

Chapter 4: Environmental and Labor Regulatory framework – “As is” and “To be”

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The environmental and labor regulatory framework for industry in India is at two levels, State and Centre. India has a very comprehensive regulatory framework for environmental management and a complex regulatory framework for labor regulation. The enforcement of this framework in both cases is a complex issue.

Environmental legislation in operation today is fairly recent going as far back as only the 1970s, with the comprehensive umbrella legislation viz., Environmental Protection Act having been enacted in 1986. Labor legislation in India on the other hand dates back to the pre-Independence period of the British Colonial rule.

In the context of the electronics industry while the labor legislation has been applicable more or less in its current form as for other industrial sectors, the regulatory framework for environmental management has been minimal since the Government of India declared electronics industry as a “non-polluting” industry. This categorization also included the electronics industry in its new incarnation – “the IT industry”.

Given the growth and increasingly global nature of the IT industry and the recognition of the polluting nature of many of the operations in the electronics industry, (see Chapter 3 for more details) public perceptions and that of policy makers and regulators of the “clean” image of this industry are now undergoing changes. While new rules and modifications in existing environmental legislation are factoring in these perceptions, labor regulations are undergoing a change in a different direction.

Labor laws are being simplified both at the Centre and State levels to facilitate and promote investments in the IT sector. Many locations are even promising “union-free” environment as an incentive for bringing in investments.

To understand the impact of these legislative dynamics this chapter attempts to briefly present the existing and emerging environmental and labor regulatory framework for the IT industry in India. This is not an exhaustive presentation of environmental and labor regulatory framework, rather the intention is to present the framework in the context of the IT industry.

4.1 Existing and emerging environmental regulatory framework for the IT industry

Environmental management in India is administered at the Central level by the Ministry of Environment and Forests (MOEF), Government of India (GOI) with the regulatory authority or implementing agency being the Central Pollution Control Board and its regional offices. At the State level, the State Department of Environment (DOEn) is the administrator while the regulatory body is the State Pollution Control Board.

This organizational structure shows a distinct hierarchy wherein environmental policies are formulated at the national level by the MOEF. The laws are enacted at the central government level with adoption and implementation of these laws at the State level by the DOEn.

In addition to this the GOI has strengthened the element of public participation in decision-making by setting up a supportive institutional set-up called the National Environmental Appellate Authority. The aim of setting up of this authority is to enable people directly affected by developmental and industrial projects to present their point of view.

4.1.1 Clearance and Consent

There are two critical stages that any project developer needs to be familiar with in the context of the Indian environmental regulation: obtaining **environmental clearance** from MOEF or DOEn and obtaining **Consent** from the SPCB.

All developmental activities ranging from water resources and mining projects to industrial activities require environmental clearances from either the Centre and / or State depending on (I) the project size (in terms of cost), (II) nature of the project and, (III) location of the project (e.g., in notified areas, ecologically sensitive areas).

Environmental clearance for a project requires preparation of an Environmental Impact Assessment Report (EIA) by the project promoter / developer and submission to the MOEF / State DOEn. The list of projects requiring clearance from MOEF is specified in the Environmental Impact Assessment Notification (amended January 27, 1994) issued by the MOEF. Those projects not listed in this notification have to obtain environmental clearance from the respective State DOEn. Environment clearance for setting up projects in sensitive areas (identified and listed by MOEF in the notification) are guided by separate guidelines issued by MOEF¹.

Specific procedures and siting criteria have been developed for industrial projects by the MOEF. Every industrial promoter has to go through this process.

The electronics industry in India however was and continues to be exempted from obtaining environmental clearance (this includes electronic components as well).

The next level is to obtain a Consent from the SPCB. Every manufacturing facility is required to obtain a consent to establish and a consent to operate from the SPCB. All likely inputs, outputs and operations at and from the proposed facility need to be declared in this consent. The pollution control devices proposed to be used by the facility to comply with prescribed standards also needs to be declared in the consent. The consent has to be regularly renewed, the frequency for which is specified by the SPCB. This typically depends on the nature of the operations (highly polluting, medium or non-polluting categorized as red, orange and green respectively).

Electronics industry is not exempt from this Consent. In fact, PCB manufacture is considered in the red category in States such as Karnataka, Andhra Pradesh and Maharashtra. However, with the new IT policies in place some States like Maharashtra and Gujarat have exempted software companies from Consent.

After receiving the consent from the SPCB and once the facility in operation, regular inspection by SPCB officers is carried out. Discussions with Compaq, and Wipro revealed that their manufacturing facilities in Bangalore are visited once every year. The SPCB may after inspection choose to refuse to grant renewal of the consent. It should record the reasons in writing so that the applicant may choose to file an appeal or challenge the decisions in any court.

Manufacturing units operating under consents are regulateable under a set of environmental regulations and rules depending on their operations. An outline of these regulations and rules is provided in the following section.

4.1.2 Legislation

Environmental legislation in India in its earliest stage was restricted to one medium and focussed on regulating emissions (water and air) commencing with the Water (Prevention and Control of Pollution) Act in 1974 followed by the Air (Prevention and Control of Pollution) Act, 1981. Rules have also been framed under these enactments for implementation of the substantive provisions of these acts. Standards for discharge of wastewater and air emissions are prescribed by these Acts.

From the early 1980s to the mid – 1980s, the scope of legislation evolved from local, isolated, medium specific legislation enacted specifically for a state to, national level legislation which encompassed development in the entire country. The Bhopal Gas Tragedy marked a watershed in Indian environmental legislation. This resulted in a holistic, umbrella legislation - the Environment (Protection) Act, 1986 which, addresses all media - air, water and solid waste. Through this Act, standards were prescribed for

emissions and discharge of industrial wastewater depending upon the nature of the receiving body (public sewers / marine environment / river etc.). Originally when the standards were developed they were concentration based but following the EP Act, progressive changes were made and load-based, industry sector specific standards were developed in 1992-93.

The greatest evidence of the multimedia approach of the Act has been the recognition of the need to regulate hazardous wastes, hazardous substances, biomedical waste and use and import of genetically modified organisms through:

- Hazardous Wastes (Management and Handling) Rules, 1989 (amended 2000)
- Manufacture, Storage and Import of Hazardous Chemical Rules, 1989
- Manufacture, Use, Import, Export and Storage of Hazardous Micro-Organisms Genetically Engineered Organisms or Cells rules, 1989
- Bio-Medical Waste (Management and Handling) Rules, 1998

This trend in legislation has impacted industrial and economic growth in the country. The movement from single to multi media approach in pollution control is one of the factors responsible for the recent change in industry's approach from pollution control to pollution prevention. The other significant factor was the increasing non-availability and cost of resources.

Direction towards pollution prevention was provided in 1992 by the formulation of the Policy Statement for Abatement of Pollution by the GOI.

Specific steps identified to meet this objective were:

- Prevent Pollution at source;
- Encourage, develop and apply the best available practicable solutions;
- Ensure that the polluter pays for the pollution control arrangement;
- Focus protection on heavily polluted areas;
- Involve the public in decision making;
- Increase the safety of industrial operations.

To achieve the objectives, the policy encourages the use of a mix of instruments in the form of legislation and regulation, fiscal incentives, voluntary agreements, educational programs and information campaigns.

A more systematic approach towards environmental protection was adopted with introduction of environmental management tools such as EIA, and Environmental Statement into legislation through rules enacted as part of the EP Act, 1986. The provisions of this act also address issues of resource depletion, and rehabilitation of people affected by developmental projects. Additionally a landmark provision of Public Hearing in January 1997 in the EP Act, has strengthened public involvement by making "Public Hearing" mandatory for all developmental projects requiring clearance from MOEF.

Protection to members of the public who become victims to accidents arising out of handling of hazardous substances from within hazardous installations was addressed in legislation when the Public Liability Insurance Act of 1991 was enacted. This Act provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accidents occurring while handling any hazardous substances and for matters connected therewith or incidental thereto. Industries carrying out hazardous operations have to take insurance cover and contribute to an Environment Relief Fund under this Act.

Introduction of notifications making environmental audit mandatory for industry and introducing the concept of an eco-labelling scheme shows a gradual move of legislation from being reactive to becoming proactive.

The repertoire of Indian environmental legislation expanded in 1999 with introduction of rules under the EP Act, 1986, that sets emission standards for new generator sets; regulates re-cycled plastics manufacture and usage; regulates environmental siting for industrial projects; regulates and controls noise pollution; and regulates municipal solid wastes management.

More recently in August 2000, the Ozone Depleting Substances (Regulation) Rules, 2000 has been passed. Draft notifications for management and handling of batteries and amendments in the Manufacture, Storage and Import of Hazardous Chemicals Rules have also been recently issued.

Any industry / manufacturing operation that has obtained a consent from the SPCB is regulated by all the above enumerated rules and regulations as applicable to the activities in the industry.

In summary, the environmental legislation in India can be categorized as shown in Annex IV.

4.1.3 Environmental Legislation and IT industry

Typically electronics and electronics component manufacture would be regulateable under the Water Act, Air Act and under the EP Act, 1986. The specific rules that could be of relevance to this industry are: the Hazardous Wastes (Management and Handling) Rules, 1989 (amended 2000), Manufacture, Storage and Import of Hazardous Chemical Rules, 1989, the very recent Ozone Depleting Substances (Regulation) Rules, 2000 and the Environment (Protection) (Second Amendment Rules), 1999 – Emission Standards for New Generator Sets.

The Hazardous Wastes (Management and Handling) Rules, 1989 (amended 2000) after its amendment follows the Basel Convention's stipulations. Explicit inclusion of various operations in the electronics industry such as etching, cleaning, degreasing, galvanizing,

and use of solvents which generate acid / alkali residues, halogen containing sludge, and contaminated solvents has been made by categorizing these processes as generating hazardous waste. Import / export of electronic assemblies or scrap such as glass from CRTs are very strictly regulated by the amended Rules.

The mandate of the newly enacted Ozone Depleting Substances (Regulation) Rules, 2000 is to regulate the phase out of ODS over the next decade. The Rules seek to ensure a step-wise elimination of ODS and regulate production, trade, import and export of ODS. The planned phase-out dates are²:

Activity	Phase-out date
CFCs may not be used in manufacturing except for medical purposes	Beyond January 2003
Use of halons prohibited	After January 2001
Methyl bromide may be used in limited quantities for pre-shipment and quarantine	Till January 2015
Hydrochlorofluorocarbons may be used	Till 2040

These Rules specify compulsory registration of ODS producers, manufacturers of ODS based products, importers, exporters and stockists. Maintenance of records and filing of periodic reports on production and use of ODS is required. The services sector promises to be the most challenging for the government to regulate with over 10,000 units involved. Hardware maintenance would belong to this category as would assembly of PCs where any soldering / cleaning operations were required.

Over the last 4-5 years, the MIT has been formulating an ozone phase-out program in collaboration with the Ministry of Environment and Forests, especially for the solvent sector where usage by the electronics industry was predominant. As a follow up of this program, MIT has also actively assisted the industry in formulating the first few projects on ODS phase out and for seeking assistance from the Multilateral Fund.

Another set of rules that could have significant bearing on the IT industry are the Environment (Protection) (Second Amendment Rules), 1999 – Emission Standards for New Generator Sets. This is because a large part of the IT industry particularly the software sector has taken recourse to captive power supply from DG sets as an assured source of uninterrupted, power in response to the unreliable power supply in States like Karnataka.

4.1.4 IT industry “spurred” changes proposed in Legislation

At the level of GOI what continues to remain is the exemption of the IT industry from obtaining environmental clearances. This sector is therefore largely regulated by the State level machinery.

Recently the Prime Minister’s IT Task Force recommended in the IT Action Plan that “.....IT Software and IT Services companies, being constituents of the knowledge industry, shall be exempted from inspection by Inspectors like those for Factory, Boiler, Excise, Labor, **Pollution / Environment** etc.”

This recommendation can have far-reaching implications to environmental controls extending even to the regular inspections by the SPCBs for renewal of consents, depending of course on how the recommendations are framed for implementation. These recommendations are yet to be implemented.

Individual State IT policies have provided a number of incentives with reference to environmental management for the IT sector. For e.g., in Andhra Pradesh the IT sector is being provided exemption from pollution control legislation and a 25% concession in power tariff for new units is being provided.

The Government of Karnataka is promoting setting up of captive power facilities in the form of DG sets. The Karnataka SPCB has simplified the procedure for seeking clearances under the Air Act and the Water Act for software companies that use captive DG sets.

In Maharashtra, according to the incentives provided by the State IT policy, software units will not require permission from the Maharashtra Pollution Control Board.

A unit set up for providing /manufacturing IT service and software will not be required to obtain consent from Gujarat Pollution Control Board according to the Gujarat State IT Policy.

Additionally, siting criteria are being relaxed and land acquisition made easy in a number of States. Land subsidy is being provided for the IT industry in Karnataka and Andhra Pradesh. In Maharashtra, permission to use agricultural land for non-agricultural purposes will not be required for the software industry in residential areas.

The Government of Karnataka proposes to provide land for software and hardware parks but the establishment and operation of the parks is to be the responsibility of the respective industries’ association. Creation and management of common infrastructure facilities like wastewater treatment plants, solid waste management facilities etc., would be the responsibility of the park.

Industrial zoning and siting policies are also undergoing changes as IT software companies are being allowed to be set up in residential areas in some States like Karnataka and Maharashtra.

Overall there seems to be a move towards relaxing environmental regulations and controls on the IT industry at the State level to promote greater investment.

4.2 Existing and emerging labor regulatory framework for the IT industry

India has a very elaborate and complex labor regulatory framework administered and regulated by the Ministry of Labor at the Centre and the Department of Labor at the State Level. Since India's transition from a regulated market to a "liberalized" one in the last 7-8 years, varying perceptions on the all-encompassing labor laws are being thrown up by government, industry and the civil society.

4.2.1 Prospects and dilemmas of Indian labor regulations

Labor market reform is becoming a very significant issue today in India, support for which is increasingly coming from the Government (viz., the Prime Minister and the Planning Commission) Public admissions have been made by the Prime Minister of the need to make the labor laws more "flexible" and that "Our country will be hard-pressed to stand up to global competition if our labor laws are not radically modified to conform to these development."

In the face of competition in an increasingly globalised market, Indian industry wants the right to retrench workers to a "reasonable degree" so that labor costs can be cut. Industry feels that pricing goods is the only way it can deal with MNCs and since the local players do not have control over the cost of raw materials, cutting labor costs is the only way out. Labor unions and labor lawyers are however of the opinion that this is probably the first step "...towards satisfying industry's demand to totally deregulate the labor market...".³

In this milieu, the government has set up the Second National Labor Commission in October 1999. The mandate of the Commission is to review the labor laws objectively and suggest appropriate changes in the laws and policies. The terms of reference⁴ towards this end are:

- to suggest rationalization of the existing laws relating to labor in the organized sector; and
- to suggest an umbrella legislation for ensuring a minimum level of protection to the workers in the unorganized sectors;

In developing the framework for its recommendations, the Commission is required to take into account the following:

- follow up implications of the recommendations made by the Commission set up in May, 1998 for review of various administrative laws governing industry;
- the emerging economic environment involving rapid technological changes, requiring response in terms of change in methods, timings and conditions of work in industry, trade and services, globalization of economy, liberalization of trade and industry, emphasis on international competitiveness and the need for bringing the existing laws in tune with the future labor market needs and demands;
- the minimum level of labor protection and welfare measures and the basic institutional framework for ensuring the same, in a manner which is conducive to a flexible labor market and adjustments necessary for furthering technological change and economic growth; and
- improving the effectiveness of measures relating to social security, occupational health and safety, minimum wages and linkage of wages with productivity and in particular, the safeguards and facilities required for women and handicapped persons in employment.

Given this churning in the labor laws it is appropriate at this point to take a brief look at what the existing labor regulatory framework is and what are the emerging laws in the context of the IT industry. It must be noted here that this not an exhaustive coverage of labor laws rather it is restricted to the significance it has for the IT industry.

4.2.2 Administering the labor regulatory framework

The Ministry of Labor has one of the longest histories in India⁴. Labor as a subject in governance in India was recognized as early as 1854 when the Public Works Department was created and labor was included as a function. Originally called the Department of Labor it was redesignated Ministry of Labor in 1947 and after a few changes in nomenclature, it is recognized today as the Ministry of Labor (MOL). The scope of the labor policy and legislation administered by the MOL includes:

- Safety, health and welfare of Labor;
- Social security of Labor;
- Policy relating to special target groups such as Child and Women Labor;
- Industrial relations and enforcement of Labor Laws in the Central sphere;
- Adjudication of industrial disputes through Central Government Industrial Tribunals-cum-Labor Courts and National Industrial Tribunals;
- Workers' Education;
- Labor and Employment Statistics;
- Emigration of Labor for Employment Abroad;
- Employment Services and Vocational Training;
- Administration of Central Labor and Employment Services;
- International Co-operation in Labor and Employment matters.

Associated with MOL are a number of offices and departments. Among these various offices of the MOL the relevant offices for the present discussion are the:

(i) Office of the Chief Labor Commissioner (Central) which is responsible for:

- Prevention, investigation and settlement of industrial disputes in the Central sphere;
- Enforcement of awards and settlements;
- Implementation of labor laws in industries and establishments in respect of which, Central Government is the appropriate Government;
- Verification of membership of Unions affiliated to the Central Organizations of Workers for giving them representation on national and international conferences and committees;
- Fixation and revision of minimum wages by notifications under the Minimum Wages Act, 1948 in scheduled employment in respect of which Central Government is the appropriate Government.

(ii) Directorate General of Factory Advice Service and Labor Institutes (DGFASLI) which is responsible for:

- Safety, health and welfare of workers in factories and docks;
- Coordinating implementation of the Factories Act, 1948, by the State Governments and formulation of model rules;
- Administration of the Dock Workers (Safety, Health and Welfare) Act, 1986;
- Undertaking research in industrial safety, occupational health, industrial hygiene, industrial psychology and industrial physiology;
- Providing training, mainly in the field of industrial safety and health, including a diploma course of one year duration in industrial safety which is an essential qualification for appointment of Safety Officers in factories;
- Regular in-service training of Factory Inspectors.

At the State level labor matters reside with the State Department of Labor. Implementation of labor laws is carried out by the Office of the Labor Commissioner while the provisions of the Factories Act are enforced by the Inspectorate of Factories.

4.2.3 Existing Labor Laws

There are a large number of labor laws in operation in India. While a listing of the various laws is made in Annex IV, this section will focus on specific laws of relevance to the present study.

Currently, amendments to the following laws are either on consultation by state with the social partners or on the basis of consideration by other concerned authorities:

- The Payment of Wages Act, 1936.
- The Minimum Wages Act, 1948.
- Employees' Provident Fund & Misc. Provisions Act, 1952.

- The Employees' State Insurance Act, 1948.
- Contract Labor (Regulation & Abolition) Act, 1970.
- The Factories Act, 1948.
- The Mines Act, 1952.
- The Workmen's Compensation Act, 1923.
- Inter-State Migrant Workmen (Regulation of Employment & Conditions of Service) Act, 1979.

4.2.4 Labor laws of significance to the IT sector

With the thrust on ensuring that the IT sector continues to grow at its present rate, immediate modifications of some of the laws are being sought. In fact in some of the States like Karnataka, Andhra Pradesh and Maharashtra the State Governments have already modified certain provisions.

The laws of significance in this context are:

The Industrial Disputes Act, 1947: This Act established in 1947, seeks to regulate industrial relations in the country. Its main objective being a just and equitable settlement of disputes by negotiation, conciliation, mediation, voluntary arbitration and compulsory adjudication. By and large, however, employer/employee relations are determined by direct collective bargaining.

The Act applies to all industrial establishments all over India whatever the strength of its workers may be. Under this Act, industrial establishments were classified in two categories of public utility services and non-public utility services. The conditions for strike or lockout were made more stringent in public utility services. Even in the case of non-public utilities, the government was empowered to prohibit strike or lockout if proceedings of the dispute were pending before a board of conciliation or an industrial tribunal⁵.

This Act of 1947, was repealed and re-enacted under the title of the Industrial Disputes Ordinance, 1959. It changed the industrial relations system completely to be 'adjudication oriented'. A large number of industries were included within the purview of the public utility services. The industrial court, appointed under the Ordinance, was empowered to prohibit strike or lockout, as the case may be, instead of the government.

A significant provision under the Industrial Disputes Act is regarding worker retrenchment. According to this provision no employee in any industrial establishment who has worked more than one year may be retrenched without being given one month's notice in writing indicating the reason for retrenchment. The employee is also entitled to compensation of 25 days salary for each year of service completed. The dismissal of workers may be contested through a petition to the Government.

This provision of the Industrial Disputes Act is being seen by industry as requiring modification to enable India to compete with MNCs.

Industrial Employment Standing Order Act, 1946⁶: Industrial Employment (Standing Orders) Act, 1946 brought uniformity to employment contracts. This Act ensures uniformity of contracts of employment between the employer and employees in keeping with the principle of collective bargaining.

According to the Act, employers in industrial establishments have to define with sufficient precision, the conditions of employment under them and to make the said conditions known to workmen employed by them. The Act requires that standing orders contain conditions of employment, which must among other items, include:

- classification of workmen, for example, whether permanent, temporary, apprentices, probationers etc.;
- manner of intimating to workmen periods and hours of work, holidays, pay-days and wage rates;
- shift working;
- attendance and late coming;
- conditions of procedure in applying for, and the authority which may grant, leave and holidays;
- requirement to enter premises through certain gates, and liability to search;
- closing and reopening of sections of the industrial establishment, temporary stoppages of work and the rights and liabilities of the employer and workmen arising therefrom;
- termination of employment, and the notice thereof to be given by employer and workmen.
- suspension or dismissal for misconduct, and acts or omissions which constitute misconduct.
- means of redress for workmen against unfair treatment or wrongful exaction by the employer or his agents or servants;

The rules thus aim at avoiding disputes arising from uncertainty and vagueness in the terms of employment.

Factories Act, 1948: The Factories Act only applies to premises using power with more than ten employees or with more than 20 workers without power. A very large number of workshops, therefore, are not covered by the act which, is enforced by the State Government.

This Act aims to regulate working conditions in factories and ensures minimum standards of safety, health and welfare conditions of factory workers. The act also regulates the working hours, leave, holidays, overtime and employment of children, women and young persons. The Act was amended in 1987 to set out safeguards with respect to the handling of hazardous substances.

The Factories Act prescribes a 48-hour week for adult workers. In offices a workweek is generally considered to be 35 to 40 hours. Non-executive staff usually receive a shift allowance if they work in shifts that differ from the usual working hours.

In terms of equal opportunity, together with the Equal Remuneration Act 1976, discrimination between men and women in either requirements or payment of wages wherever their jobs are identical, is prevented. There are situations however, where employment of women in certain types of work is prohibited or restricted by law.

The Act also requires that in every factory where more than thirty women workers are employed childcare facilities are to be provided for children under the age of six years.

The Factories Act ensures that protection of health and safety of the workers in all industries is maintained. This is a statutory obligation. Both employers and employees are required to observe the safety and protection requirements. Non-compliance with these requirements is liable for punitive action by the concerned government authority.

Contract Labor (Regulation and Abolition) Act, 1970: This Act was aimed at regulating the employment of contract labor as it was considered disorganized and exploited. The objective of the provisions of this Act is to ensure that safe working conditions, wages commensurate with the legal provisions concerning the trade or industry and certain provisions like workmen's compensation and insurance are provided to the contract labor.

In addition to the above some other labor laws applicable to the IT industry are:

- Payment of Wages Act, 1936
- Minimum Wages Act, 1948
- Maternity Benefit Act, 1961
- Employees' State Insurance Act, 1948.
- Employees' Provident Fund & Miscellaneous Provisions Act, 1952.
- Employment Exchanges (compulsory Notification of Vacancies) Act, 1959

Most of the acts passed by the Government for the welfare of workers relate to the workers in the "organized sector" of India's economy. A number of social security schemes have been established for them as well. Some acts and rules have also been framed for the non-organized sector.

To address the non-organized sector one of the provisions at the State level is the Shops & Establishments Act.

Shops & Establishments Act: This Act is a state legislation. It seeks to regulate the working conditions of workers in the unorganized sector, including shops and establishments that do not come under the Factories Act. Regulations for working hours, rest intervals, overtime, holidays, termination of service, maintenance of shops and establishments and other rights and obligations of the employer and the employees are laid down.

At the State level, commercial establishments to which the non-manufacturing sections like software development and services belong are regulated by this Act.

With this brief background on the Indian labor laws, the next section presents the emerging changes in labor laws being sought for the growth of the IT industry.

4.2.5 Emerging changes in labor laws for the IT industry

As discussed in section 4.2.1, labor market reform is imperative given the complexity and in some cases antiquity of the labor laws in the country. However in the race to be ahead in the global marketplace and retain the premier position that India has in the IT sector, the reform needs to be carried out so that worker rights and health and safety are protected.

The labor reform for the IT sector was mooted at the level of the IT Task Force set up by the Prime Minister. In the IT Action Plan II⁷ that was prepared by the task force the section on labor laws began thus:

".....62. As the Indian IT product industry will increasingly have to compete with countries like Taiwan, Singapore, Korea and Philippines, the Indian Labor Laws in this limited sector should not be adverse as compared to the Labor Laws in the competing countries. In view of this, the following modifications in the Labor Law specifically applicable to the IT Products manufacturing sector, will be enacted in S-BIT Units/Zones/Habitats with due consideration to the ILO recommendations....."

The task force recommended that:

- women be allowed to work in three shifts subject to provisions of all the ILO specified conveniences including transportation from and to the door steps of the employee;
- the temporary status of an employee be enhanced to 720 days in three years instead of 240 days out of one year as per the existing labor laws;
- manufacturers be allowed to downsize employee rolls by upto 10% of total employee strength in any year without permission;
- the IT sector be exempted from the Contract Labor Abolition Act.
- longer hours of operation be allowed so that 3-shift/4-shift operations can be run for which the labor law should allow upto 12 hour shifts without overtime as long as total number of hours worked per week averages the current norms of 48 hours per week.

As discussed in Chapter 2, in the context of IT software and services, the IT Action Plan also recommended that "*...IT Software and IT Services companies, being constituents of the knowledge industry, shall be exempted from inspection by Inspectors like those for **Factory, Boiler, Excise, Labor, Pollution / Environment etc...***"

The recommendations of the task force for women to work in three shifts appears to be a progressive decision but ensuring that transportation is provided is the critical issue. In smaller operations this will have to be strictly ensured by the workforce.

The task force also appears to be in support of increasing contractual labor / temporary status of the employee. Beyond the temporary period, employers are obliged to give permanent status to an employee which is accompanied by the need to provide a number of long-term benefits. The high attrition rate and constant state of flux of the labor market in the IT industry may have triggered this recommendation as well as the next one which requires that the reduction of employee strength be done without permission. Exemption from the Contract Labor Abolition Act would also lead to more contractual labor for this sector.

Increasing the duration of a shift from 9 to 12 hours without overtime is a stretch. This could seriously lead to reduction in efficiency even if the weekly 48 h norm is adhered to.

The recommendations of the IT task force however are yet to be implemented.

At the State level however, in a number of cases, immediate modifications have already been made in labor laws as a form of incentive for investment in the IT sector. Promises of “union-free” environments are being used as an incentive to attract foreign investments.

Simplification of all Central and State level labor enactment is being sought by the GOK. The Labor Department in the State has already issued the following notifications:

- Exemption of IT / software establishments from all provisions of the Industrial Employment (Standing Orders) Act, 1946 for a period of one year with effect from March 9, 2000 (the date the notification was issued).

This essentially means that uniformity of contracts of employment between the employer and employees is not mandated.

- IT / Software establishments, Export Promotion Industrial Parks and 100% EOUs have been declared to be public utility services under the Industrial Disputes Act, 1947 for a period of 6 months from March 9, 2000 (the date the notification was issued). This provision ensures that the conditions for strike or lockout are made more stringent. Moreover, the employees cannot claim benefits such as overtime.
- Working hours have been made flexible permitting Flexi times;
- Provisions in the Factory Act have also been relaxed by allowing night shift for women. This provision however has a caveat, which, puts the onus of safety of the employee on the employer. To facilitate this and make it easier for women to work in night shifts, software companies are being granted permission to set up operations in residential areas by the GOK.

In other States like Maharashtra, reportedly the State Government publicized³ that as an incentive to draw investments into the State, “hire and fire” industrial zones are proposed to be set up where the industries will not be subject to the prevalent labor laws, similar to the free trade zones in southern China.

Andhra Pradesh is another State where relaxation of labor laws is being pursued for the IT sector by the cyber savvy Chief Minister who was heading the Prime Minister’s IT task force.

In summary, it appears that while the labor market reform has been on the cards for a while, the IT industry is going to enjoy a significant amount of “freedom” from labor laws at least for a while. What impact this can have on other industrial sectors and on the labor market as a whole will be seen in the next few years.

4.3 Expectations from the environmental and labor regulatory framework for the IT industry

Labor and environmental laws have always been perceived as being deterrents to growth of an industry. While inflexible and antiquated laws need to undergo reforms, the rapid changes being sought to increase working hours and the percentage of contractual labor needs to be examined closely for implications on the labor market.

Experts in labor law³ strongly feel the need to reform laws such as the Industrial Disputes Act, since some of the provisions are deterrents to progress in a highly competitive environment where technology is constantly changing as well. For e.g., one of the provisions in the Act, prohibits any change in the number of permanent workers unless an industrial tribunal adjudicates in its favor. In a highly competitive environment where it is necessary to retrain workers or “..change their job content and responsibilities in the context of technological changes..” such provisions are non-productive. These provisions are also at cross-purposes with the objectives of the country’s new industrial policy, which aims at increasing productivity.

Labor is critical for the Indian IT sector since, it is on this skilled, technical labor that the entire industry’s global position is built. Any reforms in labor laws for this sector needs to ensure that this skilled pool is sustained. Simplification of labor laws is necessary provided it ensures good and secure working conditions in terms of optimal working hours, health and safety, monetary remuneration, and a system whereby the workforce is able to protect its rights. This will contribute towards improved labor productivity, which would ensure sustainability of the sector.

Many of the labor laws aimed at a workforce that is unskilled, vocational or semi-skilled do not appear to have relevance to the IT industry because this is a highly skilled, educated workforce with a very high job turnover. The attrition rate of the workforce is very high so modern human resource management practices of one-to-one employer-employee interactions are used to negotiate all conditions of employment. In fact to retain

the workforce is a challenge to the IT industry and hence significantly superior working conditions, wages, perquisites and sops are being provided by the industry. However, this situation may also be more prevalent in the larger companies. There are a large number of smaller IT companies where the scenario is not as optimal in terms of working conditions, wages etc. It is therefore a challenge to ensure that worker rights are not compromised here while labor laws are reformed and relaxed.

In the case of environmental management, initiatives such as the environmental legislation on ODS, and support for establishment of Environmental Management Systems in the electronics industry, such as the GOI-UNDP program are proactive, focussing on sustainable practices like cleaner production. However in the energy sector, while captive power sources could be used as an interim measure in the face of the immediate power constraint the choice of fuels need to be regulated to minimize environmental impact. Long term reforms such as promotion of renewable sources of energy, improvement in transmission and distribution, and demand side management must be ensured. Widespread power sector reforms in the country are on the anvil both in terms of institutional changes and infrastructure changes. Some initiatives such as privatization of billings for e.g., are underway in parts of Bangalore.

Policies and regulations focussing on anticipated infrastructure needs are essential to foster not only industry but also to ensure a better quality of life in the various Silicon Cities. Role of the private sector in enabling this infrastructure needs to be factored in while developing policies.

Policies that support reuse, recycle, recovery and remanufacture need to be put in place anticipating the environmental impact of the growing IT industry in the country. No incentives / sops exist for the remanufacture industry today.

Finally it is important that in order to be a global player, pressures from international environmental and labor-related standards will also need to be anticipated while reforming the regulatory framework.

Drawing from the findings of the situation analysis presented in this Chapter and the preceding Chapters (2 and 3), Chapter 5 presents the policy and governance related recommendations that could be useful in achieving the vision that India has of continuing to be a premier global player in the IT industry.

Endnotes

¹ For more information on environmental clearances and detailed text of all environmental legislation see MOEF's website at <http://envfor.nic.in/>

² Rules to phase out ozone-depleting substances issued, Times of India, August 8, 2000.

³ Business India, June 26-July 9, 2000. p.107-109.

⁴ For more details on the history, organization, function and responsibilities of the Ministry of Labor, Government of India visit <http://labour.nic.in/glance/molglance.html#HISTORICAL>

⁵ For detailed discussion on this Act and other labor laws see: Organized labor and economic liberalization. India: Past, Present and Future, by Debashish Bhattacharjee, Indian Institute of Management, Calcutta, 1999. <http://www.ilo.org/public/english/bureau/inst/papers/1999/dp105/>.

⁶ For a discussion on specific provisions of this Act see: From confusion to clarity. The Hindu Business Line, Monday, February 7, 2000.

⁷ The entire text of the IT Action Plans (I,II and III) is available at <http://www.nasscom.org/>

Chapter 5: Way Forward

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The situation analysis presented in the last four chapters has put into perspective, the evolution and growth of the IT industry in India; has provided a set of existing and emerging environmental, health, safety and labor issues associated with this industry and also indicated how they are managed by the existing environmental and labor regulatory framework. Added to this, potential changes in this framework and its consequences on emerging environmental, health, safety and labor issues have been outlined.

A brief insight has also been provided into the environmental and social responsibility exhibited by the IT industry and some ideas on accountability expected both from the industry and government have emerged as well.

Accountability of any industry is to various stakeholders – employees, its suppliers / vendors and customers, government and community. Ensuring effective accountability is possible therefore only through a multi-pronged approach. It has to be done through effective policy and planning on the part of government, voluntary initiatives on the part of industry and awareness and civil society initiatives on the part of the community. Increased accountability leads to more responsible environmental and social behavior.

Government policies play an important role in industrial development and in creating an enabling environment for the integration of local industries in the global economy. In India's case also policy has played a very important role in the development of the IT industry. Following the "liberalization" period starting 1992, policy is increasingly beginning to play a more facilitating role. Today policy is being used more to support and react to the industry's needs rather than create a market.

Taking this trend forward this chapter will now use the findings of the situation analysis and attempt to develop some policy and governance related recommendations that can

make the IT industry more accountable and enhance the environmental and social responsibility.

5.1 Policy and governance recommendations

Attempts will be made to develop recommendations by addressing the following issues of significance that emerged from the situation analysis in the last four chapters:

- Management of solid and hazardous waste particularly those emerging at the end-of-life stage;
- Providing support to ODS phase-out from the electronics sector;
- Promoting resource conservation;
- Promoting environmental management along the supply chain, product stewardship and corporate citizenship;
- Creating and sustaining intellectual property;
- Ensuring quality working conditions, considering gender issues and protection of workers' rights.

Some of the salient recommendations that emerge from this study in lieu of the above-delineated issues are as follows. These recommendations are based on the multi-pronged approach discussed above.

5.1.1 Strengthening enforcement through monitoring, measurement and reporting

Accountability requires transparency, responsiveness and reporting. Towards this end it is necessary to: identify activities / operations performed, measure inputs and outputs associated with these activities, monitor them over a period of time, document and communicate the findings.

Monitoring and Enforcement

In the case of the Indian IT industry there is limited information at all the levels identified above. A beginning has however been made for a section of the hardware industry in the form of the MIT-UNDP program for environmental management in the semi-conductor and PCB industry. The program is currently at the identification and measurement stage. The objective is to assist this sector to establish environmental management systems and adopt cleaner production practices.

Measurement tools and performance indicators would need to be developed by the MOEF in collaboration with MIT to effectively inventorize the outputs from the industry. Experience of MNCs such as IBM, Intel, HP, Compaq etc., could be sought in this exercise since they have monitoring and reporting systems in place.

For other sectors in the hardware industry such as electronics component manufacturing, computer hardware manufacturing, a beginning can be made using the existing tool of Environmental Audit (mandated under the Environmental Statement Notification, 1992).

This is applicable to all industries recognized as polluting i.e., wherever consent to operate is required under the Water Act, Air Act, or Hazardous Wastes (Management and Handling Rules), 1989. An Environmental Statement has to be filed to the concerned State Pollution Control Board on or before September 30 every year, as of 1993.

This Statement allows for a periodic evaluation of management systems' performance with regard to waste prevention and reduction, assessment of compliance with regulatory requirements, facilitating control of environmental practices by a Company's management and placing environmental information in the public domain.

Environmental clearance may need to be made a requirement for the complex, polluting sectors of the electronics industry particularly since incentives are being provided to the IT industry to set up operations in industrially backward areas where the local infrastructure is not prepared / available to absorb the impacts of such facilities.

By making environmental clearance a requirement an EIA will have to be carried out and an environmental management plan prepared. As required by law implementation of this plan will have to be monitored by the SPCB. Enforcement of environmental management practices could therefore be ensured.

In order to simplify the EIA process, Standard Operating Procedures (SOP) for environmental management in the various polluting sectors of the IT industry could be prepared by the MOEF in collaboration with MIT. Any project for this sector could be accorded clearance, subject to implementation of the SOPs.

Enforcement can be done at two levels (I) directly through regular monitoring by regulatory agencies (II) by integrating these SOPs as part of the pre-requisites for assistance from financing institutions.

Given the pace at which technology advances in this industry, to make enforcement more effective, there is a need to regularly build the capacity of the enforcement agencies such as the SPCBs, Factory inspectors and inspectors for the Shops and Establishments Act. However, this will have to be done in the light of policy recommendations such as those of the IT Task Force regarding exemption of Software and IT services from inspections by Factory, Labor and Environmental officers.

Environmental and Social Reporting

Evolving from this preliminary level of disclosure there is a need to promote corporate environmental reporting to enable voluntary information disclosure. Today there is no requirement for corporate environmental reporting in India. Supportive technical

assistance may need to be provided to the SSIs (which form a large part of the electronic components industry) in the form of reporting guidelines.

All large computer manufacturers (MNCs and domestic companies) have websites where, in the case of the MNCs, environmental performance and corporate environmental reports are available for public access. The Indian companies, even the very large ones like Wipro, Zenith, HCL, do not prepare a corporate environmental report and there is no mention of environmental management as a function.

According to Indian Companies Act, however as part of the Annual Report a section on Energy and Environment is mandatory. In most cases this is limited to three or four lines. Corporate governance is increasingly being recognized as an essential to business development, competitiveness and accountability. As discussed earlier in Section 3.1.3, Chapter 3, CII has developed “Desirable Code of Corporate Governance” and SEBI has recently accepted the recommendations of the Kumaramangalam Birla Committee on Corporate Governance¹. In both cases however requirements for environmental and social accountability are negligible.

There is a need for SEBI and CII to recognize the significance of environmental and social responsibility and accountability in corporate governance and integrate them into the codes of practice.

In the case of MNCs most of which are 100% subsidiaries of their parent companies, annual reports are filed in the resident country of the MNC. Environmental / social performance of Indian facilities or even their environmental management practices are conspicuous by their absence on the websites of the MNCs such as HP, Intel, IBM and Compaq.

Existing detailed individual webpages provided for sales and marketing and products and services in India could be used to provide information on environmental performance / management practices.

Software industry should also be encouraged to monitor environmental and health and safety performance in the form of energy consumption, other resource consumption like paper, consumables (printer cartridges, floppies, CDs etc.), mode of disposal of obsolete computers, care taken for health and safety of workers etc. This would also lead to sharing of experiences across the sector and assist in developing industry codes of practice. Companies like Infosys post their Annual Report on their website thereby making their operations transparent and exhibiting public accountability and corporate governance. While social performance, community initiatives find a place on this website, there is no mention about environmental performance and ergonomic standards and practices.

A system needs to be put in place with guidelines for measurement (performance indicators for which could be drawn from international experience of MNCs), reporting and communication. MOEF, MIT, industries associations (IPCA, ELCINA, MAIT) and

organizations such as NASSCOM must collaborate on efforts to develop guidelines and establish a suitable framework.

Environmental reporting could serve as a competitive advantage in the increasing globalized market given the efforts at supply chain environmental management in this sector.

In order to survive in the emerging highly competitive markets, the Indian companies will have to adopt better corporate practices, which ensure greater transparency, more disclosures and better corporate values.

5.1.2 Uniform zoning country-wide of hardware and software facilities to ensure environmental and social responsibility

Industrial zoning for the electronics industry has improved from earlier practices when hardware and software were not differentiated. Today zoning is being practiced in the form of software parks and hardware parks. Siting policies however vary across the country. In Andhra Pradesh for e.g., software industry has been exempted from zoning regulations while in Karnataka software companies are being established in residential areas. Zoning in the form of a proposed IT corridor is however being developed in Bangalore from the Electronic City to Whitefield where the Information Technology Park is located.

Uniform zoning guidelines need to be developed particularly given the likely growth of the industry across the country and the incentive to the IT industry to establish manufacturing facilities in industrially backward areas. Siting criteria and guidelines for establishing IT industrial parks need to be put in place. They must include requirement for common facilities such as water, power, sewage treatment plants, industrial wastewater treatment facilities, solid and hazardous waste management facilities (particularly for hardware and maintenance operations), recycling and recovery facilities and emergency preparedness and response plans.

In order to make operation of these parks viable, and the industry environmentally and socially responsible a framework needs to be put in place for public-private partnerships with industry associations initiating these activities.

GOK is working towards this end by providing land for establishment of IT industries with the onus of development of this land and the common facilities on the industry associations thereby making industry responsible.

5.1.3 Orientation of policy based incentives for IT industry towards resource efficiency

Power reforms are being initiated by the Ministry of Power², Government of India to significantly improve the power situation in the country. Energy conservation legislation, standards and labeling schemes are being proposed for any equipment or appliance consuming, generating, transmitting or supplying energy. A Bureau of Energy Efficiency

(BEE) is also proposed to be set up. Such reforms would contribute to increasing accountability particularly in manufacturing facilities as well as where captive power is being generated.

Although the IT industry's energy demand is not as high as that of many other industries, subsidies for the IT industry such as (i) refund of sales tax for all new industrial units which utilize diesel oil, LSHS and Furnace Oil for captive power generation for a period of five years; (ii) exemption from electricity tax for captive power generation towards self consumption, for a period of five years and (iii) reduced power tariff for IT industries prevalent in some States need to be replaced with less distortionary subsidies.

A policy framework needs to be put in place to make power transmission and distribution more efficient rather than focus only on the generation. In recognition of this, efforts at privatization of power are being initiated at the Centre and State level but they have been implemented only in pockets e.g., privatization of the billing system in parts of Bangalore.

Demand side management schemes need to be developed to promote energy conservation thus making the system more resource efficient. Industry initiatives in demand side management could include focussing R&D on developing more resource efficient systems, operations, and products .

The other resource where distortionary subsidies need to be eliminated is land. Any subsidy on land must be subject to commitments by the industry to develop appropriate environmental and social infrastructure that will ensure responsible entrepreneurship. Community initiatives such as creating green spaces, contributing to improving local infrastructure such as roads, street lighting, contributing to building the capacity of educational institutions etc. must be a part of the package that provides subsidies on land. Illustrations of some useful community initiatives by the IT industry in Bangalore are, solar powered bus stops for the community in Whitefield by SAP Systems, greening of roads by Wipro and Infosys.

5.1.4 Development of environmental policies to promote proactive and preventive approaches to environmental management

Proactive initiatives such as efforts at setting up environmental management systems are presently underway in the components sector. It is appropriate at this stage in the development of the IT industry when policies to promote both hardware and software growth are being put in place, to establish the requirement for environmental management systems as prescribed by the ISO 14000. Experience of MNCs like HP, Intel, Compaq that have large ISO 14001 programs for their other facilities worldwide can be drawn in establishing this requirement in India as well.

Under the EXIM policy incentives and preferences are provided by the GOI for export oriented units that have quality certification and SEI-CMM. This is emphasized in the IT Action Plan III as: *“The high quality of Indian Software Services and Software products*

exported, will be sustained by compulsory insistence of ISO-9000/SEI level-5 Standards or equivalent, certified by one or more competent certification agencies in India.”

Addition of EMS-ISO14001 certification to this requirement would be a very proactive step in ensuring environmental responsibility. Additionally these companies would also have a competitive edge since in the global market efforts at greening the supply chain are increasing.

Supply chain environmental management is increasingly playing a significant role in the electronics industry.

For India to be a player in the global hardware market leading companies like Wipro, HCL, Zenith must be encouraged to green their supply chain and incorporate environmental aspects into their vendor sourcing policies. This would also put pressure on the local vendors and in tandem with the government’s efforts at improving environmental management practices of the electronics industry, lead to a more responsible sector.

5.1.5 Promote product stewardship and asset recovery

Product stewardship efforts in the IT industry in India are absent. Given the projected increase in PC penetration and growth of the internet it is imperative that policies be put in place to promote product stewardship and ensure a system for recycle, recovery and organized disposal of computer hardware.

The critical issues are disposal of computers, peripherals and consumables. Government needs to work with the industry associations (e.g., ELCINA, MAIT, IPCA) and large individual companies to develop and establish a feasible and viable framework for product “take back” and to support remanufacturing. This framework must consider resource requirements for systematic collection, recovery and recycle.

The European Union’s environmental directorate’s directive known as WEEE (Waste from Electrical and Electronic Equipment) may be taken cognizance of in developing such a policy. Among other provisions this directive, requires manufacturers to organize collection and recycle their old computers. It puts full financial responsibility on producers to set up collection, recycling and disposal systems.

A large recycle and reseller market does exist in India but it is unorganized and grey.

To make recycle and recovery organized it may be useful for the government to work with the industry association and establish technical assistance programs, support technology demonstration projects, provide sources of financial support and establish a certification system for recyclers and remanufacturers. Several occupational safety and health issues such as exposure to toxic metal fumes, polymers etc. need to be considered and suitable guidelines and standards established to ensure safe practices.

Fiscal incentives and tax rebates may be provided to ensure an organized remanufacturing sector particularly for computers, peripherals and consumables.

This is essential to eliminate the large grey market in components and consumables. Today there are a few players in remanufacturing consumables (printer toners and cartridges) but they do not receive any incentives for remanufacture. In fact they face stiff opposition from large MNCs. Remanufacturing policies of the California and Texas State Governments may be considered while developing local policies. In both these States, Government offices use only remanufactured and recycled printer cartridges and toners. Additionally, printer manufacturing companies are legally not allowed to prevent consumers from using compatible / remanufactured cartridges procured from other sources.

A similar framework for computer hardware recycle, recovery and responsible remanufacture through a “take back” system must be set up to promote responsible practices by the industry.

Asset recovery programs in India are negligible. Most large users of computers such as public sector companies, educational and research institutions, government and private sector bid their machines out for disposal at the end of its useful life.

In support of “take back” policies and to prevent the products from getting into the grey market, guidelines need to be developed for asset recovery programs. This may be in the form of a contract / agreement between large consumers and the manufacturers.

Policies have recently been put in place with incentives to promote donation of old computers by IT companies to educational institutions.

5.1.6 Ensuring balance between flexibility and worker rights during labor reform to ensure industry accountability

Labor market reform is on the anvil. However while increasing the flexibility of the laws, worker rights need to be protected. For example longer shift hours, increased contractual labor, longer periods of temporary status for employees, night shift for women are being recommended. In the absence of collective bargaining in this sector, it is imperative that progressive human resource management practices be put in place to ensure worker rights.

Recommendations such as exemption from Factory / labor inspections would mean the need for an alternative effective enforcement mechanism so that provisions of the Act (e.g., working hours, health and safety, need for a crèche if more than twenty nine women are employed etc.) are followed.

MNCs through their corporate codes of conduct ensure health and safety standards at the workplace while large domestic companies like Infosys, and Wipro provide ESOPs, set up townships, provide child care centres, transport facilities for their staff and thereby

ensure good working conditions. But in the case of smaller companies, without an effective set of labor laws (albeit more flexible and modern than the existing laws) ensuring worker rights could be difficult.

5.1.7 Promotion of studies and R&D to provide technology support to the industry

Support for policies and legislation enforcement should be provided through special studies and R&D to harness technology for a sustainable growth of the IT industry.

For instance, there are sporadic documented studies on the health and safety issues in the Indian software industry. The government or civil society must carry out an exhaustive and detailed countrywide study to understand these issues in the context of the Indian software industry. Based on this study, suitable occupational safety and health guidelines, standards and best practices should be developed for the industry.

Initiatives like the UNDP-MIT,GOI (see Chapter 3) study on environmental management in the electronics industry must be used to understand the issues facing the industry and develop and promote cleaner technologies and production practices in the industry.

Policies must promote R&D, which should focus on developing more resource efficient systems and operations. The abundant technical and research skills available in the country must be capitalized upon towards this effort. For e.g., programs like the USEPA's Energy Star, which was largely responsible for the computer industry reducing PC energy use - achieved through R&D. Similarly disposal problems of CRT is provoking industry to develop flat-panel displays, such as plasma, electroluminescent, field emissions, and active-matrix liquid crystal panels, all of which use fewer toxic materials and pose fewer dangers to both the environment and workers who manufacture them.

R&D efforts must also be supported in developing clean technology, developing safer substituents for chemicals and materials used and cleaner production practices in the electronics industry.

The innumerable R&D centres that are coming up in the country (see *Moving up the Value Chain* - section 3.2.1, Chapter 3) must be made to consider environmental aspects in design. Eco-design is increasingly becoming an essential feature in IT products particularly in Europe with the introduction of product "take back" laws. This is beginning to put pressure on US hardware manufacturers as well who have large international sales.

5.1.8 Creation of awareness and strengthening civil society to increase industry accountability

To enable product stewardship policies to be effective, consumer pressure is critical. Civil society must be involved in raising public awareness regarding disposal of computers and peripherals and their impact on the environment. Consumers need to be educated on what end-of-life options are available for their computers and peripherals.

Community based initiatives towards recycle, reuse and recovery of computers, peripherals and consumables must be developed. Organizations like FORCE must publicize their service to enable more people to participate in the effort.

Given the government's administrative machinery and having witnessed the success of immunization schemes in the country this is not very difficult! Assistance of NGOs, educational institutions, local clubs and associations should be taken to promote awareness.

Programs like the Green Rating Project³ – an environmental performance rating of industry by the NGO Centre for Science and Environment, New Delhi – could be carried out for the IT industry. This involves an assessment of various players in an individual industry sector using a set of environmental performance criteria followed by a comparative rating based on their environmental performance - from good to poor. The results of this assessment are communicated to the public. Such programs are extremely useful in increasing industry accountability as well as public awareness. It has been carried out for the pulp and paper sector and a similar rating for the automotive sector is currently in progress. However, this project faced a number of challenges. Credible environmental performance data was not accessible from a centralized database. The project had to collect data through interviews, questionnaires and field visits. This is a very resource intensive activity, but due to extensive participation of a large number of the general public, information collection was possible*.

By promoting reporting and accountability projects like the GRP can add extensive value to improving the environmental and social accountability of this sector.

IT companies must also be encouraged to be proactive and train their dealers and retailers so that a customer is made aware of the availability of recycle schemes and understands the environmental and social benefits of using a recycled / remanufactured product. For e.g., HP has a take back scheme in some cities in India for laser jet toners but consumers are not aware about this scheme.

5.1.9 Increasing stakeholder engagement

Stakeholders in the present context would range from vendors, customers / clients, consumers, through government, financing institutions, (such as lenders and venture capital companies) to shareholders.

Government needs to communicate policies effectively to the industry and community. This could happen with the increasing focus on e-governance which, promises to increase transparency and accountability in governance.

* Response of industry to voluntarily join the GRP was poor. For e.g., for the pulp and paper project, letters were written to 1250 paper and pulp companies to voluntary join the project and 55 companies responded (4.4%). However most of this 4% were market leaders. For more information on the GRP see the journal *Down To Earth, July 31, 1999* published by the Centre for Science and Environment, New Delhi.

For e.g., the policy decision to allow donation of computers, imported duty free by EOU/EPZ/STP/EHTP units to recognized noncommercial educational institutions, registered charitable hospitals, public libraries, public funded research and development establishments, etc., two years after their use by the above-specified units does not appear to have been very effectively communicated. During discussions with Texas Instruments in Bangalore (a 100% EOU) it was learnt that old computers are being stored on-site because they could not donate them without paying duty on them to the Government. Stakeholder engagement here is important because it could be useful in solving the disposal issue for TI while ensuring computer facilities for an educational / public institution.

The IT industry's engagement with stakeholders in India is restricted to the annual report in most cases, dialogues with vendors, retailers, dealers and mandatory reporting to government. Communication with consumers is through conventional media and customer support services. Intel has an interesting concept of 'PC parties' through which the company holds a party for its customers and consumers at large at a public place (e.g., a hotel) to release its products. Consumers are able to use Intel products at the party and make their choices rather than have to go to a showroom to see the product. This has been a very successful strategy. Such events can be used by industry to engage with stakeholders on environmental and social issues as well.

The IT companies' only form of communication to the public and shareholders of their performance is through the Annual Report, none of which have any mention of the company's environmental performance. Multi - stakeholder engagement (suppliers, consumers, government and regulatory authorities and lenders particularly venture capital) can be achieved through a report like the corporate environmental report.

Increasingly more and more companies are moving towards system integration and providing technical (hardware and software) solutions to customers. Environmental aspects need to be integrated into the choice of technology here. This is possible only through increased engagement with stakeholders such as multiple vendors, government (to understand the policy requirements on environmental management), and customers.

Another very critical level of stakeholder engagement is between industry and educational / research institutions to build and sustain the local intellectual capacity.

Government, industry, employees, industry association, educational and research institutions, community and NGOs have to engage at multiple levels to set up policies and initiatives and establish systems if this industry is to achieve sustainable growth.

5.2 Conclusion

Most of the recommendations provided above are addressed at the Indian government and industry. This is because a performance evaluation / assessment system and the

necessary checks and balances need to be put in place prior to promoting such extensive growth of a promising sector like the IT industry.

Given the enormous incentives and relaxation of labor and environmental laws that the Government of India is proposing for the IT industry there are certain domestic policies that need to be put in place to ensure accountability and environmental and social responsibility of the IT sector.

Among the recommendations suggested above there are some cases where the MNCs with their experience can be proactive in establishing accountability of the IT sector. These include technical assistance in developing guidelines for establishment of environmental, health and safety policies and management systems, standards and guidelines for occupational health and safety, guidelines for performance measurement and reporting etc.

In fact, MNCs can serve as market leaders and using their supply chain pressures create market forces that will ensure that other domestic as well as smaller international players exhibit greater corporate responsibility and accountability.

Infrastructure development is government's responsibility but private sector initiatives through support and involvement in infrastructure projects would be necessary to increase the effectiveness of infrastructure improvement. Consortia of IT industries could support development of infrastructure along the lines of Information Technology Park and Electronic City in Bangalore.

In essence therefore, proactive environmental policies and progressive labor reforms by government, voluntary initiatives by industry, experience sharing by MNCs and greater awareness and involvement of civil society would be essential to increase accountability and responsible environmental and social management. This would then contribute to providing an enabling environment that will enhance environmental and social responsibility of industry. In addition, extensive stakeholder engagement both by industry and government will ensure that these policies are translated to the ground level and are made effective.

¹ The first formal and comprehensive attempt to evolve a code of Corporate Governance in the context of prevailing conditions of governance in Indian Companies as well as the state of capital markets, was made when the Securities and Exchange Board of India (SEBI) appointed a Committee on May 7, 1999 under the Chairmanship of Mr. Kumarmangalam Birla (a corporate leader) to suggest measures for promoting and raising the standards of Corporate Governance. In a meeting held on January 25, 2000, SEBI accepted the Committee recommendations and issued suitable guidelines for implementation of the recommendations in a time-bound manner. More details about the recommendations are available at <http://www.sebi.com/home.html>

² <http://powermin.nic.in/nrg25.htm>

³ For more information on the Green Rating Project contact CSE at the website <http://www.cseindia.org>

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Date	13/07/00

Transcription of the Interview:
On the formation of the organization:

Agilent was officially formed in November 1999, the result of a vertical split with the Hewlett Packard International. The two organizations currently operate from the same premises in Bangalore, India , but this is expected to change by October 31, 2000, with the acquisition of independent premises.

On the structure of the organization:

The parent company is HP International, with HP India as its Indian subsidiary, comprising HP Software and Hardware (PCs and Peripherals). Now, in parallel are Agilent (Sales and Marketing of Medical instrumentation) and Verifone.

On the operations of the organization:

In India, Agilent markets measurement equipment, high-end medical equipment, and chemical analysis equipment (a very small segment of the market). No manufacturing takes place here; products are merely assembled with components predominantly outsourced from Philippines and Taiwan.

On the EHS Policy of the organization:

Currently, Agilent has adopted the same EHS policy as HP, which is translated across all facilities. Agilent's EHS in India is currently not considered a strong requirement, as operations are entirely geared towards sales and marketing. However, they do have a separate EHS head, based in New Delhi.

There seems to be no evidence of customer awareness in terms of buy back schemes etc. in current marketing strategy.

On the grey market for computer hardware in India:

Bangalore does not seem to have as large a market for disassembled components as Mumbai, largely due to very different socio economic circumstances in the two cities. Bangalore is characterized by a population with high technical skills geared towards the IT and related sectors. Further, the strong presence of MNCs in the IT sector has meant a stress on quality electronic products and, therefore, a low reliance on the grey market.

On HP in India:

HP has a manufacturing facility in Bangalore , India for PCs and peripherals. HP earlier had a year long collaboration with a local company, Hindustan Computers Limited, for sales and marketing of HP computers and servers. This was subsequently dissolved.

Obsolete machines are remanufactured at the HP manufacturing facility itself. The company's recycling program for cartridges and toners (prevalent in the UK, HK and Taiwan) is not present in India, but periodic buy back schemes are held in some select cities. In this regard, Agilent has a channel partner in Tech Pacific, which organizes the collection and shipment for these peripherals.

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Interviewer	Dr. Radha Gopalan (Telephonic), EMC
Date	17/07/00

Transcription of the Interview:***On the organization's presence in India***

In India Agilent provides sales, marketing and on field implementation in terms of installing and providing service for the equipment provided.

Agilent's presence in India is testing and measurement equipment and health care solutions, currently occupying 70% of the market share in health care solutions, and about the same in testing and measurement. Agilent does not carry out any manufacturing / assembly in India nor R&D. Manufacturing is carried out at Taiwan and in the USA.

On the competition faced by the organization in India

The only competitor to Agilent in the health care solutions sector is WIPRO-GE.

On the organization's EHS policy in India

Agilent's codes of conduct are translated *to the extent possible and applicable*. Environmental, safety aspects are adhered to, such as non usage of materials like Lead and Asbestos, and stress on appropriate ergonomics at the workplace.

On the organization's assembly and distribution operations India

Third party sourcing of components is done locally for accessories such as cameras for equipment etc. The selection is through a defined vendor selection policy implemented by Agilent Technologies India.

On the predominance of South East Asian countries like Taiwan and China in hardware manufacture, over India

Due to complexities in inter-State taxation, bureaucracy, low productivity and lack of skilled labor for manufacture, hardware manufacture in India has been low. The preferred locations for manufacturing are Taiwan and other parts of SE Asia.

On the organization's vision in India

To be market leaders.

Interviewee	Mr. Amal Anand D'Silva
Organization	Summation Electronics India Ltd.
Designation	Director
Official Address	Tel.+91 22 4310492
Interviewer	Dr. Radha Gopalan , Ms. Lavanya Karthik, EMC; Personal interview in Mumbai
Date	04/07/00

Transcription of the Interview:***On the "grey market"***

The grey market essentially comprises vendors who underinvoice, or take cash payments for machines, passing on the benefits of excise non-payment to the customer. There is very little customer support offered by these vendors. Legitimate dealers would have proof of excise tax paid and would include this in the cost to the end user. Such firms are differentiated by the level of customer support they provide.

On trade in hardware in India

Import duties are currently restrictive, and not followed for individual components but only on complete system. This is responsible to some extent for the growth of the assembled PC market. Components are direct imports; the importer typically sells to select dealers, and does not interact with individual end users as retailer.

On trade in the grey market in India

This comprises largely components and peripherals. Prior to Intel's advent into the market, CPUs were also predominantly from the grey market. Aggressive marketing on Intel's part, however, has enabled Intel to corner a substantial part of this market.

On hardware manufacture in India

Manufacturing in India is low; local firms barely survive the competition from Taiwan, China, etc. Taiwan currently produces 60% of the motherboard quantum for India.

On whether the grey market is specific to SE Asia

It is quite prevalent everywhere, including the US.

On the applicability of the Factories Act to hardware manufacture:

Factories Act is applicable wherever excise tax is applicable.

On the effects of Excise Tax on the hardware market

Profit margins being low (2-3%), additional taxation becomes a liability for sellers. Some companies have found ways to relieve the burden of excise tax from resellers. HP, for instance, pays the 4% excise on transporting its machines from outside Mumbai (i.e., from New Bombay) to warehouses in South Mumbai, thus freeing resellers from having to pay this amount. Other companies, like Compaq, operate separate warehouses in Mumbai and New Bombay. Machines bought from the former cost more as the excise is transferred to the buyer, but have the added advantage of customer support. Machines sourced individually from the New Bombay warehouses may be cheaper, but come with no customer support.

Interviewee	Mr. V.P.Baligar
Organization	Government of Karnataka
Designation	Commissioner for Industrial Development and director of Industries and Commerce (now Secretary, Department of Power)
Official Address	Rashthrohana Parishat Bhavan, 14/ 3A, Nrupathunga Road Bangalore - 560 001, Karnataka, India. Tel : +91 80 2212503 (F) +91 80 2211018 Email : baligar@industry.kar.nic.in
Interviewer	Dr. Radha Gopalan, Ms Lavanya Karthik, EMC; Personal Interview in Bangalore.
Date	14/07/00

Transcription of the Interview:
On environmental clearances for the electronics sector:

Some electronics units i.e., polluting units require clearances while software and assembly do not.

On State attitude to the IT sector:

The State is essentially IT friendly, and aims to educate but not regulate industry on environmental issues. The Government has also set up two portals, Karnataka_industry.com and Investin_karnataka.com

On State initiatives in Cleaner production:

Training and incentives are being provided to industries to promote Cleaner Production, EMS and QMS. This is the First State to have provided such incentives. The first State Cleaner Production Centre was set up in Karnataka with technical assistance from UNIDO and NCPC, and wholly funded by GOK.

On industrial zoning in the city:

Initially there was no demarcation between IT and electronics. Now, industrial zoning is being initiated through schemes such as Electronic City. Two other Electronic Cities are proposed in Mysore and Dharwar. An IT corridor is proposed between Electronic City and Whitefield, with assistance provided by a Singapore Consortium. 3-4 IT Parks have been approved for the State. Specialized parks are preferred. Land for these parks will be provided by the GOK but the establishment and operation of parks is to be the responsibility of the respective industries' associations.

On infrastructure :

There is currently a generation shortage of power by 15-20% . Distribution is comparable to other States. Distribution is soon to be privatized and billings have already privatized in some parts. Captive power is being supported as an interim arrangement till the State is power sufficient, mainly to encourage growth of the IT sector.

Software companies are being allowed to set up operations in residential areas to enable proximity facilitating flexi hours. This is creating pressure on local utilities. Residential land use change is being encouraged to eventually move to SOHO. For this infrastructure is being augmented in terms of power, roads and water. This will reduce traffic congestion as well since business districts will be decongested. The idea of IT Townships is being encouraged Several, such as the Electronic City township and the ITPL township are already in the pipeline.

On component manufacture in India :

In the long run it will be cheaper to source components from India but in terms of technology we are currently still lower in the learning curve.

On simplification of labor laws:

Several amendments to existing labor legislation are awaiting approval, such as flexi times, night shifts for women and the declaring of IT as an essential service, thereby exempting it from some clauses under the Industrial Disputes Act . Further, the sector shows little sign of unionization, which may be due to the high turnover of labor: attrition rate is currently around 9-10%.

On the problem of disposal of obsolete computers:

The Government is not aware of the management of obsolete machines, or any problems in their disposal.

Interviewee	Mr. Shalabh Jain (1), Ms. Renuka Raman (2)
Organization	Compaq Computer India Ltd.
Designation	(1) Director Business Operations (2) Manager Customer Satisfaction and Quality (Process Quality)
Official Address	Compaq Centre 92, Industrial Suburb II Stage, Yeshwanthpur, Bangalore - 560022, Karnataka, India. Tel : +91 80 337 4785 (F) +91 80 337 4601 Email : shalabh.jain@compaq.com
Interviewer	Dr. Radha Gopalan, Ms Lavanya Karthik, EMC; Personal Interview in Bangalore
Date	12/07/00

Transcription of the Interview:
On the organization's presence in Indian market:

Compaq India is a 100% subsidiary of Compaq Inc. Compaq first set up a small marketing office in 1992 became a branch office in 1994. Local trading started in 1996 and in 1998, Digital worldwide was acquired. Desktops manufacturing began in Digital's factory in Bangalore on March 23 1999. 10,000 sq. feet is the current manufacturing area in this facility. Currently production includes VACs, home PCs, desktops. 100,000 machines rolled out till 2000 July. Expected to start production in servers, notebooks in the next 2 months.

No manufacturing takes place in India, only assembly. Components are sourced from Taiwan, Malaysia, USA and Mexico-based vendors- all approved by IPO. Only power cords and packaging is locally sourced. Strict vendor selection criteria are followed for all components including packaging.

There is no sub-contracting / R&D / design in India.

On employee size in India:

Currently 400 people are employed nationwide for marketing, sales, manufacture etc.

On manufacturing in India:

There is essentially an absence of manufacturing due to poor logistics, lack of critical mass in terms of PC penetration and poor infrastructure. Perwanoo in Haryana and Girgaun as well as Chandigarh are being encouraged by GOI as potential manufacturing sites but lack of trained manpower could be a deterrent. An ideal location would be Chennai due to proximity to the SE Asian market for sourcing components. However, skilled manpower and technical education as well as the historic strengths of Bangalore in terms of electronics still makes the latter the best option, and Hyderabad a close second.

On the disposal of obsolete machines:

Obsolescence of computers in India is 2% per week so in 50 weeks value of a machine is effectively zero, but this is dependent on the efficiency of inventory control, which is good in Compaq. The computers used in-house are donated to schools / colleges at the end of their useful life.

On Corporate Codes of Conduct:

All safety, environmental and health related guidelines and codes as prescribed by Compaq are applicable in this facility. Regular 6 monthly EHS audits are conducted by the Principals. No staff audit is carried out unlike ISO.

This is a ISO 9002 location, but ISO 14000 is not considered critical. Induction programs for training of employees to EHS policy are held. The plant layout is not prescribed by Compaq Inc. but safety standards, equipment and process are as per Compaq Inc's specs and are auditable.

On environmental clearances:

Annual inspections are carried out by the Karnataka State Pollution Control Board to renew the Consent.

On the absence of unionization in the facility in India:

There is no unionization since

- (a) scale of operations is low and automation is high
- (b) skilled hi tech labor is used (atleast diploma level with high computer familiarity) , and
- (c) the employee strength on the shop floor is low

Interviewee	Prof. D M Dhamdhare
Organization	Indian Institute of Technology, Mumbai
Designation	Professor, Department of Computer Science Engineering
Official Address	Department of Computer Science and Engineering Indian Institute of Technology, Powai Mumbai – 400 076
	Email: dmd@cse.iitb.ernet.in
Interviewer	Dr. Radha Gopalan (email), EMC
Date	28/07/00

Transcription of the Interview:

On what constitutes the hardware sector in the IT industry:

PCs and servers, wireless and networking components, modems, scanners, biometric devices.

On the focus of the Kanwal Rekhi School of IT, and its difference from Computer Science and Engineering:

Their roles are complementary. CSE Department is concerned mainly with development of theories, techniques/algorithms and technologies. It is also concerned with applications. The School of IT is mainly concerned with deployment of technologies and applications. It is also concerned with development of technologies for specific application areas.

On the focus of the educational policy and academic / education system in the country in response to state thrust toward the It sector:

Various new degrees in IT have been formulated by Universities. Training institutions are developing programs aimed at various segments in the IT market. Many universities (rather, state governments) are thinking of introducing minors in IT in various professional degree programmes in Science, commerce, law, medicine, arts, etc.

On whether there is a skewed growth in academics of IT as a discipline vis-à-vis other engineering disciplines, given the thrust to the IT sector:

It is not really skewed. It is more a case of lack of focus. This arises from an inability to understand exactly what is needed to be taught. This problem is seen all over the world. Hence moves in many different directions are seen. It is more like firefighting. A manpower need of one kind is perceived to be needed and attempts are made to try to develop a training/educational programme for it. Soon another need is perceived. This is inevitable given the fast pace of development. The focus of the IT industry has primarily been on software in India.

On the likelihood of increase in domestic hardware manufacture, and India's resource capabilities to making hardware as economically significant as the software sector :

Reservations regarding whether India had the infrastructure and financial resources to do hardware manufacture in India. Human resources either exist or can be generated by the system relatively easily, but not the infrastructure and financial resources.

On the policy thrust on indigenous R&D and hardware manufacture:

There has not been much of a thrust on indigenous R&D. Prof. Dhamdhare was a member of the working group on R&D of the IT task-force appointed by the Central Government. The group recommended some steps to give a boost to R&D. Some of them found their way into the task-force report. However, much more needs to be done. R&D should be a vital component of India's strategy for the future.

Interviewee	Dr E. V. Ramana Reddy
Organization	Department of Information Technology, (DoIT) Karnataka
Designation	Director
Official Address	Department of Information Technology No.9 III Floor, UNI Building, Thimmaiah Road, Miller Tank Bed, Bangalore – 560 052 Tel.: +91 80 2262466 / 2262450 Email: itdir@bangaloreit.com
Interviewer	Dr. Radha Gopalan (email), EMC
Date	03/08/00

Transcription of the Interview:***On the DoIT:***

Karnataka is not the only state to have an independent Department of IT. Few other states like Andhra Pradesh, Maharashtra and Rajasthan also have an independent Department of IT. This department basically looks after the promotion of IT industry and e-governance in the state.

The Govt. of Karnataka has recently launched "Mahithi", the Millennium IT Policy. Most of the aspects covered in the policy are state specific. The Ministry of IT, Govt. of India gives policy directives with reference to the National Long Distance Operations, Telecom infrastructure, Connectivity to international gateways, Undersea Optical Fibre Connectivity, etc.

On any specific policy guidelines laid down by the DoIT:

The Department of IT does not lay any policy guidelines regarding labour, environment and infrastructure. The guidelines in this regard are laid down by the concerned departments. The Department of IT is only trying for simplification of these guidelines and procedures for the IT industry through the respective departments.

On the focus of DoIT:

The Department of IT is not focusing only on software, but is trying to promote both hardware and software industry. The basic objectives of Government of Karnataka in IT sector and also the various incentives and concessions being offered by the Government are already illustrated in the " Millennium IT Policy " of Government of Karnataka.

Interviewee	Mr Somnath Chatterjee
Organization	ELCINA
Designation	Secretary General
Official Address	Email: somnath@elcina.com
Interviewer	Dr. Radha Gopalan (via email), EMC
Date	03/07/00

Transcription of the Interview:
On the scope and coverage of ELCINA, and its representation of the electronics component sector in India:

ELCINA is India's oldest and largest electronics association set up in 1967. Membership of ELCINA is drawn from public sector as well as private sector including foreign companies. Member companies range from large and medium units to the Small Scale Industries (SSIs) units. Current direct membership is above 250 companies located all over the country. While well integrated hardware manufacturing companies can become members of ELCINA, the focus is on components - the building block of the IT and electronics industry. ELCINA membership would constitute of about 95% of total component production in India's organised sector. Considering the total IT and Electronics hardware output, the member companies would contribute well over 70% of production since large integrated companies like ITI, BEL, ECIL, CEL, all major state electronics corporations, private sector integrated companies like BPL, Philips, Samtel, LG Hotline, etc. are members of ELCINA.

On the size and nature of the operations in the electronics component manufacturing sector:

Due to the past delicensing policy of the government for SSIs in electronic components, there are numerous small scale units in component sector. In the organised sector, the number could go up to about 80 units. However, with restructuring within the industry in the post liberalization period, there has been consolidation as well as expansion accompanied by several acquisitions and mergers. Hence within each sector of component, large units dominate the market shares. Typically the size is large for the more capital intensive sectors of components like picture tubes, semiconductors and the more sophisticated components. But in other sectors, the picture is mixed with both large and small units coexisting. In the present dynamic market environment, the role of large units is becoming increasingly significant in terms of market share in both production and export. Units are distributed fairly evenly across the country barring the north eastern and eastern region. Well development clusters are found in and around Delhi (Okhla, Noida, Ghaziabad, Faridabad, Gurgaon, Bhiwadi and then stretching upto Chandigarh and Jaipur) Bangalore, Hyderabad, Pune and Mumbai belt. Chennai and Ahmedabad are among the other smaller clusters.

On ELCINA's role in the entry and functioning of MNCs in India:

ELCINA's mission is to promote electronics and IT hardware manufacturing focusing on components. It is neutral to the operations of MNCs or any foreign company as long as the focus is on manufacturing. In fact, ELCINA has been encouraging joint ventures and entry of foreign companies in the field of sophisticated components and also conventional components. The association is closely working with the EXIM Bank and UNIDO to promote such joint venture and investment by MNCs.

On the key elements of electronics component manufacturing in India, and the predominant markets for products:

ELCINA members manufacture a wide range of electronic components. Electromechanical and passive components are the areas of strength apart from TV components including picture

tube. Over 20% of the components manufactured in India are exported. Considering the criticality of volume production with stiff global competition, exports will continue to play a critical role. Economics of component manufacturing strongly demands export operation since the domestic market is too small in case of almost all components. ELCINA services to its members are also tailored to promote exports. Among other things, the recent launch of a B2B facility at ELCINA website www.elcina.com is yet another such commitment to promote exports and international business.

On the regulatory framework for the electronic component sector:

There is hardly any regulatory framework for entry and production. This is absolutely liberal. Foreign participation is also encouraged by the government. The main problems are with regard to the regulation on trade procedures at the customs and excise. This aspect is crucial since transaction time and cost for IT and electronics matters more in this sector and India is way behind due to the regulatory policies in this area. The IT Action Plan II Report (or the hardware panel report) of the National Task Force on IT & SD which recommended pathbreaking policies in the area of trade procedure have not been implemented posing serious concern for the Indian industry. This task force was set up by the Prime Ministers Office in 1998 but no action has been taken so far.

On the procedure for environmental clearance/ licensing in this sector:

There is nothing specific as such but the MIT (Ministry of Information Technology) is understood to be working on environmental clearances for IT and electronics. ELCINA is associated with the bodies working on these issues.

On the presence of unionization in the sector, or of support groups/ NGOs:

This aspect is same as any other sector. There are some NGOs scattered across the country involved in studying various aspect concerning labour.

On the practice of any export related environmental codes, such as EMS and the ISO 14000 in the sector:

Quite a few members are working on ISO 14000 and ELCINA is also creating awareness on this. Few workshops on EMS in collaboration with MIT, UNDP and Rajiv Gandhi Foundation are slotted for this calendar year. ELCINA has a panel of experts to assist members on ISO 14000.

On the nature of the competition India faces in electronic component manufacture, and the advantages that competing countries enjoy:

Like many other sectors of the Indian industry, China is emerging as an important competitor for India both in domestic as well as the export market. The competition is more from the Far East. Inverted customs duty structure, poor infrastructure and trade procedural delays are seen as areas where the competitors have an edge. While quality, standards and prices are acceptable internationally, operational problems in this highly capital and technology intensive industry remain as the major stumbling block. On the whole, there is enough indication that the industry has geared up to face competition but the government policies for the IT and electronics hardware sector are not favourable. This view is also expressed by MNCs exploring India as a manufacturing base.

Interviewee	Mr. Padam Jain
Organization	FORCE
Designation	Director
Official Address	Email: pdj@vsnl.com
Interviewer	Dr. Radha Gopalan, Ms Lavanya Karthik, EMC
Date	Personal interview in Mumbai 06/07/00

Transcription of the Interview:
On FORCE:

The organization is about four years old, and dedicated to acquiring used computers and peripherals from corporates, repairing them and donating them free of cost to disadvantaged schools in the urban and rural areas. No fees are charged whatsoever from the academic institutions. Even 286s have been found useful, mostly in village schools. The organisation is dependent on donations from concerned NRIs. It has no other branches in India, nor does it invest in promotion.

On the consequences of FORCE's initiatives:

It has been found that the introduction of computers in schools has caused several positive changes. Attendance has gone up, as has interest in learning about the computer. Also, such schools invariably graduate to higher grades of computers on their own volition.

On Organizations involved in FORCE:

The Rotary Club, (of which Mr Jain is a member), assists FORCE in running a Computer Literacy programme in the Bombay and Thane districts. For a nominal fee, poor and unskilled people may learn to operate computers and become conversant with various software packages. Hardware is provided by the Sterlite foundation. Thirteen such classes are currently in operation.

On Energy inefficiency in computer usage:

Power is a key issue; Karnataka, for instance, has a severe shortage, not adequately resolved by generator sets, flexi time schedules etc. An estimated 150 watts is the energy consumption per machine, with upto 2000-3000 watts required for parallel processing

On the software industry in India

Except for culture specific software like Tally (an accounting package developed indigenously), the production of original software lies primarily in the US. What does exist here is a large potential for software solutions, customised programming for specific clients.

On the hardware industry in India

There is very little hardware manufacture and this also largely assembly operations. IBM is a case in point, with components sourced globally and assembled in local facilities. The competition such firms pose is tremendous; GEPS India, once manufacturer of some of the world's top ranked monitors were forced to cease operations (5 years ago) in the face of competition from IBM. (Mr Jain is currently a non-executive director for GEPS India) .

The India USSR hardware connection

The software industry in SEEPZ (SantaCruz Electronics Export Processing Zone) , Mumbai, is currently facing a gradual phasing out, a large part of which may be directly linked to the transformation of the USSR. Formerly, the USSR was a key destination of products either made in the SEEPZ, or routed through it from other countries. The changing economy and

political situation in the USSR has meant a significant fall in this trade for the SEEPZ. The Zone is today largely a training ground for recruits who are subsequently deputed, or themselves migrate, to countries like the States. This is true not just for smaller firms but also sector giants like Infosys..

On the Impact of the Software industry on urban development

Setting up operations in Bangalore works out significantly more expensive than establishing the same in Mumbai. As mentioned earlier, the load on scarce resources like power and water is tremendous; the resultant urban development further causes escalations in real estate values and cost of living, and pressurizes existing infrastructure.

On hardware recycling in India

Disposal of used/ unwanted PCs is now a serious problem in the States. In India, we are still a long way away from needing to worry about landfills, solvents use, etc. because of the extent to which recycling happens. The component has a much larger life span before eventually reaching its grave, from successive entrants into the supply chain like assembled parts, the “bhangaar” (scrap dealer), and organizations like FORCE! Recycling has changed with changes in PCB technology. With increased use of SMT, dismantling a PCB has become increasingly difficult. The average illiterate “bhangaar” can no longer break a component down for sale; the PCB is sold entirely.

On Corporate attitude towards charitable donation of used PCs

Currently, volume of donations is low. Pro-donation will is low, with companies preferring to junk or sell old machines as scrap. Alternately, donation is actually used as a kind of e-sop to employees. Digital, or Microland in Bangalore are cases in point; the firm donates used machines to schools, thereby aiding the admission of its employees wards into the same institutions!

Interviewee	Mr. K.S. Narahari
Organization	IBM India Ltd.
Designation	Country Manager, Corporate Communications
Official Address	Golden Tower, Airport Road, Bangalore 560 017, India. Tel: +91 80 5094307 , +91 80 5262355 Email: knarahar@in.ibm.com
Interviewers	Dr. Radha Gopalan, Ms Lavanya Karthik, EMC; Personal Interview in Bangalore
Date	14/07/00

Transcription of the Interview:

On the organization's presence in India:

IBM's operations in India cover software, hardware, software solutions and research. IBM re-entered the Indian market in 1992, with a JV with Tata. By Sep 1999, IBM's stake in the venture has risen from 50% to 99%. The company in India is now more aligned with IBM worldwide.

IBM started with a bonded warehouse in Pondicherry, and gradually developed an assembly plant there. Desktop PCs assembly was started here in November 1999. Plans are on to assemble Intel-based entry-level servers by the end of the year. Higher level servers, such as the AS 400 and the S390 are currently not assembled in India. Components are largely manufactured in Singapore and Poughkeepsie, by IBM certified vendors.

On the organization's performance in India

Computers Today recently ranked IBM # 4 in India for revenue, this having risen from Rs. 838 crore in 97-98 to Rs. 182 crore in 1998-99. The market share for the Think Pads series alone is 26%.

On the organization's R&D program in India

IBM has developed an R&D lab, located on the campus of the Indian Institute of Technology, New Delhi, India. This facility is about two years old, and interacts with the other seven IBM labs worldwide as required, on e-biz solutions, speech recognition, weather forecasts, VAPs, etc.

For the sixth consecutive year, IBM has registered the highest number of patents for a firm of this kind (over 2000+)

The Solutions Partnership Centre (Bangalore) is one of ten such IBM centres in the world, focusing on interfacing with independent software vendors with original applications. These are then structured for compatibility with IBM net-based platforms like the NetFiniti, certified and branded as IBM products. So far, 95 such products have been certified.

An E-Biz software centre was opened in Gurgaon last month, focusing on solutions in banking, insurance, etc.

On the organization's employee strength in India

Currently 3000 people are employed country wide, which figure is likely to rise soon to 5000.

On the organization's Corporate Codes of Conduct

These are applicable in all facilities worldwide. An Annual report is prepared by the principal Company, covering worldwide facilities.

On the organization's vision in India

IBM seeks to be a leader in the IT industry, not merely in products but also in technological development. In addition, the organization promotes mass computer literacy in schools and colleges as a good way to increase market penetration.

On the organization's community based initiatives

- Hardware and software donated to the Bharatiya Vidya Bhavan's school for free computer education to the economically disadvantaged. Also, a commitment to underwrite O&M for the school for three years.
- MoU signed with Maharashtra Government to offer free copies (not requiring licensing) of Lotus Notes, etc. to all government schools and colleges in the State.
- Donation of machines and training expertise to the Victoria School for the Blind, promoting use of software and hardware for the blind ,a pioneering effort by IBM.

On why hardware manufacture is so low in India

This is basically because of a lack of buying volume. Local Manufacture offers three advantages: Faster customer service, streamlined, efficient inventory control, and greater ability to customize machines to customer specifications; all these need large volumes to sustain operations.

On the organization's pioneering efforts in IT development in India

IBM has been a pioneer in developing Operating Systems such as DOS, and Lotus in Hindi. Plans are on to do the same in other regional languages.

Interviewee	Mr. Shiv Sunder
Organization	Infineon Technologies
Designation	Manager, Human Resources
Official Address	International Tech Park, Whitefield Road, Bangalore - 560 066. Karnataka, India.
Interviewer	Dr. Radha Gopalan , Ms Lavanya Karthik, EMC; Personal Interview, Bangalore
Date	17/07/00

Transcription of the Interview:
On the organization:

Infineon Technologies, formerly Siemens Semiconductors is now registered as an independent company with Siemens holding 75% equity. The facility in Bangalore is the design centre for software. This is a 100% FDI.

On the organization's operations in India:

The focus of operations has shifted from hardware design to embedded software, which is useful in wireless, automotive remote access, in industrial networking etc. Now, all products are sent to Munich and manufacture occurs in Europe and US. Manufacturing facilities are located in Indonesia, and China and Singapore (predominates). No separate annual reports / balance sheets are prepared by In Tech in India, as they are part of the Asia Pacific Profit Centre. The facility in ITPL is a cost centre and not an independent profit centre, oriented to 100% export and provides no local services.

On environmental clearances required by the organization in India:

Environmental clearances are not required by the individual companies, but obtained by the facility owner (ITPL). The Park does not require a periodic reporting from the lessees but makes it mandatory for them to conform to all safety drills, and maintenance requirements of common areas within the complex. Clearances required pertain to export related activities for e.g., those with bonded warehouses have to take care of the duties and other requisite EOU clearances.

On the organization's corporate codes of conduct:

Corporate codes of conduct are more in the form of ergonomics, health and safety and the policy is mandated by Infineon Techno in Munich, and applicable across all facilities. Performance is assessed by an annual corporate security audit conducted by a team from Munich. The focus of this is to codify practices to ensure security of information as well as health and safety.

On labour:

All employees are permanent and contracting is done only for administrative services. No technical work is contracted out. Working hours are 42 hrs. a week . 8.30-5.30. 5 day week, which is actually less than the ceiling limit laid down by the Shops and Establishments Act.

On the organization's environmental performance:

Office policy espouses minimal use of paper, through use of email and back to back printing. Printer cartridges are refilled and reused.

On the organization's efforts towards employee health:

No explicit awareness programs regarding occupational health have been held. However, complaints regarding exposure to screen radiation, etc., have been attended to through the issue of protection devices and antiglare screens.

On the organization's efforts towards quality control:

A QMS program is going to be initiated and 100% compliance will be demanded. Internal property security is already rigorously ensured.

Interviewee	Ms Rema Menon
Organization	Intel Asia Electronics Inc.
Designation	Head of Public Relations
Official Address	9 th Floor, Du Parc Trinity, 17 MG Road, Bangalore - 560 001, Karnataka, India. Tel : +91 80 555 0940 (F) +91 80 555 0943 Email : rema.menon@intel.com
Interviewer	Dr. Radha Gopalan, Ms Lavanya Karthik, EMC Personal Interview in Bangalore.
Date	12/07/00

Transcription of the Interview:***On the organization's operations in India:***

Intel in India has three operations: sales and marketing, strategic positioning of Intel, and a software development centre.

In India the programs they run are

(I) Genuine Intel Dealer to ensure responsible products to customer and educating the dealer / assembler of machines. This also ensures that cost-effective, optimally priced and quality systems are available to the customer.

(II) Investment in intellectual skill development by programs such as Teach for the Future. Cooperating with NCERT and schools to promote computer literacy, ICEF to promote scientific temperament in children, and working with the Salaam Balak Trust for destitute children.

(III) Support for Internet economy.

Intel has extensive activities aimed at community enrichment. PC Parties are held to increase access of users / customers to PCs.

No production activity is carried out in India. A Development Centre was set up in 1998. About 100 people are being trained abroad for the Centre, which is focused on software development for e-business. Approximately 70 people work in the Bangalore office but at any given time about 40 people are there in office.

From chipset manufacturing, Intel wants to move on to being a provider of all services pertaining to the Internet.

Interviewee	Mr. R. Chellappa
Organization	Indian Printed Circuit Association
Designation	Secretary General
Official Address	Rose Cottage, No. 33, ITI Layout, Vijanapura, Bangalore – 560 016 Tel.: +91 80 8511772 Email: pcbindia@vsnl.com
Interviewer	Dr. Radha Gopalan, EMC (via email)
Date	/07/00

Transcription of the Interview:

On IPCA's activities and the size of its current membership:

The Indian Printed Circuit Association, IPCA, is the first of its kind in the country and in fact it is the only Association representing the interests of the PCB manufacturers and users devoted to promote the welfare and progress of PCB Industry in this country. It is a voluntary, non-profit, service oriented professional organization, comprising technical personnel and leading experts of PCB manufacture as members, formed with the main objective of promoting the state-of-art PCB technology, by mutual exchange of ideas and technical interaction arranged through Seminars, conferences, etc, periodically.

The PCB technocrats who have enrolled themselves as members were only fifteen to begin with and today with the expansion of PCB, the membership has risen to an appreciable level of hundred and thirty, aiming to cater to the advancement of education and technology in the science and application of electronic packaging. The leading public sector units of both Telecommunication and Defense who are the major users and manufacturers of PCBs are in the rolls of the association along the membership of private small scale, medium and large scale PCB manufacturers, raw material and equipment manufacturers in the country.

On the volume of PCB manufacture in India :

The activity of PCB manufacture is widely spread throughout the length and breadth of the country with the region-wise distribution of 28% of the manufacturing units in north, 27% in South, 38% in the west and with a figure of 7% in the East. Based on the type of boards produced today, SSUs (Single sided) comprise 76% of the PCB manufacturers, the large scale (LSU) -15% and the medium scale units accounting to only 9%, in which the south has a higher percentage of LSUs (24%) than other regions. The north on the other hand is dominated by SSUs (90%)., The smaller shops available in the country is around 120 in numbers and the total including all the type of units is around 160 and IPCA is truly a representative body of this sector in this country with an appreciable membership of 130 on its rolls as on today.

The total installed capacity of PCB manufacture in the country is around 1500 thousand square meters per annum comprising the following product mix. The current volume of manufacture during the year 98-99, was around 450 crores and the figure for 99-00, the total estimated to be around 500 crores of all types of PCBs put together as indicated above, with an investment of about 350 crores. The PCB industry in India and the member companies in particular cater to the domestic requirements of sectors like Consumer, Industrial, Telecom and Defense and to a limited extent to IT and computer sectors, apart from being engaged in manufacturing of boards of about 20-25 % for export to other countries as well

Details of products manufactured:

- ◆ SS- Single sided
- ◆ DS- Double sided
- ◆ ML- Multilayers
- ◆ Flexible Circuit Boards

Layer counts: Capacity is available indigenously to manufacture even up to 12 layers
Normally boards are manufactured in bulk up to 8 layers, with
4 layers at a sizeable percentage of 80.

Line Widths: Capabilities have been established to handle line width up to 5mil space
and width (Three line between IC Pins). Normally the line widths
handled are at 8 mil space and width.

Technology: State-of-the-art is on par with any of the international Standards, specifications
and requirements, with moderate out flow of export being established over the past few years.

On IPCA's involvement in any policy level activity for the sector:

There is no such involvement.

On the main market for components:

The PCB industry in India and the member companies in particular cater to the domestic
requirements of sectors like Consumer, Industrial, Telecom and Defense and to a limited
extent to IT and computer sectors. Major portion of the PCBs manufactured are for domestic
consumption with 20-25% of the produced being exported to other countries as well from a
few units.

On any incentives offered to the sector by the government:

Occasionally certain anomalies of concessions are noticed on duty structure or in the
incentives to exporters etc. are being represented by the Association to the relevant
governmental forum for redressal.

On guidelines for appropriate environmental performance for the sector:

The environmental requirements of the industry are looked after by the units themselves with
appropriate waste treatment procedures and plants installed, controlled and periodically
monitored as per the stipulations enunciated from time to time by the State Pollution Boards.
IPCA is very active and aware of the environmental issues facing the industry and it is
actively participating in the Environmental Management program organized by the
Department of Electronics, an apex governmental body in the country, which has undertaken
a project on "Environmental Management in Semiconductor and Printed Circuit Board
Industry in India" duly funded by UNDP. IPCA represents itself in all such activities,
meetings and programs with the apex body, supported with the information and data required
on environmental issues of the industry, readily offered by our member-companies, relating
to their units.

On whether hardware manufacture is receiving adequate attention from the government:

Yes, with limitations, depending on the size, volume and the value of output generated and
also on the functional importance of the products produced by the hardware industry. PCB
industry being considered as one of the backbones of hardware manufacture for IT industry,
enjoys and receives adequate attention from the government with all possible incentives that
could be considered in its limits.

***On why manufacture of PCBs is still predominantly in countries like Taiwan, Malaysia
and China, and India's potential thereof:***

The PCB industry in India is well placed to undertake a substantial export effort, in addition
to meeting the growing demands of the domestic market, although the Indian PCB industry is
an obscure world player producing only USD 80m worth of PCBs in a world market of USD

25 billion approximately. Some of the reasons for the poor growth of this industry in India are due to:

- ◆ Lack of infrastructure alienating major off-shore manufacturing companies for Japan, Taiwan, South Korea etc.
- ◆ Extremely high cost of capital, leaving no leeway for domestic industry to modernize.
- ◆ Composition of industry owners with low financial muscle.

The industry needs updating of its infrastructure to be on par with that existing in any of the other countries mentioned. The capacity of even the largest unit in India is only one third of its capacity when compared to even the lowest capacity manufacturer in any other country.

On whether IPCA provides training and awareness campaigns for the sector :

Yes. Arrangements have been made for short-term courses with practical hands-on training on PCB manufacture with the help of Institutions like IISC, NTTF, STQC, CETE, ETDC for the benefit of the technical personnel employed in our member companies. The Association is trying to have the programs recognized by the University and would like to ultimately see the course as being a fully recognized degree course in PCB manufacture. Also, recently the Association has launched a development project on MICROVIA TECHNOLOGY, a leading edge technology, with the help of the renowned research institution available in the country, viz., the Indian Institute of Science at Bangalore, for implementing newer technologies to the benefit of this industry. The association has always kept up its aim in arranging at least one international seminar a year and one or two national seminars. The international seminars were usually arranged through the help of IPC, USA , EIPC.

Interviewee	Mr Milind Seth
Organization	Koll-Morgan Tandon India Pvt Ltd
Designation	Facilities Co-ordinator
Official Address	SEEPZ Tel.: +91 22 829 1723 / +91 22 829 2418 Email: kti@giasbm01.vsnl.net.in
Interviewer	Dr. Radha Gopalan, EMC (Telephonic interview)
Date	27/06/00

Transcription of the Interview:***On the organization's operations in India:***

Koll-Morgan Tandon (KMT) makes components such as stepper motors for various applications such as hard disks, printers and more recently for pollution control equipment etc. They manufacture for Koll-Morgan USA and export their products to them. Largely assembly and vendor selection is done in India at SEEPZ. A large number of components are imported from China, Malaysia, Taiwan etc.

Typical chemicals required for assembly are fluxes for soldering, bonding and adhesives, solvents such as TCE, IPA etc. Clean room conditions have to be maintained during assembly but the workers do not use masks while working with solvents. Powder coating is also carried out wherein protection is provided in the form of masks.

On the requirement of environmental clearances, and other relevant legislation:

No environmental clearances are required when facilities are located in EEPZs. The only requirement is quality standards where there is a need for a clean room.

On the labour employed, and their awareness of health related aspects of the process:

Labor is cheap in India and in this facility it is labor intensive activity. They are aware that many of their solvents are ODS.

Interviewee	Secretary to the Deputy Labor Commissioner
Organization	Department of Labor, Government of Karnataka
Designation	Deputy Labor Commissioner
Official Address	Tel. +91 80 2228679 lco@kar.nic.in
Interviewer	Dr. Radha Gopalan, Ms Lavanya Karthik; Personal interview in Bangalore
Date	14/07/00

Transcription of the Interview:

On recent amendments to labor legislation in the context of the IT sector:

Section 11 and 12 of the Shops and Establishment Act have been amended. These changes allow flexitiming, but the total hours of work allowable per week remain fixed.

The introduction of three workshifts for women has been proposed, and is currently up for Cabinet approval. Such a change would make the provision of certain facilities for women in the late shifts mandatory.

Further, the Industrial Disputes Act has also been amended, keeping the nature of operations in the IT sector in mind.

Interviewee	Mr Anil Ambo (1) , Mr. Amitesh Kumar (2)
Organization	Lipi Data Systems Ltd.
Designation	(1) Consultant, (2) Assistant Business Manager
Official Address	Tel.+91 22 4310492
Interviewer	Dr. Radha Gopalan, EMC; Personal interview, Mumbai
Date	07/07/00, 19/ 07/ 00

Transcription of the Interviews:
On Lipi's operations

Lipi in India is a JV with PBT International, UK (like HCL-Hewlett Packard was). One of the products they make are compatible cartridges and toners for printers. They have 45 offices in India and it is just one year old. Lipi has been manufacturing printers for the last 6-7 years. The remanufacturing of cartridges has commenced about 2 years ago with actual production being about a year old.

Used cartridges are collected from all over the country through regional offices (47 branches in the country) and brought to Navi Mumbai where they are sorted and screened according to product category. They are then sent to the factory at Udaipur (in the Western Indian State of Rajasthan) for remanufacture. Here the cartridges are disassembled, recoverable parts separated for reuse / recycle and new toner used to manufacture compatibles. The complete collection network is still being established.

Raw materials are imported from PBTI UK, which has manufacturing plants in Florida and Surrey, UK. PBTI has collaborations in Japan and India (here it is only technical collaboration). PBTI also manufactures compatibles for Xerox etc.

Japan and Taiwan are the main source of raw material. The raw material is sent first to UK / US and then sent by PBTI to India. Lipi is looking at directly sourcing from SE Asia. Raw materials and some toner bodies are salvaged / sourced from UK and in the facility in Udaipur the components are assembled into compatible printers and cartridges. Toner bodies are also salvaged from the Indian market typically from distributors and compatibles made in Udaipur in an ISO 9001 facility. The rejected components are presently stored on site since waste disposal is an issue.

Cartridges and toners in India today are typically either (I) disposed after a single use (II) refilled and reused but eventually disposed or (III) the plastic bodies are recovered, refurbished and compatibles are manufactured that can be used for regular printers (be it HP, Epson etc.).

Refilling is done by an unorganised but not illegal market. The ink is bought from bulk importers who source it from abroad (rough estimate of market size is INR 10 billion / year). Quality of ink is not guaranteed and there is no warranty on effect of using this refilled cartridges on printers.

A very informal, illegal market also exists where the body of the cartridges and toners are used, ink/toner refilled and sent back into the market as products of the original companies. This is an illegal market.

The international compatibles market opened up about 4-5 years ago with extensive opposition from HP and other large printer and related consumable manufacturers.

On the organization's market presence:

Lipi has a niche market in India. In Mumbai there are over 17-18 centres that "take back" cartridges and toners for manufacture of compatibles.

Main clients are the Tata Group and 70-80 corporates in Mumbai. Lipi guarantees 30% savings on consumables such as cartridges and toners.

Today Lipi has 8% rejects at the market end in the total supplied some of which may not be genuine rejects. The goal is to bring it down to 1%.

On whether Government policy provide support to production of compatibles in India:

No specific policies of GOI for remanufacturing unlike in other countries where tax benefits, support of these products by Government departments, take back policies are followed.

On the need for environmental clearances while setting up the facility in Udaipur:

This facility was an expansion of an existing printer manufacturing plant, which is an ISO 9001 company.

On the presence of an Environmental Policy or other codes of practise and training in the organization:

Not at the moment but training is provided at Navi Mumbai to all the sales and marketing force to focus on the environmental compatibility of the products. Training and discussions are also held at the manufacturing plant.

On the key barriers to operations:

Resistance from customers for recycled cartridges requesting for at least 50% lower costs on remanufactured consumables. Government does not have supportive policies in place for remanufacture. Due to lack of incentives costs of remanufacture precludes low costs for remanufactured cartridges.

Outside India 40% market share is with recyclers. HP is the main competitor and is attempting to erode the compatibles market by sending fliers to customers discouraging compatibles. Warranty clauses by HP for its printers sold in India indicate that compatibles should not be used.

Lipi had to change its contents in its brochure and underplay the recycling issue due to poor market awareness in India about environmentally friendly products.

On market competition:

In India there are about 6-7 unorganized small players in remanufacture but Lipi is one of the largest players. The plant in Udaipur has a capacity of 5000 cartridges / month (roughly in India a 1999 survey said that there are 1,25,000 printers ~ 500,000 cartridges a year may be the market size). The domestic market needs to be first established but export is a long-term vision of the company. Modi Xerox may set up a compatibles manufacturing facility in Hyderabad.

In India there are: genuine cartridge providers, genuine refillers, smuggled market from SE Asia and illegal market pirating cartridges. A combination of all this is available with dealers. Therefore average price of a cartridge is many times lower than original price.

Interviewee	Mr. Vinnie Mehta
Organization	MAIT, New Delhi
Designation	Director
Official Address	mait@vsnl.com
Interviewers	Dr. Radha Gopalan, EMC (email)
Date	20/06/00

Transcription of the Interview:***On the structure and focus of the IT sector in India:***

The IT Industry in India has the following focus areas:

- Software Exports
- Software Domestic
- Hardware Domestic
- Maintenance Services of Hardware & Software and other associated services

The Software industry is above 5.6 Billion US\$ and Hardware industry and related services industry is approx. 3.5 Billion US\$. Majority proportion of the Software production (3.5 Billion US\$) was exported in 1999-2000. There is very insignificant Hardware exports.

On the areas in the country where hardware manufacturing is carried out, and the markets catered to:

The areas in the country where hardware manufacturing and integration happens are NOIDA and Gurgaon industrial areas (periphery of Delhi), Bangalore, Chennai and Mumbai. Significant to mention - a host of MNC companies and also large domestic companies - IBM, Acer, HCL, Wipro have invested in IT manufacturing in Pondicherry, recently.

On India's presence in the supply chain of the international IT market:

As mentioned earlier there is very little exports focus in the hardware industry. However, MNCs in India have started investing in assembly of low-end systems. These include IBM, HP, Compaq and Acer. Further, very recently Compaq and HP have announced assembly of high-end server as well. The IT distribution channels in India are well evolved and robust an estimated over 60% of IT sales happen through this. The rest accounts managed by the company themselves.

On the regulatory framework for the IT sector and the specific environmental and labor related legislation applicable to it:

There are no restrictions on setting up of IT units in the country. Further, all IT products can be freely imported into the country without the requirement of any license. The peak tariff on IT products is 15%. India is a signatory to the IT agreement of the WTO and in accordance will hit zero duty regime in 2003.

On the procedure for environmental clearance/ licensing in the hardware industry in India:

There are no environmental restrictions on the IT industry in India as the IT industry has been declared non-polluting and environmental friendly.

On the presence of unionization in the IT sector and other NGOs/ support groups:

There have been no/very few, if any, labour related problems in the IT industry as the labour used is high/semi-skilled and highly literate. Very few labour union exists and are not very strong. This is because IT industry focuses heavily on various employee benefit packages as retention of employees is prime on the agenda.

On the practice of export related environmental codes, such as EMS and the ISO 14000:

Quality consciousness in the IT industry is high and most international standards are practised including those for environment.

On the competition India faces in hardware manufacturing from countries like Taiwan and Malaysia, and the advantages that these countries enjoy:

Hardware manufacturing is not competitive in India due to numerous archaic, bureaucratic and procedural hassles especially those associated with exports and imports. The average turn-around time in the industry is much higher compared to its counterparts in Taiwan, Malaysia, Philippines etc.

On MAIT's representation of the IT sector:

MAIT represents the IT industry in India focusing on the domestic market development. MAIT represents the following sectors of the IT industry:

- Domestic Hardware
- Domestic Software
- IT Training
- IT maintenance and services

MAIT does not distinguish between large and small-scale operators.

Interviewee	Dr U. C. Pandey
Organization	Ministry of Information Technology, Government of India
Designation	Director
Official Address	Email: u_pandey@hotmail.com +91 11 4363107
Interviewer	Dr. Radha Gopalan, EMC (via email)
Date	07/07/00

Response to questionnaire:

Environmental degradation seriously threatens economic and social progress and poses major challenges to present and future generations. Environmental realities and developmental imperatives need to be balanced if the long-term needs of the society are to be met. During the last decade, electronics has assumed the role of a forceful leverage to the socio-economical and technological growth of a developing society. Information Technology and Electronics are the two fast emerging areas that have taken rapid strides during the last decade. There is hardly any aspect of life where presence of electronics is not felt. Indian electronics industry is at an early stage of development and is poised for globalization. Many foreign companies are now shifting their base to India.

Environmental protection and pollution abatement are the thrust areas throughout the developed world. India is committed to the environmental protection, which is reflected in its being a signatory to the Montreal Protocol. Ministry of Information Technology (MIT), Government of India which is concerned about the environmental aspects of the rapidly expanding electronics industry in India has worked closely with the Ministry of Environment and Forests, Government of India during the last 4-5 years in formulating the Country Programme for phasing out of Ozone Depleting Substances (ODS), especially in the solvent sector where usage by the electronics industry was predominant. As a follow up of this programme, MIT has also actively assisted the industry in formulating the first few projects on ODS phase out and for seeking assistance from the Multilateral Fund. During this process, it was also observed that most of the electronics units were not aware of the environmental implications of their operations. Further even in the units which have some pollution control apparatus in place, the standards followed in terms of technology, materials and environmental management were inadequate compared to those followed in advanced countries.

Electronics manufacturing requires a variety of chemicals, which are hazardous and polluting in nature. Some of them are, the variety of dopants, such as arsene, and phosphene, cyanides, hydrofluoric acid, silane and chlorosilanes, etc. Similarly, printed circuit board manufacture and assembly produces a variety of effluents such as spent copper plating solution, photoresist developing solutions, spent etchants containing ammonia, chromium, copper, plenty of waste water and CFC's. Electron tube manufacture produces effluents rich in chromium. This needs careful examination, handling and treatment/disposal. The manufacture of glass suitable for use in the CRT involves use of lead. The water emanating from this process would need proper treatment/disposal. The discharge of liquid wastes causes ground water and soil contamination. The disposal of hazardous solid and semi-solid wastes containing heavy metals in landfills causes deterioration of ground water quality in the surrounding areas and thus causes potential risk to environment. These industries are using large quantity of natural resources like water, which is a scarce commodity in certain areas. It would therefore be preferable to resort to recycling the water.

In order to ameliorate the environmental impact from processes and products related to electronics technology and to meet increasingly stringent regulations, electronics industry has to adopt increased environmental safety standards. A systematic integrated approach to environmental management would thus be necessary. This would be possible by incorporating cleaner production technologies, the adoption of process optimisation to minimise waste and improve efficiency and the substitution of hazardous raw materials and solvents by less harmful ones.

Ministry of Information Technology, in collaboration with UNDP, has drawn up a National Programme on Environmental management in Semiconductor and Printed Circuit Board Industry (EMS-Electronics), to adapt cleaner production technologies and optimal use of raw materials/natural resources by improving the process efficiency and reuse and recycling in the selected electronics industry. Development of suitable treatment and disposal methods for the waste emanating from these process industries would be a part of this programme. The areas intended to be covered include Semiconductors, Printed circuit boards, CRT, resistors/capacitors, and electro- galvanisation of component parts. On the basis of the study conducted, in each identified thrust areas, a demonstration unit would be set up in order to demonstrate the technical feasibility and economic viability of the operation. The environmentally safe technology demonstration unit so set up would be replicated in other industries.

The project is proposed to be implemented in two phases. The first phase of the project is currently under implementation. During first phase, a detailed study of selected Indian and International electronics units is to be conducted. Based on the study, a comprehensive programme for implementation in the second phase will be developed. This will include technology adaptation-cum-developmental projects, and development of an effective institutional mechanism to plan and co-ordinate multi agency programmes. A demonstration unit will be set up at one of the Printed Circuit Board manufacturing units.

Interviewee	Mr. Jaidev Raja (1) , Mr. Mahesh (2)
Organization	Texas Instruments (India) Ltd
Designation	(1) Manager, Corporate Communications (2) EH&S Officer
Official Address	Wind Tunnel Road, Murgeshpalya, Bangalore – 560 017 Tel.: +91 80 5099381 Email: j-raja@ti.com
Interviewer	Dr. Radha Gopalan, Ms Lavanya Karthik, EMC; Personal Interview in Bangalore
Date	13/07/00

Transcription of the Interview:
On TI's presence in India:

This FDI is TI's Asian R&D centre (one of only four such centres worldwide) catering solely to the parent company in Dallas. It is a design centre, primarily focused on customized chip design. The R&D centre is geared to 100% export of its output, sent through high-speed links to the principals in the US, where chips and chip sets are accordingly fabricated.

On the organization's EH&S policy:

The principals provide an EH&S policy that is to be strictly followed including building design, layout and safety. An annual report is sent by all facilities worldwide in response to specific performance indicators laid down by the principals. An incentive in the form of awards has been instituted by TI Inc., developing healthy competition between the various facilities. More than mere compliance to EHS codes is encouraged. TI Inc's EHS policy mandated phasing out of halon based extinguishers (in 1995-96), and CFC's in airconditioning plant in Singapore. TI Inc's policy regarding hazardous substances and ODS is more stringent than existing Indian legislation. Further, ergonomic experts from TI were also flown in to provide advice on seating and correct working posture for more effective productivity.

On environmental clearances required for the facility:

For establishment of the facility, requisite clearances from State DOEn were obtained. The Pollution Control Board gets quarterly reports on diesel emissions and wastewater generated. These reports are required for consent renewal.

On infrastructure requirements for the facility:

Power is drawn from the state grid, as well as from diesel generators sited in the facility. The lack of continuous and clean power supply from the state grid is one reason for TI not setting up chip making / fab facilities in India.

On MNC's and South East Asia:

India's competitive advantage is two pronged – English speaking abilities and high intellectual skills vis-à-vis SE Asian countries. Therefore in India, MNC's focus on tapping this competitive advantage. Intellectual property is critical to the IT industry and it represents the real value addition more than manufacturing skills per se. India is presently higher up in the value chain vis-à-vis SE Asian countries. Facilities such as TI providing very good working environment can retain the local talent preventing brain drain.

On low levels of hardware manufacture in India:

Investment for fab is very high e.g., cost of setting up a semi-conductor facility is typically US\$ 1.5 billion. In addition, lack of a cluster of similar units is also a deterrent since presence of clusters means that phase wise upgrading of units can be done, as seen in the US.

On the organization's policy on recycling:

All machines and servers used in the facility are shipped in with total exemption from duty. As a result, on obsolescence, these cannot be donated, sold or in any way removed from the facility as that would entail the payment of the differential in duty. This regulation has meant the extensive onsite storage of obsolete machines. Efforts at donating these machines have met with little success. Disposal however, is still not as pressing an issue as it is in the US, primarily due to far lower volumes.

Interviewee	Ms Sandhya Ranjit
Organization	Wipro Corporation
Designation	Manager, Corporate Communication
Official Address	Doddakannelli, Sarjapur Road, Bangalore - 560 035 Karnataka, India. Tel : +91 80 8440011 (F) +91 80 8440056 Email : sandhya.ranjit@wipro.com
Interviewer	Dr. Radha Gopalan, Ms Lavanya Karthik, EMC; Personal Interview in Bangalore
Date	13/07/00

Transcription of the Interview:
On the organization's presence in India

Wipro is a diversified public limited company, involved in the manufacture of oils, consumer care products, lighting equipment, computers and peripherals. Currently, Wipro has a PC assembly plant at Pondicherry, set up a year ago (1999). All components, including the PC shells, are outsourced from Taiwan and Malaysia. A peripherals plant manufacturing Dot Matrix Printers is at Mysore, and proposed to be spun off as an individual company. The main customer for these printers is the public sector. There is no component sourcing from India except probably for peripherals.

On the organization's plans to phase out Dot Matrix Printers

The demand for Dot Matrix Printers is expected to last for another 2 years, after which e-governance may make them redundant.

On the organization's strategy for quality control in its operations

Wipro is a certified ISO 9001 and 9002 company and follows Six Sigma principles. This was the first company in India to get into 6 Sigma and has currently reached level 4. Besides this, the organization is also the only company in the country with SEI-PCMM level 5 certification. The Vendor selection policy is strong as is supply chain management. Supply chain audits are regularly carried out. The organization is proactive with respect to legislation particularly safety related. It has a strong training culture with a Central Training department. Training is provided through induction, enhancement of technical skills, leadership programs etc.

On the organization's focus on environmental aspects of their operations

There seems to be no evidence of integration of environmental aspects in the vendor selection, supply chain audit etc. Neither has an EHS been created in the organization. The organization has no environmental policy.

On unionization in the organization's assembling facility

There is no unionization in the computers and peripherals factory, due to the small size of operation and the absence of shop floor based manufacturing activity.

On the organization's policy for disposal of obsolete computers and peripherals

Obsolete machines are not remanufactured, but donated / sold to employees at depreciated values.

Interviewee Mr Lakshmanan
Organization Zenith Computers
Designation Vice President, Manufacturing
Official Address Email: prl@bom5.vsnl.net.in

Interviewer Dr. Radha Gopalan (email)
Date 17/07/00

Transcription of the Interview:

On the organization's presence in the Indian market:

Zenith has about 8% market share.

On the location and nature of operations of the organization's manufacturing facilities in India:

Zenith's computer manufacturing factory is in Goa where components sourced from outside the country is assembled. R&D is on system integration and evaluation of various components to be sourced from other vendors.

On the presence of an Environmental, Health and Safety Policy in the organization:

No such policy exists as of now.

On the environmental, and labour related clearances that are applicable to the manufacturing facility:

Factories Act is applicable to Zenith.

On local sourcing of components:

Local sourcing is limited to software and printers, UPS, stabilisers etc.

On the inclusion of product safety and / or product disposal instructions with the products:

No such instructions are issued.

On whether the organization also manufactures peripherals:

No.

On any community based initiatives the organization may have initiated/ been involved in:

None have been made.

On regular training and awareness programs for staff:

Yes, these are held.

On regular training and awareness programs for staff integrating environmental, health and safety aspects:

No such training has been done.

On the importance of ISO 14000 to the IT sector:

It is not important.

Annex I

Interviews

Annex II

Facilities at Information Technology Park Ltd., Bangalore

Annex III

Promotional material used by HP to discourage use of recycled, remanufactured cartridges

Annex IV

Environmental and labor legislation in India

A. Environmental Legislation

Specific to one environmental component:

- The Water (Prevention and Control of Pollution) Act, 1974, as amended up to 1988
- The Water (Prevention and Control of Pollution) Rules, 1975
- The Water (Prevention and Control of Pollution) (Procedure for Transaction of Business) Rules, 1975
- The Water (Prevention and Control of Pollution) Cess Act, 1977, as amended by Amendment Act, 1991
- The Water (Prevention and Control of Pollution) Cess Rules, 1978
- The Air (Prevention and Control of Pollution) Act, 1981, as amended by Amendment Act, 1987
- The Air (Prevention and Control of Pollution) Rules, 1982
- The Air (Prevention and Control of Pollution) (Union Territories) Rules, 1983
- Noise Pollution (Regulation and Control) Rules, 2000

The Umbrella legislation:

- The Environment (Protection) Act, 1986
- The Environment (Protection) Rules, 1986

Rules and Notifications under the umbrella legislation that:

Regulate project development:

- Environmental Impact Assessment Notification, 1988
- Restricting certain activities Range in special specified area of Aravalli, 1992
- The Eco Sensitive Zone - Pachmarhi, Notification, 1998
- Coastal Regulation Zone – Notifications, 1991
- Environment (Siting for Industrial Projects) Rules, 1999 - Notification
- Taj Trapezium Zone Pollution (Prevent and Control) Authority - Order

Focus on hazardous and potentially hazardous substances and wastes:

- Hazardous Wastes (Management and Handling) Rules, 1989
- Manufacture, Storage and Import of Hazardous Chemical Rules, 1989
- Manufacture, Use, Import, Export and Storage of Hazardous Micro-Organisms Genetically Engineered Organisms or Cells Rules, 1989

- Bio-Medical Waste (Management and Handling) Rules, 1998
- The Environment (Protection) (Second Amendment Rules), 1999 – Emission Standards for New Generator Sets
- Re-cycled Plastics Manufacture and Usage Rules, 1999
- 2-T Oil (Regulation of Supply and Distribution) Order, 1998
- Dumping and Disposal of Flyash - Notification
- Ozone Depleting Substances (Regulation) Rules, 2000 - Draft Notification
- Batteries (Management & Handling) Rules, 2000 - Draft Notification
- Manufacture, Storage and Import of Hazardous Chemical (Amendment) Rules, 2000 - Draft Notification

Provide compensation to injured public:

- The Public Liability Insurance Act, 1991
- The Public Liability Insurance Rules, 1991

Regulate municipal issues:

- Municipal Solid Wastes (Management & Handling) Rules, 1999 - Notification

Facilitate public involvement:

- The National Environment Tribunal Act, 1995
- The National Environmental Appellate Authority Act, 1997
- Public Hearing Notification – 1997

In addition to the umbrella EP Act, 1986 protection of forests was promoted through:

- National Forest Policy, 1988
- Forest (Conservation) Act, 1980
- Forest (Conservation) Rules, 1981

B. Labor legislation in India

The Ministry of Labor classifies the Labor laws as follows:

Laws related to Industrial Relations such as:

- Trade Unions Act, 1926
- Industrial Employment Standing Order Act, 1946.
- Industrial Disputes Act, 1947.

Laws related to Wages such as:

- Payment of Wages Act, 1936
- Minimum Wages Act, 1948
- Payment of Bonus Act, 1965.

Laws related to Working Hours, Conditions of Service and Employment such as:

- Factories Act, 1948.
- Plantation Labor Act, 1951.
- Mines Act, 1952.
- Working Journalists and other Newspaper Employees' (Conditions of Service and Misc. Provisions) Act, 1955.
- Merchant Shipping Act, 1958.
- Motor Transport Workers Act, 1961.
- Beedi & Cigar Workers (Conditions of Employment) Act, 1966.
- Contract Labor (Regulation & Abolition) Act, 1970.
- Sales Promotion Employees Act, 1976.
- Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979.
- Dock Workers (Safety, Health & Welfare) Act, 1986.
- Building & Other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996.

Laws related to Equality and Empowerment of Women such as:

- Maternity Benefit Act, 1961
- Equal Remuneration Act, 1976.

Laws related to Deprived and Disadvantaged Sections of the Society such as:

- Bonded Labor System (Abolition) Act, 1976
- Child Labor (Prohibition & Regulation) Act, 1986

- Children (Pledging of Labor) Act, 1933

Laws related to Social Security such as:

- Workmen's Compensation Act, 1923.
- Employees' State Insurance Act, 1948.
- Employees' Provident Fund & Miscellaneous Provisions Act, 1952.
- Payment of Gratuity Act, 1972.

List of Abbreviations

CBT – Computer Based Training
CFCs – Chlorofluorocarbons
DG – Diesel Generator
DOEn – State Department of Environment
EAP – Environment Action Program
EEPZ – Export Electronic Processing Zone
EHS – Environment Health and Safety
EIA – Environmental Impact Assessment
ELCINA – Electronics Component Industries Association
EMS – Environmental Management System
EOU – Export Oriented Unit
ESOP – Employee Stock Option Scheme
FDI – Foreign Direct Investment
FORCE – Foundation for Computer Education
GID – Genuine Intel Dealer
GOI – Government of India
GOK – Government of Karnataka
HTP – Hardware Technology Park
IDC - International Data Corporation
IIIT – Indian Institute of Information Technology
IIT – Indian Institute of Technology
IPCA – Indian Printed Circuit Association
IT – Information Technology
ITPL – Information Technology Park Limited
MAIT - Manufacturers' Association for Information Technology
MIT – Ministry of Information Technology
MOEF – Ministry of Environment and Forests
MOL – Ministry of Labor
MNCs – Multi National Corporations
NASSCOM - National Association of Software and Service Companies
NOC – No Objection Certificate
ODS – Ozone Depleting Substances
PC – Personal Computer
PCB – Printed Circuit Board
PSAP – Policy Statement for Abatement of Pollution
S-BIT Units – Soft Bonded Information Technology Units
SCEM – Supply Chain Environmental Management
SOP – Standard Operating Procedure
SPCB – State Pollution Control Board
STP – Software Technology Park
STQC - Standardization Testing and Quality Certification
TPM - Third Party Maintenance
TRI – Toxic Release Inventory

UNDP – United Nations Development Programs

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