

**A MINI PROJECT REPORT
ON
“E-WASTE MANAGEMENT BEST PRACTICES IN IT
SECTOR WITH REFERENCE TO IT
ORGANISATIONS IN BANGALORE”**

*MINI PROJECT SUBMITTED IN FULFILLMENT OF THE
REQUIREMENT FOR THE AWARD OF THE DEGREE OF*

**MASTER OF BUSINESS ADMINISTRATION
FROM
BENGALURU CITY UNIVERSITY**



SUBMITTED BY
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UNDER THE GUIDANCE OF
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**AI-AMEEN INSTITUTE OF MANAGEMENT STUDIES
AFFILIATED TO BENGALURU CITY UNIVERSITY
(2021-2022)**

CERTIFICATE OF INSTITUTION

This is to certify that this Project entitled **E-Waste Management Best Practices in IT Sector with Reference to IT Organisations in Bangalore** has been successfully completed by **Aftab Pasha** of Reg. No. **MB206206** during the year **2021-22** and the report is submitted in partial fulfillment of the requirements for the award of the degree of **Master of Business Administration** as prescribed by the **Bengaluru City University** under the guidance of **Dr. Y.V. Sheshadri**.

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This is to certify that this Project entitled **E-Waste Management Best Practices in IT Sector with Reference to IT Organisations in Bangalore** Submitted by **Aftab Pasha** bearing Reg. No. **MB206206** is an original work of the student and is being submitted in partial fulfilment of the requirement for the award of the degree of **Master of Business Administration** of **Bengaluru City University** under the guidance of **Dr. Y.V. Sheshadri**. This report has not submitted earlier either to this university/ institution for the fulfilment of the requirement of a course of study.

Place: Bangalore

Date:

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This is to certify that this Mini Project Report is submitted by **Aftab Pasha** is an original work of students and is submitted in partial fulfilment of the requirements for the award of the degree of **Master of Business Administration** of **Bengaluru City University** under the guidance of **Dr. Y.V. Sheshadri**. This report has not submitted earlier either to this university/institution for the fulfilment of the requirement of the course study.

Place: Bangalore

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STUDENT DECLARATION

I hereby declare that the Project Report entitled **E-Waste Management Best Practices in IT Sector with Reference to IT Organisations in Bangalore** has been prepared by me under the supervision and guidance of **Dr. Y.V. Sheshadri**, during the year **2021-22** in a partial fulfillment of the university regulations for the award of the degree of **Master of Business Administration** by **Bengaluru City University**.

I further declare that this project is based on the original study undertaken by me and has not been submitted at any time to any university or institution for the award of any other degree or diploma.

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CHAPTER: 1

INTRODUCTION



CHAPTER 1: INTRODUCTION

INTRODUCTION ABOUT TOPIC:

➤ INTRODUCTION OF IT SECTOR:

Information Technology in India is an industry consisting of two major components: IT services and business process outsourcing (BPO). The sector has increased its contribution to India's GDP from 1.2% in 1998 to 7.7% in 2017. According to NASSCOM, the sector aggregated revenues of US\$160 billion in 2017, with export revenue standing at US\$99 billion and domestic revenue at US\$48 billion, growing by over 13%. The United States accounts for two-thirds of India's IT services exports. India's IT industry is expected to grow at a rate of 12 - 14% during 2016 - 2017 as per a report by India's software industry body National Association of Software and Services Companies (NASSCOM.) This clearly shows that information technology is a sector which will likely be one of the emerging markets in the days to come as India's economy requires more hardware, software and other IT services.

Information Technology (IT) services companies, as the name suggests, provide IT services such as software development, software maintenance and support, product development, and other related services to domestic and overseas clients. 70% of all the IT companies in India are in the Small and Medium Enterprises (SME) sector. For the purpose of this study an IT services company in small scale sector would be typically 40 to 200 people strong with turnover ranging from Rupees 1 crore to Rupees 20 crore. The IT Industry eco-system in India comprises of large scale tier 1 and tier 2 companies, a number of medium size companies and a plethora of small scale companies and startups.

The industry has played a key role in transforming India's image from a government controlled economy to a global player in providing world class technology solutions and business services. People are the most important asset of any service based organisation. People Management, therefore, attains special importance in services companies. The IT industry typically suffers from high attrition rates across the segments. The attrition rates are more pronounced in small scale IT service companies.



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➤ HISTORY OF IT INDUSTRY IN INDIA:

India's IT Services industry was born in Mumbai in 1967 with the establishment of the Tata Group in partnership with Burroughs. The first software export zone, SEEPZ – the precursor to the modern-day IT park – was established in Mumbai in 1973. More than 80 percent of the country's software exports were from SEEPZ in the 1980s. Information Technology has marked a turning point in the history of global trade and services. With ever-increasing availability of international bandwidth and powerful workflow management software, it is now possible to disaggregate any business process, execute the sub-processes in multiple locations around the world, and resemble it, in near-real time, at another location.

This is driving the fundamental changes in the global IT services landscape. The vendors and customers are redefining the levels of value creation in the industry. IT also makes significant contribution in increasing productivity in various sectors of the economy. Indeed, the phenomenal growth of the Indian IT Software and Services and IT-enabled Services-Business Process Outsourcing (IT-BPO) sector has had a perceptible multiplier effect on the Indian economy as a whole. In addition to the direct positive impact on the national income and employment generation, it has triggered a rise in direct-tax collections and propelled an increase in consumer spending, significantly higher disposable incomes.

Today, India has found its niche in the IT world and is regarded as the premier destination for the global sourcing of IT and IT-enabled Services (IT). IT like Medical Transcription, Call Centers, Data Processing, Back-Office Operations, GIS, Revenue Accounting, etc., are considered as niche areas of the country and the IT industry is now getting involved in providing end-to-end business solutions, system integration, remote management, etc.

The Indian IT industry has a prominent global presence today and has emerged as the fastest growing segment of the Indian industry both in terms of production and exports. Information technology industry in India is one of the fastest growing industries. Indian IT sector has built up valuable brand equity for itself in the global markets. IT has a major role in strengthening the economic and technical foundations in India. The sector can be classified into 4 broad categories- IT services, Engineering services, IT-BPO services, E business.



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➤ THE ECONOMIC REFORMS IN 1991 AND IMPROVEMENT OF IT AREA IN INDIA:

The Indian government had strict control over the personal enterprise entities in India before liberalization of economic system in 1991. Moreover, the extensive vicinity networks and internet traces had been completely managed by using the significant authorities. As a result, the Indian IT region was absolutely held lower back due to these restraints on the functioning of the software offerings providers. The first essential IT reform by using the Indian Government become the introduction of corporation called Software Technology Parks of India (STPI). This employer supplied satellite tv for pc hyperlinks to principal IT builders enabling them to transmit the work performed in India without delay overseas. This decreased the expenses incurred to the Indian IT groups in addition to helped the clients in US believe Indian industries and opt for outsourcing. Finance minister, Dr. Manmohan Singh, added the predominant financial reforms in 1991 to resolve the debt problem created all through that point. As in step with these economic reforms the international integration have become feasible. The huge regulations on distant places business had been lifted and foreign investments had been welcomed.

Also, the inception of Windows and other person pleasant working offerings made the PC experience even greater easy and much less time eating. The Indian IT sector boomed and grewed at gain of nearly 50% each 12 months. The venture of rectifying the Y2K worm become thrown to the Indians and as a end result the amendment of all of the codes and software's, which have been to begin with designed until a date of 1999 was to be edited and huge paintings turned into outsourced to the Indian IT industries. The Indian IT industry has helped provide a national GDP of extra than 6% due to the fact those financial reforms occurred 20 years in the past and today, India is called the IT hub of the arena.

➤ NATIONAL TASK FORCE, NTP AND IT ACT, 2000 HELPED IT AREA GROW IN INDIA:

The NDA (National Democratic Alliance) authorities, underneath the leadership of high minister Atal Bihari Vajpayee, protected the improvement of IT because the pinnacle priority of their long term agenda. Indian National Task Force changed into formed for this purpose which overtook the development of IT offerings in huge and small IT firms in India.



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The National Task Force, within three months, supplied a detailed document on the Indian IT and technological industries with extra than a hundred suggestions which might help enhance the IT offerings in India. IT services boom became executed and all the hints have been acted upon sooner than later. The end result of those efforts from the Indian Government bore fruit with the IT exports touching extra than \$50 billion. Indian economy turned into now not that of a developing kingdom, however at par with those of the developed nations within the global.

The satellite, towers and other telecom associated organizations were now not owned with the aid of the Central Government. The access of personal zone in these departments helped the telecom zone grow unexpectedly resulting the boom in IT quarter in India eventually. The boom of IT is completely depending on the innovation and development of telecom enterprise. The Information Technology Act 2000 provided felony reputation of the electronic documents, virtual signatures, offences and contraventions. This helped an extended manner in placing offers with US clients as no longer the man or woman to individual meeting was required for finalization of enterprise deals.

The IT area in India these days outsources software offerings the world over and because of the economic reforms in 1991 and the various liberalization acts brought by the subsequent Governments helped the IT sector in India develop immensely. The IT quarter has provided employment to more than 30 lakh Indians and has turn out to be a supply of income for more than 2 crore Indians not directly. Because of the IT region, Indian middle elegance has attained a crucial popularity and popular of dwelling has accelerated extensively in India because of the IT revolution.

➤ INTRODUCTION OF IT INDUSTRY IN BANGALORE CITY:

The software industry in Karnataka state in India has become one of the main pillars of economy. Karnataka stands first among all the states of India in terms of revenue generated from software exports. Software exports from Karnataka amounted to excess of US\$30.41 billion in 2017-18 (up to September 2017). This achievement has earned Karnataka's capital city Bangalore the sobriquet of Silicon Valley of India. This is because of the presence of major software companies in Bangalore and the revenue generated by exports of computer software.



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Though most software companies are located in Bangalore, some have settled in other cities like Mysore, Mangalore, Belgaum and Hubli in Karnataka. The Nandi Hills area in Devanahalli outskirts is the site of the upcoming \$22 Billion, 12,000-acre (49 km²) BIAL IT Investment Region, one of the largest infrastructure projects in the history of Karnataka. This endeavor expected to create four million jobs over by the year 2030. The infrastructure required for setting up software industries in Karnataka is provided by STPI.

➤ ORIGIN OF IT INDUSTRY IN BANGALORE, KARNATAKA:

Starting in the 1980s, Karnataka emerged as the information technology capital of the country. A total of 1973 companies in Karnataka are involved in Information Technology related business including big firms like Infosys and Wipro who have their headquarters in Bangalore. The origin of the growth of the software industry in Karnataka seems to have been the entry of Texas Instruments which was the first multinational to set up base in Sona Tower, Millers Road, Bangalore in 1985. Texas Instruments was searching for a location to set up their overseas development centre in India in the early 1980s.

They first looked at the states of Maharashtra and Tamil Nadu but when both states refused permission, Karnataka was approached with a condition that land allotted must be near an airport. The then chief minister of Karnataka Gundu Rao agreed to their terms and granted land near the HAL Airport in Bangalore. Texas Instruments currently has a big facility in Bagmane Tech Park in Bangalore near the airport. There were many factors conducive to the development of the software industry in Karnataka state.

The software industry requires large numbers of skilled engineers which are regularly churned out of the engineering colleges in Karnataka. The presence of Public sector undertakings like BEL, HAL, BHEL, ITI and BEML gave ready access to manpower as well as trial opportunities of newly developed software. There were many advanced laboratories like NAL and ISRO in and around Bangalore which provided necessary basic knowledge required for software development. The successive state governments have been proactive in providing necessary facilities for growth of the industry. The salubrious climate of Bangalore also helps in the growth of the software industry there.



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➤ EFFECTS OF IT INDUSTRY IN BANGALORE, KARNATAKA:

There has been both positive and negative effects of software industry's tremendous growth. The per capita income of state has risen. The software engineers of the current generation earn salaries at the beginning of their career more than what their parents used to earn at the end of their career. This affluence can be seen with young engineers flaunting new electronic gadgets. Cars once considered a luxury has become a commodity, often leading to traffic jams and unavailability of space for parking.

More people are traveling abroad for work as well as for tourism. Growth in income has had an effect on the real estate prices with the land rates skyrocketing.^[8] Land prices have shot much beyond rate of inflation and in some places rate of land doubles every two years. Agriculture has slowed down as people find it more lucrative to sell the land rather than use it for agriculture. The surge in income of software professionals has led to increased interest among youth opting for computer science and information technology courses in college. The basic science, arts and commerce fields have felt a shortage of quality manpower. The current global recession of economy has hit software industry with some losing their jobs.

➤ LIST OF IT COMPANIES IN BANGALORE:

WIPRO	HONEYWELL
INFOSYS	CGI INC.
ACCENTURE	MPHASIS
TCS	EY
IBM	NOKIA
ORACLE	DELOITTE
COGNIZANT	INTEL
CAPGEMINI	HUAWEI
CISCO	GOLDMAN SACHS
MINDTREE	FLIPKART
HCL	MICROLAND
MU SIGMA	SONATA SOFTWARE



“E-WASTE MANAGEMENT BEST PRACTICES IN IT SECTOR WITH REFERENCE TO IT ORGANISATIONS IN BANGALORE”

AMAZON

DELL

HP

TECH MAHINDRA

SAP

SAMSUNG R&D

ROBERT BOSCH

THOMSON REUTERS

WIPRO

PHILIPS

NETCRACKER TECHNOLOGY

TESCO HINDUSTAN PVT LTD

EDGEVERVE

MICROSOFT

KPMG

HITACHI

SIEMENS

GOOGLE

INTUIT

SOCIETE GENERALE

➤ INTRODUCTION OF E-WASTE:

E-waste or electronic waste is created when an electronic product is discarded after the end of its useful life. The rapid expansion of technology means that a very large amount of e-waste is created every minute. Electronic waste or e-waste may be defined as discarded computers, office electronic equipment, entertainment device electronics, mobile phones, television sets, and refrigerators. This includes used electronics which are destined for reuse, resale, salvage, recycling, or disposal as well as re-usable. The term "waste" is reserved for residue or material which is dumped by the buyer rather than recycled, including residue from reuse and recycling operations, because loads of surplus electronics are frequently commingled (good, recyclable, and non-recyclable). Several public policy advocates apply the term "e-waste" broadly to all surplus electronics. Cathode ray tubes (CRTs) are considered one of the hardest types to recycle. CRTs have relatively high concentration of lead and phosphors (not to be confused with phosphorus), both of which are necessary for the display. The United States Environmental Protection Agency (EPA) includes discarded CRT monitors in its category of "hazardous household waste" but considers CRTs that have been set aside for testing to be commodities if they are not discarded, speculatively accumulated, or left unprotected from weather and other damage. The EU and its member states operate a system via the European Waste Catalogue (EWC) - a European Council Directive, which is interpreted into "member state law".



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➤ TYPES OF E-WASTE:

- Large household appliances (refrigerators/freezers, washing machines, dishwashers)
- Small household appliances (toasters, coffee makers, irons, hairdryers)
- Information technology (IT) and telecommunications equipment (personal computers, telephones, mobile phones, laptops, printers, scanners, photocopiers)
- Consumer equipment (televisions, stereo equipment, electric toothbrushes)
- Lighting equipment (fluorescent lamps)
- Electrical and electronic tools (handheld drills, saws, screwdrivers)
- Toys, leisure and sports equipment
- Medical equipment systems (with the exception of all implanted and infected products)
- Monitoring and control instruments
- Automatic dispensers.

➤ INTRODUCTION OF E-WASTE MANAGEMENT:

Growth in the IT and communication sectors has enhanced the usage of the electronic equipment exponentially. Faster upgradation of electronic product is forcing consumers to discard old electronic products very quickly, which, in turn, adds to e-waste to the solid waste stream. The growing problem of e-waste calls for greater emphasis on recycling e-waste and better e-waste management. Electronic waste or e-waste is generated when electronic and electrical equipment become unfit for their originally intended use or have crossed the expiry date. Computers, servers, mainframes, monitors, compact discs (CDs), printers, scanners, copiers, calculators, fax machines, battery cells, cellular phones, transceivers, TVs, iPods, medical apparatus, washing machines, refrigerators, and air conditioners are examples of e-waste (when unfit for use). These electronic equipments get fast replaced with newer models due to the rapid technology advancements and production of newer electronic equipment. This has led to an exponential increase in e-waste generation. People tend to switch over to the newer models and the life of products has also decreased. E-waste typically consists of metals, plastics, cathode ray tubes (CRTs), printed circuit boards, cables, and so on.



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Valuable metals such as copper, silver, gold, and platinum could be recovered from e-wastes, if they are scientifically processed. The presence of toxic substances such as liquid crystal, lithium, mercury, nickel, polychlorinated biphenyls (PCBs), selenium, arsenic, barium, brominated flame retardants, cadmium, chrome, cobalt, copper, and lead, makes it very hazardous, if e-waste is dismantled and processed in a crude manner with rudimentary techniques. E-waste poses a huge risk to humans, animals, and the environment. The presence of heavy metals and highly toxic substances such as mercury, lead, beryllium, and cadmium pose a significant threat to the environment even in minute quantities.

Consumers are the key to better management of e-waste. Initiatives such as Extended Producer Responsibility (EPR); Design for Environment (DfE); Reduce, Reuse, Recycle (3Rs), technology platform for linking the market facilitating a circular economy aim to encourage consumers to correctly dispose their e-waste, with increased reuse and recycling rates, and adopt sustainable consumer habits. In developed countries, e-waste management is given high priority, while in developing countries it is exacerbated by completely adopting or replicating the e-waste management of developed countries and several related problems including, lack of investment and technically skilled human resources. In addition, there is lack of infrastructure and absence of appropriate legislations specifically dealing with e-waste. Also, there is inadequate description of the roles and responsibilities of stakeholders and institutions involved in e-waste management, etc. In 2016, the Ministry of Environment, Forest and Climate Change (MoEFCC) released the updated E-waste (Management) Rules, which came in supersession of the E-waste in India (GOI, 2016).

➤ E-WASTE MANAGEMENT PRACTICES IN IT SECTOR:

- 'Act' means the Environment (Protection) Act, 1986 (29 of 1986);
- 'Authorisation' means permission for generation, handling, collection, reception, storage, transportation, refurbishing, dismantling, recycling, treatment and disposal of e-waste, granted to manufacturer, dismantler, refurbisher and recycler;
- 'Bulk consumer' means bulk users of electrical and electronic equipment such as Central Government or State Government Departments, public sector undertakings, banks, educational institutions, multinational organisations, international agencies, partnership and public or private companies that are registered under the Factories Act, 1948 (63 of 1948) and the Companies Act, 2013 (18 of 2013).



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- 'Central Pollution Control Board' means the Central Pollution Control Board constituted under sub-section (1) of section 3 of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974);
- 'Collection centre' means a centre or a collection point or both established by producer individually or as association jointly to collect e-waste for channelising the e-waste to recycler and play such role as indicated in the authorisation for Extended Producer Responsibility granted to the producer and having facilities as per the guidelines of Central Pollution Control Board, including the collection centre established by the dismantler or refurbisher or recycler which should be a part of their authorisation issued by the State Pollution Control Board where the facility exists;
- 'Component' means one of the parts of a sub-assembly or assembly of which a manufactured product is made up and into which it may be resolved and includes an accessory or attachment to another component;
- 'Consumables' means an item, which participates in or is required for a manufacturing process or for functioning of the electrical and electronic equipment and may or may not form part of end-product. Items, which are substantially or totally consumed during a manufacturing process, shall be deemed to be consumables;
- 'Consumer' means any person using electrical and electronic equipment excluding the bulk consumers;
- 'Channelisation' means to direct the path for movement of e-wastes from collection onwards to authorised dismantler or recycler. In case of fluorescent and other mercury containing lamps, where recyclers are not available, this means path for movement from collection centre to Treatment, Storage and Disposal Facility;
- 'Dealer' means any individual or firm that buys or receives electrical and electronic equipment as listed in Schedule I of these rules and their components or consumables or parts or spares from producers for sale;
- 'Deposit refund scheme' means a scheme whereby the producer charges an additional amount as a deposit at the time of sale of the electrical and electronic equipment and returns it to the consumer along with interest when the end-of-life electrical and electronic equipment is returned;
- 'Dismantler' means any person or organisation engaged in dismantling of used electrical and electronic equipment into their components and having facilities as per



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the guidelines of Central Pollution Control Board and having authorisation from concerned State Pollution Control Board;

- 'Disposal' means any operation which does not lead to recycling, recovery or reuse and includes physico-chemical or biological treatment, incineration and deposition in secured landfill;
- 'And-of-life' of the product means the time when the product is intended to be discarded by the user;
- 'Environmentally sound management of e-waste' means taking all steps required to ensure that e-waste is managed in a manner which shall protect health and environment against any adverse effects, which may result from such e-waste;
- 'Electrical and electronic equipment' means equipment which are dependent on electric current or electro-magnetic field in order to become functional;
- 'e-retailer' means an individual or company or business entity that uses an electronic network such as internet, telephone, to sell its goods;
- 'e-waste' means electrical and electronic equipment, whole or in part discarded as waste by the consumer or bulk consumer as well as rejects from manufacturing, refurbishment and repair processes;
- 'e-waste exchange' means an independent market instrument offering assistance or independent electronic systems offering services for sale and purchase of e-waste generated from end-of-life electrical and electronic equipment between agencies or organisations authorised under these rules;
- 'Extended Producer Responsibility' means responsibility of any producer of electrical or electronic equipment, for channelisation of e-waste to ensure environmentally sound management of such waste. Extended Producer Responsibility may comprise of implementing take back system or setting up of collection centres or both and having agreed arrangements with authorized dismantler or recycler either individually;
- 'Extended Producer Responsibility - Authorisation' means a permission given by Central Pollution Control Board to a producer, for managing Extended Producer Responsibility with implementation plans and targets outlined in such authorisation including detail of Producer Responsibility Organisation and e-waste exchange, if applicable;



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- ‘Extended Producer Responsibility Plan’ means a plan submitted by a producer to Central Pollution Control Board, at the time of applying for Extended Producer Responsibility - Authorisation in which a producer shall provide details of e-waste channelisation system for targeted collection including detail of Producer Responsibility Organisation and e-waste exchange, if applicable;
- (w)'Facility' means any location wherein the process incidental to the collection, reception, storage, segregation, refurbishing, dismantling, recycling, treatment and disposal of e-waste are carried out;
- 'Form' means a form appended to these rules;
- ‘Historical e-waste’ means e-waste generated from electrical and electronic equipment as specified in Schedule I, which was available on the date from which these rules come into force;
- ‘Manufacturer’ means a person or an entity or a company as defined in the Companies Act, 2013 (18 of 2013) or a factory as defined in the Factories Act, 1948 (63 of 1948) or Small and Medium Enterprises as defined in Micro, Small and Medium Enterprises Development Act, 2006 (27 of 2006), which has facilities for manufacture of electrical and electronic equipment;
- ‘Orphaned products’ means non-branded or assembled electrical and electronic equipment as specified in Schedule I or those produced by a company, which has closed its operations;
- ‘Part’ means an element of a sub-assembly or assembly not normally useful by itself, and not amenable to further disassembly for maintenance purposes. A part may be a component, spare or an accessory;



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STATEMENT OF THE PROBLEM:

The statement of the problem is to study the e-waste management best practices in IT (Information Technology) sector with reference to IT organizations in Bangalore. Electronic industry is the world's largest and fastest growing manufacturing industry which become leverage to the socio - economic and technological growth of a developing society. The “Electronics Waste” or “e waste” consists of obsolete and damaged electronic devices. At present the current practices of e-waste management in India suffer a number of disadvantages like inadequate legislation, difficulty in inventories, health hazards due to informal recycling, poor awareness and reluctance on part of the corporate to address the critical issues. Therefore, an attempt has been made to study the e-waste management best practices in IT (Information Technology) sector with reference to IT organizations in Bangalore.

NEED AND RELEVANCE OF THE STUDY:

The discarded electronic waste is the fastest growing stream of waste in industrialized countries. The electronics are changing the lives of people everywhere; starting from the way we do business, bring up children, keeping touch with others or personal entertainments. No wonder, the electronics industry is the fastest growing manufacturing industry. The Consumers are drawn to the latest cellular phones, laptops, air conditioners and consumer electronics. Hence the obsolescence of these products leads to a unique mindset where consumers preferred to replace the products rather repair and reuse. A rapid obsolescence is also due to the rapid evolving technology but on the other hand it is clear that the throw away principle yields monetary benefits to corporate. In this 21st century revolution, this throw away principle is sure to damage the quality of our lives and the generations to come. Hence the problem of electronic waste, or e waste, requires global action.



CHAPTER: 2

METHODOLOGY



CHAPTER 2: METHODOLOGY

REVIEW OF LITERATURE:

According to Vijay N. Bhoi et al. (2014), most of the waste is inherently dangerous. It will degrade to provide leachate, which can contaminate water, and make lowland gas, that is explosive. Additionally, owing to the risks related to lowland sites, there are currently terribly strict needs on the development, operation and medical care of such sites. Most designing authorities desire a figured out quarry to be used for landscaping instead of a lowland web site that nobody desires in their “back yard”. Product style should be used to assist to reduce not solely the character and quantity of waste, however conjointly to maximise end-of-life utilization. Makers, retailers, users, and disposers ought to share responsibility for reducing the environmental impacts of merchandise. A product-centred approach ought to be adopted to preserve and shield setting.

Kuehr and Williams (2003) stated that an increasing market for reused PCs in developing countries is allowing people to own PCs and access technology at more affordable prices. Moreover, charitable organizations, such as Computer Mentor, Computer Aid, World Computer Exchange, Computers for Schools and others are expanding their boundaries and providing used and refurbished computers to organizations (e.g., schools) around the world. Furthermore, reuse also reduces the environmental impacts of technological artifacts by increasing their life spans and thereby reducing the demand for new equipment.

Ramzy Kahhat, et al., (2008) stated in his article that some states are adopting e-waste regulations, but so far the U.S. does not have a federal regulation that addresses the complete e-waste situation, including residential and non-residential sectors. Federal level policies and regulations present the best way to address the e-waste situation (U.S. GAO, 2005) as they will overcome the lack of regulations in most states and will standardize regulations and policies in the country. This will create a more efficient national e-waste management system. In this scenario, the e-Market for returned deposit system will be the mechanism for residential customers to dispose of their devices in a way that motivates collection, recycle and reuse of e-waste.



“E-WASTE MANAGEMENT BEST PRACTICES IN IT SECTOR WITH REFERENCE TO IT ORGANISATIONS IN BANGALORE”

Sivakumaran Sivaramanan (2013) confirmed that the public awareness and cooperation of manufactures are essential for the advancement of e-waste management system. And also it is the responsibility of government to allocate sufficient grants and protecting the internationally agreed environmental legislations within their borders. Licensing of certification like estewardship may ensure the security to prevent illegal smugglers and handlers of e-waste. As e-wastes are the known major source of heavy metals, hazardous chemicals and carcinogens, certainly diseases related to skin, respiratory, intestinal, immune, and endocrine and nervous systems including cancers can be prevented by proper management and disposal of e-waste.

According to Peeranart Kiddee et al. (2013) e-waste can be managed by developing ecodesign devices, properly collecting e-waste, recover and recycle material by safe methods, dispose of e-waste by suitable techniques, forbid the transfer of used electronic devices to developing countries, and raise awareness of the impact of e-waste. No single tool is adequate but together they can complement each other to solve this issue. A national scheme such as EPR is a good policy in solving the growing e-waste problems.

Yamini Gupt & Samraj Sahay (2015) suggested that financial responsibility of the producers and separate collecting and recycling agencies contribute significantly to the success of the extended producer responsibility-based environmental policies. Regulatory provisions, takeback responsibility and financial flow come out to be the three most important aspects of the extended producer responsibility. Presence of informal sector had a negative impact on the regulatory provisions.

In Sukeshini Jadhav (2013) observed that proper e waste management will help efficient sourcing and collection right upto extraction and disposal of material, ensuring that e-waste will turn into lucrative products and business opportunity. The manufacturers have to take responsibility for adopting the guideline for manufacturing sound environment product and sustainability management should be started from the product manufacturing stage i.e raw material selection, product and process design can be the important factors for the designed for environment practices, which can facilitate the recycling and reuse.



“E-WASTE MANAGEMENT BEST PRACTICES IN IT SECTOR WITH REFERENCE TO IT ORGANISATIONS IN BANGALORE”

OBJECTIVES OF THE STUDY:

- To study the concept E-Waste Management.
- To study the E-Waste Management Practices in IT Sector in Bangalore.

SCOPE OF THE STUDY:

The research of the present study covers the scope which is limited to the e-waste management best practices in IT (Information Technology) sector with reference to IT organizations in Bangalore. The study enables the students to develop independent critical thinking skills and it can be utilized by the juniors as reference material for their relevant research study.

METHODOLOGY OF THE STUDY:

The study is descriptive in nature. It has been carried out with the help of secondary data taken from various journals, text books, newspapers, magazines, internet sources and online research reports.

SOURCES OF DATA:

➤ **SECONDARY DATA:**

Secondary data is a data which is readily available. The data for the present study covers the secondary sources such as magazines, websites, journals, newspapers, various books related to the topics and other references were made.

LIMITATIONS OF THE STUDY:

- Time constraint.
- In depth research was not made.
- There might be bias in the secondary information.



CHAPTER: 3

SWOC ANALYSIS



CHAPTER 3: SWOC ANALYSIS

STRENGTHS:

- Virtually unlimited supply of electrical and electronic materials available for closed loop processing by reusing or recycling.
- Awareness of the e-waste management issues by consumers and companies is changing the processes used to monitor and control the disposition of e-waste.
- Some of the larger electronics OEMs are developing and deploying products with alternative materials to those declared unacceptable by RoHS.
- Some of those same companies and others are changing their designs and adding materials identification to make dismantling and separation of recyclable materials easier at e-waste management facilities.

WEAKNESSES:

- Government regulation, to date, has been uncoordinated at the national and regional level; too much freedom for individual government entities.
- Different compliance requirements from country to country and state to state adds unnecessary costs.
- Traditional disposal by landfill (too easy and too inexpensive) has not been addressed.
- Consumers are typically not aware or provided effective incentives to reuse or recycle WEEE.
- Too many groups with good intentions are working on fixing the e-waste problem.
- E-waste management companies are not certified/audited by third parties that their processes are in compliance and appropriate.



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OPPORTUNITIES:

- Implement an international system to report, quantify, and control the movement and disposition of WEEE by mass balance (transparency) or declare it to be hazardous waste.
- Utilize the framework of an existing international organization to mandate the implementation of the fundamental and minimum global requirements for e-waste management.
- Make landfill disposal of e-waste unacceptable (ban it) or significantly more expensive (minimum 2X) than actual reuse and/or recycle costs and make it more difficult (require separation from other trash).
- Cooperate, communicate, and enforce e-waste management requirements across political boundaries and geographical regions.
- Create an e-waste export fee, based on the tons shipped to each non-OECD country, that is earmarked as capital (money) for investment in infrastructure, equipment, and environmental controls necessary to process e-waste appropriately.

CHALLENGES:

- Insufficient resources or political will to enforce government and treaty requirements, including financial and legal penalties for noncompliance
- Insufficient capital investments in processing equipment and training in both industrialized and developing countries
- Secondary markets for recovered materials or feedstock for primary markets significantly exceeds the demand for raw materials in manufacturing processes
- Commodities prices decline below the price point for e-waste management companies to make a profit
- Generators and exporters have too many methods/ways to circumvent the intent of control regulations, which undermines the integrity of the processes.



CHAPTER: 4

OUTCOMES OF THE STUDY



CHAPTER 4: OUTCOMES OF THE STUDY

OUTCOMES:

"Electronic waste" could also be outlined as discarded computers, workplace equipment, diversion device natural philosophy, mobile phones, TV sets, and refrigerators. This includes used natural philosophy that are destined for use, resale, salvage, recycling, or disposal. Others are re-usable (working and fixable electronics) and secondary scrap (copper, steel, plastic, etc.) to be "commodities", and reserve the term "waste" for residue or material that is drop by the client instead of recycled, as well as residue from use and utilization operations. As per a joint inspection report by Central Pollution Control Board (CPCB), Union Environment Ministry and Uttar Pradesh Pollution Control Board (UPPCB) found 27 illegal e-waste industries operational in Uttar Pradesh. All these units were dumping the waste into the Ramganga, causing irreparable damage to the river and its surrounding environment, these incidents highlights the silent crisis building up in India. Besides the country's burgeoning population on mobile phones has seen stupendous growth in the last decade, which a 310 million subscribers in 2001 to 1.1 billion in 2016, the number of mobile phone users in India is nearly 4 times that of United States today and it is second only to China in the world, which has 1.3 billion subscribers.

- Increasing amount of E- Waste: The Product obsolescence is becoming more rapid since the speed of innovation and the dynamism of product manufacturing / marketing has resulted in a short life span (less than two years) for many computer products. The Short product life span coupled with exponential increase at an average 15% per year will result in doubling of the volume of e-waste over the next five to six years.
- Toxic components: The e-waste are known to contain certain toxic constituents in their components such as lead, cadmium, mercury, polychlorinated bi-phenyls (PCBs), etched chemicals, brominated flame retardants etc., which are required to be handled safely. Most of the recycling practices were found inconsistent in informal sectors leading to uncontrolled release of toxic materials into the environment as a result of improper handling of such materials.



“E-WASTE MANAGEMENT BEST PRACTICES IN IT SECTOR WITH REFERENCE TO IT ORGANISATIONS IN BANGALORE”

- Lack of environmentally sound recycling infrastructure: E-waste, in the absence of proper disposal, find their way to scrap dealers, which are further pushed into dismantler's, supply chain. Current environmentally sound recycling infrastructure in place is not equipped to handle the increasing amounts of e-waste. Major dismantling operations are occurring in unorganized/informal sector in hazardous manner. The scope of increased e-waste generation and lack of adequate recycling facilities have attracted the attention of a number of recyclers globally, expressing interest to start recycling facility in India.
- Impacts on environment: The E-wastes constitutes heavy metals, persistent organic pollutants, flame retardants and other potentially hazardous substances which can cause risks to the environment if not managed properly. While recycling and material recovery, three main groups of substances are released in to the environment which needs high priority attention as they are highly hazardous in nature.
- Occupational health impacts of e-waste: We have few regulations for the informal sector to safeguard the health of those who handle e-waste. In general the workers are poorly protected in an environment where e-waste from PC monitors, PCBs, CDs, motherboards, cables, toner cartridges are burned in the open and release lead and mercury toxins into the air, besides many of these workers complain of eye irritation, breathing problems and constant headaches. Some of the critical occupational health issues are inadequate working space, poor lighting and ventilation, straining the eyes and breathing polluted air, sitting cramped on the ground for long hours, inhaling toxic fumes, exposure of body parts to fire, acid and other chemicals and unavailability of clean drinking water and toilets.
- Regulatory regime for e-waste: There are specific environmental laws or Guidelines for e-waste exists. The e-waste (Management and Handling) Amended Rule, 2018 has come into force from March 2018 having the following highlights: Amended e-waste rules for eco-friendly effective management of e-waste in the country. The changes in Rules In order to streamline e-waste disposal in the country, it has been done for the purpose of validating and organizing the units engaged in the task of recycling or dissolving e-waste.



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SUGGESTIONS:

- Be a good consumer. Do some research when you're ready to buy a new product. Make sure it's one that won't break easily or become damaged shortly after you purchase it.
- Reuse as often as possible. If you have parts and equipment that are still working, try repairing the electronic device before getting a new one. And if the device is beyond the point of being repaired, then recycle it.
- Educate yourself on what gets put into your electronics. Knowledge is power. Doing some research about the raw materials being used to manufacture your mobile phone or laptop helps you understand how harmful those materials and toxins can be if they're tossed into a landfill.
- Look for an environmentally friendly label. For example, see if the products you buy are labelled Energy Star, or have been certified by the Electronic Product Environmental Assessment Tool.
- Consider limiting the number of electronics you own. If you don't really need an extra gadget, look for devices that have multiple functions.
- Teach kids about e-waste. Children are our future, and it helps if we can instill within them at a young age a commit to e-waste recycling.
- Recycle, recycle, recycle. No matter what you have, it's important to always dispose of your e-waste properly. That means recycling all of your used electronics, with the understanding that improperly disposing of e-waste is becoming more and more hazardous, particularly since the volume of e-waste has skyrocketed.
- Understand security issues. All of your personal information remains stored on your electronic devices even if you delete it, so that's another reason not to throw it away.
- Maintain what you have. Small moves help keep what you have working longer. Clean your computer often and don't overcharge your battery so you can improve your battery's overall lifespan.



CHAPTER: 5

LEARNING EXPERIENCES AND CONCLUSION



CHAPTER 5: LEARNING EXPERIENCES AND CONCLUSION

LEARNING EXPERIENCES:

- Opportunity to learn new concepts.
- Opportunity to get explore new insights.
- Added value to the learning.
- Learned professional communication.
- Learned to collect relevant information.
- Learned to be persistent to complete the task.
- Learned to create a balance between collaborative and individual work.
- Learned to work independently.
- learned about the methods and issues.
- Studied about the concept E-Waste.
- Studied about E-Waste Management.
- Studied about the E-Waste Management best Practices in IT Sector.



“E-WASTE MANAGEMENT BEST PRACTICES IN IT SECTOR WITH REFERENCE TO IT ORGANISATIONS IN BANGALORE”

CONCLUSION:

E-waste recycling is necessary but it should be conducted in a safe and standardized manner. The acceptable risk thresholds for hazardous, secondary e-waste substances should not be different for developing and developed countries. However, the acceptable thresholds should be different for children and adults given the physical differences and pronounced vulnerabilities of children. Improving occupational conditions for all e-waste workers and striving for the eradication of child labor is non-negotiable. The amount of e-waste being generated is increasing rapidly and is compounded by both illegal exportation and inappropriate donation of electronic equipment, especially computers, from developed to developing countries. As little as 25% of e-waste is recycled in formal recycling centers with adequate worker protection. The health consequences of both direct exposures during recycling and indirect exposures through environmental contamination are potentially severe but poorly studied. Policy frameworks aimed at protecting vulnerable populations exist but are not effectively applied. Waste from end-of-life electrical and electronic equipment, known as e-waste, is a rapidly growing global problem. E-waste contains valuable materials that have an economic value when recycled. Unfortunately, the majority of e-waste is recycled in the unregulated informal sector and results in significant risk for toxic exposures to the recyclers, who are frequently women and children. Because of uncertainty of the ways to manage, electronic junks lie unattended in homes, offices, warehouses etc. and its commonly mixed with family wastes, that are finally disposed off at landfills. This necessitates implementable management measures. In industries management of e-waste ought to begin at the purpose of generation. This will be done by waste step-down techniques and by property product style.



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27-Nov-2021	Discussion of research methodology, tools for data collection and limitations of the study.	
05-Dec-2021	Discussion of e-waste, e-waste management, e-waste management best practices in IT sector, and SWOC analysis.	
12-Dec-2021	Discussion of outcomes of the study, learning experiences and conclusion.	