LIBRARY HERALD
Vol 60 No 2
June 2022

Librarian's Gender, Age, Qualifications and Experience Impact on Choice of Open-Source Software

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Choice of the software for different functions of the library is an important decision for the librarian. Various commercial and open-source software for different functions of the library is available in the market. Librarians often face issues in determining if they go for commercial software or open-source software or a hybrid model where both software are used. The current study aims to explore the various impacting factors that influence librarians' decision and choice of the software for different functions of the library. The current study tests different hypotheses made by the researcher to validate if age, qualifications, experience and gender of the librarians have any impact on their decision in choosing software for their libraries. This is a quantitative study based on data collected through questionnaire among a target segment of librarians working in private sector management institutions in Noida and Ghaziabad areas of the Uttar Pradesh, India. Both descriptive and inferential data analyses conducted using SPSS software. The results of the data analysis revealed that age, qualifications, experience and gender of the librarians actually have direct impact on choice of the software among respondent libraries, however, gender and experience of the librarian had a significant impact on the choice of the software made by them. Women librarians showed higher level of trust on commercial software and more librarians from both genders having over 10 years plus experience were ready to experiment and trying open-source software than the librarians with lesser experience. The outcome of this study can become groundwork for a further detailed study encompassing all type of libraries in all geographical regions to determine if the results hold true among all librarians and for all types of libraries.

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Keywords: *Librarian's Qualifications, Librarian's Experience, Librarian's Gender, Librarian's Age, Commercial Software, Open-Source Software, OSS, CS, Software Choice, Impact Factors*

1 INTRODUCTION

Use of technology and software for different functions of the libraries and to connect with users is a basic necessity for successful operations of any library. In addition to in-house software, if used by some libraries, two models of software currently are popular viz. commercial software and open-source software. Both software claim to have their unique advantages and various research studies have been conducted that distinguish between both models and also compare advantages and disadvantages. Commercial software is still used in very large number across libraries but different studies indicate that use of open-source software is fast picking up in libraries at least for some functions of the libraries. While some studies advocate about benefits of commercial software, other studies mention supremacy of using open-source software over commercial software. Librarians need to determine which type of software will best suit their requirements keeping in mind different facilities or constraints of their libraries. A careful and well-research judgement is necessary as library software are not changed overnight and once a software is taken, it is not easy to replace the same due to varied reasons.

In terms of code writing, there is very little difference between commercial software and open source sofrware (OSS). Both are software and perform more or less same functions and come with almost same functionalities. Factor distinguishing open-source software from commercial software is primarily availability of the source code along with the software under a public license unlike commercial software where source code is not shared with end-users and remain exclusively with the producer of the software. Though many a times layman confuse open-source software with free software but open-source software is not related to the cost factor. Developers may charge a fee for their open-source software too unlike in the case of free software. The advantage of open-source software over other types of software lies in the availability of the source code which can be used by anyone for further development, modification to suit individual or general requirements and may be redistributed. Another major advantage of open-source software lies in the fact that it is a community driven model of software development.

Libraries are using technology and different types of softwares for over two decades now. Library software have become more features rich, more complex than the one existed earlier. New developments keep taking place on regular basis and new versions of the library software keep coming on regular basis. A number of commercial software and open-source software exist in the

market for different functions of the library like automation of library routine work, digitization or developing an institutional repository, web-content management, and learning management systems. While commercial software comes as a ready to use package not subjected to change by end users, open-source software comes with an additional feature that librarians by themselves or using others help may make modifications in the software to best suit their requirements. Not only this, they may redistribtue a product free or on cost basis after these modifications.

Both models of the software come with assurance of after sale service. However, open-source software being community led initiative provide community-based support also and not limited just to the software producer alone.

Adoption level of either commercial or open-source software or both may depend upon various factors for a librarian. Qualifications, skill sets, age, experience and gender of the librarian are among a few of them. It is a general perception that librarians with higher qualifications and experience are more confident and are in a better position to experiment than the librarians with lower qualifications and with less experience are. Impact of the age of the librarian about choosing a software can go either way. It is again a general perception that older people are not highly technology savvy and avoid experimentation. Gender impact on choice of the software is again a grey area of study. According to Gupta[1], information technology sector in India employs a large number of women but most of them are at entry-level position and their number shrinks faster as one moves towards higher positions.

Many studies indicate that women librarians face discrimination and barriers in their career building and development and reasons vary in terms of social, cultural, and family set-up. Even today, women are primarily supposed to look after the home, bear children, take care of the family and do house-chores. Even working-class women are burdened with multiple responsibilities. This results in women generally becoming less risk taking at workplaces and more likely to follow a defined path and become less ambitious.

2 OBJECTIVES

The current study has gathered data of both male and female librarians working in the private sector institutions offering management programs. It will analyze if there is any relationship between qualification, experience and gender of the librarian on choice of the software made by them. It will also determine if more males or more females' librarians will be open for open-source software for library use.

This study is therefore specifically inquired:

(a) If age of the librarians has any significant impact on choice of the software (b) If qualifications of the librarians have any significant impact on choice of the software (c) If experience of the librarians has any significant impact on choice of the software (d) If gender of the librarian has any significant impact on choice of the software (e) Whether more males or more female librarians will opt for open-source software

3 SIGNIFICANCE

Using software for library works is a necessity for any library now. open-source software are getting popularity as these come bundled with availability of the source code and community support in crisis situations. Moreover, statutory bodies managing education are also promoting open-source software due to cost effectiveness and reasons cited above. Results of this study will determine and provide guidelines for other librarians how can they go about for choosing open-source software if not already done. This study will also highlight barriers and concerns faced by the respondent librarians. Their experiences will provide solutions to overcome those barriers.

4 HYPOTHESES

(a) Age of the librarians has significant impact on choice of the software. (b) Qualifications of the librarians have significant impact on choice of the software. (c) Experience of the librarians has significant impact on choice of the software. (d) Gender of the librarian has significant impact on choice of the software. (e) More males librarians than female librarians will opt for open-source software.

5 LITERATURE REVIEW

Open-Source Software (OSS) is a well-research area now and can become a separate discipline. However, beauty of research lies in its continuation and progress. Researchers in this study have therefore tried to find out what are the gaps areas to carry out new research in open-source software use in the libraries. After scanning the ocean of existing literature, we found that enormous research publications exist related to history, growth and development, comparison of commercial software with open-source software, licensing terms of OSS, barriers faced in OSS implementation, community model of development etc. However, there are only scant studies related to librarians' qualifications, experience and gender impact on open-source software adoption in the libraries and none of them are exclusive studies on these aspects but just mention some references of these aspects and this led to the need of the current study.

After going through the different studies, authors could gather and

segregate following studies that may have some relevance in context of the current study. Research gaps observed among these studies have helped in developing objectives and hypotheses for the current study.

51 STUDIES RELATED TO CRITERIA IN CHOOSING LIBRARY SOFTWARE

Raghunadha Reddy and Kumar[2] paper developed a criterion to choose a library software. Their criteria included software matching library requirement, quality of the software in terms of features and functions, training requirements needed, operating system used, hardware requirements, easy to use users' interface with customization facility, multi-functionality, flexibility following international standards, scalability, reports, security and portability of data. Similarly, Bhadauria, Mahapatra, and Manzar[3] have provided five influential factors that determine open-source software adoption viz. individual, structural, technological, task related and organizational. Kasaine and Khamadi[4] in their study tried to understand impact of organizational size, structure and culture on open-source software adoption in higher educational institutions of Kenya. Morgan and Finnegan[5] provided four contexts i.e., technological, organizational, environmental, individual, which influenced OSS adoption in any organization. Dedrick and West[6] also identified that technology; organizational; environmental contexts and user's adoption process determine adoption of open sources software. Depietro, Rocco, Edith Wiarda and Mitchell Fleischer[7] study provided a framework 'TOE framework' i.e., Technology, Organization and Environment as key factors responsible for OSS adoption.

52 STUDIES RELATED TO GENDER IMPACT IN CHOOSING LIBRARY SOFTWARE

One of the core objectives of the current study is to study if gender of the librarian has any impact while choosing software for the library work is. A few research studies have looked into the gender aspect and librarianship. According to the seminal study by Hansen, Gracy and Irvin[8], during 20th century male librarians treated women as "active partners" but not "equal partners" and women faced lot of discrimination in terms of pay and leadership role. Though this perception diminished to certain extend during 21st century but women still face discrimination in terms of pay gaps and assigning leadership roles (Hansen, Gracy and Irvin)[9]. Dasgupta[10] wrote that financial status of male members of the family was recognizing factor for women status also in 20th century. Dasgupta[11] observed that leadership was still a male trait as per majority views. According to Lin & Besten[12], males dominate the software development world even today. Lie, Merete[13] identified women in minority in IT industry. Gupta[14] study mentions that in Indian IT sector, women are employed in higher number than western counterparts but at lower positions. Majority of the women do not reach to higher positions. Dias[15] study observed hostility in team behavior

towards women. According to Dias[16], women encounter various barriers in the IT industry. According to Powell & Hunsinger[17] paper, gender bias is still prevalent in open-source software domain.

Vijayakumar and Sheshadri[18] paper's findings are contrary to general perception and according to their study gender discrimination no more exists among libraries and women are getting equal opportunities in the current century. Dasgupta[19] also acknowledges that stereotypes views are changing gradually and more women are reaching on higher levels now, but she also writes that bias again women still persists and women have to go a long way for getting equal status. Nithya[20] also found growing inclusiveness in open-source community towards women now.

53 STUDIES RELATED TO BARRIERS AFFECTING WOMEN

Vijayakumar and Mala[21] & Srija and Srinivas Vijay[22] have listed challenges including lacking self-attention time, work-life imbalance, family responsibilities and maternal duties. Gupta[23] study finds very a smaller number of women reach to higher positions as their industry span in about 5 years only due to marriage and motherhood responsibilities.

A report by OECD[24] cited lack of access to digital tools, affordability, lack of education and opportunities, social and cultural bias against women as key factors responsible for digital gender divide among G20 nations. Akhtar and Soroya[25] cited marriage, children, and career breaks, lack of mentoring & family support and hostile organizational structure & policies as the leading factors adding discrimination against women. Singh and Bongiovanni[26] mentioned that women face continuous judgements at workplaces leaving very little scope for error.

54 STUDIES RELATED TO MOTIVATION FACTORS THAT MAY HELP WOMEN

Singh and Bongiovanni[27] suggested support of a good mentor, team-leader, colleagues resulting in boosting confidence levels in the initial phase of their career may contribute to more women reaching top positions. Trinkenreich[28] paper gave details of motivation factors and various career options for women in open-source software industry. There are no exclusive studies available related to librarian's age, qualifications, or experience impact on the choice of the software made by the librarians. These three aspects have hardly found any mention in the large number of studies made on librarianship and open-source software. Similarly, no exclusive study mentions if gender of the librarians had any impact on choice of software for their libraries.

Hence, the current study is an attempt to study if librarians' gender, age and qualifications have any visible and significant impact on choice of software made by them.

6 LIMITATIONS OF THE STUDY

61 GEOGRAPHICAL

Uttar Pradesh is the largest populous state in India and the Noida and Ghaziabad areas of Uttar Pradesh are two major hubs of private educational institutions offering management programs due to their vicinity of National Capital Territory of Delhi. Hence, geographical area of this study confines to the libraries of management institutions of the Noida and Ghaziabad.

62 DOMAIN

Domain of this study is restricted to the libraries of management institutions. Standalone, integrated campuses, university systems offering at least one management program among its multiple programs in the private sector.

63 PEOPLE

This study has surveyed only the librarians to get their views on the choices of the software made by them and reasons behind their choices. Other staff of the library are not included in the survey. This has been done as primarily it is the responsibility of the librarian to choose what type of software is to be used and staff follow the choice made by the librarian.

7 DATA COLLECTION

Researcher used Questionnaire Method for data collection. For the sample institutions, researcher referred the AICTE and UGC websites to get the list of the approved institutions or universities offering management program. Researcher distributed questionnaire among 103 institutions. Eighty-one institutions responded to the questionnaire. However, among 81 respondents, many were not offering management program and a few did not fill complete data hence finally 69 responses were taken into account for data analysis. Researcher used SPSS software for analysis. Out of 69, 2 institutions were still running manual operations of their libraries.

Researcher also conducted a reliability analysis test with the collected data before proceeding for detailed analysis. The Cronbach's alpha values was calculated and found above 0.7 hence confirming high-internal consistency reliability thus data was found suitable for further analysis.

8 DATA ANALYSIS

Table 1: Respondent Librarians' Serving Institutions Break-Up

Type	Count	Percent
Stand Alone	26	37.68
University	12	17.39
Part of an Integrated Campus	31	44.93
Total	**69**	**100**

Among 69 final respondents, largest segment of the institutions they are working in (approx. 45 per cent) are part of an integrated campus followed by almost 38 percent as standalone institutions offering management program only and 17 percent are universities hence sample is diversified.

Table 2: Gender of the Respondent Librarians

Gender of the Respondent Librarians	Frequency	Percent
Female	18	26.1
Male	51	73.9
Total	**69**	**100**

Majority of the respondent librarians (74 percent) were men and 26 percent were women, which, correlates the fact that lesser number of women reach the highest position.

Table 3: Age of the Respondent Librarians

Age of the Librarians	Frequency	Percent
20-30 Years	7	10.15
30-40 Years	23	33.33
40-50 Years	31	44.92
50-60 Years	7	10.15
Above 60 Years	1	1.45
Total	**69**	**100**

Among the respondent librarians, highest percentage of the librarian are in the age group of 40-50 years followed by 30-40 age group. Librarians reaching towards the end of their career and librarians those starting their career were almost same among respondents.

Table 4: Highest Qualifications of Respondent Librarians

Highest Qualifications of the Respondent Librarians						
Qualification	**Females**	**Percent**	**Males**	**Percent**	**Total**	**Total Frequency**
Graduate	0	0	1	1.45	1	1.45
Post Graduate	8	11.59	18	26.09	26	37.68
M. Phil	3	4.35	6	8.7	9	13.05
Pursuing Ph.D.	3	4.35	7	10.14	10	14.49
Ph.D.	4	5.79	19	27.54	23	33.33
Total	**18**	**26.08**	**51**	**73.92**	**69**	**100**

Data from Table 4 shows that most of the respondent librarians possess at least post-graduation degree while a significant number of the librarians are either Ph.D. or pursuing Ph.D. Most of the male and female librarians are well qualified and hence there is no significant deviation as far as qualifications are concerned among male and female librarians.

Table 5: Working Experience of the Respondent Librarians

Total Work Experience	Frequency	Percent
0 - 5 years	6	8.7
5- 10 Years	6	8.7
10-15 Years	28	40.6
15-20 Years	17	24.6
Above 20 Years	12	17.4
Total	**69**	**100**

Highest number of respondent librarians (40.6 percent) carry 10-15 years of experience. From Table 5, it is evident that most of the librarians at least carry ten years of experience and only a small percentage of librarians have become librarians with less than ten years of experience.

Table 6: Working Experience Bifurcation among Male and Female Librarians

Work Experience Bifurcation among Male and Female Librarians					
Experience (Years)	**Female (Count)**	**Percent**	**Male (Count)**	**Percent**	**Total Percent**
0-5	3	4.35	3	4.35	8.70
5-10	3	4.35	3	4.35	8.70
10-15	8	11.59	20	28.99	40.58
15-20	2	2.90	15	21.73	24.63
20 –onwards	2	2.90	10	14.49	17.39
Total	**18**	**26.09**	**51**	**73.91**	**100**

From the data of Table 6, it is clear that at the beginning of the career, number of male and female librarians are same, however, more women librarians are either leave their jobs or are not promoted to higher i.e., librarians' positions and male librarians with higher experience are much more both in numbers and percentage than female librarians. This is in line with Gupta (2018) study results also that women career span reduces after 5 years in IT industry.

Table 7: Choice of Open Source/Commercial/Both/None Software among Respondents

Do You Use Commercial/Open-Source Software/Both/None						
Software Type	**Males**	**Frequency**	**Females**	**Frequency**	**Total**	**Total Percent**
Commercial	23	33.33	12	17.39	35	50.7
Open-Source Software	8	11.59	1	1.45	9	13.0
Both	19	27.54	4	5.8	23	33.3
None	1	1.45	1	1.45	2	2.9
Total	**51**	**73.91**	**18**	**26.09**	**69**	**100**

Data from Table 7 shows that commercial software is still the most preferred choice among respondents; however, open-source software adoption is fast catching up if one counts use of exclusive open-source software and both software together. Data also shows that commercial software use has come down to almost 51 percent from earlier 100 percent when open-source software was not available. If data and percentage is looked among absolute number of gender wise respondents, then percentage of female librarians using commercial software is very significant comparing to male librarians. Again, the data asserts that women librarians are also opting for open-source software either exclusively or at least for some of the functions. A large number of respondents are using both types of the software. Just 2.9 percent of respondents were not using any of the software.

Table 8: Software Used in Different Functional Areas

Functional Areas	Commercial		OSS		None		Total	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
For Operating System	57	85%	7	10%	3	4%	67	100%
For Desktop Software	56	84%	6	9%	5	7%	67	100%
Integrated Library System	39	58%	23	34%	5	7%	67	100%
Institutional Repository/Digital Library	22	33%	19	28%	26	39%	67	100%
Learning Management System	37	55%	16	24%	14	21%	67	100%
Web-Content Management	29	43%	8	12%	30	45%	67	100%

Out of 67 respondents using software for library operations, Table 8 data shows commercial software usage is dominant for all operations but open-source software is picking up in three key functional areas of the libraries i.e., automation of library system, institutional repository or digital library and for use as Learning Management Systems.

Table 9: Qualifications Impact on Choice of Library Software

		Given a choice between Commercial Software and open-source Software, which one you would prefer to choose.					
		Open-Source Software			Commercial Software		
		Gender of the Librarian			Gender of the Librarian		
		Female	Male	Total	Female	Male	Total
		Count	Count	Count	Count	Count	Count
Highest Qualifications	Graduate	0	0	0	0	1	1
	Post-Graduate	3	8	11	5	10	15
	M.Phil.	1	5	6	2	1	3
	Pursuing Ph.D.	1	4	5	2	3	5
	Ph.D.	3	12	15	1	7	8
	Total	8	29	37	10	22	32
Respondents Percentage		44.44	56.86	53.62	55.56	43.14	46.38

Asking about choice of software, they will make if all support is available, males and females librarians with different qualification levels responded differently. More (56%) female librarians preferred to choose commercial software than male librarians (43%) did. For open-source software choice was opposite as 44 percent females and 57 percent males preferred OSS respectively. Data of the Table 9 also implies that with higher qualification, choice of open-source software was on rise among both female and male librarians. Thus, qualifications of the librarians have a positive impact on the choice for open-source software by them.

Table 10: Gender Role in Choice of the Library Software

Statement/Count	Female (18)					Male (51)				Total (69)
	Yes	%	No	%	Total%	Yes	%	No	%	Total%
Do you feel your gender has any relation in choosing software for your library?	10	55.6	8	44.4	100	13	25.5	38	74.5	100

Responding to a direct question, 56 percent females admitted their decision was made due to gender-based constraints while for men this response was given by 25 percent only (Table 10). This supports the hypothesis that librarian's gender has role to play in choice of the software made by them.

Table 11: Age Impact on the Choice of the Library Software

	No		Yes		Total	
	Count	Row N %	Count	Row N %	Count	Row N %
Do you find your age have any relations with the choices made by you?	45	65%	24	35%	69	100%

According to the data from Table 11, 65 percent respondents did not think that their age has any relationship with the choice of the software made by them while 35 percent accepted to have age impact on choice of the software. This data supports the hypothesis that age of the librarians have impact on choice of the library software made by them.

Table 12: Are You Satisfied with the Use of OSS in Your Library

Response	Frequency	Percent
No	4	12.5
Yes	28	87.5
Total	**32**	**100.0**

Table 12 data suggests that majority (87.5 percent) of the respondents who had chosen open-source software for their libraries were satisfied with the same while only just 12.5 percent did not agree to the statement.

Table 13: Gender wise Satisfaction with open-source Software

			Are you satisfied with the use of OSS in your library in different areas (Yes/No)? (1/0)		Total
			No	Yes	
Gender of the Librarian	Female	Count	1	4	5
		% within Gender	20.0%	80.0%	100.0%
	Male	Count	3	24	27
		% within Gender	11.1%	88.9%	100.0%
Total		Count	4	28	32
		% within Gender	12.5%	87.5%	100.0%

80 percent of the female respondents and 87.5 percent of the males were satisfied with the use of open-source software in their libraries. There is no significant difference between these two categories, implying that both males and females' librarians by majority were satisfied with use of open-source software in their libraries.

Table 14: Issues Feared due to Gender in Choosing open-source Software

Statement/Count	Females (18)					Male (51)				Total (69)
	No	%	Yes	%	Total%	No	%	Yes	%	Total%
Authorities don't Expect Much Innovation	11	61.1	7	38.9	100	30	58.8	21	41.2	100
Staff don't Listen	12	66.7	6	33.3	100	44	86.3	7	13.7	100
OSS Risky Option than CS	8	44.4	10	55.6	100	28	54.9	23	45.1	100
Coding Difficult	10	55.6	8	44.4	100	25	49.0	26	51.0	100
Other Responsibilities don't Allow Experimentation	7	38.9	11	61.1	100	32	62.7	19	37.3	100
Difficult to Approach OSS Community	11	61.1	7	38.9	100	37	72.5	14	27.5	100
Job or Reputation at Stake in case Anything goes Wrong	13	72.2	5	27.8	100	40	78.4	11	21.6	100
No Financial or Moral Support	12	66.7	6	33.3	100	36	70.6	15	29.4	100
OSS Just Looks Better Conceptually but Actually not in Comparison to CS	6	33.3	12	66.7	100	39	76.5	12	23.5	100

As per findings from Table 14, 61 percent of female librarians admitted their other responsibilities as the main reason for not experiment with open-source software. Sixty-seven percent females believe that open-source software just looks better hypothetically but not in actual practice. 56 percent females consider open-source software as a risky option and 44 percent find coding as an issue with open-source software. These factors, however, are no so significant among male librarians. Only 28 percent females think risk to their job if anything goes wrong by adopting open-source software. For them, authorities or financial support are also no significant factors any more. Both female and male librarians did not find staff support as a significant issue.

Table 15: Working Experience Impact on Choice of the Software

Working Experience	Total	Male	Percent	Female	Percent	Total Percent
0-5	1	1	3.12	0	0.00	3.12
5-10	2	1	3.12	1	3.12	6.24
10-15	12	9	28.12	3	9.38	37.50
15-20	10	9	28.12	1	3.12	31.24
Above 20	7	7	21.88	0	0.00	21.88
Total	**32**	**27**	**84.36**	**5**	**15.62**	**100**

From the 32 respondents who had chosen either only open-source software or both, most significant number of respondents were in in 10-15- and 15-20-years' experience groups constituting about 69 percent jointly and in both genders, this holds true, followed by respondents in 20 years plus age group. However, only male respondents with 20 years plus age group were using some open-source software. From the Table 15, it is clear that senior librarians having good work experience are in the position of making their own decisions and hence can choose software of their choice. Female librarians, due to various constraints as discussed earlier like other responsibilities, do not seem as adventurous as males but still senior female librarians are also adopting open-source software. However, looking in terms of absolute senior level female librarians using open-source software i.e., 5, they are still equally enterprising. This supports the hypothesis that experience of the librarians also play a significant role in choosing open-source software.

9 CONCLUSION

Results of the current study have successfully established the hypotheses that age, qualifications, experience and gender of the librarians have significant impact on the choice of the library software made by them. It also successfully establishes that male librarians are in a better position to take risks and use open-source software. Female librarians are also catching up and breaking the barriers. They too have started adopting open-source software but their other responsibilities are still a big hindrance to this cause.

This study also finds that adoption level of open-source software still lags

behind the commercial software. However, it is a matter of satisfaction that more and more libraries have started using at least some open-source software. open-source software gives them a choice of decision making what is in better of interest of their libraries and they do not remain bound to the software vendor terms and conditions. It provides them a choice, a freedom to experiment new things and innovate. Future belongs to open-source software.

This study also suggests that though gender has a significant impact upon current adoption of open-source software among library community but situation can change if females are made free from societal or family burdens and provided equal opportunities like their male counterparts.

10 RECOMMENDATIONS

In light of the sustainable development goals (SDGs) of the United Nations, equal opportunity to all is an essential component of sustainable development. Females do not require any clutches but require equal opportunities to prove their mantle. open-source Software provides equal opportunity to all librarians and hence its acceptance is on the rise among libraries. It is, therefore, necessary that our policy makers, institutions authorities create an environment where female librarians do not face any disadvantage due to their gender and get equal chances to innovate, experiment without any fear. This study was limited to the management institutions of Noida and Ghaziabad regions but new research may generalize to encompass all types of libraries at all levels and in all regions of India.

REFERENCES

1. GUPTA (N) (2019). Women in Science and Technology: Confronting Inequalities. New Delhi: Sage Publishing. https://theprint.in/pageturner/excerpt/indian-it-industry-attracts-more-women-but-many-exit-within-first-5-years-in-the-job/368504/
2. REDDY (T RAGHUNADHA) and KUMAR (K) (2013). Open-source Software's and Their Impact on Library and Information Centre: An Overview. *International Journal of Library and Information Science*. 5(4): 90-96. (DOI: 10.5897/IJLIS12.038). https://academicjournals.org/article/article1379696637_Reddy%20and%20Kumar.pdf
3. BHADAURIA (VS), MAHAPATRA (R) and MANZAR (R). Factors Influencing Adoption of open-source Software – An Exploratory Study. AMCIS; 2009. 114. http://aisel.aisnet.org/amcis2009/114
4. KASAINE (AP) and KHAMADI (SID) (2018). Organizational Determinants in Adoption of open-source Software (OSS) in Institutions of Higher Learning: A case of Innorero University, Kenya. *International Journal of Scientific Research and Innovative Technology*.5(6): 85-121. (ISSN: 2313-3759)https://www.ijsrit.com/uploaded_all_files/3571444813_w8.pdf

5. MORGAN (L) and FINNEGAN (P). How Perceptions of open-source Software Influence Adoption: An Exploratory Study. *15th European Conference of Information Systems*; 2007 973-984.https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1078&context=ecis2007
6. DEDRICK (J) and WEST (J) (2002). Why Firms Adopt open-source Platforms: A Grounded Theory of Innovations and Standards Adoption. MISQ Special Workshop Issue. 236-257. https://www.researchgate.net/publication/239184573_Why_firms_adopt_open_source_ platforms_A_grounded_ theory_of_innovation_and_standards_adoption/citations
7. DEPIETRO (R), WIARDA (E) and FLEISCHER (M). The Context for Change: Organization, Technology and Environment. In Tornatzky, L.G. & Fleischer, M. (Eds), The Process of Technological Innovation. 1990. Lexington Books; Lexington, MA.Pp 151-175.
8. HANSEN (DG), GRACY (KF) and IRVIN (SD) (1999). At the Pleasure of the Board: Women Librarians and the Los Angeles Public Library, 1880-1905. *Libraries & Culture*. 34,(4): 311–346. http://www.jstor.org/stable/25548763
9. DASGUPTA (K) (1998). Women as Managers of Libraries: A Developmental Process in India. *IFLA Journal*. 24(4): 245-249. (https://doi.org/10.1177/034003529802400406); https://journals.sagepub.com/
10. LIN (YU-Wei) and BESTEN (M. DEN) (2019). Gendered Work Culture in Free/Libre open-source Software Development. *Gender, Work & Organization*. 26 (1): 1017-1031. (DOI: 10.11111/gwao.1225)
11. LIE (M) (ed) (2003). He, She and IT Revisited. New Perspectives on Gender in the Information Society. 2003. Gyldendal Akademisk, Oslo.
12. GUPTA (2019). *op. cit.*
13. DIAS (CE), ACCO (TH), BOGO (MM), FAGUNDES (F) and SIQUEIRA (JA) (2019). Barriers Faced by Women in Software Development Projects. *Information*. 10: 309. https://doi.org/10.3390/info10100309
14. DIAS (CE) (2019).*op. cit.*
15. POWELL (W.E) and HUNSINGER (DS) and MEDLIN (BD) (2010). Gender Differences with in the open-source Community: An Exploratory Study. *Journal of Information Technology Management*. 21(4): 29-37. http://jitm.ubalt.edu/XXI-4/article3.pdf
16. VIJAYAKUMAR (S) and SHESHADRI (KN). Librarianship and Gender Discrimination: A Study of Indian Scenario. In: Proceedings of International Conference on Gender Equality through the Strategy of Gender Mainstreaming, 6-7 December 2018. https://www.researchgate.net/publication/332876460Librarianship_and_Gender_ Discrimination_A_Study_of_Indian_Scenario
17. DASGUPTA, Ibid.

18. RUFF (NA) (2021). The Truth about Women and Open Source. *Academy Software Foundation*. https://www.aswf.io/diversity/the-truth-about-women-and-open-source/

19. VIJAYAKUMAR, Ibid.

20. SRIJA (A) and VIJAY (SS) (2020). Female Labour Force Participation in India: Insights through Time Use Survey. *Review of Market Integration*. 12(3): 159-199. (doi:10.1177/09749292211031131) https://journals.sagepub.com/toc/rmia/12/3

21. GUPTA, Ibid.

22. OECD (2018). Bridging the Digital Gender Divide: Include, Upskill, Innovate. *OECD Report*. https://www.oecd.org/digital/bridging-the-digital-gender-divide.pdf

23. AKHTAR (G) and SOROYA (MS) (2021). Factors Influencing Career Routes of Female Librarianship: A Literature Review. *Library Philosophy and Practice (e-journal)*. 6468. https://digitalcommons.unl.edu/libphilprac/6468

24. SINGH (V) and BONGIOVANNI (B) (2021). Motivated and Capable but No Space for Error: Women's Experiences in Contributing to open-source Software. *The International Journal of Information, Diversity, & Inclusion*. 5(3): 98-126. https://jps.library.utoronto.ca/index.php/ijidi/article/view/36197

25. SINGH.*op. cit.*

26. TRINKENREICH (B) (2021). Please Don't Go - Increasing Women's Participation in open-source Software. *arXiv:2103*.10450v1 [cs.SE]1-3. https://arxiv.org/pdf/2103.10450.pdf