

# Effectiveness of ICT Harnessing on Library Service Delivery: A Comparative Loom from Two Academic Institutions of Madhya Pradesh

Krashnu Kumar Yadav<sup>1</sup>, Mohammad Aslam Khan<sup>2</sup>

<sup>1</sup>Research Scholar, Department of Library & Information Science, Mansarvoar Global University, Sehore (M.P.)

<sup>2</sup>Head of Dept. Library and Information Science, Saifia College, Bhopal (M.P.)

## Abstract:

The prime motto of the study is explored the harnessing of Information and Communication Technologies (ICTs) for delivery of library services and resources among the Intellectual community Madhya Pradesh with the special region of Khargone District's academic Institutions i.e. Govt. P.G. College, Khargone (GPGCK) and Govt. P.G. College Mandleswar (GPGCM). The article espoused quantitative method and used a well structured questionnaire to amass the responses of the respondent's data. More than 355 questionnaires distributed among the intellectual community of GPGCK and GPGCM and 80 percent respondents given the effective responses to attain the objectives of the study. The results unearthed that library services viz. Circulation, Reference, CAS/SDI, and Digital services but Social media platform services were more effective and support in delivery of library services and provide utmost satisfaction among both academic institutions. It was also noticed that lack of technical library personnel, poor bandwidth of the internet and erratic power supply were the foremost barriers in GPGK and GPGM. The study urged that promotion and implementations of social media tools for library services delivery will be effective and provide the utmost satisfactions among the end users, which is the prime objective of the library and Information Science Professionals.

## Subject Areas:

Digital Library, Social Media Platform, Library Management, Library Resources and Services, Academic Institutions

**Keywords:** Effectiveness of Information and Communication Technology, Library Services and Resources, Library and Information Science Professionals, Digital Era, Academic Institutions Library

## 1. Introduction:

**“Man is made by his belief as he believes so he is- Bhagwat Gita”**

The revolution of Information and Communication Technology opined enormous opportunities to bridge the communication gap and remove the time and distance constrain in to the human society. ICT and its applications supported and assisted to the community for provide the quality services and the resources at their requisite time, place and form with no bar of time and place. Information and Communication Technology is a wide and divergent notion. It is described by Olivera, T. and Martins, M. F. (2011)<sup>1</sup>, as

the utilization of technological tools, resources, services, and applications to do the works and activities viz. communication, creations, disseminations, storage, managing the information. Gawadekar, A. S. and Gautam, J.N. (2022)<sup>2</sup> explained that Library and Information Science Professionals are keen eager to learn new and innovative ICT tools, application and strived to implement and utilize the ICT's applications and tools for providing the optimum harnessing of library resources and services and optimum satisfactions to the end users. Due to the implementation of ICT in library profession, there are drastically changes in service design and delivery among the end users. Tamizhchelvan, S. D. (2012)<sup>3</sup> explained that deploying the ICT by Library and Information Science Professionals, the effectiveness of library services and resources increased by the maximum harnessing of the library resources and services and provide the utmost satisfaction to the end user community. Singh, T. and Singh, J. (2022)<sup>4</sup> briefed that deployment of ICTs reinforced various changes in delivery and design of library services and its model. Library and Information Resource Centre play a significant role for fulfill the set goals of the academic institutions and supported to fulfill the thrust of knowledge of the seekers. Library professionals are keen eager to learn new and innovative technologies and strived to implement for the library services design and offered the quality library services and facilities to the end users. The study explored the effectiveness of ICTs in library services design in two academic institutions of Khargone District i.e. Govt. P.G. College, Khargone and Govt. P.G. College, Mandleswar, Dist. Khargone.

## 2. Statement of Problem:

In the revolution era of the ICTs, there has been wide scope for harnessing the ICTs applications and tools for providing the quality library services and facilities to the end users and fulfill the thrust of knowledge of the knowledge seekers. The existing research mostly focused on Effectiveness of ICT's tools and applications on Library Service Delivery among the library users and understands the challenges and strives to avoid the restrictions for proper design of library service model in GPGCK and GPGCM. Related research only examined different perspectives and certain features and characteristics of ICTs in academic library. In Academic libraries, little research has been conducted by the various researchers on ICT and its effects on library services. Therefore, the study motivated to conduct the research and strived to fill the research gap and helpful for inspiration for transformation of digital library services delivery among the end users.

## 3. Research Objectives:

The prime objectives of the research are as followings.

- To assess the effectiveness level in library service delivery among intellectual community of the two academic institutions libraries.
- To estimate the challenges in the harnessing of ICT on Library services delivery in the mentioned institutions libraries.
- To ascertain the effects of ICTs use on Library Services delivery in aforementioned institution's libraries.
- To understand the significant of Library utilization by implementations of ICTs in Library services delivery.

#### **4. Literature Reviews:**

##### **4.1. Information and Communication Technology:**

Ekmekci, P.E. and Arda, B. (2020)<sup>5</sup> explored that Information and communication Technology(s) play a pivotal for the inclusive development of the human being. ICTs tools and applications has been shranked the distance, easy to communicate and save the time, money and manpower and produce the concrete results in effective and efficient manner which is the need of the hour for the inclusive and sustainable development of the human being. Okiki, O. C. (2012)<sup>6</sup> explained that In the 21<sup>st</sup> century, there are drastically changes in all spheres of human being viz. education sectors, Service sectors, Agricultural sectors and etc. The ICTs impacted the all sectors and facilitate the quality services and save the time and money.

##### **4.2 Significances of ICTs in Academic Libraries:**

Choubey, N.S. and Gawadekar, A.S. (2012)<sup>7</sup> elaborated that the prime objective of academic library is to design user oriented library services which support to fulfill the academic and research need of the academic community and update their knowledge. Reitz, J. M. (2012)<sup>8</sup> enlightened that library and information professionals deployed the ICTs tools for maximum accessing the library resources and services and fulfill the thrust of knowledge.

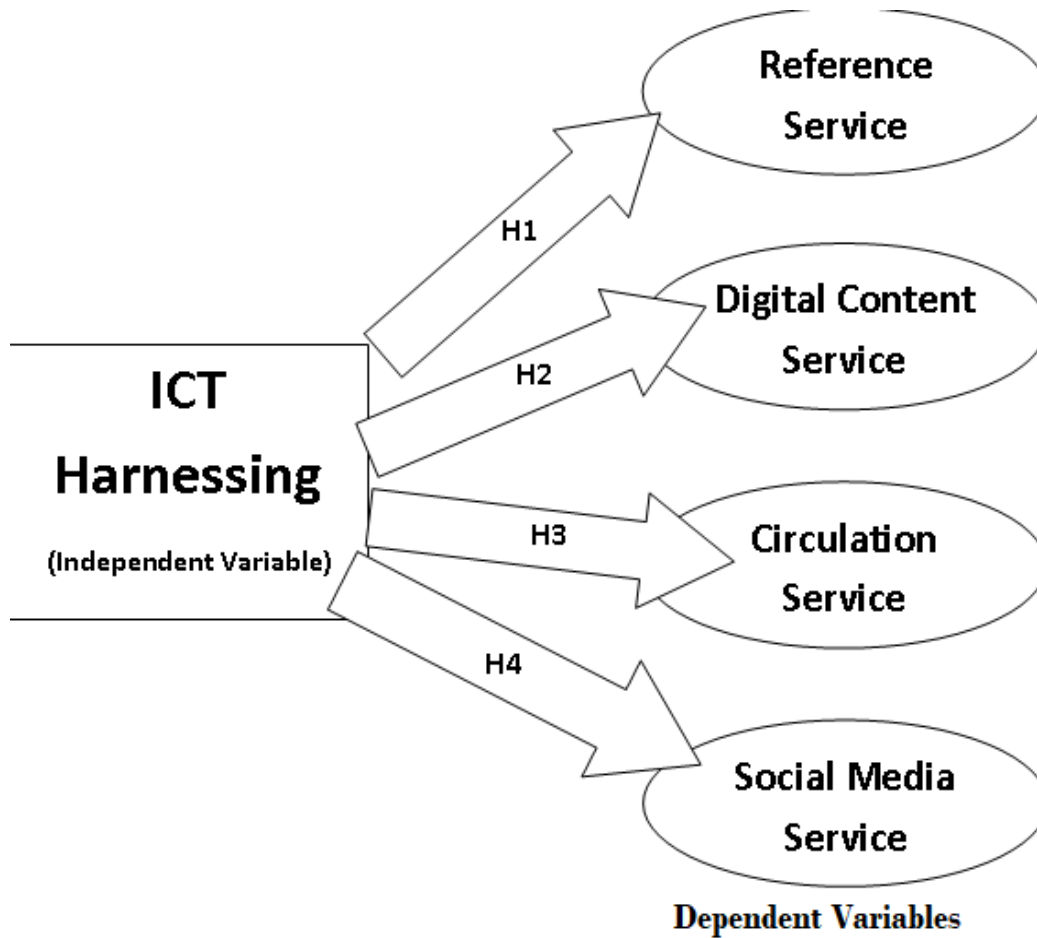
##### **4.3 Effectiveness of ICTs in Academic Libraries:**

Sujatha, H.R. (2011)<sup>9</sup> explicated that the academic community has been interested and focused to harnessing of internet and digital resources. Library and Information Science Professional strived to provide the digital resources to the intellectual community for utmost satisfaction to the end user community. The study recommended that speed of internet and availability of internet facilities focused. Thanuskodi, S and Ravi, S. (2011)<sup>10</sup> described that faculty and students used internet resources and services in their learning and research activities. Ample of resources are available on digital platform. These resources and services enhanced the quality of academic and research productivity. The study also elaborated that by dint of these amenities, we nurtured the skillful intellectual which is the need of the hour. Kaur, A. and Randhawa, S. S. (2010)<sup>11</sup> posited that Library and Information Centre providing enormous digital resources which support to fulfill the desires of the intellectuals of University of Bangladesh. The study suggested that the digital infrastructure facility improved and provide the 24/7 accessibility of internet facilities.

##### **4.4 Challenges in ICTs Harnessing:**

Singh, D. Singh, D and Chander, Ram (2020)<sup>12</sup> explored about various challenges of utilizations of ICTs in Library services viz. constrain budget, lack of technical knowledge, infrastructural challenges and etc. Raji, S.K. (2018)<sup>13</sup> briefed about lack of resources and technical tools for proper implementation and adoption of ICTs in Library service design. The study ascertained various challenges and barriers for utilization of ICTs in efficient and effective manners. Onuoha, J.A. and Obialor, D.C. (2015)<sup>14</sup> needed the affordable and reliable digital resources and services for proper implementation in service design. Singh, D. Singh, D and Chander, Ram (2020)<sup>15</sup> depicted that harnessing of digital technology enhancing the productivity of intellectuals and fulfill the gap between the end user and library services and resources.

**5. Conceptual Framework:**



The conceptual framework of the study to buttress the significance of literature sourced, to answer the questions that other study have not yet explained and to understand the gap in the field of the study that needs to be filled by the researchers. The study’s objectives are also suggested to design a conceptual framework to serve a engine that will support to establish influence that one phenomena has others. Figure no.01 depicted the conceptual framework diagram for the study and explored the relationship between dependant variables (Reference Service, Digital Content, Circulation Service, and Social Media Service) and independent variables (ICT Harnessing) that used in the study.

**6. Hypotheses of the Research Study:**

On the basis of the research objectives and conceptual framework of the research study following hypotheses are formulated and able to give the answers of effectiveness of ICT harnessing for the service delivery among the intellectual community.

- Harnessing of ICT applications has a significant positive effect on the reference services of Academic Libraries.
- Harnessing of ICT applications has a significant positive effect on digital content services of Academic Libraries.
- Harnessing of ICT applications has a significant positive effect on circulation services of Academic Libraries.
- Harnessing of ICT applications has a significant positive effect on social media services of Academic Libraries.

### 7. Methodology:

The researchers used quantitative method and design a well structured questionnaire for the data collections. Researchers used questionnaire methods due to its characteristics viz. constant, stable, uniformity, low chances of variations and un-bias responses. The questionnaire designed in various sections the details are as follows.

Sl. No.	Section	Particular	Remarks
1	Section A	Demography Section	This section addressed the demography of the respondents viz. Gender, Age, Qualifications and etc.
2	Section B	Effectiveness of Library Service Delivery	This section addressed the level of effectiveness of library services. It was measured by Likert Scale.
3	Section C	Effectiveness of ICT harnessing on Library Services	This section addressed the ICT Harnessing for Library services and resources. Likert scale used as a measurement tool.
4	Section D	The challenges of ICT harnessing in Library	This section Addressed the challenges of ICT harnessing and measured by the same Likert Scale
<b>Likert Scale is mostly used by the researchers due to its simplicity and easiness for the data analysis.</b>			

Total 354 questionnaires distributed among the intellectual community. Total of 177 questionnaires were distributed among the intellectual community of the Govt. P.G. College, Khargone and total 160 respondents given the effective responses. And the same distribution among intellectual community of Govt. P.G. College Mandleswar where 124 respondents given the effective and valuable responses for smoothly conduction of the research and supported for the data analysis and interpretations. Total 284 sets of questionnaires had been used for analysis, and interpretation, the details of the responses briefed in data analysis and interpretation section of the study.

### 8. Test Reliability and Validity:

During the research reliability and validity is most important factors for the smooth conduction of the research. The research presented Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) for the validity and soundness of path estimates. Researcher also focused and checked data discrepancy.

#### 8.1 Exploratory Factor Analysis:

Table no. 01 explicated Exploratory Factor Analysis and Table. presents the EFA results, which were run in SPSS (v.23). The questionnaire had 8 observed items measuring ICT Effect. The dependent variable, Library Service, had four dimensions. These were circulation services, reference services, digital content services, and social media services. Circulation service had 6 observed variables, reference service had 9 observed items, digital content service had 5 observed variables, and social media services 7 observed variables. The total variance extracted (TVE) was expected to be at least 50%, and from Table 1, we realized the TVE for this study was 76.54%, which was very high. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, and a minimum of 0.6 was expected. This study however scored 0.814. The Bartlett’s Test of Sphericity was expected to be statistically significant,

to indicate there existed adequate correlations among the variables to warrant EFA. Results for this was statistically significant ( $\chi^2 = 644.22$ ; Sig. = 0.000), indicating EFA was appropriately conducted. The correlation Determinant was expected to be not equal to zero (0), as an indication of positive definiteness. The Determinant for this EFA was 0.0005 (greater than 0), indicating there was positive definiteness in the data used for the estimation

Table no. 01 : Exploratory Factor Analysis						
Particular	Components					Total Variance Explained
	1	2	3	4	5	
ICT-HN1	0.922					76.54
ICT-HN2	0.871					
ICT-HN3	0.877					
ICT-HN4	0.898					
ICT-HN5	0.949					
ICT-HN6	0.964					
ICT-HN7	0.945					
RS-1		0.915				
RS-2		0.877				
RS-3		0.845				
RS-4		0.909				
RS-5		0.929				
RS-6		0.887				
RS-7		0.901				
CL-1			0.817			
CL-2			0.796			
CL-3			0.838			
CL-4			0.904			
CL-5			0.891			
CL-6			0.848			
DC-1				0.951		
DC-2				0.807		
DC-3				0.721		
DC-4				0.837		
DC-5				0.857		
SM-1					0.763	
SM-2					0.776	
SM-3					0.673	
Kaiser-Meyer-Olkin Measure of Sample Adequacy						0.814
Approximate Chi-Square						644.22
Bartlett's Test of Sphericity						Df 88
						Sig. 0.000
a. Diterminant						0.0005

### 8.2 Confirmatory Factor Analysis:

Table No.02 illustrated Confirmatory Factor Analysis of data of the study. After the EFA met the respective thresholds, the data was further tested using CFA, as presented in Table 2. Just like the EFA, the standardized factor loadings for each measurement variables were expected to be at least 0.5. This was achieved for all the measurement items, indicating the measurement items significantly defined the

Table no. 02 : Confirmatory Factor Analysis	
Components	
Fit Indicator	St. Factor Loading
ICT-HN1	0.911
ICT-HN2	0.899
ICT-HN3	0.825
ICT-HN4	0.861
ICT-HN5	0.977
ICT-HN6	0.986
ICT-HN7	0.937
RS-1	0.928
RS-2	0.983
RS-3	0.871
RS-4	0.998
RS-5	0.837
RS-6	0.728
RS-7	0.815
CL-1	0.567
CL-2	0.732
CL-3	0.841
CL-4	0.932
CL-5	1.003
CL-6	0.942
DC-1	0.991
DC-2	0.754
DC-3	0.802
DC-4	0.846
DC-5	0.732
SM-1	0.73
SM-2	0.802
SM-3	1.173

proposed latent variables. The Cronbach’s Alpha (CA) for all the variables were larger than the minimum expected value of 0.7, indicating there was high internal consistency among the measurement variables. As per model fit indices, CMIN/DF is expected to be less than 3, GFI should be at least 0.8, TLI and CFI are all expected to be greater than 0.9, whiles RMSEA and SRMR are also expected to be

less than 0.08. From Table 2, it is realized that the results met these thresholds, and so we concluded that our data appropriately fit the construct model.

**9. Analysis and Discussion:**

**9.1 Effectiveness Level in Service Delivery among the intellectual community:**

The first objective of this paper sought to assess the level of effectiveness in the delivery of library services among the two Universities. Four library services were identified from literature, which were Reference services, Circulation, Digital contents and Social media. To assess if there existed any significant differences in the library services provided by GPGCK and GPGCM, independent samples t-test was conducted. Results revealed that both academic institutions were effective in service delivery through Reference, Digital and Circulation services. Both institutions were seen to have performed poorly through social media service. Bamigboye, O. (2007)<sup>16</sup> Briefed about that the effective service delivery of a library is assessed by measuring the satisfaction that users derive from the service. That is, if the service meets the demands placed on it. In relation to the findings of this study, he remarked that library patrons are much concerned with the quality of the reference service they receive, and that providing a high-quality reference service should be a priority for all library services. In assessing the perception of library service quality, Udem, O.K., Ikenwe, J.I. and Ugwuamoke, E.C. (2020)<sup>17</sup> identified that the respondents perceived provision of circulation services, reference services as of good quality or effective, meritorious and encouraging. This supports the choice of our constructs in the assessment of the effectiveness of library service delivery. The libraries in academic institutions employ social media tools not only for communication purposes, but that they have also adapted their research methodologies to this context. Regrettably, only a few African university libraries have social networking sites, and only a few have been able to link their sites to their library’s website. This result also corroborates with the assertion that there are limitations involved in the use of social media (WhatsApp) for library service delivery. He outlined technological competence required to use the web client system to deliver services and time investment in the management of social media, as some of these bottlenecks. Tables 3-6 present the t-test scores for the four services.

**Table: 03: Independent Sample T-test: Reference Services**

Sl. No.	Meseasurement Items	Name of Institute	N	Mean	Std. Deviation	Mean Difference	t	Sig.(2-tailed)
1	Reference Service (RS)	GPGCM	124	4.25	1.214	-0.100	-0.100	-0.100
		GPGCK	160	4.35	1.107			
2	E-Mails (RS1)	GPGCM	124	4.33	1.339	-0.125	-0.125	-0.125
		GPGCK	160	4.45	1.211			
3	Indexing and Abstracting Services (RS2)	GPGCM	124	4.44	1.029	-0.100	-0.100	-0.100
		GPGCK	160	4.54	0.927			
4	Bibliographic Services (RS3)	GPGCM	124	4.04	1.373	-0.150	-0.150	-0.150
		GPGCK	160	4.19	1.274			
5	Selective Dessimation Service (SDI) (RS4)	GPGCM	124	4.31	1.318	-0.125	-0.125	-0.125
		GPGCK	160	4.14	1.211			
6	New Arrivals Alerts (RS5)	GPGCM	124	4.25	1.364	-0.050	-0.050	-0.050
		GPGCK	160	4.31	1.277			
7	Current Awareness Services (RS6)	GPGCM	124	4.14	1.447	-0.050	-0.050	-0.050
		GPGCK	160	4.19	1.371			
8	Electronic Documents Delivery (RS7)	GPGCM	124	4.25	1.419	-0.100	-0.100	-0.100
		GPGCK	160	4.35	1.323			



**Table: 04: Independent Sample T-test: Circulation Services**

Sl. No.	Measurement Items	Name of Institute	N	Mean	Std. Deviation	Mean Difference	t	Sig.(2-tailed)
1	Circulation (CL)	GPGC M	124	3.41	1.422	0.085	0.368	0.713
		GPGC K	160	3.33	1.510			
2	Library Membership (CL1)	GPGC M	124	3.69	1.047	-0.213	-0.680	0.497
		GPGC K	160	3.90	1.900			
3	Book Reservation (CL2)	GPGC M	124	3.64	1.478	0.063	0.261	0.794
		GPGC K	160	3.58	1.549			
4	Overdue Fines (CL3)	GPGC M	124	4.23	1.591	0.200	0.783	0.435
		GPGC K	160	4.03	1.638			
5	Reminders (CL4)	GPGC M	124	2.90	1.620	0.125	0.477	0.634
		GPGC K	160	2.78	1.691			
6	Interlibrary Books Borrowing (CL5)	GPGC M	124	2.06	1.649	0.200	0.768	0.443
		GPGC K	160	1.86	1.644			
7	Online Chat (CL6)	GPGC M	124	2.98	1.526	0.138	0.566	0.572
		GPGC K	160	2.84	1.546			

**Table: 05: Independent Sample T-test: Digital Contents**

Sl. No.	Measurement Items	Name of Institute	N	Mean	Std. Deviation	Mean Difference	T	Sig.(2-tailed)
1	Digital Contents (DC)	GPGC M	124	3.94	0.995	0.128	0.574	0.862
		GPGC K	160	3.77	0.999			

		K	0					
2	Books and Reference Materials (DC1)	GPGC M	12 4	4.20	1.195	0.013	0.067	0.946
		GPGC K	16 0	4.19	1.148			
3	Manuscripts and Archival (DC2)	GPGC M	12 4	4.83	1.167	0.940	10.98 7	0.039
		GPGC K	16 0	3.89	1.114			
4	Digital Library/ Institutional repository (DC3)	GPGC M	12 4	3.50	1.441	-0.125	- 0.540	0.590
		GPGC K	16 0	3.63	1.487			
5	Subscribed Databases (DC4)	GPGC M	12 4	3.84	1.471	0.050	0.218	0.828
		GPGC K	16 0	3.79	1.429			
6	Open Access Resources (DC5)	GPGC M	12 4	3.34	0.476	-0.013	- 0.165	0.869

Table: 06: Independent Sample T-test: Social Media (SM)

Sl. No.	Measurement Items	Name of Institute	N	Mean	Std. Deviation	Mean Difference	t	Sig.(2-tailed)
1	Social Media (SM)	GPGCM	124	2.20	0.87084	0.013	0.088	0.930
		GPGCK	160	2.19	0.92145			
2	Library Face book Account (SM1)	GPGCM	124	1.95	0.94000	0.012	0.088	0.930
		GPGCK	160	1.94	0.84700			
3	Twitter Alerts (SM2)	GPGCM	124	2.43	1.27100	0.037	0.185	0.854
		GPGCK	160	2.39	1.29700			
4	Linkdin(SM3)	GPGCM	124	2.23	1.10200	-0.012	- 0.074	0.941
		GPGCK	160	2.24	1.04600			

### 9.2 Challenges in Library service Delivery:

To determine if there existed any significant differences in the challenges among both libraries, an independent samples t-test was conducted. Eighteen (18) ICT challenges were identified from literature and performed the test on. Result revealed that both universities had only one (1) challenge in common, which was copyright and intellectual property rights management. It was also revealed that both universities were not facing four (4) out of the eighteen challenges which were examined. These included, no suitable working environment, lack of interest by library users, lack of co-operation within libraries and lack of awareness of ICT potentials by users. However, UG was found to be battling with twelve (12) out of eighteen of the challenges surveyed. These were, lack of trained library personnel on ICT; erratic power supply; poor attitude of staff towards library automation and their unwillingness to

change old ways of doing things; poor attitude of university management on ICT; lack of access to appropriate ICT equipment; fear of change and a lack of personal change management skills; lack of ICT equipment support; obsolescence of software and hardware; cost of maintenance; cost of staff training; poor internet connection and poor connectivity; and the lack of back up services i.e. electricity/generator. The results corroborate with the assertion that, the major problem that the twenty-first century libraries are faced with is not insufficient funding, but the abysmal performance of library staff and other information professionals in underdeveloped nations due to a lack of ICT skills. There is no effective telecommunications and power supply infrastructure in Africa to act as starting blocks for the development of internet services. Library showed less ICT challenges because they have improved ICT infrastructure which even reflected in the effectiveness of their service delivery. The reason for this significant progress and achievement is because China has put in place various policies to ensure and promote ICT utilization, especially in their educational sector. The education ministry in China for example, has effectively carried out several projects to facilitate and promote ICT use in schools. Table 7 presents the t-test scores for ICT use challenges.

**Table: 07: Independent Sample T-test: Challenges of ICT Harnessing (CIH)**

Sl. No.	Measurement Items	Name of Institute	N	Mean	Std. Deviation	Mean Difference	T	Sig.( 2-tailed )
1	Financial Support (CIH1)	GPGC M	124	4.25	1.214	-0.100	-0.100	- 0.100
		GPGC K	160	4.35	1.107			
2	Unskilled Library Professionals (CIH2)	GPGC M	124	4.33	1.339	-0.125	-0.125	- 0.125
		GPGC K	160	4.45	1.211			
3	Erratic Electric Supply (CIH3)	GPGC M	124	4.44	1.029	-0.100	-0.100	- 0.100
		GPGC K	160	4.54	0.927			
4	Unawareness of ICT Potentials (CIH4)	GPGC M	124	4.04	1.373	-0.150	-0.150	- 0.150
		GPGC K	160	4.19	1.274			
5	Lack of Attitude for Library Automation (CIH5)	GPGC M	124	4.31	1.318	-0.125	-0.125	- 0.125
		GPGC K	160	4.14	1.211			
6	Lack New Arrivals Alerts (CIH6)	GPGC M	124	4.25	1.364	-0.050	-0.050	- 0.050

		GPGC K	160	4.31	1.277			
7	Current Awareness Services (CIH7)	GPGC M	124	4.14	1.447	-0.050	-0.050	-
		GPGC K	160	4.19	1.371			
8	Electronic Documents Delivery (CIH8)	GPGC M	124	4.25	1.419	-0.100	-0.100	-
		GPGC K	160	4.35	1.323			

**Conclusion:**

The study was set out to ascertain the effects of ICT use on library service delivery. The study was founded on sound literature, based on which the research instrument was developed. Sound methodology was also adopted in the analysis and presentation of results. After the analysis, it was concluded that Reference, Digital, Circulation services but Social media, were effective in service delivery in both universities. It was also revealed that lack of trained library personnel, poor internet connection and erratic power supply were some of the most challenges faced by GPGCM library in the use of ICT. Lastly, result on effect of ICT use on library services revealed that the level of ICT use in library operations significantly influenced the level of library services delivered by both GPGCK library and GPGCM library.

**Research Implication:**

The research findings present theoretical implications for ICT use literature by way of extending the scope of the research on performance in library service delivery. Furthermore, the findings will enable managers to identify how to effectively and efficiently manage their libraries by investing in new technologies. Also, these research findings will allow expansion of ICT use in libraries and other organizations from developing countries with the objective of identifying organizational performance.

**Recommendations:**

Firstly, in this era of multiple and vibrant social medias, institutions have been using such mediums to target clients. For profit making firms, social media presents less option to market their products to customers. Although libraries are non-profit ventures, they could also capitalize on the prospects of social media, to promote their services to target audience (the academic community). Secondly, it is also recommended that libraries focus on social media as a viable avenue to promote library services since social media is mostly patronized by the youth, who form a greater portion of the clientele of the libraries. Libraries of today have outgrown the stage of being passive and archival institutions to become effective institutions of service. Evidence from other studies has shown that one of the ways which have helped in this achievement is through effective reference service. It is therefore recommended that libraries could create enabling environments where users feel comfortable making inquiries. Again, timely responses should be attached to user enquiries. It is also recommended that, university libraries, especially those in developing countries, seeking to improve their library performance should invest in ICT. Thus, it could greatly boost the performance of their libraries.

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