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# Investigating the impact of digital technologies on innovative library services

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**Abstract**
Under the government's Digital India program, agencies are required to establish lines of communication with citizens.
**Aim of the study:** The main aim of the study is to investigate the Impact of Digital Technologies on Innovative Library Services.
**Materials and Methods:** This research used a descriptive survey approach. Researchers may often collect primary data for the goals of describing, explaining, or examining a phenomena via the use of a descriptive survey study methodology.
**Conclusion:** The study's findings suggest that digital technologies have had profound effects on libraries.

**Keywords:** Digital India program, digital technologies and innovative library services

## 1. Introduction

### 1.1 Overview

Under the government's Digital India program, agencies are required to establish lines of communication with citizens. The goal is to eliminate the need for paper delivery of government services. The proliferation of digital technologies including the Internet, smartphones, apps, tablets, and computers has led to a shift toward digital forms in almost every aspect of contemporary life. Education systems in India's metros and other cities have also been substantially updated, laying the groundwork for the widespread use of digital methods. Many overseas institutions and the conventional educational system in India are incorporating digital education into their curricula. Books were the primary method of instruction in traditional classrooms. Teachers would write their explanations on the chalkboard, and their pupils would copy them word for word. Learners depend on instructors and prioritize memorization and note taking. However, these days, chalk is hardly used in classrooms. With the advent of digital teaching tools like PowerPoint presentations, video lectures, e-learning strategies, practice demonstrations, and online training, the classroom experience has undergone a dramatic transformation toward more student engagement. The expansion of high-speed Internet access into rural regions is a primary goal of the Digital India initiative. The core elements of Digital India are.

- Building digital infrastructure for every citizen.
- Electronically delivering services to the public.
- Digital literacy.

For such a massive, well-planned, and coordinated project to equip students with technical skills, provide students with digital access to government services, invest heavily in ICT and telecom infrastructure, and link the digital services of different government agencies.

#### 1.1.1 Innovative services in the library

- Full-text online and print book searching via OPEC.
- Research scholars may get information and reminders about when their sources are due through SMS or email at a "Information Kiosk".
- Ask a Librarian.
- Scan this QR code to access academic resources.
- Read academic journals and books online for free.
- Chat with a Librarian.
- Use our free Plagiarism Checker.

### 1.1.2 Impact of Digitization on Libraries

For libraries, the term "digitization" encompasses a wide range of practices, from repro-micrographic methods to methods of technological communication and beyond, to the establishment and usage of databases. The following library departments and how they function in light of how digitization has impacted them:

a) **Library Management:** Under this, digitalization impacts the fields of categorization, cataloging, indexing, database design, computer-aided search, and systematic document indexing.
b) **Library Automation:** Digitalization will have an impact on this through facilitating database organization, library automation, and other clerical tasks.
c) **Library Networking:** Resource pooling and data dissemination, both of which have been impacted by automation, are on the horizon.

### 1.1.3 Innovative Services of Library

The library system as we know it will undergo a radical transformation because of Web 2.0 technologies. Every day, more and more people need physical services because of their cell phones and Android phones. Traditional libraries' Library 2.0 services are declining because their patrons choose other options. Additionally, because of ongoing assessment and revision, Library 2.0 Services can adapt to the evolving requirements of its patrons. There are no borders for providing innovative services, thus anybody from anywhere can do it. There are no limits placed on your usage of these resources, just as with regular library resources.

**Big data:** The library field might benefit from just knowing more about user opinions. In an essay titled "Big data in libraries," published on publiclibrariesonline.org, Ginny Mies makes the following assertion: Libraries may leverage even the most fundamental forms of consumer insight to expand their reach, strengthen relationships within their communities, and position themselves to thrive in an ever-evolving technological and social landscape. Libraries may also make use of big data to personalize user experiences by providing content and tools based on individual tastes.

**Artificial Intelligence:** Siri and Alexa are now widely accessible across several platforms, proving that artificial intelligence is not some far-off concept. This offers a challenge for libraries, since many AI applications are designed to provide users with information, as pointed out by Kristin Whitehair in an article for Public Libraries Online. "Intelligence is artificial, not human," they insist further. Libraries, in contrast to AI, may connect people not just to knowledge but, more crucially, to each other. By giving all of the library's applications an intelligent side, we can better understand user behaviour patterns and adapt software to match their needs.

**Block chain technology:** As Bit coin's fame has grown over the last year, block chain has become one of the most discussed innovations in that time. Block chain technology offers a viable alternative to centralized databases by maintaining records of all digital transactions in a decentralized database that is available to everyone on the network. A new approach to information collection and storage, then. The block chain can be used to create an improved metadata system for libraries, to track rights and ownership in a digital-first sale, to connect library and university networks, or even to support community skill-sharing and borrowing programs," wrote Sue Alman, an educator in the field of emerging technologies, in an article for EdSurge.

**Internet of Things:** The Internet of Things (IoT) is gaining traction as widespread Internet access becomes expected rather than optional. Internet of Things (IoT) is a term for the daily connected items that send data between them, much like RFID (Radio Frequency Identification). However, this is the only scenario in which data is sent online: the Internet of Things. Opportunities for gallery applications, from tracking usage of the space to taking part in the humidity monitoring program for unique collections, and more, are among the site's attractions, as noted in a recent piece in the American Library Association. Therefore, libraries may enhance the user experience by providing more resources and services.

## 2. Literature Review

Nooji, Meeramani, Nataraj, Sharmila (2023) [1]. Universities of all stripes are increasingly investing in the design, cultivation, and use of library digital resources made possible by Information and Communication Technology (ICT). This article takes a close look at the many digital resources (DRs) that may be accessed by students and faculty at universities. The purpose of this research is to provide light on how digital materials are used in academic libraries. To determine the impact of technology on academic growth, an empirical study was done.

Dawar, Asad & Rafi, Muhammad (2022) [2]. Using a printed research questionnaire, this study gathered primary data from college and university students in the provincial capital. The writers used a Likert scale to create the survey and spoke with service industry experts before releasing it into the wild to ensure its validity. This study developed a conceptual model based on the technology acceptance model and tested many assumptions to see how well it stood up to the investigation. Structural equation modelling software was used to perform route analysis and model creation on the collected data. The study's findings highlight how technology developments have improved academic achievement and services by accelerating the use of library resources, bolstering administration abilities, and boosting user performance. Enhanced user productivity and proactive academic library services are the result of a combination of skilled leadership and the application of cutting-edge technology.

Islam, AYM Atiquil, Rafi, Muhammad (2022) [2]. The purpose of this research is to determine whether communities are motivated to become digitally included as a result of technological incentives. Incentives for using technology, actual use of that technology, searching ability, social integration, and capacities are the five areas that the writers evaluate. To verify the suggested study model and its connections to the characteristics the authors examined, data were gathered from 329 participants in 14 public libraries and analyzed using structural equation modelling. The findings demonstrated the considerable effect that technological incentives have on technology adoption, internet proficiency, social cohesion, and the capacity to promote digital inclusion in the community. The advancement of network technology for things like digital taxes and banking, social integration and government engagement, and cutting-edge health and educational

advantages will be encouraged by technological community incentives. Incentives provided by technology will increase people's information literacy and digital access, which in turn will aid in the development of their cognitive abilities and capacity for critical thought.

Lamba, Manika (2022) [4]. Building design, program and event planning, patron experience and engagement, literacy program creation, administration and management are just a few of the areas where library services are fast evolving thanks to innovations. A deeper dive into the difficulties, trends, and best practices of these technologies is essential to enable their effective implementation and consideration. Innovations in Library Technology Library service innovation is a topic that is always evolving, and this book explores the latest, most ground-breaking research and methods from libraries all around the globe. It also highlights growing worldwide themes and trends, and provides practitioners with advice on how to implement the most current developments in their local library settings. This book is perfect for librarians, researchers, professors, teachers, and students because of the breadth of themes it covers, including the acceptance of technology and the design of educational institutions.

Shah, Ashraf (2019) [5]. The early concepts of digital libraries have been brought to life thanks to the development of new technology during the last three decades. In today's information era, digital libraries play an increasingly important role in education. They are increasingly used as a barometer of the library's contribution to social change and national progress. A repository for digital information, whether created digitally or converted from analog sources. The purpose of this article is to talk about the benefits and drawbacks of using digital libraries in the modern era of information. It is symbolic of digital environment's fundamental ideas, context, components, qualities, process, benefits, and downsides.

## 3. Methodology

This research used a descriptive survey approach. Researchers may often collect primary data for the goals of describing, explaining, or examining a phenomena via the use of a descriptive survey study methodology. To understand and characterize the effects of digital information technologies on society, the researcher used a descriptive survey approach. The study focused on how the rise of digital information technologies has altered library service provision, patron engagement with those services, and the ability to gauge those services' efficacy. 240 library patrons and 240 librarians made up the study's sample size. It was determined that the study should include both library users and experts so that the researcher could gain a well-rounded picture of how digital technologies have affected libraries in the 21st century. Purposive sampling was used to choose research participants. This method of sampling was used to make sure that we only got responses from people who were knowledgeable about how digital technologies affect libraries. The study was conducted by the researcher in Nigeria. In specifically, the state of Enugu was the focus of the research. Professionals and students from Enugu State University of Science and Technology and the Institute of Management Technology used the library. The questionnaire was the tool of choice for the researcher.

The questionnaire was selected because of its ability to provide copious amounts of data. Three experts from the University of Nigeria, Nsukka were used to evaluate the questionnaire's face validity. Experts in measurement and assessment evaluated the items for their readability, organization, and ability to provide reliable data for the research. The final version of the instrument was prepared with the help of the experts' feedback. The test-retest method was used by the researcher in order to establish the instrument's dependability. The researcher did this by giving out 30 questionnaires (15 to library patrons and 15 to library staff). The same respondents were called again after two weeks and given the same instrument. The researcher used the correlation coefficient in SPSS version 22 to determine the reliability value, and the result was.86. It seems the instrument was trustworthy. The researcher utilized a mix of descriptive statistics (such as percentages, means, and standard deviations) and inferential statistics (such as a t-test) to analyze the data from this study, ensuring statistical significance at the 0.05 level. Tables showed the outcomes.

## 4. Results

### 4.1 Digital Technologies of Information and its Impact on Libraries

Both regular library patrons and working professionals returned at a rate of 100%. There were 62 males and 38 females in the library patron sample. The gender split among librarians was 61% male and 39% female. Users' ages ranged from 18 to 22, with 20 being the median. The librarians had a mean age of 35 (ranging from 28 to 42 years old). No one who used the library had a job. Since they were all students, this is to be anticipated. Furthermore, they were both single. However, almost all librarians (88%) reported being in committed relationships. Only 2% were widowed, 3% were remarried, and 7% were never married. The average user of the library has been using it for 15 years (the range is 6-24 years). This study's assumptions were tested using the following Tables.

**Table 1:** T-test study of library patrons and staff to determine how digital technologies have altered service provision

| Grouping | Mean | STD | T | DF | Decision |
|---|---|---|---|---|---|
| Users | 3.1 | .91 | | | |
| Professionals | 3.2 | .64 | 9.561 | 673 | NS |

The purpose of the table was to collect feedback from library patrons and staff on how digital technologies had altered service provision. P=0.60 was statistically significant higher than the minimum criterion. Since the opposite was shown to be true, the researcher draws the conclusion that library patrons and staff alike think that digital technologies have a major effect on library services. The study's author draws the following conclusion with 95% certainty: library patrons and experts agree that digital technologies have altered library service delivery.

**Table 2:** Impact of digital technologies on library use AT-Test Analysis of library users and librarians

| Grouping | Mean | STD | T | DF | Decision |
|---|---|---|---|---|---|
| Users | 3.4 | .77 | | | |
| Professionals | 3.3 | .81 | 9.063 | 654 | NS |

Table 2 above was an attempt to measure how widespread use of digital technologies has been in relation to library visits. The p-value was larger than the threshold for statistical significance ($p$>0.05). As a result, we find no

evidence to support the second hypothesis and conclude that the mean ratings of library users and professionals on the influence of digital Technologies on the consumption of library services are not significantly different.

**Table 3:** T-Examining the effects of digital technologies on library administration with a t-test among library patrons and staff

| Grouping | Mean | STD | T | DF | Decision |
|---|---|---|---|---|---|
| Users | 3.1 | .82 | | | |
| Professionals | 3.1 | .90 | 6.562 | 601 | NS |

The purpose of this table was to compare the average opinions of library patrons and staff members about the effect of digital technologies on library administration. The p-value was larger than the threshold for statistical significance (p> 0.05). As a result, the researcher believes that there is no statistically significant difference between the mean ratings of library users and experts about the influence of digital Technologies on library administration, negating the third premise.

**Table 4:** T-test comparing consumers' and librarians' mean opinions on how digital technologies have altered library book formats

| Grouping | Mean | STD | T | DF | Decision |
|---|---|---|---|---|---|
| Users | 3.3 | .73 | | | |
| Professionals | 3.3 | .61 | 8.513 | 8.542 | NS |

Table 4 was designed to help us get a sense of how library patrons and staff feel about the effects of digital technologies on library resources. The p-value was larger than the threshold for statistical significance (p> 0.05). As a result, the researcher believes that there is no statistically significant difference between the mean ratings of library users and experts about the influence of digital Technologies on the format of library material contents, thus rejecting the fourth premise.

**Table 5:** T-test comparing consumers' and librarians' mean opinions on how digital technologies have affected library usage

| Grouping | Mean | STD | T | DF | Decision |
|---|---|---|---|---|---|
| Users | 3.0 | .39 | | | |
| Professionals | 3.0 | .54 | 9.910 | 6.541 | NS |

The average ratings of library patrons and staff on the effect of digital technologies on library usage are shown in table 5 above. The p-value was larger than the threshold for statistical significance ($p$>0.05). Therefore, the researcher finds that there is no statistically significant difference between the mean ratings of library users and professionals on the influence of digital Technologies on library usage, refuting the fifth and final hypothesis.

The widespread use of digital technologies has altered almost every area of modern life. Both library patrons and professionals were surveyed to determine the effect on libraries. This was accomplished by the researcher by evaluating five potential explanations. The first hypothesis postulated a statistically significant disparity between the average ratings given by library patrons and those given by library staff when asked about the effect digital technologies have had on the provision of library services. That was an unfounded presumption. However, the results demonstrated that library patrons and staff alike believe that digital information technologies have had a significant influence on 21st-century library service delivery. This finding suggests that libraries have also adjusted to the new realities of the twenty-first century. They've modified the way they provide their services to customers.

The second premise is that both library patrons and professionals have different perspectives on how digital technologies have affected their usage of library resources. The opposite was found to be true, with both library patrons and experts agreeing that digital technologies have had a major influence on the usage of library resources. That is to say, end-users and experts alike acknowledged that digital information technologies had substantially altered the way libraries are used. Also, the study's findings disprove the third hypothesis by showing that the mean ratings of library users and professionals on the influence of digital Technologies on library administration are not significantly different. That is to say, library patrons and experts alike agree that digital technologies have had a major effect on library administration. As with many other aspects of modern life, library administration has evolved to meet the needs of the information era.

### 4.2 Effect of ICT use on library service delivery

**Table 6:** Independent samples T-test: Reference Service

| Measurement Items | University | Mean | Std. Deviation | Mean Difference | T | Sig. (2-Tailed) |
|---|---|---|---|---|---|---|
| Reference Services (RS) | JU | 4.25 | 1.214 | −0.100 | −0.544 | 0.587 |
| | UG | 4.35 | 1.107 | | | |
| Emails (RS1) | JU | 4.33 | 1.339 | −0.125 | −0.619 | 0.537 |
| | UG | 4.45 | 1.211 | | | |
| Indexing & abstracting services (RS2) | JU | 4.44 | 1.029 | −0.100 | −0.646 | 0.519 |
| | UG | 4.54 | .927 | | | |
| Bibliographic service (RS3) | JU | 4.04 | 1.373 | −0.150 | −0.716 | 0.475 |
| | UG | 4.19 | 1.274 | | | |
| Selective Dissemination of Information (RS4)- | JU | 4.31 | 1.318 | −0.125 | −0.625 | 0.533 |
| | UG | 4.44 | 1.210 | | | |
| New arrivals alerts (RS5) | JU | 4.25 | 1.364 | −0.050 | −0.239 | 0.811 |
| | UG | 4.30 | 1.277 | | | |
| Current Awareness Services (RS6) | JU | 4.14 | 1.447 | −0.050 | −0.224 | 0.823 |
| | UG | 4.19 | 1.370 | | | |
| Electronic document delivery (RS7) | JU | 4.25 | 1.419 | −0.100 | −0.461 | 0.645 |
| | UG | 4.35 | 1.323 | | | |

**Table 7:** Independent samples T-Test: Circulation Service

| Measurement Items | University | Mean | Std. Deviation | Mean Difference | T | Sig. (2-Tailed) |
|---|---|---|---|---|---|---|
| Circulation (CL) | JU | 3.41 | 1.422 | 0.085 | 0.368 | 0.713 |
| | UG | 3.33 | 1.510 | | | |
| Library Membership (CL1) | JU | 3.69 | 1.047 | −0.213 | −0.680 | 0.497 |
| | UG | 3.90 | 1.900 | | | |
| Book Reservation (CL2) | JU | 3.64 | 1.478 | 0.063 | 0.261 | 0.794 |
| | UG | 3.58 | 1.549 | | | |
| Overdue Fines (CL3) | JU | 4.23 | 1.591 | 0.200 | 0.783 | 0.435 |
| | UG | 4.03 | 1.638 | | | |
| Reminders (CL4) | JU | 2.90 | 1.620 | 0.125 | 0.477 | 0.634 |
| | UG | 2.78 | 1.691 | | | |
| Interlibrary book loans (CL5) | JU | 2.06 | 1.649 | 0.200 | 0.768 | 0.443 |
| | UG | 1.86 | 1.644 | | | |
| Online chat (CL6) | JU | 2.98 | 1.526 | 0.138 | 0.566 | 0.572 |
| | UG | 2.84 | 1.546 | | | |

**Table 8:** Independent samples T-Test: Digital Contents

| Measurement Items | University | Mean | Std. Deviation | Mean Difference | t | Sig. (2-tailed) |
|---|---|---|---|---|---|---|
| Digital contents (DC) | JU | 3.94 | 0.995 | 0.128 | 0.574 | 0.862 |
| | UG | 3.77 | 0.999 | | | |
| Books and reference material (DC1) | JU | 4.20 | 1.195 | 0.013 | 0.067 | 0.946 |
| | UG | 4.19 | 1.148 | | | |
| Manuscripts & archival material | JU | 4.83 | 1.167 | 00.94 | 10.987 | 0.039 |
| (DC2) | UG | 3.89 | 1.114 | | | |
| Institutional databases/digital library | JU | 3.50 | 1.441 | −0.125 | −0.540 | 0.590 |
| (DC3) | UG | 3.63 | 1.487 | | | |
| Subscribed databases (DC4) | JU | 3.84 | 1.471 | 0.050 | 0.218 | 0.828 |
| | UG | 3.79 | 1.429 | | | |
| Open access material information | JU | 3.34 | 0.476 | −0.013 | −0.165 | 0.869 |
| (DC5) | UG | 3.35 | 0.480 | | | |

**Table 9:** Independent samples T-test: social media

| Measurement Items | University | Mean | Std. Deviation | Mean Difference | t | Sig. (2-tailed) |
|---|---|---|---|---|---|---|
| Social media (SM) | JU | 2.20 | 0.87084 | 0.013 | 0.088 | 0.930 |
| | UG | 2.19 | 0.92145 | | | |
| Library Facebook account (SM1) | JU | 1.95 | 0.940 | 0.012 | 0.088 | 0.930 |
| | UG | 1.94 | 0.847 | | | |
| Twitter alerts for users (SM2) | JU | 2.43 | 1.271 | 0.037 | 0.185 | 0.854 |
| | UG | 2.39 | 1.297 | | | |
| LinkedIn (SM3) | JU | 2.23 | 1.102 | −0.012 | −0.074 | 0.941 |
| | UG | 2.24 | 1.046 | | | |

## 5. Conclusion

The study's findings suggest that digital technologies have had profound effects on libraries. Libraries have been affected by digital technologies in several ways, including service delivery, library use, library administration, library patronage, and library material type. The library of the twenty-first century is a product of its time. People in general, and library patrons in particular, have a strong desire to consume digital material. This has forced libraries to adapt and become more proactive to keep their patrons interested. This is significant because, in the digital media era, library patrons have a plethora of media options vying for their attention. Most of these media are jam-packed with material in a user-friendly style. Competition is fiercer than libraries think it is, making their jobs more difficult. According to the results of this research, libraries should keep using methods of information presentation that are likely to pique patrons' interest. It is also recommended that library administration keep a close eye on developments in digital technologies and adapt accordingly. Finally, more research has to be done in other locations of Nigeria so that results can be compared more accurately.

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