

**HUMAN RESOURCES IN THE
ELECTRONICS INDUSTRY:
A CASE STUDY OF BANGALORE**

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Introduction:

Education has become an important area of interest to economists since empirical investigations revealed that output of goods and services had grown rapidly than the quantity of inputs (labor and capital) used to produce it. This difference in the values of input and output known as 'residual' was attributed to advances in knowledge, education of the labor force etc., The attempts for estimating the effect of each potential source of residual including education were initiated in some of the studies. All such studies resulted in the dawn of a new branch of economics in the form of 'Economics of Education'. T.W. Schultz considered being the pioneer in the field of economics of education was responsible for the current thinking on issues related to economics of education. In the latter years this thinking process came to be known as 'human capital revolution in economic thought'. Studies in the developed and developing countries have established a positive relationship between person's earnings and the amount of formal schooling received. (Becker, 1962 Schultz, 1963). Reviews of studies on cost benefit analysis in education have shown that benefits exceed the rate of return to physical capital. Rate of return to primary education is generally higher than the rate of return to secondary education. (Psacharopoulos 1969)

These developments in the domain of economic science have highlighted the importance of educated manpower for any economy in general and the type of industry where such manpower is located in particular. The human capital analysis was stimulated by concern for poverty, economic development, income distribution and the like. The analysis is also connected to human resource development and use of quantifiable base for decision-making process.

Statement of the Problem:

The assumption behind the human capital theory is that there is direct relationship between education and productivity. Skills and knowledge possessed by people are the resources, which generate stream of earnings in the future. Skills and abilities will be obtained through investments in activities like education, health care, proper nutritional intake etc., Increased returns to education also steps up the demand for education., The demand and supply of educated manpower depends on size of the population in a given economy, density in a given region and the economic status.

As against this, the actual utilization depends on consumer perception and preferences, acceptability and cost and of course the supply of educated manpower. In India it is quite evident from the statistics of unemployment that colleges and universities are over producing educated people to the point where our economy is no longer in a position to absorb and employ educated labor at

respective levels of earnings and job responsibility. The subsidization of education coupled with enhanced private rates of returns for education has stimulated the demand for education. In contrast to this the rate of growth of modern sector is not in tune with the increase in supply of human resource. This has resulted in the escalation of minimum levels of education required for job access, which has further enhanced the demand for higher education.

As a result of oversupply of educated labor, those university graduates who fail to find a job corresponding to their education and training will settle for less ambitious openings which require lesser qualifications. As a result of this 'over qualification' employees raise the minimum educational qualification required to fill vacancies to screen the less educated applicants. This again leads to a rush for more academic credentials to maximize their chance of getting a job. Thus as higher levels of education is considered important for getting jobs, there would be decrease in the use of the knowledge gained by these additional qualifications. In other words it may result in mal utilization of the qualification once the work is found. Jafri (1978) while assessing the manpower situation in the industry and estimating the need for human resource in future reveals that there was under utilization of human resources between and within the industries.

Objectives:

The above discussion raises many questions, which need careful examination. Need is specially felt to address issues like,

- Can education really help in getting the right job?
- Are the schools and universities are producing the human resource to provide employers with a 'finished product'?
- Is the composition of the output of the education system matching the requirements of the production sectors?

A careful understanding of the needs of nation's work force can be made, by considering the trends in the educational attainments of workers. The present study makes a modest attempt to investigate and analyze the educational attainments of the workers in the Electronics industry. In this background the study would examine the following objectives.

1. What is the educational background of the workers in the Electronics Industry (EI)?
2. What is occupational structure of the workers in the EI.?
3. What is the hiring policy of the firms?
4. What are the educational requirements and the attainments of the work force in the EI ?
5. What is the rate of return of various levels of workers in the EI?
6. Is there optimum utilization of human resources in the EI?

Methodology and Sample:

In view of the fact that the EI is considered to be the fastest growing one, the study has chosen this industry for detailed investigation. This industry is also likely to affect all other sectors with widespread technical changes. The new millennium is likely to be dominated by this industry with a multiplicity of products.

The survey for collecting the primary data would be confined to firms in Bangalore region. The reason for choosing Bangalore is that it is considered as an 'Electronics City'. The turn over of the firm would be taken as criteria for selection of sample units for a detailed investigation. A list of firms of electronics industry was prepared for the Bangalore region. Firms with more than rupees one crore were selected for the purpose of data collection. Sample units were chosen based on the circulatory sampling method. A detailed list of firms is presented in the appendix.

Separate instruments were prepared for data collection from the firms and the employees. The questions were formulated in such a way as to get information about the kind of products produced, capital invested, number of employees, recruitment procedures and the like from the firms. The employees schedule sought information about the educational background of the people working in the firm, their present salary, their cost of education, asset holdings of the family, on the job training, previous experience etc.,

Indian Electronics Industry: An Overview

Indian electronics industry has tremendous potential to be come an engine of growth and productivity improvement for all sectors of the economy and for the country. With the continued thrust on liberalization, in order to make IT products cost effective and price competitive, the use and penetration of computers in the society is fast expanding with special emphasis on multi-lingual technologies. Investment in knowledge based industries will determine a country's dominance in the present century. The software industry has emerged as one of the fastest growing sectors in the economy with a Compound Annual Growth Rate (CAGR) exceeding 50% over the last five years and with a likely turnover of US\$ 6 billion and exports of US\$ 4 billion during 1999-2000. The Government has targeted an export of US \$ 50 billion by the year 2008 for the Indian software industry.

Electronics Production

The Indian electronics industry production is estimated to be Rs. 51,950 crores during the year 1999-2000, as compared to Rs. 41,140 crores during 1998-99, and thus registering a growth of about 26%. Consumer electronics sector has achieved a production level of Rs. 11,200 crores during 1999-2000. Color TV industry continued to witness phenomenal growth and has crossed a production of 57 lakhs nos. during the year 1999-2000.

Policy Measures

To accelerate exports in Electronics and Information Technology sector, a number of policy measures were taken and procedures further simplified. As a major step to promote manufacture of electronics hardware, Domestic Tariff Area (DTA) sales upto 50% of the FOB value of exports has been permitted for electronics hardware under Export Oriented Units (EOU) Export Promotion Zones (EPZ) schemes. The electronics and software units have been given an option to apply for EPCG license to the competent authority on the basis of self-declaration regarding the nexus between the capital goods to be imported with the items to be exported. In order to provide single window clearances and approvals, powers of approval of the Designated Officers of Ministry of Information Technology for implementation of STP/EHTP schemes have been further enhanced. Applications for setting up STP/EHTP units involving import of capital goods upto US\$ 10 million can be approved by the Designated Officers. The value limit on free import of computer systems, including personal computers has been removed.

Tax Policy

The salient features of the Tax Policy as applicable to the electronics sector are many. For example, foreign investment of up to 100% is permitted in units set up solely for exports. Service tax from computer software is exempted. Exporters of entertainment software extended income tax exemption under Section 80 HHH. Provision for

issue of Sweat Equity by companies has been introduced in the Companies' Amendment) Act, 1999. The customs duty on raw materials for the manufacture of electronic components rationalized, @ 5% on 121 items, 15% on 7 items and 25% on 4 items. The customs duty on chemicals, plastics, metals and non-ferrous metals varies from 25 to 35%. The customs duty on capital goods for the manufacture of semi-conductors devices reduced to zero% on listed items. Customs duty on electronic components in general is @15%.The Central excise duty on most of electronic goods rationalized @ 16% and a number of items such as radios, two-in-ones, amplifiers, clocks/ watches, calculators, pagers, cellular phones, telephone sets, etc., included under a different attractive scheme.

Export Processing Zones and 100 % Export Oriented Units

The Government has established Free trade Zones or Export Processing Zones. These zones provide internationally competitive infrastructure facilities, duty free imports of capital goods, raw-materials, components and other inputs, tax holidays against export and access to the domestic market. 100 % Export Oriented Units can be set up under any of the schemes, viz., Electronics Hardware Technology Park (EHTP), Software Technology Park (STP), Export Processing Zone (EPZ) and 100% Export Oriented Units (EOU) and all the incentives available to units in EPZs are applicable to these units. To induce more investment for R&D activities, a weighted deduction of 125% has been provided on the sums paid to any

university, college or an institution or a scientific research association for the purposes of scientific, social or statistical research.

Production Profile

Consumer electronics sector continues to consolidate its production base and is likely to achieve a production level of Rs. 11,200 crores during 1999-2000, thus achieving a growth rate of 22 per cent. Color TV industry has witnessed phenomenal growth during the year and is likely to cross a production of 57 lakhs during the year. The component industry, specially related to color TV improved their performance during the year. The production of CPTs is showing substantial growth and production is likely to be around 49 lakhs during the year 1999-2000. The production in computer and instrumentation industry is witnessing negative growth. However, the sale of personal computers has increased substantially, estimated to be over 11 lakhs in numbers. Prices of colour TV and computers have also come down in consonance with the worldwide trend. The strategic electronics sector is showing a growth of about 12 percent. In export as well as domestic sector, computer software remains a thrust area and the fastest growing sector. Software export has jumped to Rs. 17,000 crores during 1999-2000, from Rs. 10,940 crores during 1998-99, a growth rate of over 55%. Domestic Software Industry is likely to go up to Rs. 7,300 crores during 1999-2000 from Rs. 4,900 crores during 1998-99. During the year 1999-2000, computer software industry has witnessed a growth of 53% and hardware

industry 10%. While Software is doing well in the country, there is a problem in hardware production. It may be attributed to:

- * Distorted Tariff Structure: Customs duty, in general, rationalized to 5 slab rates and peak rate reduced to 35%, special additional duty at 4% continues, special customs duty at 5% abolished, surcharge at 10% levied on all imports except on items bound by GATT.
- * Poor Infrastructure: Basic infrastructure in terms of facilities, power supply and other hardware facilities are poor to support the growth of this vital industry.
- * High Cost of Finance: In view of growing competition and dwindling profit margins the cost of money seems to be higher for the units engaged in this industry.

Very low investment is taking place in Hardware Industry and foreign investment is going to Taiwan, China, Brazil, Malaysia, etc. The production and growth trends during last 5 year have been as follows:

Year	Production	Growth (%)
1995-96	22,340	18.6
1996-97	26,640	19.2
1997-98	32,070	20.4
1998-99	41,140	28.3
1999-2000	51,950	26.3

Consumer Electronics

The consumer electronics industry has achieved a production of Rs. 11,200 crores in 1999-2000, registering a growth of 22%. The colour television industry continued to lead the growth reaching a level of 57 Lakh sets in the year 1999-2000. During the year four units have crossed 0.5 million sales mark. Consumer prices of CTV sets were further reduced with major cuts in the prices of sets with screen sizes of 25 inch and above. As a result the large screen size segment witnessed sizeable growth. Some companies have also introduced flat screen TV in 21le, 25le and 29l. segment. After stagnating for almost four years the B/W TV industry has shown a growth of 10% during the year. In audio segment, the limelight was on the music systems market. Price reduction, attractive promotional schemes, more features especially the DSP based multi- channel sound marked the growth in this category. Almost all the music systems incorporate a CD-player. The product range spans from micro to premium high-end audio systems. The large number of titles being made available on CD at affordable prices is supporting this growth. The CD-audio

production is estimated to have increased to over 250 lakh nos. The tape recorder industry also registered a growth of 35% increasing to 140 lakh nos. Resurgence of microwave oven market was another key element in the growth of consumer electronic sector. The total number of microwave ovens sold during the year are estimated to be 1,20,000 nos. With the convergence of Computers, Communication, Consumer electronics technologies dictating the product design, functions and features, the major companies in consumer electronics industry have taken an initiative in offering digital consumer electronics products. DVDs, digital cameras, DSP based audio products, Internet TV/STB have been introduced in the market. With establishment of another major Indian brand in the electronic clock market, the clock industry registered a 35% growth. The electronics watch segment is witnessing an intense competition in the low price segment. Following table gives the production of major consumer electronics products.

**Production of Major Consumer Electronics Products in India
(Production in Lakhs Nos.)**

Item	1997-98	1998-99	1999-2000
B&W	60	60	58
CTV	34	44	57
Radio Receiver	70	70	70
Tape Recorder & Combinations	88	105	140
VCRs/VCPs	3.7	3.7	3.9
Electronic Watch	95	135	170
Electronic Clocks	195	210	260

Source : Ministry of Information Technology Government of India.

Electronic Components

The consumer electronics sector in general and the CTV industry in particular continued to be the growth engine for electronic component industry. The impressive and sustained growth in CTV industry helped the CPT industry to achieve growth of around 33% in quantitative terms during the year. The production of CPTs is expected to be around 49 lakhs in number, up from 36.9 lakhs in 1998-99. There was no significant change in other component sectors. There was no investment flow in the area of surface mount components, display devices, micro-electronic, opto-electronic devices, etc. The components for telecom and computer sector continued to be imported in the form of sub-assemblies. Also no manufacturing base exists for the modern components. The developments like taking over of the largest PCB plant by a foreign company, acquisition of a connector plant by another MNC, and increase in foreign equity in the existing component plants, etc., indicates the sign of restructuring in the Indian electronic component sector. The industry associations/forums related with components have been taking steps to attract investment in component sector through various means like organizing seminars/ exhibitions/ workshops, sector specific inter-action with equipment manufacturers, etc. Prices of components continued to fall due to availability of cheaper imported components. As a result, the profit margin of component manufacturers continued to be under pressure.

Computers

Indian Information Technology (IT) industry revolution depends on four movements of hardware, software, service and training sectors. It is imperative that all these sectors grow simultaneously and equally. IT sector has been the fastest growing segment of the Indian industry as well as exports. The production during the year is expected to be Rs. 2,000 crores. The items of manufacture include personal computers, servers, workstations, supercomputers, data processing equipment and peripherals like monitors, keyboards, disk drives, printers, plotters, digitizers, SMPS, modems, networking products and add-on cards. The bulk production was in PII and PIII based PCs. Ink-jet printers have been the most popular printers this year. It is proposed to increase the PC penetration from the present level of 3.43 per thousand to 20 per thousand by the year 2008. The PC production in India is expected to be around 4 lakh units during the year against an estimated demand of 14 lakhs. The domestic demand is expected to increase to 20 lakh units by the year 2000-01. PC production has grown strongly. Prices have also come down in consonance with the worldwide trend. It is a well known fact that use of computers increases the productivity of any organization. Thus the application have witnessed in the areas of Banking, Financial services, Trade and commerce, Health, Governance, Public services and utilities etc. More and more On Line Transaction Processing (OLTP) are being introduced in the country. Small Office Home Office (SOHO) sector is emerging very fast.

Computer Software

The Indian Software Industry has been doing consistently well during last few years recording an annual average growth rate of above 50%. The size of the industry is likely to grow from Rs.15,890 crores in 1998-99 to Rs. 24,300 crores in 1999-2000. Software exports from the country continued to grow and are likely to be Rs. 17,000 crores in 1999-2000 from Rs.10,940 crores in 1998-99, a growth of over 55%. Domestic software is also likely to grow from Rs.4,900 crores in 1998-99 to Rs. 7,300 crores in 1999-2000. The Indian software industry has already established its credentials in providing high quality solutions to the world. The capability of Indian Software industry is reflected in the very high market capitalization. Government is supplementing the efforts of the Indian software industry by providing right policy environment and infrastructure for its growth. The availability of high-speed data-communication for software has been greatly enhanced. Government has accepted IT Task Force recommendations with regards to the software sector and has gone ahead in implementing the same. A target of software export of US\$ 50 billion by the year 2008 has been set especially to small and medium software exporters has been established.

Communication and Broadcasting Sector

The thrust areas covered in this sector are non-public network telecom industry, Wireless Communication, user specific transmission, switching and terminal equipment. The Broadcasting sector broadly covers digital broadcasting of audio & video,

broadband access, digital compression, digital storage and retrieval, hard disc based and optical technologies. The production of communication and broadcasting equipment during 1999-2000 is estimated to be of the order of Rs. 4,800 crores, as compared to production of Rs. 4,400 crores in 1998-99. With the announcement of New Telecom Policy 99 (NTP), the opportunities in the area of communication and broadcasting are expected to grow rapidly in the country. Internet Service Providers (ISP) licenses have been given to private sectors which will boost Internet and Information Technology. Private investments in telecom sector in value added and basic services are welcome. Cellular radio, paging services and ISDN exchanges have been established in major cities in the country. This sector is expected to experience substantial investment in coming years with the entry of more entrepreneurs in Basic Telecom, Mobile Satellite Communication services, Digital and several other Value Added Services.

It follows from the discussion that the Indian electronics industry has made considerable stride in the recent years. Its contribution in terms of export earnings, attracting domestic and foreign investments and provision of employment are noteworthy. The employment generated from this industry is as below.

Employment Generation

Software Sector -	2.2 million
Hardware Sector	
Direct Employment -	1.6 million
Indirect Employment -	3.2 million
Total Employment	
Generation -	7.0 million

One may conclude from this that in the years to come this industry will dominate the economy with its deep-rooted growth prospects.

Electronics Industry in Karnataka

Karnataka currently enjoys a thriving electronics industry. It is mostly concentrated in and around Bangalore, of late, other parts of Karnataka have also seen a growth in IT related activity. Some recent developments regarding the industry in Karnataka are described below.

In 1992 Bangalore was the first city in India where a satellite earth station was set up for high speed communication services to facilitate software exports. Subsequently, in 1999 STPI established earth stations in Mysore and Manipal. The state made a giant forward leap in the Information Technology sector when Union Minister for IT Mr. Pramod Mahajan inaugurated the country's first

'extended facility' of the international gateway and network operations center at the Software Technology Parks of India (STPI) in the Electronics City. In August 2000, a Cyber Park - Technology Incubation Centre, another first of its kind, was set up in Bangalore to promote the growth of the IT sector. The Karnataka State Government has formulated the Information Technology Policy that gives a thrust to the Information Technology sector and encourages units to set-up their operations in the state of Karnataka. Under this policy, several infrastructural facilities are proposed in Mysore, Hubli, Manipal and Mangalore apart from Bangalore to help the development of the IT industry. The facilities include providing training to engineers and others as well as providing employment opportunities. The setting up of IT industries under this policy will help earn valuable foreign exchange through software exports. It also will help in increasing the tax base of the state.

Software Technology Parks of Karnataka

Software Technology Park of Karnataka, a registered society will implement the IT development policy across the state of Karnataka. STPs have been set up in Mysore, and Manipal while Hubli and Mangalore have been identified for future development. Companies registered under the Software Technology Park (STP) scheme obtain several benefits including those mentioned below: Single window government clearance; 100% foreign equity permitted; Complete duty free import; No corporate income tax till 2010;

Dedicated data communication links; and Custom bonding and export certification provided at single point.

Software Exports from Karnataka

Karnataka's software industry has shown a steady and high growth rate in comparison with other states in the country. Karnataka leads among the major centers in India with the highest growth of software exports in 2000-01 with US \$1.58 billion.

Software exports from Karnataka during the year 2000-2001 touched Rs. 7,475 crore (US \$1.58 billion), surpassing the targeted figure of Rs. 6,400 crore by over Rs. 1,000 crore. The exports during previous fiscal were Rs. 4,321 crore. The growth rate in exports during the year doubled to 72 percent from 35 percent achieved last year. During 1998-99, software exports from the state were a mere Rs. 3,200 crore.

The growth from Software Technology Parks of India, Bangalore unit , is highest among all the STPI units in the country. (Times of India Report) According to the report, while two companies have achieved exports worth over Rs. 1,000 crores, 13 companies exported software worth over Rs.100 crore and a total of 66 companies did exports between Rs. 10 and Rs. 100 crore. Infosys Technologies, Wipro, TCS, Digital Equipments and i-flex formed the top five exporters from the state. Naidu projected that the software exports

from the state would touch Rs. 11,000 crore next year and would cross Rs17,000 crore by 2003 Availability of talent and early presence of the industry; proactive state government; and the right mix of cooperation among the industry, academia, and financial institutions are the main reasons for the success of the software industry, says the report. During the year under review, a total of 165 new companies were registered, taking the overall total number of companies to 928. Thirty four percent of the new companies came up with 100 percent foreign equity. However, there has been a fall in number of new companies in the year from 497 new companies registered during the previous year. Of the 497, only 319 companies became operational and as many as 178 companies are still to commence operations. On the hardware front also, the state registered impressive growth of 82 percent with exports worth Rs. 357 crore coming in the year as against Rs.196 crore achieved during 1999-2000. The top five hardware exporters were Wipro GE Medical Systems, Hical Magnetics, Tyco Electronics, TVS Electronics and Bharat Electronics Limited. The software industry had attracted an investment of Rs. 923 crore during the year, with over 50 percent coming in the form of foreign equity. Lucent, Dell, Huawei are some of the companies which made substantial investments. The Manipal/Mangalore centre of the STPI showed over 100 percent growth with exports zooming from Rs.76 crore in 1999-2000 to Rs. 176 crore in 2000-2001. The number of companies grew four-fold from three to 12. In line with its expansion plan, the STPI would make operational the high-speed data (HSD) communication facility at its Hubli centre. The HSD

communication facility, coming up at Mangalore in the form of F3 Earth Station, will be made operational by October 1.

The Future of the IT Industry in Karnataka

The future plans of the IT industry in Karnataka include the following:

- Establishment of IT backbone;
- Further development of the industry in secondary cities besides Bangalore;
- Development of high speed data communications facilities at Hubli and Mangalore;
- Promotion of private IT Parks;
- Planning of an IT Corridor from the International Technology Park Ltd. in Whitefield to Electronics City; and
- Achieving a software exports target of Rs. 11000 crores (US \$2.34 billion) in 2001-2002 and Rs. 17000 crores (US \$3.5 billion) by 2002-2003.

IT Industry in Bangalore

- 1984 - Texas Instruments enters India for offshore development.
- 1986 - DoE announces software policy.
- 1991 - Software Technology Parks of India (STPI) is set up
- 1992 - Exclusive satellite international gateway for export industry is set up.

- 1997 - Govt. of Karnataka announces IT Policy and Karnataka becomes the first state in India to do so.
- 1998 - Number of IT companies grows to 253, with total projects worth US \$840 Million.
- 1999 - Indian Institute of Information Technology, Bangalore (IIITB) and the KITVEN FUND are established.
- 2000 - Number of IT companies grows to 782, with total projects worth US \$1.1 Billion.
- 2001 - Number of IT companies grows to 928, with total projects worth US \$1.6 Billion.

IT Companies in Bangalore

There are more than 100 multinational companies in Bangalore. Take a look at a [list of some multinational companies](#) that have set up operations in Bangalore.

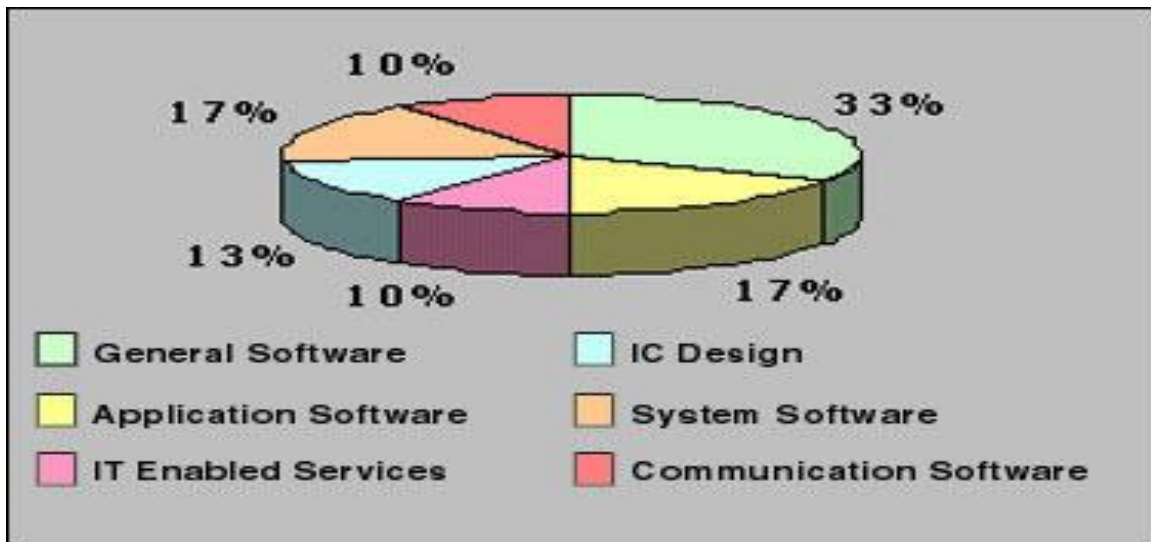
In the year 2001 Bangalore has seen a cumulative investment of around US\$1.3 billion in the software industry. About 165 new software industries have been established and the total number of software professionals is about 80,000. Get details about the [IT companies](#) that are located in Bangalore.

Industry Composition

Below is a break up of the number of IT companies in Bangalore classified by type of activity.

- Integrated Circuit design (IC) - 46
- Communication software - 108
- Systems software - 166
- Application software - 293
- Service companies - 303

The IT industry's composition in Bangalore shown in the diagram below indicates that a large percentage of the companies is involved in high technology software development.



Here's an overview of the industry's composition in the years 1999-2001 in terms of the value in US dollars.

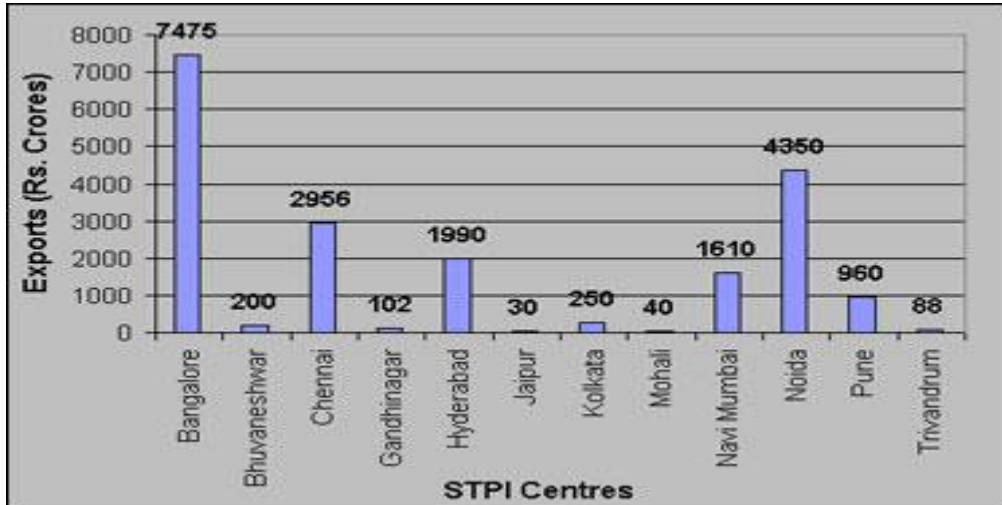
Value in US\$ Million	1999-2000 No. of Companies	2000-01 No. of Companies
Above US \$200M	Nil	2
Between US \$20M-200M	6	13
Between US \$2M-20M	51	66
Less than US \$2M	100	189
Less than US \$0.5M	277	212

Software Exports from Bangalore

Bangalore has a strong base in VLSI, Telecom and other high technology services. Growth in software exports has been 73% during the year 2000-01. Below are the details about the growth of software exports from Bangalore.

Year	No. of	Rs.
	Companies	in Crores
1991-92	13	5.6
1992-93	29	20.6
1993-94	53	90
1994-95	79	200
1995-96	125	480
1996-97	163	980
1997-98	207	1700
1998-99	267	3200
1999-00	782	4321
2000-01	928	7475
2001-02	938	not available

The graph below shows the growth of software exports from Bangalore in comparison with other cities in India.



Top Ten Software Exporters for the Year 2000-01

1. Infosys Technologies Ltd.
2. Wipro Ltd.
3. Tata Consultancy Services Ltd.
4. Digital Equipment India Ltd.
5. I-Flex Solutions Ltd.
6. Mphasis BFL Ltd.
7. Lucent Technologies Ltd.
8. Hewlett Packard India Ltd.
9. IBM Global Services India Pvt. Ltd.
10. Philips Software Centre Pvt. Ltd.

Field Survey Results

As stated earlier we chose the firms in the electronics industry in Bangalore region randomly taking into account the turnover of the firms as the basis. A total of 12 firms were surveyed. All the employees who were present in the respective firms during the time of interview were also surveyed. Survey instruments used to elicit information have been enclosed in the appendix

Out of the total respondents 88.48 per cent were male employees indicating a high degree of male participation in the electronics industry. It is also interesting to note that majority of these respondents belonged to the socially advanced category which is shown in the table below.

Social Status of the Employees

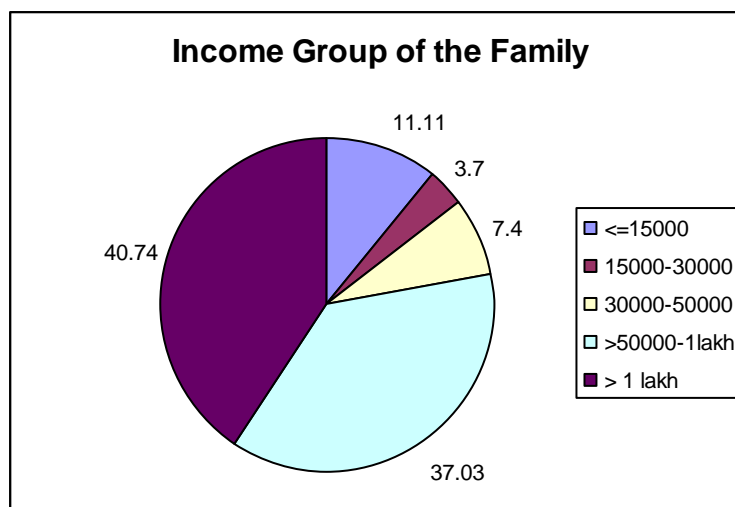
Social Category	Employees (%)
SC	Nil
ST	3.70
OBC	7.40
Advanced	88.88



We can note from the table that, out of the total respondents none represented scheduled caste category. Nearly 88 per cent of the employees belonged to the socially advanced category. The grouping of respondents according to **different monthly income groups** shows the pattern as depicted below.

Income Group of the Family (Monthly)

Family Income Category	Employees (%)
<=15000	11.11
15000-30000	3.7
30000-50000	7.4
>50000-1lakh	37.03
> 1 lakh	40.74



The table indicates that more respondents are found in the family income group of Rs. 50,000 to Rs. 100000 and greater than per month. This may probably indicate that the high cost of technical education has not permitted the families with lower incomes to send their children for pursuing technical education.

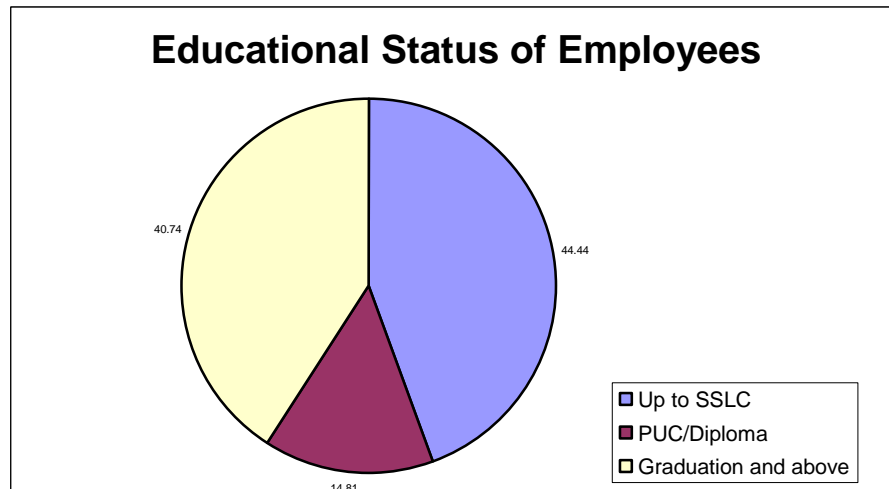
Educational profiles of the employees, indicates that more number of people working in the electronics industry have higher levels of education. The following table shows levels of education attained by the respondents.

Educational Status of Employees

Educational Level	Employees (%)
Up to SSLC	44.44
PUC/Diploma	14.81

Graduation and above

40.74

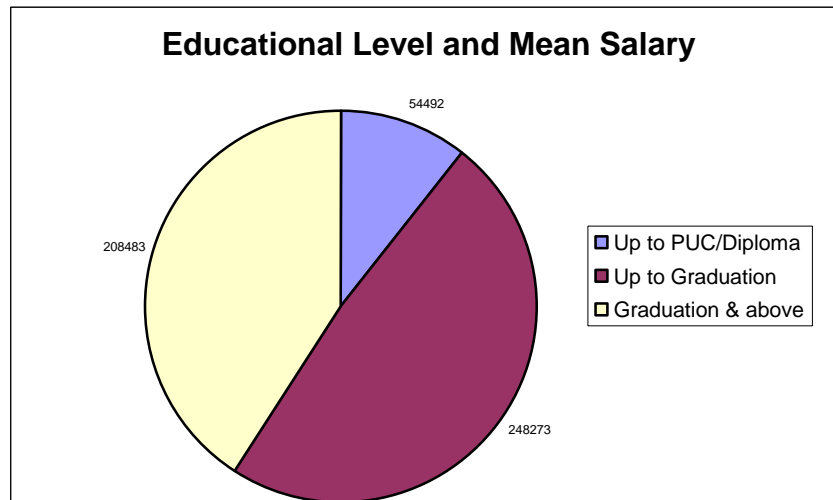


From the above table we can note that 40.74 per cent of the employees surveyed had qualification equivalent or higher than graduation. Around 14.8 per cent were having PUC/Diploma qualification. Rests of the 44 per cent were having qualification equivalent or less than SSLC (Matric). Technical personnel had graduation plus qualification and for routine office jobs, less qualified people were employed.

If one looks at **mean monthly earnings** of the employees, with different educational qualifications the following picture emerges.

Educational Level and Mean Salary (Rs.)

Educational Level	Rupees
Up to PUC/Diploma	54492
Up to Graduation	248273
Graduation & above	208483



The above table shows that the mean salary of the employees at the lower level of education is also low as compared to the higher levels of education. The mean salary also declines as one moves to a qualification level higher than graduation.. This seems to indicate that the rate of monetary returns to employees would start declining as they move higher and higher with regard to their educational qualifications.

Rate of Return:

An attempt was made to calculate the rate of returns to the employees in the electronics industry in the surveyed units in Bangalore region. In order to do so we estimated mean life time costs and earnings of the employees. The net present values of both costs and earnings were also estimated. The following tables show NPVs of both costs and earnings with different rates of interests.

Net Present Values of Costs With Different Rates of Interests

Age	5%	6%	7%	8%	9%	10%
19	171	146	128	114	103	93
20	1,622	1,391	1,217	1,082	973	885
21	1,020	874	765	680	612	556
22	417	357	313	278	250	227
23	833	714	625	556	500	455
24	3,550	3,043	2,663	2,367	2,130	1,936
25	2,927	2,509	2,195	1,951	1,756	1,596
26	2,670	2,288	2,002	1,780	1,602	1,456
27	2,021	1,732	1,516	1,347	1,213	1,102
28	2,994	2,566	2,245	1,996	1,796	1,633
29	2,442	2,093	1,831	1,628	1,465	1,332
30	3,392	2,907	2,544	2,261	2,035	1,850
31	807	691	605	538	484	440
32	807	691	605	538	484	440
33	807	691	605	538	484	440
34	807	691	605	538	484	440
35	807	691	605	538	484	440
36	578	496	434	386	347	315
37	2,917	2,500	2,188	1,944	1,750	1,591
38	2,588	2,218	1,941	1,725	1,553	1,411
39	2,588	2,218	1,941	1,725	1,553	1,411
40	2,588	2,218	1,941	1,725	1,553	1,411
41	2,588	2,218	1,941	1,725	1,553	1,411
42	7,433	6,371	5,575	4,956	4,460	4,055

Net Present Values of Earnings With Different Rates of Interest

Age	5%	6%	7%	8%	9%	10%
19	171	146	128	114	103	93
20	1,622	1,391	1,217	1,082	973	885
21	1,020	874	765	680	612	556
22	417	357	313	278	250	227
23	533	457	400	356	320	291
24	600	514	450	400	360	327
25	673	577	505	449	404	367
26	383	329	288	256	230	209
27	950	814	713	633	570	518
28	892	764	669	594	535	486
29	917	786	688	611	550	500
30	917	786	688	611	550	500
31	917	786	688	611	550	500
32	917	786	688	611	550	500
33	833	714	625	556	500	455
34	917	786	688	611	550	500
35	667	571	500	444	400	364
36	1,167	1,000	875	778	700	636
37	2,500	2,143	1,875	1,667	1,500	1,364
38	1,167	1,000	875	778	700	636
39	833	714	625	556	500	455
40	833	714	625	556	500	455
41	833	714	625	556	500	455
42	833	714	625	556	500	455

The internal rate of return for all the age groups of the employees was worked out to be **115 per cent**. Such a high rate of return may probably indicate the boom, which the electronics industry experienced in the recent past in the Bangalore region in particular and in the Indian economy in general. Phenomenal rise in

the salaries of the employees in the information technology seems to have been indicated by this higher internal rate of return.

Educational Level & Years of Training Received

Educational Level	Years of Training
Up to PUC/Diploma	2 Years
Up to Graduation	4 Years
graduation & above	4 Months

Above table shows that whatever may be the level of qualification the employer is required to provide some training to enable the employees to get the necessary skills to perform the job. This probably shows the deficiencies in the curriculum and the indifferent attitude of the present educational system to produce the output as desired by the industry. The inadequacy of skills and greater dependence on higher and higher qualifications, probably indicates the devaluation of education. (Panchamukhi P.R 1974) This issue was brought by the discussions we had with the employers during the course of data collection. The students would get theoretical knowledge but the practical aspect of putting the knowledge to practice is lacking in them. Even the prospective candidates aspiring for a employment in the industry opined that, either they must have previous experience or some sort of on job training which would get them a job. In this background, we tried to

analyze the news paper advertisements related to electronics industry wherein advertisements for job openings were advertised. The leading news papers from Bangalore were chosen to track such advertisements over the past six months. Most of the advertisements wanted some years of experience for the prospective candidates irrespective of their qualification. This seems to indicate that the 'finished product' is not available to the firms in electronics industry. Thus either training or on job experience would mould the employees to perform the tasks assigned to them.

The following table shows different posts advertised, educational qualification required for the posts and the amount of experience required to be possessed by the prospective candidates for the years 1998-99.

POST ADVERTISED	EXPECTED QUALIFICATION	EXPERIENCE REQUIRED
BIOS Engineer	B.E/M.E Computer Sci/Elec	3-5 years
Embedded Soft. Profes	Engineers(B.E/M.Tech)	2-4 years
Hardware Design Eng.	B.Tech/M.Tech in Elect.	6-10 years
Hardware Engineers	B.E Degree	1-2 years
Hardware Engineers	Diploma in Electronics	2-3 years
Hardware Engineers	Engineering Graduate/PhD	1-3 years
Hardware Faculty		1 years
Hardware Personnel	B.E/M.E Electronics	5-10 years
Hardware Professionals	PhD/M.Tech/ME in Elect.	2 years
Hardware Professionals	B.E/M.E in Computer	2 years
IT Training Faculty	B.E/MCA	Experienced
Leaders	M.Tech/BES	3-12 years
Leaders	B.Tech/B.E/MCA/MSC	5 years relevant exp
Leaders & Engineers	B.E/MCA	2+ years
PCB Design Engineer	B.E/ME Electronics	5-10 years Exp in Design
Professionals	B.E/B.Tech/MSC Electronic	3+ years
Professionals	B.E/B.Tech/M.Tech	5+ years
Programmers	B.Tech/B.E/MCA	5 years
Project & Technical		
Project Leader	Engineer/MCA	6+ years
Project Leader/Manager.	B.E/M.E/MCA/MSC/MBA	1-2 years as a OAB & Prog.
Project Leaders	B.E./B.Tech/MCA	5-8 years
Project Leaders	B.E Comp/Electronics	2-3 years
Project Leaders	B.E/B.Tech/MCAs	1-8 years of software develop.
Project Leaders	B.E/MCA	3-12 years
Project Leaders &		
Project Manager	B.E Comp/Electrical	7-10 years
Project Manager	Engineering Graduate	8-12 years
Project Manager	B.E/B.Tech/MCA/Post Grad	6-8 years of IT
Project Manager	B.E/Electronics	5-8 years
Project Manager	B.sc./B.com or B.E/MCA	8-10 years

POST ADVERTISED	EXPECTED QUALIFICATION	EXPERIENCE REQUIRED
Project Manager &		
Project Manager &		
Project Manager/Lead	B.E./M.E in Computer Sci	3+ years
Project Managers		
Project Managers	B.E./Electronics/compt. Sci	3-5 years
Project Technical Lead	B.E./B.Tech in CS/Elect.	7+ years
R & D Engineers	M.Tech/B.Tech/BES	4-7 years
Senior Engineers	M.Tech/B.E degree in Elect	1-3 years of develop. Exp
Senior Engineers	B.E./B.Tech in CS/Elect.	3+ years of industry
Senior Engineers	Electronics & Mechanical	2-5 years Exp in Design
Senior Hardware Eng.	Degree in Electronic	3 years
Senior Hardware Eng.	B.E./B.Tech/M.Tech	3-7 years
Senior Project Manager	B.E./M.E	3-5 years
Senior Soft. Engineer	B.E./B.Tech/MCA	2+ years
Senior Software Eng.	B.sc/B.com	3-5 years
Senior Software Eng.	B.E./M.E in Computer	2-8 years
Senior Software Eng.	Computer Science	More than 3 years
Soft. Eng & Proj Leaders	B.E./B.Tech/MCA	1-8 years
Software Developers	B.E/MCA/MSC	2-4 years
Software DSP	PH.D/M.Tech(ECS/DSP/CS)	2 years
Software eng. Prog.	Engineering Graduate	5-7 years
Software Eng.(Embed)	B.Tech/B.E in Electronic	3+years in telecom Projects
Software Engineer	Engineering Graduate/Post	1-3 years
Software Engineer	B.E/M.E/Computer. Science	3-5 years
Software Engineer	B.e.M.E/B.s/M.s	Fresh
Software Engineers	B.Tech/B.E in Electronic	3+years in telecom Projects
Software Engineers	B.E(CS)/MCA	2+years
Software Engineers	B.E Comp/Electronic	3-7 years
Software Engineers	B.E/M.E/M.Tech	3-6 years
Software Engineers	Engineers Degree	2-3 years of relevant Exp.
Software Engineers	B.Tech/M.Tech/PhD	2+ years
Software Engineers	B.E/B.Tech/MCA	2-4 years

POST ADVERTISED	EXPECTED QUALIFICATION	EXPERIENCE REQUIRED
Software Engineers	B.Tech	2-4 years
Software Engineers	M.Tech/B.E	3-12 years
Software Engineers	B.E/MCA	2 years on any RDBMS
Software Engineers &		
Software Manager	B.Tech/M.Tech/PhD	6-8 years in IT
Software Personal	B.E/B.Tech/MCA	2-6 years
Software Personal	B.E. Electronics/Compt. Sci.	2 years
Software Personal	B.E./M.E/MCA	5-8 years
Software Personal	B.E/B.Tech/MCA	3 years of relevant Exp
software personal	Diploma/B.e Electronics	2 years of Exp in Windows
Software Personal	B.E/MCA	2 years Exp in IT industry
Software Personal	B.E/B.Tech /MCA	2 years of IT industry
Software Personal	Engineering Degree	2 years of C/C++VC++
software professionals	MCA/Engineer	2-6 years
software professionals	B.E(Electrical, Electronic	2 years
software professionals	B.E(Electrical, Electronic	6-10 years
Software Professionals	Degree in Computer Science	2 years
Software Professionals	B.E/M.E/MCA/PhD	3 years
Software Professionals	B.E/M.E in Electronics	2-6 years
Software Professionals	B.E/MCA/ME/M.Tech	2-10 years
Software Programmer	B.E/B.Tech/MCA/BSC	2 years
Software Programmers	B.E/MCA or degree	6 months to 2 years Exp
Software Project Lead	Engineers Degree	5 years
Software trainees	B.E/MBA(Finance & Mktg)	Fresh
Software(Data Com)	B.Tech/B.E in Electronic	3+years in telecom Projects
Technical Lead Engin.	B.Tech/M.Tech/Ph.D	5-7 years

Source: *Advertisements columns of different English dailies from Bangalore for the year 1998-99.*

From the table we can note that the range of experience varies from six months to more than Ten years. Even those having Ph D qualification in the relevant field have to produce the proof of experience. This only speaks about the state of affairs of the skills and

knowledge that are imparted to the students. The employers in the industry feel that the students coming out of traditional educational institutions have been considered as raw products and some kind of on the job experience would make them fit for the job responsibilities in the electronics industry.

In this background we tried to assess the students coming out of the institutes run by the corporate sector in the field of information technology. The response of the students as well as the employers was somewhat different. We could learn that the difference between the traditional courses and the courses offered by professional training institutes run by national level organizations have something to say with regard to the production of finished products, as required by the industry. The information on the relevance of the courses offered by such national level organizations has revealed the following advantages with regard to their courses.

Advantage Position of Private Educational Institutes in IT

<p>Homework done by the institutes before launching a course</p>	<p>Private institutes seem to have good experience in imparting knowledge as required by the employers especially in the software sector. They plan to expose the students to new advancements in the respective fields.</p> <p>They constantly interact with students and employers/industry to identify the technical skills</p>
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	employers look for in the professionals they hire.
Courses with specific job orientations	<ul style="list-style-type: none"> a. These institutes design their teaching programmes to cater to the needs of the students who want a career in the electronics industry. The courses offer professional practice, which integrates theory, and practice. b. As part of the program, students are sent to different organizations to gain one year's work experience, for which they are also remunerated by the concerned organization. c. The syllabus for the professional practice is derived in consultation with the industry.
Alliances with other institutes/ Universities abroad.	Leading private institutes have alliance abroad wherein bright students would have the chance of gaining additional qualification. The student from such institutes would be exempt from studying certain portion of the syllabus abroad. By this students can save time and money in getting extra knowledge.
Certification	Through this process the private institutes tie up their course in a one-to-one way with the real world applications of software from leading companies in the

	<p>field. Such tie up with major companies also helps them to anticipate changes in curriculum. This has helped such institutes to incorporate skill enhancement courses as required by the industry.</p>
<p>Bridging the gap between World of Learning and World of Work</p>	<p>Private institutes recognize this gap and treat this as the weakness of the present education system. They try to bridge this gap by orienting education to the world of work. They bridge such a gap through,</p> <ol style="list-style-type: none"> a. Theory - Practice Symbiosis through <ul style="list-style-type: none"> • Shifting the emphasis from mere transmission of knowledge to equipping a student with professional skills • Developing an integrated view of knowledge b. Establishing mutually helpful linkages with the world of work, like <ul style="list-style-type: none"> • On the job training • Sandwich program • Internship and practice schools.

Source: Adapted from different web-sites of leading educational training centers

Few Observations

It seems that the more qualified people are employed in the electronics industry. The occupational structure of the employees shows that people with higher qualifications are in more numbers in electronics establishments around Bangalore region, which may hold true for other regions as well. At present the firms do not follow any structured hiring policy while recruiting people. It seems that they follow ad hoc methods of advertising, tracing people from private employment exchanges and searching resumes on the popular job.com websites. Hiring policy as such is absent while making recruitments.

The profiles of the employees surveyed and the discussions we had with the employers of the industry has indicated that the kind of graduates or undergraduates that our educational system produces is not user friendly directly into the electronics industry. The skills and knowledge required by the industry are totally different from those that the students acquire during their education. On job training seems to a must for most of the jobs in this particular industry. As against this, the students coming out of the private corporate teaching institutes seem to be facing the job market with some amount of confidence. This is probably due to the king of syllabus and on job training they receive during their education. Practice schools have been playing a vital role in producing the finished

products as desired by the industry. It seems that, now the time has come to rehaul the technical education system to suit the demands of the industry. The newspaper advertisements that were examined clearly show that some experience is a must to enter the list of job aspirants.

With regard to utilization of work force in the electronics industry, it needs to be noted that in view of the mismatch between the educational attainments and the requirements the full utilization seems to be lacking. Since the employees lack the skills and knowledge as required on the floor of the units, the full utilization is far below from the expected levels.

Since the things in this particular industry are undergoing change at a much faster rate, it becomes more crucial for the educational institutes to cope up with the changing scenario. Faster adaptability of the curriculum to the changing needs would be helpful in producing the kind of job aspirants as desired by the industry. In this context more and more institute-industry collaboration and enlarging the scope of practice schools would be quite useful.

Appendix - I

LIST OF ELECTRICAL AND ELECTRONICS INDUSTRIES IN BANGALORE

SL NO	NAME OF THE INDUSTRY	ANNUAL TURNOVER (Rs.)
1	A.K.CIRCUITS PVT LTD	
2	A.K.INSTRUMENTSCOMPANY	
3	A.K.J. ENTERPRISES	
4	A1 ELECTRONICS	
5	AARGEER INDUSTRIES	
6	DABHILASH TRANSFORMERS	
7	ACCUREX SOLUTIONS PVT. LTD.	
8	ACCUTROL SYSTEMS PVT. LTD	
9	ACE COMPONENTS & ELECTRONICS	9600000
10	ACUTEC	
11	ADIGA TRANSFORMERS AND COILS PVTLTD.	
12	ADITYA PLOTS AND IMAGES	
13	ADS EXPORTS	17200000
14	ADVANCE COMPONETS &INSTRUMENTS PVT LTD	29800000
15	ADVANCE ENGINEERS PVT. LTD.	
16	ADVANCE SALES AGENCY	
17	ADVANCED ELECTRONICS LTD.	
18	ADVACED MICRONIC DEVICES PVTLTD.	288000000
19	AEON TELELECTRONIC PVT.LTD.	
20	AIRVATHA ELECTRONICS & ALLIED PRIODUCTS PVT LTD	
21	ALFA LABTECH	
22	ALFIN BLOWERS PVT LTD	
23	ALLAN MEDINA PLASTICS PVT.LTD.	
24	ALFA CABLES	
25	ALPHA ELECTRONICS	2000000
26	ALPHA SCALES PVT LTD.	
27	ALPHA ZEE CONTROL & SYSTEMS PVT LTD	10000000

SL NO	NAME OF THE INDUSTRY	ANNUAL TURNOVER (Rs.)
28	ALPHA-IMAGES PVT LTD.	10000000
29	ALPHTRON COMPONENTS PVT LTD.	2500000
30	ALPHEN HAUSEN ELECTRONICS PVT LTD	
31	ALTRON ELECTRONICS SYSTEMS PVT LTD.	
32	A.M. ELECTRONICS DEVICES	
33	A.M ELECTRONICS	
34	AMEYA ELECTRONICS AND APPLIANCES	1500000
35	AMITRONICS PVT LTD.	
36	AMPHENTRONIX LIMITED	
37	ANALOG & DIGITAL SYSTEMS	22400000
38	ANCO COOMMUNICATION LIMITED	
39	ANDIG SYSTEMS	6000000
40	ANNAMALAI ELECTRONICS	
41	ANNPURNA ENTERPRISES	
42	ANUP CERMAMICS	
43	APPLIED ELECTRONICS LIMITED (APLAB) MUMBAI	
44	ARCHANA AUDIO VISUALS	
45	ARDENT ELECTRONIC ENTERPRISES	
46	ARGO TRANSFORMERS COMPANY PVT. LTD	
47	ARKYS SYSTEMS & SERVICES	1000000
48	ARRAVI ENTERPRISES	2500000
49	ARUN MAGNETICS	
50	ASEA BROWN BORIVALI LTD.	
51	ASHWINI ELECTRONICS	1500000
52	ASSOCIATED ELECTRONIC & ELECTRICAL INDUSTRIES PVT.LTD	
53	ASSOCIATED ELECTRONIC ENGINEERS	
54	ASSOCIATED METAL FINISHERS	
55	ATEL SYSTEMS	
56	ATHREYONIX	
57	AUTOCON	
58	AUROMATION TECHNOLOGIES	
59	AVASARALA AUTOMATION PVT.LTD.	

SL NO	NAME OF THE INDUSTRY	ANNUAL TURNOVER (Rs.)
60	AVISHKAR ELECTRONICS	
61	AVON DATA CABLES PVT. LTD.	1500000
62	AVR. ELECTRONICS PVT. LTD.	
63	B.D.S. ELECTRONICS	
64	B&H INTERGRATED SERVICES	
65	BAMO ELECTRONICS	
66	BANGALORE POWER SUPPLIES & CONTROL	
67	BANGALORE SYSTEMS & DEVICES PVT. LTD.	
68	BHARATHTRONICS	1000000
69	BASAVESWARA ELECTRONICS PVT LTD.	7500000
70	BEACON CONTROLS	
71	BELAX SYSTEMS	
72	BELLS CONTROLS LTD	
73	BELLS ELECTRICALS	
74	BELTRONICS	2700000
75	BENAKA ELECTRONICS	
76	BENSON POWER & CONTROL PVT.LTD.	
77	BEST CHOICE PVT LTD.	
78	BETA COMPUTERS PVT. LTD	
79	BHAGYADEEPA CABLES PVT LTD.	12000000
80	BHARAT ELECTRONICS LIMITED	
81	BHARAT HEAVY ELECTRICALS PVT.LTD	
82	BIFORA CLOCK INDUSTRY LTD	
83	BIFIRA WATCH COMPANY LTD	
84	BIRLA 3M LTD.	
85	BOARDS AND CIRCUITS INDIA	
86	BORG TRONIX	2000000
87	BPL ENGENNERING LTD	
88	BPL LTD	
89	BPL SANAYOL LTD	
90	BPL SANAYOL LTD TECNOLOGIES LTD.	1618000000
91	BPL-DYNAMIC ELECTRONICS LTD	
92	BRITISH INSTRUMENTATION SYSTEMS	

SL NO	NAME OF THE INDUSTRY	ANNUAL TURNOVER (Rs.)
93	B. T. SOLDERS PVT LTD.	
94	BUILDMENT TECHNOLOGIES PVT LTD.	
95	C.S MEDICAL PVT. LTD.	
96	C.D. INSYTRUMENTATION PVT.LTD.	
97	C. V. ELECTRONICS	
98	CANARYS AUTOMATIONS LTD.	
99	CAPRONICS PVT LTD.	
100	CCUBE SYSTEMS	3200000
101	CENTURY SYSTEMS & TECHNOLOGIES PVT LTD.	
102	CHAITANYA POWER CAPACITORS PVT. LTD	
103	CHAITRA ASSOCIATES	
104	CHAITRA ENTERPRICES	
105	CHARMVEL ELECTRONICS PVT.LTD	
106	CHIP TECH ELECTRONICS PVT LTD.	
107	CHIRRA ELECTRONICS PVT.LTD.	
108	CIRCUIT AIDS INC.	
109	CIRCUIT TECHNOLOGY	
110	CIRCUTRON PVT LTD.	
111	CIR-Q-TECH TECHNOLOGIES PVT LTD.	
112	CLIXPORT PVT LTD.	
113	C-MAC CENTUM ELECTRONICS LTD.	
114	COMPAC SYSTEM	
115	COMPOSITE TECHNOLOGIES PVT. LTD.	
116	COMPTRONICS	7300000
117	COMPUTER PERIPHERAL DEVICES PVT. LTD.	
118	COMPUTER PRINTING PRODUCTS & ACCESSORIES	
119	COMPUTER-TIME ASSOCIATES	
120	COMSYSTEMS	
121	COMTRON ELECTRONIC (INDIA)	
122	CONCEPT ELECTRONIC PRIVATE LTD.	9000000
123	CONNECTWELL INC.	
124	CONSOLIDATED PROCESS CONTROLS PVT. LTD	
125	CONTACT SYATEMS	

SL NO	NAME OF THE INDUSTRY	ANNUAL TURNOVER (Rs.)
126	CONTINENTAL DEVICE INDIA LIMITED	
127	CONTROL ENGINEERS	
128	CONTROL SYSTEMS	
129	CONTROL SYSTEMS & INST. DEVICES PVT. LTD.	4000000
130	CONVERGENT TECHNOLOGIES	
131	COSMIC POWER SYSREMS	300000
132	COSMIC SOLDERS PVT LTD.	1800000
133	CREATIVE ELECTRONICS	
134	CREATIVE MICROSYSTEMS	
135	CRYSTALONICS DISPLAYS PVT LTD.	8000000
136	CUSTOM CONTROLS	
137	COSTOMISED TECHNOLOGIES PVT. LTD.	720000
138	CYCLO ELECTRIC	15000000
139	DALIMA CEMENT LTD	
140	DARPAN ELECTRONIC	
141	DART TECHNIQUES	
142	DATA CARE GROUP	
143	DATALOGIC (INDIA) PVT. LTD.	7000000
144	DEEP KONTROLS	
145	DELTRA (INDIA)	
146	DENT-EQ	
147	DEVIKA ELECTRONICS	
148	DHARMA COMPUTERS PVT. LTD.	
149	DIFFUSION ENGINEERS PVT. LTD	
150	DIGION	
151	DIGITAL EQUIPMENT INDIA LTD	284.1CRORE
152	DIGITAL SYSTEMS	
153	DIGITAL SYSREMS INC.	
154	DIGITATION	
155	DIGITEC CONTROLS	
156	DIGITEC CONTROLS	
157	DIGITRONIX MEASURING INSTRUMENTS	4500000
158	DIGVIJAYA COMPUTER LINES PVT.LTD.	

SL NO	NAME OF THE INDUSTRY	ANNUAL TURNOVER (Rs.)
159	DIGVIJAYA ENTERPRICES	
160	DIO-NICS INSTRUMENTS	800000
161	DOLOR SYSTEM & SERVICES LTD.	4000000
162	DOT TECHNOLIGIES	3500000
163	DUCOM	8000000
164	DUPUIS SOCIAL CENTRE	
165	DYNAMIC ELECTRONICS LTD.	37000000
166	DUNASCAN INSPECTION SYSTEMS COMPANY	
167	E. I. D. PARRY (INDIA) LTD. ELECTRONICS DIVISION	12260000
168	ESSAE - TERAOKA LTD .	
169	E. D. D.M. FORMATICS PVT LTD	
170	EDUTECH	
171	EFFICINT ELECTRONICS & ENGINEERS	1500000
172	EFGE LOAD CELLS PVT LTD.	
173	EKMI SYSTEMS & SERVICES	
174	ELASTRONIKS CORPORATION	
175	ELEBEAM DEVICES LTD.	
176	ELCO NTTF (INDIA) PVT. LTD.	
177	ELECTRO CERAMICS MFG. CO.	
178	ELECTRO NUMERICS	
179	ELECTRO SYSTEMS ASSOCIATES PVT. LTD.	15000000
180	ELECTRODYNE CONTROLS & SYSTEMS	
181	ELECTROHMS PRIVATE LIMITED	
182	ELECTROMECH	
183	ELECTRONIC AUTOMATION PRIVATE LIMITED	
184	ELECTRONICS CALCULATORS & COMPUTERS	
185	ELECTRONIC DEVICES	

Source : Consortium of Electronics Industries in Karnataka