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The Journey of Digital Library Establishment in Pakistan: A Systematic Literature Review

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Abstract

This study examined the published literature on digital library resources and the users' experiences (*i.e.* satisfaction level, motivating factors, and major challenges) with these resources in Pakistan. Several e-databases were consulted including Research Gate, ScienceDirect, Web of Science, and Google Scholar to retrieve relevant literature. The study adopted a systematic literature review approach followed by PRISMA guidelines. Out of 323 articles, a total of 22 relevant studies were included based on pre-defined inclusion and exclusion criteria. The findings of this study reveal that most of the end-users are satisfied with the digital library resources, and they consulted these resources for academic and research endeavors. The authenticity and accuracy of the DLRs were the main motivating factors in the effective use of DLRs. Furthermore, this study consolidated several factors faced by end-users while using DLRs. The results of this study could help the policymakers, HEC authority, LIS professionals to further improve access to DLRs and resolve the problems facing end-users in the country. Moreover, the findings of this study will help the university administration and library authority to plan the subscription of resources keeping in view the associated barriers.

Keywords: HEC digital library; users' satisfaction; electronic resources; motivational factors; challenges; systematic literature review; Pakistan.

Introduction and background of the study

The first digital library (DL) project started in the 1990s (Pavani, 2007), and it encompasses other terms like a virtual library, desktop library, electronic library, and library without walls (Saracevic & Dalbello, 2001). The digital contents may be locally held or accessed remotely via a computer network and possess resources like e-books, e-journals, and e-databases (Sahak & Masrek, 2014). According to Sharma *et al.* (2011), researchers, research R&D organizations, and academicians worldwide and particularly in developing countries are adopting digital library resources to meet their academic and research needs. Digital libraries are also critical for smooth e-learning as it offers a variety of information services anytime and anywhere (Alzaza & Zulkifli, 2007). In 1974, University Grant Commission (UGC) was established to promote standards of Higher Education in Pakistan. However,

it was a funding body later it was restructured in 2002 as the Higher Education Commission (HEC) of Pakistan. The main objective behind its establishment was to upgrade the existing infrastructure of universities and to regulate the research activities (Rafiq & Ameen, 2012; said, 2006). Among other initiatives, the HEC had launched a national digital library program (NDLP) in 2004 aimed at achieving excellence in higher education which providing access to 75,000 peer review e-journals and e-books, world-renowned e-databases, on a wide range of disciplines (<http://www.digitallibrary.edu.pk/>) to meet the scholarly information needs of Pakistani community (HEC Digital Library, 2020). Access to HEC DL is made available to about 250 public and private academic institutions, and R&D organizations in the country. Numerous researchers such as Ahmad and Amjid (2014), Arif and Ameen (2011), Mirza and Mahmood (2012), Tahir, Mahmood, and Shafique (2010) reported that both research students and faculty members were adopting e-resources for different academic and research needs in Pakistan. Consequently, several studies have determined the impact of HEC digital library resources on research productivity (Ahmed and Uzair, 2017; Arif & Kanwal, 2009; Khan & Ahmed, 2013a, 2016b); Khan *et al.*, 2017; and Rafi, Jian Ming & Ahmed, 2019).

Some researchers also explored the issues influencing the use of HEC DL resources (Arif & Kanwal, 2009; Bhatti & Asghar, 2014; Iqbal, Akhtar & Muhammad, 2017; Khan & Ahmed, 2013; Khan, Ahmed & Masrek, 2014; Mubeen, Soroya & Mahmood, 2021; Warraich & Tahir, 2009). Hence, no systematic study has been conducted to investigate the users' satisfaction, motivational factors, and challenges associated with the use of HEC DL in the study context. Thus, this study was conducted to evaluate users' experiences with HEC DL using Meta-analysis and systematic literature review (SLR) approaches.

Research Questions

RQ1: What is the satisfaction level of users regarding the usage of HEC DL resources and services?

RQ2: What are the motivating factors of users behind the use of HEC DL resources and services?

RQ3: What challenges being faced by users while accessing HEC DL resources and services?

Methodology

To achieve the main purpose of this study, a systematic literature review was conducted by following PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA; Moher *et al.* (2009) to identify the relevant published studies on HEC DL resources and services. Initially, a systematic search of the literature was consulted using Advanced Boolean Operators on renowned e-databases such as LISTA (Library Information Science & Technology Abstracts) a platform of EBSCO-Host, Web of Science, and Google Scholar for locating articles on HEC DL in Pakistan. Different strings were used to ensure that each study must have used the term(s) "HEC digital library" OR "Pakistan national digital library" AND "resources" AND "services", HEC digital library OR NDL AND Pakistan AND resources AND services, "HEC digital library" OR "Pakistan national digital library" AND "electronic resources" AND "electronic Journal" AND "e-book*" AND "Databases" AND "services", "HEC digital library" OR "Pakistan national digital library" AND "resources" AND "services" "users' satisfaction", "impact of HEC digital library" and 'challenges/obstacles/issues/problems faced by users/scholars while accessing HEC digital library resources and services (Table 1).

Table 1

Searching strings used on Google Scholar, LISTA, and Web of Science

Search Strings	Google Scholar English Articles	Web of Science English Articles	LISTA Academic journals/ English
"HEC digital library" OR "Pakistan national digital library" AND "resources" AND "services"	274	-	-
HEC digital library OR NDL AND Pakistan AND resources AND services	-	-	12
"HEC digital library" OR "Pakistan national digital library" AND "electronic resources" AND "electronic Journal" AND "e-book*" AND "Databases" AND "services"	-	11	-
"HEC digital library" OR "Pakistan national digital library" AND "resources" AND "services" "users' satisfaction" "impact of HEC digital library"	-	26	-
	Total		323

These databases allowed authors to assemble a comprehensive list of all relevant articles. Thus, a total of 323 articles were retrieved through searching in these databases. But their relevancy to the aims/objectives of the study had to be determined so the process of scoping was carried out. In this regard, an inclusion criterion was used to determine which study to be included and excluded. The inclusion criteria are given in Table 02.

Table 2

Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Only English publication	Non- English
HEC digital library Pakistan	Any other digital library
Accessible Articles	Non-Accessible Articles
Article	Books, Thesis
Only English publication	Non- English

Filtering: Articles were filtered by reviewing the abstract of the extracted papers. All studies have been reviewed keeping in view the pre-defined inclusion and exclusion criteria. Duplicate as well as irrelevant studies were removed. Fig. 1 shows that the selection was made after a five-stage filtering process. Thus, a total of 22 studies had met the research objectives. Next, the information was extracted from each relevant study to answer the research questions.

Quality assessment of selected studies: Several quality assessment checklists are developed and used over time (Khanet *al.*, 2011). The present studies were assessed and marked out of 13 points score. According to Kitchenham (2004), and equal to 09 or more than 09 points is a good score out of 13 for measuring quality assessment. These studies were measured based on research questions, research

design, sample size, data collection tools, response rate, coding and analyses, and presentation of the data. Table 3 shows the overall range of total scores of selected studies which are between 08-12 points. In the present study, Boynton and Greenhalgh (2004) checklist was used to evaluate the quality of each study. This checklist has been used widely in several SLRs to evaluate the quality of research publications (Rafique & Mahmood, 2018). Further, the selected studies were reviewed keeping in view the pre-defined inclusion and exclusion criteria while duplicate, as well as irrelevant studies, were removed. Fig. 1 shows that the selection was made after a five-stage filtering process.

Validity and Reliability: Keeping in view the importance of validity and reliability components in a research study, this paper reported the results of only high-quality studies with no evidence of biases, and the data was entered in a standardized format. The searching, as well as the selection process, was used (see Figure 1) that postulates all stages of the process: consulted databases, obtained documents deleted at each stage as well as the reasons behind their removal (Moher *et al.*, 2009). Further, each process from searching the relevant articles to the final selection of the articles as well as data extraction was checked twice to ensure the accuracy of the data.

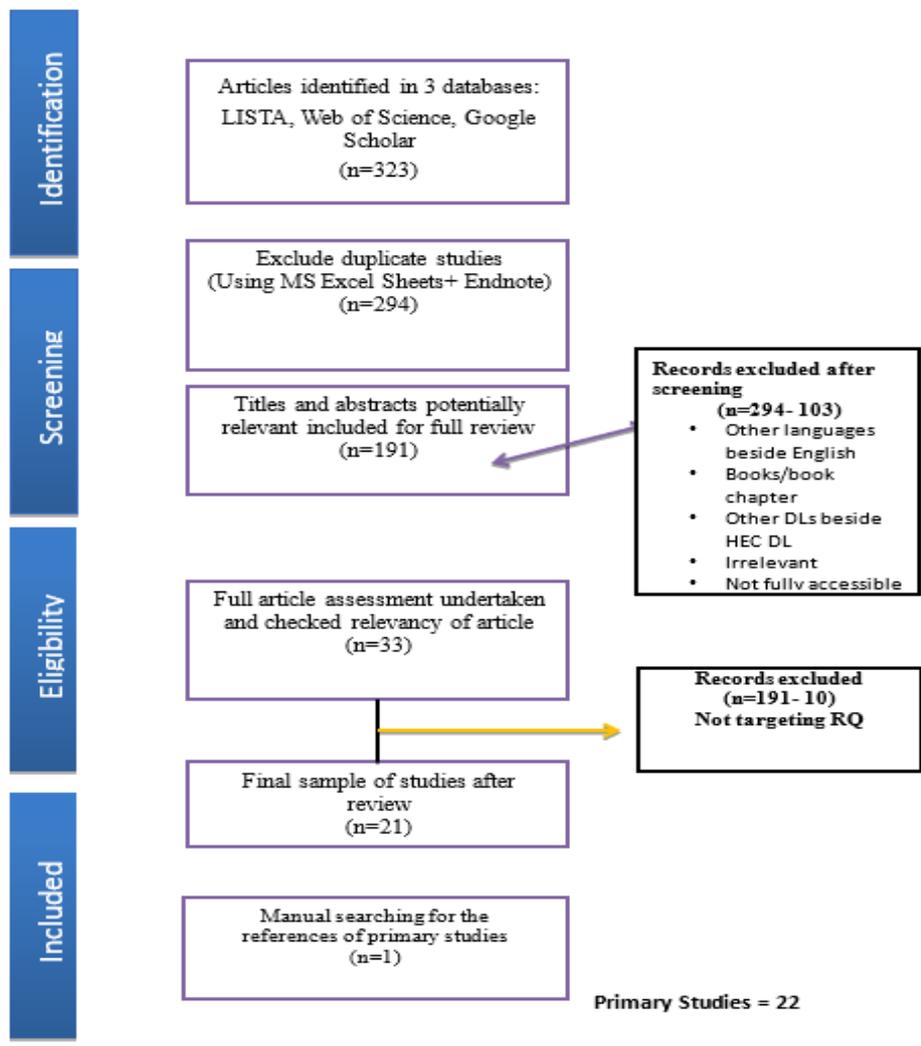


Figure1. Flow chart of records retrieved, screened, and included in SLR based on PRISMA

Table 3
Quality Assessment

Studies	Score of Questions and Design (Total 2)	Score of Sampling	Score of Data Collection tool (Total 4)	Score of Response (Total 1)	Score of Coding and Analysis (Total 2)	Score of Results' Presentation (Total 2)	Grand Total (Total 13)
Ahmed, S., &Uzair, A. (2017)	Pakistan		M.Phil., Ph.D. LIS researchers	90		Impact of non-access journals on research material	Mix
Khan, A., & Ahmed, S. (2020)	2	2	3	1	2	2	12
Ahmed, S., & Uzair, A. (2017)	1	2	2	1	1	1	8
Khan, A., Ahmed, S., Khan, A., & Khan, G. (2017)	2	2	3	1	1	1	10
Khan, A., Ahmed, S., & Masrek, M. N. (2014)	2	2	3	1	2	1	11
Arif, M., & Kanwal, S. (2009).	2	1	3	1	2	1	10
Arshad, A., & Ameen, K. (2014).	2	1	3	1	2	1	10
Arshad, A., & Ameen, K. (2018).	1	1	3	1	2	1	9
Bhatti, R., Chohan, T. M., & Asghar, M. B. (2014)	2	1	2	1	1	1	8
Iqbal, M. J., Akhtar, N., & Muhammad, S. (2017).	1	2	3	1	2	1	10
Hussain, M. (2019).	2	1	3	1	2	2	11
Khan, A., & Ahmed, S. (2016).	2	2	3	1	2	2	12
Khan, A., & Ahmed, S. (2020)	2	2	3	1	2	1	11
Warraich, N. F., & Ameen, K. (2008).	2	1	3	1	1	1	9
Warraich, N. F., & Ameen, K. (2010)	2	2	2	1	2	2	11
Sultan, M., & Rafiq, M. (2021).	2	1	3	1	2	1	10
Rafique, A., Ameen, K., & Arshad, A. (2019).	2	1	3	1	2	1	10
Shafiullah, M. F. (2011).	2	1	3	1	2	1	10
Rafi, M., JianMing, Z., & Ahmad, K. (2019).	2	1	2	1	2	1	9
Safdar, M., & Rehman, S. U. (2015)	1	1	3	1	2	1	9
Mubeen, I., Soroya, S. H., & Mahmood, K. (2021)	1	1	3	1	2	2	10
Sadruddin, M. M. (2015).	1	1	3	1	2	1	9
Rafi, M., Ahmad, K., & Ming, Z. J. (2020).	1	1	3	1	2	2	10
Khan, A., & Ahmed, S. (2013).	2	2	2	1	2	2	11
Quality Score Expected	46	46	92	23	46	46	299
Quality Score Obtained	39	32	64	23	42	30	230

Results

Overview of studies: Searching strings were run into Web of Science, LISTA, and Google scholar to acquire the related studies. A manual search was also performed to get more related studies using backward, forward citation approaches. A total of 323 studies were found on HEC DL and scanned to check their relevancies. The results were checked against the pre-defined inclusion, exclusion criteria and only 33 studies met the inclusion criteria. After importing results into MS excel and Endnote, the duplicate results were removed accordingly. The acquired results were checked for their full-text

availability and yielded only 22 studies that were finalized for inclusion. The selected studies were published in world-renowned databases/journals of the UK, US, and Pakistan. Out of them, seven (07) studies were published in Pakistani Journals, ten (10) in the UK, and only four (04) in USA LIS journals. Table 4 shows details of the studies. Out of 22 extracted studies 17 studies used quantitative method (Arif & Amin, 2009; Arshad & Amin, 2014; Arshad & Amin, 2018; Bhatti, Chohan & Chohan, 2014; Hussain, Rafi & Raffique, 2019; Iqbal, Akhtar & Muhammad 2017; Khan & Ahmed, 2013a, 2016b, 2017c, 2020d; Khan, Ahmed & Masrek, 2014; Mubeen, Soroya & Mahmood, 2021; Safdar & Rehman (2015); Shaffiullah, 2011; Sultan & Rafiq, 2021 and Warraich & Ameen, 2008), while 04 of them Ahmed & Uzair, 2017, Sadruddin, 2015; Warraich & Ameen, (2008a, 2010b, 2018c) were based on mix methods.

Methodological nature of the studies: most (n=10) used survey method (n=10) followed by four papers adopted random sampling, four papers used stratified random sampling while only 03 studies adopted convenient sampling (Table 4).

Purpose of DL usage: Table 5 shows that the HEC resources were being used by the research community. They were using HEC resources for research work as well as to improve their research quality. The other dominant purpose behind the use of HEC digital library resources was to prepare class assignments.

Satisfaction level of the DL users: A total of 12 studies reported that the users were satisfied with the HEC DL resources and services. These studies concluded that these resources fulfilled the information needs of end-users effectively (Table 6).

Table 4
Selected articles for Systematic Literature Review

Study	Country	Population	Sample size; Sampling technique	Aspect Covered	Barriers	Method
Ahmed, S., & Uzair, A. (2017)	Pakistan	M.Phil., Ph.D. LIS researchers	90	Impact of non-access journals on research	Non-accessibility of material	Mix
Khan, A., Ahmed, S., Khan, A., & Khan, G. (2017)	United Kingdom	Scholars	Convenient sampling 707	Impact of electronic resources on research productivity	-	Quantitative Survey method
Khan, A., Ahmed, S., & Masrek, M. N. (2014)	United States	Researchers	Stratified random sampling 1031	Utilization of e- resources Satisfaction with digital library resources	Restricted access Electricity failure Limited Access	Quantitative Descriptive Survey method
Arif, M., & Kanwal, S. (2009).	United Kingdom	Female students	Convenient sampling 315	Acceptance and importance of DL The problem in the context of limited access	Restricted access Electricity failure Low bandwidth Lack of information literacy programs Lack of IT training workshops Unavailability of IT literate staff	Quantitative Survey
Arshad, A., & Ameen, K. (2014)	United Kingdom	Faculty members	690	Patterns of using scholarly e-journals and articles Barriers faced by academics	Restricted Access Access on Payment Low bandwidth Lack of training programs Unawareness with HEC databases Lack of advanced searching skills	Quantitative Survey
Arshad, A., & Ameen, K. (2018).	United Kingdom	Academic staff	-	Scholarly use of resources Barriers encountered The disciplinary difference in the use of e-journals	Lack of e-literacy programs Un-sufficient subscribed material	Quantitative Survey
Bhatti, R., Chohan, T. M., & Asghar, M. B. (2014)	USA	Faculty members	120	Preferences Impact Purposes Barriers in using HEC DL resources	Lack of computers Electricity failure Low bandwidth Lack of training English language problem Access issue	Quantitative Survey research method

Iqbal, M. J., Akhtar, N., & Muhammad, S. (2017).	Pakistan	HEC DL visitors	128	Convenience sampling	Satisfaction of users with HEC DL services	-	Quantitative
Hussain, M. (2019).	Pakistan	Faculty members and students	177		Awareness	Low bandwidth	Quantitative
					Purposes of using e-resources	Inadequate IT infrastructure	Survey
						Non-availability of computers	
Khan, A., & Ahmed, S. (2016).	Pakistan	Masters and Ph.D. students	196	Random sampling	The disciplinary difference in use patterns	-	Quantitative
					Purposes of usage		Survey
					Barriers faced in using e-resources		
Khan, A., & Ahmed, S. (2020)	USA	MS/MPhil & Ph.D. researchers	1031	Random sampling	Use and accessibility of e-journals and databases	Restricted access	Quantitative
					Preferences of resources	Low internet Bandwidth	
					Barriers	Un-awareness with HEC digital library resources	
						Lack of training	
						IP based access	
Warraich, N. F., & Ameen, K. (2008)	UK	LIS professionals	75		Librarians' usage/ satisfaction/ perception regarding HEC digital library program	Lack of online searching skills	Mix method
					Awareness/ opportunities/ challenges	Lack of training programs	
Sultan, M., & Rafiq, M. (2021).	UK	HEC recognized University libraries	88				Quantitative
Rafique, A., Ameen, K., & Arshad, A. (2019).	UK	-	-		Patterns of e-journals use		Quantitative
Shafiullah, M. F. (2011).	Pakistan	Head Libraries	15		Most and least used database		
					Explore HEC digital library resources and services		Quantitative
					Perception of head librarians about their usefulness		
Rafi, M., JianMing, Z., & Ahmad, K. (2019).	UK		52		Effectiveness of the use of HEC DL	Lack of technological infrastructure	Quantitative
						Lack of digital literacy	
						Unavailability of qualified and trained staff to assist	
						Inadequate technical infrastructure	
						Involvement of non-professional administrators in decision making	
Safdar, M., & Rehman, S. U. (2015)	USA	LIS professionals & library users	400	Convenience sampling	Users' perception regarding awareness/ purpose/ problem/ satisfaction with PRR	-	Quantitative
Mubeen, I., Soroya, S. H., & Mahmood, K. (2021)	UK	Post graduate research students		Convenient sampling	Factors encourage and discourage HEC DL	Electricity failure	Quantitative
						Low internet Bandwidth	

Sadruddin, M. M. (2015).	Pakistan	Faculty members	Random sampling 40	Awareness and purposes of using HEC DL	Non-availability of archival publications Access issue	Mix method
Warraich (2018).	Pakistan	LIS scholars	Stratified random sampling 75	Perception, use, satisfaction with e- resources	Lack of technical expertise -	Mix method
Khan, A., & Ahmed, S. (2013)	UK	Research scholars of MS/MPhil and PhD	Stratified random sampling 14	Research scholar's satisfaction and their research productivity	Lack of training Lack of awareness regarding RSS and email alerts Non-cooperative library staff IP based access Electricity failure Low internet bandwidth Lack of advance searching skills Restricted access Lack of computers Non-availability of archival and mostly used publications/journals	Quantitative Descriptive survey research
Warraich, N. F., & Ameen, UK K. (2010)		LIS professionals	Stratified random sampling 75	Perception regarding use and satisfaction with HEC DL	-	Mix method Multi method approach

Table 5
Purposes of utilizing HEC Resources and Services

Studies	Purposes
Khan, A., Ahmed, S., Khan, A., & Khan, G. (2017)	a) Engineering students were using DLR resources for academic purposes.
Khan, A., Ahmed, S., & Masrek, M. N. (2014)	For academic purposes were using: 1) HEC e-databases, 2) e-books 3) e-Journals
Arshad, A., & Ameen, K. (2018).	a) The academic staff was using HEC digital library resources for research purposes b) To improve their teaching experiences c) To meet their scholarly needs
Hussain, M. (2019).	a) The students were using DLRs to prepare class lessons, assignments as well as for research purposes.
Sadrudin, M. M. (2015).	a) For research purposes b) Prepare assignments c) Authentic resources to meet information needs
Sheikh, A. (2017)	a) To get authentic open access required material
Khan, A., & Ahmed, S. (2013).	a) Research purposes b) Accelerate research quality

Challenges being faced by the DL users: The studies highlighted challenges that hinder the way of the utilization of HEC digital library resources. The most prominent factor was lack of training/ orientation programs, restricted access, low bandwidth, electricity failure, unawareness about the HEC digital library, non-cooperative and non-IT literate staff. Other prominent factors included lack of advanced searching skills, insufficient IT infrastructure, and access issues. Few studies have reported a lack of computer and IT skills, lack of information literacy programs, and non-availability of archival material (Figure 1).

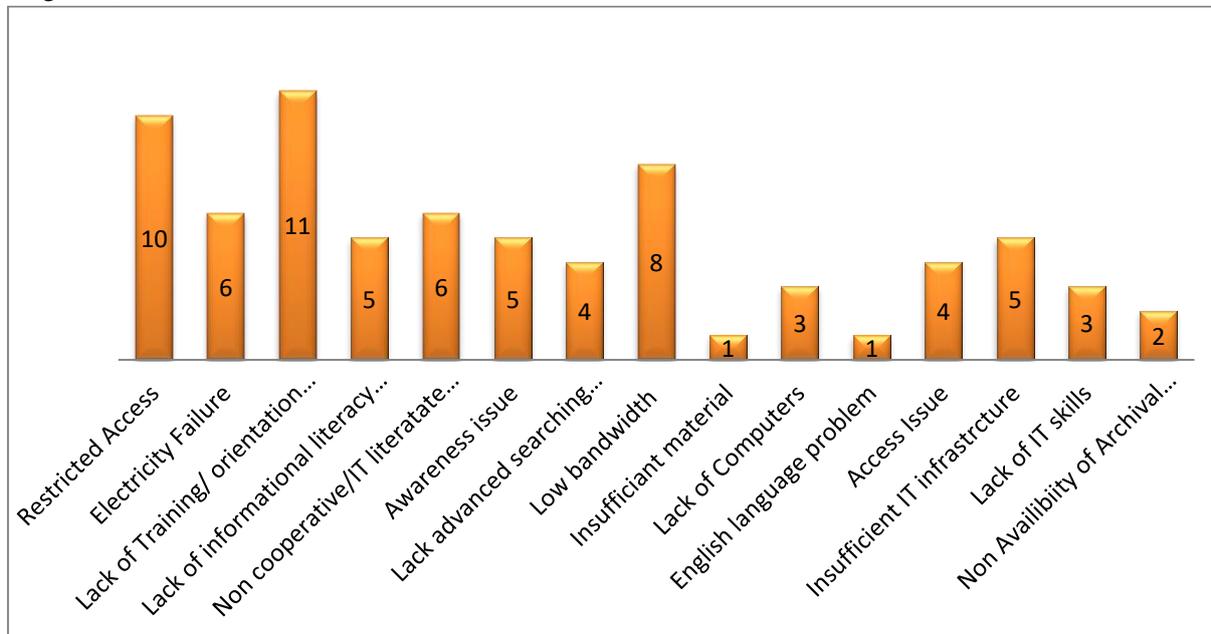


Figure 2. Challenges encountered in the utilization of HEC DL resources

Table 6
Users' satisfaction with HEC Digital Library resources

Studies	Satisfaction with NDLP Resources and Services
Ahmed, S., & Uzair, A. (2017)	Not satisfied Non- accessible require articles puts a destructive impact on the researcher and the research outcomes.
Khan, A., Ahmed, S., Khan, A., & Khan, G. (2017)	a) The researchers were satisfied with the NDLP resources and services b) DLR have a positive impact on the research output
Khan, A., Ahmed, S., & Masrek, M. N. (2014)	a) The students were satisfied with DLRs
Arif, M., & Kanwal, S. (2009).	a) The researchers were not satisfied with the available resources offered by HEC digital library. The restricted access of DLRs negatively impacts the research output. a) The academic staff was more satisfied with HEC resources especially the e-journals more useful in their research activities.
Arshad, A., & Ameen, K. (2018).	b) The teaching community was more satisfied with DLRs and considered them a positive factor impacting their teaching experiences and research output.
Hussain, M. (2019).	a) Satisfied with DLRs.
Khan, A., & Ahmed, S. (2016).	a) The engineering students reported that the use of DLRs puts a significant impact on their research work and they were satisfied with the available resources.
Rafi, M., JianMing, Z., & Ahmad, K. (2019).	a) Satisfied with DLRs as it puts a positive impact on research output
Sadruddin, M. M. (2015).	a) Satisfied due to its positive impact on research output
Iqbal, M. J., Akhtar, N., & Muhammad, S. (2017).	a) The users were not so much satisfied with the DLRs and services
Shafiq, H., & Wani, Z. A. (2018)	a) researchers were satisfied with PRR
Khan, A., & Ahmed, S. (2013).	a) Satisfied with offered resources b) Satisfied with the resources interface c) Display of search results d) Satisfied with the provided information
Rafique, A., Ameen, K., & Arshad, A. (2019).	a) students of engineering were more satisfied with the resources provided by ScienceDirect, Springer, Emerald, and Wiley
Warraich, N. F., & Ameen, K. (2008).	a) LIS professionals were extremely satisfied with the offered resources
Warraich, N. F., & Ameen, K. (2010)	a) researchers were more satisfied with e-journals than e-books
Bhatti, R., Chohan, T. M., & Asghar, M. B. (2014)	a) Not satisfied

Discussion

This study revealed that most of the population of selected studies were using HEC DLR for academic and research purposes (Arshad & Ameen, 2018; Hussain, 2019; Khan & Ahmen, 2013; Sadruddin, 2015). The researchers were accessing digital contents of the Pakistan research repository considering it as an important source that might be utilized for research purposes (Safdar, 2015; Shafiq & Wani, 2018; Warraich, 2008). The current study also explored that majority of the population of the selected studies were satisfied with the resources offered by the HEC digital library (Arif, 2009; Arshad, 2018; Iqbal, 2017; Hussain, 2019; Khan, 2016 a; 2017 b; Sahifullah, 2011; Warraich, 2018). Out of 22 selected studies, 16 studies dealt with the user's satisfaction with HEC DL. Furthermore, most of the researchers/faculty members were satisfied with the offered HEC resources while some users have shown their dissatisfaction. There was a positive correlation between their research output and HEC DL resources (Ahmed & Uzair, 2017; Arshad & Ameen, 2018; Khan et al., 2017; Rafi, JianMing & Ameen, 2019; Sadruddin, 2018). However, limited, or restricted access harmed the research output of the researchers (Arif & Ameen, 2009). The researchers also showed their satisfaction with the users' interface as well (Khan & Ahmed, 2013). Overall satisfaction level was good with the available resources. However, few studies (Ahmed, 2017; Arif, 2009; Bhatti, 2014; Iqbal, 2017) reported the low or no satisfaction of the users with the offered resources and services of the HEC digital library. This study also explored that the researchers preferred to use HEC resources due to their authenticity (Sheikh, 2007). The preferred sources for academic researchers and scientists were e-journals and were more satisfied with e-journals than eBooks (Brennan *et al.*, 2002; Grefsheim & Rankin, 2007; Tenopir *et al.*, 2009; Warraich, 2010). Zhang and Kudva (2014) reported the use of eBooks in US academic institutes is in the infancy stage.

The included articles reported several challenges that researchers faced in the utilization of HEC Digital Library resources. These challenges include lack of awareness, slow internet speed, lack of searching skills, lack of IT/ ICT training, electric breakdown, restricted access, and within-campus access were the dominant and major factors that were hindering the way of proper utilization of HEC digital library resources. Consequently, the unavailability of computers and untrained and non-cooperative staff is also a factor that has a negative influence in the same context (Bhatti, 2014; Hussain, 2019; Khan, 2013). Furthermore, several LIS experts reported that the lack of training and skills to search and use online resources are the major causes behind the proper utilization of HEC DL resources (Arif & Kanwal, 2009; Arshad & Ameen, 2014; Bhatti, 2014; Khan & Ahmed, 2020, 2013; Khan, Ahmed & Masrek, 2014; Rafi, Ahmed & Ming, 2020; Warraich & Ameen, 2008; Warraich & Tahira, 2009) They further advocated the importance of ICT pieces of training to cope up with this issue. Some studies also documented that the low bandwidth or internet speed is one of the challenges that hinder the way of proper utilization of HEC Digital Library resources (Arif & Kanwal, 2009; Arshad & Ameen, 2014; Hussain, 2019; Khan & Ahmed, 2013a, 2020b; Mubeen, Soroya & Mahmood, 2021; Shafiq & Wani, 2018; Warraich & Tahira, 2009). The time taking downloading and browsing process is collectively the cause behind it. Researchers also addressed that electricity failure (Arif & Kanwal, 2009; Bhatti, Chochan & Asghar, 2014; Khan, Ahmed & Mesrek, 2014, 2013; Shafiq & Wani, 2018; Warraich & Tahira, 2009), unawareness, lack of information literacy skills and inefficiency in using advance searching skills causes the low utilization of DL resources (Arif & Kanwal, 2009; Arshad & Ameen, 2014; Khan & Ahmad, 2013; Rafi, Ahmad & Ming, 2020; Warraich & Ameen, 2008). This study also depicts that limited access and IP based access is also stumbling blocks in the effective use of HEC digital library resources (Arshad & Ameen, 2014; Khan & Ahmad, 2020; Warraich & Tahira, 2009; Shafiq & Wani, 2018; Rafi, Ahmad & Ming, 2020). Hence, researchers believe that these issues are the main causes that divert the users' attention from HEC digital library resources to freely available internet resources (Saddique, 2006).

Other extracted challenges from the selected studies were English language problem, lack of computers/computer labs, inadequate IT infrastructure, non-cooperative and untrained library staff, lack of IT and technical skills and restricted access, dissatisfaction with the available resources, unavailability of required resources proves a challenge for them that influenced their priority regarding the use of NDL resources. Moreover, the findings of this study show most of these studies were quantitative and used stratified random sampling to achieve their research objectives. The major population of the selected studies comprised of Masters/Ph.D. students. Some studies evaluated the perception of the faculty members and LIS professionals about HEC digital library resources (Arshad, 2018; Bhatti, 2014; Hussain, 2019; Sadruddin, 2015; Safdar, 2015; Shafiullah, 2011 and Warraich, 2008). The analysis of these studies shows that the motivating factor for researchers to use HEC DLR/S was the authenticity or accuracy of resources that resulted in positive research output.

Limitations and future research directions

The search was limited to the articles published in English. There might be other relevant articles published in other languages that have not been included in the present study. The present study was limited to the services provided by HEC to accelerate research productivity. Several studies can be conducted to create awareness in researchers about the HEC services specifically designed to meet the information needs of the researchers. The present study has included the results of Web of Science, Google Scholar, and LISTA, another study can be conducted by increasing the scope of the present study.

Conclusion

Digital library resources have highly affected the changing environment of higher education both in developed and underdeveloped countries (Bhatti, 2014). This study was undertaken to investigate the purposes behind the usage of HEC digital library resources and services as well as the satisfaction level of the users with offered resources and services. The study also aimed to highlight certain barriers to the proper utilization of HEC digital library resources and services. HEC has spent a heavy amount on the digital library program and is still taking the best possible initiatives to inculcate the research culture in Pakistan. It is addressing their information needs with the provision of authentic resources. The study has highlighted the user's satisfaction level with the usage of the HEC digital library (Arshad & Ameen, 2018; Hussain, 2019; Khan, Ahmed & Masrik, 2014; Khan & Ahmed, 2016; Shafiq & Wani, 2018). It has also exposed the challenges that hinder the way of proper utilization of the resources. Though, the study has shown a positive and satisfied behavior of the researchers in the context of the available HEC DL resources and has also pointed out several barriers that affect the use of HEC DL. One of the most highlighted factors reported in most of the studies was the lack of ICT pieces of training and orientation sessions. The users were neither fully aware of the available resources and services nor had capabilities to use and search for their required resources independently. Other highlighted factors were restricted access and low bandwidth. HEC can take initiatives by considering the hindrances that are impacting the main objective of HEC, which is to provide not only authentic resources but also inculcate research culture into its community in the light of the present study.

Following are the implications of the study: -

- 1- The study will help HEC to plan and take required initiatives by considering the satisfaction level of the researchers/users with offered resources as well as the issues and problems faced by them that hinder the way of proper or no utilization of HEC digital library resources.
- 2- The findings of the study will help the university authorities in understanding the usability of HEC digital library resources and in planning the deliverance of those resources by considering all those issues highlighted in the present study. This will pave the way to serve the researchers by removing all the obstacles.

- 3- The results will help the web designers and managers of digital libraries to know the factors that are negatively affecting the use of digital libraries through users' perceptions and their satisfaction with the resources.

Following are the recommendations after considering the previous studies

The library administrators should spend a huge amount on the subscription of the most relevant databases keeping in view the offered disciplines of their respective institutes. The library staff should strengthen their ICT skills to support the students/ researchers as well as HEC should design and conduct training and awareness sessions for librarians and students to change the alarming situation. HEC should market its resources and services so that awareness levels among the scholarly community may be increased. HEC must involve institutions, administrators, and librarians in policymaking and planning regarding its resources and services so that it may become able to offer its resources more effectively and without facing any hindrance. Librarians must provide orientation sessions to the users so that they may utilize the HEC digital library resources more effectively. The supervisors/ professors should be fully aware of the HEC digital library resources and should create awareness among their students. Information literacy programs and capacity-building training should be designed to inculcate information literacy skills into researchers as well as to make them information literate. The institutions should pay proper attention to the solid IT/ ICT infrastructure. Off-campus, access should be ensured to resolve the issue of access. Further studies must be carried out using the qualitative or mixed-method to get more insight into the situation that will help in understanding the phenomenon.

Reference

- Abbas, A., & Faiz, A. (2013). The usefulness of digital and traditional libraries in higher education. *International Journal of Services Technology and Management*, 19(1-3), 149-161.
- Ahmed, S., & Uzair, A. (2017). The impact of non-accessible library and information science journals on research productivity in Pakistan. *Pakistan Journal of Information Management and Libraries*, 18(2), 40-57.
- Ali, M., Jan, T., & Jan, S. U. (2015). Awareness & utilization of electronic information resources among medical students. *Journal Of Medical Sciences*, 23(4), 238-241.
- Alzaza, N. S., & Zulkifli, A. N. (2007). Mobile-based library loan service (MBLLS). *Proceedings of the Rural ICT Development Conference*, (pp. 1-8). Executive Development Centre (EDC), Sintok, Malaysia. http://najishukri.files.wordpress.com/2010/05/pape_rmblls.pdf
- Arif, M., & Kanwal, S. (2009). Acceptance of digital library among female students and effects of limited access of digital library on their performance in research work: a case of International Islamic University. *The International Information & Library Review*, 41(3), 122-128.
- Arshad, A., & Ameen, K. (2014). Academics' use of scholarly e-journals: a case of the university of Punjab. Paper presented at the European Conference on Information Literacy, 492, 652-662.
- Arshad, A., & Ameen, K. (2018a). Academic scientists' scholarly use of information resources in the digital environment: perceptions and barriers. *Global Knowledge, Memory and Communication*, 67(6/7), 467-483.
- Arshad, A., & Ameen, K. (2018b). Usefulness of e-journals consortium in Pakistan: academic staff's perceptions and expectations. *Serials Review*, 44(4), 275-281.
- Bhatti, R., Chohan, T. M., & Asghar, M. B. (2014). HEC Digital library and higher education: trends and opportunities for faculty members at the Islamia University of Bahawalpur, South Punjab, Pakistan. *Library Philosophy and Practice*. 1059.
- Boynton, P. M., & Greenhalgh, T. (2004). Selecting, designing, and developing your questionnaire. *BMJ*, 328(7451), 1312-1315.
- Hussain, M. (2019). Use of electronic information resources by teachers and students: a study of Khushal Khan Khattak University Karak, Pakistan. *Journal of Information Management and Library Studies*, 2(1), 35-51.

- Iqbal, M. J., Akhtar, N., & Muhammad, S. (2017). Scholars perceptions about HEC library resources and services: A survey of user's satisfaction. *Pakistan Library & Information Science Journal*, 48(2).
- Iqbal, M. J., Muhammad, S., & Akhtar, N. (2016). A quantitative analysis of digital library & IT facilities in Pakistani University Libraries: A case study. *Pakistan Library & Information Science Journal*, 47(1).
- Khan, A., & Ahmed, S. (2013). The impact of digital library resources on scholarly communication: challenges and opportunities for university libraries in Pakistan. *Library Hi Tech News*, 30(8), 12-29.
- Khan, A., & Ahmed, S. (2016). The impact of digital library resources' usage on research productivity: a study among engineering students in Pakistan. *Pakistan Journal of Information Management and Libraries*, 17, 174-183.
- Khan, A., & Ahmed, S. (2020). Usage of e-databases and e-journals by research community in Pakistani Universities: issues and perspectives, *Library Philosophy and Practice*, 4570.
- Khan, A., & Qutab, S. (2016). Understanding research students' behavioural intention in the adoption of digital libraries: A Pakistani perspective. *Library Review*, 65(4/5), 295-319.
- Khan, A., Ahmed, S., & Masrek, M. N. (2014). Scholars' satisfaction with digital library collection and gaps in the provision of effective information resources and services: a Pakistani perspective. *Journal of Electronic Resources Librarianship*, 26(4), 250-267.
- Khan, A., Ahmed, S., Khan, A., & Khan, G. (2017). The impact of digital library resources usage on engineering research productivity: an empirical evidences from Pakistan. *Collection Building*, 36(2), 37-44.
- Kitchenham, B. (2004). Procedures for performing systematic reviews. *Keele, UK, Keele University*, 33(2004), 1-26.
- Licklider, J. C. R., & Clapp, V. W. (1965). *Libraries of the Future* (Vol. 2): MiT Press Cambridge, MA.
- Liu, Z., & Luo, L. (2011). A comparative study of digital library use: factors, perceived influences, and satisfaction. *The Journal of Academic Librarianship*, 37(3), 230-236.
- Moher, D., Liberati, A., Tetzlaff, J. and Altman, D.G. (2009), Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement, *Journal of Clinical Epidemiology*, 62(10), 1006-1012.
- Mubeen, I., Soroya, S. H., & Mahmood, K. (2021). Identifying the factors influencing digital library use among research students: a case of National Digital Library of Pakistan. *Digital Library Perspectives*, 37(3), 192-208.
- Pavani, A. M. (2007). The role of digital libraries in higher education. *International Conference on Engineering Education, Rio de Janeiro, Brazil*. <http://www.ineer.org/Events/ICEE2007/papers/637.pdf>.
- Rafi, M., JianMing, Z., & Ahmad, K. (2019). Evaluating the impact of digital library database resources on the productivity of academic research. *Information discovery and delivery*, 47(1), 42-52.
- Rafique, A., Ameen, K., & Arshad, A. (2019). Use patterns of e-journals among the science community: a transaction log analysis. *The Electronic Library*, 37(4), 740-759.
- Saddique, A. (2006). Status of the services of the information resource centre, University of the Punjab: an appraisal", unpublished Master's thesis, University of the Punjab, Lahore.
- Sadrudin, M. M. (2015). Contribution of digital libraries and its role in reaping quality researches in Pakistan-challenges and opportunities. *Pakistan Library & Information Science Journal*, 46(1).
- Safdar, M., & Rehman, S. U. (2015). Users' perception and satisfaction with higher education commission Pakistan research repository (PRR): problems and opportunities. *Library Philosophy and Practice*, 1271.
- Shafiq, H., & Wani, Z. A. (2018). Assessment of Search Interface of Information Retrieval Systems A case study of select academic databases. Paper presented at the 2018 5th *International Symposium on Emerging Trends and Technologies in Libraries and Information Services (ETTLIS)*.
- Shafiullah, M. F. (2011). Digital library services of Higher Education Commission in Pakistan. *Pakistan Library and Information Science Journal*, 42(2), 12-28.

- Sultan, M., & Rafiq, M. (2021). Open access information resources and university libraries: analysis of perceived awareness, challenges, and opportunities. *The Journal of Academic Librarianship*, 47(4), 102367.
- Warraich, N. F., & Ameen, K. (2008). Perceptions of library and information science professionals about a National Digital Library programme. *Library Hi Tech News*, 25 (8), 15-19.
- Warraich, N. F., & Ameen, K. (2010). Perceptions of LIS professionals regarding use of Pakistan National Digital Library databases. *The Electronic Library*, 28(1), 108-121.
- Warraich, N. F., & Tahira, M. (2009). HEC national digital library: challenges and opportunities for LIS professionals in Pakistan. *Library Philosophy and Practice*, 2009, 1-10.