Chapter 1

INTRODUCTION

1.1 BACKGROUND

Agriculture has been an integral part of human life ever since the inception of the human race. It fulfills the basic needs of food, cloth and other essentials things of human as well as animal life, as such it plays a key role in the development of human civilization. Agriculture was the key factor of development that led to the rise of civilization. The husbandry of domesticated animals and plants contributed to create food surplus for meeting increased requirement of densely populated and stratified societies. Until the industrial revolution, the majority of the human population was engaged in Agriculture as a labour force.

In India, agriculture has special significance because it is basically an agrarian country. Agriculture contributes nearly 1/6th to national GDP of our country and a major portion of Indian population is dependent on it for livelihood. Singh\textsuperscript{1} opined very appropriately that agriculture in India, since ancient times is the most crucial sector for ensuring food and nutritional security, sustainable development and for the alleviation of poverty. It is the key sector in India for generating employment opportunities for the vast majority of the population particularly in rural areas. Agriculture research and training programmes play a vital role in agricultural development of a country and their success depends upon to a large extent easy excess to information facilities.
Agricultural education is the basic foundation for developing manpower for agriculture and allied activities so as to undertake and enhance the research, education, training and extension. Considering the immense importance of agricultural education in our country, the government of India has proposed to establish four central agriculture universities and has allocated Rs 200 crore in its budget 2014-15. Two of these will be pure agricultural universities, to be set up in Rajasthan and Andhra Pradesh, and other two will be horticulture universities, to be established in Telangana and in Haryana states. The higher educational institutions, i.e., universities play an important role in society as realized by our First Prime Minister Pandit Jawahar Lal Nehru:

“…A university stands for humanism, for tolerance, for progress, for adventure of ideas and for the search of truth. It stands for the onward march of the human race towards ever high objectives. If the university discharge their duties adequately then it is well with the nation and people. But if the temple of learning becomes a home of narrow bigotry and petty objectives, how then will the nation prosper or people grow in stature.”

India has achieved a rapid progress in agricultural sector as a result of introduction of modern agricultural management systems and Green Revolution Movement in the last decade. The country after having attained the first phase agricultural development with first Green Revolution is now leading towards the second Green Revolution Movement phase with a clear objective in order to reach the target of producing food grains over 225 million tones and more per year. Our
country is in fact capable of producing more food grains than this, if our agricultural education system is further strengthened and streamlined along with due stress on research and extension activities.

India is essentially an agrarian society and agriculture is the life-line of more than seventy percent of the rural population of India. In India, special emphasis was laid on the development of an agricultural education and research infrastructure immediately after Independence. During the year 1965, soon after the re-organisation of the Indian Council of Agricultural Research (ICAR) and the creation of the Department of Agricultural Research and Education (DARE) under the aegis of the Ministry of Agriculture, Government of India, the responsibilities of higher education, research, extension, consultancy, and libraries in the field of agricultural sciences including animal and veterinary sciences became the sole responsibility of the ICAR. Since then, the ICAR has been playing a catalytic role in the field of education, research, extension pertaining to all aspects of agricultural sciences and making the country as a self-reliant, hunger-free India as well as a food-secure India.

The current millennium has witnessed revolutionary changes in the field of Information Technology. Every aspect of human life is under the purview and influence of technology. The Information and Communication Technology has made the world a global village. Information has been considered as an essential resource for all round development of the society. Information provides tremendous opportunities to accelerate the pace of development both at national and international level. It has different implications for both haves and the haves not. In the formal
case, it is an addition to improving the quality of lived life and in the latter: it is used for attending to basic survival need.

### 1.2 SIGNIFICANCE OF THE STUDY

The need for agricultural information is probably almost as ancient as agriculture itself. The clay tablets excavated in the ancient city of Babylon have been discovered containing agricultural information. Information resources in the electronic form occupy a pivotal position in any university or research library. E-resources have become the fundamental source of information in variety of fields and more so in the field of education and research in agriculture and allied sciences. Research and development have an inseparable relation with the library systems where the libraries are going online today. In a research article, Srivastava\(^3\) studied the information needs of agriculture scientists, the decision makers and planners and observed that information is considered as a basic resource for all the scientific and technical research in every field including agriculture.

Now-a-days, e-resources are in more demand. In academic libraries, these resources are being preferred by the library users to the print media. Jewell and Mitchell\(^4\) opined that “with its easy and quick search and display capabilities, these resources bring the research findings into the researcher’s desktop and the time consumed on accessing the desired documents become predominantly less. The e-resources over the internet further enhanced the quality of service delivery in libraries. As such, currently the e-resources have become an inseparable part of academic libraries and researchers.
The exponential growth of e-resources makes their management in academic libraries difficult. Efficient management of e-resources enables users to lead, guide and direct in systematic way in order to achieve the ultimate aim of a library i.e. users’ satisfaction. Librarians as managers of e-resources handle the increasing demand of its users by properly satisfying their information needs. He should have good knowledge of different e-consortia, various e-resources available at free cost or subscribed by the respective institution; and off-line collections available in the library. Jewell and Mitchell1 opined that an effective E-Resource Management System (ERMS) helps the users to obtain their required information in more efficient way.

The amazing growth of Internet and World Wide Web (WWW), high resolution capture devices, highly capable digital storage media, multi-faceted search engines, fast processing power of computer, dropping computer cost and increased band-width network have forced libraries specially academic libraries to adopt effective E-resource management system to manage and provide easy access to meet the diversified demand of their users. The study of management and use of these e-resources in agriculture university is a unique study which will help the concerned libraries to adopt proper way to ascertain optimal use of the investment made by the university.

1.3 OBJECTIVES OF THE STUDY

The objective of the present study, in general, is to assess the level of management and usage of e-resources available in the libraries of agriculture
universities of the state of Rajasthan. The role of the library staff and their efforts to provide library services are also studied. The specific objectives of the present investigation are as follows:

1. To study the provided of space, building and infra-structure facilities to make use of e-resources in agricultural libraries in Rajasthan.

2. To reveal the present status of e-resources at the Agricultural University Libraries in Rajasthan,

3. To explore the current practices of selection and evaluation of e-resources,

4. To propose the collection development policies of e-resources adopted,

5. To identify the behavior of the customers interested in e-resources,

6. To identify how the relevant management issues are addressed by the library related to e-resources,

7. To study the emerging new information environment trends that affects the collection development activities of university libraries,

8. To study the services provided by university libraries using-e-resources,

9. To identify various channels of accessing electronic information resources by users.

1.4  SCOPE OF THE PRESENT STUDY

In order to keep the sphere of the present study, compact and comprehensive, only the agricultural and veterinary university libraries of Rajasthan have been covered. Therefore the libraries of following agricultural university libraries of
Rajasthan have been studied and approached for the study:

1. Swami Keshwanand Rajasthan Agricultural University Library, Bikaner.

2. Maharana Pratap University of Agriculture & Technology Library, Udaipur.

3. Rajasthan University of Veterinary and Animal Sciences library, Bikaner.

4. Agricultural University Library, Kota.

5. Sri Karan Narendra Agricultural University Library, Jobner.

6. Agricultural University Library, Jodhpur.

The oldest agriculture university library is situated at Udaipur in Maharana Pratap University of Agriculture & Technology, which has good collection of educational resources. The libraries of Swami Keshwanand Rajasthan Agricultural University Library, Bikaner, and Rajasthan University of Veterinary and Animal Sciences library, Bikaner although established later on, yet these libraries have good number of educational resources and e-resources. Remaining three universities have been elevated from the colleges to universities in 2003. They also have their independent libraries, with good collection of e-resources. The Government of India has proposed in its budget- 2014-15 for establishment of four central agricultural universities, one of these universities will be established in Rajasthan.

Apart from central libraries of all the agriculture universities, libraries of various constituent colleges working under these universities have also good collection of document resources hence these have also been included in this study.
All the agricultural universities of Rajasthan are plotted on the political map of Rajasthan in Figure 1.1.

**FIG. 1.1 PHYSICAL LOCATION OF AGRICULTURAL UNIVERSITIES IN RAJASTHAN**

The use and management status of e-resources available in agricultural universities under study have been studied by analyzing the user’s data. The study was based on the responses and feedback received from the respondents comprising students, teachers and research scholars of agricultural universities. They have been selected on random basis who are on the rolls of agricultural universities of Rajasthan. One thousand questionnaires were sent to the library users of these
universities, out of which five hundred eighty questionnaires were received duly filled. All the sample users are shown in Table 1.1.

Table 1.1 Sample Users of the Agricultural University Library Resources

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Agriculture Libraries</th>
<th>Teacher</th>
<th>Res. scholar</th>
<th>PG student</th>
<th>UG student</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Swami Keshwanand Rajasthan Agricultural University Library, Bikaner.</td>
<td>18</td>
<td>14</td>
<td>38</td>
<td>47</td>
<td>117</td>
</tr>
<tr>
<td>2.</td>
<td>Maharana Pratap University of Agriculture &amp; Technology Library, Udaipur.</td>
<td>23</td>
<td>15</td>
<td>52</td>
<td>62</td>
<td>153</td>
</tr>
<tr>
<td>3.</td>
<td>Rajasthan University of Veterinary and Animal Sciences library, Bikaner.</td>
<td>14</td>
<td>11</td>
<td>26</td>
<td>37</td>
<td>88</td>
</tr>
<tr>
<td>4.</td>
<td>Agricultural University Library, Kota.</td>
<td>5</td>
<td>4</td>
<td>16</td>
<td>18</td>
<td>42</td>
</tr>
<tr>
<td>5.</td>
<td>Sri Karan Narendra Agricultural University Library, Jobner,</td>
<td>12</td>
<td>10</td>
<td>42</td>
<td>46</td>
<td>110</td>
</tr>
<tr>
<td>6.</td>
<td>Agricultural University Library, Jodhpur</td>
<td>8</td>
<td>6</td>
<td>22</td>
<td>34</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>80</td>
<td>60</td>
<td>196</td>
<td>244</td>
<td>580</td>
</tr>
</tbody>
</table>
1.5 LIMITATIONS OF THE PRESENT STUDY

All kinds of scientific as well as social researches have several obstacles relating to sophisticated research design and it is also observed that many minor/major loopholes cannot be detected. So in this research also, in spite of sincere efforts, made by the researcher to fulfill the gaps between the real outcome and proposed research, yet to establish conformity of high degree of beliefs due efforts have been made to improve the results. Great care has also been taken in understanding, analyzing and interpreting the data. However, the researcher was unable to overcome the following limitations:

1.5.1 Confined to education sector- Effects of e-resources are realized in all sectors of the human society but this study precisely confined to the agriculture education sector only. It does not reveal the impact of e-resources on other sectors, i.e., manufacturing and services sectors. In education sector, specific studies are undertaken in agricultural university library management and use of the e-resources of these universities only.

1.5.2 Restricted geographical region- The study precisely confined to the agricultural universities situated in the state of Rajasthan. It does not include the other universities of Rajasthan as well as other states of India even that of the other countries. So the results of the study may not be generalized.

1.5.3 Incorporation of technological characteristics: The emergence of Information and Communication Technology (ICT) has changed the traditional library services. Advanced tools and techniques are being developed and provided to
the users with a very fast speed. In electronic media, the innovations are realized in portable storage devices, hard disc capacity, computer processing speeds, e-resources on Internet. Accordingly, the figures, data and the developments reported in the study become surpassed in no time. It was the most significant limitation of the present investigation. In view of this, the results of this study are to be taken in the correct perspective. However, every effort has been made to record, verify and report authentic data, no claim is made to the accuracy of data reported beyond the date cited.

1.5.4 Limitations of survey method- A well structured questionnaire was designed by the researcher in this research to collect primary data. The method has its own limitations. Apart from poor response, it suffers from the difficulty of translating the objectives of the research into a set of sample questions which is an intellectual job. The defect in designing the questionnaire may result in inaccurate data. Further ambiguity in questions is prone to misinterpretation by the respondents, who may give ideal answers rather than real and factual answers. Sometimes, respondents do not provide real facts to avoid negative impression, administrative hurdles, or not to reveal. All such data can not be scrutinized and there is not any way except to accept it.

1.6 HYPOTHESES

In order to resolve the research problem under study, some hypotheses need to be established that can be tested during the course of the research work. A hypothesis is an assumption, suspicion, assertion or an idea about a phenomenon, relationship or situation, the
reality or truth of which is not known. According to Kerlinger⁵, ‘A hypothesis is a conjectural statement of the relationship between two or more variables.’ For the present research study, following hypotheses have been formulated:

(i) Agriculture information systems have been playing a crucial role in the promotion of research and development activities in agriculture in Rajasthan.

(ii) Management of e-resources in agricultural libraries needs proper attention.

(iii) Access and use of agricultural information resources especially e-resources are increasing day by day.

(iv) ICT has been influencing agricultural libraries like other type of libraries to build their electronic resources to satisfy users information needs.

1.7 METHODOLOGY

Research is a well-planned activity in which methodology performs the vital role. Research methodology designs the whole process to be followed and the methods to be used which ultimately imparts the quality to the investigation work. It determines exactly what the different activities of the proposed research are, how to make progress in the study, how to measure its progress, and how to ensure that research work is proceeding on the right track. It not only plans the methods and techniques to be used for the proposed investigation but also considers the logic of its application for the predetermined objectives. The modern Information and Communication Technology offers several advanced methods to resolve the research problem. Every method is typical and consists its own advantages and limitations.
Selection of suitable method and its application will have to be sought to find out correct and appropriate solution of the problem under investigation.

In the modern information era, the researchers come across a number of problems, and to resolve these minor and major problems various methods are adopted. Each method is typical and incorporates its own merits and demerits along with limitations.

Webster International dictionary,\textsuperscript{6} elaborates the meaning of ‘Research methodology’ as a careful critical enquiry or examination in seeking facts for principles, diligent investigation in order to ascertain something.

Research methodology, in general parlance, guides researcher in the process of solving the given research problem in the systematic way. According to Kothari\textsuperscript{7}, ‘research methodology is the systematic method of discovering new facts by verifying old facts, their sequences, inter-relationship, causal explanation and natural laws which govern them’. He further explains that research methodology plans not only research methods but also consider the logic behind their use.

Two different approaches are adopted in research methodology i.e. quantitative or qualitative. The quantitative approach involves data generation in quantitative form which can be subjected to rigorous quantitative analysis in a formal and rigid fashion. The approach can be further sub-classified into inferential, experimental and simulation approaches to research. Qualitative approach to the research methodology is concerned with subjective assessment of attitudes, opinions
and behavior. This approach generates results either in non-quantitative form or in the form which is not subjected to rigorous quantitative analysis.

Both the approaches, qualitative as well as quantitative, are involved in the present study. It is an empirical study in which the management and use of e-resources of Agricultural University Libraries are studied in light of quantum and quality of e-resources of the Agricultural Universities of Rajasthan. The information relating to budget allocation to arrange e-resources, infrastructure development, human resource engaged, are analysed by quantitative approach and those relating to behavior and attitude of users are analysed by qualitative approach. Proper methodology is applied to solve each and every problem faced during the course of the present research.

1.7.1 Statement of the Problem

The study is focused on the study of management practices and use status of e-resources of the agricultural universities of Rajasthan. The problem is entitled as below:

“Management and Usage of E-resources of Agricultural University Libraries in Rajasthan.”
1.7.1.1 Highlights of the research

Table 1.2 Highlights of the research

<table>
<thead>
<tr>
<th></th>
<th>Source of data</th>
<th>Primary data: collected through two sets of self structured questionnaires, one for library administrator and another for library users. Secondary data: obtained through literature, websites, annual reports etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Type of the research</td>
<td>Exploratory, Descriptive and Empirical.</td>
</tr>
<tr>
<td>3</td>
<td>Universe of the study</td>
<td>All the Agricultural Universities of Rajasthan.</td>
</tr>
<tr>
<td>4</td>
<td>Sampling size and classification</td>
<td>580, classified as library administrator, faculty, research scholar, PG student and UG student.</td>
</tr>
<tr>
<td>5</td>
<td>Tools of data collection</td>
<td>Self designed questionnaire, using sources with pilot study and cronbach’s alpha for validation.</td>
</tr>
<tr>
<td>6</td>
<td>Sampling Technique</td>
<td>Random and judgmental.</td>
</tr>
<tr>
<td>7</td>
<td>Analysis of data</td>
<td>Statistical tools: Chi-square test of Independence, Karl Pearson correlation.</td>
</tr>
</tbody>
</table>
1.7.2 Data Collection

In a research, data are the raw information used to derive any conclusion and the data collection is the first stage in the process. Two major approaches, used to gather information about the research are information from secondary sources and primary sources. The data obtained from secondary sources are termed as secondary data and those gathered from primary sources are called primary data. The researcher has applied several methods and tools with the intention of gaining greater insight and more clear and complete picture about the research study. The primary and secondary data required for conducting the present study have been collected by using the following methods:

1.7.2.1 Information Resources Used

The study of relevant literature helps the researcher to understand the research problem. The study provides a wide canvas to the research under study. The survey of the pertinent literature reveals the fact of the researches that have been conducted by other researchers, the methodology they have used to resolve similar and related problems. In fact, the study assists the researcher in setting his/her research on right track. Library method is also used to collect both primary and secondary data. University handbook, newsletters, encyclopedia, annual reports of libraries, government publications, etc. are studied intensively for the purpose. A comprehensive bibliography of the books, articles of journals, e-resources, etc. consulted; has been provided. A detailed description of reviewed literature has been presented in chapter no.3, entitled, ‘Review of Literature’.
Annual reports and websites of the concerned universities are studied to collect secondary data about these libraries of agriculture universities of the state universities of Rajasthan. The annual reports of National assessment and accreditation council and University Grant Commission were consulted and data were recorded. Some valuable information were also collected from the records of the ministry of Human Resource, Government of India.

1.7.2.2 Libraries Surveyed and Techniques followed:

All the information relating to the e-resources and library services being provide in the libraries of agricultural universities under study are collected in the questionnaire sent to these libraries. Telephone contacts and e-mails correspondence were also used frequently to complete the information which was not responded. In order to fill up the gaps what-so-ever that remain in collection of the information through questionnaires, the researcher visited all these libraries. Personal meetings with all the heads of agricultural universities libraries were made to understand the replies and clarify them in detail.

1.7.2.2.1 Questionnaire

A questionnaire is a set of questions designed in the light of the scope and objectives so as to obtain information required for a research study. It is a very popular survey method used to collect primary data required for a research study. According to Kerlinger, “questionnaire is a written document listing a series of questions pertaining to the problem under study.” Researcher took the help of various books of renowned authors for designing questionnaire to gather primary data to
resolve the research problem.

Two groups of respondents were decided in the present study to collect data one group is of the library administrators of all the libraries and the group belongs to the library users. As such, two sets of questionnaires were designed, one for the agricultural university libraries, to be filled up by the head of the concerned library, and another for the user of the agricultural university libraries of Rajasthan. The questionnaire for library was divided into four sections covering all aspects of information about agricultural university libraries. The questions incorporated in this questionnaire have broader views. The information required was of indicative and statistical in nature to know specially the status of digital library services providing e-resources to the agricultural university libraries of Rajasthan. The data were collected under the heads viz. Institution’s profile, respondent’s profile, infrastructure of e-resources, library services and service provider’s view. The second set of questionnaires i.e. ‘questionnaire for users of agricultural university libraries’ was sent to the library user’s viz. faculty members and students selected. As stated earlier, 30 teachers 60 research scholars, 60 PG students and 60 UG students were approached with the second questionnaire.

1.7.2.2.2 Observation

The observation method was used to consolidate the data collected by using personal interview and questionnaire method. Individual samples were also collected from time to time after varying intervals. In this method, relevant and important data are collected by the investigator and the same are used for analysis of the problem.
1.7.2.2.3 Interview

In order to minimize the problems of incomplete information provided, personal interviews with the respondent were conducted. The method helped a lot in collections of data and elucidation of the problems. For the effective plan of the interview a tentative schedule was prepared and interviews were held with some sample users to complete and verify the data collected.

All Agricultural University libraries of Rajasthan were approached through questionnaires sent to them by registered/ speed post /e-mail. Only a few libraries responded at the first instance. Therefore, reminders were sent and finally personal visits were resorted to wherever necessary, to obtain the filled-in questionnaires. Primary data regarding users of the library were collected through another questionnaire sent to them and adopted the same procedure for obtaining the responses. The researcher took hard pain and succeeded to receive 84% (210 responses were obtained out of 250 questionnaires dispatched) responses from the users.

1.8 ANALYSES AND INTERPRETATION OF THE DATA

In order to resolve the research problem, hypotheses are formulated and these hypotheses are tested by applying statistical tools. The primary data obtained in the questionnaire are analysed by using various techniques, e.g., ratio, percentage, loocust parameter method. Mean, Mode and Median are used to measure central tendency of the data. SPSS (Statistical Package for Social Sciences ver.20.0)} has been adequately applied in the investigation. Probability distribution tests, which are
normally part of testing procedures like ‘t’, ‘f’ and $\chi^2$ are used in the study. Various experts and well wishers are contacted time to time to consult the analytical results and their advices have been given due weightage. All the statistical methods used in the research for analysis and presentation are described hereunder in nutshell:

1.8.1 **Statistical tools and techniques used for analysis**: The primary data gathered from the respondents are analyzed and inferences are drawn using standard statistical tools and techniques. These are discussed hereunder:

1.8.1.1 **Measures of central tendency**: This method is used to obtain the most representative figure for the entire mass of data. Measures of central tendency show the point about which items have a tendency to cluster. These measures are also known as statistical average. The measures of central tendency used in this research are as follows:

(i) **Arithmetic mean** ($\bar{X}$) – It represents the average value of the group of data. Arithmetic mean is obtained by dividing the total of the values of various given items in a series by the total number of items.

$$X = \frac{X_1+X_2+X_3+\ldots+X_n}{n}$$

(ii) **Median** ($M$) – It is a positional average which is the value of the middle item of series when it is arranged in ascending or descending order of magnitudes. It divides the whole series into two halves, in one half all values are less than median, whereas in the other half all values are higher.
than median value. When the number of items is odd, the value of \((n+1)/2\)th item of ascending or descending series is taken as median item. In case of even number of items, the mean value of two middle items of the ascending or descending series is taken as median item.

Median for odd number of items,  \(M = (n+1)/2\)th item.

Median for even number of items,  \(M = \text{Mean value of } \frac{n}{2} \text{th and } \left(\frac{n}{2}+1\right) \text{th item}\)

(iii) Mode (Mo) – It is also a positional average which is the most commonly or frequently occurring values in a series. In a distribution, it is that item around which there is maximum concentration. In general, mode is the value of the item which has the maximum frequency.

1.8.1.2 Dispersion analysis- The scatter of values of items of a variable in the series around the true value of average is represented by measures of dispersion. In this study, following measures of dispersion are used:

(i) Range - It is the difference between the values of the extreme items of a series.

\[
\text{Range} = \text{Highest value} - \text{Lowest value}
\]

It is the simplest possible measure of dispersion. Range gives an idea of the variability very quickly but it is affected very greatly by fluctuation of sampling. As such range is used as a rough measure of variability.
(ii) **Standard deviation (σ)** – It is the most widely used measure of dispersion of a series which is less affected by fluctuations of sampling. It is defined as the square–root of the average of squares of deviations, when such deviations for the values of individual items in a series are obtained from the arithmetic average.

\[
\text{Standard deviation (σ)} = \sqrt{\frac{\sum(X_i - \bar{X})^2}{n}}
\]

Standard deviation is regarded as a very satisfactory measure of dispersion in a series.

- **Co-efficient of standard deviation** - The ratio of the standard deviation to the arithmetic mean of a series is called co-efficient of standard deviation. It is often used for comparing with similar measures of other series.

\[
\text{Co-efficient of standard deviation} = \frac{\sigma}{\bar{X}}
\]

- **Co-efficient of variation** - When the co-efficient of standard deviation is multiplied by 100, the resulting value is known as co-efficient of variance.

\[
\text{Co-efficient of variance} = \text{Co-efficient of standard deviation} \times 100
\]

- **Variance** - The Square of the standard deviation of a series is known as variance. It is frequently used in the context of analysis of variation.
1.8.1.3 **Percentage analysis**- This method is used to compare different data belonging to different groups. Simple percentage method was adopted to study various responding groups, available and use of e-resources in different libraries, budget allotted to e-resources, etc. It is also found suitable to discuss the change in library collection / budget in comparison with the last few years.

1.8.1.4 **Chi-square test of independence**- Chi-Square ($\chi^2$) test is one of the simplest and most widely used non-parametric tests. This test describes the magnitude of difference between observed frequencies and expected frequencies under certain well defined assumptions. For same values of actual and observed frequencies, the value of chi-square is zero. The greater the discrepancy between observed and expected frequencies, the greater is the value of $\chi^2$. The test is helpful to find out whether such differences are significant or are insignificant and could have arisen due to fluctuations of sampling and biased errors. If, the calculated value of Chi-square is less than the table value, it indicates that the difference between actual and observed frequencies may have arisen due to fluctuations and can be ignored. The quantity $\chi^2$ is defined as

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

Where O refers to the observed frequencies and E refers to the expected frequencies.
In addition, this test helps to know that how appropriately the theoretical distributions such as Binomial, Poission, Normal etc. can be filled into empirical distribution.

Procedure used to determine and interpret the value of $\chi^2$ are:

1. Tabulate the observed frequencies and then calculate the expected frequencies for each observed value.

2. Calculate the difference between observed and expected frequencies and obtain the square of these values, i.e., obtain the value of $(O-E)$

3. Find the square of the difference i.e $(O-E)^2$ and divide it by the expected frequency of the respective cell. Now obtain the sum of overall cells $(O-E)^2/E$. For independence of various categories of users and e-resources with respect to organizations under study has been examined by application of Chi-square test with the null hypothesis ($H_0$) that the two attributes under different contingency tables are independent of each other. Thus, if calculated value of Chi-square comes less than or equal to its tabulated value at 5% level of significance and required degree of freedom than $H_0$ will become significant, i.e., the two attributes dependent of each other. Views of subject experts have also been incorporated as part of the analysis.
1.8.2 Software Used

The large quantum of the primary data is grouped appropriately and further analysed in light of the hypothesis formulated. Following two statistical packages are used to obtain statistical results from the data.

(i) MS-Excel
(ii) SPSS

1.8.2.1 MS-Excel

It is an important program of Microsoft Office package based on spreadsheet program. Spreadsheets are used to organize real world data, such as a check register or a rolodex. Data can be numerical or alphanumeric (involving letters or numbers). This program facilitates in making changes in the figure easily, including correcting spelling values, adding, detecting, formatting, and relocating data. It also assist in performing certain mathematical functions automatically viz. addition, subtraction, multiplication, division, etc, It also facilitate program based calculations. A spreadsheet can hold almost limitless amounts of data—a whole filing cabinet’s worth of information can be included in a single spreadsheet. Microsoft excel is a very powerful calculator and data presenter software, as such has very important application for research work. In this study, MS-Excel is used for statistical calculations and generation of tables, graphs and diagrams.

1.8.2.2 SPSS Statistical Package

It is a Windows based software program that can be used to perform from data entry level to analysis and to create tables and graphs. SPSS is capable of handling large amounts of data including their complexity.
SPSS is the acronym of Statistical Package for the Social Sciences. It is a full-featured data analysis program that offers a variety of applications including data base management and reporting, statistical analysis, and graphics. SPSS can take data from any type of file and use them to generate tabulated reports, charts, and plots of distributions and trends, descriptive statistics and complex statistical analysis. Further, the functions of SPSS software are used to test the hypothesis by applying chi-square test of independence of attributes and descriptive analysis etc. in the concerned area.

All the data, gathered in the present study are analysed by using SPSS, Ver.20.0 to get statistical results. This latest version provides all the statistical assistance required in the study, specifically for testing hypothesis by applying chi-square or student’s ‘t’ test. Descriptive statistical analysis was also carried out using mean, median, mode, percentage etc. for demographic and other characteristics.

1.8.3 Presentation of Data:

The large number of primary data obtained during the course of the research are analyzed and presented through different tables and charts using line, pie and column diagram, etc. Results of statistical tests have been recorded in tables and interpreted in the thesis in a systematic manner. All the results of the analysis and conclusions drawn have been presented at the end of the thesis in a separate chapter so as to make their use quick and convenient.
1.9 METHODS OF PRESENTING REFERENCES/CITATIONS.

In order to present the bibliographic references and citations in the thesis, American Psychological Association, latest 6th edition (APA) format is used. This style of documentation is widely accepted style particularly in the social sciences. This style specifies the names and order of headings, formatting, and organization of citations and references, and the arrangement of tables, figures, footnotes, and appendices as well as other manuscripts and documentation features.

The APA style applies the author-date style of parenthetical referencing, with such some citations keyed to a subsequent list of ‘References’. It is similar to the Harvard style. The APA publication manual provides basic guidelines for documenting both print and electronic resources. In 2007, the pattern for e-resources was updated and supplemented under the heading ‘APA style guide to electronic references’. Some of the examples are as follows:

**Journal article: One author**

General style

**Author, A.A. (Year). Title of article. Title of journal, volume (issue), pages number.**

Journal article: Two authors


Book by one author


Book by two authors


Book by more than two authors


Book written under editorial direction


Dissertation/Thesis

General style: Research Scholar, A. A. (Year). Title of the Ph.D. Place: Publisher.

ICICI prudential. Dissertation, Master of Commerce (Business Administration), University College of Commerce and Management Studies, Mohanlal Sukhadia University, Udaipur. p164.


**Website has been cited as below:**

References


