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Systematic Review on Mobile Technology in Marketing Academic Libraries in Developing Countries

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ABSTRACT

The paper investigated the usage of mobile technology in marketing academic libraries in developing countries. The main purpose, apart from awareness, is to look at how researchers are studying mobile technology in marketing academic libraries, what are the current issues investigated and what has to be the direction of the topic globally. The paper employed 23 research papers for systematic review. The findings reveal that academic libraries are aware of mobile technology and use it at various levels for academic library promotion, visibility, and teaching and learning. Factors influencing the use of mobile technology in marketing academic libraries were identified and further noted that little has been studied regarding mobile technology in marketing academic libraries and its performance in developing countries.

KEYWORDS

Academic libraries; mobile technology; social media; systematic review; developing countries

Introduction

Academic libraries as the heart of universities have in recent decades experienced rapid change-working environments fostered by technological development in information management and services (Global System for Mobile Association (GSMA), 2020). Today, technology plays a major function in every aspect of human life (Bharti & Verma, 2021). Technology has significantly impacted the business enterprise as various products and services can be marketed with the aid of social media and web technologies (Dei, 2020). Academic libraries have deployed this technology and become prominent in its functions including digitization and networking through the universe and at broader perspective. Marketing and promotion of the academic library information resources and services is undertaken through various technologies which among others include Web 2.0 technologies, social networking and mobile technology have contributed to new prospects and strategies in library information science (Bhardwaj & Jain, 2016; GSMA, 2020). Mobile technology is an innovative cellular communication medium in which a Code Division Multiple Access (CDMA) platform is used to facilitate interaction by allowing individuals to utilize single frequencies in order to restrict interferences from other people. It is a handheld information technology medium or artifacts which consist of hardware, software for interface and applications and interactive network services. The technology keeps on growing as it started as a network of

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2G to the current and advanced network of 5G with high speed and improved access (Abata-Ebire et al., 2019; Sunday & Shehu, 2020).

Marketing is the management process that identifies, anticipates and satisfies customer requirements efficiently and profitably. It is an ongoing conversation with a specific customer, which combines promotion, publicity and advertising in an organized and strategic way (Raul et al., 2016). Marketing in academic libraries provides a continuous process of establishing connection between information resources and services and its potential customers (Ihejirika, 2020). It entails in engaging customers by being innovative toward reaching out and validating the academic library values. In light of this, marketing strategies, principles and theories such as Marketing Mix Theory is crucial in meeting customer needs, satisfaction and achievement of the institution goals (Waral, 2019; Yi, 2016). On a different note, Yi (2016) argues that marketing in academic library is not always on information resources and new products and services promotion but rather it incorporates enhancing awareness and thorough involvement of customers on the existing services, resources and measuring their usefulness. However, when an academic library is marketing its information resources, in particular, the accessibility of new purchased resources like the subscribed information datasources or a set of online periodicals must be communicated to the academic community in demand. In this regard, communication supported by Information and Communication Technology (ICT) skills are worth mentioning strategies for effective dissemination of the new arrivals. The academic community who are well informed, have higher chances of having their desires fulfilled and thus satisfied with information resources and services (Mwilongo, 2017).

A marketing communication mix is characterized by 7Ps (Product, Price, Place, Promotion, Participants, Physical evidence and Process) that can be integrated with various promotion media and information technologies for effective marketing processes (Wichmann et al., 2021). The first 4Ps are highly considered during the marketing of library information resources and services; Product refers to goods or services that a library offers to its users and price is the cost library users pay for a product or service (Mwilongo, 2017). Place indicates the appropriate location or area and a platform for marketing the product while promotion includes the advertising strategies. Information technology is more applicable in making academic library marketing of information resources and services successful through the use of Web library, Web mail, social networking which provides a direct marketing and can easily assist in promotion, gathering feedback from users, retaining or gaining new users, subject to efforts on promotion and quality of products advertised (Ihejirika, 2020; Raul et al., 2016; Waral, 2019; Yi, 2016). Various social media including smartphones, Instagram, Twitter, Facebook, YouTube, Mashup, Podcasts and application of Web 2.0 technologies such as Blogs, LinkedIn, Wiki, Google forms and sites provide a good forum for promotion of library information resources and services (Bharti & Verma, 2021; Wichmann et al., 2021).

Today, smartphones are likely to become the prominent and highly accepted medium for marketing services (GSMA, 2021). The medium provides a standard means of access to Internet services and the significant fact that the rate of connection from mobile devices supersedes those of computer-based. Smartphones are made in such a way that service providers including famous academic publishers are capably integrating various

applications through which their content is compatible and can easily accessed through mobile devices as they are frequently used (Bhardwaj & Jain, 2016; Raul et al., 2016). It is not surprising that some academic libraries use mobiles and Web technologies which are capable of detecting mobile devices for provision of the appropriate and interested content. Advanced development in Information Technology (IT) has influenced and resulted to the application of sophisticated, wearable and easily portable-based gadgets rather than those that are desktop-based (Wichmann et al., 2021). Good examples of these sophisticated and portable gadgets include smartphones, iPad, tablets, e-book readers and Personal Digital Assistant (PDA). It is obvious that mobile technology improves security and instant access to information and services. It is a potential technology for communication, business, social interaction, connecting people and marketing services (GSMA, 2021).

Marketing through mobile technologies has tremendously become a multi-channel online marketing platform capable of reaching specific customers on their smartphones, tablets or feature phone devices through Website, email, Short Message Service (SMS) or Multimedia Message Service (MMS), social media and/or any mobile application (Bhardwaj & Jain, 2016; Bharti & Verma, 2021; Waral, 2019). Marketing of academic library information resources and services through mobile technologies involves interaction with specific users for publicizing library events such as orientation, relevant news and information literacy services. In addition, it assists in alerting users about new additions to the collections through Current Awareness Services (CAS) and Selective Dissemination of Information (SDI) (Mwilongo, 2017). On the other hand, marketing through mobile technologies helps to share links to articles, videos or Web content that might prove relevant or helpful to users and provide a platform for community information. The aforementioned mobile technologies in marketing functions are conveniently and instantly communicated to users through chats on WhatsApp, SMS, MMS and mobile installed social media applications such as Facebook, YouTube, Twitter and Instagram (Maideen, 2017; Mustapha et al., 2021; Wichmann et al., 2021). Academic librarians who have the responsibility of marketing services have always to decide on the purpose of marketing through mobile technologies based on specific needs of the library, make the academic library profile unique, think big and start small such as WhatsApp chats (Dei, 2020; Waral, 2019). On this, they have to decide on what to market and prepare the market, promote all the library events and maintain constant communication with the academic user community (Wichmann et al., 2021).

Currently, mobile devices have advanced with complex software for interaction with cloud computing services, perform multimedia content and provide for advanced interaction between parts of the universe (Bharti & Verma, 2021; GSMA, 2021). In this, new hardware and technologies including Bluetooth, multi-touch platforms, mobile websites, Global Positioning System (GPS), WiFi, media creation and capture applications are potential features in improving interaction and access to resources and services (Maideen, 2017; Waral, 2019). This technology is prominent all over the globe, highly adopted and ultimately conceptualized as mobile technology (m-technology). The latter has broadly changed the way individuals communicate (Dei, 2020). Marketing through mobile technologies requires platforms which can provide specific audiences with time and location, personalized information that promote goods, services, reminders on

appointments and concepts. Theoretically, marketing through mobile technologies is regarded as any business communication conducted through a universal network to which customers are regularly networked using a personal mobile gadget (Dei, 2020). On this, Maideen (2017); Odu and Omini (2017) opine the fact that mobile technology has made communication and information access very convenient and timely to customers from the comfort of their own residences and working places and from wherever they are with their mobile gadgets or PDAs on hands.

The emerging information technology confirms new development in information and communication (Bharti & Verma, 2021). These technologies are not limited to 5G, Internet of Things (IoTs), Big data, Artificial Intelligence (AI), Blockchain and Cloud computing (Mwilongo & Kotoroi, 2021). Among other effects of emerging technologies in human life, they are also crucial at improving communication in academic libraries. For instance, the Internet of Things (IoTs) can assist academic libraries in designing smart libraries (Mwilongo & Kotoroi, 2021). On the other hand, the emerging 5G technology which is featured with seemingly high-speed wireless Internet services which is about 20 times faster than 4G, is expected to make m-technology successful by provision of effective broadband download speeds over mobile networks, Webpages and cloud computing. In light of this endeavor, universities have to adopt the 5G evolution for efficient and embraced mobile broadband for m-technology realization toward meeting needs of their customers and utmost satisfaction (Dei, 2020; GSMA, 2020; Mwilongo & Kotoroi, 2021).

The Global System for Mobile Association (GSMA) (2021) report indicates the universal trends of 5G technology adoption and connections by 2025. The United States of America and United Kingdom are leading in the adoption of this innovation while most of the developing regions are far lagging behind following various constraints which among others include infrastructures, resources and expertise. For instance, in Africa, some of the mobile companies such as Vodacom and Mobile Telecommunications Network (MTN) in South Africa launched the first major 5G wireless networks in 2020. Different locations across South Africa including universities offer 5G mobile services and Fixed Wireless Access (FWA) points. The aim of the government of South Africa is to ensure that the entire region is offered with FWA for the aim of bridging the gap of Internet connectivity between the public and business sectors. Further initiatives of adopting this technology are underway in the sub-Saharan African countries including Uganda, Kenya, Gabon and Nigeria (GSMA, 2021). It is expected that by 2025, the sub-Saharan Africa population of about 30 million will be using mobile services connected to 5G technology (Figure 1).

A systematic review of academic libraries marketing through mobile technology literature in developing countries was attempted in this research paper to determine awareness and level of use of mobile technology in marketing academic library information resources and services. It also highlights the factors influencing the use of mobile technology in marketing of library information resources and services. As attributed by Osinulu et al. (2018), mobile technology in marketing academic libraries in developing countries is crucial as it contributes to effective management of information resources and services by linkage to the academic community. It demonstrates high degrees of commitment, accountability and responsibility of librarians to their customers through

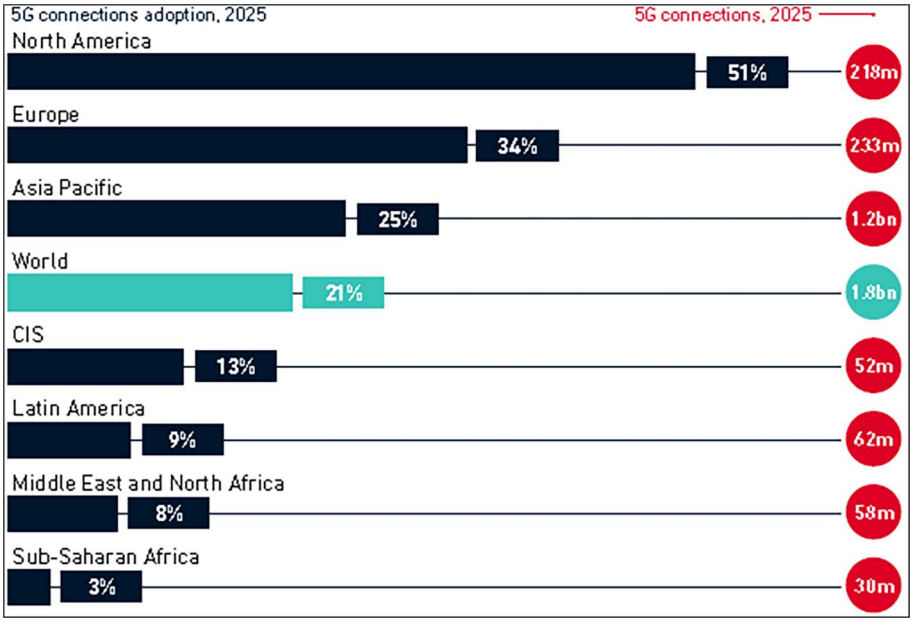

Figure 1. 5G Connections and adoption by 2025, GSMA (2021).

identification of their needs, involving and satisfying their needs. In this regard, three fundamental research questions were developed to span the breadth of this systematic review and obtain insights on mobile technology in marketing of the academic library information and services in developing countries. The following were the research questions:

1. To what extent are the academic libraries aware of the role of mobile technology in marketing of information resources and services?
2. What is the level of use of mobile technology in marketing of academic library information resources and services?
3. What are the factors influencing mobile technology in marketing of library information resources and services?

Methods

This study used a systematic literature review based on Search, Appraisal, Synthesis and Analysis (SALSA) framework and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria. The SALSA approach provided the reviewer an ability to minimize the likely factors of subjectivity and is pointed as one of the most appropriate measure which identifies, evaluates and systematizes literature (Fernández del Amo et al., 2018) and guarantees precision and completeness of the methodology used in systematic review (Grant & Booth, 2009). In addition to this, the PRISMA statement ensures accuracy and completeness of the study at hand (Moher et al., 2009). The PRISMA statement provided a preliminary and evidence-based list of organized information for establishing a comprehensive and combined report of meta-analysis and the systematic review (Sam et al., 2020). In light of this, a systematic review is obviously an audit of a deliberate inquiry

that consumes precisely and unambiguously the strategies to measure and scan data from the collected search studies that comprise the review (Sam et al., 2020). The SALSA framework subsequently led the reviewer to the PRISMA criteria. Table 1 presents the framework for the systematic literature search and review in this study.

A systematic literature search was conducted to three aggregate data sources which included Google Scholar, ResearchGate and Refseek as well as backward citation track which provided other search results on the study. A combination of search key terms was employed to obtain the data sources from 2015 to February 2022. These subject search terms were: "mobile technology" + "academic libraries marketing" + "developing countries" and "smartphone technology" + "academic libraries marketing" + "developing countries." The resulting searches were evaluated and the PRISMA statement recommendations for the selection of the articles were followed. The criteria for inclusion of the articles involved the article keywords being in the title, the article abstract and the article published in a scientific and peer-reviewed publisher. The exclusion criteria of the search results were those with duplicates, papers from the conference proceedings, editorial letters, non-English articles and articles which were not primarily research-based and non-focused. In this, 90 articles were excluded from the content analysis. One hundred and five (105) articles were found by the combined search, 15 of which met the inclusion criteria. Content analysis was conducted for the 15 articles obtained from the search. A snowball method was used for backward citation track for other articles which were not found during the search. Eight (8) additional articles were obtained and ultimately ended with 23 articles that were relevant for mobile marketing in academic libraries in developing countries. This is an indicator that either the use of mobile technology in marketing academic library information resources and services is not an area where researchers want to investigate or the area of study is not familiar in many parts of the developing countries. Lee et al. (2021) explain that content analysis is highly applicable and flexible research approach applied in library and information field with varying research themes and objectives. It is a fairly focused method to perform; it can be done conveniently and with less attention on ethical issues. Figure 2 presents a flow of information for the search results which are relevant to this study.

The articles included for further analysis were extracted and categorized based on the study objectives. The next section provides the detailed analysis of the included articles.

Analysis process

The analysis of the articles included in the study was based on research questions. Content and Microsoft Excel computer application software was used to achieve the analysis. The selected articles were coded to simplify the review process and subject to

Table 1. SALSA framework for systematic literature search and review.

Stage	Description
Search	Key actions: Keywords identification; search data sources Study scope:Limited to studies related to mobile marketing of academic library resources and services in developing countries. The limitation on the selected studies provide major insights in order to appraise and synthesize the phenomenon underpinning the study
Appraisal	Key actions: Studies selection through the PRISMA approach
Synthesis	Key actions: Data extraction and categorical organization
Analysis	Key actions: Data analysis, findings comparison and conclusion

Source: Fernández del Amo et al. (2018).

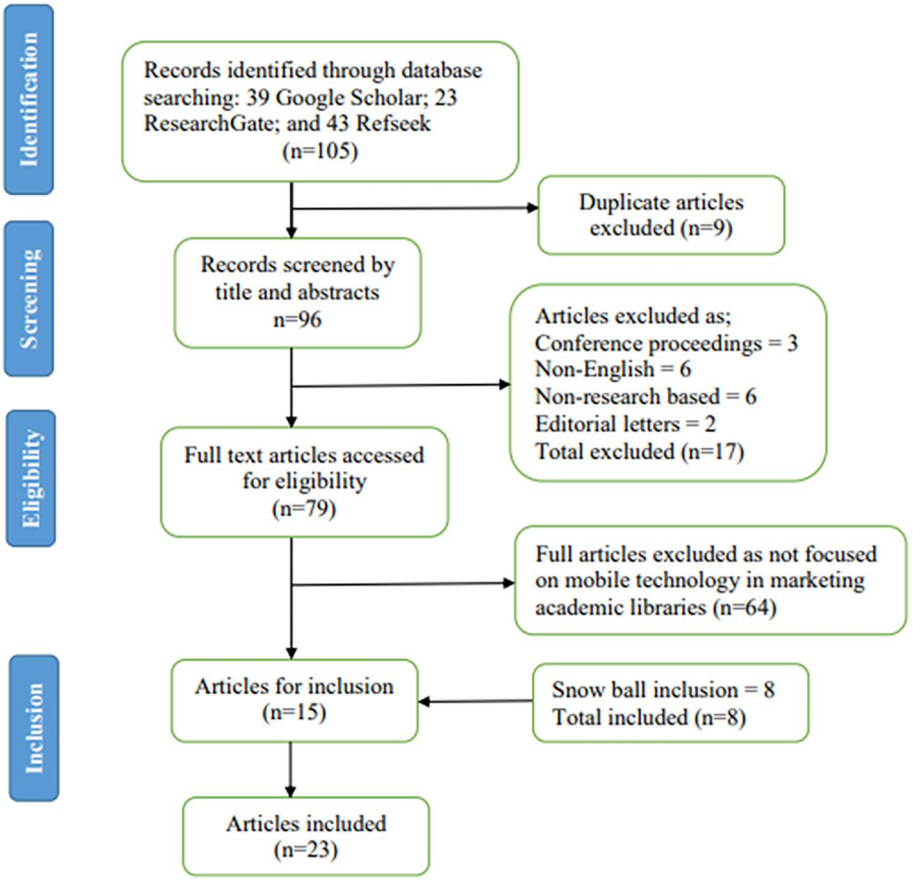

Figure 2. Flow of searched information (PRISMA statement).

research questions. Descriptive statistics in the form of tables, pie charts and graphs were used to present the review analysis. As indicated in Table 2, the spreadsheet provides the valuable and appropriate information about each article such as the author, the title, the database where the articles were retrieved and the year of publication.

Table 2 indicates that majority of the publications on mobile technology in marketing academic library information resources and services have been done in the year 2017 equals to six (6) articles while in 2015 and 2020 each year equals to four (4) articles. In addition, three articles were published in 2018 whereas two (2) articles on each year were published in 2016, 2019 and 2021 but none for 2022. This is to say from 2015 to 2021 there were publications in the area and this is quite impressing on the application of mobile technology in marketing library information resources and services. It is alarming to find none of the publications are identified in 2022. But this is not the scope of this study to analyze the reasons as to why publications are not observed in this time. However, a significant number of publications were in the year 2017. This implies that the use of mobile technology in the marketing of academic library information resources and services became a prominent innovation in most developing countries in 2017 (Figure 3).

Table 2. List of articles included in systematic review ($n = 23$).

Code	Author	Title	Database	Year
M1	Akpokodje, V.N. & Vicki Lawal, V.	The Changing Nature of Academic Libraries Service Delivery: Taking the Library with You	Google Scholar	2015
M2	Dokhani, F., Asnafi, A.R., Hariri, N. & Nooshinfard, F.	The use of Library 2.0 and Mobile Messaging Applications: (Case Study: Central Library of Islamic Azad University, Science and Research Branch of Tehran)	Google Scholar	2017
M3	Mustapha, A., Ibrahim, A.A., Garba, K.D. & Muhammed, M.	Application of Mobile Technology in Information Service Delivery in Bayero University Library, Kano	Google Scholar	2021
M4	Chaputula, A.H. & Mutula, S.	Factors Impacting Library-related Uses of Mobile Phones by Students in Public Universities in Malawi	Google Scholar	2018
M5	Maideen, S.	Mobile Technologies for Academic Libraries: An Overview	Google Scholar	2017
M6	Ocran, T.K.	Perception of Students on Mobile Technology Based Library Services	Google Scholar	2017
M7	Ocran, T.K., Underwood, E.P.G. & Arthurc, P.A.	Strategies for successful implementation of mobile phone library services	Google Scholar	2020
M8	Odu, J.O. & Omini, E.U.	Mobile Phone Applications and the Utilization of Library Services in the University of Calabar Library, Calabar, Nigeria	Google Scholar	2017
M9	Shehu, A.B.	Mobile Technologies in Nigerian Academic based Library Services Application, Challenges and Prospects	Google Scholar	2020
M10	Bharti, K.L. & Verma, S	Use of Emerging Technologies in the University Libraries: A Study of Review of Literature. Library Philosophy and Practice (e-journal) 6134. https://digitalcommons.unl.edu/libphilprac/6134	Google Scholar	2021
M11	Damilola, A.E.B., Okesanya, R.O., Abiodun, O.J. & Kusoro, A.	Use of Mobile Technology for the Provision of Reference Services in Nigeria University Libraries	Refseek	2019
M12	Dei, D.G.J.	Assessing Adoption and Implementation of Mobile Technology-Based Library Services in Academic Libraries	Refseek	2020
M13	Elahi, H, Islam, S., & Begum, D.	Perception on the Use of Mobile Phones in Retrieving Information from Academic Libraries: A	Refseek	2018

(*continued*)

Table 2. Continued.

Code	Author	Title	Database	Year
		developing country perspective		
M14	Akeriwa, M., Penzhorn, C. & Holmner, M.	Using mobile technologies for social media based library services at the University of Development Studies Library, Ghana	Refseek	2015
M15	Gholami, Z., Abdekhoda, M. & Gavgani, V.Z.	Determinant Factors in Adopting Mobile Technology-based Services by academic librarians	ResearchGate	2018
M16	Kari, H.K.	Libraries and mobile technologies: An assessment of the deployment of mobile technologies in libraries of Nigeria, *SKHID Journal,* 1(165), 41–47.	ResearchGate	2020
M17	Gaffar, S.A. & Kumar, K.S.	Awareness and access to mobile applications in an Academic Library	ResearchGate	2015
M18	Kubat, G.	The Mobile Future of University Libraries and an Analysis of the Turkish case	ResearchGate	2017
M19	Madhusudhan, M. & Dar, S.A.	Mobile Information Services and Initiatives in University Libraries: A New Way of Delivering Information	ResearchGate	2017
M20	Mansour, E.	Use of Smartphone Apps among Library and Information Science Students at South Valley University, Egypt	ResearchGate	2016
M21	Mansouri, A. & Asl, N.S.	Assessing Mobile Application Components in Providing Library Services	ResearchGate	2019
M22	Rath, P.	Application of Mobile Technology in Libraries: A survey of periodical literature published by emerald	ResearchGate	2015
M23	Vassilakaki, E., Papaconstantinou, V.M. & Garoufallou, E.	Identifying the uses of mobile technology among Library and Information Science undergraduate students	ResearchGate	2016

Source: Authors' construction (2022).

In terms of the aggregate data sources, Google Scholar has 10 included articles; while nine (9) articles were from ResearchGate, only four (4) included articles were from Refseek aggregate tool. In this regard, Google Scholar had been the most prominent aggregate tool for resources in respect to the use of mobile technology in marketing academic library information resources and services. This might be contributed to its prominence and being the oldest tool launched by Google in 2004 which provides citations over all the indexed world databases mainly in social sciences and humanities (Orduna-Malea et al., 2017) (Figure 4).

Figure 3. Publications in different years from 2015 to 2022. *Source*: Authors' own computation (2022).

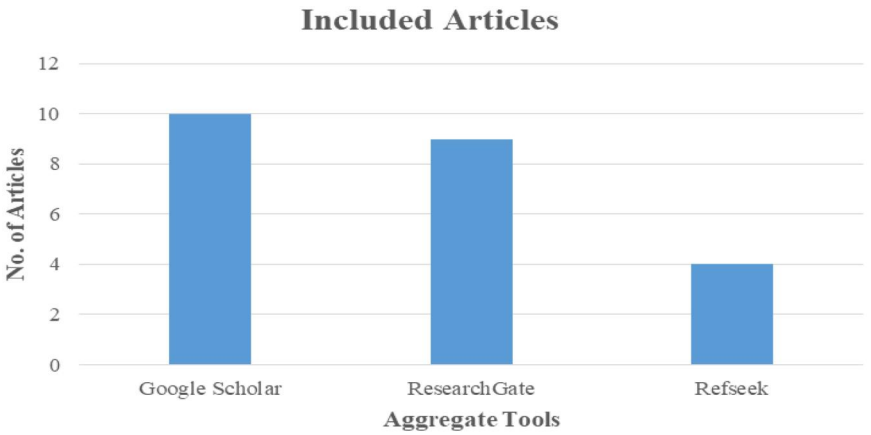

Figure 4. Aggregate tools with its included articles (2015–2022). *Source*: Authors' own computation (2022).

Results and discussion

This section covers the results and discussion of the systematic review based on the research questions that were developed to review the essence of mobile technology in marketing of academic library information resources and services.

Awareness on mobile technology in marketing information resources and services

The advent of ICT influenced academic libraries to provide information resources and services in a timely, accuracy and pertinent methods. The academic libraries and their librarians in developing countries have to be aware of the changing technologies and the ways information resources and services are promoted and shared among academic users. The study by Akpokodje and Lawal (2015) held that the changing nature of academic libraries service delivery: taking the library with you indicates that the academic

libraries and librarians in Nigeria are well informed of the use of mobile technology in marketing library information resources and services. The Akpokodje and Lawal (2015) observation is similarly supported by Odu and Omini (2017). The mobile technology marketing in libraries involves the promotion of new arrivals or Current Awareness Services (CAS) and services such as Online Public Access Catalogue (OPAC) and reference services. On the other hand, the academic library of the Central Library of Islamic Azad University, Science and Research Branch of Tehran in Iran is aware of the mobile technology in marketing information resources and services. This is evidenced by Gholami et al. (2018) and Dokhani et al. (2017) on the study of the use of library 2.0 and mobile messaging application where the central library benefits from the 3G and 4G Internet services which help librarians to market their information resources and services through Instant Messenger, Telegram, Imo and WhatsApp.

This technology has improved the marketing of library resources and services through real-time text messaging and chat with the academic community and other stakeholders. Furthermore, Mustapha et al. (2021) in the study of the application of mobile technology in information service delivery in Bayero University Library, Kano observed that librarians are aware of the mobile technology in marketing functions. The information and services that are marketed through mobile technology include among others, the Mobile OPAC (MOPAC), mobile collections and databases. For instance, the renowned publishers such as EBSCO have developed a mobile interface application which allows librarians and users to have access to current published articles and books from their database. Similarly, the library uses mobile instructions in promoting library services including library orientation and information literacy services. In a similar approach, Chaputula and Mutula (2018) indicate that academic libraries in Malawi are aware of mobile technology in promoting information resources and services through notification. Libraries use mobile phones for reference and instructional services. Most of the current information resources and services are easily marketed through mobile phone SMS, MMS and WhatsApp. Through MMS, academic libraries promote and share information in the form of text, photos, videos, animations and audio to majority of users in the shortest time possible.

Maideen (2017) found that academic libraries in India have been deployed and are aware of the presence of mobile technology in marketing services. Libraries use mobile technology in advertising acquired and current information resources and services including database advertisement and browsing through Open Public Access Catalogue (OPAC). In addition, Ocran et al. (2020) studied the perception of students on mobile technology-based library services in Ghana and found that smartphones are the most applicable devices in accessing information resources and services. On a similar view, Akeriwa et al. (2015) and Dei (2020) opine on the fact that majority of the Ghanaian library management and customers are strongly aware and they appreciate the use of mobile technology in sharing library services only that the exact mobile-based library services are not well articulated to the customers. However, the academic libraries awareness of this endeavor enabled them to benefit from this technology as have always been used to the devices in marketing information resources and services to students and other potential users. The smartphones capability to accommodate various software and applications such as Twitter, WhatsApp, Skype, Facebook and the use of Quick

Table 3. Screened articles based on country ($n = 23$).

Article code on awareness	Country	Count	Percent
M1, M3, M8, M9, M11, M16	Nigeria	6	26.1
M2, M15, M21	Iran	3	13.0
M4	Malawi	1	4.3
M5, M10, M17, M19, M22	India	5	21.7
M6, M7, M12, M14	Ghana	4	17.4
M13, M23	Bangladesh	2	8.7
M18	Turkish	1	4.3
M20	Egypt	1	4.3
	Total	23	100

Source: Authors' own computation 2022.

Response (QR) code have made access and information sharing possible (Odu & Omini, 2017). Other regions that indicate awareness on mobile technology in promoting academic library services at various levels are Egypt, Turkish and Bangladesh (Elahi et al., 2018; Kubat, 2017; Mansour, 2016).

Table 3 shows the trend of awareness on mobile technology in marketing library information resources and services. The results indicate that countries such as Nigeria, India and Ghana have adopted and deployed the mobile technology in promoting academic library information resources and services. In light of this view, researchers from these countries have developed interest of researching on the ways this technology influences the performance of the academic libraries in mobile sharing of information resources and services. Awareness to this technology contributes toward the visibility, technology absorption and currency, transparency, time and other resources management, reaching the mass through distance learning, satisfaction and effective performance of the academic libraries.

Levels of applying mobile technology in marketing information resources and services

Apart from the awareness on mobile technology in marketing information resources and services, Nigerian universities have advanced the level of usage of this technology. It is similarly used in administering some of their courses through podcasts and other mobile-friendly course materials and in commercial course management systems such as Blackboard (Akpokodje & Lawal, 2015; Mustapha et al., 2021). On this, Odu and Omini (2017) argue that smartphone application is currently considered as the next information and communication technology facility that aims to reshape the library services with enabled mobile technology for web search and ultimately form a comprehensive digital interaction. For instance, the University of Calabar Library has advanced in the use of mobile technology in offering library services related to CAS, reference and circulation services. Smartphone applications such as Facebook, WhatsApp, Skype, Instagram, YouTube and Twitter are commonly used in fast track of the CAS, reference, circulation and lending services. They are also used in the exhibition and display services. Further to CAS, Al-Baridi (2021) identifies the potential and common mobile academic library services that can be marketed. These services include among others, online reference services, Online Public Access Catalogue (OPAC), Internet services, document delivery services, bibliographical services, Selective Dissemination of

Information (SDI), Inter-library loan services, plagiarism tools services, indexing and abstracting services, user education services and consulting services. This technology has enabled ease sharing of information in a broad spectrum and thus improved academic library performance, visibility and networking.

On a different note, Sunday and Shehu (2020) posit the fact that academic libraries in Nigeria have gone a further step. They are deploying mobile technologies through laptops, PDAs, iPad, Androids, Tablets and smartphones by integrating the technologies embedded with for library and information resource services. Among the services performed by mobile technologies are not limited to library mobile augmented reality, library mobile audio tour, library QR codes, mobile library collection and database, facial and optical character mobile recognition for users with visual or hearing disabilities and wireless mobile printing services (Madhusudhan & Dar, 2017; Mansouri & Asl, 2019; Sunday & Shehu, 2020). Despite its prominence in academic libraries, mobile technology in India has similarly advanced in the provision of mobile learning (m-learning) through which most of the information services on library homepages are accessed through mobile phones (Maideen, 2017). For instance, library alerts including information on new reading resources for acquisition, reading resources on display, reserved reading resources for collection, reading resources overdue, library circulation services, information for instructions and events are offered through mobile technology.

The universities in India have also advanced the level of usage of mobile technologies. They are using this technology on formal education, distance and e-learning. There have been advanced utilization of e-resources over mobile interfaces in India. This follows the fact that some publishers including the EBSCO deliver their resources such as e-books, audio resources such as audiobooks, e-journals, Web database and dissertations which can be accessed and used through mobile phones (Maideen, 2017). This kind of mobile technology interface linkage with publishers and on mobile learning has also been noticed and is applicable in Malawi and Ghana (Chaputula & Mutula, 2018; Ocran, 2017; Ocran et al., 2020). On the other hand, Abata-Ebire et al. (2019) opine on other levels of mobile technology application in academic libraries. The technology has shown delightful performance in areas related to service innovations, mobile learning, instructions and web lectures which is potential for distance learning (Mwilongo, 2015). However, some of African countries, Tanzania inclusive, have not significantly optimized the use of mobile technology in promoting academic library information resources and services (Kafyulilo, 2014; Kaliisa & Picard, 2017; Mustapha et al., 2021; Ocran et al., 2020).

Factors influencing the application of mobile technology in marketing library information resources and services

New technology deployment and sustainability in developing countries is always constrained by various factors based on economic, social, technological and political issues. Mobile technology in marketing academic library information resources and services in developing countries is similarly influenced by the aforementioned general factors. For instance, Dokhani et al. (2017) conducted a study on the use of library 2.0 and mobile messaging applications in Tehran—Iran and observed that librarians' time spent on

Table 4. Factors influencing use of mobile technology in marketing academic libraries ($n = 23$).

Article code	Country	Factors	Count	Percent
M2; M5	Iran; India	Librarians time spent on mobile devices Provision of quick response to the network Librarians skills on mobile technology Users expertise to mobile devices Limited memory of mobile devices Copyright, license and privacy issues	2	8.7
M3; M12; M4	Nigeria; Ghana; Malawi	Commitment among Librarians Lack of technical know-how Bandwidth or Internet connectivity Inadequate mobile technology training Inadequate ICT infrastructures Lack of policy framework Financial constraint	3	13
M10; M23	Nigeria; Bangladesh	High initial costs on mobile technology Security issues Small display screen of mobile devices Awareness to mobile marketing technology	2	8.7
			7	30.4

Source: Authors' own computation 2022.

mobile devices, limited memory of mobile devices, provision of quick response to the network, librarians skills on mobile technology, users expertise to mobile devices, copyright, license and privacy issues influenced the use of mobile technology in marketing library information resources and services. Their observation in Tehran resembles that of the study by Maideen (2017) on mobile technologies for academic libraries in the Indian academic libraries. In Nigeria, Mustapha et al. (2021) posit that commitment among librarians, lack of technical know-how, lack of policy framework, poor Internet connectivity, inadequate mobile technology training and infrastructures affected the use of mobile technology in marketing library information resources and services. In addition, Bharti and Verma (2021) on the study of the use of emerging technologies in university libraries in Nigeria indicate that high initial costs for mobile technology, small display screen of mobile devices and security issues affected the use of mobile technology in marketing library information resources and services. These factors observed in Nigeria corroborate the findings of Dei (2020) and Chaputula and Mutula (2018) who opine similar phenomena in the use of mobile technology among the academic libraries in Ghana and Malawi respectively. Table 4 summarizes the factors that influence the use of mobile marketing technology in academic libraries from different regions.

Table 4 indicates that 7 (30.4%) of the screened articles scrutinize the factors that influence mobile technology in marketing academic library information resources and services. The findings show that African countries are facing challenges on issues related to technological know-how, frameworks, infrastructures and resources, particularly financial constraints in establishing the mobile technology system for marketing and delivery of information resources and services. The fact that there is an increasing impact of mobile technology in academic libraries and emerging technologies such as 5G which enables possible access to networks, it may lead to effective mobile application in mainstreaming the teaching, learning and research works. The academic libraries have a role to overcome the emanating drawbacks as the mobile technology has the potential to change the academic library service delivery. This study is crucial as it paves the way for policy frameworks, practice and managerial intervention with regard to

infrastructural development, capacity building and raising awareness, establishment of the mobile technology framework, financial support and commitment.

Conclusion

The aim of this study was to undertake a comprehensive assessment of previous research studies on mobile technology in marketing academic libraries in developing countries. This is an essential evaluation that is carried out to discover how practitioners and researchers dealt with the issue of mobile technology in marketing academic libraries in this region of the world. The inquiry begins with a brief explanation of the current advancement of technology in general and the introduction of mobile technology in particular in the marketing academic libraries. This was purposefully done so as to comprehend the significance and background of the element. It also included a discussion of the notion of mobile technology in marketing academic libraries information resources and services. Various literatures on the use of mobile technology in marketing academic libraries in developing countries were reviewed and classified into three major themes, namely the extent of academic libraries' awareness, the level of use and factors influencing the use of mobile technology in marketing of information resources and services. In the discussion section, further explanations of the key subjects discussed as well as the primary prospects for future inquiry were provided. It can be concluded that the research into mobile technology in marketing academic libraries in developing countries is on diminishing end, as very few researchers are investigating issues in this area. This is justified by a number of studies obtained from three different aggregate tools. The fact that studies on the use of mobile technology in marketing academic libraries in developing countries is diminishing signifies that either the relevance of mobile technology as an important tool for promoting library services delivery is diminishing or researchers' interest on this area is going down.

Limitations and areas for further investigation

The present study, like every reviewed study, is hampered by a variety of flaws. For example, from 2015 to 2022, all of the publications analyzed were about mobile technology in marketing academic library information resources and services for developing countries and were sourced from Google scholar, ResearchGate and Refseek aggregates. As a result, this research does not include mobile technology in marketing academic library information resources and services in other areas of the universe. A systematic review in this study was employed and thus other studies should undertake a meta-analysis on mobile technology in marketing academic libraries in developing nations. As a result, a meta-analysis study to find often and significant elements of effective mobile technology in marketing academic libraries in developing nations is widely anticipated. It is also said that mobile technology in marketing academic libraries is a growing trend, particularly in developing nations; thus, other researchers should undertake studies utilizing more powerful statistical data analysis techniques. This is because the bulk of the research examined did not go beyond descriptive and inferential statistics for data analysis.

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No potential conflict of interest was reported by the author(s).

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