

# THE INTEGRATION OF DIGITAL HUMANITIES (DH) IN BANGLADESHI LIBRARIES: PROSPECTS AND CHALLENGES

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## Abstract

This study examines the role of Digital Humanities (DH) in the libraries of Bangladesh, with a focus on integrating digital technologies, staff training, and enhancing the accessibility of digital resources. Given the rapid advancement of digital tools in academic environments, this research aims to assess DH implementation in libraries, identify key challenges, and suggest strategies to enhance their effectiveness and inclusivity. The study adopts both quantitative and qualitative approaches. Data were collected through two primary methods: Google Forms and interviews, with a sample size of 103 respondents. The data collected were analyzed utilizing Structural Equation Modelling (SEM) with SmartPLS 4. The study finds a mixed adoption of digital humanities (DH) tools across libraries in Bangladesh, as the use of new technology required to fully digitalize them is still uneven. While urban academic libraries have made substantial progress in digitalizing resources and offering DH-based services, rural libraries continue to face significant barriers due to limited ICT infrastructure, the digital divide, and digital literacy gaps among staff and users. The analysis reveals that the lack of structured training for librarians and insufficient funding for infrastructure development pose significant obstacles. The study also highlights that integrating DH into libraries in Bangladesh is inevitable, as it can transform libraries into digital hubs for knowledge production and dissemination. The study recommends enhancing library ICT infrastructure, reducing the digital divide to make resources accessible to all, and offering digital literacy programs for both staff and library users.

**Keywords:** *Bangladesh; digital divide; digital literacy; digital humanities (DH); digital resources; ICT infrastructure; librarian training; libraries.*

## 1. Introduction

Digital Humanities (DH) represents a transformative shift in the way libraries interact with information, research, and scholarship. In Bangladesh, this transformation is particularly crucial as the country grapples with the challenges of digitalization and access to technology. The integration of DH into libraries presents a unique opportunity to enrich academic research, foster interdisciplinary collaboration, and bridge the digital divide that persists across Bangladesh. The role of libraries in this digital transformation is pivotal, especially as

they serve as key access points for both digital resources and technological expertise (Soltani & Nikou, 2020; Jaillant, 2022).

Libraries in Bangladesh have begun to embrace DH tools and methodologies, but the extent of their integration remains under active exploration and evaluation. Public libraries have shown resilience in adapting to the challenges posed by the COVID-19 pandemic, with many turning to digital platforms to continue serving their communities (Begum et al., 2022). However, despite these advancements, significant barriers remain to fully implementing DH, including gaps in ICT infrastructure, digital literacy, and resource allocation (Islam & Roy, 2021). Additionally, the evolving needs of library users and the rapid pace of technological advancements present both opportunities and challenges for library management (Farid et al., 2023). As Bangladesh continues to digitalize, the future of DH in libraries is bright but requires a concerted effort from policymakers, librarians, and academic institutions to overcome the obstacles and capitalize on the potential of digital tools in the libraries (Rahman et al., 2024). Academic libraries are beginning to experiment with DH tools to support research, teaching, and learning (Zhang et al., 2021). However, the lack of a comprehensive strategy for integrating DH within the library's broader mission often hampers the full potential of these initiatives (Caffrey et al., 2023). In Bangladesh, the focus on digital information security, as well as the need for specialized training in DH skills for library professionals, remains critical to ensuring the sustainability of these efforts (Farid et al., 2023; Mourer, 2020). The digital divide in Bangladesh, exacerbated by socioeconomic disparities and infrastructural challenges, also affects access to DH resources in the libraries. While urban libraries may experience more rapid technological advancements, rural areas often lag, limiting the reach and effectiveness of digital tools (Aziz, 2020; Shohel et al., 2021). This divide underscores the necessity for libraries to not only adopt digital technologies but also ensure that these technologies are accessible and usable for all members of society, regardless of their location or socioeconomic status (Islam & Inan, 2021).

This article aims to evaluate the role of DH in libraries in Bangladesh by examining the current state of DH integration, identifying challenges, and proposing solutions for enhancing the effectiveness and inclusivity of DH initiatives. By examining various aspects of DH implementation, including infrastructure, staff training, and user accessibility, this evaluation offers a comprehensive understanding of the opportunities and challenges faced by libraries in Bangladesh. It aims to demonstrate how libraries can utilize digital humanities (DH) to promote research, education, and preservation, while addressing the country's pressing digital inclusion challenges (Rahman et al., 2024).

More specifically, the objective of this study is to assess the current state of ICT infrastructure in libraries in Bangladesh that supports digital humanities. The study evaluates the effectiveness of librarian training programs in digital humanities (DH) tools and identifies areas for improvement. It also aims to analyze the accessibility of digital resources and barriers to equitable access in Bangladeshi libraries, examine the scope of interdisciplinary collaboration in digital humanities (DH) initiatives between libraries and scholars and finally propose strategies for the successful integration of digital humanities in libraries.

## Hypothesis

**H1:** Increased investment in ICT infrastructure positively impacts the successful integration of digital humanities in libraries. **H2:** Enhanced training programs for librarians in DH tools significantly contribute to the successful integration of digital humanities in libraries. **H3:** Improved accessibility to digital resources leads to a higher degree of successful

integration of digital humanities in libraries. **H4:** Greater interdisciplinary collaboration between libraries and digital humanities scholars positively influences the successful integration of digital humanities into libraries.

## 2. Literature Review

### 2.1 Global Practices and Trends of Digital Humanities and Libraries

Digital humanities (DH) has emerged as a transformative field, reshaping traditional practices within libraries worldwide. The integration of DH methodologies into libraries has allowed for innovative approaches to knowledge organization, access, and research support. This section examines global practices and trends by focusing on specific studies that highlight the dynamic relationship between libraries and digital humanities, underscoring their objectives, methodologies, findings, and actionable recommendations.

One significant study in this context is by Currier, Mirza, and Downing (2020), which delves into the potential of librarians' project management skills in supporting DH projects. Their research aimed to investigate the effective use of these competencies in managing the inherent complexities of digital humanities (DH) initiatives. To achieve this, they employed a case study methodology and analyzed various academic libraries that have implemented DH projects. Their findings revealed that librarians possess valuable project management skills, such as organization, collaboration, and resource allocation, which are essential for handling the multifaceted nature of DH projects. However, the study also identified a significant gap: the lack of interdisciplinary training among librarians. Because DH projects often require collaboration across diverse academic disciplines, librarians need specialized training to navigate these intersections effectively. The authors recommended the development of interdisciplinary training programs to equip librarians with the necessary skills to manage and contribute meaningfully to digital humanities (DH) projects. Such programs would not only enhance the capacity of librarians but also ensure the sustainability and success of digital humanities (DH) initiatives.

Building on the theme of librarians' roles in digital humanities (DH), Mourer (2020) examined the pedagogical contributions of subject librarians in this field. The objective of this research was to investigate how subject librarians engage in teaching and supporting digital humanities (DH) tools and methodologies. Mourer conducted a narrative review of librarian practices, focusing on their involvement in educational initiatives within academic institutions. The findings of this study highlighted the crucial role that subject librarians play in disseminating DH knowledge since DH tools often involve specialized software, data visualization techniques, and coding languages, where librarians act as facilitators, bridging the gap between technical expertise and scholarly inquiry. Despite their significant contributions, the study highlighted that librarians frequently face challenges due to a lack of formal training in digital humanities (DH). This gap hinders their ability to provide comprehensive support to students and researchers. As a solution, Mourer recommended incorporating digital humanities (DH) competencies into library science curricula. Incorporating digital humanities (DH) competencies into library science curricula would equip future librarians with the necessary skills to effectively support and advance digital humanities (DH) projects.

While the role of librarians is central to the successful implementation of digital humanities (DH) projects, the tools and methodologies themselves also warrant critical evaluation. Boyd Davis, Vane, and Kräutli (2021) focused on one such tool—data visualization—and its impact on humanities research. They conducted their study to evaluate

the potential of data visualization in DH to improve research results. The methodology involved a detailed analysis of visualization tools used in various DH projects, evaluating their strengths and limitations. The findings revealed that data visualization serves as a powerful tool in humanities research because it enables scholars to uncover patterns, relationships, and insights that might not be evident through traditional methods. However, the study also identified a significant challenge: issues of trust and transparency in data visualization. Because these tools often involve complex algorithms and graphical representations, they can obscure the underlying data, leading to potential misinterpretations. This lack of transparency can undermine the credibility of research findings, particularly in a field like the humanities, where interpretation and context are paramount. To address this issue, the authors recommended enhancing the transparency of data visualization tools by incorporating clear documentation, open-source coding, and user-friendly interfaces. These measures would ensure that researchers and librarians alike can use these tools with greater confidence and accountability.

The studies by Currier et al. (2020), Mourer (2020), and Boyd Davis et al. (2021) collectively highlight key global trends in the integration of digital humanities (DH) into library practices. They highlight the critical roles librarians play as project managers, educators, and facilitators in digital humanities (DH) projects. At the same time, they draw attention to the challenges posed by a lack of interdisciplinary training and issues of transparency in digital humanities (DH) tools. These challenges necessitate targeted interventions, such as developing training programs, revising library science curricula, and enhancing the usability of digital humanities (DH) tools to ensure that libraries remain at the forefront of DH innovation.

Moreover, the interconnected themes in these studies emphasize the evolving nature of libraries in the digital age. Libraries are no longer mere repositories of knowledge; they are dynamic spaces where technology, scholarship, and interdisciplinary collaboration converge. For instance, the emphasis on interdisciplinary training for librarians reflects the broader shift toward collaborative research models in academia. For libraries to continue serving as hubs for innovation, they must adapt to these changing paradigms by investing in both human capital and technological infrastructure.

Another significant insight from these studies is the emphasis on bridging the gap between technical expertise and scholarly inquiry. These studies highlight the unique position of librarians in bridging this gap due to their dual expertise in information science and academic disciplines. This duality enables them to support researchers in navigating the complexities of DH tools while maintaining the scholarly rigor that is central to the humanities. However, as the findings of Mourer (2020) and Currier et al. (2020) suggest, this potential remains underutilized in many contexts due to gaps in training and resources. Therefore, addressing these gaps is not just a matter of professional development but also a strategic imperative for libraries seeking to remain relevant in the digital age.

## **2.2 Digital Humanities and Libraries: Bangladesh Background**

Bangladeshi libraries are facing both unique opportunities and multiple challenges as they strive to integrate digital humanities (DH) into their operations. This section discusses studies examining the role of libraries in Bangladesh. These studies primarily examine how public libraries addressed the pandemic, the quality of library services, and the broader challenges that arise when implementing national digital policies. All of these studies

demonstrate how digital transformation, infrastructure development, and service provision collectively contribute to the library field in Bangladesh.

Begum, Roknuzzaman, and Shobhane (2022) conducted a fascinating study on how public libraries in Bangladesh responded to the COVID-19 outbreak. The primary goal of their study was to examine how these libraries addressed the significant challenges posed by the global health crisis. The study employed qualitative interviews with library workers to reveal that libraries in Bangladesh faced significant challenges in transitioning to digital services during the pandemic. Many libraries lacked the necessary ICT infrastructure and digital tools, which made it difficult for them to meet user needs. The lack of adequate training for library staff to handle the technology demands of digital service delivery exacerbated the problem. This case highlights the importance of investing in libraries' ICT infrastructure to enable them to better handle similar problems in the future. The writers advocated for prioritizing employee training programs that emphasize digital skills. Providing library staff with the necessary skills would enhance the quality and accessibility of digital library materials, given their crucial role in service delivery.

The results of Begum et al. (2022) also highlighted a larger issue in Bangladeshi libraries: the digital divide. This divide is evident not only in the lack of technological tools but also in the fact that both library staff and users struggle to use technology effectively. In the digital age, closing these gaps is essential to ensure that everyone has equal access to information and understanding. Libraries can help close this gap in a special way because they are places where people can learn about and use technology. Therefore, significant investments in technology and human resources are necessary to achieve this goal.

In an academic setting, Alam (2021) examined the Eastern University Library's service quality and its impact on user satisfaction. In this study, the goal was to identify the factors that contribute to a positive library user experience, particularly in a school setting. The study employed a survey method to gather feedback from library users regarding their perceptions of service quality. The results showed a strong correlation between the quality of library services and user satisfaction. In particular, the study revealed that users desire quick access to digital tools, intuitive interfaces, and prompt assistance from library staff. However, the study also identified areas for improvement, including the need for improved digital tools and more personalized services. Alam suggested using digital technologies to improve customer-focused services. For example, incorporating AI-powered tools for resource discovery and virtual assistance could significantly enhance the user experience.

In the digital-first world, Alam's study highlighted the importance of ensuring that library services adapt to users' evolving needs. Academic libraries, in particular, need to take the initiative to provide better services by always improving their digital tools. Libraries should invest in technologies that facilitate access to knowledge and resources, ensuring their relevance and competitiveness. Also, tactics that focus on the user, like personalized suggestions and virtual consultations, can help libraries get to know their customers better. It is essential for college libraries in Bangladesh to consider these improvements, as they directly impact user satisfaction with the services they receive.

Aziz (2020) examined the connections between the challenges of digital transformation in Bangladesh's library sector and the broader issues of digital inclusion. This study, focusing on digital inclusion, examined the challenges in implementing the National ICT Policy in Bangladesh. The study employed a policy analysis approach to identify several significant issues, including inadequate infrastructure, low digital literacy, and income disparities. Aziz discovered that these systemic issues impede the implementation of the National ICT Policy, despite its ambitious goals of digitizing the country. For example, many rural areas in Bangladesh lack the basic infrastructure necessary for a stable internet connection. This makes it more difficult to access digital tools. Similarly, the fact that most

people lack proficiency in using technology effectively makes it challenging to utilize digital tools and websites effectively.

To address these issues, Aziz suggested that policymakers should prioritize equal internet access. This entails constructing additional infrastructure in underserved areas, advocating for technology education programs, and ensuring that regulations encompass underrepresented groups. This necessitates a comprehensive approach to digital inclusion that enables libraries to thrive in the digital world. By addressing infrastructure and literacy issues, the government can equip libraries with the necessary tools to become digital change agents, facilitating access to information and knowledge for everyone in the country.

The research by Begum et al. (2022), Alam (2021), and Aziz (2020) provided a more comprehensive understanding of the digital arts and libraries in Bangladesh. They demonstrated the interconnectedness of issues related to digital adaptation, service quality, and inclusion, and offered recommendations to address these challenges. These results are crucial for the future of libraries in Bangladesh, particularly as they strive to adapt to the digital world.

One important lesson from these studies is the need to implement comprehensive changes when transitioning to digital. Libraries can't work on their own; their success relies on the infrastructure, policies, and participation of other users. Libraries require assistance from both the public and private sectors to effectively integrate digital humanities into their operations. This entails investing in technology, developing user-focused services, and establishing regulations that promote digital inclusion for all.

Additionally, it's impossible to overstate the importance of librarians in the digital age. The results of Begum et al. (2022) and Alam (2021) clearly indicated that library staff should continue learning to keep pace with the rapidly changing demands of a digital world. To build a staff that can lead the future of libraries in Bangladesh, it is important to have training programs that focus on digital skills, customer service, and new technologies.

### 3. Research Method

The research employed both quantitative and qualitative methods to gather data for this study. A total of 103 respondents participated in the survey. The participants included university teachers, students, librarians, library staff members, and experts in digital technology from three universities in Bangladesh. A simple random technique was used to select the participants, who were selected randomly, and their participation was on a voluntary basis.

Data were collected through Google Forms and interviews. Quantitative data were collected through a closed-ended questionnaire survey, and qualitative data were gathered through one-on-one interviews. A structured questionnaire was developed based on a 5-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree" for the quantitative method.

Variable	Questions	Source
ICT Infrastructure Investment (III)	Libraries have sufficient ICT infrastructure to support digital humanities initiatives.	Begum, R., & Shobhanee (2022)
	High-speed internet access is consistently available in my library for DH projects.	Habiba & Ahmed (2020)
	Libraries receive adequate funding for the maintenance and upgrading of digital infrastructure.	Alam, H., & Ogawa (2023)
	Collaborative partnerships enhance ICT infrastructure in libraries.	Aziz (2020)
	ICT infrastructure in libraries has significantly improved during the last five years.	Shohel et al. (2021)
Librarian Training	Librarians in my institution are well-trained in	Mourer (2020)

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in DH Tools (LTDT)	<p>using digital humanities tools.</p> <p>Regular workshops are held to improve librarians' skills in DH methodologies.</p> <p>Librarians are confident in curating and managing digital data using DH tools.</p> <p>Training programs in DH tools adequately meet current technological demands.</p> <p>DH training has positively impacted the quality of library services.</p>	<p>Currier, Mirza, &amp; Downing (2020)</p> <p>Caffrey et al. (2023)</p> <p>Zhang, Su, &amp; Hubschman (2021)</p> <p>Farid, Warraich, &amp; Iftikhar (2023)</p>
Digital Resource Accessibility (DRA)	<p>All users can easily access digital resources provided by the library.</p> <p>Libraries provide equitable access to digital resources for rural and urban users alike.</p> <p>User-friendly platforms are available to facilitate access to digital resources.</p> <p>Digital resources meet the academic and research needs of users.</p> <p>Efforts are made to ensure users are aware of available digital resources.</p>	<p>Soltani &amp; Nikou (2020)</p> <p>Islam &amp; Inan (2021)</p> <p>Rodríguez &amp; Pulido-Montes (2022)</p> <p>Alam (2021)</p> <p>Rouf et al. (2024)</p>
Interdisciplinary Collaboration (IC)	<p>Libraries collaborate with scholars from multiple disciplines on DH projects.</p> <p>Collaborative projects between libraries and academic departments are common.</p> <p>Libraries provide platforms for interdisciplinary research and DH tool usage.</p> <p>Interdisciplinary collaboration enhances the overall impact of library research services.</p> <p>Libraries host events that encourage cross-disciplinary engagement in DH initiatives.</p>	<p>Jaillant (2022)</p> <p>Das &amp; Banerjee (2021)</p> <p>Ikenwe &amp; Udem (2022)</p> <p>Farid, W., &amp; Iftikhar (2023)</p> <p>Deja, Rak, &amp; Bell (2021)</p>
Successful Integration of DH (SIDHL)	<p>My library effectively integrates digital humanities into its core services.</p> <p>Users are satisfied with the library's digital humanities services.</p> <p>DH integration in libraries enhances users' academic research experiences.</p> <p>The integration of DH has increased the library's overall usage.</p> <p>The library's DH integration is recognised as successful by institutional stakeholders.</p>	<p>Boyd Davis, Vane, &amp; Kräutli (2021)</p> <p>Alam (2021)</p> <p>Caffrey et al. (2023)</p> <p>Shohel et al. (2021)</p> <p>Alam, H., &amp; Ogawa (2023)</p>

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### 3.1 Data Analysis

Data were analyzed using Smart PLS 4 for Structural Equation Modeling (SEM). SEM was chosen to analyze the relationships between the dependent variable (Successful Integration of Digital Humanities in Libraries (SIDHL)) and the four independent variables (ICT Infrastructure Investment (III), Librarian Training in DH Tools (LTDT), Digital Resource Accessibility (DRA), and Interdisciplinary Collaboration (IC)). This method enabled the examination of the direct and indirect effects of these variables on the integration of DH in libraries.

**Table 1**

*Factors Loading with Communalilty and Redundancy, Convergent Validity and Average Variance Extracted (AVE)*

Construct	Item	Factor Loading	Communalilty	Redundancy (P-value)	Average variance extracted (AVE)
SIDHL					0.86
	SIDHL1	0.72	0.65	0.02	
	SIDHL2	0.86	0.65	0.05	
	SIDHL3	0.78	0.69	0.01	
	SIDHL4	0.89	0.69	0.03	
IC					0.71
	SIDHL5	0.86	0.62	0.02	
	IC1	0.82	0.57	0.00	
	IC2	0.78	0.69	0.00	
	IC3	0.89	0.56	0.00	
DRA					0.70
	IC4	0.84	0.63	0.00	
	IC5	0.76	0.65	0.00	
	DRA1	0.74	0.65	0.00	
	DRA2	0.85	0.58	0.00	
LTDT					0.82
	DRA3	0.84	0.53	0.00	
	DRA4	0.89	0.63	0.00	
	DRA5	0.80	0.65	0.00	
	LTDT1	0.78	0.68	0.00	
III					0.78
	LTDT5	0.82	0.59	0.00	
	LTDT3	0.78	0.69	0.00	
	LTDT4	0.78	0.57	0.00	
	LTDT5	0.73	0.63	0.00	
	III1	0.81	0.54	0.00	
	III2	0.78	0.63	0.00	
	III3	0.74	0.65	0.00	
	III4	0.81	0.54	0.01	
	III5	0.79	0.63	0.01	

- Communalilty values above 0.5 indicate inclusion in factor analysis. All values exceed 0.5.
- Factor loadings >0.7 indicate sufficient variance extraction. All factor loading scores are >0.7.
- P-values <0.05 indicate statistical significance. All p-values are <0.05.
- AVE scores >0.5 ensure adequate convergence. All AVE scores exceed 0.5.

**Table 2**

*Reliability and Convergent Validity*

Item	Cronbach's $\alpha$	Composite Reliability rho(A)	Composite Reliability rho(C)	VIF
SIDHL	0.75	0.74	0.81	1.91
IC	0.71	0.76	0.83	1.46
DRA	0.73	0.83	0.75	1.09

LTDT	0.78	0.85	0.76	1.21
III	0.86	0.74	0.77	1.9
Optimum Values	>.7	>.7	>.7	<5

Table 2 shows that all variables meet the criteria: Cronbach's  $\alpha$ , Composite Reliability  $\rho(A)$ , and  $\rho(C)$  are all  $>0.7$ , and VIF is less than 5. VIF values below 5 indicate no significant multicollinearity.

**Table 3**

*Outer Model –Discriminant Validity (Fornell-Larcker Criterion: Correlation matrix of Constructs and Square Root of AVE (in Bold))*

	SIDHL	IC	DRA	LTDT	III
SIDHL	<b>0.78</b>	-	-		
IC	0.68	<b>0.78</b>	-		
DRA	0.34	0.38	<b>0.78</b>		
LTDT	0.52	0.61	0.21	<b>0.75</b>	
III	0.36	0.41	0.28	0.18	<b>0.58</b>

The Fornell-Larcker criterion checks discriminant validity by ensuring the square root of a construct's average variance extracted (AVE) is greater than its correlation with any other construct. In this study, all constructs meet this criterion, confirming discriminant validity.

**Table 4**

*Cross-loading Analysis*

	SIDHL	IC	DRA	LTDT	III
SIDHL1	0.76	0.58	0.08	0.03	0.08
SIDHL2	0.76	0.59	0.08	0.13	0.32
SIDHL3	0.81	0.58	0.12	0.23	0.16
SIDHL4	0.65	0.49	0.32	0.16	0.15
SIDHL5	0.62	0.32	0.13	0.18	0.41
IC1	0.59	0.89	0.25	0.25	0.23
IC2	0.46	0.74	0.04	0.35	0.14
IC3	0.52	0.80	0.01	0.45	0.23
IC4	0.40	0.68	0.01	0.30	0.32
IC5	0.36	0.75	0.03	0.19	0.54
DRA1	0.25	0.49	0.62	0.20	0.20
DRA2	0.14	0.57	0.74	0.13	0.16
DRA3	0.07	0.04	0.71	0.31	0.00
DRA4	0.07	0.04	0.88	0.24	0.11
DRA5	0.09	0.06	0.83	0.30	0.48
LTDT1	0.03	0.05	0.56	0.65	0.32
LTDT5	0.04	0.03	0.22	0.84	0.17
LTDT3	0.31	0.45	0.21	0.74	0.30
LTDT4	0.23	0.41	0.22	0.76	0.17
LTDT5	0.35	0.32	0.33	0.89	0.23
III1	0.15	0.32	0.02	0.45	0.86
III2	0.21	0.56	0.05	0.32	0.78
III3	0.16	0.34	0.31	0.01	0.69
III4	0.25	0.10	0.27	0.30	0.60
III5	0.34	0.30	0.14	0.17	0.80

Gefen and Straub (2005) state that discriminant validity is achieved when items correlate weakly with other constructs, except their own. Reflective relationships, known as loadings, should be high within the same construct and low across different constructs. Table 3 confirms high within-construct loadings and weak cross-construct correlations, validating the outer model for cross-loading analysis.

**Table 5**

*Outer Model –Discriminant Validity (HTMT Ratio), Threshold: HTMT<0.9*

	SIDHL	IC	DRA	LTDT	III
SIDHL				-	-
IC	0.56				-
DRA	0.05	0.53			
LTDT	0.14	0.18	0.47		
III	0.11	0.14	0.65	0.20	

According to Franke & Sarstedt (2019), if the HTMT value is significantly below the critical value of 0.9, it establishes discriminant validity. Here we can see that the value is below 0.9. So, the model is valid and established.

**Table 6**

*Inner Model; Path Coefficients of the Tested Model & Hypothesis Testing and Structural Model Evaluation*

Hyp	Relationship	B	Mean	Std. Dev	R2	Q2	f2	t-statistic	sig.
H	IC→SIDHL	0.31	0.41	0.1	0.54	0.00	0.74	0.72	0.02**
H2	DRA→SIDHL	0.21	0.65	0.05	0.55	0.03	0.68	0.82	0.00**
H3	LTDT→SIDHL	0.24	0.47	0.01	0.54	0.02	0.57	0.76	0.00**
H4	III→SIDHL	0.28	0.73	0.02	0.54	0.00	0.36	0.75	0.00***

Note: \*p<0.05; \*\*p<0.01, \*\*\*p<0.001; n.s= not significant; (two-tailed test). R = Rejected; (A) = Accepted.

- Beta coefficients (B) estimate path relationships in the structural model, indicating consistency across items. The cutoff value for B is >0.20, and all values in Table 6 meet this threshold.
- R Square (R2) explains variance in endogenous variables due to exogenous variables. Values of 0.42, 0.51, 0.535, and 0.537 are moderate, aligning with Cohen's and Chin's benchmarks.
- Q-square (Q2) measures predictive relevance, with all values above zero indicating good model fit.
- F-Square (f2) assesses the effect size when removing an exogenous variable. Values of 0.74, 0.68, 0.57, and 0.369 indicate a significant effect, per Cohen's benchmarks.

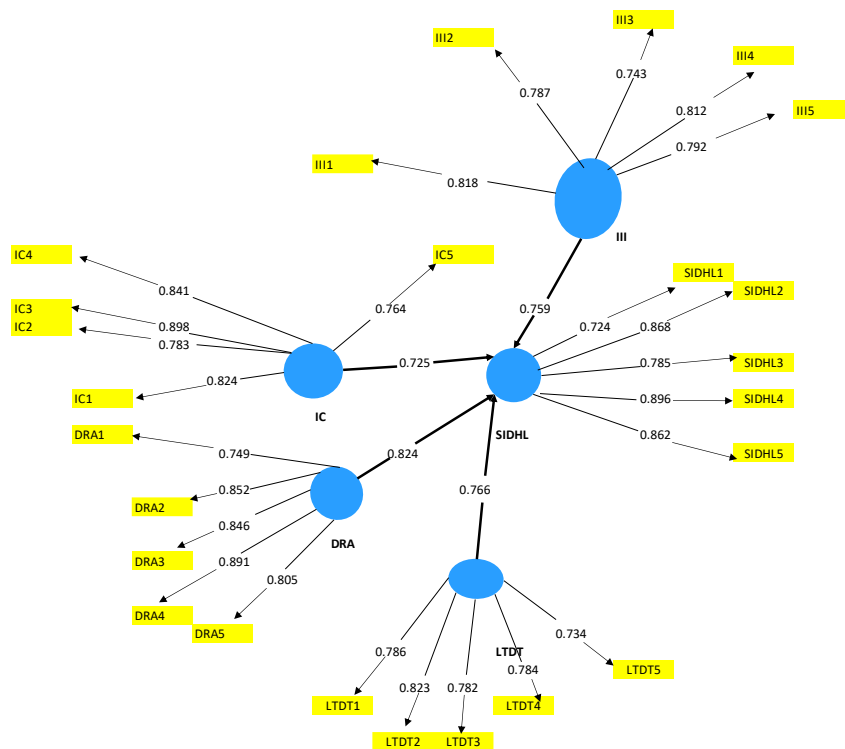
**Table 7**

*Goodness-of-fit Indicators*

Fit indices	Structural model value	Recommended value	References
Gfi	0.94	> .90	Hair et al. (2010)
Agfi	0.96	> .80	Hu and Bentler (1999)
Nfi	0.94	> .90	Hu and Bentler (1999)
Cfi	0.97	> .90	Bentler and Bonett (1980)
Rmsea	0.02	< .08	Hu and Bentler (1999)
Srmr	0.06	< .07	Hu and Bentler'(1999)

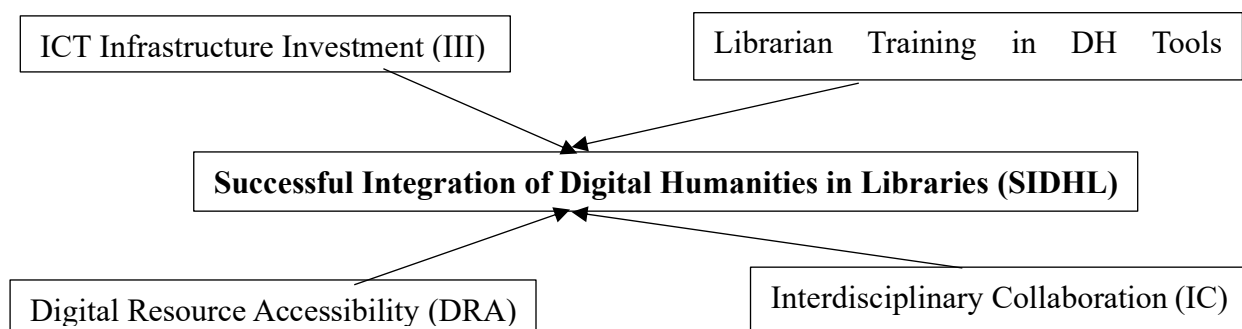
- Goodness-of-Fit Index (GFI): The Value 0.949, which is higher than the suggested value of 0.90, indicates a strong fit between the model and observed data.
- Adjusted Goodness-of-Fit Index (AGFI) Value 0.967 is higher than the suggested value of 0.80, which reflects a good fit, considering adjustments for the number of parameters.
- Normed Fit Index (NFI) Value 0.964 shows a value Higher than the suggested value of 0.943, indicating a high level of fit between the model and data.
- The Comparative Fit Index (CFI) Value is 0.975, which is greater than the recommended value of 0.90, suggesting a reasonable fit between the model and the observed data.
- Root Mean Square Error of Approximation (RMSEA) Value 0.021 is under the advised value of 0.08, demonstrating a satisfactory match between the model and data.
- Standardized Root Mean Square Residual (SRMR) Value is 0.066, clearly meets the suggested value of 0.07, and indicates a good fit for the structural model.

**Figure 2**  
*Bootstrap model*



### 3.2 Conceptual Framework

**Figure 1**  
*Conceptual Framework*



### **3.2.1 ICT Infrastructure Investment (III)**

The crucial role of ICT infrastructure in advancing digital humanities underscores its importance in library settings. As libraries strive to meet modern digital demands, it has become evident that without reliable ICT systems, their capacity to innovate is severely limited. The findings of Begum et al. (2022) highlight that the challenges faced during the pandemic were largely due to these infrastructural deficiencies, further reinforcing the need for targeted investments in technology to facilitate successful digital integration.

### **3.2.2 Librarian Training in DH Tools (LTDT)**

Specialized training programs for librarians are crucial to enhance their capabilities in digital humanities (DH) projects. Although librarians generally possess solid project management skills, a lack of proficiency in digital humanities (DH) tools can hinder their contributions (Currier, Mirza, & Downing, 2020). By implementing targeted training initiatives, libraries can better support DH endeavors and empower their staff to take on more significant roles within these projects (Currier et al., 2020).

### **3.2.3 Digital Resource Accessibility (DRA)**

Access to digital resources is crucial for reducing digital inequalities and enabling libraries to participate in digital humanities (DH) initiatives. Aziz (2020) highlighted barriers, including infrastructure gaps and digital literacy, which limit equitable access. Ensuring accessibility promotes inclusivity and strengthens the overall success of DH integration.

### **4.2.4 Interdisciplinary Collaboration (IC)**

Interdisciplinary collaboration significantly enhances the integration of digital humanities (DH) methodologies in academic libraries. This partnership not only fosters innovation but also leads to the development of more effective digital information management policies (Farid et al., 2023). As noted by Farid, Warraich, and Iftikhar, such collaborations are crucial for establishing sustainable practices within academic institutions, underscoring the need for ongoing dialogue between libraries and digital humanities (DH) scholars (Farid et al., 2023).

### **4.2.5 Successful Integration of Digital Humanities in Libraries (SIDHL)**

The successful integration of digital humanities in libraries highlights the importance of infrastructure, training, accessibility, and collaboration. Boyd Davis et al. (2021) indicated that the effectiveness of digital humanities depends on transparency, trust, and skilled tool use, emphasising its reliance on various independent factors.

## **4. Discussions**

### **4.1 ICT Infrastructure Investment (ICT)**

Libraries in Bangladesh are still not well-equipped with digital technology, which is one of the main challenges, though they serve their communities by embracing new technologies that truly enrich the user experience. With a robust ICT infrastructure, they enable enhanced accessibility to digital archives, interactive resources, and powerful data analytics tools. Investing in up-to-date infrastructure is crucial, as it enables libraries to meet the diverse needs of all their users, making information more accessible and engaging than ever. Policymakers should prioritize investment in modern ICT infrastructure, which serves as the backbone for any DH initiative (Habiba & Ahmed, 2020). Libraries need high-speed

internet, servers, and advanced computing tools to support the management and accessibility of digital resources (Begum et al., 2022). Given that Bangladesh faces a digital divide, it is essential to ensure equitable access to these technologies across libraries, especially in rural and underserved areas (Islam & Roy, 2021).

#### **4.2. Librarian Training in DH Tools (LTDT)**

In the current scenario, Librarians, staff, and users are still digital immigrants and digital naïve. Librarians are at the heart of making digital humanities more engaging and effective. By attending specialized training programs, they can gain the skills they need to navigate various digital tools confidently. This not only empowers them to assist others in their digital research journeys but also helps in curating meaningful collections that spark curiosity. With their expertise, librarians can create a vibrant space for digital scholarship that enriches everyone involved. A key administrative task is to ensure that library staff, particularly librarians, receive adequate training in the tools and methodologies of digital humanities (DH). Librarians are not only responsible for managing collections but also for fostering new research approaches (Currier et al., 2020). Training programs on digital literacy, data management, and project management specific to DH are essential (Zhang et al., 2021). This enables them to guide users effectively and maintain the quality of digital resources (Hossain, 2021).

#### **4.3. Digital Resource Accessibility (DRA)**

Librarians play a pivotal role in fostering an engaging environment for digital scholarship, benefiting all participants. Most libraries in Bangladesh lack digital resources due to budget constraints. On the other hand, Access to digital resources is crucial for the success of digital humanities initiatives. Libraries must tackle challenges that hinder access, such as inconsistent internet services, complex digital tools, and the need for diverse language options, so that everyone, especially those from underrepresented communities, can fully engage with these valuable resources. Ensuring that digital resources are accessible to all users, including those with limited digital literacy or restricted internet access, is crucial for the success of DH projects (Farid et al., 2023). Libraries should adopt user-centric designs for digital platforms to facilitate simple navigation (Rahman et al., 2024). Moreover, efforts to make digital resources available in local languages can overcome linguistic barriers and promote inclusivity (Aziz, 2020).

#### **4.4. Interdisciplinary Collaboration (IC)**

It's essential for everyone, particularly those from underrepresented backgrounds, to have the chance to engage with invaluable resources. Libraries play a crucial role in this endeavor by bringing together different academic disciplines. By partnering with researchers, technologists, and policymakers, libraries can initiate interdisciplinary projects that challenge conventional humanities research. These collaborations not only enhance the research environment but also pave the way for exciting innovations in Bangladesh. DH thrives in an interdisciplinary environment. The administration should foster collaborations among library staff, academic researchers, and technology experts to enhance research capabilities and broaden the scope of DH initiatives (Alam, 2021). Such collaborations can lead to the creation of innovative digital platforms that serve both educational and research needs (Jaillant, 2022). Furthermore, partnerships with international institutions can help local libraries stay current with global digital humanities (DH) trends (Deja et al., 2021).

#### **4.5. Successful Integration of Digital Humanities in Libraries (SIDHL)**

When libraries effectively weave digital humanities into their fabric, they create vibrant spaces that foster creativity and collaboration. This synergy not only enhances user engagement with digital materials but also creates opportunities for groundbreaking research. Therefore, to implement DH in Libraries of Bangladesh, the concerned authorities and policymakers should ensure that libraries are well equipped with technology, staff are digitally literate, and updated digital resources are available.

#### **4.6. Administrative Implications**

Integrating Digital Humanities into libraries in Bangladesh can significantly transform the landscape for both academic and public institutions. For administrators, looking to make this shift successful and sustainable, it's important to focus on a few key factors. They should consider digitizing and digitalizing the library with tech tools and resources, training staff to make them digitally literate, engaging with the community, and continuously evaluating the impact of these initiatives to create a vibrant and relevant learning environment. Balancing innovation with tradition will be essential for thriving in this new digital landscape.

#### **4.7. Sustainability of DH Programs**

Sustainability remains a key concern for the long-term success of digital humanities (DH) programs in libraries. Authorities should secure continuous funding and institutional support for DH projects (Soltani & Nikou, 2020). This could involve lobbying for government support, seeking donor funding, or establishing partnerships with the private sector (Caffrey et al., 2023). Furthermore, library managers should continuously assess the evolving needs of users to ensure that digital services remain relevant and effective (Mourer, 2020).

### **5. Conclusion**

Integrating Digital Humanities (DH) into libraries in Bangladesh can significantly transform the current library landscape for students, academics, and researchers, and can serve as a hub for knowledge production and dissemination. However, the study reveals that the path to a successful DH integration in Bangladeshi libraries is complex but achievable. The role of DH in libraries across Bangladesh is both critical and transformative, and its implementation faces numerous challenges. Successful integration requires a robust ICT infrastructure, skilled librarians, collaborative efforts across disciplines, and inclusive access to digital resources. As Bangladesh transitions to a more digital society, libraries must continue to evolve to meet the growing demands of digital scholarship. To be fully digitised, it is imperative to ensure that libraries are equipped, supported, and responsive to the changing landscape of information and technology. The study focuses on creating a holistic, well-supported ecosystem for DH that considers both technological and human aspects of transformation (Rahman et al., 2024). A strategic approach to investment, training, collaboration, and sustainability will position Bangladeshi libraries as leading institutions in the global digital humanities movement (Shohel et al., 2021; Hossain, 2021). By addressing these issues, libraries in Bangladesh can navigate the challenges of digital transformation and foster environments that promote innovation, inclusivity, and scholarly advancement (Farid et al., 2023). The collaborative efforts of library staff, policymakers, academic researchers, and technology experts will be key to ensuring the sustained growth of Digital Humanities in the libraries of Bangladesh.

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