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# A Comparative Analysis of Automated and Manual Literature Reviews: Insights from Teaching and LIS Professionals, and Research Scholars

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**ABSTRACT**

*This study explored the comparative effectiveness and efficiency of automated versus manual methods of literature reviews among teaching professionals, LIS professionals, and research scholars. Applying a mixed-methods methodology, the survey questionnaire was blended with a more comprehensive literature review to examine the frequency of use and preferences, perceived advantages and disadvantages, and attitudes in the adoption of automation at the academic and research levels. In addition, 56 respondents offer insightful understanding regarding the perception and utilization of automation in professional groups. The study clearly shows remarkable differences in preference and practice and emphasizes how the role of technology is continuously changing in processes for literature reviews. Besides, it explains the problems and opportunities with automation incorporated into research and teaching workflows. This helps fuel the discussion on improving research practices and the rate of technological adoption in higher education and professional settings. This paper provides actionable advice for educators, researchers, and LIS professionals.*

***Keywords:*** *Automated Literature Review; Manual Literature Review; Research Practices; Teaching Professionals; LIS Professionals; Automation in Academia.*

## 1.0 Introduction

Academic research relies heavily on literature reviews since they are the cornerstone for synthesizing current knowledge, pointing out gaps, and setting the stage

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for future research. These reviews were previously carried out manually by experts and academics who navigated the vast terrain of scholarly publications, libraries, and databases. But new technologies have sparked a paradigm shift, bringing automated solutions that promise to improve accuracy and efficiency while streamlining this procedure. These days, with everything being digitized, there are big changes happening to the methods used for literature reviews.

Scholarly debate has been sparked by the contrast between printed manual methods and contemporary automated alternatives, prompting critical inquiries into their comparative effectiveness. Through the use of an interdisciplinary approach, we hope to provide subtle insights that cut beyond disciplinary borders and advance knowledge of the interplay between automation and manual approaches in the academic workforce. The purpose of this study is to inform best practices and assist professionals and scholars involved in literature review procedures in making informed decisions by clarifying the advantages, disadvantages, and implications of each technique.

Ultimately, this research serves as a guiding light for scholarly discourse at the intersection of tradition and innovation, where the transformative potential of technology meets the enduring pursuit of knowledge generation and dissemination.

## 2.0 Literature Review

Prior research has explored the benefits and limitations of both automated and manual literature reviews. Automated tools, such as citation management software and literature search engines, offer the advantage of speed and comprehensiveness. These tools can rapidly scan thousands of documents and extract relevant information, saving researchers time and effort **(**Carnevale *et al.*, 2019**)**. Conversely, manual literature reviews allow researchers to apply critical thinking skills and evaluate the quality of sources more thoroughly (Smith & Jones, 2020). Manual reviews also enable researchers to uncover nuanced connections between studies that may be missed by automated algorithms.

Automation has significant drawbacks, though. It is possible that automated technologies will miss important insights that are visible during a manual review process since they are unable to recognize the nuances and context included in scholarly publications (Green *et al.*, 2022). These tools also rely on predefined algorithms and keyword searches, which may lead to partial or biased data retrieval if the search parameters are not precise or well-tuned (Wilson & Thompson, 2021).

On the other hand, manual literature reviews enable researchers to use critical thinking techniques and more fully assess the Caliber of sources (Smith & Jones, 2020). Researchers can find subtle relationships between papers through manual inspections that

automatic algorithms might overlook. A more interpretive and integrative synthesis of the literature is made possible by this method, which encourages a deeper engagement with the content (Brown & Adams, 2018). Furthermore, manual reviews support a contemplative process that allows scholars to repeatedly improve their comprehension and classification of the literature (Martinez & Perez, 2017).

Moreover, hybrid approaches have been proposed as a method of combining the advantages of both manual oversight and automated instruments. These methods can improve the review process's effectiveness without sacrificing the thoroughness and attention to detail that come with manual evaluations (Harris & Baker, 2019). To ensure a thorough yet nuanced examination, these hybrid methods frequently involve first wide searches carried out by automated tools, followed by in-depth manual evaluations of the filtered results (Lee & Zhang, 2020).

## 3.0 Methodology

The study uses a mixed-methods approach; this review paper combines a survey questionnaire with a literature review to gain a comprehensive understanding of the topic.

**Objective:** This study aims to compare the outcomes, challenges, and perceptions associated with automated and manual literature reviews among research scholars, LIS professionals and teaching professionals.

**Survey Questionnaire:** Approximately 100 research scholars, LIS experts, and teaching professionals received the questionnaire via Google Sheets, WhatsApp, and email. To increase response rates and reach, the distribution was done through a number of channels. Participants' views and personal experiences with automated and manual literature evaluations were gathered for the survey. Particular fields of analysis included:

### 3.1 Frequency of conducting literature reviews

Preferred methods (automated V/s. manual). Perceived advantages and disadvantages of each method. Attitudes toward the automation of literature review processes in research and teaching.

#### 3.1.1 Sampling and data collection

The target population included individuals actively engaged in academic research, library and information science, and teaching. These groups were selected due to their direct involvement with literature reviews in their professional activities. Out of the 100

distributed questionnaires, 66 responses were received, of which 56 were selected for detailed analysis based on completeness and relevance of the responses.

### 3.1.2 Data analysis

Responses were analysed using Excel for quantitative data and thematic analysis for qualitative data. Quantitative data analysis involved descriptive statistics to summarize the frequency and distribution of responses. Thematic analysis was conducted to identify common themes and insights from open-ended responses, providing a deeper understanding of participants' attitudes and experiences.

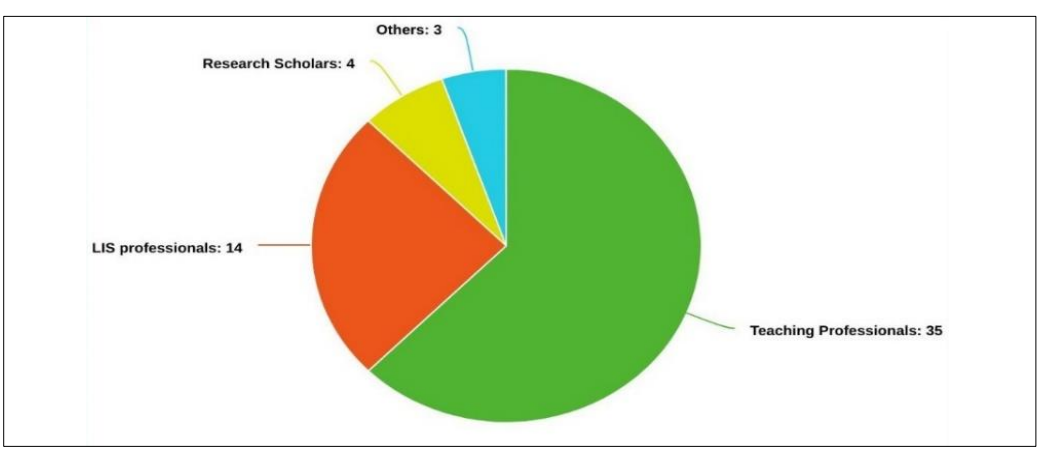
### 3.1.3 Limitations

- The survey is limited to the time period from April 1 to May 14, 2024.
- The survey was conducted in India.
- There is no conflict of interest in the topic.

### 3.2 Interpretations

**Professionals responded to the survey:** 62.5% respondents are teaching professionals and Faculty, 7.14% of respondents are Research Coordinator and Research Scholars, 25% of respondents are LIS professionals and 5.67% are Laboratory Professionals, IT and Analyst. Hence, major respondents are Teaching Professionals / Faculties. Figure 1 shows respondents' professional backgrounds.

**Figure 1: Respondents' Backgrounds**

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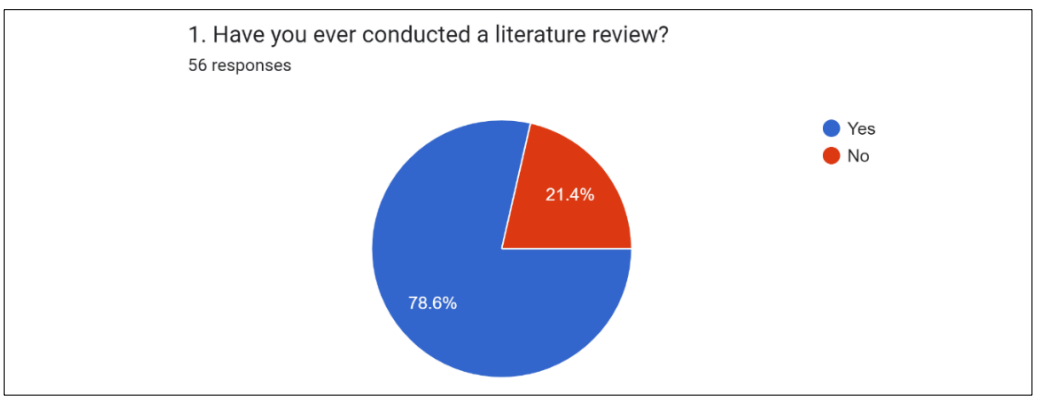
### 3.3 Literature review practices

Figures below show the literature review practices. Figure 2 shows the percentage of respondents engaged in literature reviews. Figure 3 shows the frequency of conducting literature reviews among respondents. Figure 4 shows preferences for automated, manual, or hybrid methods.

**Figure 2: Engagement in Literature Reviews**

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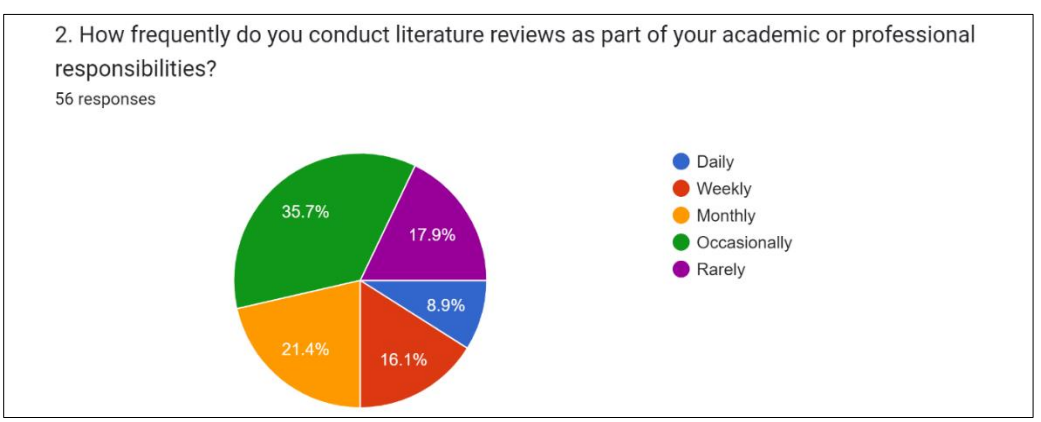
44 respondents selected the response of yes and where 12 selected as no options.

**Figure 3: Frequency of Literature Reviews**

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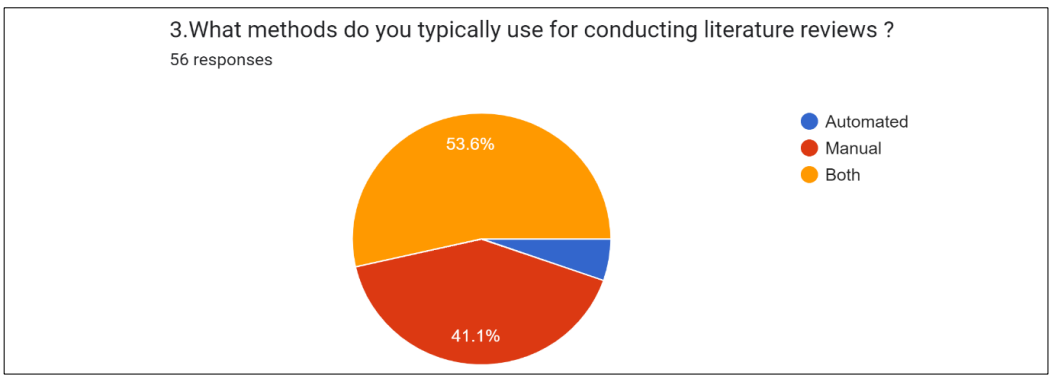
8.9% respondents selected daily, 16.1% opted for weekly, 21.4% choose monthly, 35.7% responses were occasionally and 17.9% made a choice of rarely. Where, occasionally and rarely are 53.6% and 46.4% in the options of daily, weekly, and monthly.

**Figure 4: Preferred Methods**

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5.3% of respondents selected the option of automated, 42.1% opted of manual and 53.6% choose both.

### 3.4 Perceptions of automated and manual literature reviews

Figures below shoe the perceptions. Figure 5 shows awareness levels of automated review tools. Figure 6 shows common tools utilized for literature reviews.

**Figure 5: Awareness of Automation**

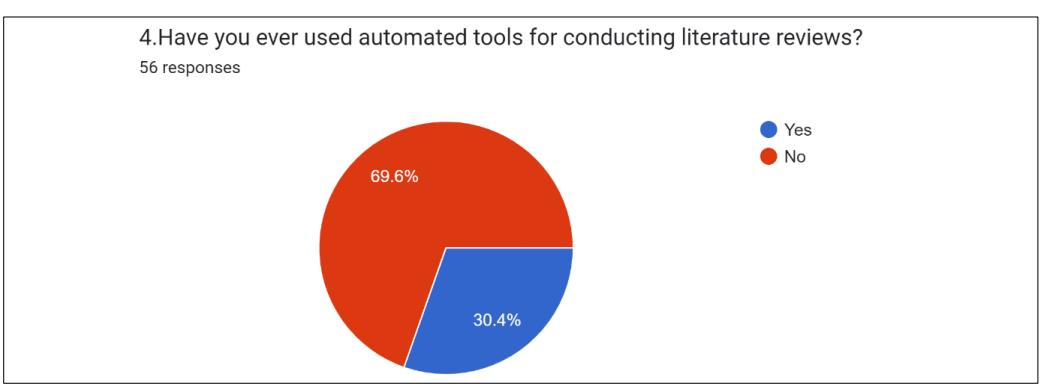


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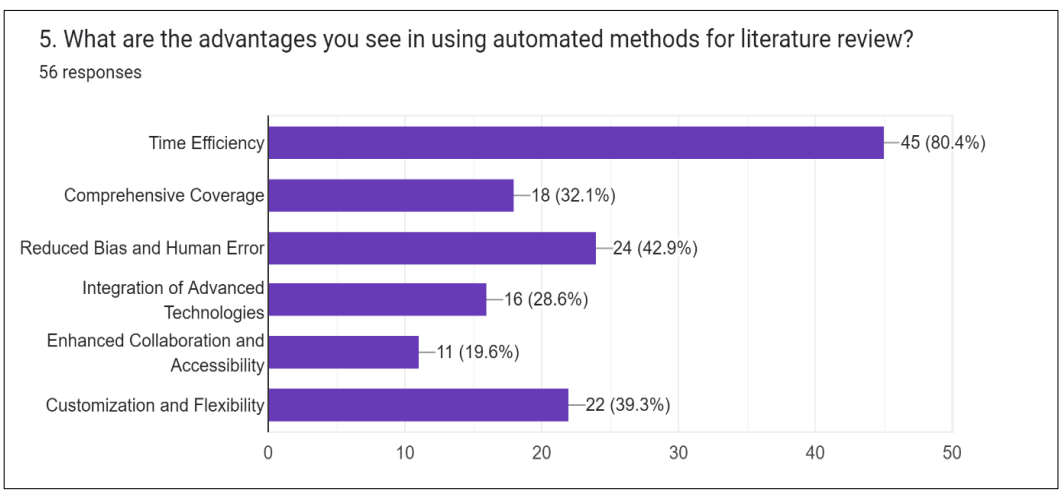
Figure 7 shows advantages of automated reviews as identified by respondents. Figure 8 shows respondents' comfort with automated review methods. Figure 9 shows effects of review methods on research outcomes.

30.4% (17) respondents selected the option of yes and where, 69.6% (39) respondents choose the option of No.

**3.5 If yes, which tools have you used, and what was your experience with them?**

The 15 respondents' responses were Google Scholar, Manual feels good, Zotero, AI tools, Mendeley, AI tool chat gpt, R software- it was a good experience, Pubmed, Scopus, Scholarcy, IEEE, CHATGPT, ChatGPT, ebscohost, chatgpt, SCISPACE, and Databases Good.

**Figure 6: Tools Used for Reviews**

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The respondents opted the advantages like Time Efficiency (80.4%), Reduced Bias and Human error (42.9%) and Customization and Flexibility as high weights (39.3%) and Comprehensive Coverage (32.1%), Integration of Advanced Technologies (28.6%) and Enhanced Collaboration and Accessibility (19.6%) are lower weightage.

The respondents choose like Technical Complexity (42.9%), Limited Access to Specialised (44.6%), Retrieval of irrelevant or Low-Quality information Ethical and Legal Considerations (32.1%), Cost and resource constraints (28.6%), learning curve and training (23.2%) is a major limitation.

**Figure 7: Perceived Advantages**

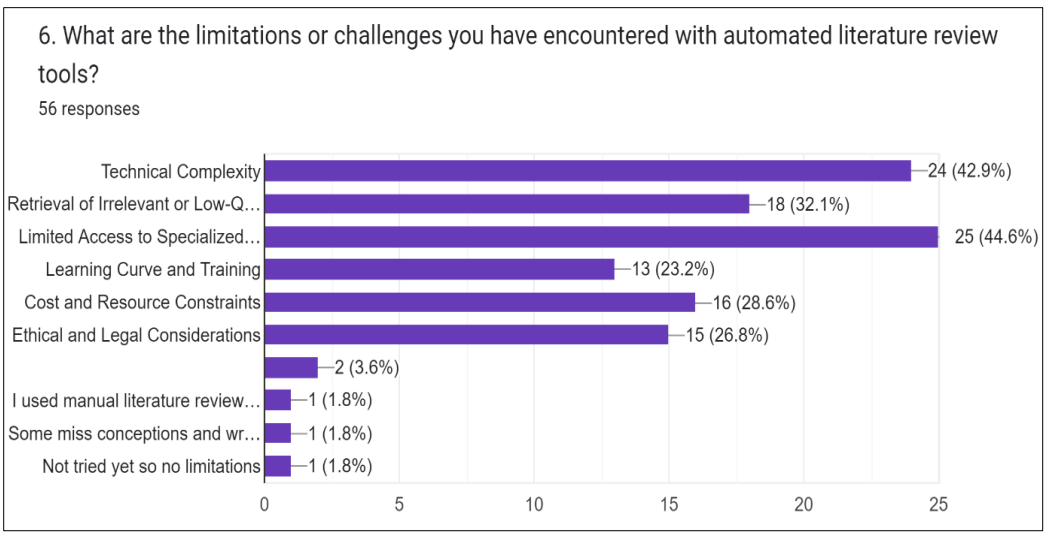


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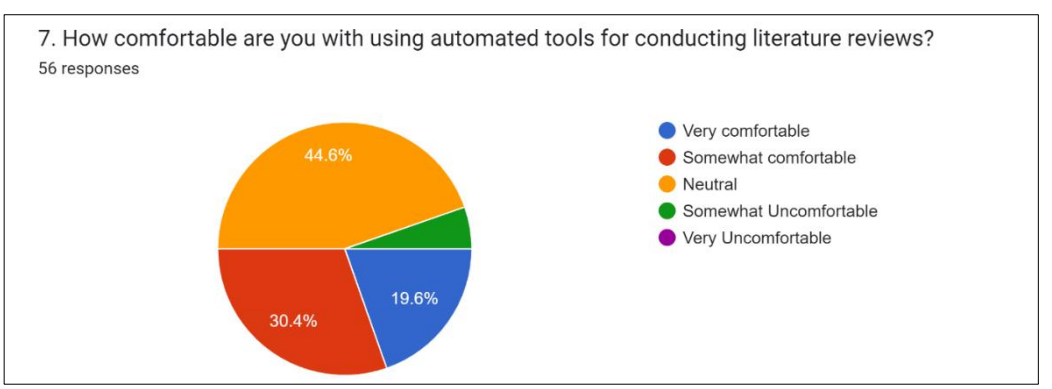
**Figure 8: Comfort Levels**

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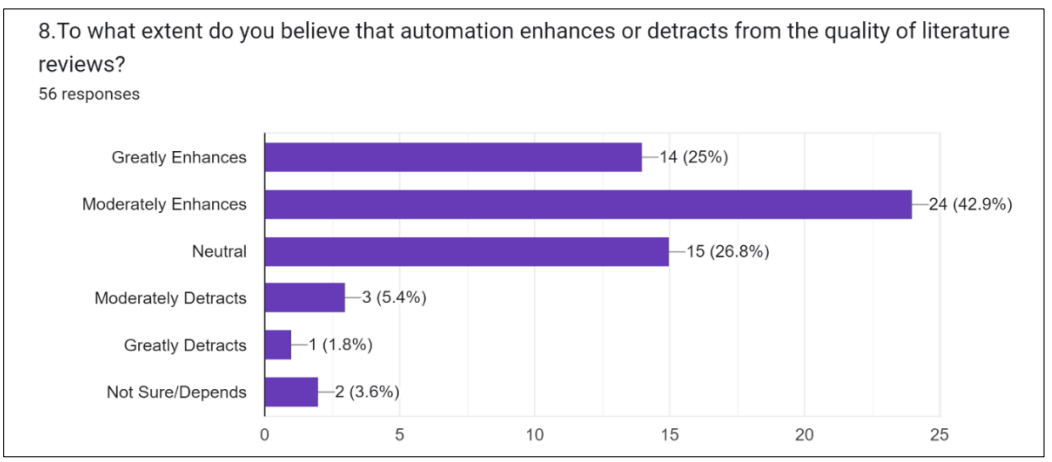
Neutral respondents are 44.6%, 19.6% selected the option of very comfortable, 30.4% are somewhat comfortable 5.4% responses are somewhat Uncomfortable.

25% respondents opted for greatly enhances (14) and moderately enhances (24) and 26.8% (15) respondents opt for neutral. Whereas, 3 respondents select the option of Detracts and 2 respondents choose not sure / depends.

**Figure 9: Impact on Research**

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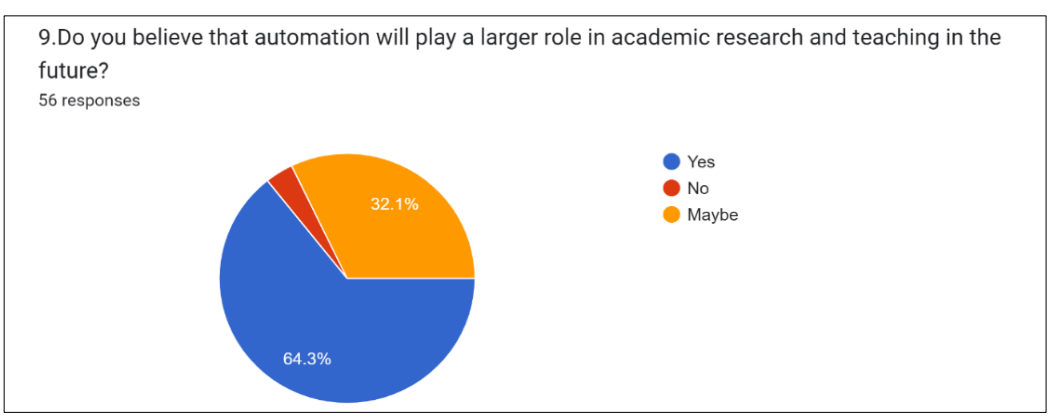
Below the pictures give the pictorial representation Figure 10 shows the willingness to adopt automated tools in the future. Figure 11 shows factors contributing to effective literature reviews. Figure 12 shows the major challenges faced during literature reviews. Figure 13 shows common practices used in manual reviews. Figure 14 shows criteria used to assess literature sources.

**Figure 10: Future Adoption Preferences**

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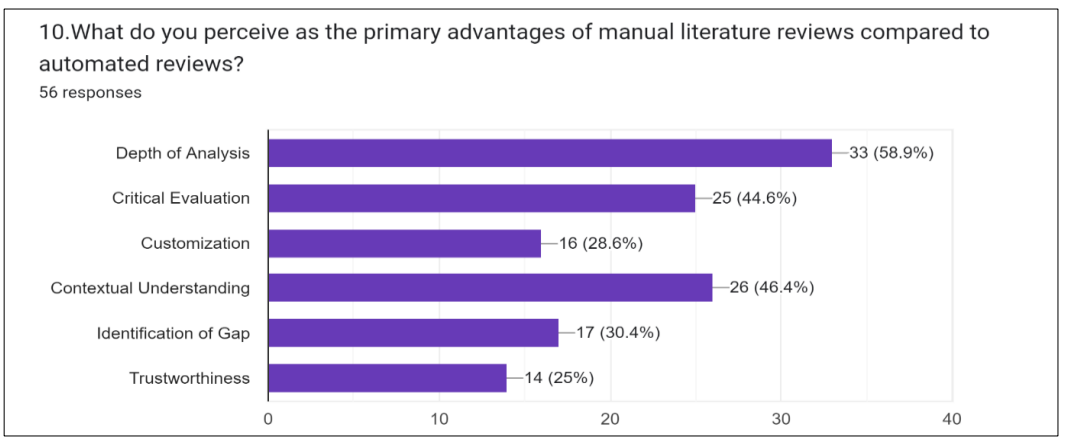
64.3% (36) respondents choose the option of Yes and 18 respondents choose no option, whereas 2 respondents choose Maybe.

**Figure 11: Key Review Factors**

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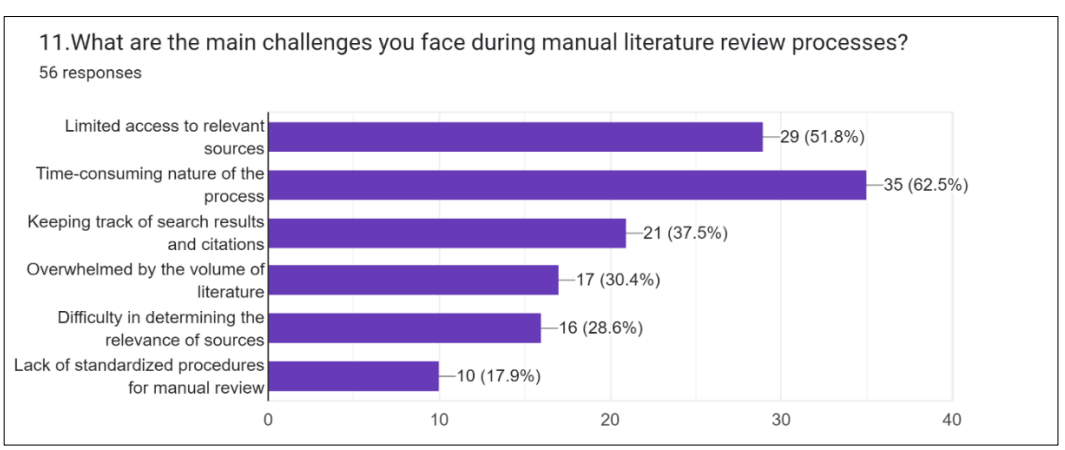
The responses were like, Depth of Analysis 33 respondents, Contextual Understanding 26 respondents and whereas, Critical evaluation responses was 25. 16 respondents choose customisation, 17 responses were identification of gap and 14 responses was trustworthiness.

**Figure 12: Challenges Identified**

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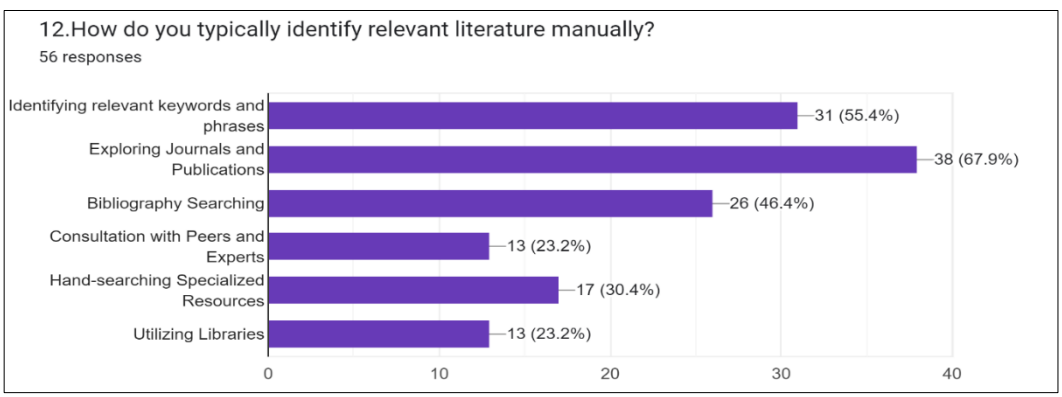
The main challenges according to the responses received are like 1st as Time-consuming nature of the process (62.5%), 2nd as Limited access to relevant sources (51.8%), 3rd as keeping track of search results and citations (37.5%), 4th as overwhelmed by the volume of literature (30.4%) and Difficulty in determining the relevance of sources (28.6%) and 5th to lack of standardized procedures for manual review (17.9%).

**Figure 13: Manual Review Methods**

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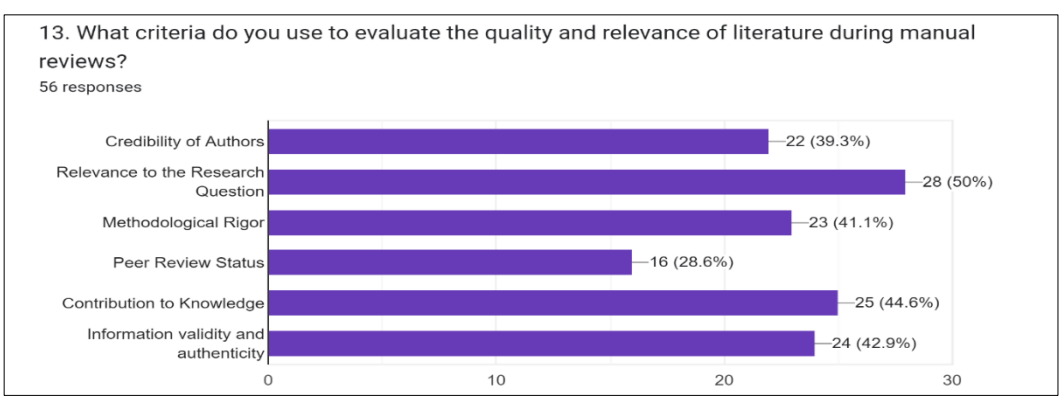
38 respondents choose Exploring journals and publications - 31 respondents, identified relevant keywords and phrases – 26 respondents and Bibliography searching – 17 respondents select the option, where Hand-searching specialised resources, utilizing libraries and Consultation with peers and experts was selected as a low as concerned.

**Figure 14: Evaluation Criteria**

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All the 6 options like 1. Relevance to the research question (50%), 2. Contribution to knowledge (44.6%) 3. Information validity and authenticity (42.9%), 4. Methodological Rigor (41.1%) and, 5. Credibility of authors (39.3%) and 6. Peer review status (28.6%) are selected by the respondent's response.

### 3.6 Comparison between manual and automated methods

Figure 15 shows the key differences between manual and automated methods. Time and Efficiency is the major differences which selected by the respondents. Where, Cost and Resources, Human judgement and Depth of Analysis was medium responses and also Error-proneness and Identification of Nuances was low responses for this option.

**Figure 15: Manual vs. Automated**

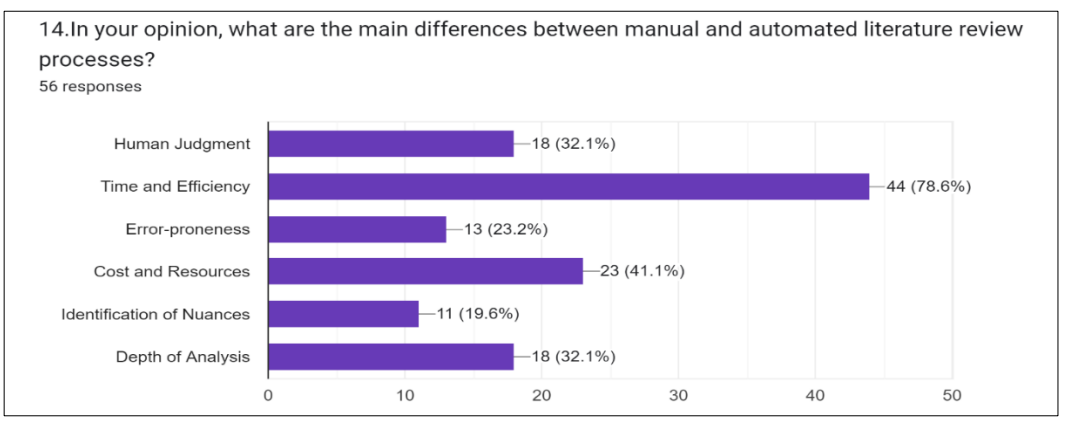


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**Figure 16: Preferred Approach**

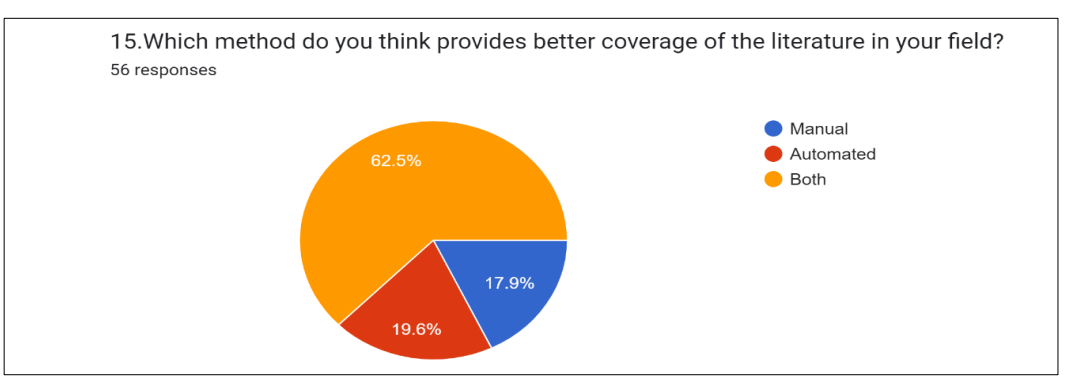


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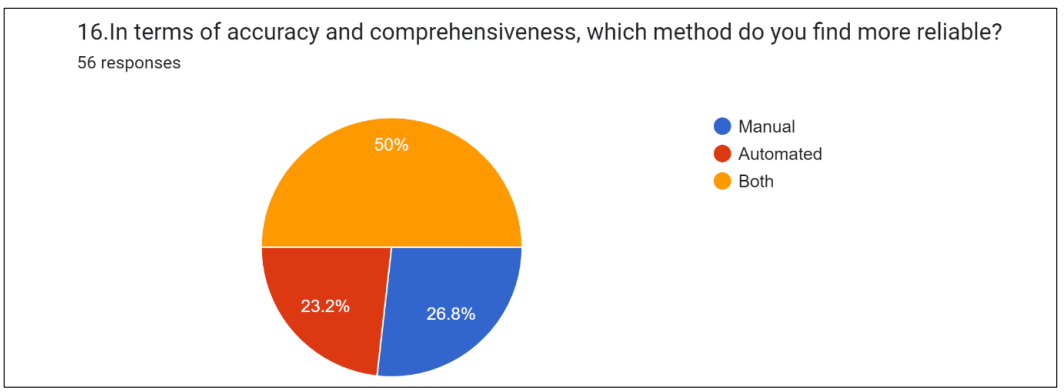
Figure 16 shows preferences for specific review methods. 62.5% of respondents select the option of both, where 19.6% for automated and 17.9% for manual.

**Figure 17: Scenario-based Choices**

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5Figure 17 shows method preferences in different research scenarios. 0% choose both option, 23.2% choose manual and 26.8% choose automated option.

## 4.0 Preferences and Recommendations

Figure 18 shows overall preferences for literature review methods.71.4% responses were both and 17.9% as manual and 10.7% as automated. Figure 19 shows perceptions of automated reviews' pros and cons.

**Figure 18: Overall Preferences**

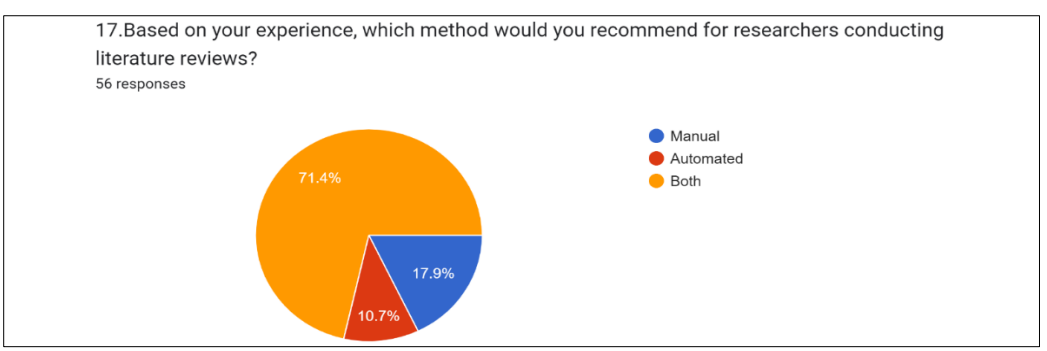


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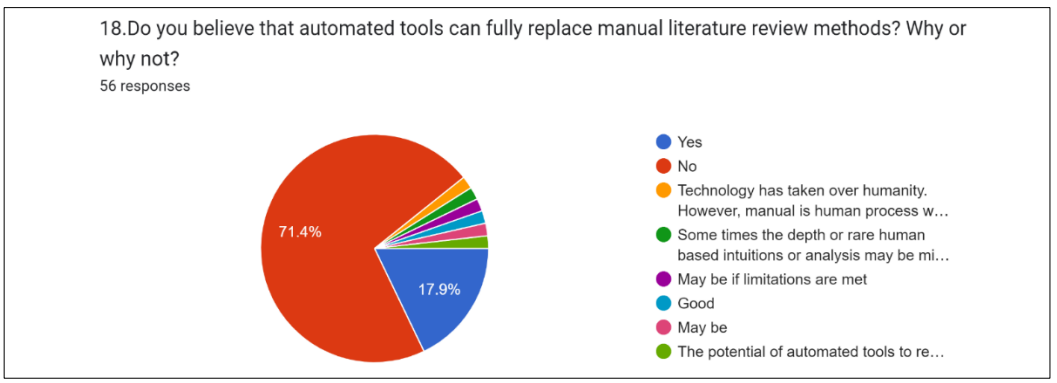
**Figure 19: Concerns and Benefits**

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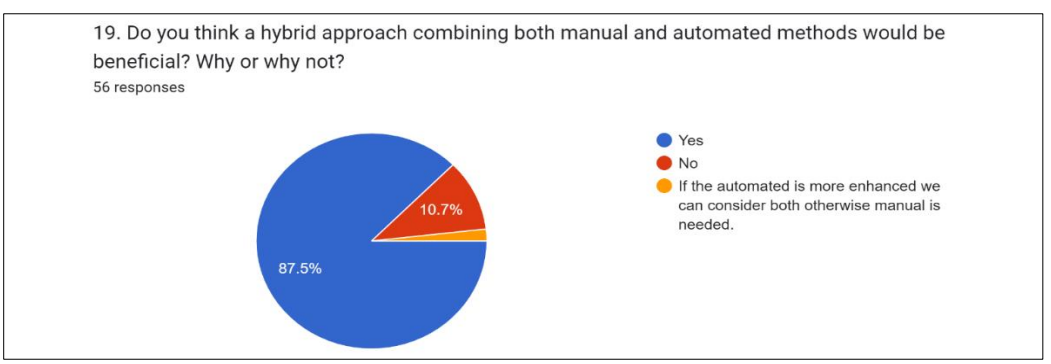
71.4% strongly responded for No option, 17.9% responses were yes and 10.7% responses were may be, potential, depth analysis and other. Figure 20 shows Respondents' recommendations for adopting automated tools.

**Figure 20: Future Recommendations**




*Source: Created by the author based on data analysis*

87.5% respondents select the option of yes, whereas, 10.7% respondents choose No and 1.8% respondent gave a mixed reason.

## 5.0 Findings

1. 35 respondents are faculty / teaching professionals
2. 44 respondents gave the responses as they conducted the literature review.

3. Literature review frequency – 46.4% in the options of daily, weekly, and monthly and where, occasionally and rarely are 53.6% and
4. Methods typically used to conduct literature review – 53.6% opt for both methods.
5. Usage of automated tools for conducting literature review – 69.6% (39 respondents) gave information of NO.
6. The advantages towards automated literature review like Time Efficiency, Reduced Bias and Human error and Customization and Flexibility were selected by the respondents.
7. The challenges or limitations of automated literature review - like Technical Complexity, Limited Access to Specialised, Retrieval of irrelevant or Low-Quality information Ethical and Legal Considerations, Cost and resource constraints, learning curve and training was highlighted by the respondents.
8. Comfortable in using automated tools in literature review - 44.6% in neutral and 50% respondents say comfortable.
9. Automation will play a larger role in academic research and teaching in the future – 64.3% (36 respondents accept).
10. Primary advantages in manual literature reviews - Depth of Analysis, Contextual Understanding and Critical evaluation.
11. The main challenges according to the responses received are like 1st as Time-consuming nature of the process, 2nd as Limited access to relevant sources, 3rd as keeping track of search results and citations, 4th as overwhelmed by the volume of literature and Difficulty in determining the relevance of sources and 5th to lack of standardized procedures for, manual review.
12. Time and Efficiency, Cost and resources were the major differences found from the respondents.
13. Better coverage of the literature – Both options were selected by the respondents 62.5%.
14. Accuracy and comprehensiveness are reliable in both options, according to the respondents.
15. Recommend and Suggested for the researchers to conduct literature review – Both options were selected for 59.2%.

## 6.0 Analysis Based on Responses

1. The respondents prefer both the method for time-saving and information gatherings.

2. The responses give clear information there are Time Efficiency, Reduced Bias, and Human error Customization and Flexibility, and also, they gave information on challenges.
3. Respondents gave information on how automation will play a role in academic research and also few respondents gave information like the technological tool playing a vital role.
4. The respondents highlight on major differences in time and efficiency, cost, and resources.
5. In the questionnaire the suggestions and recommendations of mixed manual and automated literature review.

## 7.0 Conclusion

A study reveals mixed opinions among research scholars, LIS professionals, and teaching professionals on the use of manual and automated literature review methods. Automated tools are praised for their speed and efficiency, but they often lack the ability to discern nuanced connections and contextual subtleties. Manual reviews, on the other hand, are appreciated for their depth and critical evaluation capabilities. The study suggests a balanced approach, integrating both automated and manual methods, to enhance the quality and efficiency of literature reviews. It recommends adopting hybrid review strategies, investing in advanced tools, and providing training for effective utilization. The study also indicates that automated literature reviews will be used with greater effectiveness in the future.

## 8.0 Suggestions / Recommendations

1. Deep study in review along with approaches.
2. Analysis of Statistical tools.?
3. Wide approach of feasibility analysis.?

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