

# Research on MCDA Approach for Library Ranking: A Case Study on University Libraries in Sri Lanka

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**Abstract:** This paper presents the nutshells of undergoing survey about the development of a multivariate ranking system for academic libraries in Sri Lanka using MCDA (Multiple Criteria Decision Analysis) approach. Ranking libraries is an interesting topic nowadays, due to most of institutes follow this to evaluate their services and recognize their current passions. There is no any systematic performance evaluation or ranking system for Sri Lankan library context, therefore proposed study will be most innovative among the library leaders of Sri Lanka. The library performance evaluation indicators found from the literature and Analytic Hierarchical Process (AHP) with FUZZY logic used as the tools of this study.

**Keywords:** library ranking, AHP and FUZZY, MCDA approach, Academic Libraries, Sri Lanka.

## 1. Introduction

Over Thousand years, the library is considered as the heaven of information sources. It exists to collect the record of human experience and to provide intellectual and physical access to that record. The word “Library” was exclusively in bond with three other words; “Silence”, “Classical” and “Books”. However, in this super speed information era, the importance of libraries is gradually swallowed up by the profit oriented, third party information delivery institutions. Electronic resources, the Internet and World Wide Web (WWW) have substituted into the traditional library resources such as books, newspapers, and periodicals. Rapidly, libraries are fully loaded with e-books, e-journals, and bibliographic databases while the size of the library buildings are reducing accordingly. Their physical space requirements will shape up according to the virtual context.

Librarians are supposed to be recruiting after testing their managerial level problem solving aptitudes and ICT skills. Most of the “Chief Librarians” now more like to call them as “Library Managers” (Calvert, 2008). Meanwhile, the increasing expectations of users have challenged libraries to improve their quality of services. Day by day, library managers feel more pressure to exploit available resources entirely. As a result, several libraries and information services have adopted quality management evaluation practices in recent years among the various initiatives implemented ISO 9000 standards, 5S movement, benchmarking (Hsieh, Chang & Lu, 2000) and LibQUAL(Fagan, 2014). Therefore, three-fold aspects; “Books”, “Readers” and “Staff” which had assumed as the “Library” by Ranganathan at medieval library era, has typically changed into “e-resources,” “Patrons” and “Managers” respectively (Illangarathne & Yingming, 2014). As a result, they have to practice continuous assessment about their services and customer satisfaction.

When considering the academic libraries, they play the vital role at high education institutes throughout the various ways such as from acquisition the information up to checking the plagiaries issues of their stakeholders’ scholarly works. According to the Miller, for academic libraries, in particular, has a responsibility to conserve scholarly communications as well as be the systematic agent of primary resources (Miller, 2008). Due to the many services provided by the academic library at their institutes, it has long enjoyed their status as the “heart of the university.” (Oakleaf, 2010).

Evaluating the library efficiency and effectiveness is not the novel concept. Most of the standard libraries are always update with the modern library functions and engaged in various dimensions of evaluations to get an idea about what kind of enhancements they achieved and which kind of satisfaction levels of their customers expected. Those library assessments will help the library management to assure the satisfaction levels of their stakeholders as well as nature of their competitors.

Ranking libraries are the ultimate stage of evaluation, and it can be applied to achieve a lot of benefits. Evaluation, the bunch of libraries instead of single library assessment, would be helped library

management to understand their proper place which they are among their competitor libraries. Libraries must demonstrate their value and document their contributions to overall institutional effectiveness and be prepared to address changes in higher education (ASQUAL, 2011).

### **1.1 Problem Statement**

Library evaluation has investigated in various ways. Library physical resource, website, electronic resources, and library building space assessments are necessary. Library reference service, online services, staff, and some other service quality evaluations are prominent. Library customer satisfaction, user perceptions, and user need investigations and assessments also taken place. Most of the studies based on a single aspect of above and limit to own library evaluations. Recently, some researchers investigated the performances of the libraries using various approaches. Most of the studies are comparisons between two libraries. There are no adequate studies find for library comprehensive performance evaluations towards rankings. Therefore, it can be seen a gap between library overall performance assessments and rank based on it.

### **1.2. Objectives of the study**

The general objective of this study is to develop a library ranking system based on the library resources, service quality & customer satisfaction for the academic library context in Sri Lanka. Other specific objectives of the study are;

- a) To study the existing quantitative and qualitative library evaluation processes.
- b) To distinguish the appropriate criteria for applying as input to measure the library service quality
- c) To investigate the impact of library service quality on the customer satisfaction.
- d) To apply the MCDA methods to rank libraries.

The proposed study aims to develop a novel library ranking system for Sri Lankan University libraries throughout the multivariable ranking methods such as AHP and FUZZY after investigating the existing literature. This study will be most significant by two ways; using Multiple Criteria Decision Analysis-MCDA approach to measure the values of KPI-Key Performance Indicators of libraries and apply this approach to Sri Lankan University library context.

## **2. Review of Literature**

### **2.1 Library Performance Evaluation Initiatives and Model Implications**

When search literature it was found several library performance evaluation methods and library assessment models. Major highlighting of them is described as follows;

The list-checking method was used very beginning to evaluate the library collections. By this approach, the third party pre-prepared library book lists such as ALA (American Library Association) book list, Choice's opening day collection, and H. W. Wilson's five catalogs have being used to evaluate the existing collections of the libraries (Hyödynmaa, Kannisto & Nurminen, 2010). Kassim and Kochtanek evaluated library digital resources using five levels; (i) focus group evaluation, (ii) database usage, (iii) weblog analysis, (iv) the web survey and (v) remote usability evaluation (Kassim & Kochtanek, 2003). Nicholson introduced a conceptual framework for the holistic measurement and cumulative evaluation of library services. Satoh et. al. used four dimensions derived from the GAP theory of SERVQUAL assessment; (i) personal effects of service, (ii) library as place, (iii) collections, and (iv) access to evaluate the library service quality (Satoh et. al, 2005). Nejati and Nejati measured the service quality at University of Tehran Library using the SERVPERF service quality evaluation model. The author used 20 different kinds of service quality aspects to evaluate the service quality at libraries (Nejati & Nejati, 2008).

Association of Research Libraries - ARL introduced the library service quality assessment model to measure the customers' perceptions about the services of libraries called LibQUAL (Davis & Kyrillidou, 2011). Alemna proposed the eight criteria for evaluation libraries; (i) library resources; (ii) Effectiveness, (iii) Efficiency, (iv) Cost-effectiveness, (v) Benefit, (vi) Time saved, (vii) Satisfaction, and (viii) Cost-benefit analysis (Alemna, 2012). Noh evaluated electronic resources in academic libraries using an input-output analysis of evaluation indicators. Inputs refer acquisitions of e-resources such as web

databases, e-books, e-journals, and outputs refer their usage (Noh, 2012). Asogwa assessed the academic library performance in Nigerian Universities using the eight performance evaluation principles (Asogwa, 2014). Pant evaluates academic library websites based on six variables; (i) usefulness, (ii) efficiency, (iii) effectiveness, (iv) learnability, (v) Satisfaction, and (vi) accessibility to evaluate the library websites (Pant, 2015).

Berndtson & Öström rank public libraries in the European Union throughout six dimensions using more than 65 000 public libraries. The authors calculate the final score from more than 38 inputs and issue a star level 1-6 for good library accordingly (Berndtson & Öström, 2015). American Library Association<sup>1</sup> (ALA) ranks libraries based on four measures; (i) By the size of population served, (ii) By the size of the library collection, (iii). By the number of times items in the collection were checked out, and (iv) By the Number of visits to the library. [www.thebestcolleges.org](http://www.thebestcolleges.org)<sup>2</sup> ranks libraries based on architectural interest of library buildings and collections interest of library users. [www.haplr-index.com](http://www.haplr-index.com)<sup>3</sup> ranks 7,930 public libraries in the United States using the federal data, which obtained through five inputs and ten outputs measures.

## 2.2 Library Performance Evaluation Initiatives within Sri Lankan library context

Ranaweera evaluated the collection and service quality of the national library of Sri Lanka based on the user satisfaction (Ranaweera, 1996). Wijerathne evaluated the university library websites using seven criteria. The author mainly focused on the content elements and design features of web site and allocated scores to individual aspects. Finally according to the obtained scores ordered the website accessibility (Wijerathne, 2013). Gamage examined the library resources and services provided by libraries specializing in indigenous medicine in Sri Lanka based on their existing resources and services (Gamage, 2009). QAA - Quality Assurance & Accreditation Council of the University Grants Commission, Sri Lanka introduced the quality review process to the University libraries through five aspects; (i) Vision, Mission and Objectives, (ii) Management, (iii) Resources, (iv) Services, (v) Integration, (vi) Contribution to Academic Output, (vii) Networking and (viii) Evaluation (University of Peradeniya, 2007).

Based on the discussion above, it is noted that library evaluation takes place in every kind of aspects in the library context and it is counts as an essential part of the library service which can improve the performance while competing with others. Library resources, services provided and user satisfaction are counted as the most considerable aspects at evaluation. Reviewer observations, customers' perceptions via likert scales and given score methods have being vastly used to measure the actual level of performance. Evaluating these outcomes and based on them a graphical explanation (figure 1) is drawn to depict the proposed conceptual model.

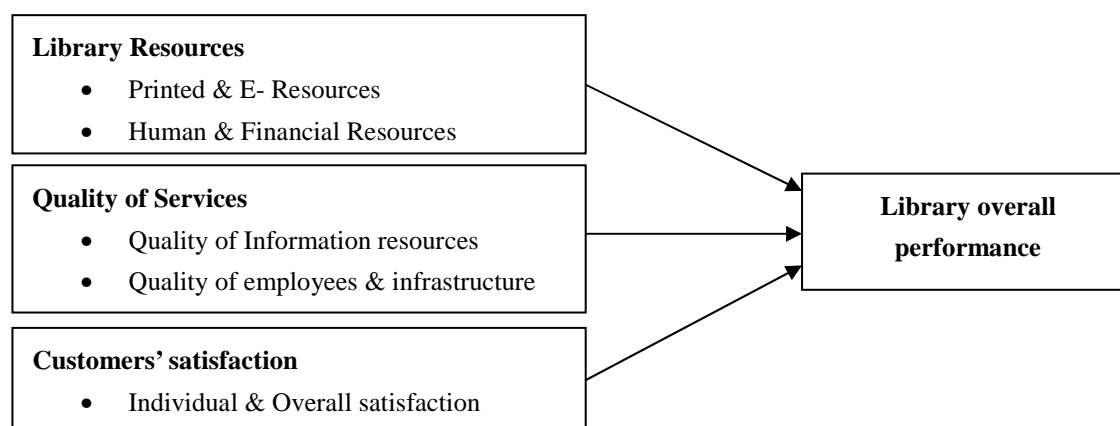


Figure 1: Proposed conceptual framework of the study

<sup>1</sup><http://www.ala.org/tools/libfactsheets/alalibraryfactsheet13>

<sup>2</sup><http://www.thebestcolleges.org/amazing-libraries>

<sup>3</sup><http://www.haplr-index.com/haplr100.htm>

<sup>4</sup><http://www.mohe.gov.lk/index.php/en/about-ministry/overview>

### 3. Methodology

Based on the above conceptual framework it is supposed to evaluate overall performance of the context libraries through their available resources, assured quality of the service and level of the customer satisfaction. To test the model, it is expected to conduct the overall performance evaluation survey using two types questionnaires which distributed to the sample find from Sri Lankan University libraries. After measure the individual library performance it is expected to give a overall performance indicator to the appropriate library.

Based on the proposed MCDA approach which combined with FUZZY logic and AHP – Analytic Hierarchical Process, and using above mentioned casewise performance indicators, it is expected to solve the following matrix.

**Table 1: pairwise comparison matrix for library ranking**

	$L_1$	$L_2$	$L_n$
$L_1$	1	$a_{12}$	$a_{1n}$
$L_2$	$a_{21} = \frac{1}{a_{12}}$	1	$a_{2n}$
$L_n$	$a_{n1} = \frac{1}{a_{1n}}$	$a_{n2} = \frac{1}{a_{2n}}$	1

After calculate above pairwise AHP matrix, it is expected to derived a list of most highly performed libraries accordingly.

### 4. Conclusion

Libraries act as the disseminators of information. They are doing this systematically. If they have a picture about their current service level, it can be easily maintained their customers' perceptions and compatibility. Most of the ranking systems are catering on this manner and some of them are help to make the decisions in both ways; customer level and management level. Based on that it can be determined that ranking libraries are most significant on this information era. Today customers are highly expected quality service and recognition of the service among the similar organizations as well. Therefore, it can be predicted that proposed study based on library overall performance through the identified criteria will be the benchmark as well as innovative outcome of the LIS industry.

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