii) Further an amount of Rs.176 lakhs was estimated as Management expenses (Rs.133.00 lakhs) and contingencies (Rs.43 lakhs) for administering the project including architect's fee at 5% of tendered cost of project and project management consultation fee of Rs.25.48 lakhs for entire duration of project and salaries and allowances and other establishment cost of the Company.

7.3.10 The project is now under execution and an amount of Rs.269.05 lakhs had been spent upto the end of March 1991. The work is expected to be completed by March 1992.

7.3.11 The Ministry stated (November 1991) that the R&D and E&T Complex projects were delayed due to various reasons such as getting Government approval for the Project and funding thereof, getting 'No

Objection Certificate" etc. and as such the construction could start only from March 1990. The Ministry further stated that the delay in starting the project and changes in the original building plan because of certain restrictions and additions imposed by HUDA, led to price escalation and the original cost of Rs.9.50 crores (1985) had to be revised to Rs.17.13 crores.

7.4 Office Complex at Bombay

7.4.1 The Company acquired (July 1986) a plot of land in Bandra Kurla Complex, Bombay for construction of office complex from the Bombay Metropolitan Regional Development Authority (BMRDA), on lease for a period of 80 years at a total premium of Rs.221.25 lakhs. The Department of Electronics had released an amount of Rs.221.00 lakhs as share capital for meeting this expenditure.

7.4.2 The Company had appointed (December 1987) M/s.Space Design Associates as Architect at 5% of the project cost as fees for their job.

7.4.3 As per the project report submitted to the Board of Directors on 28th July, 1987, the project was estimated to cost around Rs.4.93 crores (excluding the cost of land) and the expected benefits included a saving of annual outflow of rent amounting to Rs.161.04 lakhs. The Board also approved (December 1987) the appointment of STUP Consultants Ltd., as Project Management Consultants at a lumpsum fee of Rs.13 lakhs.

7.4.4 Though the construction was to commence by November, 1987, the Company could not take up construction upto March, 1989, due to delay in getting "No Objection Certificate" from Bombay Municipal Corporation. Consequently, the cost of the project increased and the revised cost of the project was estimated (October, 1990) at Rs.794.84 lakhs. The revision of cost was mainly due to (i) increase in cost index over DPR index by 50% due to price escalation of material, labour and services, and (ii) increase in building area by 3%.

7.4.5 The construction of this building is in progress and was expected to be completed in all respects by February 1992. An amount of Rs.363.95 lakhs has been spent as at the end of March 1991.. Due to delay in completion of the project, the Company's offices have been continued in various hired premises.

7.4.6 The Ministry stated (November 1991) that the project was behind schedule due to various reasons, such as inordinate delay in getting approvals from BMRDA, BMC etc. which had resulted in price escalation leading to increase in the cost of the project.

8. OVERSEAS OPERATIONS

8.1 The London Office of the Company was inaugurated on 27th May, 1987 with only the Vice-President having taken charge. Two Technical Marketing Executives of the Company were posted in August, 1987. The major activities planned for this office are as follows:

- Co-ordinate all export activities on a global basis;
- Market Company's services and products overseas;
- Set up distribution channels for soft-ware products developed in India by the Company and others; and
- Be a window for new technologies.

8.2 The expenditure incurred by the London Office for the years 1987-88 to 1989-90 is given below:

Table No.XIII

(Rs. in lakhs)

Particulars	1987-88	1988-89	1989-90
1. Manpower	13.00 (£54.400)	28.71 (£1,06,352)	32.29 (£1,19,604)
2. Establishment	18.75 (£78,457)	41.24 (£1,52,736)	39.29 (£1,45,513)
Total	**31.75** **(£1,32,857)**	**69.95** **(£2,59,088)**	**71.58** **(£2,65,117)**

Note: Exchange rates of £1 =Rs. 23.90 prevailing as on 31.3.1988, Rs. 27 as on 31.3.1989 and 31.3.1990 as circulated by Foreign Exchange Division of Ministry of External Affairs have been taken while converting expenditure in foreign currency into Rupees.

8.3 Total revenue projected from office and actual revenue realised during 1987-88 to 1989-90 are indicated below:

Table No.XIV

Year	Projected revenue	Actual revenue realised	Percentage of actual revenue over projection.
			(Rupees in lakhs
1986-88 (18 months)	800	250.50	31.3
1988-89	1400	92.10	6.6
1989-90	3000	162.59	5.4
Total	**5200**	**505.19**	**9.7**

8.4 The revenue of Rs.250.50 lakhs credited to London Office during 1987-88 include earnings of Rs.199.81 lakhs from a turnkey project, the order for which was bagged (on 28.12.1986) before setting up of London Office. The performance of this office during 1986-88 to 1989-90, was far below expectations.

8.5 The Ministry stated (November 1991) that London Office had started functioning effectively from September 1987 only and after initial experience, the revenue targets for the period 1987-88 to 1989-90 were revised to Rs.6.5 crores as against which Rs.5.05 crores were realised. It further stated that the London Office booked orders over US $ 6 million upto March 1991.

9.RESEARCH & DEVELOPMENT

9.1.1 Research & Development group at Secundrabad is engaged mainly in the following areas:

(a) Parts development;

(b) Technology development and

(c) Systems engineering

9.1.2 There is another Research & Development group functioning in Bombay engaged in matters concerning communication equipments. These groups are also expected to be involved in providing support to maintenance function through indigenisation of spares, development of special tools/products, improving diagonistic techniques, etc. These groups are expected to provide technical information service to the other divisions of the Company.

9.1.3 The Company, upto end of March, 1991, had incurred progressive expenditure of Rs.1029 lakhs in acquisition of capital assets and incurred revenue expenditure of Rs. 1878 lakhs on Research & Development as per details given in the following table:

Table No.XV

Expenditure on Research & Development

	Upto 1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	Total upto 1990-91
					(Rupees in lakhs)			
Capital Expenditure								
Plant & Machinery	317	45	22	88	158	198	55	883
Others	100	15	12	-	4	15	-	146
	417	60	34	88	162	213	55	1029
Revenue Expenditure								
Manpower Expenses	141	64	97	115	117	174	226	934
Establish-ment ex-penses	152	47	64	120	104	112	141	740
Consumables	52	19	24	21	24	36	28	204
Total	345	130	185	256	245	322	395	1878

9.1.4 The financing of the Research & Development expenditure is made through both internal resources and grants-in-aid received from the Government of India.

9.1.5 The Board of Directors was informed (September, 1980) that the Research & Development wing had undertaken 46 projects (listed in Annexure-I).

9.1.6 Out of these 46 projects, the Company did not take up 17 projects. Out of 29 projects taken up, 6 projects were grouped under one project and was completed at a cost of Rs.101.49 lakhs and the remaining projects (23) were completed at a cost of

Rs.83.08 lakhs. The delay in the completion of the projects ranged from 9 to 24 months.

9.1.7 R&D had undertaken the following project on development of application systems since 1983, which came to fruition over a period of time.

Table No.XVI

S.No.	Name of the Project/Product	Duration of the Project Commencement	Completion	Brief discription and utility
1.	Automatic Finger Print Identification System	1985-86	1989-90	CMC is the only fourth Company in the world to have developed the Finger print access and criminal tracing system.This system enables identification of criminals through Finger Print matching easier and faster.
2.	Load Dispatch Management System	1985-86	1986-87	This software enables monitoring of Power network and controls quality of power on real time basis.
3.	Railway Traction SCADA	1985-86	1986-87	This system enables control and monitoring of traction power for electrified section of Railways. It provides on time display to the traction power controller for effective Management.
4.	Office Automation	1989-90	Under Beta testing	Office automation in an advanced office system comprising of document Management Systems, Electronic Mail System, Telex Management System, Resource and Forms Management. An integrated solution based on MS Window, enables to move towards paperless office.
5.	ARTS	N.A.	N.A.	A state-of-the-art digitale storage and retrievel system for art objects, specially useful for museums and scholars.
6.	SMART LAB	N.A.	N.A.	The real time system that monitors hundreds of process parameters spread over a number of locations and generates alarms at a Central Station.

9.2 **Special Products**

9.2.1 The R&D had also developed entirely with indigenous effort and know-how, certain special products through local vendors and attempted marketing of the following special products:

9.2.2 The Company in June 1980, initiated the project for Word Processing and Electronic Composition in Indian Script and developed a special product **'Lipi'**, an Indian language word processing system after incurring a development expenditure of Rs.23.15 lakhs during 1981-82 to 1983-84.

9.2.3 In July, 1984, the Company decided to produce and market Lipi. As the Company had no facility of its own to undertake the production, it decided to get the products manufactured, to its specifications, through outside agencies. At that time it had projected a sale of 1000 Lipi's over a period of five years. The Company called vendors from Hyderabad area only, as it was felt convenient from the view point of constraints of time required by vendors for delivering products and interfacing with R&D at Secunderabad. Two vendors 'A' and 'B'were selected and trial production of 20 Lipi's each was entrusted to them. It was reported in November, 1985 that the quality of the products was critical and the firm 'A' had not adhered to delivery schedule. It was nevertheless favoured with further orders (November, 1985) for 80 Lipis valued @Rs.63.60 lakhs.

9.2.4 Out of total of 111 Lipi's purchased by the Company during 1985-86 to 1986-87, it could sell only 59 Lipi's as can be seen from the details given below:

Table No.XVII

(Rs.in lakhs)

Year	1985-86		1986-87		1987-88		1988-89		1989-90		1990-91	
	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty	Value
Opening Stock	-	-	38	30.58	65	46.57	20	14.92	16	13.66	13	11.72
Purchases	59	51.05	52	34.00	-	-	-	-	-	-	-	-
	59	51.05	90	64.58	65	46.57	20	14.92	16	13.66	13	11.72
Sales	21	31.91	25	26.63	8	7.44	2	1.44	3	1.94	-	-
Capitalised/ Cannibalised	-	-	-	-	37	22.69	2	1.80	-	-	13	11.72
Closing Stock	38	30.58	65	46.57	20	14.92	16	13.66	13	11.72	-	-

Note: Closing stock indicated at cost.

9.2.5 The Company retained for its own use unsold stock of 36 Lipis valued Rs.27.47 lakhs and wrote off 16 Lipis not in working conditions valued Rs.8.74 lakhs.

9.2.6 The Company attributed reasons for poor sale of their product to customer dissatisfaction due to deficiency in the quality of the product viz. (i) Poor quality of hardware, (ii) Unsatisfactory working of the features offered by this product and (iii) Old look of the machine, and hence the Company decided (December 1986) to stop further production of Lipis. Thus, the Company failed in launching its very first product.

9.2.7. The main reasons for failure of this product may be attributable to the following:

(i) Before taking up the production, the Company did not carry out any detailed market survey, to know the actual requirements of the market.

(ii) Being the maiden product introduced by the Company, with a projected sale of 1000 Lipis over a period of five years, the Company should have given more weightage for quality and cost of production of the product, rather than hurrying up in introducing the product. The Company also did not take sufficient care to assess the capabilities of the party selected for manufacture of the product.

9.2.8 The Ministry stated (November 1991) that 'Lipi', a multilingual word processor was developed to aid implementation of the three language formula and the same had, somehow, not taken off as expected. There were several spin-off benefits from this project, such as Indian Language Ticket and Chart Printing for Railways, Transiliteration of Telephone Directory, etc.

9.3 **Automex**

9.3.1 The Company also developed another product- Automex- a totally computerised communication system suitable for large organisation,at a cost of Rs.10.61 lakhs incurred during 1981-82 to 1983-84. The Company decided to produce this product also along with Lipi, and estimated a sale of 100 Automex systems over a period of five years. A trial production of 5 systems each was awarded to "A" and "B"- the same parties selected for production of Lipi. Despite failure on the part of both the vendors to adhere to delivery schedule and quality, further orders of 30 systems valued at Rs.47.76 lakhs was placed on "A" in November, 1985. Out of 59 systems purchased by the Company during 1985-86 to 1989-90, the Company sold 52 systems upto the end of March, 1991, capitalised two systems valued Rs.3.36 lakhs, leaving a balance of 5 systems valued at Rs.7.08 lakhs. The performance of this product was also not satisfactory and hence the Company could not achieve the targeted sales of 100 systems.

9.4 Other Special Products

9.4.1 Micro Processor Based Products

Micro Processor based products developed by the Company other than Lipi and Automex are:

(a)Autotext (teleprinter/telex terminal)

(b) Oasis (a general purpose package catering to the day-to-day information needs of senior executive)and

(c) Statmux (a stand alone statistical multiplexor for synchronous terminal).

9.4.2 The details of purchase, sales and stock of these products for the last six years ending March, 1991 are as follows:

Table No.XVIII

	1985-86		1986-87		1987-88		1988-89		1989-90		1990-91	
	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value.	Qty.	Value

(Value - Rs. in lakhs)

Opening Stock	-	-	15	5.81	72	17.28	119	33.06	134	43.27	153	32.73
Purchase	15	5.81	82	19.70	380	72.33	167	51.55	100	17.67	95	19.18
	15	5.81	97	25.51	452	89.61	286	84.61	234	60.94	248	51.91
Sales	-	-	25	8.48	253	90.62	114	39.55	67	25.07	96	26.11
Capitalised	-	-	-	-	80	11.78	38	5.80	14	3.14	50	5.23
Closing Stock	15	5.81	72	17.75	119	33.06	134	43.27	153	32.73	102	20.81

9.4.3 As at the end of March, 1991, 182 items valued at Rs.25.95 lakhs were retained for the Company's own use.

9.5 IMPACT Products

9.5.1 IMPACT* products developed by the Company are:

(i) Data Entry Machine; and

(ii) PCs.

*IMPACT means Indigenous Micro Processor and Computer Technology.

9.5.2 The details of purchases, sales and stock of these products for the last six years ended 31st March, 1991 are given below:

Table No.XIX

	1985-86		1986-87		1987-88		1988-89		1989-90		1990-91	
	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
										(Value - Rs. in lakhs)		
Opening Stock	-	-	26	20.67	143	141.80	203	192.06	175	276.76	138	264.15
Purchases	70	53.24	370	294.04	489	399.97	707	645.21	691	1158.96	650	2827.70
	70	53.24	396	314.71	632	549.84	910	837.27	866	1435.72	788	3091.85
Sales	44	52.04	253	196.42	403	325.15	508	538.90	557	1465.37	614	3064.24
Capitalised	-	-	-	-	26	20.59	227	257.41	171	180.88	82	124.77
Closing Stock	26	20.67	143	141.80	203	192.06	175	276.76	138	264.15	92	263.01

9.5.3. Sales have increased both in quantity and value. The quantity and value of closing stock indicate that excess purchases have been made each year.

10.EXPORTS

10.1.1 The Company's export activity includes (i) technical consultancy service, (ii) execution of turnkey projects, (iii) hardware maintenance and (iv) imparting training in hardware and software. The details of earnings in foreign exchange from these activities and also from some other sources like reimbursement of duty, clearing charges on spares, and inventory cost on spares imported under warranty maintenance, on behalf of foreign parties vis-a-vis total earning of the Company are given in the following table:

Table No. XX

	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
				(Rupees in lakhs)				
1.Total Earnings	1430.56	2164.90	4257.02	6453.00	7286.38	10534.15	12446.79	14202.27
2.Earning in foreign exchange								
(a)Export	-	-	-	-	-	-	99.53	278.46
(b)Technical Consultancy services	21.19	54.59	37.35	37.58	45.98	85.99	49.82	52.58
(c)Turnkey contract	-	-	-	-	199.81	-	-	
205.18								
(d)Others	0.11	3.45	3.56	8.32	4.71	6.11	13.24	4.03
Total	21.30	58.04	40.91	45.90	250.50	92.10	162.59	540.25
Percentage of export earning to total earnings	1.5	2.7	1.0	0.7	3.4	0.9	1.3	3.8

10.1.2 It may be seen from the table that there was no perceptible growth in the export earnings.

10.1.3 The Ministry stated (November 1991) that any overseas marketing effort in a highly competitive world market, normally takes time to yield results. Against tough international competition CMC achieved the export business of over US $ 6 millions upto

March 1991 and realised foreign exchange worth Rs.5.05 crores for 87-88 to 89-90 as against the revised plan target of Rs.6.5 crores upto March 1990.

10.2 Contract with TCIL

10.2.1 The Company on 14th May, 1982 signed first Memorandum of Understanding (MoU) with Telecommunications Consultants India Limited (TCIL) (A Government of India Enterprise), for deputing two Computer Experts to TCIL for assisting in the execution of the work undertaken by TCIL with Public Telecommunication Corporation, Yemen Arab Republic. These experts were to work in the area of system consultancy, software development and education and training personnel under the administrative control of the team leader TCIL.

10.2.2 The MoU provided for (a) Payment in equivalent US $ to the Company, all the actual expenses on the personnel in India, for the deputation period including vacation, (b) Payment of 50% of the profit of this project by TCIL, subject to a minimum of US$ 300 per month, per person for the personnel deputed by the Company for their actual stay in Yemen and for vacation earned.

10.2.3 The period of validity of this contract was for three years, to be extended subsequently after mutual consent. Accordingly, two engineers were deputed to Yemen on 4.6.1982 and 19.7.1982 respectively.

10.2.4 The second MoU was signed by the Company with TCIL on 19th January, 1983, for deputing two additional Computer experts on the similar terms except that instead of sharing 50% of profit, TCIL was to pay the Company US$ 450 per month, per person so deputed. Accordingly, two more engineers were deputed to Yemen on 28th January, 1983.

10.2.5 The Company could not complete computerisation of (a) Cable Record and Commercial System and (b) Payroll and Personnel Information System as per schedule and TCIL did not clear the Company's dues amounting to Rs.2.16 lakhs. The dispute resulted in termination of the contract by the Company in November, 1984. Out of Rs.2.16 lakhs due from TCIL, the Company could not recover Rs.1.21 lakhs, which was written off.

10.2.6 The Management stated (June 1990) that the system development work prolonged beyond September, 1983, due to never-ending modifications suggested during development, delay in approval of specifications, etc; resulting in extra costs. As late as in April, 1984, TCIL suggested file conversion from RANDOM to ISAM. This was not agreed to by the Company, as it involved complete redesigning of the system, making infructuous more than one year's strenuous efforts put in on this job. As this problem was not sorted out and the entire dues of the Company were not cleared, it was finally decided in November, 1984 to withdraw from the project.

10.3 **Agreement with PCS, USA**

10.3.1 On 16th June 1980, the Company entered into an informal memorandum of understanding with Professional Consulting Services of Georgia (PCS), USA (for which formal agreement was executed on 18th January, 1983), to provide technical services in the field of highly skilled Computer Systems, Software

Development, Programming, etc; through its qualified personnel as per requirement of M/s.PCS. The monthly charges were fixed for each category of personnel in January 1981. The agreement provided for updating of these charges by mutual consent. The agreement did not indicate the period of validity of the contract though it remained in force till 1985-86. These rates agreed upon in 1981 were not updated.

10.3.2 In all 24 officials were deputed in batches and an amount of US$ 5.25 lakhs was received from PCS during 1981-82 to 1984-85. As PCS was not settling the dues, it was decided by the Company in November, 1984 not to depute any more engineers. An amount of Rs.5.43 lakhs due from PCS was also written off as bad debt in 1987-88.

10.3.3 The Management stated (June, 1990) that no increase in the price was asked for, as they were considered reasonable under the then prevailing market conditions. Further, another compelling reason for termination of the contract was to put an end to the practice of 'body' exports and concentrate on high technology and meaningful application abroad, so as to gain experience, expertise, confidence and credibility.

11. MANPOWER ANALYSIS AND UTILISATION

11.1 General

11.1.1 The particulars of total number of employees, turnover, cost of materials used, value added, expenditure on salaries and other benefits including welfare expenses for six years upto 1990-91 are furnished below:

Table No.XXI

Particulars	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
(i) Total number of employees						
(Average)	1200	1475	1657	1818	2052	2221
(ii)Expenditure on				(Rs. in lakhs)		
salaries, benefits,						
including welfare	598.66	805.28	966.21	1145.42	1604.83	2471.61
(iii)Turnover	4257	6453	7286	10543	12447	14202
(iv)Cost of materials						
equipments, sub-contracting						
system and peripherals	2702	4302	4186	7157	7624	8960
(v)Total value added	1555	2151	3100	3386	4823	5242
(vi)Per employee/per annum :		(In Rupees)				
(a)Average outgo	49888	54595	58311	63004	78208	111283
(b)Turnover	354750	437492	439710	579923	606579	639441
(c)Value added	129583	145831	187085	186249	235039	236019
(vii)Ratio of value						
added to average outgo	2.6	2.7	3.2	3.0	3.0	2.1

11.1.2 It may be seen from the table that the turnover per employee increased from Rs.3.54 lakhs in 1985-86 to Rs.6.39 lakhs in 1990-91 (increase by 81 per cent). The value added per employee, increased from Rs.1.30 lakhs to Rs.2.36 lakhs for the corresponding period (increase by 82 per cent).

11.1.3 The Management stated (June 1990) that per capita value addition was low in comparison with the turnover during this period because the Company, in order to play the role of a total Computer support Company, deliberately went in for execution of turnkey projects where material content was high.

11.1.4 Average earning per employee included about 15 to 22 per cent by way of (1) reimbursement of expenses incurred for (i) defraying cost of medical treatment, (ii) grant of leave travel concession and leave encashment as per rules and (2) incentive and other schemes sanctioned by the Board.

11.1.5 An interesting small family incentive scheme is described below:

From 12th March 1987 small family incentive at 12% of annual basic pay subject to maximum of Rs. 1500 per annum and 9% of annual basic pay subject to maximum of Rs. 1125 per annum is paid to those married staff members, including widows/widowers/divorcees, who have no living children or one living child, and two living children respectively. No incentive is paid to those employees who have more than two living children. This incentive is also paid to the Bachelors/single women above the age of 25 years with effect from 1.1.1989.

11.1.6 On 31.3.1991 the Company had 702 bachelors and 122 single women eligible for this incentive.

11.1.7 The Management stated (June 1990) that one of the national objectives was to promote small families and achieve zero growth levels in population,and Government had been propogating that marriages should be delayed to achieve this vital national objective. The Management took a decision to extend the benefit of small family incentive to single staff members also of the age of 25 and above.

The progressive outlook of the company in this field is commendable.

11.2.1 Composition of Manpower

The following table gives the composition of manpower engaged on various functions ;

Table No.XXII

Composition of man power	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
1)Hardware Engineers	393	391	417	452	547	612
2)Software Engineers	281	366	411	527	636	558
3)Research and Development	171	204	205	228	198	264
4)Manager	42	115	127	145	141	167
5)Marketing	62	90	102	109	108	124
6)Operational staff	81	103	104	112	94	110
7)Management Services	314	336	343	354	453	430
Total	1344	1605	1709	1927	2177	2265

11.2.2 It may be seen from the table that technical personnel constitute a sizeable work force directly engaged on services that generate large portion of the Company's earnings. Thus, effective utilisation of the manhours significantly enhances the earnings. In terms of Manufacturing and other Companies (Auditor's Report) (MACO(AR) order 1988, a service Company, to which category the Company belongs, is required to have a system of allocating manhours utilised to relative jobs. But no system to book the time utilised on jobs, to record idle hours, to ascertain manpower utilised on each contract, etc. is in vogue. There is also no reporting system to Management/Board level in this regard.

11.2.3 The Management stated (June 1990) that idle time generally arises in labour intensive industries or jobs involving low work- skills. However, for a high-tech Company, the concept of idle time was totally out of place and it would be a wasteful exercise and avoidable expenditure to introduce procedures to work out idle hours.

11.2.4 The Audit Board pointed out that the requirement of MACO(AR), 1988, regarding allocation of manhours to relative jobs were not followed by the Company.It also pointed out that CMC had devised a MIS for the Department of Meteorology for ascertaining the utilisation of man hours on computers.The Ministry assured the Audit Board that CMC would introduce the required MIS from 1.4.1992.

11.3 Personnel Policies

11.3.1 The scale of pay of each grade in force in the Company does not indicate the rate of increment and periodicity of increment, in the absence of which, the method of granting annual increments could not be ascertained.

11.3.2 The Management stated (June 1990) that the Company being a service oriented Company, in order to maintain a very high productivity level, increments on salary were given on the basis of merit, performance and potential. No or lower increments were given if the performance was not upto the mark. Therefore, prescribed rates and periodicity of increments had not been incorporated in salary grades and this was also accepted by DOE and BPE from time to time.

11.4 Training of the Personnel

To keep pace with the rapid development of Computer technology, the training opportunities are provided both in India and abroad to its staff for enhancing their professional capabilities. The table below indicates the number of persons sent abroad for training and the expenditure incurred on them for last eight years ending 31st March, 1991.

Table No.XXIII

Year	No.of persons sent abroad for training	Expenditure incurred in foreign currency (Rs.in lakhs)
1983-84	33	20.04
1984-85	57	34.61
1985-86	45	45.04
1986-87	63	78.11
1987-88	67	51.62
1988-89	86	79.59
1989-90	47	37.01
1990-91	23	26.34

11.5 Staff Turnover

11.5.1 During the period of five years ending 1987-88, 557 employees left the organisation, of whom 414 employees belong to technical side such as Field Engineering, System Consultancy/Computer Centre and R&D Group. The average strength of technical divisions during the year 1987-88 was 997 compared to 526 during 1983-84. During this period of five years, the Company had to recruit 865 employees to make-up for the vacancies caused due to the employees leaving the jobs (414) and to augment the strength (451). Thus the ratio of staff turnover (414) to the average strength of technical staff during these five years (756) represented 54.8% which is indicative of a very high rate of staff turnover.

11.5.2 Further analysis of the staff turnover revealed that nearly 70% of the persons who left the organisation had served the Company for less than three years as can be seen from the following details:

Table No.XXIV

Experience	No.of persons left	Percentage to total persons left
Less than 1 year	182	32.6
1 year to 2 years	126	22.6
2 years to 3 years	80	14.4
3 years to 5 years	65	11.7
5 years and above	104	18.7
	557	100.0

11.5.3 A review of this vital aspect of migration of trained manpower is required to be made for taking suitable remedial measures.

11.5.4 The Management stated (June 1990) that in view of the fact that Computer Professionals were in great demand throughout the world, the total staff turnover and the turnover in technical functions was low,which would indicate that the work environment in the Company was congenial. The so called brain drain for the Company was much less than the industry average of 25%.

11.5.5 The Management further replied that their average outgo of 11% per annum compared favourably with the Industry average of 25%. Computation of manpower turnover on the basis of one year's average strength is not correct as the employee recruited should serve at least for five years so that expenditure incurred on him for improving his capabilities can be utilised to the optimum extent. The above table would indicate that on an average 70% of the staff left the Company within three years of their recruitment.

11.5.6 No data has been furnished by the Management in support of industry average of 25%.

12. INVENTORY ANALYSIS

12.1.1 The Company maintains a wide variety of Computer Equipments, which involve heavy expenditure on procurement of spares and maintenance of imported systems. Absence of standardisation and multiplicity of Computer systems entail high spares-inventories. The following table indicates the number of systems under maintenance, inventory holdings, annual consumption, inventory carrying in terms of months of consumption for the last five years ending 31.3.1991.

Table No.XXV

MANUFACTURE	SYSTEM/EQUIPMENT UNDER MAINTENANCE					INVENTORY CONSUMPTION (RUPEESIN LAKHS)					CLOSING STOCK (RUPEES IN LAKHS)					INVENTORY IN TERMS OF NUMBER OF MONTHS CONSUMPTION				
	3/87	3/88	3/89	3/90	3/91	86-87	87-88	88-89	89-90	90-91	3/87	3/88	3/89	3/90	3/91	3/87	3/88	3/89	3/90	3/91
I.IBM System	65	36	31	30	33	25	31	47	83	127	58	42	34	56	90	28	16	9	8	9
II.Non-IBM System																				
i) Burroughs	23	24	32	32	33	29	44	92	96	124	129	132	181	164	194	53	36	24	21	19
ii)Central Data Corporation	4	6	8	9	9	42	52	75	76	48	102	91	107	122	150	29	21	17	19	38
iii)CIL Honeywell Bull	12	12	12	12	13	18	24	33	38	27	72	85	83	91	88	48	43	30	29	39
iv)Digital Equipment Corporation	180	218	296	334	357	72	76	213	184	221	156	193	244	229	275	26	30	14	15	15
v)Hewlett Packard	156	161	185	232	224	36	20	38	42	53	61	66	91	102	99	20	40	29	29	22
vi)International Computers Limited	6	6	6	5	3	11	11	16	16	7	45	45	47	25	26	49	49	35	19	45
vii)PRIME	8	8	10	10	N.A.	1	1	N.A.	N.A.	N.A.	7	11	N.A.	N.A.	N.A.	84	132	N.A.	N.A.	N.A.
viii)ROBOTRON	3	3	2	1	N.A.	1	4	N.A.	N.A.	N.A.	10	17	N.A.	N.A.	N.A.	120	51	N.A.	N.A.	N.A.
ix)UNIVAC	9	9	15	16	17	29	31	68	66	75	83	97	96	103	118	34	38	17	19	19
x) Others	139	174	222	242	282	73	162	199	171	265	247	321	430	543	681	41	24	26	38	31
TOTAL-Non IBM	540	621	788	893	938	312	425	734	689	820	912	1058	1279	1379	1631	35	30	21	24	24
TOTAL	605	657	819	923	971	337	456	781	772	947	970	1100	1313	1435	1721	35	29	20	22	22

Note :*Closing stock includes stores and spares (at cost) before provision for obsolescence and stock in Bonded ware house.

**N.A.:Separate figures are not available but these have been included in others.

12.1.2 The stock of inventories for different systems varied from 8 to 132 months consumption. This was due to accumulation of non-moving stock of spare parts which had in turn resulted in high level of obsolescence. The particulars of inventory not moved for over three years, write-off of stores and spares, and provisions for obsolescence are given below :

Table No.XXVI

Year	Inventories not moved for three years and above	Stores & Spares written off	Provision for obsolescence after writing off stores and spares
	(Rupees in lakhs)		
1983-84	268.00	58.34	15.34
1984-85	83.00	61.87	13.47
1985-86	54.25	68.28	5.19
1986-87	58.00	66.87	8.32
1987-88	55.00	98.73	30.00
1988-89	42.39	42.39	-
1989-90	70.01	70.01	-
1990-91	57.15	55.45	-

12.1.3 During the period 1983-84 to 1990-91, the company had written off surplus/obsolete inventories amounting to Rs. 521.94 lakhs, the realisable scrap value of which was estimated at Rs. 23.64 lakhs. The Company has not so far (November 1991) initiated any action to dispose of this inventory. One of the reasons for the large accumulation of inventories and subsequent write off of some of them due to its obsolescence was that the Company had to extend maintenance support to a variety of imported Computer Systems and the Company was not able to determine the norms for inventory levels, as many of the systems are new for which they had no previous experience and had to rely solely on their best judgement. The contention of the Company does not appear to be correct as, despite gaining experience in maintenance activity during the last 10 years, the Company is not able to anticipate the requirements on rational basis to reduce the level of inventories and incidence of obsolescence.

12.1.4 The Audit Board was concerned about the high inventory holdings of the Company and the consequential write-off every year. The Ministry stated that Company's inventory holdings could be kept to the minimum, provided foreign manufacturers of the imported systems were allowed to keep the spares in bonded warehouse and the CMC could draw the same on payment as and when required.

12.1.5 As regards, non-fixation of norms of inventory holdings, the Ministry assured the Audit Board that CMC would follow from 1.4.1992, the norms indicated by the manufacturer when the computer system was first imported in to India, and in respect of those systems which were already in operation in India, CMC would arrive at a norm taking into account the Indian conditions, lead time involved in procurement of spares,the system failure rate etc.

12.2 C ii HB Spares in Bonded Warehouse

12.2.1 The Company during 1979-80 imported C ii HB spares sufficient for six systems and kept them in the bonded warehouse of the Custom Department. Actual systems imported in the country were only two i.e. one each in 1979-80 and 1981-82. In 1987-88, the Company charged off an amount of Rs.9.72 lakhs being CIF cost of spares lying in the bonded warehouse, the title of which was surrendered to Bombay Customs. The reasons given by the Company are as follows :

(i) These spares were no longer required in view of the fact that these were imported into the country during 1979-80.

(ii) Company's stock holding was sufficient to maintain the two systems under their maintenance.

(iii) By surrendering these obsolete and surplus spares, the Company could save unnecessary payment of customs duty.

12.2.2 When the Company had imported two systems only, and had sufficient spares in stock for maintaining these two systems, the action of the Company to import spares even before importing the balance four Computer systems was imprudent and had resulted in infructuous expenditure in foreign exchange of Rs.9.72 lakhs.

12.2.3 The Management stated (June 1990) that under an agreement concluded (August 1978) with C ii HB, to be in force for a period of four years efrom the date of sale of first Computer system in the country, the supplier would supply alongwith first Computer system in India, an initial kit of spares sufficient to support six systems. This kit of spares was to be given free of charge to the Company provided at least six such systems were purchased by the Indian users during the currency of the agreement. It was also stated that due to insurance nature of these spares, the initial kit would not have been substantially different even if lesser number of systems were to be purchased by Indian users.

12.2.4 When the Company has no control over the purchase of system by Indian users, it was not appropriate for entering into such a contract which resulted in avoidable expenditure.

13.FINANCIAL POSITION

13.1 The table below summarise the financial position of the Company udner broad heandings for the last six years ending 31st March, 1991.

Table No.XXVII

(Rupees in lakhs)

	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
Liabilities						
a) Paid-up Capital	1200.00	1500.00	1500.00	1500.00	1500.00	1515.00
b) Reserves & Surplus	532.76	617.33	763.98	809.66	912.56	572.12
c) Borrowings						
i) From Govt.of India	597.12	783.13	1323.65	1440.17	1613.25	1655.25
ii)From Banks	260.63	114.43	413.07	2816.02	2527.87	1691.67
iii)From Others	38.34	1.62	0.37	0.15	0.15	-
d) Trade dues & current liabilities (including provisions	1313.39	3087.14	2328.42	3466.26	3847.56	7994.88
Total	3942.24	6103.65	6329.49	10032.26	10401.39	13428.92
Assets						
e)Gross Block	1880.31	2322.93	2651.25	3389.01	4198.02	4521.71
f)Less: Depreciation	291.95	398.46	942.23	1283.39	1683.04	2111.15
g)Net Fixed Assets	1588.36	1924.47	1709.02	2105.62	2514.98	2410.56
h) Capital Work-in-progress-	33.31	46.85	307.21	378.48	762.91	
i) Investments	-	-	-	500.00	-	-
j)Current Assets, Loans & Advances	2353.88	4145.87	4573.62	7064.95	7437.54	9826.52
k) Misc.Expenses (Not written off)	--	-	-	54.48	70.39	428.93
Total	3942.24	6103.65	6329.49	10032.26	10401.39	13428.92
Capital Employed	2628.85	3016.51	4001.07	6011.52	6483.44	5005.11
Net Worth	1732.76	2117.33	2263.98	2255.18	2342.17	1658.19

Note : (1)Capital employed represents net fixed assets plus Capital work-in-progress and working capital.

(2)Net worth represents paid-up capital plus reserves and surplus less intangible assets.

13.2 The working results of the Company for the last six years ending 31st March 1991, are tabulated below :

Table No.XXVIII

(Rs. in lakhs)

	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
1)Income from Services	4211.44	6360.78	7172.81	10304.23	12245.12	14099.55
2)Other Revenues	45.58	92.22	113.57	238.93	201.67	102.72
Total	4257.02	6453.00	7286.38	10543.16	12446.79	14202.27
3)Expenditure	4171.91	6348.65	7115.42	10489.12	12181.00	14852.59
4)Profit for the year	85.11	104.35	170.96	54.04	265.79	(-)650.32
5)Add(+)/Less(-) prior period adjustments	(-)12.89	(-)13.41	(+)7.30	(-)42.82	(-)158.13	(-)25.93
6)Net profit before tax	72.22	90.94	178.26	11.22	107.66	(-)676.25
7)Provision for taxation	-	-	35.00	4.18	23.14	-
8)Net profit after tax	72.22	90.94	143.26	7.04	84.52	(-)676.25
9)Dividend	-	-	-	-	-	-
10)Percentage of profit/loss before tax to income	1.70	1.41	2.45	0.11	0.86	(-)4.76
11)Percentage of profit/loss before tax to capital employed	2.75	3.01	4.46	0.19	1.66	(-)13.51
12)Percentage of profit/loss before tax to net worth	4.17	4.30	7.87	0.50	4.60	(-)40.78
13)Percentage of profit/loss before tax to Gross Fixed Assets	3.84	3.92	6.72	0.33	2.56	(-)14.96

13.3 The Company did not pay any dividend to Government during the last six years on its equity investment, which increased from Rs.500 lakhs in 1983-84 to Rs.1515 lakhs in 1990-91.

13.4 The Company's profits in all these years should be viewed in the context of the following:

(i) Conversion of loan (carrying interest of 11.5%) sanctioned for the project INDONET into equity on 31.3.1986 with retrospective effect i.e. 1.4.1984, thereby giving relief of interest burden amounting to Rs.22.68 lakhs for the year 1985-86.

(ii) The unutilised balances of grants at the end of the year 1985-86 to 1987-88 amounted to Rs.8.69 lakhs, Rs.27.72 lakhs and Rs.159.37 lakhs respectively. As these amounts were not operated in separate bank accounts, these amounts were utilised for working capital. The relief of interest for the Company due to these balances worked out to Rs.1.50 lakhs, Rs.0.79 lakh and Rs.15.91 lakhs during the year 1985-86 to 1987-88 respectively. Similarly, the Company partially utilised equity/loans amounted to Rs.2.50 crores out of total amount of Rs.11.95 crores received during 1983-84 to 1987-88 for implementing the projects for setting up R&D Complex at Hyderabad and Office Complex at Bombay for its working capital. This also helped the Company to reduce the interest outgo.

(iii) The Company received moratorium towards payment of interest and repayment of principal during the year 1986-87 and 1987-88 on the loans amounting to Rs.4.45 crores and Rs.3.50 crores respectively. Interest (penal) relief accrued to the Company due to this, works out to Rs.16.43 lakhs and Rs.4.50 lakhs respectively.

(iv) Treatment of expenditure on London Office incurred from 1987-88 to 1988-89 amounting to Rs.54.45 lakhs as deferred revenue expenditure which has resulted in increase of profit by the corresponding amount for the year 1988-89.

(v) The main reason for loss during 1990-91 was provision of Rs. 8.75 crores on account of revision of salaries with effect from 1st January 1987.

13.5 The Management stated that the conversion of loan into equity made as a part of funding mechanism relating to Project INDONET, a development project of national importance.

13.6 Debt equity ratio of the Company was 0.53:1; 0.52:1; 0.58:1; 0.62:1; 0.67:1 and 0.79:1 for the last six years ended March, 1991. The ratio from 1985-86 onwards was less than 1. The Government of India had made an exception in respect of this Company and disbursed more funds for equity capital than loans. This has helped the Company considerably to reduce the interest burden.

14.FINANCIAL MANAGEMENT & INTERNAL AUDIT

14.1 Sundry Debtors

14.1.1 The Seventh Five Year Plan indicated targets for income, expected realisations and outstanding debts for each year. The details regarding the volume of book debts, income receivable from various services, and outstanding debts indicated in the Seventh Five Year Plan and actuals thereagainst are given in the following table :

Table No.XXIX

As on	As per	Total Book Debts: Considered good	Considered doubtful	Total	Income including other revenue	% age debtors to sales	Debtors in terms months Sales
		(Rupees in lakhs)					
31.3.85	Plan	300.00	6.00	306.00	2350.00	13.02	1.56
	Actual	321.50	21.98	343.48	2164.90	15.87	1.90
31.3.86	Plan	375.00	7.00	382.00	3725.00	10.26	1.23
	Actual	544.53	27.58	572.11	4257.02	13.44	1.61
31.3.87	Plan	750.00	8.00	758.00	7925.00	9.56	1.15
	Actual	1130.05	36.21	1166.26	6453.00	18.07	2.17
31.3.88	Plan	1350.00	15.00	1365.00	14725.00	9.27	1.11
	Actual	1707.63	25.96	1733.59	7286.38	23.79	2.86
31.3.89	Plan	2950.00	27.00	2977.00	24250.00	12.28	1.47
	Actual	2008.27	65.85	2074.12	10543.16	19.67	2.36
31.3.90	Plan	3125.00	45.00	3170.00	35000.00	9.06	1.09
	Actual	2673.71	98.01	2791.72	12446.79	22.43	2.69

14.1.2 As can be seen from the above table, the Company could not realise its debts in any year during the Seventh Plan. The book debts as on 31st March, 1990 represented 22% of total income of that year or 2.69 number of months of the Income. If the Company could have realised its book debts quickly during 1987-88 to 1990-91 and maintained its debtors at, say 1.5 months sales, it could have reduced its cash credit for which interest amounting to Rs.22.96 lakhs, Rs.61.45 lakhs Rs.257.51 lakhs and Rs.322.18 lakhs were paid respectively during these years on bank overdrafts.

14.1.3 The analysis given below would reveal that at the end of March, 1991 debts amounting to Rs.13.08 crores, out of Rs.35.71 crores, were outstanding for more than six months.

Table No.XXX

Year	Debts over one year	Debts over six months but less than 12 months	Total debts over six months	Debts due for less than six	Total book debt (considered good) months
		(Rupees in lakhs)			
1983-84	45.20	23.67	68.87	207.31	276.18
1984-85	77.08	0.93	78.01	243.49	321.50
1985-86	91.67	20.82	112.49	432.04	544.53
1986-87	139.36	82.38	221.74	908.31	1130.05
1987-88	445.55	47.83	493.38	1214.25	1707.63
1988-89	480.35	122.64	602.99	1405.27	2008.26
1989-90	698.13	188.84	886.97	1806.74	2693.71
1990-91	1163.47	144.43	1307.90	2262.62	3570.52

14.1.4 The Management should evolve a system of periodic monitoring of outstanding dues and investigate circumstances under which these dues got accumulated to evolve an adequate system for recovery of outstanding dues.

14.1.5 When the Audit Board pointed out that the position of Sundry Debtors needs improvement, the Ministry agreed to take necessary action in that regard. They added that the majority of debtors were Government Departments.

14.1.6 During the year 1987-88, an amount of Rs.29.21 lakhs was written off by the Board as bad debts accepting reasons attributed by the Management for write off. The reasons of some of the cases were as follows :

	Amount (Rupees in lakhs)
(i) Customer disputing services	5.38
(ii) Dispute about the period of service	2.39
(iii)Wrong billing	2.25
(iv)Machine not working and no mainteiance calls	1.64
(v)Ill health of Company	1.34

14.1.7 The reasons (i) and (ii) given above indicate failure on the part of the Company to maintain proper records of their maintenance activity. Reasons given at (iii) and (iv) above indicate lack of effective system of billing of customers.

14.1.8 The Management stated (June 1990) that the amounts were written off due to various reasons viz. (i) since the bills were raised in advance, whenever there was more than reasonable break-down of the computer system under maintenance, claims for excessive break down were made later (ii) The customer's letters regarding discontinuance of maintenance service were either not received at all or received after considerable delay. Management further stated that In future credit notes would be issued to customers in cases of excess or wrong billing, and, as monthly maintenance charges were mostly computerised, the possibility of wrong billing would be minimised.

14.1.9 A case which was not specifically reported to the Board giving reasons for write off, except indicating that the debts were persued but were irrecoverable, is indicated below :

14.1.10 M/s. Burn Standard Company Limited

(i) For the services rendered to M/s. Burn Standard Company Limited, the Company raised bills on the customer during 1983 to 1985 amounting to Rs.2.97 lakhs. The Company did not receive any payment from the customer except an advance of Rs.0.33 lakhs. The Company could not pursue the clearance of bills of the customer due to non-availability of relevant papers and documents, resulting in write off of outstanding amount of Rs.2.64 lakhs.

14.1.11 The Management stated (June 1990) that when the jobs were in the advanced stage of completion, there was change in Burn Standard's Management, resulting in miscommunication between the old and new officials. In the absence of written system specifications, the concerned new officials did not certify the jobs to the extent completed.

14.2 Internal Audit

14.2.1 The Company has introduced internal audit system from 1978-79 and the internal audit was done by the Company's own staff till 1988-89. From 1990-91 the Company has entrusted the internal audit work to a firm of Chartered Accountants on an experimental basis.

14.2.2 Though the Company has prepared an internal audit manual, the same has not so far been submitted to the Board for approval.

14.3 Accounting Manual

14.3.1 The need to prepare an Accounting Manual containing the financial and accounting procedures prescribed from time to time by rules, regulations or procedures has been emphasised in various circulars issued by the BPE. In September 1968, the BPE stated that Government attached great importance to this matter and that those undertaking which have so far not prepared the Accounting Manual should do so at an early date.

14.3.2 The accounting manual of the Company is still in draft stage (November 1991).

14.4 Cost Accounting

14.4.1 BPE emphasised the need for setting up an efficient cost accounting unit in every Government Company. The Company does not have any cost accounting unit nor developed any cost accounting system, for collection of cost for various activities/jobs undertaken by the Company and to ascertain profitability or otherwise of each job/activity.

14.4.2 The Ministry stated (November 1991) that CMC being a service organisation, its services were priced on man-month basis. Bought out items/materials etc. were booked project wise and other expenses like salaries, rent etc. were distributed and covered by manpower cost per month. Under the existing system, the Company had not been able to apportion costs to its activities on an entirely scientific basis. However, CMC had been asked to workout the costs.

14.5 Management Information System

14.5.1 Appointment of Financial Consultant

The Company in April 1979, appointed M/s. Y.S.Tayal & Co., as financial consultant on assignment basis on payment of charges at Rs.400/- to Rs.1000/-per day to advise on all intricate financial matters including preparation of formats for management reporting, internal audit procedures, finance and accounting controls on various matters etc. However, the appointment of M/s Tayal & Co. was made without following the BPE's prescribed procedure viz. by inviting open tenders.

14.5.2 The Consultant was paid fees of Rs.2.97 lakhs for 407days of Consultancy Services during September 1978 to December 1986. In addition, expenditure of Rs.0.89 lakh was also incurred towards air fare, hotel stay etc. during this period. No report on Consultancy Services was submitted by the Consultant.

14.5.3 The Management stated (June 1990) that the Board kept in view the BPE guidelines of 4.5.1977, and open tenders were not invited as the Chartered Accountants were prohibited from canvassing and competing on assignments as a part of professional ethics. The benefits accrued to the Company on the advice of the Consultant were in the matters of taxation, inventory control etc. The report by the Consultant on any intricate financial matters on which his advice had been sought was not made available to audit.

14.5.4 When the Company had stated that open tenders were not invited as the Chartered Accountants were prohibited from canvassing and competing on assignments, it was not understood, how the Company had invited limited quotations from various Chartered Accountants while finalising (September 1990) the firms for the internal audit assignment of the Company for the year 1990-91.

14.6 Financial/Accounting System

Accepting the recommendations of the Committee on Public Undertakings in its 15th Report (4th Lok Sabha -September 1968) on Financial Management in Public Undertakings, the BPE issued broad guidelines which inter-alia stated that the Board of a Government Company should lay down detailed powers and functions of the financial heads, particularly in regard to (a) matters to be reserved for the concurrence of the Financial Advisor (b) the matters on which he should be consulted and (c) the matters on which he need not be consulted. The Company has not laid down any guidelines for the financial head of the Company viz.Executive Director (Finance).

P.K. Sarkar

(P.K.SARKAR)

New Delhi **Deputy Comptroller and Auditor General**
The 28 APR 1992 **(Commercial)-cum-Chairman,Audit Board**

Countersigned

(C.G.SOMIAH)

New Delhi **Comptroller and Auditor General of India**

The 28 APR 1992

(Referred to in Para 9.1.5)

Projects undertaken under Research & Development Activities.

1. System Integration Project. To integrate an optimum medium large computer system with the processor and peripherals from various sources.
2. Add-on memory for EC-1030 system. To design and provide indigenously additional memory to EC-1030 computer system.
3. Enhancement to computer system with Line Printer and Card Reader add-on.
4. Enhancement to computers with disk and console sub-system add-on.
5. IBM 1401 enhancement project- to provide a faster processor with a larger memory and additional instruction set, keeping the same peripheral.
6. Add-on memory for EC-1040 computer system. To design and provide indigenously additional memory to EC-1040 computer system.
7. Input/output controllers for low speed peripherals such as card reader and line printer.
8. Computer enhancements with indigenous communicat-ion terminus.
9. Development of IBM 1401 simulator programme on R-1040 computer system.
10. Development of application software for gross industry application packages.
11. Enhancement ofIBM 1620 computer system. To design and develop enhancement logic and interface hardware to attach a line printer.
12. Evaluation of Robotron Card Punch and verifier Model I.
13. Evaluation of Hindustan Teleprinter High Speed paper tape reader.
14. Evaluation of Robotron Card punch and verifier Model II.
15. Enhacement of Card Reader speed of IBM 447 Electronic Accounting Machine.
16. Enhacement of IBM 024 card punch to enable it to become 64 character machine from 48 character machine.
17. Design and development to replace obsolete assemblies in IBM unit redcord machines with indigenously available components.
18. Development of parts used in computer system.
19. Development of logic card test equipment.
20. Application software development on LSI-II Computer System.
21. 1620 Memory Enhacement.
22. 024/056 Logic in TTL/CMOS.
23. IBM Unit Record Machine replacement study.
24. Info Scriber
25. Special keyboards for Indian languages.

26. LSI-11 based online enquiry system directory enquiry etc.
27. Medical erquipment based on micro-processors.
28. New Products like fibre optics special printers,bubbles etc.
29. Evaluation of I/D's.
30. PCB Card Repair Project.
31. Development of maintenance technique, diagnostic test equipment for effective maintenance.
32. Mini based system for RJE and Data Entry.
33. Graphic sub system.
34. Data based application packages.
35. Interactive Data Communication application packages.
36. Special application packages.
37. Image sub system.
38. Development of interactive work station.
39. Development of Computer System using mini computer network.
40. Hybrid system integration.
41. Floppy disc interface to IBM 1401 system. To design and develop a floppy disc interface to IBM 1401 system.
42. Development of COBOL compiler for enhancement of IBM 1401 processor.
43. Teleprinter interface job unit for mini computer.
44. Message switching system with micro processors.
45. Processcontrol application with micro processors.
46. Communication application with micro processors and mini systems.

[illegible] based online [illegible] system directory enquiry etc.
17. Medical equipment based on microprocessors.
18. [illegible] products [illegible] fibre [illegible]
[illegible]
19. Evaluation of [illegible]
20. PCB Card repair project.
21. [illegible] of [illegible] diagnostic [illegible] [illegible] maintenance.
22. [illegible] based system for [illegible] and [illegible]
23. [illegible] system
24. Data base [illegible]
25. [illegible] Data [illegible] [illegible]
[illegible]
26. [illegible]
27. [illegible]
[illegible]
[illegible] software.
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[illegible] [illegible] design [illegible] [illegible]
[illegible] system.
[illegible]
[illegible]
[illegible] computer.
[illegible]
[illegible]
[illegible] application [illegible]
[illegible]
[illegible] application [illegible] micro
processors [illegible] systems.

ERRATA

Page No.	Reference	For	Read
2	4th line from bottom	activites	activities
5	15th line from bottom	due for repayment	outstanding
6	21st line	Projecets	Projects
29	8th line from bottom	dintinguish	distinguish
33	10th line from bottom	benefitted	benefited
36	11th line from bottom	Commputer	Computer
37	4th line from bottom	Devember	December
50	12th line from bottom	Transiliteration	Transliteration
54	Table no.XX	(c) Turnkey contact 205.18	(c) Turnkey contract
54	Table no.XX (c)Turnkey contract	-	Figure for 1990-91 may be read as Rs.205.18 lakhs
70	3rd line	efrom	from
71	3rd line	heandings	headings
71	Table No.XXVII	Figures for (h) capital work-in-Progress	

Year	For	Read
1985-86	33.31	-
1986-87	46.85	33.31
1987-88	307.21	46.85
1988-89	378.48	307.21
1989-90	762.91	378.48
1990-91		762.91

Page No.	Reference	For	Read
76	Headings in No.XXX	- Debts due for less than six	Debts due for less than six months
		- Total book debt (considered good) months	Total book debts (considered good)
77	19th line	mainteiance	maintenance
78	8th line	persued	pursued