

E-waste Management Practices: A Case Study of IIT Roorkee

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Abstract: The amount of e-waste is growing very fast in India. There are many sources for this growing volume of e-waste. Higher education institutes are also one of the major sources of the growing volume of e-waste. These Higher education institutes are not only purchasing bulk amounts electronic equipments, but also replace them very rapidly due to frequent changes in technology. In this paper one of the Higher education institute was selected for the study. The main objective of the case study was to understand the process of e-waste management in an organization. In this paper SAP-LAP method was used for the analysis of the case. During analysis through this method various variables were identified which influence effective management of e-waste in an organization.

Keywords: E-waste, IIT Roorkee, LAP, SAP.

I. INTRODUCTION

On the basis of convenience one of the reputed organization of higher education institute was selected for the study. The SAP-LAP methodology was used on that organization for the purpose of case-study. The variable identified from the literature were tested which of them influences the effective management of e-waste in that organization.

Reduction in the cost of electronic devices and rapid change in technology are two main factors for increase in sale of electronic devices in India. Frequent change in technology is also one of the major factor. Due to frequent change in technology the life span of these electronic devices is going shorter day by day [3] [4].

This growing volume of e-waste is very harmful and need to be manage effectively [6]. According to UNEP, this growing volume of e-waste have severe risk for the environment and human health [11]. A study also shows that the percentage of e-waste as municipal waste in European Union is 4% [12]. Similar in the United State 2-5% of e-waste represent total municipal waste [9]. Through recycling of e-waste we can not

only save environment and human health but also saves energy [1]. In India as per the study, Mumbai Municipal Corporation is generating high e-waste in Mumbai Metropolitan Region. The main source of e-waste generation are educational and software industry, shops malls etc. [8].

In this paper, SAP-LAP methodology was used to understand the process of e-waste management in IIT Roorkee.

II. METHODOLOGY OF CASE STUDY

The SAP-LAP methodology recommended by Sushil [10] is used for the analysis of case study for the selected organization. There are two phases in that methodology i.e. SAP and LAP. In SAP analysis the case is represented on the basis of three components, these components are situation, actor and process. In second phase the case is studied through Learning, Action and Performance (LAP). The main objective for using that method (SAP-LAP) is to understand the whole process of e-waste management in an organization. Finally, we can say that to know the answer of questions like understand what, why and how [7]. SAP-LAP model to understand the effective e-waste management is given below:

Situation:

- What is the status of e-waste management in an organization?
- Why e-waste should be managed effectively by the organization?
- How e-waste management can be implemented effectively in the organization?

Actors:

- Who are the actors involved in the e-waste management?
- What they will get by effective e-waste management?
- Why they will be benefited from the effective e-waste management?

Process:

- What are the main processes of the e-waste management?
- How the present process can be improved?
- What are the main processes of e-waste management?

Learning:

- To understand the learning in current running processes.
- How through the effective e-waste management the current process can be improved?
- Which actors can be affected by effective e-waste management?

Action:

- What corrective actions need to be taken for the effective e-waste management?
- Who will be the main actor for the effective e-waste management?
- What steps need to be taken for improving the e-waste management?

Performances:

- How the enactment is enhanced by the e-waste management?
- What are the views of stakeholder on performance?
- How the performance can be measured?

To understand the organization at initial level a field study was conducted. In the process of field study, structured and unstructured interviews were conducted with Managers, Professors and other employees which were involved in the process of e-waste management in the organization. During interview they expressed their views related to process of e-waste management in their organization. The information collected during interview were used to conduct SAP-LAP analysis.

Many informations were collected through the website of the organization, reports and observations. After compiling the information from different sources, the SAP-LAP analysis was conducted as shown in the Fig. 1.

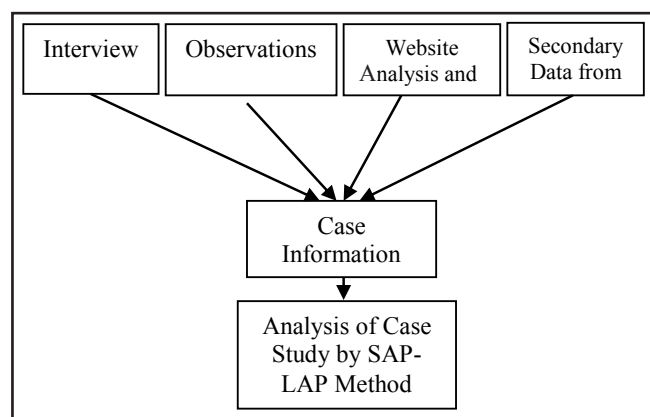


Fig. 1: Methodology for Case Study

III. SELECTION OF ORGANIZATION FOR CASE STUDY

By field survey, experts' opinion and literature study, it was found that in service sector higher educational institutes and software industries are using huge amount of electronic equipments like computer, servers, printers, and scanners and due to market demand and use of latest technologies they are more frequently removing their old electronic equipments. Hence, a reputed higher educational institute was chosen for the study.

A. Case Study: IIT Roorkee

TABLE I: ORGANIZATION PROFILE

Year of establishment	1847
Undergraduate Degree courses	10 disciplines of Engineering and Architecture
Post Graduate's Degree courses	55 disciplines
Year of computer centre establishment	1978
No. of Academic Departments	18

For the purpose of case study one of the top institute IIT, Roorkee was selected. IIT Roorkee is one of the Institute of National importance in higher education, engineering and applied research. In 1996 institute has completed 150 years of existence and has been declared by the government as 7th Indian Institute of Technology (IIT). Through website and observation many information related to institute were collected.

B. Computer Centre

The establishment of Computer center in IIT Roorkee was held in 1978. This computer center was used to fulfill all the requirements of the institute with the help of DEC-2050 system. In 1993 DEC-2050 was replaced with Tata Elxsi 3200 mainframe computer.

C. Departments

There are 18 academic departments in IIT Roorkee which include engineering departments, applied science department, humanities and social sciences departments and so on. The research is classified into two parts (Department research and Sponsored research).

IV. SAP-LAP ANALYSIS

To understand the e-waste management process of IIT Roorkee, SAP-LAP framework was used. The current status of e-waste was observed along with the people involved in this process.

The processes involved in the e-waste management were also studied. Finally, based on the learning various action were recommended to improve the existing performance of e-waste in IIT Roorkee.

A. Situation

To understand the current situation of e-waste in IIT Roorkee a field was conducted. During field study the structured and unstructured questions were asked to the employees involved in the management of e-waste in an organization. It was found that computer and other electronic equipments like printer, server are being used in each department as well as in computer labs for the purpose of teaching and maintaining different types of databases in different departments like A/c, admission, placement, exam, registrar.

The institute also has the online presence through the website www.iitr.ac.in [2]. Since the organization main focus is providing quality education to students and research work, many of the employees are aware about the e-waste management and its impacts on environment and health. Top management was interested in the effective e-waste management because they feel by effective e-waste management, IT equipment cost can be saved and their reuse can be increased. So the organization understands the need for effective e-waste management. Further, institute is in process by which the effective e-waste management can be implemented in the organization. The situation of the institute is summarized below:

- The institute established in 1847.
- The computer was used in labs as well as for the basic computation purpose like accounts, admission, placement, exam and registrar.
- The institute has the online presence through the website www.iitr.ac.in.
- Many employees were aware about the effective e-waste management.
- Top management was interested in the effective e-waste management because they feel by effective e-waste management, IT equipment cost can be saved and their reuse can be increased.
- The organization recognized the need for effective e-waste management.
- The institute interested to devise a process to improve the e-waste management in an organization.

B. Actor

The top management feels that the institute will be benefited, if the effective e-waste management is implemented in their organization, because they feel by effective e-waste management they can save the environment and health. The employees of the institute were quality education focused. The

institute feels that regular training programs to be conducted for the employees involved in the process of electronic devices sale and purchase. Institute also feels that the government support should be provided for effective implementation of e-waste in an organization. The actors of effective management of e-waste in the institute are summarized below:

- The top management of the institute can influence the e-waste management in an organization.
- Employees involved in electronic devices sale and purchase should trained time to time to improve e-waste implementation in the institute.
- The institute feels that with the government help in terms of fund and infrastructure, management of e-waste may be made effective in an organization.

C. Process

It was found that the process of e-waste management in the institute required improvement because the currently the management of e-waste is in traditional manner. The main focus of the organization is to provide quality education to the students and research work.

The institute is basically selling his old computers and other electronic devices to vendors, who provide maximum profit in return. The present process of e-waste management may be improved if the top management of the institute understands the significance of effective e-waste management. There was a lot of potential for effective management of e-waste in the institute. The existing process of effective management of e-waste in the company is summarized below:

- The institute was operating in the traditional manner.
- The effective e-waste management in the institute required improvement.
- All elementary works were done.
- The institute is basically selling his old computers and other electronic devices to vendors, who provide maximum profit in return.
- The current process may be improved if the senior management of the institute understands the significance of effective e-waste management.
- There was a lot of potential to improve the e-waste management in the institute.

D. Learning

Existing literature suggest that by the effective e-waste management we can save our environment and human health, which definitely leads to good public image of the institute. By implementation of effective e-waste management institute can save the environment and health and improve public image. By improving public image the institute may get the broader global presence.

- The learning from the existing e-waste management process institute is summarized below:
- By implementation of e-waste management in an effective manner institute can help to save our environment and human health.
- By implementing e-waste management in an effective manner institute may be able to draw broader global presence.
- Effective e-waste management will give competitive advantage to the institute.
- By managing e-waste in an effective way the image of the institute may enhance among public.

E. Actions

Top management feels that by implementing current rules and regulation related to e-waste management, institute can improve effective e-waste management in the institute. Effective management of e-waste is one of the strategic decisions for the institute. By sale of unused electronic devices to authorized recyclers only or by donating used electronic devices to other departments, institute can focus on reduce, reuse and recycling of e-waste. There is need to redefined the structure of the institute for effective management of e-waste. Counselling of the employees may be one of the best tool to avoid the reluctant behavior towards effective management of the e-waste. By providing proper training employees can be made more familiar towards the hazardous nature of this e-waste. Government may provide help to the institute in many terms to improve existing process of e-waste management. By allocating separate fund for the effective management of the e-waste in the institute we may avoid that problem. The suggested actions to be taken are summarized below:

- Top management feels that by implementing current rules and regulation of e-waste management in the institute, the process of effective e-waste management can be improved.
- By sale of unused electronic devices to authorized recyclers only or by donating used electronic devices to other departments, institute can focus on reduce, reuse and recycling of electronic devices.
- By redefining the current structure of the institute may help for the effective management of e-waste.
- Employee's counseling and training should be done about the hazardous nature of e-waste.
- Support from government in terms of infrastructure and fund may help to improve e-waste management.
- Separate fund should be dedicated to the effective management of e-waste in the institute.

F. Performance

Many reputed organization have already implemented effective e-waste management in their organization across the countries. Effective management of e-waste result great improvent in their organization. Improvent in terms of good public image, reuse and reduce of electronic devices, etc. keeping in view IIT Roorkee as one of the top educational institute in India effective e-waste management to be implemented in the institute. This will result the better public image and better resource unilization by reuse, reduce and recycling. This will also help the institute to reduce the cost involved in the e-waste management. Effective management of e-waste implementation will improve the working of the organization:

- By implementing effective e-waste management many organization have improved their performance across the countries.
- The improved performance can be measured in terms of various factors like good public image, reuse and reduce of electronic devices.
- It may help the institute in terms of the good public image and better resource utilization.
- The institute may reduce the budget of IT by effective management of e-waste.
- Effective management of e-waste may help the the institute's ability to deliver better image to its customer.
- The effective e-waste management will improve the working of the organization.
- Keeping this in view, effective e-waste management suggested by the institute.

V. CONCLUSION

Management of e-waste in IIT Roorkee was found satisfactory and need to be improved further for betterment. The senior management of the institute realize that the institute will be benefited if the effective management of e-waste implemented in the organization. Apart from this, the instute was focused on purchasing energy efficient equipments and reduce, reuse of electronic devices which result the satisfactory implementation of e-waste in the institute. The institute feels that with the Government help in terms of fund and infrastructure the current process of e-waste management can be improved in the institute. Existing literature suggested that effective management of e-waste in the institute may help to improve the public image of the institute. Many reputed organizations across the countries have already implemented effective management of e-waste, which result their improved performance. It may help the institute to improve good public image and better resource utilization. Management of e-waste will also help

to cut the cost of IT products by implementing reuse, reduce and recycling of e-waste. Keeping in view all these relevant factors, the implementation of effective management of e-waste suggested in the institute.

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