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Framework for Implementation of Sustainable Green Information Technology in Library Digitalization

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Abstract: ***The green library, also known as a sustainable library, is a relatively new concept that is gaining popularity among libraries. The Green Library Revolution is an organization of academics, libraries, governments, towns, and higher education campuses committed to greening libraries and reducing environmental degradation. We are going to focus on this paper to examine how green information technology works by conducting a digitization experiment in library services and we propose a framework for Green computing access to Library Services among the various categories of cloud computing that result in energy savings. It also focuses on the efficiency of Green Information Technology instruments in library services and their widespread adoption in modern days.***

Keywords: ***Green Library (Gl), Green Information Technology (Git), Green Library Movement (Glm), Sustainability.***

1. INTRODUCTION

Humans are constantly degrading our beautiful environment, causing problems such as global warming and climate change. Narrowing glaciers, melting ice caps, and wide temperature swings clearly show that something is wrong with our climate. When we consider challenges like global warming and climate change, we really do not think of library resources. However, libraries use a lot of energy to provide their services and thus contribute to the problem. For our survival and quality of life, we require a healthy natural environment [1]. It is past time for librarians to play a significant role in environmental improvement.

We can design a green library by selecting an appropriate site for construction, using natural materials and recyclable products for construction, conserving resources such as water, energy, paper, and so on, and being responsible for waste material recycling. So green library concepts are becoming more popular, and by properly designing a green library, we can

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reduce the harmful impact on the environment while also improving the environment inside the library.

Application of technology to information handling, including generation, storage, processing, and broadcasting. In the library, information technology refers to all of the electronic infrastructure and facilities that the library uses to improve and efficiently provide services. In general, such facilities include hardware, software, and communication links between various libraries' outlets to facilitate the sharing of common resources, particularly in Library Networks, microcomputers designed to handle any of the library processes such as acquisitions, cataloging, serial control, circulation control, bibliographic control, and selective dissemination of information [2].

Fig.1: Path to a Green Library

Objective:
The objective of this proposal of Framework for the implementation of Sustainable Green Information Technology in Library Digitalization is:
To explore how we can transfer libraries into Green Libraries.
To address the role of Green Information Technology (GIT)
To emphasize the importance of GIT in transforming academic libraries into green libraries.
To address the operation and practice of the Green Library for Cost and energy savings.

Literature Survey
We studied some literature on green libraries, sustainable libraries, and green library movements for this study. There are only a few pieces of literature that have been discovered and deemed to be relevant. Go into great length regarding the Green Library Movement and how it got started in the 1990s [3]. (Antonelli, 2008) describe the various online pages and websites associated with the Green Library Building.
Direct the world, on how to minimize waste of electrical & electronic devices through reusing, recycling, and other means of waste recovery to reduce the disposal of waste. It is

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also applicable to the subject of Library Information Science, as the number of computer users in this discipline is growing [4]. The European Union also discusses how direct participants in the treatment of waste electrical and electronic equipment might improve their environmental performance. Digitalization development in Library service protection systems the workspace, which may be further broken up into server rooms, with air-conditioning, adequate office space, conference room, Toilets & Kitchen, and Security [5]. This classification clearly encompasses far more than preserving expenses alone, and it has the ability to provide a clear picture of both the entire cost structure and the pure preservation component of all operations. According to [6], sustainability is widely seen as a crucial component of our lives. However, the environment is more than a trendy name. We should put this into practice if we actually care about the environment, and it is also an ethic to instill in our future generations. In this section, the library also plays a vital role in transforming into a digital library that focuses on sustainability in order to avoid chopping down trees. In their research work about Green Libraries, [7] Libraries could use a variety of tactics to promote green strategies and educate their users about the benefits of their green infrastructure, according to the report. They contain library exhibits, periodicals, and library programs, all of which are relevant to being green. Libraries can help people organize their strategic thinking and abilities. To prevent printing materials, make better use of cloud computing services. Recycling concepts should be pushed and adopted by the unemployed youth, who should be encouraged to adopt the same activities. Green is a positive image for libraries, and they should use their efforts to go green to develop a strong green image among their stakeholders and users. Library staff should go beyond sustainability and focus on proactive approaches to greening libraries and ensuring their long-term viability. Some signs should be displayed to raise awareness about Green Building and Library care. The structure of the Library Building has a significant impact on how national environmental exposures can be raised. The result was a structure with a deep base plate that had a minimal list, a glass façade, a five-story extension, two large learning common space basements with two pond skylights to enhance daylight penetration. Rather than an old skylight that had been occluded for so many years, one of the skylights has become an important archive feature of the Library renovation [8].

2. METHODOLOGY

Libraries have many reasons to become green, including rising energy prices and usage, a rise in consumer interest in ecologically friendly products and services, and heightened public expectations for fulfilling environmental obligations and compliance requirements.
The independent variables and dependent variables in this study are depicted in the diagram below. The independent variables will have an effect on the dependent variable and are interconnected. The independent variables in this research are conservation of energy, resource efficiency, increased natural environmental exposure, environmental load reduction, and global development sustainability. In the meantime, the report's dependent variable is an ecologically friendly library [9]. The industries, importers, and beneficiaries of information technology, including intermediate and good producers, are the sources of green information technology's direct environmental consequences. Users of information technology help lessen the ecological consequences of a variety of economic and social activities, which is of concern to society and is made possible by information technology. Reengineering

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information technology products to enhance energy efficiency is the primary goal of the first wave of green information technology.

With the following systems, the primary emphasis and empowerment of other green information technology aim to lessen environmental damage and greenhouse gas emissions.

By concentrating our research on these six areas, we can make information technology more environmentally friendly across its entire life cycle and achieve total environmental sustainability for libraries.

- Green information technology approaches & guidelines
- Green design
- Green preservation
- Green use
- Green treatment of waste
- Green standards & performance measures

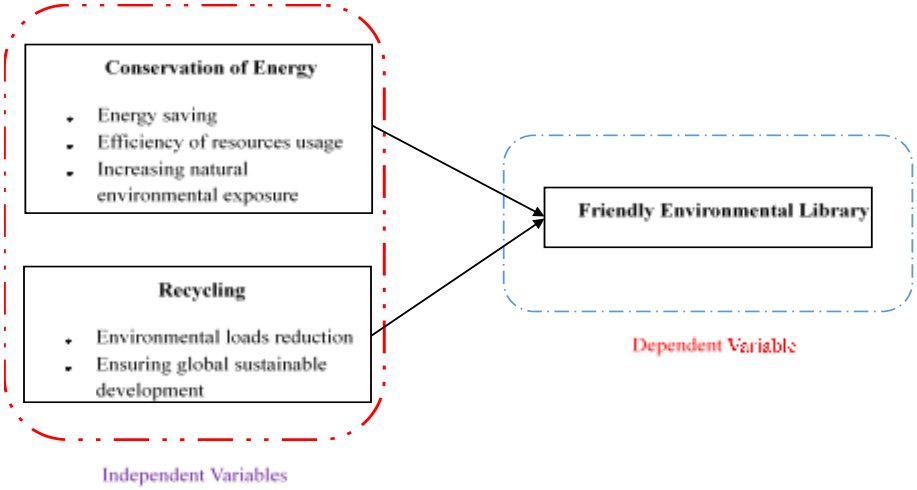

Fig.2: Conceptual framework

This research paper looked into the literature on green libraries, ICT in libraries, and Green Information Technology (GIT). Green construction codes, as well as green ICT standards, have been investigated. Working in an academic library has also helped to identify areas where ICT can be used as GIT to contribute significantly to the green movement. After a brief introduction to green libraries, ICT, and GIT, the study's main topic, GIT in academic libraries, has been examined in order to give a comprehensive picture of the function of GIT in transforming libraries into green libraries in the context of academic libraries [10].

The study's hypothesis is that as the number of Green Library buildings around the world grows, so will the number of people who use and like libraries. The research relied on documentary screening and portrayal techniques. To begin, major literature sources on the subject were studied, and analyses were made based on the information acquired in accordance with the study's goals. To give recommendations, comparative studies were performed on Green Library samples.

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Framework for Sustainable Green Information Technology

Infrastructure for green information technology incorporates an environmental viewpoint, creates a detailed plan, covers more ground when it comes to greening information technology, and puts new initiatives into action.

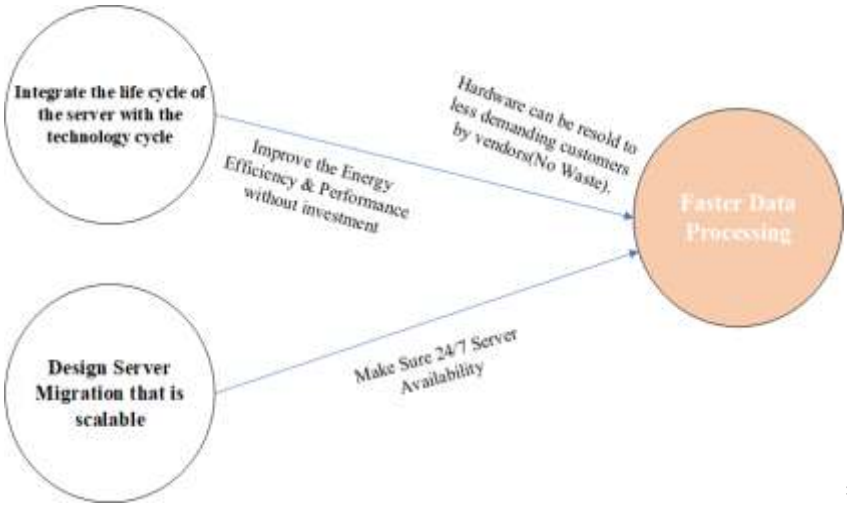

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Fig. 3: Green ICT Practice

The phrase "green computing" refers to the effective use of resources in IT/IS infrastructure and computing [11]. The effectiveness of green computing places an emphasis on reducing potentially harmful environmental impact while also achieving financial feasibility and better system performance. The term "green technology" refers to a broad range of topics, including sustainable digital services, eco-friendly, recycled products, and alternate methods of generating and using electricity. Smart technology primarily refers to hard drive monitoring and analysis, which enables businesses to save money and energy. Utilizing mobile technologies to access digital information and upgrading library missions, smart technology revolutionizes the development of green buildings while reducing energy usage.

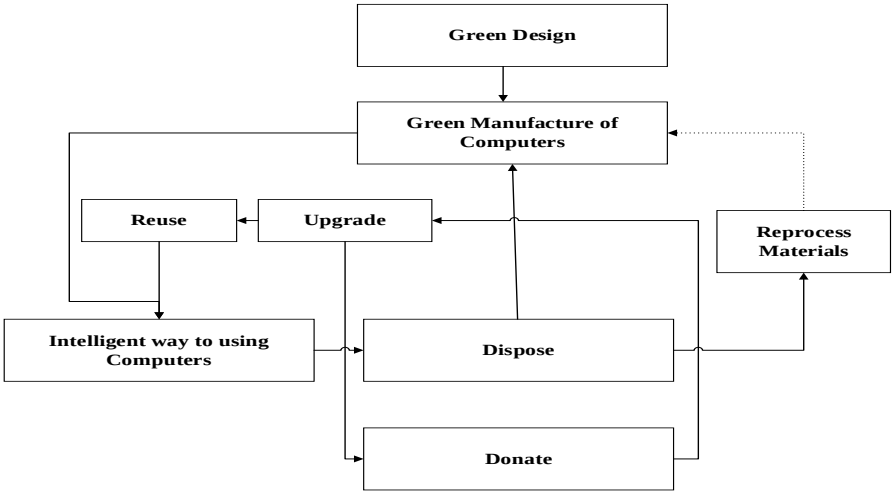

Fig. 4: Green Design

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Green use relies on using computers and other information systems in an environmentally friendly way by lowering their energy consumption. Green disposal refers to the refurbishing and recycling of outdated or discarded electronic devices. Designing computers, servers, and cooling equipment that is energy efficient is part of green design. The goal of green manufacturing is to develop a way to produce computers, electronic equipment, and other related subsystems with little or no influence on the environment.
This emphasis on recycling e-waste is supported by ethical considerations in the empirical research into green libraries. The literature evaluations also show that digital formats (adopting green information technology and digital technology) are marketed as ecologically friendly substitutes for print [12]. The claim that electronic forms are more environmentally friendly than print and should thus be given preference for development has been contested by a number of outspoken detractors. Making more ethical purchases is only one component of ethical energy usage and its impact that will be covered in this essay. Academic libraries are currently faced with the crucial dilemma of balancing the necessity of fundamental sustainability in today's digital environment with the tradition of ongoing growth and the sustainable energy usage that growth entails.

3. CONCLUSION

The challenges of sustainable development that today's entrepreneurs must simultaneously overcome force them to be proactive in more than just the economic realm. In addition to being expensive to maintain, computers and related infrastructure (such as data centers) are also bad for the environment because of their carbon emissions. With today's increased environmental awareness, green computing lessens the detrimental consequences of ICT on sustainability. By utilizing power management strategies, eliminating e-waste, and saving electricity, this approach helps the environment. The paper provided recommendations for the most effective use of the newest technologies while summarizing some of the helpful practices. Green computing involves not just creating, utilizing, and disposing of computers in a manner that is favorable to the environment but also making better use of already available computing resources by putting novel ideas like green clouds into practice. Instead of only searching for financial incentives like cost minimization, cloud providers need to significantly increase the use of renewable energy sources while reducing the electricity consumption of clouds. Green ICT sustainability addresses problems like using renewable energy sources to power data centers, reducing e-waste, designing energy-efficient hardware, middleware, and software, running multiple operating systems via virtualization, informing customers to encourage them to make green decisions.

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