

# Digital Resource Investment Patterns in Health Science College Libraries: A Budget Analysis

Trupti Aniruddha Tulsankar<sup>1</sup>; Dr. Vrushali Rane<sup>2</sup>

Research Scholar, SHPT School of Library & Information Science, SNDT Women's University, Mumbai<sup>1</sup>; Deputy Librarian, SNDT Women's University, Juhu Campus, Mumbai, India<sup>2</sup>

*trupti.tulsankar@gmail.com; libraryjuhu@sndt.ac.in*

## ABSTRACT

*Despite the critical importance of e-resources in medical education and research, there is a limited systematic analysis of budget allocation patterns and expenditure frameworks in Maharashtra's Health Science Libraries. This study also helps us understand investment patterns; libraries can better align their resources with the educational curricula and professional development needs of HSCLs of Maharashtra, ensuring they remain valuable partners in the healthcare ecosystem. This knowledge is essential for maintaining the relevance and effectiveness of health science libraries in an increasingly digital world while demonstrating their value to stakeholders and securing continued support for their vital role in healthcare delivery and medical research.*

**KEYWORDS:** Digital Resource Investment, Health Science Libraries, ROI.

## 1. INTRODUCTION

The Landscape of Health Science College Libraries (HSCLs) have radically transformed the digital era, fundamentally altering how information resources are acquired, managed, and delivered to users. The rapid growth of electronic resources has transformed the landscape of health science libraries, providing users access to a vast array of digital content, including e-journals, e-books, databases, and multimedia resources. The effective management and delivery of these e-resources require dedicated budgets and financial resources. Separate budgets for e-resource subscriptions enable health science libraries to maintain and expand their digital collections, providing users with continuous access to the latest research, clinical guidelines, and educational materials (Ashraf & Parvez, 2019). This access to up-to-date information is crucial for healthcare professionals, researchers, and students to make informed decisions and advance medical knowledge (Ishtiaq et al., 2020).

On one hand, this digital transformation has created new challenges and opportunities in resource investment and budget allocation. On the other hand, the increase in the complexity of digital resources, rising costs, and evolving user needs have made investment pattern analysis crucial for effective library management. Health science libraries

encounter specific difficulties when it comes to investing in digital resources. Anderson, Max (2013), Shimray, Somipam & Ramaiah, Chennupati (2015), Christine(2020), Oyadeyi, Adekunle [et al., 2021] and several others reported the challenges include the constantly changing landscape of medical knowledge and research, the high expenses associated with specialised medical databases and journals, the necessity for immediate access to the latest clinical information, intricate licensing and access models, the need to integrate with clinical workflows, the growing emphasis on evidence-based practice, and the diverse range of user needs covering education, research, and clinical practice. Fought et al. (2014), Roy, Angélique(2022) and Masenya, Tlou. (2024) undertook the study to investigate digital resource investment patterns in health science libraries is a crucial area of study in today's rapidly evolving healthcare and information landscape. Health science libraries face mounting pressure to adapt their collections and services while operating within strict budgetary constraints, making it essential to understand and optimize their digital resource investments. Despite the central role of digital resources in health science libraries, there is still significant uncertainty about optimal investment patterns and their relationship to library effectiveness.

This study addresses the critical need for evidence-based approaches to digital resource investment decision-making in health science libraries. The need for this research stems from the continuous transformation of medical information delivery and consumption methods, where digital resources have become increasingly central to healthcare practice and research. This study focuses on the Digital Resource Investment Patterns in Health Science Libraries in Maharashtra. The Health Science College Libraries affiliated with the Maharashtra University of Health Sciences (MUHS), Nashik are undertaken for this study.

## **2. LITERATURE REVIEW**

Burrows, S. (2006) documented the pattern of acquisition, management, and usage at the Louis Calder Memorial Library of the University Of Miami Miller School Of Medicine. He highlighted the quick adoption of electronic versions and the ongoing adjustments in scholarly communication. He also notes similarities and differences in electronic journal patterns between health sciences libraries and other academic libraries. Asante, E.(2014) investigated the relationship between budgetary constraints and the operation of academic libraries in Ghana. He advocates allocating a separate budget for libraries to improve collection development, service provision, acquisition and selection, and patronage. Singh, P. (2017) performed the analytical study of usage, cost analysis and return on investment (ROI) in the digital environment of the Science Direct online database with special reference to the Banaras Hindu University Library System. He suggests that if an investment does not have a positive ROI or if there are other opportunities with a higher ROI, then the investment should not be undertaken.

Singh, Har & Mahajan, Preeti. (2017) analysed the budget allocation for books and journals and the growth of resources in five university libraries in Northern India for a decade.

F. Okogwu and N. Achebe(2018) investigated the complexities associated with the acquisition of electronic resources by university libraries in Southeast Nigeria and reported cost is a fundamental challenge in acquisition. They emphasize the need to enhance library budgets to cover electronic resource costs. Bhat, A.(2019)evaluated the impact of electronic information resources, highlighted the need for increased budget allocation for electronic resources in libraries, and emphasized the necessity of recurring funds for any time, anywhere access. Hye K. & Bakar, Engku & Ahmad Mustaffa, Nurakmal (2020) study proposed a framework for budget allocation and

purchasing model for university academic libraries, building on a previous model. The framework ensures improved cost allocation and expenditure planning based on stakeholders' needs and conditions set by university management, helping libraries prioritize budget allocation decisions.

Murphy (2022) examined the impact of technology on health science libraries worldwide. He discovered that new technologies will be increasingly incorporated into health science libraries over the next decade, posing challenges for both users and librarians. However, librarians will continue to find ways to adapt to and make use of these tools to meet the needs of their users. Thormodson, K., Cisney, Lori, and Hoover, Benjamin(2022) surveyed academic health sciences libraries to learn about the challenges they face as part of a growing health system. Masenya, Tlou (2024) examined the opportunities and challenges associated with implementing digital technologies in medical libraries through digital transformation. She found that digital transformation has the potential to enhance libraries' processes, practices, and performance and help them stay relevant in their increasingly competitive environment.

The evolution of health science libraries from Burrows' 2006 observations to Masenya's 2024 analysis reveals a sector in continuous transformation. The successful management of digital resources require a delicate balance between budgetary constraints, technological advancement, and user needs. The future of health science libraries will depend on their ability to adapt to changing circumstances while focusing on their core mission of supporting healthcare education, research, and practice through effective digital resource management.

### **3. OBJECTIVES OF THE STUDY**

- ✓ To identify current trends in digital resource acquisition and investment across health science libraries.
- ✓ To identify barriers and challenges in digital resource management.

### **4. METHODOLOGY**

In this research, the investigator has focused on dental colleges within the Health Science College libraries affiliated with MUHS, Nashik. This study is part of a comprehensive research project and employed a survey method. A meticulously crafted questionnaire was administered via Google Forms to gather data from the librarians of Dental Colleges. There are 326 Health Science Colleges (HSCs), including Allied Medical Sciences. HSCs affiliated with MUHS (Source: Perspective Plan 2017-22 Maharashtra University of Health Sciences, Nashik); out of the 326, 217 HSCs librarians participated by responding to the questionnaire.

### **5. DATA ANALYSIS AND INTERPRETATION**

#### **5.1 Status of Health Science Colleges (HSCs)**

**Table 1 - Status of HSCs**

<b>Status of College</b>	<b>Frequency</b>	<b>Percentage</b>
Government	31	14.30%
Govt. Aided	17	7.80%
Private	153	70.50%
Autonomous	7	3.20%

Central Government	4	1.80%
Thane Municipal Corporation(TMC)	2	0.90%
Brihan Mumbai Municipal Corporation(BMC)	3	1.40%
<b>Total</b>	<b>217</b>	<b>100</b>

The majority of the surveyed colleges (70.5%) are private institutions, indicating a prevalence of privately-run colleges in the sample. Government-run colleges make up 14.3% of the total, signifying a significant presence of public institutions in the survey. Additionally, 7.8% of the colleges are government-aided institutions, receiving financial assistance from the government. A smaller percentage (3.2%) of the colleges in the survey have autonomous status, granting them academic and administrative independence. Colleges under the central government account for 1.8% of the total, reflecting a limited representation of centrally administered institutions. Finally, a few colleges are run by municipal corporations, with 0.9% under the Thane Municipal Corporation and 1.4% under the Brihan Mumbai Municipal Corporation.

## 5.2 Types of E-Resources

**Table - 2** Types of E-resources

E-resources		To a great extent	Somewhat	Very little	Not at all
E-books	Count	0	0	16	201
	% within	0%	0%	7.40%	92.60%
E-journals	Count	0	0	15	202
	% within	0%	0%	6.90%	93.10%
E-newspaper	Count	0	0	17	200
	% within	0%	0%	7.80%	92.20%
Bibliographic databases	Count	0	0	18	199
	% within	0%	0%	8.30%	91.70%
Full-text databases	Count	0	0	30	187
	% within	0%	0%	8.30%	91.70%
Research Reports	Count	0	0	8	209
	% within	0%	0%	3.70%	96.30%
Patents	Count	0	0	10	207
	% within	0%	0%	3.70%	96.30%
A/v resources	Count	0	0	25	192
	% within	0%	0%	11.50%	88.50%

According to the above Table, a survey was conducted to assess the availability of different electronic resources in colleges. The majority of respondents (ranging from 88.5% to 96.3%) indicated that these resources are "Not at all" available in their institutions. A small percentage of respondents (ranging from 3.7% to 11.5%) reported "Very

little" availability of various e-resources. These findings highlight potential concerns regarding the management and utilization of electronic resources in healthcare education institutions.

### 5.3 Availability of Paid e-resources

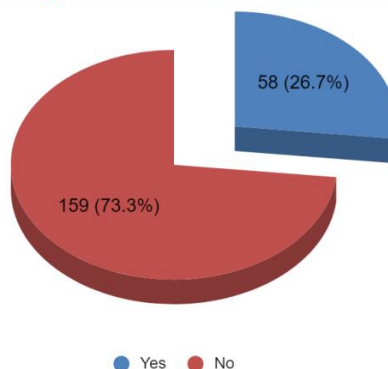
**Table 3** - Availability of Paid e-resources

Responses	Frequency	Percentage
To a great extent	0	0%
Somewhat	0	0%
Very little	27	12.40%
Not at all	190	87.60%
<b>Total</b>	<b>217</b>	<b>100%</b>

The above table indicates that 12.40% of respondents reported having paid for e-resources to a minimal extent. Most respondents, accounting for 87.60%, reported not having paid e-resources.

### 5.4 Separate budget for subscription of e-resources

**Separate budget for subscription of e-resources**



**Fig.1** - Separate budget for subscription of e-resources

Only 26.7% of the responses indicated having a separate budget for subscribing to e-resources. Most responses (73.3%) reported not having a separate budget for e-resource subscriptions. The lack of a separate budget could pose challenges in acquiring and maintaining access to electronic resources, such as e-journals, e-books, databases, and other digital content.

### 5.5 Annual budget allocated for the purchase of e-resources

**Table 4** - Annual budget allocated for the purchase of e-resources

% of an annual budget	Frequency	Percentage
Up to 20%	0	0%
21 to 30%	0	0%

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31 to 40%	21	9.70%
41 to 50%	20	9.20%
More than 50%	68	31.30%
None	108	49.80%
<b>Total</b>	<b>217</b>	<b>100%</b>

Table 4 shows the distribution of the percentage of a yearly budget allocated for acquiring electronic resources. There's a clear polarization in budget allocation patterns. Almost half (49.8%) don't invest in e-resources at all. About one-third (31.3%) are heavily invested (>50% budget). This suggests a significant digital divide among libraries.

### 5.6 Annual Expenditure Spent on E-resources

**Table 5** – Annual Expenditure Spent on E-resources

2019-20							
E-resource		Up to Rs. 10,000/-	Rs. 10,001 – Rs.50,000	Rs. 50,001 – 1 Lakh	Above Rs. 1 Lakh – 5 lakhs	Above Rs. 5 lakhs- 10 lakhs	More than Rs. 10 lakhs
E-books	Count	0	18	11	168	14	6
	% within	0%	8.30%	5.10%	77.40%	6.50%	2.80%
E-journals	Count	0	26	12	138	22	19
	% within	0%	12%	5.50%	63.60%	10.10%	8.80%
E-databases	Count	0	17	10	146	22	22
	% within	0%	7.80%	4.60%	67.30%	10.10%	10.10%
2020-21							
E-books	Count	0	26	13	153	20	5
	% within	%	12%	6%	70.50%	9.20%	2.30%
E-journals	Count	0	35	24	117	22	19
	% within	0%	16.10%	11.10%	53.90%	10.10%	8.80%
E-databases	Count	0	26	11	135	22	23
	% within	0%	12%	5.10%	62.20%	10.10%	10.60%
2021-22							
E-books	Count	0	30	11	152	12	12
	% within	0%	13.80%	5.10%	70%	5.50%	5.50%
E-journals	Count	0	39	22	116	21	19
	% within	0%	18%	10.10%	53.50%	9.70%	8.80%
E-databases	Count	0	29	20	123	22	23
	% within	0%	13.40%	9.20%	56.70%	10.10%	10.60%

In Table 5, data is presented regarding the annual expenditure allocated to various electronic resources (e-books, e-journals, and e-databases) over three academic years (2019-20, 2020-21, and 2021-22) by HSCLs in Maharashtra. The expenditure is categorized into different financial ranges, ranging from "Up to Rs. 10,000/-" to "More than Rs. 10 lakhs."

**E-books:** Over the three academic years, the highest expenditure on e-books falls within the range of "Above Rs. 1 Lakh – 5 lakhs," with approximately 70-77% of the institutions allocating funds within this range. A small percentage (around 5-6%) of institutions have allocated funds between "Rs. 50,001 – 1 Lakh" for e-books. The percentage of institutions allocating "More than Rs. 10 lakhs" for e-books is relatively low (around 2-6%).

**E-journals:** Expenditure on e-journals is more evenly distributed across the ranges compared to e-books and e-databases. The highest percentage of institutions (around 54-64%) allocated funds within the range of "Above Rs. 1 Lakh—5 lakhs" for e-journals. A significant portion (around 8-18%) allocated funds between "Rs. 10,001—Rs. 50,000" for e-journals. The percentage of institutions allocating "More than Rs. 10 lakhs" for e-journals is around 8-9%.

**E-databases:** Similar to e-books, the highest expenditure on e-databases falls within the range of "Above Rs. 1 Lakh – 5 lakhs," with approximately 57-67% of institutions allocating funds within this range. A significant percentage (around 10%) has allocated funds "More than Rs. 10 lakhs" for e-databases. The percentage of institutions allocated between "Rs. 50,001 – 1 Lakh" for e-databases is relatively low (around 5-9%).

### 5.7 Percentage of allocation for maintenance of the e-resources out of the total library budget

**Table 6** – % of allocation for maintenance of the e-resources out of the total library budget

Particular	% of allocation for maintenance of the e-resources out of the total library budget							Total
		Zero	1-5%	6-10%	11-15%	16- 20%	More than 20%	
<b>Software AMC</b>								
	Count	67	150	0	0	0	0	217
	% within	30.90%	69.10%	0%	0%	0%	0%	100%
<b>Hardware AMC</b>								
	Count	0	0	5	82	129	1	217
	% within	0%	0%	2.30%	37.80%	59.40%	0.50%	100%
<b>New Software Purchase</b>								
	Count	0	0	9	66	132	10	217
	% within	0%	0%	4.10%	30.40%	60.80%	4.60%	100%
<b>New Hardware Purchase</b>								
	Count	0	0	30	43	134	10	217
	% within	0%	0%	13.80%	19.80%	61.80%	4.60%	100%

The above table indicates the allocation percentage for maintenance of e-resources out of the total library budget varies among libraries. Most libraries allocate between 1% and 5% of their overall budget to software Annual

Maintenance Contract (AMC). On the other hand, hardware AMC takes up a more significant portion, with most libraries allocating between 11% to 20% of their budget. When purchasing new software and hardware, libraries typically allocate a more significant percentage, with most allocating between 16% to 20%. In some cases, the percentage can be even higher than 20%.

### 5.8 Availability of sufficient budget for the subscription of e-resources

**Table 7** - Availability of sufficient budget for the subscription of e-resources

Responses	Frequency	Percentage
Strongly Disagree	0	0%
Disagree	103	47.50%
Neutral	20	9.20%
Agree	0	0%
Strongly Agree	94	43.30%
<b>Total</b>	<b>217</b>	<b>100</b>

The above Table presents the findings regarding respondents' perception of the availability of a suitable budget for the subscription of electronic resources. The results show varying opinions, with 47.5% of respondents disagreeing with the availability of a sufficient budget, 43.3% strongly agreeing, and 9.2% remaining neutral on the issue.

### FINDINGS

- The majority of the surveyed colleges (70.5%) are private institutions, indicating a prevalence of privately-run colleges in the sample.
- Most respondents, accounting for 87.60%, reported not having paid e-resources.
- Most responses (73.3%) reported not having a separate budget for e-resource subscriptions.
- The Budget Perception Distribution shows that 47.5% disagree about having sufficient budget, 43.3% strongly agree about budget adequacy, and 9.2% maintain a neutral stance. This indicates clear polarization in budget satisfaction.
- Resource allocation patterns in institutions reveal a significant divide in the perception of budget availability. Nearly half of the institutions face budget constraints, while a notable portion has adequate funding. A small segment is undecided about the adequacy of their budget.
- There are clear indications of unequal funding among different institutions, suggesting varying levels of support. This also points to differences in the prioritization of electronic resources and highlights challenges in resource allocation.

Based on the above finding, researchers conclude that health science education sector has significant private-sector involvement. However, there are clear disparities in electronic resource funding and availability, which present a crucial challenge that needs immediate attention. Developing comprehensive strategies to address these inequalities is essential for ensuring uniform quality in health science education and maintaining competitive standards across all institutions.



## RECOMMENDATIONS

Based on the above findings, the researcher gave recommendations as follows:

1. ***Budget Enhancement:***

- Increase allocation for electronic resources
- Develop sustainable funding models
- Explore consortium-based purchasing
- Implement cost-sharing mechanisms

2. ***Resource Optimization:***

- Conduct regular usage analysis
- Prioritize high-demand resources
- Implement cost-benefit assessment
- Develop strategic resource selection criteria

3. ***Financial Planning:***

- Create long-term budget planning strategies
- Develop alternative funding sources
- Establish emergency fund reserves
- Implement flexible budget allocation models

4. ***Stakeholder Engagement:***

- Enhance communication with funding authorities
- Demonstrate the value of electronic resources
- Build partnerships with other institutions
- Engage users in resource selection

5. ***Infrastructure Development:***

- Invest in necessary technological infrastructure
- Develop staff training programs
- Implement efficient resource management systems
- Create sustainable maintenance plans

## CONCLUSION

The findings emphasize the need for a more standardized approach to electronic resource funding while acknowledging the unique needs of different institutions. The significant percentage of libraries reporting inadequate budgets indicates a pressing need for improved funding mechanisms and resource optimization strategies. However, the substantial portion of reporting budget adequacy provides valuable insights into successful funding models that could be replicated.

Moving forward, the focus should be on developing sustainable funding models, optimizing resource utilization, and enhancing stakeholder engagement to bridge the current digital divide among institutions. The implementation of recommended strategies could help create more equitable access to electronic resources across health science libraries, ultimately improving the quality of healthcare education and research support.

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