

Cloud Readiness among Library Professionals in Maharashtra: A Weighted Awareness Index and Machine Learning Assessment of Cloud-Based Library Management Systems in Public Libraries

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Abstract

Cloud computing has become a central element of digital transformation in libraries, supporting remote access and reduced dependence on local servers. Public libraries in India are only beginning to adopt such systems, and little is known about the readiness of their professionals. Limited budgets, uneven internet connectivity, shortage of trained staff and weak planning make the move from manual or standalone systems to cloud platforms difficult. Evidence from Maharashtra, where about 11,150 public libraries operate, is especially scarce. A structured questionnaire of 56 questions was administered to 144 library professionals working in public libraries of Mumbai, Thane, Palghar and Raigad, the four districts selected from the Mumbai Metropolitan Region. Forty-three five-point Likert items were grouped into eight readiness dimensions covering implementation, infrastructure and budget, challenges, administrative planning, user engagement, service diversity, training and sustainability. Responses were coded and tabulated in SPSS for profiling and index construction. A Weighted Awareness Index algorithm assigns Likert weights of one to five, reverses negatively worded items and normalises scores to a scale of zero to 100 before classifying readiness as low, moderate or high. A Random Forest classifier, validated through stratified ten-fold cross-validation, is specified as the machine learning component for predicting readiness bands from respondent-level data. Only 11.8 percent of the libraries were automated and 60.4 percent reported no cloud-based library management system. The overall Weighted Awareness Index was 56.8, indicating moderate readiness, with challenges and outcomes scoring highest at 64.3 and service diversity lowest at 51.5. Internet speed and the absence of dedicated IT technicians were the weakest enablers, although 56.9 percent of respondents considered cloud-based systems sustainable in the long term. Public libraries in the region show clear willingness towards cloud adoption but lack the infrastructure, trained manpower and financial planning that it requires. Targeted training, connectivity upgrades and planned budgeting can raise readiness.

Keywords: Cloud readiness; Library professionals; Weighted Awareness Index; Cloud-based library management system; Public libraries; Machine learning

How to Cite This Article

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Introduction

Digital technologies have changed the way organisations create value, coordinate activities and deliver services. Research on information and communication technology shows that digital integration can influence organisational performance, but that the outcome depends on supportive conditions and on how people perceive and accept change [1]. The expansion of ICT also carries material and environmental costs, ranging from electrical and electronic waste to greenhouse gas emissions [2], [3]. Digital transformation has therefore been studied both as a source of efficiency and as a force that affects environmental sustainability [4], [5]. Libraries, as public service institutions, are not exempt from these pressures.

Digital transformation is now understood as a broad organisational change and not merely the purchase of new technology [6], [7]. It has been described as a process in which digital technologies disrupt existing practices and prompt strategic responses, structural changes and new ways of creating value [8]. Sustainability, defined as meeting present needs without compromising the ability of future generations to meet their own [9], offers a useful lens for judging such change, particularly when economic, social and environmental concerns are considered together [10].

Libraries are a natural setting in which to examine these ideas. Over the last two decades they have moved from card catalogues to automated systems, and cloud-based library management systems (LMS) now offer cataloguing, circulation, remote access and data storage without the need for local servers. For public libraries, which depend on limited government grants and local support, the cloud promises lower maintenance, shared services and wider reach. Yet the same libraries often face weak connectivity, few computers, small budgets and staff who have received little formal training.

Maharashtra has approximately 11,150 public libraries, and studying all of them is not feasible. This research therefore limits its universe to four districts of the Mumbai Metropolitan Region, namely Mumbai, Palghar, Thane and Raigad, which together combine dense urban libraries with smaller municipal and semi-urban ones. Data were collected from 144 library professionals through a questionnaire of 56 questions that covers respondent profile, current use of cloud-based LMS, infrastructure and budget, challenges, administrative planning, user engagement, diversity of cloud services, training and sustainability.

Existing literature offers broad discussions of digital transformation and sustainability, but very few studies measure how ready public library professionals are to adopt cloud-based systems, and none that we are aware of does so for Maharashtra. To fill this gap, the study constructs a Weighted Awareness Index that converts Likert responses into a comparable readiness score and outlines a machine learning layer for classifying readiness levels. Understanding readiness before large investments are made can prevent wasted expenditure and uneven access to services.

The objectives are to profile the respondents and their libraries, to assess the present level of cloud-based LMS use, to compute readiness scores for eight dimensions, to identify the areas that need policy attention, and to suggest practical measures. The remainder of the paper reviews related literature, explains the methodology, presents and discusses the results, and ends with conclusions.

Literature Review

Zhao and Liu [1] examined how ICT and the digital integration of supply chains relate to firm financial performance, and showed that perceived government support and cognitive constraints on digital transformation work against each other. Their findings suggest that the benefits of technology depend on external support and on how decision makers perceive change. This is relevant to public libraries, which depend largely on state funding and on the attitudes of their staff.

Ongondo et al. [2] reviewed the management of waste electrical and electronic equipment across the world and drew attention to the growing quantity of discarded devices and the uneven systems available to handle them. Libraries maintain computers, servers and peripherals, so the review is a reminder that owning hardware brings a disposal burden, which shared cloud infrastructure may ease but does not remove.

Belkhir and Elmeli [3] assessed the global emissions footprint of ICT, projected trends up to 2040 and offered recommendations for limiting its growth. The study makes clear that digital services are not environmentally neutral. A move to cloud-based systems should therefore be judged on energy use and efficiency as well as on convenience and cost. The recommendations point towards efficiency and responsible use, which matter as much for a small library server room as for large data centres.

Truong [4] investigated the impact of digital transformation on environmental sustainability. The work shows that the environmental consequences of digitalisation need to be examined in context and cannot be assumed from the adoption of technology alone, which supports a careful reading of cloud adoption in libraries where reduced local equipment must be set against dependence on remote data centres.

Alojail and Khan [5] studied the contribution of digital transformation to sustainable development and linked technology adoption to economic, social and environmental outcomes. Their discussion widens the evaluation of cloud systems from cost savings to service quality, inclusion and long-term viability, themes that are also covered by the sustainability items of the present questionnaire.

Plekhanov et al. [6] reviewed the literature on digital transformation and proposed a research agenda, observing that knowledge in the field is spread across several perspectives. Their review helps to position cloud adoption in libraries as an organisational change problem that involves strategy, people and processes rather than a purely technical task.

Gong and Ribiere [7] developed a unified definition of digital transformation by comparing existing definitions in the literature. Their effort responds to the confusion that surrounds the term and gives a clear basis for operationalising transformation when studying library professionals, who may use the word loosely in practice. A shared definition also makes it easier to compare findings across studies and settings.

Vial [8] reviewed the digital transformation literature and presented a process-oriented view in which digital technologies disrupt existing arrangements, trigger strategic responses and lead to structural changes, while organisational barriers can slow progress. This view fits the present study, which treats infrastructure gaps, planning weaknesses and training needs as barriers to library change.

Kazmi [9] explains sustainability through the definition of the World Commission on Environment and Development, which stresses meeting present needs without harming the capacity of future generations to meet theirs. Applied to libraries, the definition implies that any cloud system must be affordable, maintainable and dependable over many years, not only at the time of purchase.

Purvis et al. [10] traced the conceptual origins of the three pillars of sustainability, namely economic, social and environmental, and showed that the idea has a more complex history than is commonly assumed. Their analysis supports the use of balanced criteria, including financial, social and technical factors, when readiness for cloud adoption is assessed. Such a multidimensional approach is reflected in the eight dimensions of the questionnaire used here.

Hilty and Aebischer [11] described ICT for sustainability as an emerging research field in which the effects of ICT are examined at several levels. For cloud-based library systems, the direct effects of equipment and energy use sit alongside the indirect effects of improved services, a combination that readiness studies should keep in view.

Geissdoerfer et al. [12] compared the circular economy with sustainability and questioned whether it represents a new paradigm. The comparison is useful for libraries because extending the life of equipment and sharing resources through the cloud are circular practices that can be assessed against wider sustainability goals. These links between reuse and sustainability are useful when interpreting the sustainability items.

Snyder [13] provided guidelines for using the literature review as a research methodology and distinguished systematic, semi-systematic and integrative approaches. The present review follows an integrative and thematic approach in line with those guidelines, because the available studies come from different fields and no single body of work addresses cloud readiness in public libraries.

Ahsan et al. [14] reviewed techniques and technologies for data-driven next-generation smart grids and showed how data analytics supports the evolution of energy systems. Although the setting differs from libraries, the study illustrates how data-driven methods are used to evaluate complex systems, which parallels the use of an index and machine learning in the present work.

Rehman et al. [15] proposed an efficient energy management approach for smart grids that considers demand response programmes and renewable energy sources. Their work demonstrates how computational models can support decisions on resource use, and it offers a methodological analogy for applying algorithms to the assessment of library readiness.

Taken together, these studies establish that digital transformation is an organisational and sustainability issue and not only a technical one. They also show that data-driven methods are widely accepted for evaluating complex systems. However, none of the reviewed works measures the awareness and readiness of library professionals for cloud-based library management systems, and none addresses public libraries in Maharashtra. The reviewed works also differ in setting, from firms and supply chains to energy grids, so their findings are transferred to libraries with caution and used mainly to frame concepts, dimensions and methods rather than to predict results. This gap motivates the construction of a Weighted Awareness Index and the survey-based assessment reported in the following sections.

Research Methodology

Research Design

The study follows a quantitative, cross-sectional survey design. Primary data were collected from library professionals at a single point in time through a structured questionnaire, and the responses were analysed with descriptive statistics and a composite index. The design is

suited to the research problem because the aim is to measure the present level of awareness and readiness for cloud-based library management systems, not to test the effect of an intervention. Quantitative methods allow results from different libraries to be compared on a common scale and make it possible to repeat the study in other districts.

Study area and population

According to available data, Maharashtra has approximately 11,150 public libraries. Because of this large population, a study covering the whole state is not feasible, and the universe was therefore delimited to four major districts of the Mumbai Metropolitan Region: Mumbai, Palghar, Thane and Raigad. These districts include metropolitan, municipal and semi-urban libraries and so provide a reasonable range of library types, user volumes and resource levels within a manageable geographical area. The remaining districts of Maharashtra are outside the scope of the findings, which should be read as indicative for the Mumbai Metropolitan Region rather than for the entire state.

Sample

The sample consists of 144 library professionals who responded from public libraries in the four districts. Respondents include librarians, assistant librarians, clerks, secretaries and administrative officers, with librarians forming the largest group. Every one of the 144 responses was complete for all tabulated items, and each frequency table therefore sums to 144. Of the respondents, 83 were female and 61 were male, and 127 worked in libraries that were not yet automated. The sample size of 144 is modest relative to the state population, so the study is exploratory in nature and generalisation is limited accordingly.

Research Instrument

A structured questionnaire of 56 questions was used. Questions 1 to 5 collect identification details such as name, contact information, library address and designation. Questions 6 to 13 record gender, age group, educational qualification, years of experience, type of library, automation status, cloud-based LMS in use and approximate number of daily users. Questions 14 to 56 are 43 statements rated on a five-point Likert scale from strongly disagree (1) to strongly agree (5). These statements are grouped into eight dimensions: LMS implementation (9 items), infrastructure and budget (4), challenges and outcomes (5), administrative readiness and planning (5), user engagement and feedback (5), diversity of cloud-based services (5), training and technical support (5), and sustainability and future planning (5).

Data Coding and Processing

Responses were entered and coded in SPSS, and frequency tables were generated for every question. Likert categories were coded from 1 to 5. Because five statements are worded so that agreement signals a barrier rather than readiness, they were reverse scored (6 minus the mean score). These are Question 26 on the difficulty of matching cloud costs with the annual budget, Question 27 on staff resistance, Question 28 on the need for user orientation, Question 30 on data privacy and security concerns, and Question 51 on the need for further staff training. The remaining 38 items were scored in the positive direction. Data screening confirmed that every question had 144 valid responses with no missing values, so no imputation was needed.

Weighted Awareness Index

The Weighted Awareness Index (WAI) converts Likert responses into a comparable score between 0 and 100. For an item i with response frequencies $f(k)$ at scale weights $w(k) = 1$ to 5 and $N = 144$ respondents, the item mean is the sum of $w(k) \times f(k)$ divided by N . The item index is $WAI(i) = (\text{mean} / 5) \times 100$. A dimension index is the arithmetic mean of the item indices belonging to that dimension, and the overall index is the mean of all 43 item indices, so every item carries equal weight. Reverse-scored items enter the index after transformation, so that a higher score always indicates higher readiness. A score of 100 would mean that every respondent strongly agreed with a positively worded item, while a score of 20 would mean that every respondent strongly disagreed. Scores below 50 are classed as low readiness, scores from 50 to 65 as moderate readiness, and scores above 65 as high readiness. The thresholds are cut-offs adopted for this study: 50 corresponds to a mean score of 2.5, midway between disagreement and neutrality, and 65 to a mean of 3.25, which lies above neutrality.

Machine Learning Assessment

The machine learning layer is designed to operate on the respondent-level response matrix. The 43 Likert items and the profile variables are treated as ordinal and categorical features, and the readiness band derived from each respondent's index is the target class. A Random Forest classifier is the main algorithm because it handles mixed variable types, resists over-fitting and provides feature importance values. Class imbalance, if present, is handled through class weights. A Decision Tree is kept as an interpretable baseline. The data are divided into training and test sets in a 70:30 ratio with stratification, hyperparameters are tuned within the training set, and performance is checked through stratified ten-fold cross-validation using accuracy, precision, recall and F1-score. Feature importance is then used to identify the questions that contribute most to readiness.

System Architecture

Figure 1 shows the architecture of the assessment framework as a sequence of stages. The study universe feeds the sample and instrument stage, where the 144 respondents answer the 56-item questionnaire. The coded data move to the SPSS screening stage, which produces the frequency tables for each of the eight dimensions. The WAI stage applies Likert weights and reverse scoring, and its output follows two

routes. One route produces dimension scores and readiness bands that are reported in this paper. The other route, drawn with a dashed border, passes the respondent-level data to the machine learning assessment. Both routes join at interpretation, where gaps in infrastructure, training and service diversity are identified, and the final output is a cloud-readiness profile with recommendations for public libraries.

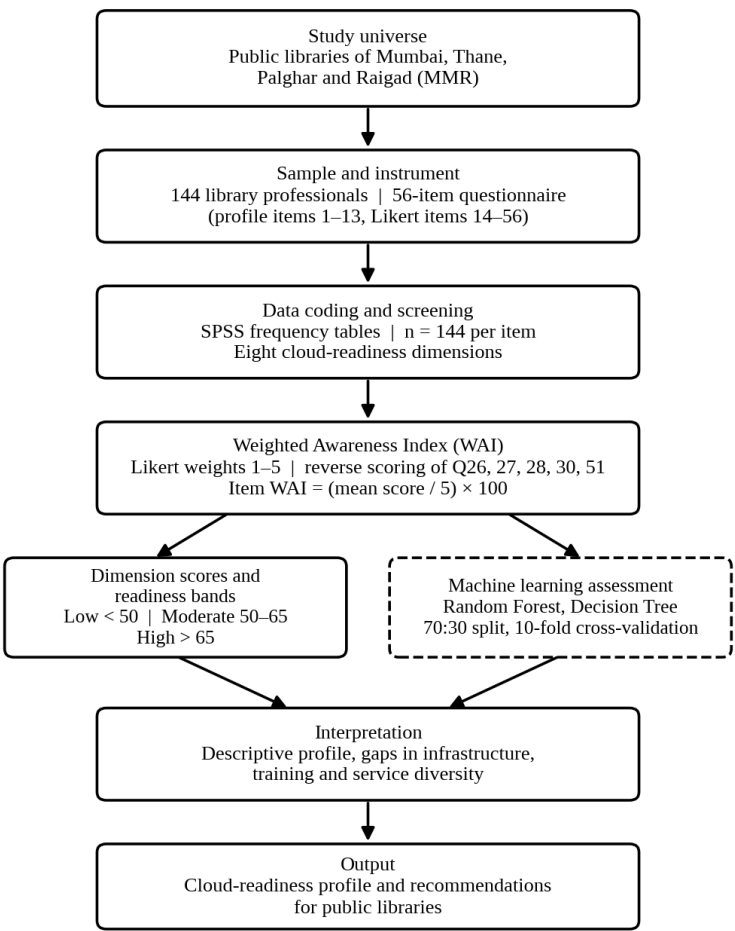


Fig. 1. Architecture of the cloud-readiness assessment framework (WAI and machine learning layers).

Ethical Considerations

The questionnaire collected names and contact details in its first questions, but these identification details are not reported in this paper. Results are presented in aggregate form, so that no individual respondent can be identified from the tables and figures.

Results and Discussion

This section presents the results of the survey of 144 library professionals. All figures and tables are drawn from the SPSS frequency output, and each table sums to 144 respondents. Percentages are calculated on the full sample of 144, and each table follows its figure to give the exact counts. Ten graphs were selected from the available outputs to cover the respondent profile, the present state of automation and cloud use, key enabling conditions and future intentions. Figures 2 and 3 describe gender and age. Figures 4 and 5 describe automation and the cloud-based LMS in use. Figures 6 to 10 report responses on connectivity, cloud tools beyond the LMS, IT technical support, sustainability and plans for expansion. Figure 11 summarises the Weighted Awareness Index for the eight dimensions.

Across the 43 Likert items, the overall index is 56.8, which falls in the moderate band. Six items score above 65, seven score below 50 and the remaining thirty are moderate. Item scores range from 45.1 for the use of cloud storage for digital archives to 76.5 for the absence of staff resistance. The results below report descriptive and index findings; classifier outputs from the machine learning layer are not reported in this section.

Gender Profile

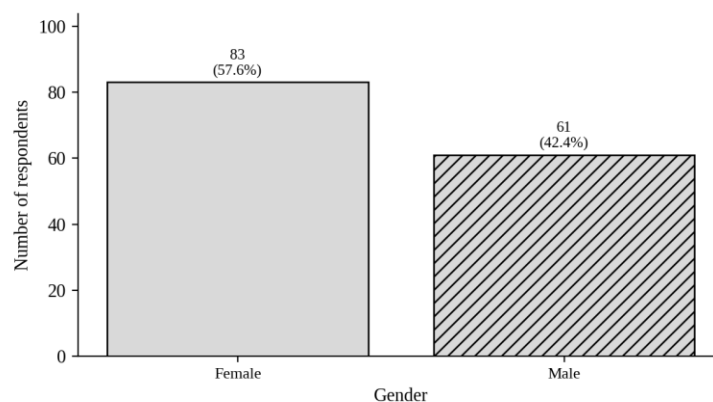


Fig. 2. Gender distribution of respondents ($n = 144$)

Table 1. Gender distribution of respondents ($n = 144$)

Gender	Frequency	Percent (%)
Female	83	57.6
Male	61	42.4
Total	144	100.0

Figure 2 and Table 1 show that women formed the majority of the respondents. Of the 144 library professionals, 83 (57.6%) were female and 61 (42.4%) were male, a difference of 15.3 percentage points. The distribution indicates that library work in the four districts is staffed largely by women, which matters for planning training programmes, since schedules and delivery formats should suit both groups. The balance is also adequate for later comparisons, because neither gender group is so small that it would distort the readiness scores. The result therefore gives a reasonably representative base for the awareness findings reported in the following figures and tables.

Age Profile

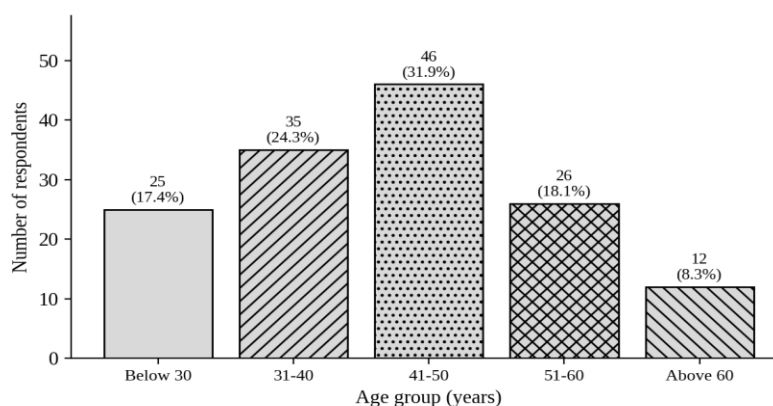


Fig. 3. Age-group distribution of respondents ($n = 144$)

Table 2. Age-group distribution of respondents ($n = 144$)

Age group	Frequency	Percent (%)
Below 30	25	17.4
31-40	35	24.3
41-50	46	31.9
51-60	26	18.1
Above 60	12	8.3
Total	144	100.0

Figure 3 and Table 2 present the age profile of the sample. The largest group was aged 41 to 50 years with 46 respondents (31.9%), followed by 35 respondents (24.3%) aged 31 to 40. Twenty-six respondents (18.1%) were between 51 and 60, 25 (17.4%) were below 30, and 12 (8.3%) were above 60. Respondents aged 31 to 50 together make up 56.3 percent of the sample, so the workforce is dominated by mid-career professionals. This pattern suggests that many staff have long experience of manual routines and may need structured support to adjust to cloud platforms, while younger staff can act as peer trainers.

Library Automation

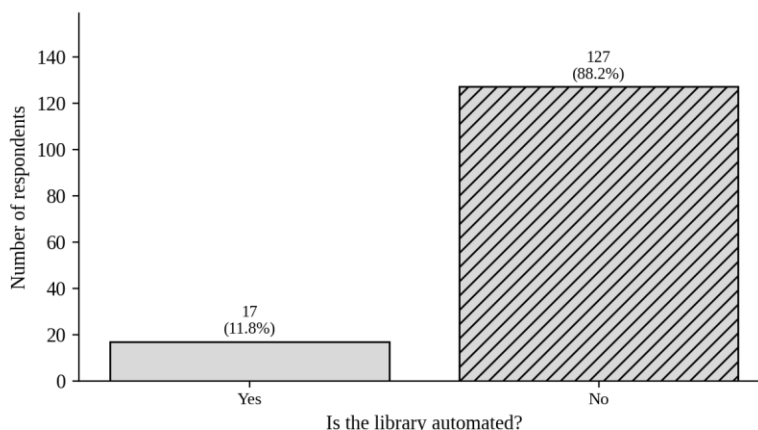


Fig. 4. Automation status of libraries ($n = 144$)

Table 3. Automation status of libraries ($n = 144$)

Library automated	Frequency	Percent (%)
Yes	17	11.8
No	127	88.2
Total	144	100.0

Figure 4 and Table 3 show the automation status of the libraries. Only 17 respondents (11.8%) reported that their library was automated, whereas 127 (88.2%) reported that it was not. The finding is important because automation is the foundation on which a cloud-based library management system is built; libraries without basic computerised cataloguing and circulation must first meet this requirement before they can move to the cloud. The very large share of non-automated libraries explains the low index values in later items and signals that cloud readiness in the study area is constrained at the most basic level.

Cloud-based LMS in Use

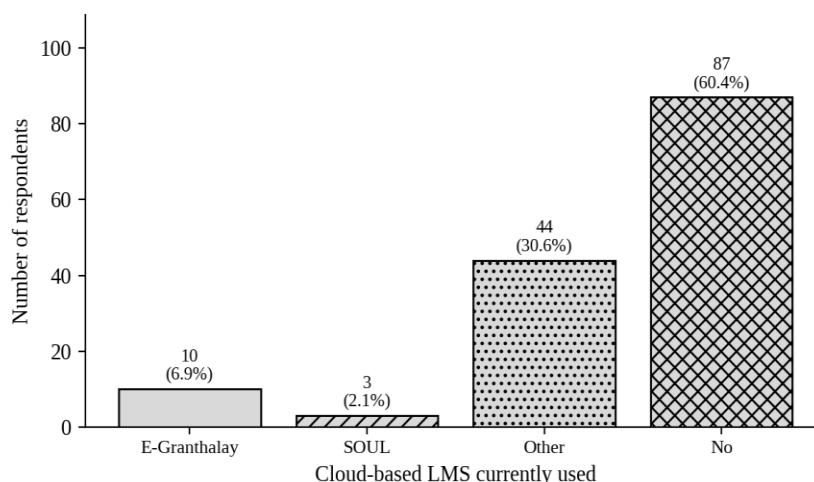


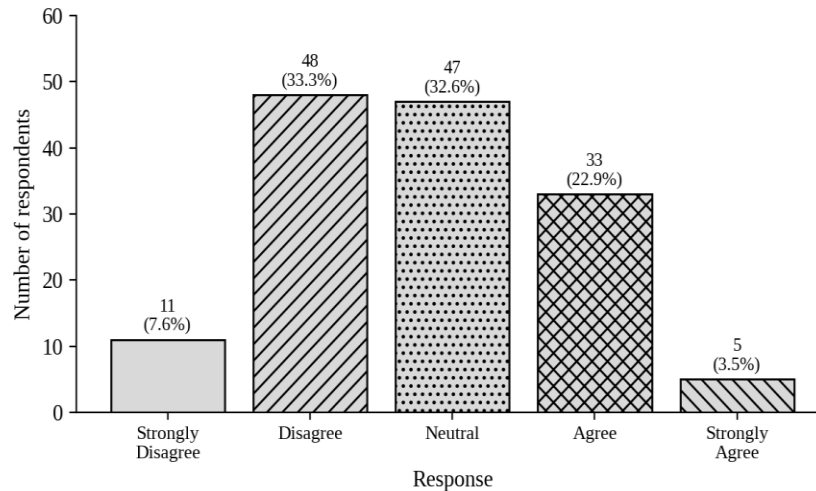
Fig. 5. Cloud-based LMS currently used in libraries ($n = 144$)

Table 4. Cloud-based LMS currently used in libraries (n = 144)

Cloud-based LMS used	Frequency	Percent (%)
E-Granthalay	10	6.9
SOUL	3	2.1
Other	44	30.6
No	87	60.4
Total	144	100.0

Figure 5 and Table 4 report the cloud-based LMS currently used. A total of 87 respondents (60.4%) reported that their library uses no such system. E-Granthalay was used by 10 libraries (6.9%) and SOUL by 3 (2.1%), while 44 respondents (30.6%) selected other systems. Libraries using a named platform therefore account for only 13 respondents (9.0%). The dominance of the no-system category confirms the limited penetration of cloud-based library software in public libraries of the region. It also shows that the group answering the implementation questions is small in practice, so those responses should be interpreted with this limited base of actual users in mind.

Internet Connectivity

**Fig. 6.** Internet speed supports uninterrupted cloud-based LMS use, Q24 (n = 144)**Table 5.** Internet speed supports uninterrupted cloud-based LMS use, Q24 (n = 144)

Response	Frequency	Percent (%)
Strongly Disagree	11	7.6
Disagree	48	33.3
Neutral	47	32.6
Agree	33	22.9
Strongly Agree	5	3.5
Total	144	100.0

Figure 6 and Table 5 examine whether the internet speed in the library supports uninterrupted use of the cloud-based LMS. Only 38 respondents (26.4%) agreed or strongly agreed, while 59 (41.0%) disagreed or strongly disagreed and 47 (32.6%) were neutral. The item records an index of 56.2, in the moderate band, but the weight of disagreement over agreement shows that connectivity is a real constraint. Because cloud systems depend on a stable connection, weak bandwidth can interrupt circulation, cataloguing and remote access, and it needs attention in any adoption plan alongside hardware, software and staff training.

Cloud Tools Beyond the LMS

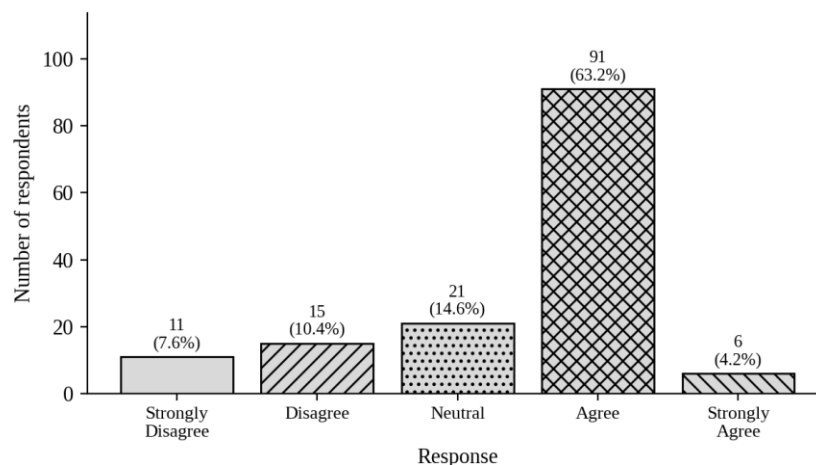


Fig. 7. Use of cloud-based tools beyond the LMS, Q42 (n = 144)

Table 6. Use of cloud-based tools beyond the LMS, Q42 (n = 144)

Response	Frequency	Percent (%)
Strongly Disagree	11	7.6
Disagree	15	10.4
Neutral	21	14.6
Agree	91	63.2
Strongly Agree	6	4.2
Total	144	100.0

Figure 7 and Table 6 show whether libraries use cloud-based tools beyond the LMS, such as Google Drive or SlideShare. This item is among the highest-scoring in the survey: 91 respondents (63.2%) agreed and 6 (4.2%) strongly agreed, giving a combined 97 (67.4%). Only 26 respondents (18.1%) disagreed or strongly disagreed. The item index is 69.2, in the high band. The result suggests that informal use of free cloud services is common even where a full cloud-based LMS is absent, which can serve as a useful stepping stone towards more structured and planned adoption.

Dedicated IT Technician

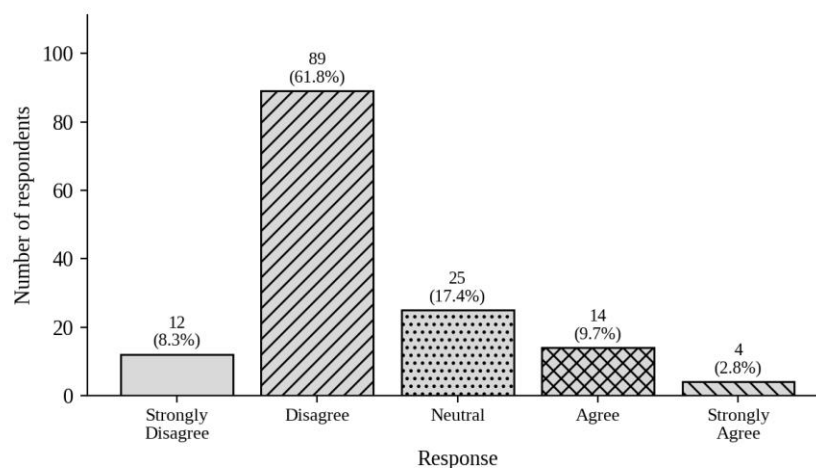


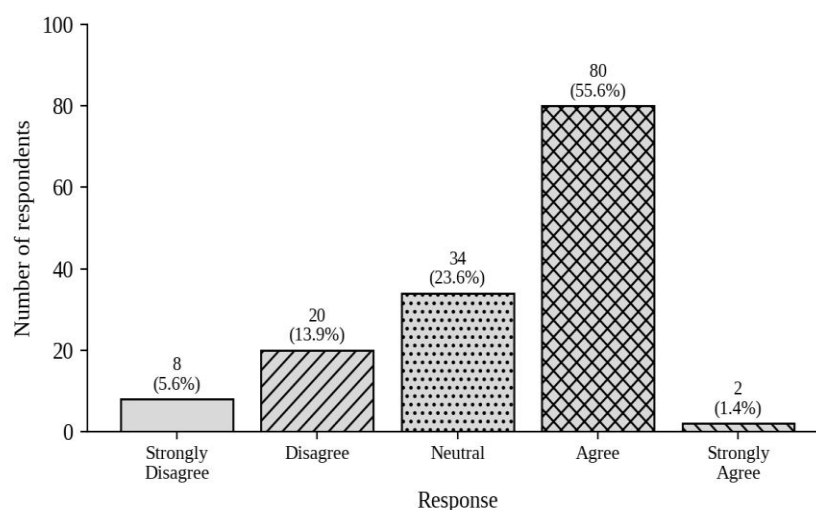
Fig. 8. Availability of a dedicated IT technician, Q49 (n = 144)

Table 7. Availability of a dedicated IT technician, Q49 (n = 144)

Response	Frequency	Percent (%)
Strongly Disagree	12	8.3
Disagree	89	61.8
Neutral	25	17.4
Agree	14	9.7
Strongly Agree	4	2.8
Total	144	100.0

Figure 8 and Table 7 present responses on whether the library has a dedicated IT technician to assist with cloud-based tools and services. A large majority disagreed: 89 respondents (61.8%) disagreed and 12 (8.3%) strongly disagreed, a combined 101 (70.1%). Only 18 respondents (12.5%) agreed or strongly agreed, and 25 (17.4%) were neutral. The item index of 47.4 falls in the low band. The shortage of technical staff means that libraries must rely on vendors or on general staff to solve problems, which increases risk, delay and cost and weakens confidence in cloud adoption among staff.

Long-Term Sustainability

**Fig. 9.** Cloud-based LMS considered sustainable for long-term operations, Q52 (n = 144)**Table 8.** Cloud-based LMS considered sustainable for long-term operations, Q52 (n = 144)

Response	Frequency	Percent (%)
Strongly Disagree	8	5.6
Disagree	20	13.9
Neutral	34	23.6
Agree	80	55.6
Strongly Agree	2	1.4
Total	144	100.0

Figure 9 and Table 8 show opinions on whether cloud-based LMS are sustainable for long-term library operations. Agreement was strong: 80 respondents (55.6%) agreed and 2 (1.4%) strongly agreed, so 82 respondents (56.9%) viewed cloud systems as sustainable. Another 34 (23.6%) were neutral and 28 (19.4%) disagreed or strongly disagreed. The item index is 66.7, in the high band. Library professionals thus see long-term value in cloud systems even though they report constraints in infrastructure and staffing, which indicates a positive attitude that policy support, funding and training can turn into actual adoption in the coming years.

Plans For Cloud Expansion

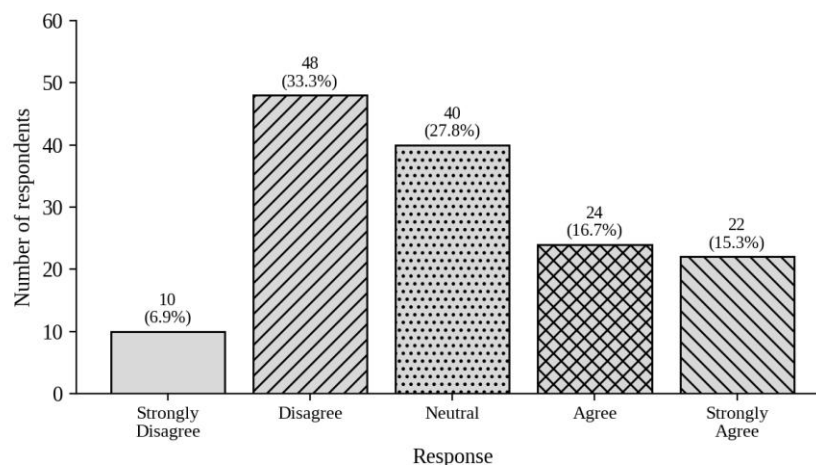


Fig. 10. Plans to shift more services to cloud-based platforms, Q56 (n = 144)

Table 9. Plans to shift more services to cloud-based platforms, Q56 (n = 144)

Response	Frequency	Percent (%)
Strongly Disagree	10	6.9
Disagree	48	33.3
Neutral	40	27.8
Agree	24	16.7
Strongly Agree	22	15.3
Total	144	100.0

Figure 10 and Table 9 report whether libraries plan to shift more services to cloud-based platforms. Opinions were divided: 24 respondents (16.7%) agreed and 22 (15.3%) strongly agreed, a combined 46 (31.9%), while 58 (40.3%) disagreed or strongly disagreed and 40 (27.8%) were neutral. The index is 60.0, in the moderate band. Nearly one in three respondents therefore intends to expand cloud services, but a larger share has no such plan. The result indicates that intention exists in a sizeable minority, and that awareness building and funding support may be needed to move the neutral respondents towards a decision.

Weighted Awareness Index by Dimension

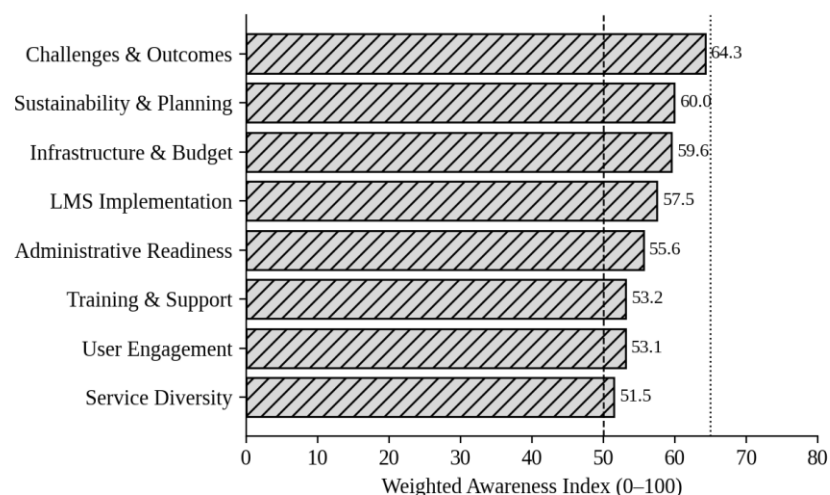


Fig. 11. Weighted Awareness Index (0–100) by readiness dimension. Dashed line = 50 (low/moderate); dotted line = 65 (moderate/high).

Table 10. *Weighted Awareness Index by dimension (n = 144)*

Dimension	Items	WAI	Band
Challenges and outcomes	5	64.3	Moderate
Sustainability and future planning	5	60.0	Moderate
Infrastructure and budget	4	59.6	Moderate
Cloud-based LMS implementation	9	57.5	Moderate
Administrative readiness and planning	5	55.6	Moderate
Training and technical support	5	53.2	Moderate
User engagement and feedback	5	53.1	Moderate
Diversity of cloud-based services	5	51.5	Moderate
Overall index	43	56.8	Moderate

Figure 11 and Table 10 summarise the Weighted Awareness Index for the eight dimensions. Challenges and outcomes recorded the highest score (64.3), followed by sustainability and future planning (60.0) and infrastructure and budget (59.6). Implementation (57.5), administrative readiness (55.6), training and support (53.2) and user engagement (53.1) occupy the middle range, while diversity of cloud-based services was lowest (51.5). All eight dimensions fall in the moderate band and the overall index is 56.8. No dimension reaches the high band, so readiness is partial and uneven, and services, training and engagement need the most attention.

Conclusion

This study measured the cloud readiness of 144 library professionals working in public libraries of Mumbai, Thane, Palghar and Raigad, using a 56-question survey and a Weighted Awareness Index. The overall index of 56.8 shows moderate readiness, and no dimension reached the high band. Only 11.8 percent of libraries were automated and 60.4 percent used no cloud-based LMS, while connectivity, dedicated IT technicians and diversity of cloud services were the weakest areas. At the same time, 56.9 percent of respondents regarded cloud systems as sustainable, and cloud tools beyond the LMS were widely used.

The findings point to three priorities: basic automation and connectivity, structured training with technical support, and financial planning that includes subscription and upgrade costs. The study is limited to four districts, uses a modest sample and reports index results from aggregated frequency tables. The machine learning assessment described in the methodology should be run and reported on the respondent-level data in future work, and the study can be extended to other districts of Maharashtra.

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