

IMPACT OF ICT ON PRIME INSTITUTES OF DELHI

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ABSTRACT

The premise of the present study is to ascertain that whether the libraries of prime institutes in Delhi are benefitted with the advent of Information and Communication Technology (ICT) based products and services. Idea is also to identify that whether these libraries are automated or not. To carry on this research works; primary data concerning to fifty libraries of institutes of Delhi i.e. Union territory of India is collected. The data against 13 attributes was collected and analyzed by applying Principal Component Analysis (PCA) as data reduction technique using SPSS version 20.0. The result states that three attributes greatly influence the impact of ICT on the libraries of prime institutes of Delhi.

KEYWORDS: Information and Communication Technologies (ICT), Principal Component Analysis (PCA) Library Services, Library Automation.

1. INTRODUCTION

In the era of information explosion, a tremendous amount of information is being generated and transmitted from every corner of the world in the form of print material, research articles, lectures, presentations, video conferencing, technical reports, standards and patents etc. With the development and application of ICT, libraries have shifted from the traditional to the hybrid library, then the automated library and so on. As an effect of these changes, the structure of libraries has also changed in a dynamic way, as in a continuous process. In the early stages of twentieth century, libraries were facing the problems, of how to cater and fulfill the users' demand in a minimum span of time. The solution was to adopt the ICT based products and services. To deal with new challenges and increasing demand of users, libraries are reconsolidating; reshaping, redesigning and re-packaging their services and information products by incorporating ICT based products and services.

This research covers the prime institutions of Delhi to find out particular library software used by these institutions, different modules of library software used by Delhi institutions and technical problems faced while incorporating ICT in the libraries of different prime institutions of Delhi.

Owing to ICT enabled products and services, libraries have changed the way, in terms of the provision of information services. These products and services are the integration of computer and communication technologies, which can be, applied, to store and disseminate the information. They have changed the traditional practices of libraries in the delivery of services(Ahmad & Fatima, 2009).

ICT on LIS means as the application of computers and communication technologies to the acquisition, organization, storage, retrieval and dissemination of information process. In the present scenario, users can have access to a variety of information and digital archives of libraries from any corner, as well as get update on the activities of libraries by the SMS on their mobile phones. It also helps to users to access, manage, integrate, evaluate, create, and communicate with other users more easily than ever.

2. Literature Survey

The brief description of literature studied from 1997 to 2013 is given below.

Petrina (1997) proposed a questionnaire to determine the technical, financial, and human resources available in the institution to participate in African Virtual Library and Information Network (AVLIN). **Arbib¹ and Bronstein** focused the new skills of LIS(library and information science) professionals as a trainers and guides in information and technology related issues. **Contreras, Paula (2003)** focused to meet the changing needs and expectations of library users and use of technology to improve the efficiency and effectiveness of these services. **Kanamadi and Kumbar(2006)** described library portals and the web-based library services need, objectives, hypotheses, scope, limitations and methodology. **Saxena(2009)** explained the impact of electronic publishing on

Academic library and radical changes on them due to the impact of electronic media and internet **Madhusudhan, Margam (2010)** has examined the use and implementation of RFID technology at the Indian Law Institute Library and National Social Science Documentation Centre Library, New Delhi. Nattar, S (2010) focused on RFID system for library transaction, inventory function and theft detection. **Krubu, Osawaru (2011)** stated that over the past twenty-seven years, academic libraries have been affected by changes in information and communication technology that has lead to reorganization, change in work patterns, and demand for new skills, job retraining and reclassification positions. **Krubu, Osawaru (2011)** also focussed that ICT holds the key to the success of modernizing information services and also used in converting the existing paper-print records in the entire process of storage, retrieval and dissemination. **Krubu, Osawaru (2011)** also stated that Academic libraries are also using modern ICTs to automate their core functions, implement efficient and effective library cooperation and resource sharing networks, implement management information systems, develop institutional repositories of digital local contents, and digital libraries: and initiate ICT based capacity -building programs for library users. **Rasul, Sahu(2011)** stated that information technology not only affects the technical services of libraries but the shapes the library services offerd to the public. **Magre(2013)** focused the use of computers, internet and increased reliability on electronic books and e-learning resources.

3. METHODOLOGY

The methodology used to collect data for this research is through survey and interview method. The demographic data collected for this purpose is given in Table 1.

Table 1 : Demographic data of Library

	Male	Female			
Gender	28	22			
	20-25	25-30	30-35	35-40	40+
Age	0	2	5	8	35
	12th	BA	MA	M.Phil	Ph.D
Qualification	0	4	21	10	15
	<5	5-10	10+		
Experience	2	10	38		

For this research hypothesis taken into consideration is:

H_{A1} There is wide variation in the extent of adoption of ERP/ library practices or software(s) depending on the type and size of educational institutions and different capabilities of users.

H_{A2} There is wide variation in the drawback, pitfall, problems, and shortcoming of engaging in the ERP / Library software to different educational institutions.

Thus to justify the above hypothesis it was necessary to analyze the important parameters among various attribute by using the data reduction techniques. A methodology of PCM a statistical data mining technique is used for analyzing the primary data. PCM is a statistical approach that can be used to analyze interrelationships among a large number of variables and to explain these variables in terms of their common underlying dimensions (factors). The statistical approach involving finding a way of condensing the information contained in a number of original variables into a smaller set of dimensions (factors) with a minimum loss of information.

For conducting factor analysis first the reliability of data is checked, then co-relation between different variables are checked and to conduct PCA variance in different variables their communality is analyzed. Then through extraction method variance is computed and component matrix is taken out to give result of main factors extracted as explained in the following section.

4. ANALYSIS INTERPRETATION:

A survey has been done on 50 Libraries of educational institutions of Delhi. All these institutions have Library Automation software's, they have adopted different modules of the working software and their planning of full automation in the coming years as given in Table 2. It is shown that 42% institutions are using Libsys software, 26% are using Netlib software and 18% are using Troodon Library Software. All the remaining 14% institutions are using 5 different brand of library software. All these institutions are implementing core modules and adopting other modules slowly and slowly. Table 2 shows that 8 different brand of Library Software's are used by 50 different institutions.

The other data related to services is analyzed through PCA factor analysis to identify the important parameters among various attribute by using data reduction techniques. For the purpose the reliability of the primary dataset has been checked. To check the reliability Cronbach's Alpha statistics technique is used as given in Table 3.

Table 2: Percentage of particular Library Software used by different institutions

S/w Code	Library S/w	Frequency	%
1	Libsys Ltd.- LSA Academia	21	42
2	Inflibnet Centre – Soul	3	6
3	Kaptron Pvt. Ltd. Netlib Library Software	13	26
4	Comtek Services Pvt. Ltd - Troodon Library Software	9	18
5	Libware - Integrated Library Management System	1	2
6	Microsoft Office Tools	1	2
7	Mindmill Software Ltd. - Mindmill Library &documentation Management System	1	2
8	Lib Lime Koha- Integrated Library System	1	2
	Total	50	100

If the result of this operation is less than .5; then it states that the data is not reliable for the application of Factor Analysis but as given in Table 3 value of Cronbach's Alpha is .794. This means further analysis can be done but whether PCA can be applied on that data and there is need to apply KMO and Bartlett's Test as shown in Table 4.

Table 3 : Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
.798	.794	13

KMO and Bartlett's Test where KMO tells the proportion of common variance in our variables. If this is greater than .50 we can proceed with the analysis. In this work it is .675 which is positively acceptable. The Bartlett's Test of Sphericity tells us if the correlation matrix is factorable. The significant value tells us 0 and we should proceed to the formal PCA analysis as shown in Table 4.

Table 4 : KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.675
Approx. Chi-Square	332.193
Df	36
Sig.	.000

The first section of Table 5 shows the Initial **Eigen values** or amount of variance in the original variables accounted for by each component. The **% of Variance** column gives the ratio, expressed as a percentage, of the variance accounted for by each component to the total variance in all of the variables. The **Cumulative %** column gives the percentage of variance accounted for by the first n components. For example, the cumulative percentage for the second component is the sum of the percentage of variance for the first and second components. For the initial solution, there are as many components as variables, and in a correlations analysis,

the sum of the eigen values equals the number of components. Since that eigen values greater than 1 be extracted, so the first three principal components form the extracted solution.

Sum of Square column of the Table 5 shows the extracted components. They explain nearly 80% of the variability in the original thirteen variables, so we can considerably reduce the complexity of the data set by using these components, with only a 20% loss of information.

Table 5 : Extraction Method: Principal Component Analysis. (Total Variance)

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.668	43.599	43.599	5.668	43.599	43.599	5.635	43.343	43.343
2	3.468	26.680	70.278	3.468	26.680	70.278	3.047	23.436	66.779
3	1.351	10.393	80.671	1.351	10.393	80.671	1.806	13.892	80.671
4	.988	7.604	88.275						
5	.473	3.640	91.915						
6	.340	2.615	94.529						
7	.283	2.179	96.708						
8	.184	1.416	98.124						
9	.098	.757	98.881						
10	.084	.648	99.530						
11	.042	.323	99.853						
12	.019	.147	100.000						
13	.000	.000	100.000						

Figure presented here is scree plot which helps us to determine the optimal number of components. The eigen value of each component in the initial solution is plotted.

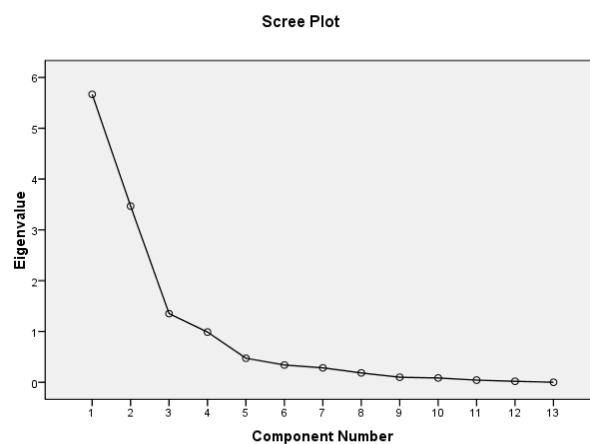


Figure1. Scree plot

In Table 6 Component matrix has been a countercheck to Table 5 Total Variance. The table shows that in the 13 item of variable set there are three factors which are accounted for the study. The 6 bold numbers in the column 2 states that the numbers in group frame the factor 1. Similarly column number 3 having four bold numbers frames the component of second factor and for factor 3 there is only one item.

After analyzing the result so retrieved in table **Total Variance Explained** and **Component Matrix^a** it is well understood that there are three factors which are accounted for data reduction using PCA in factor analysis.

Table 6 : Total Variance Explained and Component Matrix

	Component		
	1	2	3
Are you satisfied doing Cataloguing through software	.968	.106	.023
Do you use ICT equipment in your routine work	.930	.038	.093
Are you satisfied doing Acquisition through software	.926	.081	.121
Are you satisfied doing OPAC through software	.886	.010	.055
Do you feel library should have digital resources / services for teachers and students	.856	.121	.044
Do you prefer both print and electronic form of your routine library work	.848	.170	.140
Are you satisfied doing Circulation through software	.830	.049	.242
Quality of web based services	.142	.930	.293
Do you feel AMC is important to increase your productivity	.142	.930	.293
Do you agree that online services are important for your organization	.163	.870	.276
Do you face technical problem	.110	.692	.647
Do you feel need for web based services	.035	.654	.623
An average, how many hours you spend in a week in using the e-resources?	.040	.109	.435

Factor 1 (ICT Equipments and Digital Resources) states that highest total number for initial Eigen value is 5.668 and this value is framed by grouping of eight item set. The highest component score is .968 and the minimum is .830. The factor states that ICT equipments play an important role in performing day to day operations. Library personnel's and technical people feel more comfortable with ICT tools in their routine work. They feel that the circulation should be through electronic devices and if necessary than print media may be opted. Digital resources also prove to be useful for teachers and students for their academic activities.

Factor 2 (AMC to Maintain Quality Products) stands at the second rank with the initial Eigen value of 3.468 as its total number. This value is the combination of two attributes whose component score range lies from .930 to .870. The idea for framing this factor is to ensure that ITC tools should work perfectly. For this AMC should be must in an organization. This enables to maintain quality among the ITC tools and help in providing ready support to technical staff, teachers and students.

Factor 3 (E-Resources and Query Solving) explains the third status with the initial Eigen value of 1.351 as its total number. This value is the combination of only one attributes whose component score is .647 to .435. This factor explains that beneficiaries are using the e-resources to solve their academic as well as technical problems. This factor believes that there is a need of web based services.

5. Conclusion

After analyzing the result it is well understood that there are three factors which are accounted for data reduction using PCA in factor analysis, so we need not to take all the attributes but we can consider only 3 factors for further analysis to explore Library services of different institutions of other states also.

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