CHAPTER 5

RESEARCH METHODOLOGY

5.1 INTRODUCTION

This chapter details out the research methodology for the present study. It explains a suitable methodology to achieve those objectives stated in Chapter 1. The objectives of this study stated in Chapter 1, to identify and explore the use of digital library resources in University Libraries in Tamil Nadu: an analytical Study among LIS Professionals. It needs an exhaustive study of the demographic characteristics and details of the e-resources required as indicated by the respondents. Second, was the identification and exploration of the opinion and limitations of the respondents in use of digital library e-resources. This was done by detecting the factors through literature survey and comparing them across the demographics characteristics.

5.2 PILOT STUDY

Two studies were carried out during the study period.

The first study was conducted to identify the Effectiveness of Digital Library effectiveness of digital library in university libraries of Tamil Nadu. This is an empirical study were 520 questionnaires were administrated among the LIS professionals working in 22 State Universities, 28 Deemed Universities and 2 Central Universities of which 372 were responded and response rate is 71.54%. The effectiveness of digital library has been ascertained based on the concepts such as Views on Digital library, Satisfaction in digital library use, Look and feel of the digital library website, Flexibility and usability of digital library website and
Effectiveness in task completion. The findings of the study were encouraging and the university libraries irrespective of domain and type of university were effectively used. The study reveals that digital library is not an ornamental idea and it is something that could be beneficial. Further the study indicates digital library is part of library service irrespective of domain and type of universities. The LIS professionals were expressed their satisfaction in digital library use. Look and feel of the digital library website were satisfactory and were has no particular opinion on Flexibility and usability of digital library. In general the university library digital libraries were effectively utilized.

The second study was conducted to identify the web design effectiveness of digital library. This study analysis the web design effectiveness o digital library based on the concepts of ‘Importance of Digital Library’; ‘Reading the Text’; Usefulness of Pictures and Graphics; Organization of Pages and Texts; Organization of Menus and Submenus and Other Links to other Important Website in the digital library web pages. Towards analyzing the web design effectiveness of digital library, 520 questionnaires were administrated among the LIS professionals working in 22 State Universities, 28 Deemed Universities and 2 Central Universities of which 372 were responded and response rate is 71.54%. The results of the study were encouraging. The library professionals has realized the importance of digital library and identifies the organization of pages and text, menus and submenus must be helpful the users of the digital library. The study also indicates the importance of other library links.

5.3 RESEARCH DESIGN

Analytical study, a research using empirical evidence, is a way of gaining knowledge by means of direct and indirect observation or experience. Empirical evidence, one's direct observations or experiences, can be analyzed quantitatively or qualitatively. Further the exploratory and descriptive research design was adopted due to the nature of the study. Exploratory research provides insights into and comprehension of an issue or situation. Exploratory research is a type of research conducted because a problem has not been clearly
defined. Exploratory research helps to determine the best research design, data collection method and selection of subjects. While descriptive research, also known as statistical research, describes data and characteristics about the population or phenomenon being studied. Descriptive research answers the questions who, what, where, when and how. Thus, on the basis of the above, the two research designs were appropriate for the present study as it was important to gauge the various project specific risks that impact the fashion retail outlets without hindering their routine tasks and also understand the use of digital library.

5.4 RESPONDENTS OF THE STUDY

Library and Information Science (LIS) professionals from the 52 Universities in Tamil Nadu

5.5 SAMPLING PROCEDURE

5.5.1 Selection of Study Area

Tamil Nadu, one among the 29 states in India, has 22 State Universities, 28 Deemed Universities and 2 Central Universities. These universities were specialized in different domains such as Arts and Science, Engineering, Medical, Multiple domain and specific domain such as Agriculture, Education, Law, Music, Physical Education, open university etc. These universities have well established libraries which provide digital resources to their users. Quite huge budget were set apart by these universities of digital resources and specifically for the institutional repositories.

5.5.2 Selection of Respondents

The University Library has different category of personals working in the library such as Librarian, Deputy Librarian, Assistant Librarian, Technical assistants, administrative staff, ministerial staff etc., with different educational background who has close association with the users of the library. However in
this study a library staff who has UG Library science education qualification alone considered.

The total population of study were 520 approximately of which 372 were responded of which 148 belongs to State University, 208 belongs to Deemed University and 16 belongs to Central university.

5.5.3 Universe of the Study

The library and information science professionals working in State University, Deemed University and Central University formed the universe of the study.

5.5.4 Selection of Respondents

Since the total population works out to more than 500 in all the 52 Universities in Tamil Nadu, each university were given 10 questionnaire. A total of 372 LIS professionals were taken up for the study.

5.5.5 Sample Size

A total of 520 Library and Information Science professionals who were in service in Universities of Tamil Nadu were contacted for the study. Among them, only 372 users responded to the study and hence these 507 respondents formed the sample size.
Table 5.1

Sample Size

<table>
<thead>
<tr>
<th>S.No</th>
<th>Type of University</th>
<th>No. of Universities</th>
<th>Questionnaire distributed</th>
<th>Responses received</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>State University</td>
<td>22</td>
<td>220</td>
<td>148</td>
<td>39.8</td>
<td>39.8</td>
</tr>
<tr>
<td>2</td>
<td>Deemed University</td>
<td>28</td>
<td>280</td>
<td>208</td>
<td>55.9</td>
<td>95.7</td>
</tr>
<tr>
<td>3</td>
<td>Central university</td>
<td>2</td>
<td>20</td>
<td>16</td>
<td>4.3</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>52</td>
<td>520</td>
<td>372</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

5.5.6 Sampling Frame

Study state : Tamil Nadu

Study area : Universities in Tamil Nadu

Nature of respondents : Library and Information Science Professionals

Number of respondents : 372

5.5.7 Study Tools

A structured questionnaire was formed keeping in mind the objectives and hypotheses of the study. This questionnaire contained all the information pertaining to the objectives of the study.
5.5.8 Pilot Study

A pilot study was conducted with a sample of 520 users of Library and information Science Professionals. Based on the results of the pilot study, the questionnaire was further modified and developed to suit the stated objectives. Accordingly the revised version of the questionnaire was finally administered.

5.5.9 Administration of the Questionnaire / Method of Data Collection

The revised and finalised questionnaire was administered on all the 520 Library and Information Science Professionals working in 52 university libraries in Tamil Nadu. All these respondents were provided with necessary guidance in filling the questionnaire. They were also explained about the purpose of this study and also were assured of the confidentiality of their responses. A total of 372 employees responded and the response rate is 71.54%.

5.6 INSTRUMENTATION USED FOR THE STUDY

5.6.1 Selection of Variables

In this study two types of variables viz., Dependent and independent variables were considered. They are

- **Dependent variables:** considering the objectives of the study, Library personnel and Library and Information Science Professionals who have exposures on e-resources, literatures on related study with their knowledge, attitude and adoption were utilized for construction of questionnaire. The concepts, factors and the variables thus suggested were adopted as dependent variables.

- **Independent variables:** Independent variables that were expected to influence the dependent variables were identified by discussions with LIS professionals, Information Scientists and reviews
especially on use of e-resources. The major types of independent variables selected in this study are place, designation and sex.

Survey research is a commonly used method of collecting information about a population of interest. There are many different types of surveys viz., Interview, Questionnaire. In this study questionnaire method has been adopted. The two most common types of survey questions are closed-ended questions and open-ended questions. In this study majority of the questions are Closed-Ended Questions. There are several ways to administer them.

- The respondents are given a list of predetermined responses from which to choose their answer.
- The list of responses should include every possible response and the meaning of the responses should not overlap.
- A Likert scale, which is used in the example above, is a commonly used set of responses for closed-ended questions.
- Closed-ended questions are usually preferred in survey research because of the ease of counting the frequency of each response.

5.7 DATA COLLECTION

The revised questionnaire was administrated among 590 respondents of faculty and research scholars of Vellore and Chennai campuses of VIT University. A total of 509 have responded and response rate is 84.48%.

5.8 DATA ANALYSIS PROCEDURES

The following statistical tools were employed for the analysis and the interpretation of the data.

- Mean and Standard deviation
- Percentage analysis
- Correlation Analysis
- Reliability Test
- Exploratory Factor Analysis (EFA)
- Kruskal-Wallis test
- Structural Equation Model (SEM)

5.8.1 Mean and Standard Deviation

In this study mean and standard deviation were used wherever necessary to classify the respondents into different categories. Mean plus one standard deviation indicated high level and mean minus one standard deviation referred to low level. The range in between the + standard deviation indicated the medium level.

5.8.2 Percentage Analysis

Percentage analysis was used in descriptive analysis for making simple comparisons. For calculating percentage the frequency of the particular cell was multiplied by 100 and divided by the total number of respondents pertaining to particular cell. Percentage was corrected to one decimal place.

5.8.3 Reliability Test

To ensure that the research produces reliable findings and results, a reliable tool would need to be employed. Moreover, the exploratory nature of this study necessitated the need to conduct some form of test to check whether items used in the measures are tapping into the same construct (variables) or not. Such test was accomplished through the use of factor analysis. Factor analysis is a data reduction technique used to reduce a large number of variables to a smaller set of underlying factors that summarize the essential information contained in the variables. Two widely used methods in factor analysis are Principal Components and Principal Axis Factoring. However, this study adopted the former and applied it to all variables that employed multi-items measures.
Reliability is concerned with consistency of a variable. There are two identifiable aspects of this issue: external and internal reliability. Nowadays, the most common method of estimating internal reliability is Cronbach alpha ($\alpha$). The formula used is

$$\alpha = \frac{K}{K - 1} \left( 1 - \frac{\sum_{i=1}^{K} \sigma_{Y_i}^2}{\sigma_X^2} \right)$$

### 5.8.4 Exploratory Factor Analysis (EFA)

To explore the relative factor a statistical procedure to determine the factors has been employed. This procedure is generally known as Exploratory Factor Analysis (EFA). Further multidimensional are treated with EFA to analyse their dimensions and variation extraction through each dimension. Exploratory factor analysis is a statistical method to investigate linearity of number of variables of interest to a smaller number of unobservable factors; parameters of linear functions are called factor loadings. Exploratory factor analysis consists of two stages. First one loading set is calculated that shows theoretical variances and covariance which fit the observed ones as closely as possible. A method generally used to determine a first set of loadings is called the principal component method. These loadings might not agree with the prior expectations, or might not have reasonable interpretation. So second stage consist of factor rotation to find the point of loadings that fit equally well the observed variances and covariance’s and interpreted more easily.

### 5.8.5 Kruskal-Wallis Test

The Kruskal-Wallis (Kruskal & Wallis, 1952) is a nonparametric statistical test that assesses the differences among three or more independently sampled groups on a single, non-normally distributed continuous variable. Non-normally distributed data (e.g., ordinal or rank data) are suitable for the Kruskal-Wallis test. In contrast, the one-way analysis of variance (ANOVA), which is a parametric test,
may be used for a normally distributed continuous variable. The Kruskal-Wallis test is an extension of the two-group Mann-Whitney U (Wilcoxon rank) test. Thus, the Kruskal-Wallis is a more generalized form of the Mann-Whitney U test and is the nonparametric version of the one-way ANOVA.

5.8.6 Structural Equation Model (SEM)

The term structural equation modeling (SEM) does not designate a single statistical technique but instead refers to a family of related procedures. Other terms such as covariance structure analysis, covariance structure modeling, or analysis of covariance structures are also used in the literature to classify these techniques together under a single label. These terms are essentially interchangeable, but only the first will be used.

Structural equation modeling (SEM) uses various types of models to depict relationships among observed variables, with the same basic goal of providing a quantitative test of a theoretical model hypothesized by the researcher. More specifically, various theoretical models can be tested in SEM that hypothesize how sets of variables define constructs and how these constructs are related to each other. For example, an educational researcher might hypothesize that a student’s home environment influences her later achievement in school. A marketing researcher may hypothesize that consumer trust in a corporation leads to increased product sales for that corporation.

SEM can test various types of theoretical models. Basic models include regression, path, and confirmatory factor models. Our reason for covering these basic models is that they provide a basis for understanding structural equation models. To better understand these basic models, we need to define a few terms. First, there are two major types of variables: latent variables and observed variables. Latent variables (constructs or factors) are variables that are not directly observable or measured. Latent variables are indirectly observed or measured, and hence are inferred from a set of observed variables that we actually measure using tests, surveys, and so on.
The structural equation modeling approach involves developing measurement models to define latent variables and then establishing relationships or structural equation models with the latent variables.

5.9 VALIDATION OF THE STUDY

Validation is a process of establishing documentary evidence demonstrating that a procedure, process, or activity carried out in production or testing maintains the desired level of compliance at all stages.

The guidelines on general principles of validation as four types of validation:

- Prospective validation (or premarket validation)
- Retrospective validation
- Concurrent validation
- Revalidation

In view of demands for high quality service, many systems aim to assess professional performance of established services. As the ability to self-assess has shown to be limited, there is a need for external assessments. Reliable, valid, feasible and effective measures of performance are vital to support these efforts. Since 1993, multisource feedback or 360-degree evaluation is increasingly used in service sectors as a way of assessing multiple components of professional performance. Multi source feedback involves external evaluation of performance on various tasks by peers with knowledge of a similar scope of practice and Users.

In this study the validation has been carried with reliability test.

5.9.1 Reliability of Responses

Reliability is concerned with consistency of a variable. There are two identifiable aspects of this issue: external and internal reliability. Nowadays, the
most common method of estimating internal reliability is Cronbachs alpha (α). The formula used is

\[ \alpha = \frac{K}{K-1} \left( 1 - \frac{\sum_{i=1}^{K} \sigma_{Y_i}^2}{\sigma_X^2} \right) \]

A commonly accepted rules for describing internal consistency using Cronbachs alpha (Cronbach, Lee and Shavelson 2004) are \( \alpha \geq 0.9 \) (Excellent), \( 0.9 > \alpha \geq 0.8 \) (Good), \( 0.8 > \alpha \geq 0.7 \) (Acceptable), \( 0.7 > \alpha \geq 0.6 \) (Questionable), \( 0.6 > \alpha \geq 0.5 \) (Poor) and \( 0.5 > \alpha \) (Unacceptable).

Table 5.2
Reliability analysis – Alpha Value

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Category</th>
<th>Concept</th>
<th>No. of Variables</th>
<th>Alpha Value</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Views, Needs and Importance</td>
<td>Views on Digital library,</td>
<td>3</td>
<td>0.7146</td>
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<tr>
<td>2</td>
<td></td>
<td>Importance of Digital Library,</td>
<td>3</td>
<td>0.7098</td>
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<tr>
<td>3</td>
<td></td>
<td>Effectiveness of Digital Library</td>
<td>4</td>
<td>0.7302</td>
</tr>
<tr>
<td>4</td>
<td>Technology and content</td>
<td>Digital library page layout</td>
<td>5</td>
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<tr>
<td>5</td>
<td></td>
<td>Technology and site information</td>
<td>5</td>
<td>0.6997</td>
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<tr>
<td>6</td>
<td></td>
<td>Digital library website capabilities</td>
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<td>Usability interface,</td>
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<td>System performance,</td>
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<td>Search and database structure,</td>
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<td>Types of document,</td>
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<tr>
<td>14</td>
<td></td>
<td>User satisfaction</td>
<td>6</td>
<td>0.6909</td>
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<td>15</td>
<td>Barrier and Future</td>
<td>Reason for digitization,</td>
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<td>Digital preservation,</td>
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<td>Challenges for digital media,</td>
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<td>18</td>
<td></td>
<td>Skill set of user,</td>
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<td>Barriers</td>
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<td>20</td>
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<td>Opinion</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>120</td>
<td></td>
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</tbody>
</table>
5.10 CONCLUSION

In this chapter research design has been presented. Use of questionnaire and interview methodology has been extensively used for this exploratory research. The details of research methodology, questionnaire design, its validation and administration are discussed. The research questions and the formulation of hypotheses are also highlighted.