# Impact of EMS (ISO 14001) Implementation on IT, Electronics and Telecom Industries: A Global Scenario

**Madhumita Chakrabarty**
*Assistant Professor, Department of Commerce*
*Mahadevananda Mahavidyalaya*
*E-mail ID: chakrabartim777@gmail.com*

**Abstract**

Technology is quite significant for a country's development and in order to function a society smoothly, the inhabitants have no other option than to use modern technologies. But the uncontrolled technology impacts environment negatively. The IT (Information Technology), Electronics and Telecommunication sector has wide positive impacts on society and the economy of any country, yet its adverse impact cannot be denied. The industries are developing at the cost of the nature. To find a way out, the industries are adopting measures to reduce their environmental impacts. They are coming up with ISO 14001 based Environment Management System (EMS) standards and procedures to combat the harmful effects of their production processes. Although standardization is more or less voluntary for the corporate sector, but in order to seek entry into the global market place, it may well create a formidable barrier. On the contrary, if the industries implement ISO 14001 procedures, it would benefit them economically as it opens the door to international trade and results in cost reduction. Most companies now recognize that there are sound business reasons for adopting ISO 14000 procedures.

**Keywords:** Competitive advantage, cost reduction, economic growth, environmental impacts, e-waste, global markets, ISO 14001.

## 1. Introduction

The problem of the environment is as old as mankind itself, however the particular awareness of the matter has developed step by step. It absolutely was not till the extraordinary explosion of commercial and technological development throughout the Second World War and the accompanying deterioration of the biosphere that ecologists finally succeeded in drawing the attention of the international community to the problem. In the 18$^{th}$ century, advances in

science and technology brought about industrial revolution. It marked a new era in human civilization. The widespread use of electronic equipments has made communication easier, boosted business activities and created employment opportunities. These spectacular developments in modern times have doubtlessly increased the standard of our lives. Concurrently, these have led to manifold problems including the problem of massive amount of hazardous waste and other wastes generated from electronic products (e-waste). Like China, India is currently confronted with the massive problem of e-waste generation. During this current scenario, the human health and environment would be drastically vulnerable if cooperative legislations and actions were not taken for efficient management and disposal of e-waste.

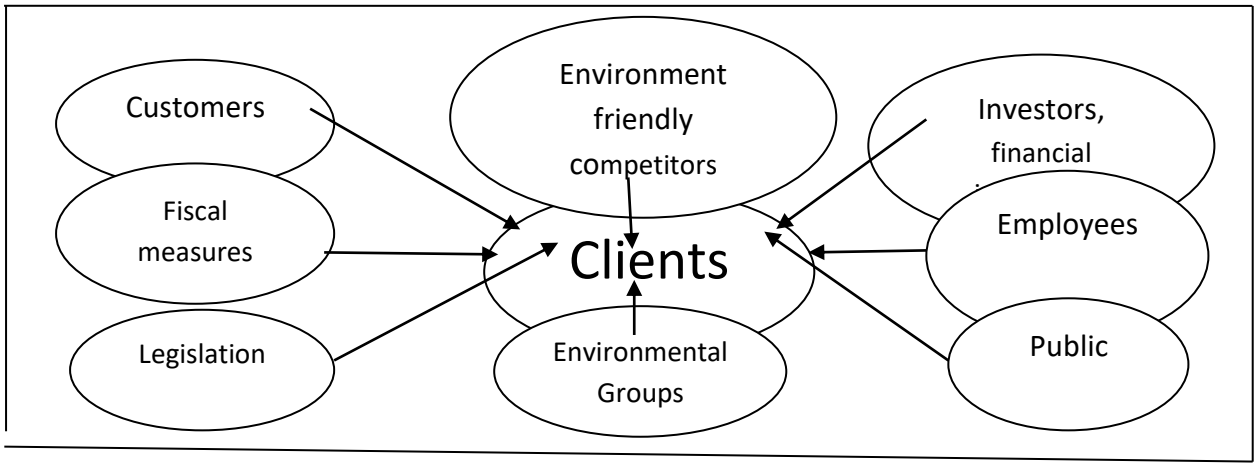
It is not easy to reduce environmental pollution since every facet of our lives is intimately tied to it. The inherent consequences of every day human activities and speedy industrialization are climate change and global warming. These are often described as one of the most serious environmental issues faced by humanity, as this problem is closely connected to the process of development and economic growth. Jim Hansen, the leading climate scientist for NASA (National Aeronautics and Space Administration) warned that "we are on the precipice of a tipping point beyond which there is no redemption". In this direction, all nations have responded in their own method. The United Nations Conference on the Human Environment, held in Stockholm in June 1972 constitutes the symbolic turning point in the growing awareness of the problem to find solutions at the regional level. The Stockholm Conference in the second stage recognized the relationship between the environment and development, one of the fundamental themes of the report produced by the United Nations World Commission on Environment and Development. In the third stage, the United Nations General Assembly convened United Nations Conference on Environment and Development (UNCED) in order to inject new life into environment and development principles. The Conference was held in June 1992, in Rio de Janeiro and attended by the largest ever number of Heads of State and Government. One of the great merits of this Conference was to establish for the first time a relationship between the concepts of environment and development. International Organization for Standardization (ISO) additionally showed their concern by constituting a Technical Committee and assigning the responsibility of formulating a standard with a view to certifying the organization against that standard (ISO 14001 based EMS standard). Although the GATT (General Agreement on Tariffs and Trade) and trade liberalization have opened the door to global markets, yet the

developing countries feel the door being shut again because they fear that this new voluntary environmental standard will not be voluntary but become a market-based trade barrier. It is a market–driven condition to do business and so the companies who are not ISO14001 certified will be out of the market.

## 2. Linkages between business organization and the environment

Industries have two broad links to the outside world with respect to environmental issues. The first link is with the general public – social groups, pressure groups, supporters of pressure groups, consumers of products and neighbours to production plants. The second link is with public bodies - institutions deriving their legitimacy from the democratic process. These bodies include financial institutions, government departments, environmental regulations and local authorities. The environmental pressure groups may be exhibited in Figure 1.

**Figure 1** ***The Environmental Pressure Groups***




McKinsey used a seven–element approach to understand the importance of the linkages between all the elements in an effectively functioning business organization. A manager responsible for implementing the environmental management system will require an overhaul of all the business elements, but not necessarily fundamental change in the 7-S model of an EMS organization. 7-S model of an EMS organization is expected to include —

1) Shared Purpose - to include improved environmental performance as captured in the environmental policy.

2) Strategy – to ensure that environmental performance criteria are integrated into the business plans of the organization.

3) Structure - to ensure that environmental performance roles and responsibilities are defined and allocated.

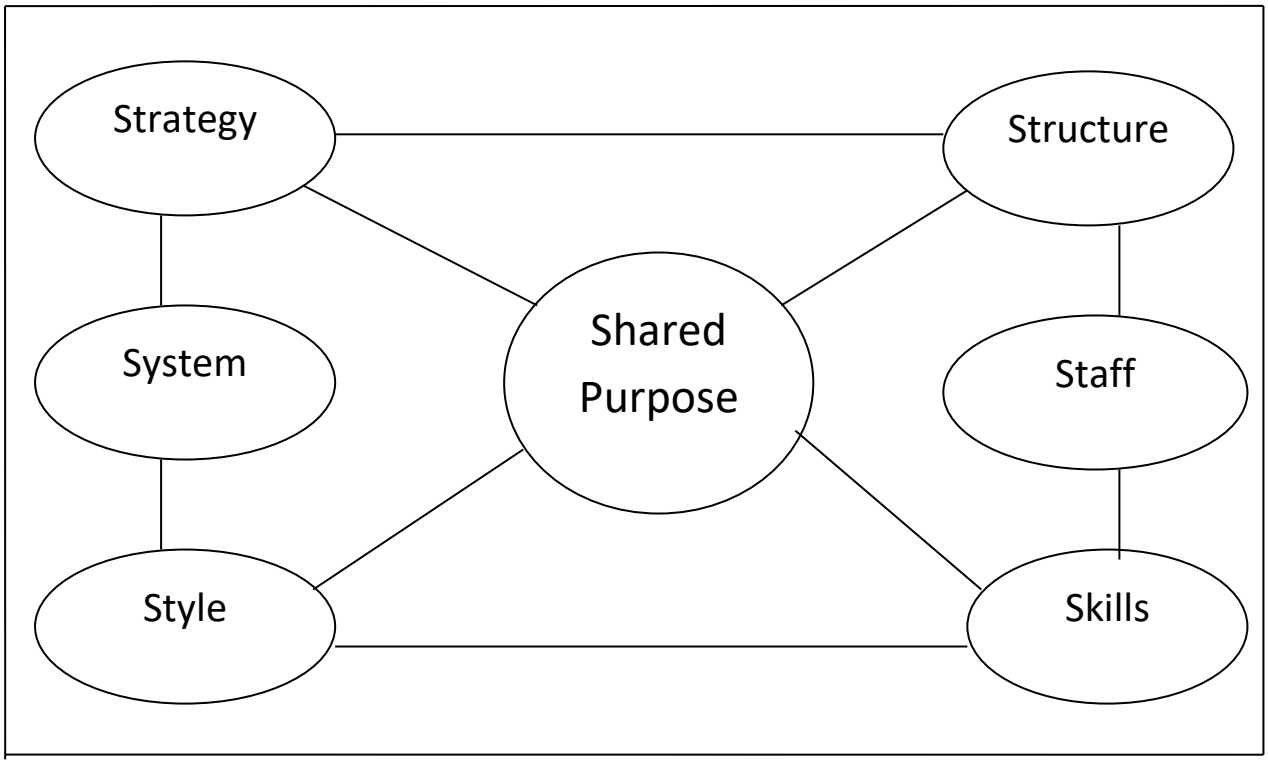
4) Systems - to ensure that the day-to-day practices and procedures comply with the environmental performance standards.

5) Staff - to ensure that appropriate staff are identified to enable the smooth implementation of the environmental procedures.

6) Skills - to equip staff and have access to the necessary skills required to implement the environmental procedures.

7) Style - to ensure that managers reflect the environmental performance standards in their best possible way, using proper time and reward for their staff. The structure of McKinsey 7-S Model is depicted in Figure 2.

**Figure 2** ***McKinsey 7-S Model***




## 3. E-waste – Concepts, National and International scenario

***3.1 Concept of e-waste*** – In the 20th century the information and communication revolution has brought about vast changes in the manner we organize our lives, our economies, industries and institutions. The digital products have become a fundamental part of our day to day lives presenting us with greater comfort, security, ease and quicker acquisition and exchange of information. This is the younger and highly competitive industry for which, technical performance rules and environmental concerns have not yet been a priority. Its

rapid increase combined with rapid product obsolescence led to discarded electronics, which is now the fastest growing waste material in the industrial and corporate world. The Basel Convention has recognized digital waste or e-waste as unsafe and developed a framework for management of trans-boundary movement of such waste. In the EU, e-waste is the quickest developing waste flow, developing at 3-5% per annum, that is three times quicker than common waste. Outside the EU, a critical percent of this waste is still land filled, recovered without pre-treatment, permitting risky materials like heavy metals and brominated flame retardants to leak into the surroundings. E-waste is the most rapidly growing waste hassle in the world. About 40 million tonnes of e-wastes are generated each year. The countries of the European Union (EU) and other developed countries to an extent have addressed the problem of e-waste by means of taking policy initiatives and by adopting scientific methods of recycling and disposal of such waste. The European Union defines this new waste movement as Waste Electrical and Electronic Equipment (WEEE). There is a board mentioned as WEEE, that is a voluntary organization gathering e-waste from individual produces in European Union countries. Since there is no definition of the WEEE within the environmental policies in India, it is actually referred to as e-waste. As consistent with CPCB (Central Pollution Control Board), Indian Guidelines, 2008, e-waste is defined as waste generated from used digital gadgets and home equipment that are not appropriate for the original use and are designed for recovery, recycling and disposal. E-waste broadly describes loosely discarded, surplus obsolete, damaged electrical or electronic devices. Electronic waste contains old, end-of-life digital home equipment such as computers, laptops, TVs, DVD players, refrigerators, freezers, cellular phones, MP3 players, etc., which have been disposed of by their authentic users. Many of these electronic appliances incorporate toxic materials. E-waste consists of many unsafe parts, which could negatively effect the environment and have an effect on human health if not properly managed. Both developed countries, and developing countries like India face the problem of e-waste management.

***3.2 E-waste Management - Indian and International context -*** The problem of e-waste has become a direct and long term concern as its unregulated accumulation and recycling can lead to important environmental problems endangering human health. Countries which include China and India face all of a sudden growing quantity of e-waste, both, from home era and unlawful imports. Sixty-five cities in India generate greater than 60% of the whole WEEE/ E-waste generated in India. There are ten states that make contributions to 70% of the whole e-waste generation within the country. Maharashtra ranks first observed by Tamil

Nadu, Andhra Pradesh, Uttar Pradesh, West Bengal, Delhi, Karnataka, Gujarat, Madhya Pradesh and Punjab. Among the top ten e-waste producing cities, Mumbai ranks first observed by Delhi, Bangalore, Chennai, Kolkata, Ahmedabad, Hyderabad, Pune, Surat and Nagpur. For the recycling of e-waste, India mainly based upon the unorganized region as only a handful of organized e-waste recycling centres are there. Over 95% of the e-waste is dealt with and processed in the majority of urban slums of the nation, in which untrained workers perform the harmful strategies without private protective equipment. These are threatening to their health as well as to the environment. Moreover, it causes wastages of precious resources. A range of organizations, bodies, and governments of many countries have followed or evolved the environmentally sound options and techniques for e-waste management to cope with the developing chance of e-waste to the environment.

***3.3 E-waste Management Legislations*** **-** Since 2003, the US in partnership with UNs formed an organization called STEP (solving the E-waste Problem) to recycle electronics waste. As of early 2012, 25 states in the United States have passed e-waste recycling laws, 18 of which include bans on putting e-waste in landfills. The Chinese authorities have issued some of environmental laws, regulations, standards and technical guidance related to e-waste control. Japan keeps to favour the promotion of a legitimate material cycle society primarily based on the 3R approach (Reduce, Re-use, Recycle). India's first e-waste management and handling rules got into effect on 1st May, 2012. Australia, New Zealand and 23 other states within the Pacific are growing a local e-waste management strategy, similarly to the primary e-stewardship program in the region. On the African continent, a developing quantity of states are growing nation-wide e-waste legislations, with South Africa and Nigeria mainly and international locations like Ghana, Kenya, Uganda and Ethiopia additionally making important strides primarily based on the polluter pays principle.

***3.4 Benefits derived from E-waste Management*** **-** E-waste recycling reduces operating and transportation costs, emissions, substitutes virgin materials and yields financial benefits. The presence of valuable resources such as copper, silver, gold and platinum make it appealing to recycle e-waste. E-waste is a cheap source of raw materials. For rising economies, these material flows from waste imports not only offer a commercial opportunity, however additionally fulfill the demand for reasonably-priced second-hand electrical and electronic equipment. It offers employment to those who advocate recycling e-waste while stressing the need for safe recycling. Commenting on the advantages of safe recycling, the former

President of India, Dr. A.P.J. Abul Kalam once said at the inauguration ceremony of the Attero Recycling Plant in Roorkee in Delhi in January, 2010: "With metal prices rising, recycling will help in sustaining our economy as it is much cheaper than extracting metals from its ore."

**4. Relevance of ISO 14001 based EMS in e-waste management and handling**

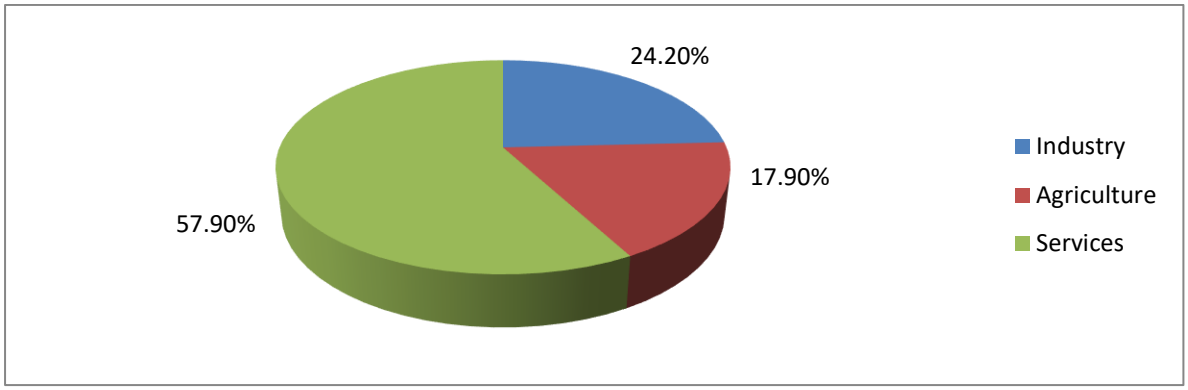
In Economics, a concept referred to as negative externality is frequently used to explain a cost that is suffered by a third party as a result of an economic transaction. A negative externality is also referred to as an external cost. Some externalities like waste arise from consumption while other externalities, like carbon emissions from factories, arise from production. The Harvard Business School economist and strategy Professor Michael Porter stood conventional wisdom about the impact of environmental regulations on commercial enterprises by affirming that well-designed regulation could actually enhance competitiveness. According to Porter (1991), strict environment regulations do not inevitably hinder competitive advantage against rivals; rather they often enhance it. He suggested numerous mechanisms by way of which environmental regulation might enhance competitiveness, which include reduction in the use of hazardous substances or lower waste disposal costs.

The ISO 14001 standard, created by the International Organization for Standardization (ISO), specifies a set of requirements for the advent and implementation of an Environmental Management System (EMS), which helps corporations to minimize any negative effect of their operations on the environment. ISO 14001 based Environment Management Standard may be described as certainly one of the cost reduction mechanisms utilized by business organizations to make sure sustainability. It assures the usage of environmental resources to meet current needs in addition to conserve those resources for the future. The standards offer an opportunity to respond more efficiently and proactively to environmental impact of any business organization. If a business organization put into effect an EMS, then the organization will save money, improve its environmental performance and decrease its risks of environmental prosecution giving the organization a new competitive advantage.

**5. IT, Electronics and Tele-communication industries - Environmental awareness vs. economic viability -** Service sector covers a wide kind of activities including trade, retail, banks, hotels, transport, computer services, education, health, communication, financing, insurance, commercial services, electricity, gas, water supply, etc. The Indian service sector has attracted the highest quantity of Foreign Direct Investment (FDI) equity inflows in the

period April 2000 - May 2015 [Department of Industry Policy and Promotion (DIPP)]. Service sector is the largest sector in India. Sector-wise Indian GDP composition in 2014 is presented in Figure 3.

**Figure 3:** ***Sector-wise Indian GDP composition (2014)***

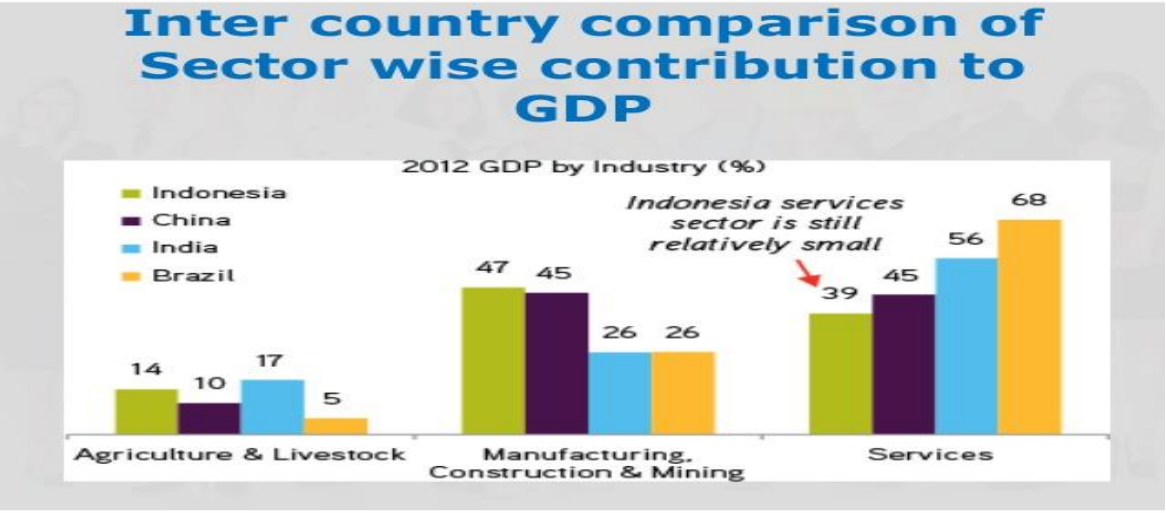



[*Source: CIA (Central Intelligence Agency) – 2014*]

The figure shows that the contribution of service sector in Indian GDP composition is highest (according to CIA Survey – 2014). In India, the service sector for the past decade and a half has been emerged as one of the fastest developing sectors of the economy. According to the Economic Survey (2001-2012), India has the second fastest developing service sector in the world with its compound annual growth rate at 9%, just beneath China's 10.9%.

If we look at the global image of sector-wise contribution to GDP (**Figure 4**), we can say that contribution of manufacturing sector is highest in Indonesia, contributions of manufacturing and service sector both are same in China, and contribution of service sector is highest in India and Brazil.

**Figure 4** ***Inter country comparison of Sector-wise contribution to GDP (2012)***




(*Source: http://slideshare.net*)

Information and Communication Industry is the most spirited part of service sector. The Indian electronics industry had its origin to the year 1965 with an orientation towards space and defense technologies. This was rigidly controlled and initiated by the government. By the first decade of the the twenty first century, environmental sustainability had become a core part of business decisions of firms in the information and communication technology (ICT) industry. In India, tons of e-waste is generated annually. It is a widely known indisputable fact that e-waste contains hazardous constituents that are potentially harmful to the environment and human health, if not handled properly. For these firms, green practices were not solely aimed towards preserving environmental resources and reducing energy consumption, however conjointly as a sound business practice to enrich the brand value as their customers more and more prefer to work with 'greener' vendors. An EMS provides an efficient framework for managing environmental responsibilities. It also helps firms integrate environmental efforts into their overall business operations. Implementing ISO 14001 permits organizations to deal with the environmental impact of their activities, services, products and people. The standard provides a framework so that firms can determine vital environmental issues and implement appropriate management programs to regulate and improve them. The bottom line is that ISO 14001 saves money and reduces risk. The first Indian electronics company to get the ISO 14001 environment management certification is Electronic Manufacturing Services, Deltron division of Continental Device India Ltd. (certified in 1982).

Ten (10) companies have been selected randomly out of a large number of companies falling under IT, Electronics and Telecommunication sector whose recognition has been highlighted in Table 1.

**Table-1** ***Recognition of ISO 14001 certified multinational IT, Electronics and Telecommunication companies***

| ***Company (IT, Electronics & Telecommunication)*** | ***Whether enlisted in top 500 companies*** | ***Ranking in top 500 companies (based on Market values & Prices - March 2014*** | ***Whether enlisted in Stock Exchange*** | ***Whether ISO 14001 certified*** |
|---|---|---|---|---|
| Oracle Financial Services Software Ltd. | Yes | 27 | Yes | Yes |
| Siemens Ltd. | Yes | 53 | Yes | Yes |

| | | | | |
|---|---|---|---|---|
| TCS Ltd. | Yes | 125 | Yes | Yes |
| Ericsson Ltd. | Yes | 227 | Yes | Yes |
| Infosys Ltd. | Yes | 338 | Yes | Yes |
| WIPRO Ltd. | Yes | 496 | Yes | Yes |
| Mphasis Ltd. | No | No rank | Yes | Yes |
| HCL | No | No rank | Yes | Yes |
| Rolta | No | No rank | Yes | Yes |
| Mindtree Ltd. | No | No rank | Yes | Yes |

(***Sources:*** *Financial Times Global 500, Forbes Global 2000 and Fortune Global 500 - Gilly Wright , November 19, 2015*)

There are many ways to measure the world's largest companies and there are countless rankings. Three of the most respected and renowned rankings (the Global Fortune 500, Forbes Global 2000 and the FT 500) are chosen to give a full picture. All rankings are for 2014. The survey showed us that most of the companies (6 out of 10 i.e., 60%) that follow cleaner and greener mechanism and ISO 14001 certified, are enlisted in the top 500 companies. All the 10 companies are also enlisted in Stock Exchange. Hence we may conclude that, ISO 14001 based EMS companies do not compromise with profit for the sake of cleaner and greener technologies; rather clean initiatives help them to improve their financial stability. ISO 14001 ensures waste-reduction, recycling, re-use, reduction in fines and penalties, and increase in productivity of manpower. These parameters in one way or the other enhance domestic and international competitiveness and improve the profitability of the business organizations. An in-depth study of environmental initiatives adopted by the above companies:

**Oracle Financial Services Software Ltd. –** Oracle Financial Services Software Limited (OFSS), a subsidiary of Oracle Corporation, an American Multinational Financial Corporation. It is an IT solution provider to the banking industry. Under the requirements of ISO 14001 Oracle is setting performance targets to deliver environmental best practices. They have been proactively implementing programs to conserve and protect the atmosphere. ISO 14001 certification initiatives form part of the overall Oracle environmental management system spanning five key areas of environmental awareness - water, energy, transport, waste and procurement. Oracle is committed to reducing its use of water resources via innovative solutions. In the area of waste management and reduction, Oracle has waste segregation programs; procurement policies ensuring purchase of

recycled merchandise ranging from paper to office chairs; recycling of toner, ink and mobile phones, and company cleaners without any chemical and produces no waste onsite. Environmental awareness also extends to Oracle's supply chain with a requirement for prospective suppliers to provide their environmental credentials.

**Siemens Ltd. –** Siemens is a German multinational company headquartered in Berlin and Munich, and the largest industrial manufacturing company in Europe with branch offices abroad.

The principal divisions of the company are Industry, Energy, and Healthcare. Siemens has recognized environment protection, health management and occupational safety (EHS) as one of the most important elements in the organization's sustainable growth. They continually strive to create a safe working environment by being responsive, caring and committed to the various needs governing the security and well-being of employees. Most of the company's manufacturing facilities are ISO 14001 certified. The environmental protection policy of Siemens is based on global standards for environmental management. Where the products are concerned, they take a holistic approach to environmental protection, ensuring that all products are environmentally compatible during the entire product life cycle, from development through manufacturing and use, to re-use, recycling or disposal. They have a suitable management system (ISO 14001) and they comply with the rules, guidelines, internal standards or similar, governing product related environmental protection (product design, restrictions on materials, labeling, information obligations, re-use, recycling, environmentally compatible product use, maintenance and disposal) and, wherever applicable, measures for protection against hazardous substances, and they train up their employees accordingly.

**Tata Consultancy Services (TCS) Limited** – The company is a part of the Tata group and is an Indian multinational IT service, consulting and business solution organization that delivers real results to global business. TCS embodies the Tata group's philosophy of building sustainable businesses that are firmly rooted in the community and demonstrate care for the environment. Towards this, TCS has adopted the 'triple bottom-line' approach and recognizes 'people', 'planet', and 'profit' as the central pillars of corporate sustainability. Most of the delivery centres in India have been certified for ISO 14001 Environmental Management System (EMS). They have added 17 centres to the list of 19 ISO 14001:2004 certified centres including two overseas centres in Hungary and China. All capital expenditure incurred by TCS is evaluated for: Environmental, Societal and Financial perspective. TCS continuously strives to reduce its ecological footprint. To improve energy

efficiency, TCS regularly invests in energy audits and implements the actions based on the audit findings. It is also raising awareness amongst all its associates and partners; thereby, promoting concern for the environment. TCS has actively taken up "Green IT", and is offering environmental consulting and associated IT services as part of its offering suite to its clients. Its expenditure on environmental protection includes the investment made for implementing the environmental management system, environmental improvement projects, bio-diversity enhancement projects and green IT initiatives.

**Ericsson Ltd. –** Ericsson is a Swedish multinational networking and telecommunication company headquartered in Stockholm. It is associated with the Indian telecom industry for over 110 years. Ericsson prioritizes sustainability and corporate responsibility issues in terms of importance to their business, stakeholders, society, and the environment. These are determined through a continuous process of reviews, consultation, and assessment that takes its starting point in their sustainability strategy work. By designing and manufacturing products and solutions that prioritize energy and material efficiency, and conserving scarce resources in their own activities, they reduce their own environmental footprint and that of their customers. Ericsson received worldwide ISO 14001 certification on December 2001. This marked the first time as a company that received one ISO 14001 certificate that encompassed both manufacturing and non-manufacturing international operations. Ericsson decided to expand the scope of its EMS companywide, convinced that real environmental contributions would come when all its employees are committed and involved. The company's global EMS systematically measures Ericsson's environmental impacts and ensures that environmental objectives are on track and met. Consequently, Ericsson can identify key environmental aspects of any operation. Once identified, it can then concentrate its efforts on those areas that will make the greatest impact.

**Infosys Ltd. –** Infosys Technologies Ltd., an Indian multinational corporation is a global provider of consulting and IT (information technologies) services. The environmental goals of the company are part of their corporate scorecard. Infosys Technologies, the leading IT consulting and software services has been certified to ISO 14001:2004 by Det Norske Veritas (DNV). The certification has been received by its development centres in Pune, Chennai, Bangalore, Bhubaneshwar, Hyderabad, Mangalore, Mohali and Mysore. They have received ISO 14001:2004 certification for almost 77% of their locations in India. The company takes various initiatives towards achieving resource conservation, pollution prevention, effective waste management, adherence to all applicable legislations and awareness creation among

employees. Hazardous waste generation is at a minimal level at Infosys. The 'Ozone Initiative' is the EMS at Infosys, which helps the company to comply with all the legal requirements. It drives Infosys to be an environment-friendly company with systems of waste management, recycling, etc. It helps in the abatement of pollution and conservation of natural resources. It also provides a secured working environment to protect its employees.

**WIPRO Ltd.** - WIPRO Ltd. (Western India Palm Refined Oils Limited) or more recently, Western India Products Limited is an Indian multinational IT consulting and services providing company. Its headquarter is in Bengaluru, India. In 2013, Wipro demerged its non-IT businesses into separate corporations to usher in a lot of concentration on independent businesses. WIPRO Limited is a leading global information technology, consulting and business process services company. WIPRO work together with education and civil society networks on Sustainability. They minimize their internal footprint on energy, water and waste, collaborate with suppliers to assist them become more sustainable, provide products and solutions that modify customers to become greener, products and services give assistance to GHG reduction. 90% of their waste is recycled/ reused, degradable and non-degradable wastes are separated by them. 21 facilities of WIPRO are ISO 140001 certified and 22 campuses certified for EMS – ISO14001. Ranging from zero, their renewable energy footprint has steadily swollen to 100 million units comprising over 25% of their overall energy consumption. 40% of their water is recycled. Sustainable Development Goal focuses on achieving sustainable development in its three dimensions – economic, social and environmental in a balanced and integrated manner. This goal calls for action by all countries - poor, wealthy and middle income to promote prosperity while protecting the planet and covers a wide range of issues like poverty eradication, economic growth, education, health, social protection, climate change, environmental protection. They have been following the guidelines of the ISO 14001 framework. 18 of their campus sites in India and a couple of them in Australia are certified to ISO 14001:2004 standard. Wipro complies with all applicable environmental regulations. There have been no instances of environmental fines imposed or negative consequences because of their operations.

**Mphasis Ltd. –** It is an Indian multinational IT services company. It serves financial services, telecom, logistics and technology industries. The company is committed to raising environmental, health and safety awareness. They aim to ensure that in the course of their business activities they not only minimize their impact on the environment, but also look after the health and safety interests of their employees, in addition to seeking opportunities to

improve the local environment and the communities in which they operate. The company ensures the responsible use of energy throughout their business; including conservation of energy, improvement in energy efficiency and preference to renewable over non-renewable energy sources whenever feasible, strive to prevent pollution and to minimize the environmental impact. Mphasis holds ISO 14001 certification for its environment protection efforts.

**Hindustan Computers Limited (HCL) –** HCL Infosystems Limited is India's premier information enabler, leading ICT system integrator and Distribution Company and therefore the country's largest PC manufacturer. HCL Technologies Limited is an Indian multinational IT services company. HCL has India's largest vertically integrated computer manufacturing facility with over three decades of electronic manufacturing experience. HCL Infosystems realized that the growing demand for electronic products in India has become a matter of concern over the environmental impact of e-waste. Under the 'HCL eSafe' program, the corporate has brought together its several voluntary initiatives to protect and safeguard the environment. HCL eSafe is the endeavor to protect the environment, health and safety of all their stakeholders. Over the years, they have pioneered several voluntary initiatives in environment protection, starting from environmentally-efficient manufacturing to e-waste recovery and disposal programs. HCL is the first IT company within the country to possess all of its manufacturing plants complying to ISO 14001. In addition to that, HCL is the pioneering company in India to have set–up a comprehensive e-waste management program for its manufactured products through a tie-up with a licensed recycler.

**Rolta –** Rolta is an Indian multinational company headquartered in the city of Mumbai, India. The corporate is a leading provider of innovative IT solutions for several vertical segments, including federal and state governments, defense and homeland security, utilities, process, power, financial services, manufacturing, retail, and healthcare. The company is certified to ISO 14001:2004 for Environment Management System. It has benchmarked its quality processes, practices and standards against globally accepted norms, and continually updates its own standards to stay pace with the industry. Rolta strives to supply best-of-class solutions and services to its customers.

**Mindtree Ltd. –** It is an Indian multinational information technology consulting company specializing in corporate IT services and solutions. All their India offices are ISO 14001:2004 certified. Mindtree pledges to adopt an expanded sustainability framework. They need to figure towards an eco-system which will fulfill the social, economic and environmental needs

of present and future generations. Since its inception, sustainability has been an integral part of the Mindtree culture and strategy. For them, sustainability is a business imperative, which aims to make and maintain the required conditions under which people, the planet and their profits co-exist in productive coherence. They aim to cut down the environmental impact of their business operations through resource conservation practices, Green House Gas footprint reduction, efficient energy management and efficient waste management. It also ensures regulatory compliance and enables effective management review.

## 6. Conclusion

The pollution in electronics industry is at low level, however the unauthorized e-waste dismantling, recycling, resource recovery has become a global concern as several components are toxic and non-biodegradable, and the processes used for material recovery are hazardous. The issue of proper management of wastes is important to the protection of livelihood, health and environment. The Indian Supreme Court banned the import of hazardous waste in 1997. The Karnataka State Pollution Control Board has set down guidelines and authorized two companies to oversee corporate e-waste recycling as per their guidelines. CPCB India is finalizing the set of policies and currently issued a proper set of guidelines for correct and eco-friendly management and disposal of the digital waste. The Ministry of Environment and Forests is processing the policies framed by electronics equipment producers with the assistance of NGOs. Department of Information Technology (DIT), Ministry of Communication and Information Technology, has additionally published and circulated a complete technical manual on Environmental Management for Information Technology Industry in India. There have been efforts to arrange and manage e-waste recycling from state-to-state. As an attempt to make the consumers aware of the recycling of e-waste, numerous electronic business houses which includes Apple, Dell and HP have begun numerous recycling schemes. Nokia India introduced its recycling marketing campaign for the Indian region. The Department of Environment, Delhi government, has decided to involve rag pickers in general waste management. These rag pickers are trained, given uniforms, ID cards and hired to clean waste. The E-waste Management and Handling Rules, 2011 ought to be more stringently enforced. The recycler should get registration from CPCB to establish dismantling or recycling units. The majority of countries globally nevertheless lack powerful e-waste policy and regulation, in addition to suitable series of e-waste systems and infrastructure. Further, without extra clarity and harmonization of e-waste regulations from global bodies, even the country- stage regulations and policies that

do exist are restrained of their effectiveness because of their patchwork nature. Finally, a quite lot of evaluation on consumers' position in establishing a successful e-waste control system is required to further enhance consumers' return rates for used electrical and electronic equipment (EEE), an important bottleneck even in those nations with long histories of e-waste control. There is a need for a separate law for powerful implementation of the concepts governing the e-waste management.

## References

### Books


- "E-waste in India: A growing Industry and Environmental Threat", India, October 2007.
- "E-waste Worsening Environmental Pollution", *The New Indian Express News Service*, India, July 2014.
- "India has second fastest growing services sector", *Economic Survey*, India, July 2014.
- "Sector wise Contribution of GDP of India", India, July 2015.
- "Service sector in India, Service Industry in India", India, September 2015.
- "Telecommunications and the Environment: The way to sustainable development", *The Problem of the Environment.*
- Christina, M. (2007). "A Legal, Political, Economic and Moral Framework for Global Warming", *Report on Natures Trust*, Colorado, August.
- Jain, A. and Johri, R. (2004). Global e-waste growth – E-waste: Implications, regulations and management in India and current global best practices, New Delhi, India.
- Kulkarni, S. (2015). "A Brief Report on Electronics Industry in India", India.
- Lakshmi et. al. "E-waste in India – Bridging the Gap between the Informal and Formal Sector".
- Paramasivan, T. (2002). "Taking Professional care of the Nature: The Environmental Audit", *The Chartered Accountant*, Vol. 51, No.2, August.
- Rathore, A. K. (2014). "National Scenario of E-Waste - Scientific India - By the Scientists, for the People", *Environment: Scientific India Magazine,* (2013 – 2014).
- Research Unit (Larrdis), Rajyasabha Secretariat (2011). "E-waste in India", New Delhi, India.

- Wath et. al. (2011). "E-waste scenario in India, its management and implications", *Environmental Monitoring and assessment*, Vol. 172, Issue 1, pp 249–262 January.
- Williams et. al. (2002). "Environmental Issues in the Electronics Industry", *Environ. Sci & Tech*.

**URLs**

- https://books.google.co.in
- http://businesswireindia.com
- https://economictimes.indiatimes.com
- http://emcentre.com
- http://en.wikipedia.org
- http:// financeshop.capitalmarket.com
- http://hagueconstruction.co.uk
- http://morningstar.in
- http:// rajyasabha.nic.in
- http://slideshare.net
- http://speed.economictimes.indiatimes.com
- http:// statisticstime.com
- https://timesofindia.indiatimes.com
- https://wipro.org
- http://www.amazon.in
- http:// www.answers.com
- http:// www.asa.in
- https://www.bsigroup.com
- http:// www.cdil.co
- http:// www.ecil.co.in
- https://www.ericsson.com
- https://www.faceprep.in
- https://www.gfmag.com/
- https://www.grin.com
- https://www.hclinfosystems.in
- http://www.hcltech.com
- http:// www.ibef.org

- https://www.icmrindia.org
- https://www.indiamart.com
- https://www.infosys.com
- http:// www.iswa.org
- http:// www.meic.org
- https://www.meta4.com
- http://www.mindtree.com
- http://www.moneycontrol.com
- http://www.mphasis.com
- http:// www.newindianexpress.com
- https://www.oracle.com
- http:// www.reff.org
- http://www.rolta.com
- https://www.siemens.co.in
- https://www.wipro.com
- https://w5.siemens.com
- https://yourstory.com
- http:// ysrinfo.files.word.com