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RESEARCH ARTICLE

SUSTAINABLE DIGITALIZATION: ACCESS TO INFORMATION AND INFORMATION PRESERVATION

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Abstract

This paper looks at the concept of sustainable digitalization using the interests of information access and preserving information. With the on going transformation of the digital technologies,current developmen ts and the related need to be able to maintain fair access and long-term preservation of data are an important part of long-term sustainable development. The study focuses on the problem of the digital divide, data lifecycle and the issue of the policy and infrastructure in the hope of achieving sustainability in digital practices. Through the mixed-methods approach, the paper outlines some of the major barriers and provides the policy and practice insights in order to foster inclusive, accessible, and sustainable digital environments.

Introduction:-

Digitalization has revolutionized how the societies generate, distribute and store data. Due to the dependence of the world on digital technologies more and more, the digital transformation especially with regard to guarantees of further access and maintaining the digital data has attracted the global interest of sustainability. Sustainable digitalization does not only imply technological development, but it has social, economic, and environmental implications that allow encouraging sustainability and inclusiveness.

Sustainable digitalization has a number of dimensions. Socially, it relates to the need that every person, irrespective of the socioeconomic status, geography, and educational background, gets access to the digital tools and information. Economically, it is connected to developing digital systems that are cheap and durable. On the environmental level, we should take energy consumption and ecological footprint of data centers and digital infrastructures into consideration.

In addition to this information has become a major resource in the decision-making process in various sectors be it in health, education, governance and business too. Loss of useful digital information or failure to get the right information at the right time can sometimes be very wide-reaching. Thus, the preservation of information, i.e., the set of activities aimed at preserving digital content over the long term so that it can be successfully accessed and utilized, is an inherent element of the sustainability strategy.
In this paper, the following question will be answered: How is it possible to digitalize in such a manner that a possible access and preservation of information to future generations could be guaranteed? It will serve the purpose of creating an equity-driven, resilient, and environmentally aware framework of sustainable digitalization.

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Literature Review

Sustainable digitalization occupies the borders of such academic spheres as information science, sustainability studies, and digital governance. According to such scholars as Baker (2020), modern-day equity implies digital inclusion, where digital divides are not only infrastructure but also refer to expressions in the form of digital skills and literacy. Warschauer (2003) states that the digital divide takes account of issues regarding access, relevant use, and societal inclusion.

According to Lavoie (2014), digital preservation entails activities related to keeping, curating, and making sure that digital materials are in on-going access. The problems associated with preservation are bit rot, obsolescence of software and hardware and absence of institutional practices that are standardized. Conway (2010) stresses on the paradox of digitization- the existence of access in conjunction with long-term risks that digitization can incur unless it is utilized aptly.

The environmental repercussions of digital infrastructure are becoming interesting. According to Reynolds and Wyatt (2021), they demonstrate an increase in energy consumption of global data centers and the onset of green computing practices. Garcia and Liu (2021) provide the idea of the digital sustainability concept that combines the digital system management and environmental and social governance (ESG) practices.

Digital green strategies focus on policy formulations. The Recommendation on Open Science provided by UNESCO (2021) encourages fair access to knowledge and insists on the necessity to keep digital assets to reuse them in the future. Nevertheless, not all countries have an extensive digital preservation plan. Alston (2022) reviews the digital growth paradigm that does not combat systemic inequalities and asks to base the digitalization process on human rights.

Ethics is also gaining popularity. According to scholars, the access to information must be considered a basic right, and all governments and organizations are obliged to maintain digital inclusivity and transparency. Cultural preservation is critical in digital archives, which have been highlighted in indigenous and post-colonial studies that caution erasure because of the biased priorities of digitization.

Additionally, research on technological responses to the issues of preservation has been conducted. These involve block chain use in validation of digital records, cloud-based redundancies and AI in the generation of metadata as well as the creation of digital records. Although technology has been developed, it is not implemented thoroughly because of financial and expertise issues.

On the whole, the literature highlights the necessity of integrated approaches to technologically and humanistic aspect of the digital access and preservation. A sustainable digital future is based on the collision of the digital inclusion, ethical governance and ecological stewardship.

Methodology:-

Mixed methods research design was undertaken. Data was obtained in a form of quantitative data which was taken by surveying digital archivists, librarians and IT professionals in both academic and governmental institutions. Qualitative information was obtained through semi-structured interviews of the important actors in digital preservation and access policy (Osei-Asiamah, 2023).

The geographic location of participants is Pretoria, South Africa. One hundred survey participants and 15 interview participants were studied in this research. Since this research topic deals with digital access and preservation issues, data analysis was based on descriptive statistics and thematic coding to recognize the patterns. Thematic coding emphasized on those issues which occurred repeatedly which included inequality in access, policy gaps, infrastructure limitations and environmental awareness.

Results/Findings:-

The results indicate several key findings:

1.**Access Inequality**: More than 60 per cent of the respondents of survey stated that their institutions had enormous problems in providing equitable access to digital resources, particularly in rural or under-funded areas.

2.**Preservation Infrastructure**: Fewer than 40 per cent of institutions possessed specific strategies to digital preservation. A lot of them do not have backup procedures and depend on short-term storage.

3.**Technological Obsolescence:** The major theme noted by the interviews was that of the swiftness of technological change making it hard to preserve on a long-term basis. Issues of unsupported file formats and unreliable storage media as well as lack of proper migration strategies were also raised.
4.Policy Gaps: There was a demand among the stakeholders to come up with realistic and balanced policies in terms of national and institutional policies which will facilitate sustainable digital practices. These are accountability guidelines, funding models and control.
5.**Environmental Factor:** Respondents admitted the energy consumption of data centers and supported the use of greener technology and efficient energy consumptions of data processes. Some participants referred to the absence of awareness about the carbon footprint of online services.

Recommendation:-

1.**Invest on Digital Infrastructure**: Governments and institutions are encouraged to invest in excellent, expandable, and green infrastructures that are digital. These involve renewable-powered data centers, a high-speed internet connection, as well as an affirmed data bank.
2.**Design Engaging Policies:** The existing national strategies should be made inclusive to digital equity and their guidelines visibly present when accessing and preserving it. Marginalized communities and resource-scarce institutions need to be paid special attention.
3.**Promote Open Standards**: Open standards to be used in format of data and metadata may enhance interoperability and longevity. Sharing platforms and repositories are institutions that ought to be guided by international guidelines on digital preservation.
4.**Education/Capacity Building**: There is need to have training programs to develop skills of digital preservation and inclusive digital access to professional personnel. Efforts on digital literacy must be directed to both the producers and the consumers of the digital content.
5.**International cooperation:** Cross-border cooperation will align the approaches to digital preservation and access best practices. International alliances will also be able to play the game of mutual resources in curbing technology obsoleteness and on-the-net control.
6.**Sustainability Audits**: Institutions ought to go through an aesthetic audit to gauge on the effect of their digital practices on the environment, social, and economic fronts. This could be how to shift to more sustainable models.
7. **The use of Artificial intelligence**: Central to promoting sustainable digitalization by means of maximizing efficiency, increasing transparency, and enabling informed decision-making in companies are artificial intelligence (AI), blockchain, and automation of metadata. By means of artificial intelligence, process optimization, resource management, and predictive analytics enable sectors to cut energy consumption, minimize trash, and embrace circular models. While automation of metadata guarantees effective data governance, precise analytics, and smooth digital resource management, blockchain offers transparency and unchangeable record-keeping enabling responsible supply chains, dependable sustainability certifications, and better carbon credit management (Osei-Asiamah et.al, 2024).Together, these innovations enable companies to sustainably digitize processes but also pose fresh problems. One must weigh energy use, scalability, inclusivity, and governance systems among other criteria. Responsible deployment calls for inclusive strategies that take into account not just environmental and financial goals but also social effects guaranteeing that digital innovation results in sustainable advantages for all stakeholders while lowering bad outcomes

Conclusion:-

Finally, sustainable digitalization is a complex project needing all-encompassing solutions tackling fairness, access, and preservation. Effective digital transformation guarantees that digital materials remain accessible and authentic even in changing technical terrain by balancing urgent information needs with the need of long-term preservation. From fighting data decay and technical obsolescence to addressing institutional shortcomings in standardization and practice, the research emphasizes the complexity of digital preservation. Significantly, the article supports treating digital access as a basic right deserving of intentional policy actions to bridge digital divides and advance transparency and inclusion. Moreover, although it presents hopeful answers, the efficient deployment of cutting-edge technologies including AI for metadata generating and blockchain for trustworthy record-keeping has to be backed by strong policy, technical expertise, and enough resources. Sharing best practices around the world also calls for international cooperation. Moving ahead, inclusive policymaking, on-going investment in technological capacity, and an ethical drive to protect cultural variety and stop digital erasure will drive sustainable digitalization. Putting these ideas into practice will guarantee not only current access but also the lasting resilience and relevance of knowledge for next generations.

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