

Exploring the Factors Influencing Usage Behavior of the Digital Library Remote Access (DLRA) Facility in a Private Higher Education Institution in India

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Abstract - Digitalization has transformed the world and empowered education across the globe alike. Digital Library Remote Access (DLRA) facilities have empowered students, researchers and academicians to have uninterrupted and complete access to literature and scientific information on finger tips through a single window. In order to understand the factors influencing the digital library usage in a private Higher Education Institution of Eminence in India, the study employs non-probability sampling, convenience sample of 400 researchers and students of the deemed to be university. The results of the investigation substantiates that habit plays a crucial role in ascertaining the behavioral intention and the usage behavior of DLRA technology.

Keywords: Digital Library, Remote Access, Social Influence, Hedonism, Habit, Behavioral Intention, Usage Behavior

I. INTRODUCTION

The higher education terrain has experienced an intense transformation caused by the COVID-19 pandemic, rapidly steering towards the widespread adoption of remote learning technologies (Oliveira *et al.*, 2021; Anthony Jnr & Noel, 2021; Ali, 2020; Dubey & Pandey, 2020). This shift has been imperative in ensuring the continuity of education amid the extensive disruptions caused by the pandemic (Manca & Delfino, 2021). Numerous academic articles and reports have explored the sway of the pandemic on higher education, with a specific emphasis on the role of digital libraries in facilitating remote learning (Ćirić, & Ćirić, 2021; Bhati & Kumar, 2020; Mehta & Wang, 2020). Yu, Xu & Yu (2022) discusses the swift move to online learning stimulated by the pandemic and highlights the vital role of digital resources in sustaining educational activities.

Digital libraries play a critical role in granting students and educators' remote access to a plethora of educational materials, ranging from academic journals to e-books (Yu, Xu & Yu, 2022). Additionally, Radina & Balakina (2021) delve into the difficulties encountered by higher education institutions throughout the pandemic and the tactics employed to overcome these challenges. The study identifies digital libraries as essential component in the overall strategy to ensure seamless access to learning resources for students across diverse geographical locations.

The broader trends in educational technology adoption, particularly the accelerated integration of digital tools and resources catalyzed by the pandemic, are explored by Amankwah-Amoah *et al.*, (2021). Digital libraries are identified in their research as key enablers of remote access to educational content. Examining the post-pandemic scenario, Kasmia & M'hamed (2023) and Bygstad *et al.*, (2022) investigated the enduring impact of the pandemic on higher education practices. The authors argue that the momentum gained in the adoption of digital technologies, including digital libraries, is likely to persist even after the pandemic subsides. Institutions, they suggest, have recognized the advantages of digitalization and are poised to continue leveraging these technologies to enhance the overall educational experience.

Hence, it can be inferred that the academic literature overwhelmingly supports the idea that the pandemic has propelled higher education institutions into a digital era, with remote learning technologies and digital libraries playing pivotal roles. Researchers concur that the trends initiated during the pandemic are not transient; instead, they are expected to endure and shape the future landscape of higher education. As institutions navigate this evolving educational paradigm, the enduring theme in academic discourse remains the central role of digital libraries in providing remote access to educational resources, example: <http://lib.jnu.ac.in>, <https://library.iima.ac.in>, <http://mgcl.iitr.ac.in>. Ahmad (2020) in his seminal work has emphasized the importance of digital libraries in empowering research in higher education institutions and research centers in India. Academic scientific literature evidenced that the National Digital Library of India of IIT Kharagpur maintained research repository of e-resources in an open remote access facility (<https://ndl.iitkgp.ac.in/>) to enable research activities by scientists and researchers (Singh, 2022).

Examining the psychological underpinnings of DLRA technology users, empower libraries and librarians equally in enhancing the reach and meaning of the library service in general. Understanding how ones' own perception, expectations and norms in the society, hedonistic attitudes

and habit of users shape the behavioral intention to use and actually use DLRA facility remains our focus. Digital Library is a source of information as well as an information system on its own. The study purports to examine the factors including social influence, facilitating conditions, hedonism and habit impacting the behavioral intention and actual use behavior of DLRA facility.

The literature studying Library Information Science in the past focus on adoption and validation of theories like LibQUAL (Wu, Yuan & Tsai, 2020; Salauddin & Kumar, 2020; McCaffrey, 2013; Greenwood, Watson & Dennis, 2011), DigiQUAL (Jafarbegloo *et al.*, 2014; Naiich, Nouruzi & Hamidi, 2012), ServQUAL (Asogwa *et al.*, 2014; Cook & Thompson, 2000) and other user satisfaction (consumer satisfaction) theories. While previous research in the digital library context studied service quality and user satisfaction, novelty of the present study remains in examining the role of the user's hedonism, social influence, facilitating conditions provided by the institution and habit in determining the formation of behavioral intention and user self-reported usage behavior of using DLRA technology. The study contributes to the information system literature by examining adoption of technology. The study also contributes to library information science literature by concentrating on understanding user behaviour applying consumer behavior focusing on behavioral intention and use behaviour.

II. LITERATURE REVIEW

Technology adoption, in general, is evidenced to be impacted by various factors including, technology factors such as perceived ease of use and usefulness (Davis, 1989; Adams *et al.*, 1992; Joo & Choi, 2015), relative advantage (Lee *et al.*, 2011), economic factors such as perceived benefits (Huijts *et al.*, 2012), company resource readiness (Lin *et al.*, 2007), perceived cost (Zainab *et al.*, 2017), trialability (Lee *et al.*, 2011) and user factors such as complexity (Kim *et al.*, 2009), attitudes towards technology (Hussein, 2017; Kim *et al.*, 2009; Yang & Yoo, 2004), self-assessed abilities and skills (Kulviwat *et al.*, 2014). The present study aims to study the impact of social influence, facilitating conditions, hedonism and habit on behavioral intention and usage behavior of DLRA technology.

A. Social Influence

Social influence, as described in UTAUT2, encompasses the impact of the opinions of important others on the individual user's intention to use technology (Venkatesh *et al.*, 2012). Venkatesh *et al.*, (2012) found that social influence has a direct and positive impact on users' behavioral intention to adopt technology, emphasizing the significance of social factors in technology implementation. Gupta, Dasgupta & Gupta (2008), found that social influence impacts technology adoption. In library technology adoption, the influence of colleagues, supervisors, or peers can shape an individual's perception of the technology and affect their

intention to use it. Subjective norms is the individual's perception of societal expectations and norms regarding the use of technology, which has been evidenced to influence the behavioral intention (Yu and Huang, 2020). Reference group influence includes the role of peer groups influencing the individual's attitudes and intention in using the technology (Moorthy *et al.*, 2019). Thus, we hypothesize:

H₀: Social Influence has a significant positive impact on Behavioral Intention to use DLRA technology.

B. Facilitating Conditions

According to Macedo (2017), UTAUT2 (Venkatesh *et al.*, 2012) defines facilitating conditions denote the perceptions of the user about the organizational and technical support offered to individuals for utilizing a specific technology. Users' behavioral intention to adopt technology is evidenced to be impacted positively and directly by facilitating conditions. The availability of a robust technical infrastructure within the library setting is a key facilitating condition (Nikou & Economides, 2017). A study by Teo (2011) explored the effect of technical support and infrastructure on users' intentions to adopt technology in Singaporean libraries. The findings indicated that a supportive technical environment positively influenced adoption intentions. In the context of libraries, the availability of supportive conditions can influence the intentions to use and usage behavior in embracing DLRA technology. When individuals perceive that the necessary conditions for using a technology are in place, their intention to adopt is likely to increase. Thus, we hypothesize:

H₀: Facilitating Conditions has a significant positive impact on Behavioral Intention to use DLRA technology.

C. Hedonism

Hedonism, which emphasizes the pursuit of pleasure and the avoidance of pain, can significantly impact individuals' motivations and intentions to use DLRA technologies. Hedonism is a psychological concept rooted in pleasure-seeking and the pursuit of enjoyable experiences (Hirschman & Holbrook, 1982). The dimensions of hedonism including pleasure and enjoyment are evidenced as important motivational factors in adopting the technology (van der Heijden *et al.*, 2003; Moon & Kim, 2001). Application of Technology Acceptance theories including TAM, UTAUT and their extensions have acknowledged the role of hedonism in technology adoption (Emon, 2023; Baishya & Samalia, 2020; Gupta, Dogra & George, 2018; Kool *et al.*, 2016). Venkatesh and Bala (2008) proposed the Hedonic-Motivation System Adoption Model, emphasizing the importance of hedonic motivations in addition to utilitarian motivations in forming behavioral intentions (Dhiman *et al.*, 2020). Hedonistic motivations in technology adoption are manifested as the desire that drives individuals to seek enjoyment and positive experiences while using the

technology. The enjoyment derived from interactive and engaging digital content can enhance users' satisfaction and contribute to positive behavioral intentions, as suggested by authors like Wu and Liu (2007). Hence, we hypothesize:

H_0 : Hedonism has a significant positive impact on Behavioral Intention to use DLRA technology.

D. Habit

Habits, understood as automated and repetitive behaviors, and they determine the users' intentions to adopt new technologies (Emon, 2023). Habit is conceptualized as a form of automaticity in behavior resulting from repeated actions (Ouellette & Wood, 1998 and Verplanken & Aarts, 1999). In the context of technology adoption, these habitual actions can significantly impact individuals' decision-making processes. Habit has been incorporated into various technology acceptance models to enhance their explanatory power, including UTAUT and UTAUT2. These models acknowledge that individuals with established habits related to specific technologies are more likely to exhibit positive intentions and behaviors toward adopting similar technologies. The UTAUT2 (Venkatesh *et al.*, 2012) model recognizes the influence of habit on users' behavioral intentions. Beldad *et al.*, (2012), Lu *et al.*, (2011) and Dellaert *et al.*, (1998) have empirically established the association between habit and technology adoption. Beldad *et al.*, (2012) found that users with strong habits related to existing technologies were anticipated to accept new, similar technologies. This aligns with the idea that habitual behaviors create a predisposition towards the adoption of technologies that fit into established routines. The digitization of various aspects of life has accelerated the development of habits in digital environments. Rooksby *et al.*, (2014) explored the habituation process in the context of digital technologies, emphasizing how individuals develop habits through repeated interactions with digital interfaces. This habituation can have a profound influence to adopt new technologies within digital ecosystems. Library users often develop routines and habits around the use of DLRA technology, hence, the influence of habit cannot be overlooked. Thus, we hypothesize:

H_0 : Habit has a significant positive impact on Behavioral Intention to use DLRA technology.

E. Usage Behavior

Behavioral intention denotes an individual's particular probability or inclination to execute a specific behavior. Technology adoption in libraries involves users' inclination to embrace and use new technological tools and services. Usage behavior denotes the actual behavior of individuals in using a particular technology or service (Anderson *et al.*, 2024). Understanding usage behavior is crucial for evaluating the success of technology adoption in libraries. While behavioral intention provides insights into users' willingness to adopt technology, usage behavior reflects the

practical application of the adopted technology. Deng and Benbasat (2009) applied the UTAUT model in library to explore users' usage behavior in adopting new technologies. In the library context, understanding both behavioral intention and usage behavior is vital for designing effective strategies to promote technology adoption. According to Venkatesh *et al.*, (2003), while elements influencing behavioral intention like perceived ease of use and usefulness, are critical in adoption of technology, ongoing support and facilitating conditions become crucial for ensuring sustained usage behavior. Behavioral intention helps determine usage behavior in the study of technology adoption in libraries. Hence, we hypothesize:

H_0 : Behavioral intention to use has a significant positive impact on Usage Behavior of DLRA technology.

III. METHODOLOGY

The descriptive study approach is used to examine impact of hedonism, social influence, facilitating conditions and habit on behavioral intention to use and actual usage behavior of DLRA technology (Momani, 2023). The scale items for the measurement model were adapted from the work of Venkatesh *et al.*, (2012), UTAUT2. It is necessary to re-specify the scale to a specific information system such as the DLRA technology while adopting the UTAUT2 scale.

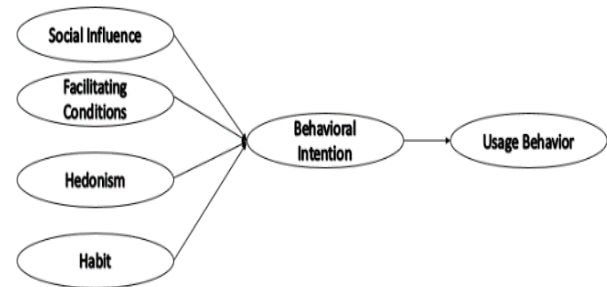


Fig. 1 Conceptual Model

The present cross-sectional descriptive study employs non-probability sampling method, purposive sampling of 400 people, from DLRA technology users, including students and research scholars of a private Deemed to be University which is a higher education institution that has been recognized as an institution of eminence in India that has the remote access facility to its digital library contents and subscriptions. The data were collected through a structured questionnaire using survey method (Carlsson & Torngren, 2020). The data collected were tested in terms of reliability using Cronbach's Alpha. In order to estimate convergent validity of the measurement model, the Fornell-Larcker criterion (1981) has been applied using Composite Reliability (CR) and Average Variance Extracted (AVE) (Chaudhry *et al.*, 2023). Partial Least Squares-Structural Equation Modelling (PLS-SEM) was employed to test the model. The demographic profile of respondents is presented in Table I, where the profile included 52.5% males and 60.5% respondents aged between 21-30 years of age.

TABLE I DEMOGRAPHIC PROFILE OF RESPONDENTS

Demographics	Criteria	No.	%
Age	<20	66	16.5
	21-25	128	32
	26-30	114	28.5
	>31	92	23
TOTAL		400	100
Gender	Male	210	52.5
	Female	190	47.5
TOTAL		400	100

IV. RESULTS AND DISCUSSION

The results of the study established that the constructs are reliable, have well above the threshold level suggested by many authors. The Cronbach’s alpha values are above the 0.84 with social influence and maximum of 0.91 is with facilitating condition (Hair *et al.*, 2019). The composite reliability is ranging from 0.90 to 0.93 which ensures internal consistency among the constructs of the study (Hair *et al.*, 2019). The AVE also varied between 0.70 and 0.80, that is above the threshold level of 0.05 (Hair *et al.*, 2019; Bagozzi and Yi, 1988). All the above reliability and validity tests clearly indicates that the constructs are with internal consistency, that is, reliability and convergent validity (see Table II).

TABLE II MEASUREMENT MODEL

Constructs	Cronbach’s Alpha	AVE	Composite Reliability
Behavioural Intention (BI)	0.866168	0.792057	0.919093
Facilitating Condition (FC)	0.911253	0.790405	0.937756
Habit (HABIT)	0.861985	0.704770	0.905112
Hedonic Motivation (HM)	0.876189	0.800901	0.923447
User Behaviour (UB)	0.854024	0.703290	0.901351
Social Influence (SI)	0.843270	0.762381	0.905681

TABLE III INTER-CORRELATIONS OF CONSTRUCTS

	BI	FC	HABIT	HM	SI
BI	.79				
FC	0.7825	.79			
HABIT	0.8106	0.7819	.74		
HM	0.4738	0.3446	0.3779	.80	
SI	0.8036	0.5596	0.6146	0.5847	.76

TABLE IV PATH COEFFICIENTS

	Original Sample	Standard Error	T Statistics	VIF
BI → UB	0.151	0.304	0.496	3.496
FC → UB	-0.284	0.286	0.991	3.085
FC → BI	0.075	0.141	0.534	5.074
HABIT → BI	0.252	0.069	3.659	3.064
HABIT → UB	0.549	0.183	2.995	3.487
HM → BI	-0.005	0.079	0.057	1.577
SI → BI	0.374	0.092	4.059	2.520

The discriminant validity is ensured with the latent variable correlations being smaller than the square root of AVE of each latent variable and the construct’s item cross-loading being greater than other constructs. The results (Table III) emphasizes the constructs met the discriminant validity.

In order to estimate the path model through PLS method, the multi-collinearity test is applied as suggested (Joe F. Hair *et al.*, 2011). It is observed that facilitating conditions and performance expectancy are at the value of 5, however within the suggested cut-off value when the behavioural intention acts as dependent variable. With the second level, the collinearity values are well below the value of VIF 5. The R² value of BI as a dependent variable is 0.859 which is strong implies that 85.9 percent of variation in users’ behavioural intention to use of digital library resources is jointly explained by social influence, facilitating conditions, hedonism and habit. With use behaviour as a dependent variable, three constructs namely behavioural intention, facilitating condition and habit jointly explains 22.8 per cent of variation.

The behavioural intention of the users of digital library is significantly and positively influenced by habit ($\beta = 0.252$, $t = 3.659$) and social influence ($\beta = 0.374$, $t = 4.059$). Many of the digital library studies like Tibenderana and Ogao (2008), Orji (2010), Aylee & Sreenivasarao (2013), Chang *et al.*, (2015) and Chaudhry *et al.*, (2023) have found that social influence is an important predictor of the user behavioural intention. The result of study confirms the observation about social influence on digital library user behavioural intention and the path coefficient is higher than the other predictor habit. It is also noted that the path coefficient of other construct facilitating conditions and hedonism are positive, but statistically insignificant. It is noted from the effect on facilitating condition, habit and behavioural intention on user behaviour that habit positively and significantly affects the user behaviour of digital library resources ($\beta = 0.549$, $t = 2.995$), however facilitating

condition and behavioural intention are positive but statistically insignificant.

V. LIMITATIONS

The following limitations should be echoed while understanding the results of this study. The study used data that was sourced from a single point in time comprising segments that are predominantly in the age group 18-30. The respondents were enrolled into a full-time educational program from a private deemed to be university, recognized as institution of eminence by the Government of India, hence the respondents are elites with respect to education. Hence, the respondents do not qualify for the technologically or educationally underprivileged segments that normally have to be the target of DLRA technology adoption, when the technology is newly introduced in a technology deprived institution. The sample examined in the study shows that technology adoption is not a preserve of the technology deprived population. DLRA facility is gaining traction and has already reached high levels of adoption in various forms (e.g. <https://infilibnet.ac.in>). Thus, the cross-sectional character of the study is a possible limitation. It is likely that a longitudinal study targeting various segment of the population, observing the process and progress of technology adoption concentrating on behavioral intention and usage behavior. This will help elevate the explanatory power of various causal factors of technology adoption in relation to time leading to behavioral intention and usage. As is the case with a survey research, other factors could potentially explain behavioral intention and usage behavior of technology adoption in this context. It is likewise notable that DLRA technology is emerging and evolving in most developing countries. The need to improve usage behavior in technology adoption is a key factor in continuous usage of technology in digital library in emerging economies. Finally, qualitative studies on the motivations of behavioral intention and usage behavior of DLRA technology adoption could convey comprehensive data on the processes of digital library and technology use.

VI. IMPLICATIONS

Adopting technology for remote access in digital libraries enhances information accessibility by eliminating geographical barriers, allowing library users to access digital resources from any location using various devices. Digital library technology facilitates the preservation and dissemination of diverse materials, including rare documents, multimedia content, and scholarly articles, thereby enriching academic research and learning opportunities. Sophisticated search features and indexing systems provided by digital library technologies enable users to efficiently locate pertinent information within extensive datasets, streamlining the research process and bolstering productivity. Moreover, technology adoption fosters collaboration among researchers by facilitating seamless sharing and dissemination of research findings and

resources. Digital libraries serve as platforms for collaborative research endeavors, promoting interdisciplinary collaboration and knowledge exchange. Additionally, digital library technologies open up novel avenues for research, such as text mining, data analysis, and visualization techniques, empowering researchers to derive insights from vast digital content and generate fresh knowledge.

The adoption of technology in digital library research carries transformative implications for information accessibility, scholarly communication, collaborative endeavors, and research methodologies. By leveraging digital technologies, libraries can better meet the needs of their users and advance knowledge and scholarship. Furthermore, the study emphasizes the significant influence of habit on other factors affecting the adoption and usage of DLRA (Digital Library Remote Access) technology. As users become accustomed to utilizing remote access facilities in digital libraries, they are more likely to continue using the technology. This insight contributes to information systems research by identifying factors that influence technology adoption.

VII. CONCLUSION

It is inferred from the results of the study that behavioral intentions are formed by social influence. How others opine about the behavioral intention impacts the attitudes and behavior of users towards technology adoption. The study confirms the phenomenon that social influence is a decisive factor in behavioral intention and motivates actual usage behavior in technology adoption, in the digital library context. Social influence comprises peer (reference group) perceptions of users' behavioral intention to use technology and societal expectations of users' behavioral intention and the use of technology. Though social influence positively affects intention, it does not significantly determine DLRA usage. Though the paper assumed that hedonism motivates behavioral intention, the study findings revealed that habit rather motivates behavioral intention in technology adoption. Automaticity in established routines aids habit to motivate behavioral intention in technology adoption in the case of DLRA technology. Post-pandemic, facilitating conditions of technology adoption such as infrastructure and conducive environmental settings have become the order of the day; hence, users don't feel motivated by facilitating conditions to intend to use and actually use technology. Since technology infrastructure has become the default prerequisite in today's society as a part of technological evolution, facilitating conditions have a negative and small significance in relation to technology adoption.

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