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Review Article

The Role of Technology in Enhancing Library Services in Developing Countries: Comparative Studies on West African Libraries

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ABSTRACT

Libraries across West Africa are navigating a difficult transition shaped by decades of underinvestment, persistent infrastructure gaps, and rapidly growing community information needs that have outpaced institutional capacity. Although technology theoretically offers a pathway to overcome these constraints, its adoption in West African library settings remains uneven, with outcomes varying significantly across national and institutional contexts. This study examines how technology-driven interventions are reshaping library services in four West African countries-Nigeria, Ghana, Senegal, and Côte d'Ivoire-and identifies the structural and contextual factors that determine whether such interventions succeed or stall. A mixed-methods comparative design was employed, involving structured questionnaires administered to 312 library professionals across 24 academic, public, and special libraries in the four countries, supplemented by semi-structured interviews with 36 purposively selected library directors and technology officers. Quantitative data were analysed using descriptive statistics and one-way ANOVA, while qualitative responses underwent thematic analysis grounded in the Technology Acceptance Model and the Diffusion of Innovations framework. Results showed that Integrated Library Systems (ILS) and digital catalogue access recorded the highest adoption rates across all four countries (68-84%), whereas institutional repositories and AI-assisted reference tools were limited to a small number of well-resourced institutions. Technology integration significantly improved catalogue access times by a mean of 47%, enhanced user satisfaction scores, and expanded the reach of extension services. However, pronounced country-level differences emerged, with Nigerian and Ghanaian libraries demonstrating stronger institutional adoption than their Senegalese and Ivorian counterparts. These differences closely tracked variations in electricity reliability, internet penetration, and budget allocation. The findings indicate that technology alone does not transform library services; sustained electricity, affordable connectivity, trained staff, and institutional leadership that treats technology as a long-term programmatic commitment rather than a short-term project expenditure are the critical determinants of successful outcomes.

Keywords: Comparative Library Studies, Developing Countries, Digital Library Services, Library Technology, Technology Acceptance, West Africa.

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INTRODUCTION

Something that rarely features in discussions about the global information landscape is just how much the library still matters in West Africa. Not as a relic or a symbol, but as a genuinely functional space-a place where students prepare for examinations without reliable internet at home, where small business owners access government tender notices, where researchers locate references, they cannot afford to download. Against that backdrop, asking what technology can do for West African libraries is not an abstract question. The answer has practical consequences for millions of people who depend on these institutions in ways that their counterparts in high-income countries long ago stopped needing to.

The past two decades have brought substantial change to the technology landscape of African libraries, though change has come inconsistently and, in some respects, has widened rather than narrowed the gap between well-resourced and underfunded institutions. Automated cataloguing, digital reference desks, institutional repositories, Wi-Fi provision, and e-resource subscriptions have all arrived, in various combinations, at libraries across Nigeria, Ghana, Senegal, and Côte d'Ivoire. So too have the complications that accompany technology adoption in resource-constrained environments: irregular power, bandwidth

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that arrives in bursts, staff trained on legacy systems who find upskilling difficult alongside already heavy workloads, and institutional budgets that fund hardware in year one and discover that maintenance, subscriptions, and upgrades require money in years two through ten.

This study emerged from a recognition that the literature on technology and libraries in West Africa is substantial in volume but thin on comparative rigour. Studies tend to examine single countries, single institution types, or single technologies. They are often useful but rarely allow the kind of structured comparison that might reveal what it is specifically about the Ghanaian or Nigerian context - as opposed to any individual institution - that shapes adoption outcomes. Without that comparative dimension, recommendations remain generic, and funders and policymakers lack the contextual specificity needed to design effective interventions.

This paper presents findings from a mixed-methods comparative study conducted across 24 libraries in Nigeria, Ghana, Senegal, and Côte d'Ivoire. It addresses three core questions. First, what is the current state of technology adoption in West African academic, public, and special libraries, and how do adoption levels vary across countries and library types? Second, what measurable effects has technology integration had on service delivery, user access, and staff efficiency? Third, what structural factors - infrastructural, financial, organisational, and cultural - explain why technology adoption succeeds in some settings and stalls in others? The study contributes a comparative empirical foundation to a field that has relied heavily on country-level case narratives and calls for further synthesis.

LITERATURE REVIEW

Technology Adoption in Libraries: Global Trajectories

The wave of library automation that swept through North American and European institutions from the 1970s onward established a set of expectations about what a modern library should look like - centralised catalogue management, barcode-based circulation, digital access to periodicals, and eventually, full integration with online platforms and institutional repositories. Libraries in developing countries have broadly tracked this trajectory, but on a delayed and more fragmented timeline, and the constraints they face are qualitatively different rather than simply being the same barriers at an earlier stage (Lor and Britz, 2012).

Research on technology adoption in libraries has been shaped significantly by two theoretical frameworks: Rogers' Diffusion of Innovations (Rogers, 2003) and Davis's Technology Acceptance Model (TAM) (Davis, 1989). The Diffusion framework introduced the concept of innovation attributes - relative advantage, compatibility, trialability, observability, and complexity - as predictors of whether a technology spreads through a social system. TAM shifted attention toward individual-level perceptions of usefulness and ease of use as the proximate causes of adoption behaviour. Both frameworks have generated substantial library research, with mixed findings about which factors carry the most weight in specific institutional and cultural contexts (Venkatesh *et al*., 2003).

What is less often discussed in the mainstream library technology literature is the extent to which both frameworks assume stable preconditions - functional infrastructure, trained personnel, and reliable service delivery - that are not givens in many developing-country settings. When the electricity goes out for 6 hr a day, and the institution's technology budget was consumed by a donated system that requires proprietary maintenance contracts, the question of whether staff perceive a technology as useful becomes somewhat secondary to questions about whether the technology can function at all (Adeya, 2002).

West African Libraries: Institutional Context

West Africa's library systems are products of colonial administration, post-independence institutional building, and decades of structural adjustment that curtailed public sector spending in ways whose effects on library infrastructure are still visible today. Nigeria's National Library and the network of university libraries administered through the National Universities Commission represent the region's largest institutional library sector by absolute numbers, though per-student resource levels vary enormously between federal and state institutions (National Universities Commission, 2022). Ghana's library system has benefited from a more stable funding environment and a functioning national public library network, though rural service gaps are significant (Ghana Library Authority, 2021).

Francophone West Africa presents a distinct institutional pattern. Senegal's university library system, centred on the Université Cheikh Anta Diop in Dakar, has developed comparatively strong digital infrastructure partly through sustained partnerships with French development institutions and partly through domestic investment in the national ICT strategy. Côte d'Ivoire's library sector, still recovering from the disruptions of civil conflict in the 2000s, presents a more fragmented picture, with urban institutions in Abidjan maintaining reasonable technology levels while provincial libraries operate with minimal resources (Coulibaly and Diallo, 2020).

Adeyemi and Bashorun (2021) documented the pattern of technology adoption in Nigerian university libraries between 2015 and 2020 and found that while hardware acquisition had accelerated, software integration, staff training, and sustainability planning lagged behind. Quayson and Asante (2021) reported similar findings in Ghana, noting that donated hardware often sat unused for extended periods following the departure of the technical assistance teams that had configured it. These findings suggest that adoption, defined as the presence of technology in

an institution, and use, defined as functional integration into service delivery, are meaningfully different outcomes that deserve separate analytical treatment.

Digital Transformation and Persistent Barriers

The concept of digital transformation has entered the library science vocabulary from the broader management literature, bringing with it a useful but sometimes overstated sense of radical discontinuity. In practice, what West African libraries are doing is better described as incremental digitalisation - the selective replacement of manual processes with digital alternatives, constrained by resource availability and infrastructure reliability (Mutula and Wamukoya, 2009). The institutions that have made the furthest progress share a recognisable set of characteristics: stable electricity or viable backup power, a dedicated ICT budget line, at least one staff member with advanced technical skills, and institutional leadership that has made technology a sustained strategic priority rather than a one-time procurement decision (Kaur, 2016).

Connectivity remains the most widely documented barrier in the literature. Agyemang-Duah *et al.* (2021) found that Ghanaian public libraries averaged connection speeds of 4.2 Mbps, with frequent daily outages. Musa and Usman (2021) documented similar conditions in northern Nigerian academic libraries. At those speeds and reliability levels, cloud-based systems, streaming e-resources, and real-time remote access services are effectively unusable, which means that libraries adopting technology platforms designed for high-bandwidth environments face a fundamental compatibility mismatch. This finding has led some scholars to argue for technology-path strategies that prioritise offline-capable solutions before connectivity-dependent ones, building capability incrementally as infrastructure improves (Chisenga, 2006).

Financial sustainability presents a compounding problem. Hardware purchases, even when donor-funded, generate recurrent costs in maintenance, software licensing, and eventually replacement. Institutional budgets in West African libraries rarely include adequate provision for these recurrent costs, which means that technology deployments frequently degrade over time rather than improving as accumulated experience and expanded capability would predict (Musoke, 2009). Open-source alternatives - Koha, DSpace, Greenstone - have gained traction in the region precisely because they eliminate licensing costs, though they introduce their own demands in terms of technical capacity for configuration, customisation, and ongoing support (Bankier and Gleason, 2014).

METHODOLOGY

Research Design

A convergent mixed-methods design was selected for this study, combining structured quantitative data collection with in-depth qualitative inquiry in a manner that allows both statistical comparison across institutions and contextualised explanation of the mechanisms behind observed patterns. The design followed the logic of embedded triangulation: quantitative findings established the broad pattern of adoption and its effects, while qualitative data provided the institutional and contextual texture needed to interpret why that pattern takes the form it does in each country setting (Creswell and Clark, 2018).

The theoretical foundation drew on two frameworks applied in complementary roles. The Technology Acceptance Model guided the design of survey items capturing librarians' perceptions of technology usefulness and ease of use, and their relationship to adoption behaviour. The Diffusion of Innovations framework informed the comparative analysis across countries, directing attention to how institutional, infrastructural, and cultural attributes of each national library system shape the rate and pattern of technology spread (Rogers, 2003; Davis, 1989).

Study Sites and Sampling

Twenty-four libraries were selected across Nigeria, Ghana, Senegal, and Côte d'Ivoire using purposive stratified sampling. The sampling frame was constructed to ensure representation across three library types (academic, public, and special), two institutional sizes (large and mid-sized), and urban and peri-urban locations within each country. Table 1 presents the distribution of study sites.

A total of 312 library professionals completed the structured questionnaire, with response rates ranging from 86% to 94% across the four country samples. An additional 36 purposively selected senior library staff - directors, deputy directors, and technology officers - participated in semi-structured interviews of 45 to 75 min duration.

Data Collection Instruments

The structured questionnaire comprised four sections. Section A captured respondent and institutional characteristics. Section B addressed technology adoption status, covering 18 discrete technologies and services ranging from automated cataloguing and digital reference to institutional repositories and AI-assisted search. Respondents rated each technology on a four-point adoption scale: not present, present but non-functional, partially functional, and fully integrated into daily service delivery. Section C assessed the effects of technology on service quality using a 22-item Likert scale instrument adapted from the LibQUAL+ framework, modified for the West African context through a prior validation study. Section D addressed perceived barriers and enabling factors through both closed-scale and open-ended items.

Interview protocols were semi-structured and country-specific, with a common core of questions addressing technology history, decision-making processes, infrastructure challenges,

staff capacity, and sustainability planning, supplemented by context-specific probes developed in consultation with country-based research collaborators. All interviews were conducted in the respondent's preferred language (English or French) and, where conducted in French, transcribed and translated by bilingual research assistants with library science backgrounds.

Data Analysis

Quantitative data were analysed using IBM SPSS Statistics version 27. Descriptive statistics characterised adoption rates and service effect ratings by country and library type. One-way ANOVA tested for statistically significant differences in mean adoption scores across the four country samples, with Tukey's post hoc test applied where the omnibus F-test indicated significant variation. Correlation analysis examined relationships between infrastructural variables (electricity reliability hours per day, average internet speed in Mbps, and annual technology budget per library) and composite adoption and service effect scores.

Qualitative data from interview transcripts were analysed using thematic analysis following Braun and Clarke's six-phase framework. Analysis proceeded inductively in a first pass to identify emergent themes, followed by a deductive second pass applying the TAM and Diffusion of Innovations frameworks as interpretive lenses. Themes were reviewed and refined through a process of peer-checking involving two research collaborators who independently coded 25% of the interview corpus, producing a Cohen's kappa of 0.81, indicating strong inter-rater agreement. Quantitative and qualitative findings were integrated in the results and discussion section using a joint display approach.

RESULTS

Technology Adoption Rates Across Countries

Table 2 presents composite technology adoption scores by country, calculated as the mean proportion of the 18 surveyed technologies rated as fully integrated across all libraries within each country sample. Scores ranged from a high of 0.74 in Ghana to a low of 0.48 in Côte d'Ivoire, with Nigeria (0.69) and Senegal (0.56) occupying intermediate positions. The one-way ANOVA indicated that these differences were statistically significant, $F(3, 308)=14.37$, $p<0.001$. Tukey post hoc comparisons identified significant pairwise differences between Ghana and both Senegal and Côte d'Ivoire, and between Nigeria and Côte d'Ivoire (all $p<0.01$). The difference between Nigeria and Ghana was not statistically significant ($p=0.43$), nor was the difference between Senegal and Côte d'Ivoire ($p=0.18$).

At the technology category level, the highest adoption rates across all four countries were recorded for Integrated Library Systems (mean adoption rate 76%), online catalogue access (71%), and Wi-Fi provision (68%). The lowest rates were recorded for AI-assisted reference and recommendation systems (11%), institutional repositories (22%), and e-resource management platforms (28%). Within-country variation was considerable: in Nigeria, for example, federal university libraries recorded adoption rates 28% points higher on average than state university libraries, with public libraries occupying an intermediate position.

Effects of Technology on Service Delivery

Service effect scores, measured on the adapted LibQUAL+ instrument, were highest for user access and discovery dimensions - specifically, the speed with which users could locate catalogue records, the ease of verifying resource availability, and the perceived breadth of accessible collections through e-resource subscriptions. Technology integration was associated with a mean 47% reduction in catalogue query time (based on timed task data collected at a subsample of 12 libraries), a finding consistent across library types and countries, though the absolute query times at baseline varied considerably.

Qualitative data enriched these findings considerably. Library directors at well-resourced institutions frequently described the transition to automated cataloguing and digital reference as having fundamentally changed the workday of professional librarians, freeing time previously spent on manual record-keeping for more substantive user engagement. One library director at a large Nigerian federal university captured the shift succinctly, noting that before automation, a librarian might spend half of each working day on tasks that the system now handles in seconds - which meant that user enquiries that would previously have taken days to process could now be answered within the hour.

Where service effects were weaker, the explanations converged around two themes. The first was infrastructure instability. At

Table 1: Distribution of Study Sites by Country and Library Type.

Country	Academic Libraries	Public Libraries	Special Libraries	Total
Nigeria	4	2	0	6
Ghana	3	2	1	6
Senegal	3	2	1	6
Côte d'Ivoire	3	2	1	6
Total	13	8	3	24

Note. Academic libraries include both university central libraries and faculty-level collections. Special libraries comprise research institute and government ministry libraries.

Table 2: Technology Adoption and Service Effect Scores by Country.

Country	Composite Adoption Score (0-1)	Service Effect Score (mean Likert)	Electricity (hr/day)	Internet Speed (Mbps)	Annual ICT Budget (USD '000)
Nigeria	0.69 (SD=0.11)	3.74 (SD=0.38)	12.4	8.6	47.2
Ghana	0.74 (SD=0.09)	3.89 (SD=0.31)	18.2	14.3	63.5
Senegal	0.56 (SD=0.13)	3.42 (SD=0.44)	16.1	9.2	38.6
Côte d'Ivoire	0.48 (SD=0.14)	3.21 (SD=0.47)	10.3	5.8	24.1

Note. Electricity=mean reliable electricity hours per day averaged across study sites in each country. Internet Speed=median bandwidth available at library study sites. Annual ICT Budget=median institutional ICT expenditure per library in USD thousands. Service Effect Score=mean rating across 22 LibQUAL+-adapted items on a 1-5 Likert scale.

institutions where electricity averaged fewer than 12 hr per day, libraries had often developed workaround practices - running the ILS on a dedicated UPS, printing daily catalogue snapshots, maintaining parallel manual registers - that preserved basic service continuity but eliminated most of the efficiency gains that the technology had been expected to deliver. The second theme was staff skills mismatch. Several institutions had invested in capable systems whose advanced features remained unused because no staff member had sufficient technical knowledge to configure and maintain them. In these cases, the technology was present but its potential was substantially unrealised.

Structural Factors Shaping Adoption Outcomes

Correlation analysis identified significant relationships between composite adoption scores and three infrastructure variables: electricity reliability (r=0.61, $p<0.001$), internet speed (r=0.57, $p<0.001$), and annual ICT budget (r=0.68, $p<0.001$). These correlations were consistent in direction and magnitude across all four country subsamples, though the absolute levels of each infrastructure variable differed substantially by country (see Table 2). Together, the three variables explained 54% of the variance in composite adoption scores in a multiple regression model, $F(3, 308)=12.18$, $p<0.001$.

Thematic analysis of interview data generated five themes that explained the mechanisms behind these statistical relationships. Theme 1, Infrastructure as Prerequisite, captured the near-universal view among library directors that technology cannot perform its intended function below certain thresholds of electricity and connectivity. Theme 2, Budget Continuity Versus Project-Phase Thinking, distinguished between institutions that had embedded technology costs in recurrent budgets and those that treated technology as a capital project, finding that the former consistently maintained and expanded capability while the latter degraded over time. Theme 3, Staff Capacity as a Leverage Point, captured evidence that the presence of even one highly skilled technical staff member transformed institutional capability, while its absence created bottlenecks that affected the entire technology portfolio. Theme 4, Leadership Commitment as Organisational Signal, emerged from comparisons between institutions within the same country with similar resource levels but divergent adoption outcomes, where directorial priorities appeared to be the differentiating factor. Theme 5, User Expectations and Community Engagement, reflected evidence that libraries whose user communities actively demanded technological services - particularly in university settings with strong postgraduate communities - were more likely to sustain political support for technology investment.

Comparative Analysis: Country Profiles

Ghana's comparatively strong adoption profile reflected a combination of factors that were difficult to disentangle but collectively favourable: longer daily electricity availability (18.2 hr on average), higher median internet speeds (14.3 Mbps), a functioning national library coordination structure that facilitated knowledge sharing across institutions, and a relatively robust tradition of professional library training at the University of Ghana. Library directors in Ghana also described a political environment in which technology investment in public institutions carried visible symbolic weight for government, which translated into more consistent budget allocations than in the other three countries.

Nigeria's profile was marked by higher absolute heterogeneity - the range of adoption scores across Nigerian study sites was wider than in any other country - reflecting the scale and diversity of the Nigerian library system. Federal university libraries in Nigeria performed comparably to Ghanaian institutions on most measures, while state university and public libraries faced significantly greater infrastructure constraints. The dual structure of the system, with its large, well-resourced upper tier and chronically underfunded lower tier, means that national averages for Nigeria understate both the achievements of its leading institutions and the challenges faced by the majority.

Senegal's intermediate position reflected genuine strengths - a relatively stable connectivity environment in Dakar, a tradition of francophone scholarly networking, and a national digital strategy that had specifically targeted tertiary education - alongside persistent weaknesses in provincial library provision and a technology skills base that remained concentrated in the capital. Côte d'Ivoire's lower scores reflected the cumulative effect of infrastructure disruption and underinvestment over the

preceding two decades, compounded by an ICT budget profile that was roughly half that of comparable Ghanaian institutions.

DISCUSSION

The findings of this study do not support a simple optimistic or pessimistic reading of technology's role in West African libraries. What they support, instead, is a more differentiated account in which technology has demonstrably improved service delivery in institutions where specific conditions are met, while delivering limited or degraded benefits in institutions where those conditions are absent. The conditions that matter most, in order of the strength of evidence from this study, are: reliable electricity sufficient to sustain continuous system operation, affordable internet connectivity above functional thresholds for the specific platforms in use, sustained institutional budgeting that treats technology as a recurrent cost rather than a capital project, and the presence of technically skilled staff who can maintain and develop the technology portfolio over time.

These findings extend the Technology Acceptance Model in a direction that the model's original formulation did not anticipate. TAM situates the key adoption variables at the level of individual perception - does the user find this technology useful, does it feel easy to use - and predicts adoption from those psychological antecedents. In the West African library context, what the data show is that a prior layer of structural conditions determines whether the technology is even usable, irrespective of how it is perceived. A librarian who finds the ILS enormously useful but works in a building where electricity is available for 10 hr a day will adopt different strategies than one with the same perceptions but 18 hr of reliable power. The TAM framework needs to be prefixed, in contexts like this, with an infrastructure layer that conditions the range of practically possible adoption outcomes (Lwoga and Komba, 2015).

The Diffusion of Innovations framework performs better in this context, particularly in its emphasis on the social system as a locus of innovation spread. The library coordination structures that exist in Ghana - professional associations, inter-library networks, training consortia - create channels through which experience with technology diffuses between institutions in ways that amplify the impact of successful implementations. Where those structures are weaker or more fragmented, as in Côte d'Ivoire's currently reconstituted library system, each institution essentially reinvents the wheel, and the cumulative learning that would ordinarily lower barriers to adoption does not accrue at the system level (Rogers, 2003).

The finding that the single presence of a skilled technical staff member can shift institutional outcomes substantially has practical implications that extend beyond its theoretical interest. It suggests that targeted human capital investments - graduate-level training in library informatics and technology management, incentive structures that retain technical expertise within the library sector rather than losing it to better-compensated private sector roles - may generate returns disproportionate to their cost in the current West African library environment. One institution, one skilled technologist, and sustained budget continuity appears to be a viable minimum viable unit for meaningful technology integration, even in environments where infrastructure is only partially adequate.

The comparison between Nigerian and Ghanaian institutions raises a question that the data can illuminate but not fully resolve: to what extent do observed country-level differences in adoption reflect genuine systemic differences, and to what extent are they artefacts of institutional sampling? The study's sites were selected to be representative of each country's library system rather than of its leading edge, but within-country variance was substantial, particularly for Nigeria. Future comparative work with larger samples and more systematic institutional stratification would allow more confident attribution of observed differences to country-level factors versus institutional ones.

CONCLUSION

West African libraries are not failing to adopt technology because they do not want it or do not understand its potential value. They are navigating adoption under conditions that make sustained, effective integration genuinely difficult - conditions defined by infrastructure inadequacy, budget volatility, staff skills gaps, and institutional environments where technology competes for resources against many other pressing needs. The variation observed across the four countries in this study demonstrates that these conditions are not uniform, and that where they are more favourable, libraries achieve meaningfully better technology integration and deliver measurably improved services to their users.

The practical implications of this research point in several directions simultaneously. For library administrators, the data suggest that technology investment sequencing matters: beginning with offline-capable, open-source platforms that function reliably under constrained infrastructure - and building electricity backup capacity before deploying bandwidth-intensive services - is more likely to produce durable service improvements than adopting capability-rich systems that fail when conditions deteriorate. For national governments and development partners, the correlation between ICT budget continuity and adoption outcomes argues for structural financing mechanisms - dedicated technology budget lines, equipment replacement schedules, open-source support consortia - rather than one-time capital injections that leave institutions unprepared for the recurrent costs of maintaining what they have been given. For library training institutions, the evidence on technical staff as leverage points argues for graduate-level informatics programmes that combine library science with practical technology management competencies, and for professional development pathways that

give working librarians access to those competencies without requiring long absences from their institutions.

This study has several limitations that should shape how its findings are read. The 24-library sample, while diverse, is too small to support strong generalisations about any individual country's library sector, particularly for Nigeria, whose system encompasses hundreds of institutions. The cross-sectional design captures a snapshot of adoption and service delivery at a single point in time, which limits what can be inferred about trajectories of change. The technology effect measurements, while triangulated across survey and observational methods, rely substantially on self-report, and the LibQUAL+ instrument used for service quality assessment was developed and validated in a different institutional context. Future research that follows specific institutions longitudinally, that enlarges the comparative sample, and that develops context-specific service quality instruments for the West African library environment would substantially strengthen the evidence base on which practical recommendations can be built.

The libraries of West Africa serve communities whose information needs are real and consequential. Getting the technology question right - understanding not just whether to adopt but which technologies, in what sequence, under what conditions, and with what support structures - is therefore not a peripheral concern. It is central to whether these institutions can deliver on the functions their communities most need them to perform.

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ABBREVIATIONS

AI: Artificial Intelligence; **ANOVA:** Analysis of Variance; **TAM:** Technology Acceptance Model; **ICT:** Information and Communication Technology; **LibQUAL+:** Library Quality; SPSS: Statistical Package for the Social Sciences; **UPS:** Uninterruptible Power Supply.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

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