

# **Towards Management Information Systems for Strategic Periodicals Collection Management for Saudi Academic Libraries in the World of Electronic Journals**

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**A Thesis**

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# Background to the problem:

- ◆ Canceling printed Journals (PJ) subscriptions facing the decline of budget in Saudi Academic Libraries.
- ◆ EJ and PJ collections do not satisfy the user's needs.
- ◆ SALs cancelled their PJs without having them covered on EJ.
- ◆ The PJ Collection is not currently updated.

# The Importance of the study

This study differs from previous researches in that:

- ◆ It integrates certain management methods with EJ collection management and development criteria.
- ◆ This integration between the two subjects is considered, relatively new in the field of Library and Information Science.
- ◆ An MIS model was developed to make the Decision Making Process of adopting EJ more effective.



- ◆ The study compared ten components of the evaluation criteria, which SAL professionals prefer to use in the EJ decision-making process, to the international guidelines for EJ collection management in general and with UK in particular.
- ◆ This was undertaken to understand to what extent SALs differ from others.



# The Statement of the Problem

- To investigate the extent and nature of EJ adoption in SALs and how this affects their Periodical Collection Management (PCM).
- How the Collection Management Policies can make the EJ decision-making process, for library managers and other Stakeholders, more effective?

# Broad Objectives of the study

1. To determine the nature and extent of EJ adoption in SAL.
2. To determine the impact of EJs on SALs periodicals collection management relating to the services, costs, staffing, and equipment.
3. To identify the important criteria for SALs professionals (stakeholders), with regard to the decision-making process, in EJ collection management & development.
4. To compare EJ collection management situation in Saudi Arabian libraries with the International Guidelines and UK academic libraries.
5. To develop a MIS model for EJ decision making in SALs.

# Hypothesis of the study

1) There is a significant increase expected in EJ titles and budget and a decrease in PJ titles and budget between the years 1995 and 2000.

2) There is a significant relationship between EJ costs and Periodical Collection Management procedures such as Services, Equipment/Facilities, Periodicals Control and Periodicals Collection Management.

3) There is a significant relationship between EJ staffing/training and Periodicals Collection Management procedures such as Services, Equipment/Facilities, Periodicals Control and Periodicals Collection Management.

4) The Criteria considered important in EJ collection management policies is influenced by the type of job of library professionals.


5) The Criteria considered important in EJ collection management policies is influenced by the managerial level of library professionals.



# Research Questions

1. What are the main differences between PJs and EJs in SALs?
  - a. What was the size of journal collection titles between 1995 and 2000?
  - b. What were the journal acquisition budgets between 1995 and 2000?
  - c. What were the electronic journals provisions for different disciplines?
  - d. What is the impact of EJs on services, IT infrastructure activities (facilities/ equipment), costs, and staffing of established SALs?





**2. What are the criteria ranked as important by professionals in SALs with regard to the decision-making process in EJ collection management & development when;**

- a. Selecting EJs?**
- b. Using identification tools to pinpoint EJs?**
- c. Developing EJ collection policies?**
- d. Considering quality control measurement?**
- e. Evaluating EJ collection management policies?**
- f. Offering training programmes to staff members?**
- g. Considering equipment & facilities?**
- h. Preserving or storing EJ holdings?**
- I. Accessing EJs?**



3. Who are the stakeholders in the EJ decision-making process?
  - a. What is the relationship between the highly ranked criteria for EJ selection and the staff members` job function and managerial level in the library operation process?
4. What are the differences and similarities between the situation in EJ applications in SALs and the International guidelines along with UK academic libraries?



## Research Methodology

The study used:

- The descriptive survey method.
- The purposive sampling method was used.
- The sample consisted of six SALs out of eight.
- The questionnaire method was used to collect the data.
- Both quantitative and qualitative analysis was applied to the data collected.



# Scope and limitations of the Study

## ◆ Subject limitation

a. In order to investigate the impact of EJs on periodicals collection management (PCM) in SALs the study included only electronic journals.

b. The study investigated stakeholders' (library managers) judgment of the effectiveness of EJ collection management policies and avoided taking into consideration the users' attitude.



- ◆ **Time limitation:** The study selected all SALs, which had EJs in their collections from 1995 to 2000.
- ◆ **Language limitations:** The study selected literature mainly in English and some in Arabic.
- ◆ **Method limitations:** The researcher was restricted to collecting information by questionnaires, which were sent by post/fax to various SALs.



## **The Sample of the Study**

- 1. The Total Population consisted of eight SALs out of which only six were chosen for the survey as they were using Electronic systems in their operations for more than five years.**
- 2. The library professionals involved in EJ management who were identified in the six SALs belonged to the following three groups:**
  - a. The first group are Senior Managers.**
  - b. The second group are the Technical Services Librarians.**
  - c. The third group are the General Information Services Personnel.**



**3. The total number of SAL professionals who were directly involved in EJ management in the three groups, described above were 81 out of whom 58 responded. The study therefore consisted of 58 Library personnel in various levels.**



# Methods of Data Collection

- ◆ **Three Questionnaires** were developed to obtain information on the main dimensions of the study.

**The First Questionnaire** was designed to elicit the following;

- Background information related to job level and activities.**
- The degree of impact that factors of EJ had on periodicals collection, during the years 1995 to 2000.**
- The preferences of SALs' professionals on the important criteria in EJ decision-making process.**

**The Second Questionnaire** was designed to collect quantitative information relating to the size, titles, budget and costs of EJ in SALs between 1995 and 2000.

**The Third Questionnaire** was designed to collect information about the electronic information systems, automation systems and sub-systems in SALs.





## Added new plans

- ◆ **A fourth questionnaire** was developed to find out to what extent the situation of EJ collection management of SALs, as measured during the period from 1995 to 2000, has changed during 2001 to 2003. This questionnaire which aimed to collect information from **the Directors of information services** in the six SALs elicited information on the following:
  - 1. To find the impact of EJ on collection management procedures in terms of increase or decrease.**
  - 2. To what extent the important criteria in EJ decision-making process are being applied in SALs currently.**



# Statistical Analysis

The SPSS version 10 was used extensively for analyzing the data obtained through questionnaires. Besides Frequencies, Percentages and Means the other statistical procedures used to test the hypotheses were as follows:

- ◆ As most of the data is categorical and qualitative the Chi Square test was used to find the difference between the number of library professionals who evaluated the degree of impact of EJ in terms, of increase or decrease, on PCM procedures. It was also used to identify the important criteria of EJ collection management in the decision making process by SAL professionals.
- ◆ The Mann-Whitney Test was used to determine the significance of the difference expected between the budget and size of PJs and EJs.



- ◆ **The Spearman Rank Correlation was used to find the relationship between the different variables of EJs and PCM procedures. It was also applied to measure the degree of importance of the criteria affecting EJ decision-making and its relationship to the various managerial levels.**
- ◆ **The data collected through questionnaires sent to the UK libraries was qualitatively analysed in order to compare the situation with SALs.**
- ◆ **For the comparative aspect of the study a qualitative analysis was made of the criteria as evaluated important by SAL professionals in EJ collection management with that of International guidelines.**
- ◆ **A qualitative analysis was made of the data of the fourth questionnaire, which was added to gain additional information regarding the current situation in SALs.**



## The comparative study

- ◆ The ten components of the evaluation criteria, which SAL professionals prefer to use in the EJ decision-making process were compared with the international guidelines for EJ collection management.
- ◆ Surveyed eight International guidelines and applied what is suitable with the study variables (to cover all the points in the ten components of the decision-making criteria) and also applicable to SALs, such as: Cedars, ACRL , ICOLC , Follett Report , Niso standards and others.
- ◆ Three articles were also referred to compare EJ collection management criteria in SALs and in developed countries. These articles are that of Breaks, Gardner, and Bluh.



## The EJMS model

**The concept of EJMS in the library environment involves looking at the library itself as an open system working as a whole with input resources, transformation processes, and outputs.**

- ◆ **It incorporates strategic planning, operational and technical planning with setting goals and objectives essential to maintain a balance between the needs of library managers on one hand and the users on the other.**
- ◆ **This integration requires the establishment of appropriate performance measures, the use of transformation processing to provide management information, and a decision support system, based either on stand alone work station or on integrated system.**
- ◆ **The application of the EJMS and DSS will basically help the academic libraries, Saudi Arabia in particular and the libraries in other developing countries in general, in dealing with the problems they are likely to face in the process of transition to the electronic resources.**

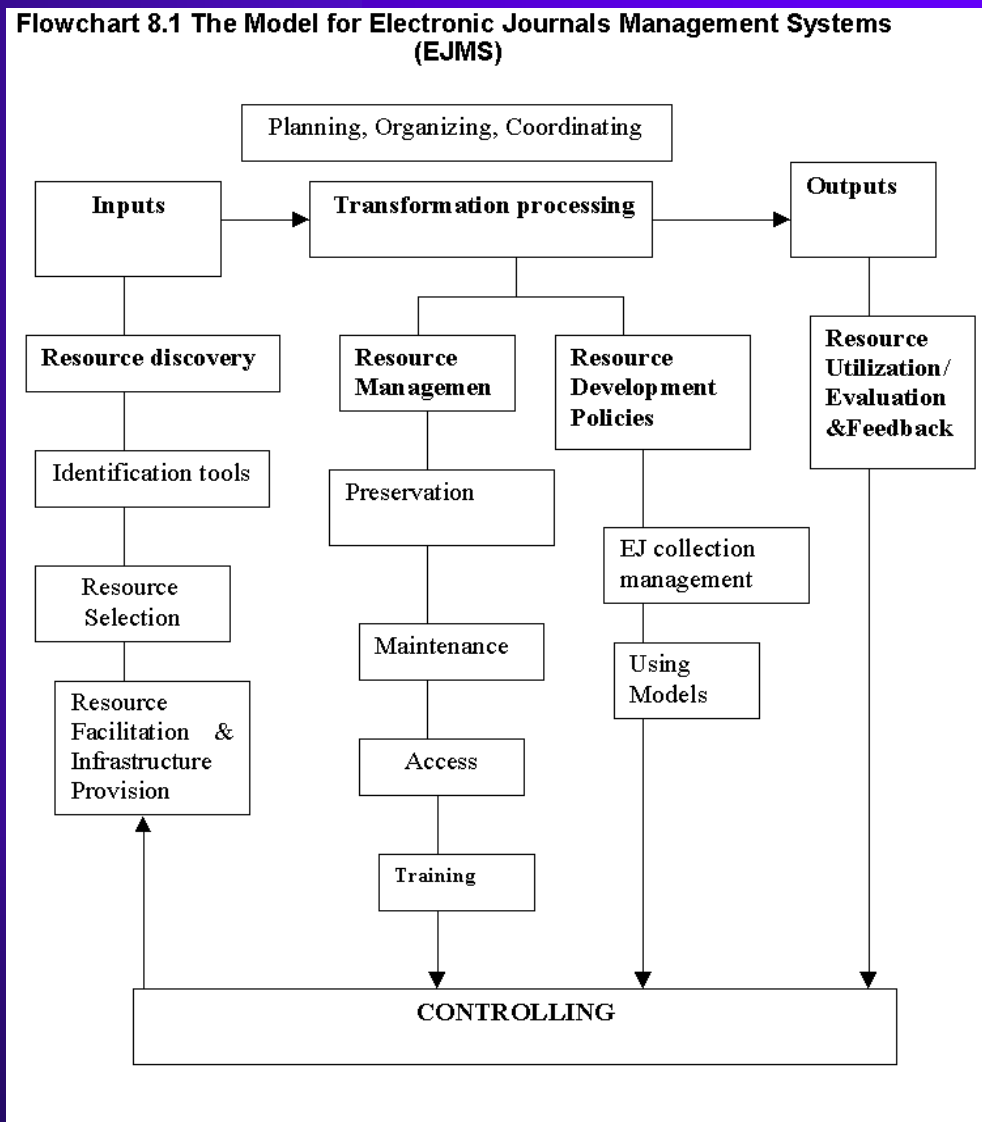


The EJMS model, which was developed based on The Knowledge-Based Systems, The Stakeholders Approach, and Decision Support Systems (DSS), involved the following;

- ◆ **Resource Discovery:** consists of selection tools, and selection process when subscribing to electronic journals.
- ◆ **Resource Delivery:** consists of preservation and maintenance, and accessing electronic journals.
- ◆ **Resource Utilization:** consists of quality measurement, evaluation and feedback.
- ◆ **Infrastructure Provision:** consists of electronic journals equipment and facilities, and staffing and training.
- ◆ **Resource Management:** consists of selection criteria, selection development policies, electronic journals collection management, and training staff and users.

# The Model for Electronic Journals Management Systems

(EJMS)



# Applying MIS Model to EJMS:

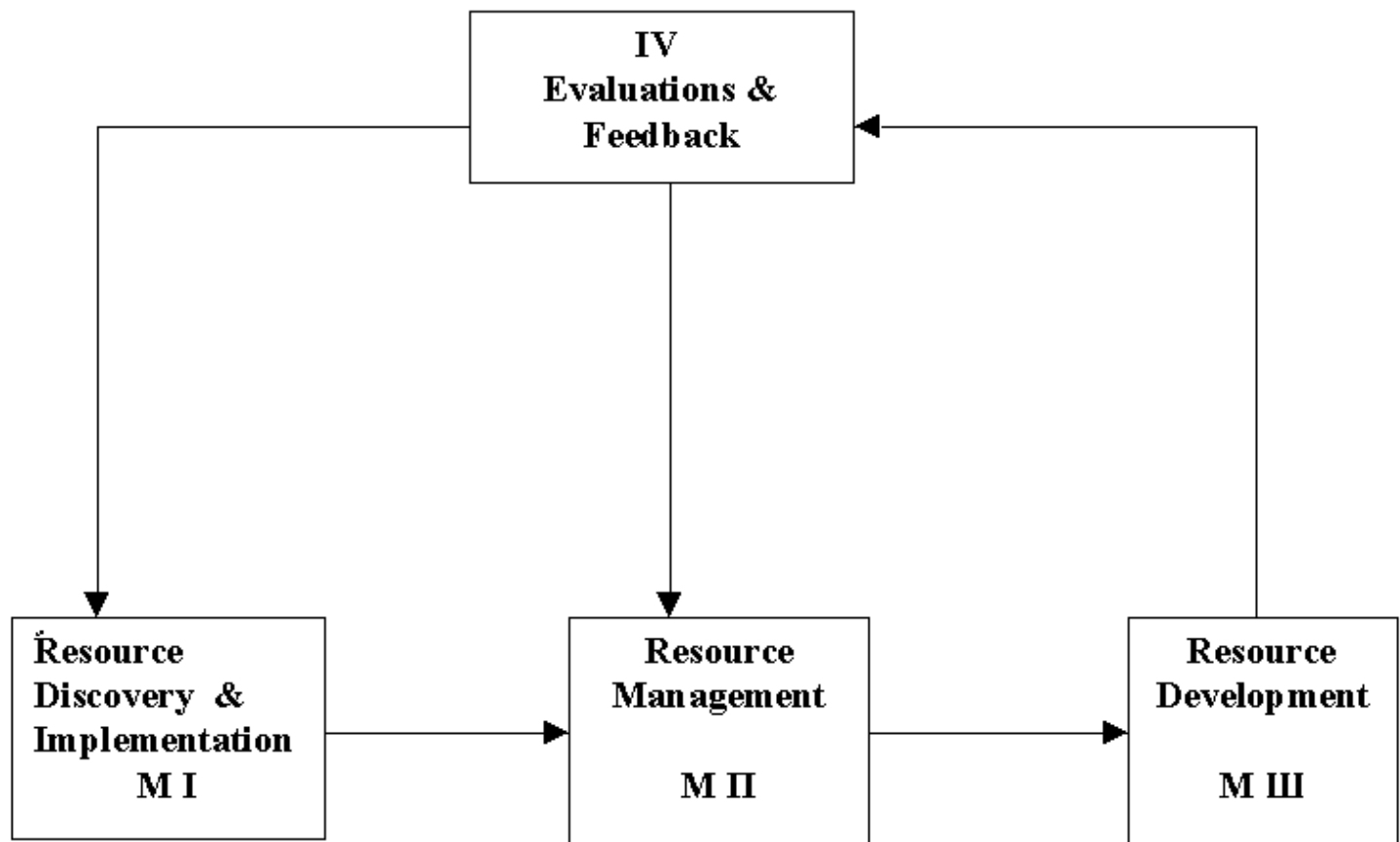
The MIS model for EJMS consists of four basic components that are as follows:

1. **Resource Discovery & Implementation (M I)** which involves identifying all the EJs available anywhere in the world.
2. **Resource Management (M II)**, which relates to the EJ management dealing with its storage, preservation, accessing and training.
3. **Resource Development (M III)** involves EJ development in terms of selection development policies and EJ collection management along with using specific models.
4. **Resource Utilisation (M IV)**, which relates to evaluation and feedback.



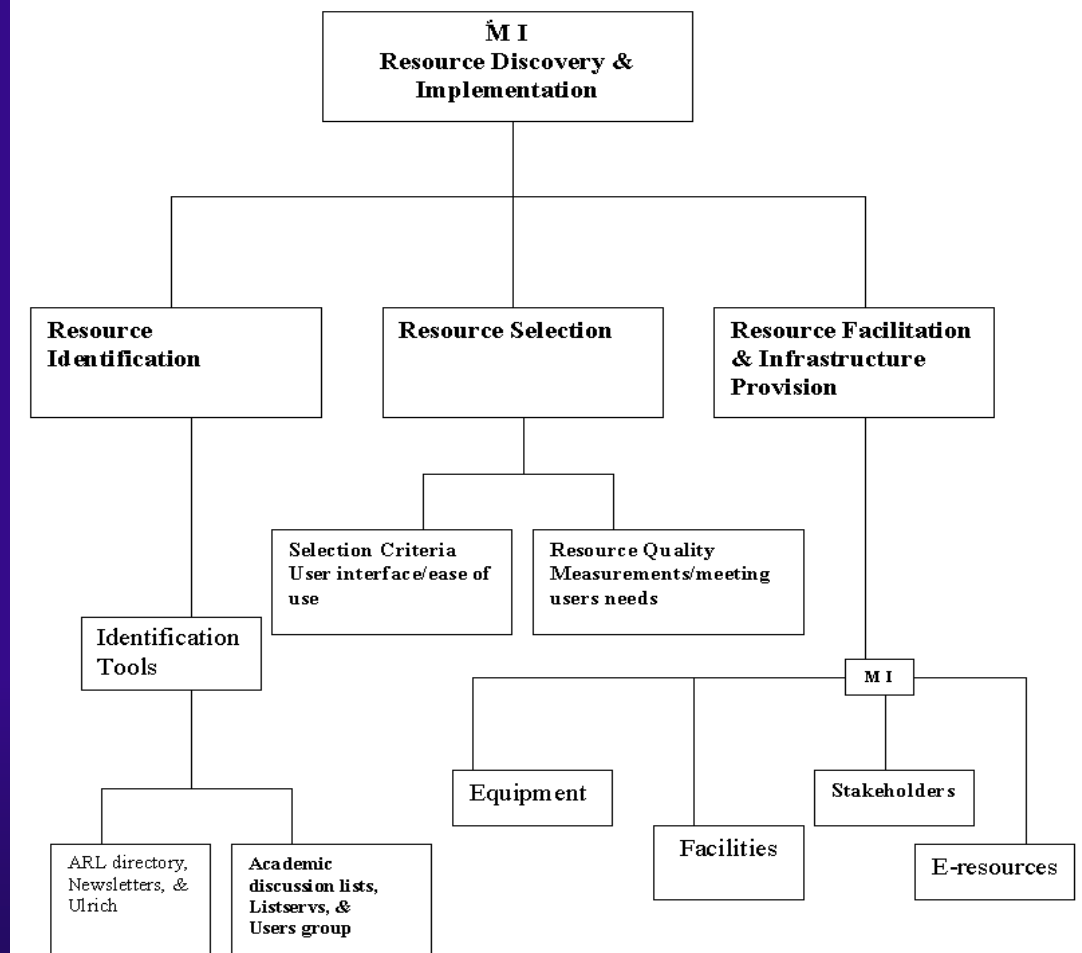
# The MIS Model for Electronic Journals Management Systems (EJMS)

Flowchart 8.2 The MIS Model for Electronic Journals Management Systems (EJMS)



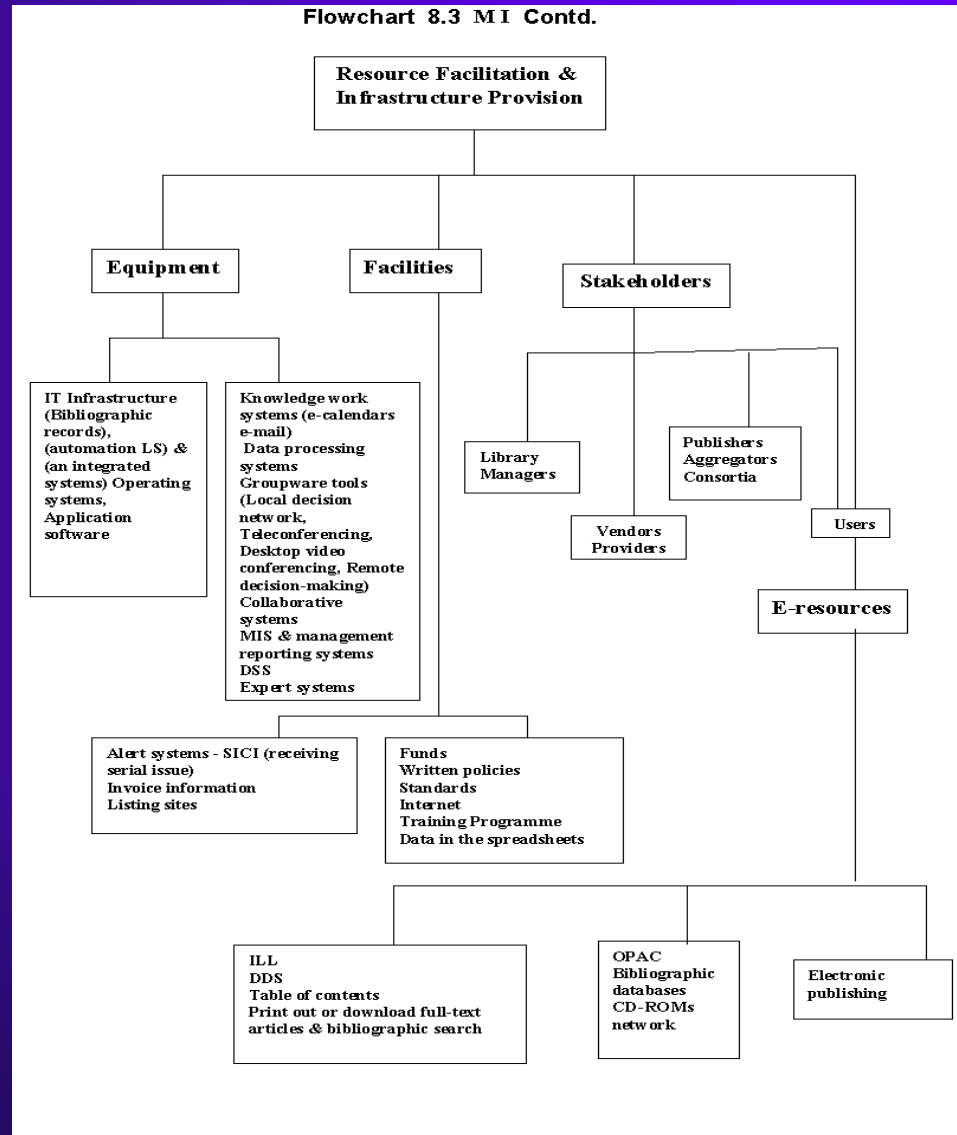
# Resource Discovery & Implementation in Model I for (EJMS)

Flowchart 8.3 Resource Discovery & Implementation in Model I for (EJMS)



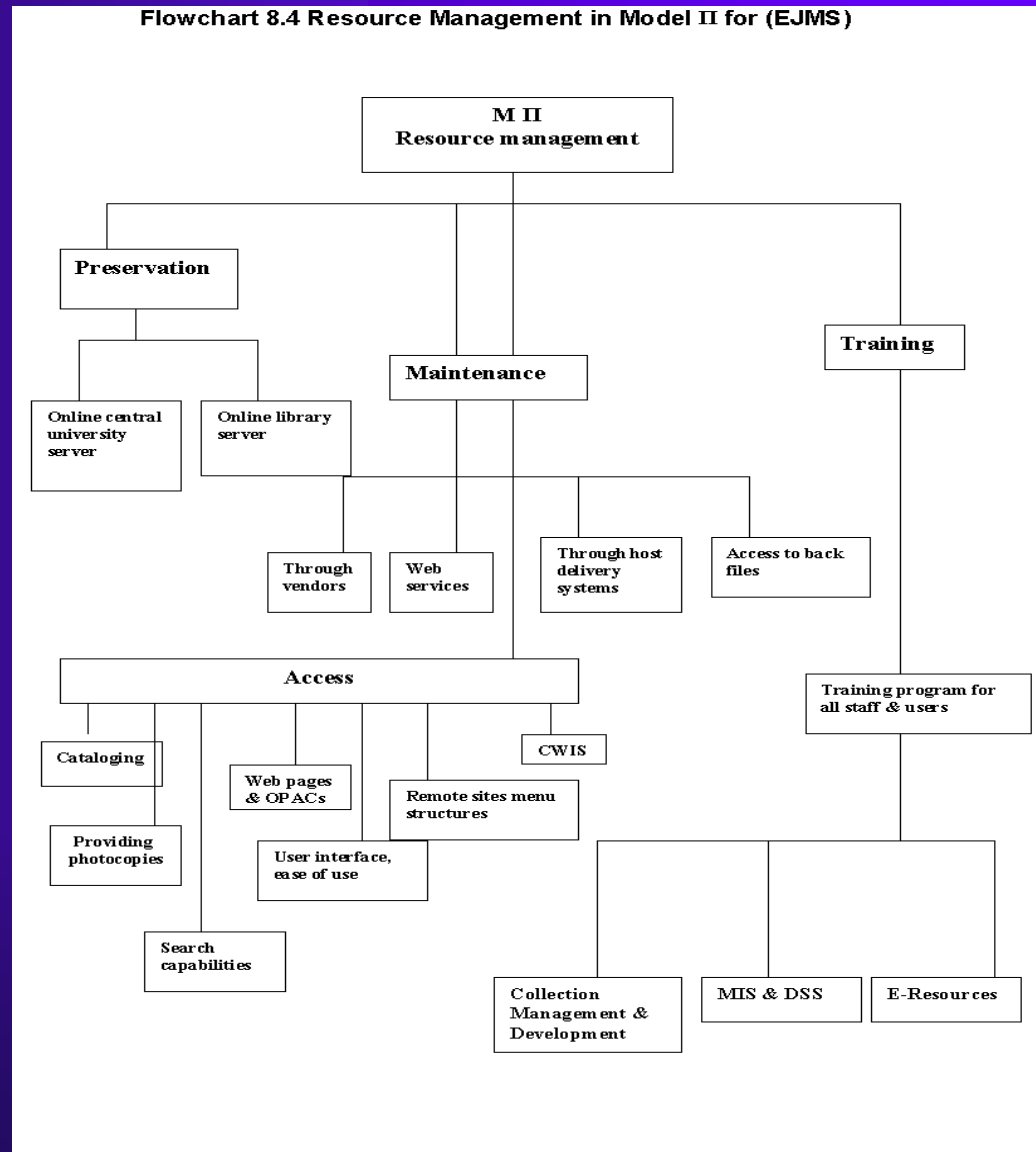
# MI Contd.

Flowchart 8.3 MI Contd.



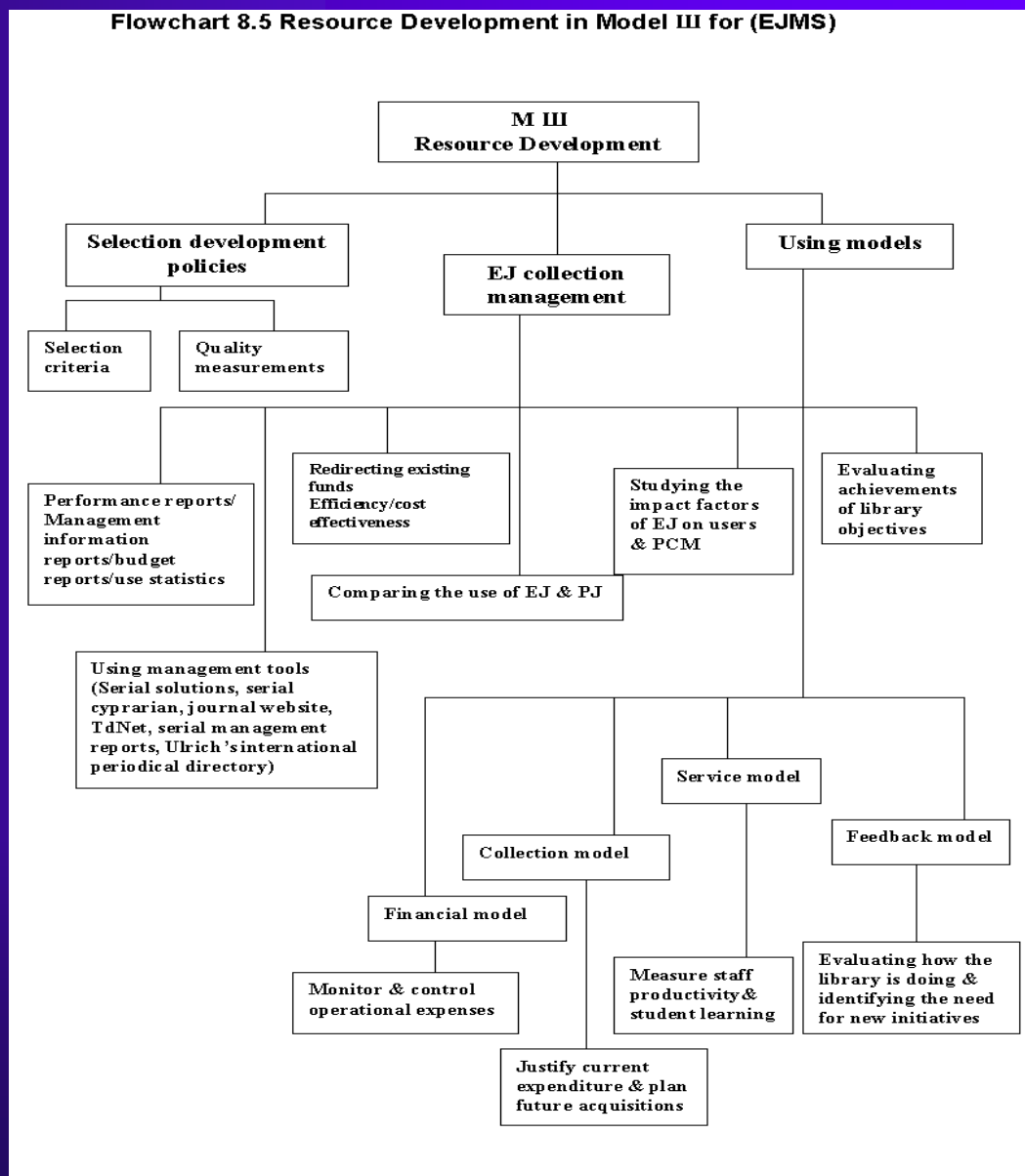
# Resource Management in Model II for (EJMS)

Flowchart 8.4 Resource Management in Model II for (EJMS)



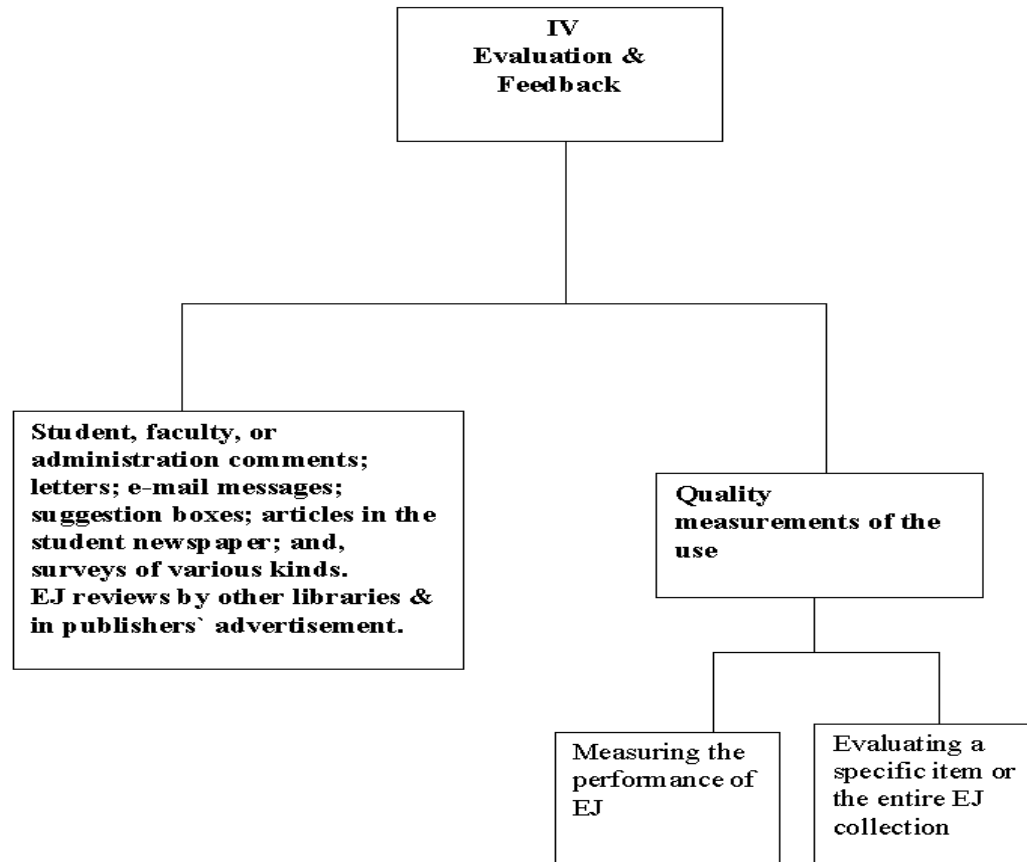
# Resource Development in Model III for (EJMS)

Flowchart 8.5 Resource Development in Model III for (EJMS)



# Resource Utilization in Model IV for (EJMS)

Flowchart 8.6 Resource Utilization in Model IV for (EJMS)



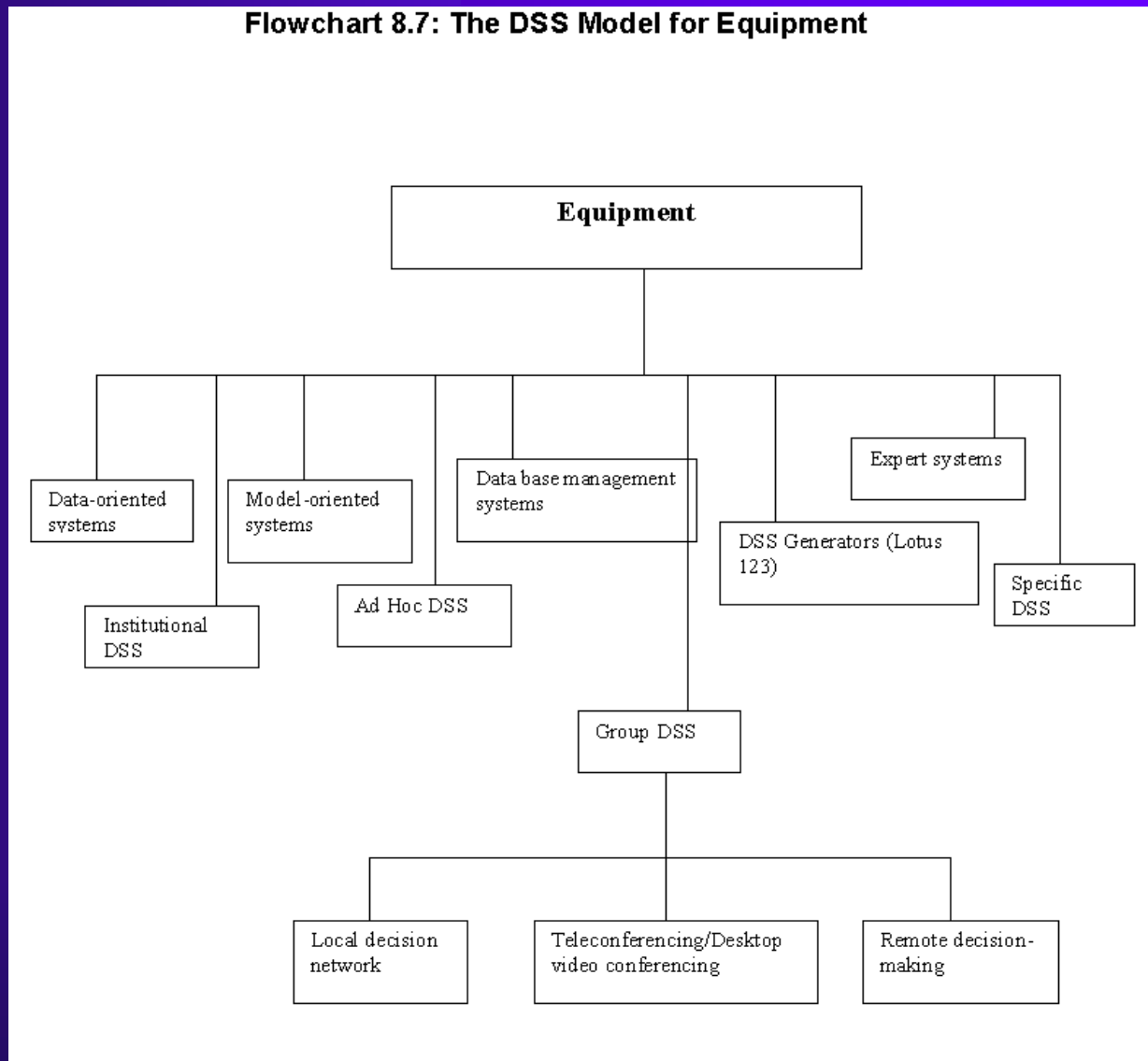
# Decision Support Systems (DSS):

As all SALs would not be able to apply the MIS model to EJMS an alternative model DSS was developed. It consists of four basic components:

- **DSS equipment.**
- **Decision support (DS) tools in EJ collection management, which have been identified by the study according to the information reported by the different managerial levels.**
- **Decision support report, which is generated by each level of management.**
- **Decision support professionals who use these reports for effective decision-making.**

# The DSS Model for Equipment

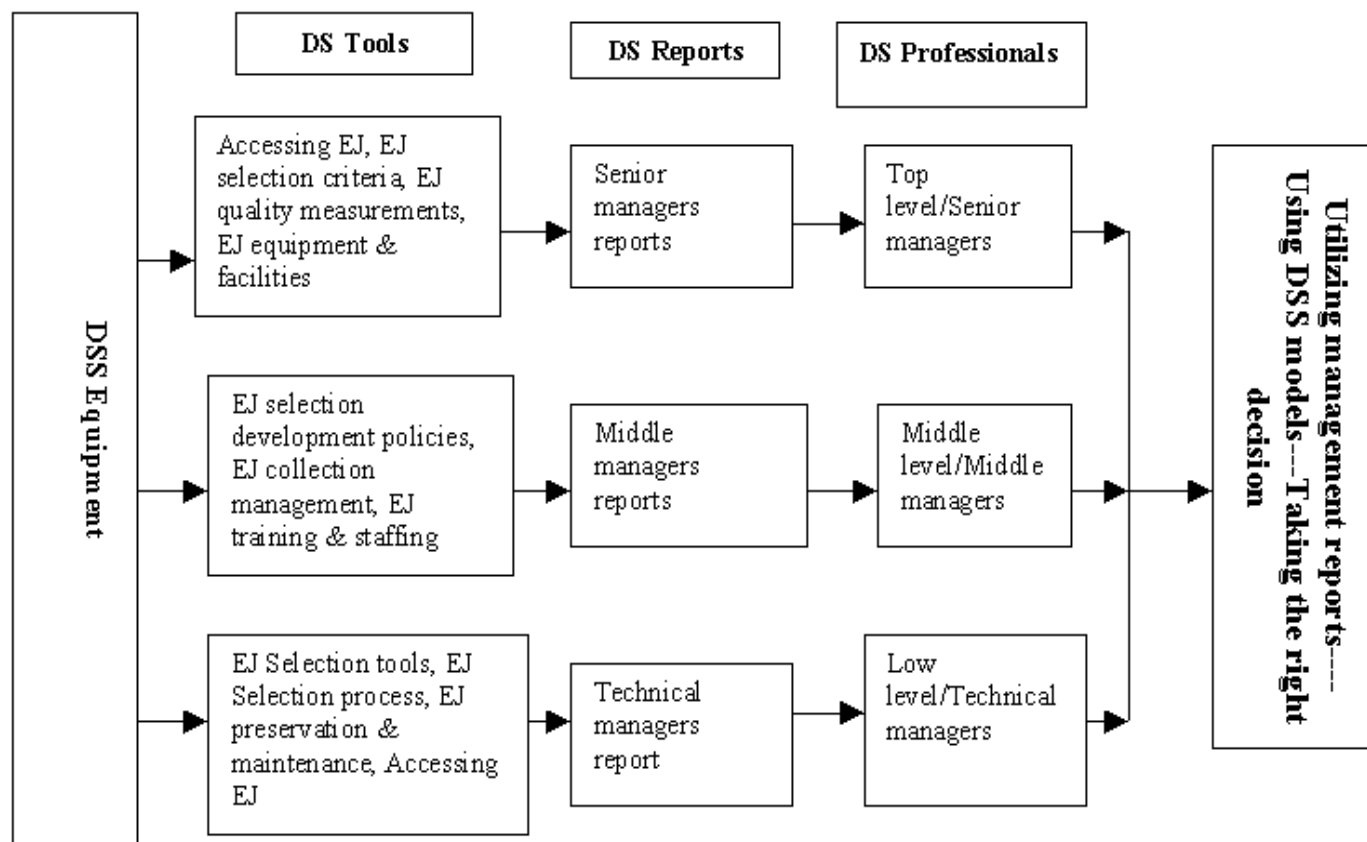
Flowchart 8.7: The DSS Model for Equipment





# The Decision-making support process of Library Professionals in SALs


Flowchart 8.8: the Decision-making support process of Library Professionals in SALs



## Conclusion

In order to determine the nature and extent of EJ adoption in SALs it was found that:

- ◆ The high increase in the budget of EJs in 1996 perhaps resulted in a low increase in the budget of PJs.
- ◆ A significant difference was found between the increase in budget acquisition of PJ and EJ in SALs thereby confirming the **first hypothesis**.
- ◆ There was a continuous decrease in PJ from 1997 to 2000.




**To assess the impact of EJs on periodicals collection management such as services, equipment, costs, and staffing in SALs it was found that:**

- ◆ **EJs had a positive effect on Services and Equipment/Facilities.**
- ◆ **A positive significant relationship was found between Costs and Services, Costs and Periodicals control and between Costs and Periodicals Collection which confirmed **the second hypothesis.****
- ◆ **It was therefore concluded that procedures, which require assessment and evaluation, are directly related to Costs whereas Equipment/Facilities were found not significantly related to Costs.**



- ◆ A significant relationship was also found between staffing and services and between staffing and Equipment/Facilities. No significant relationship was found between Staffing and the other two factors viz. Periodical Control and Periodical Collection that are very important in PCM decision-making. Therefore, we accept partially the **third hypothesis** relating to staffing as being positively correlated to factors of Services and Equipment/Facilities while rejecting that there is a correlation between Staffing and Periodicals Control and Periodicals Collection.
- ◆ The above results indicate that the library professionals in SALs see an obvious and logical relationship between Staffing and the factors of Services and Equipment/Facilities. However, they are not aware of PCM procedures such as Periodicals Control and Collection Management, which underlie effective decision-making concerning staffing.



The **third objective** of the study relates to the criteria considered as influencing the decision making process of SALs managers and professionals. It was found that:

- ◆ More than 70% rated “selection tools” “selection development policies” and “accessing EJs” as very important.
- ◆ The criteria of “EJ collection management” “EJ preservation maintenance” “Quality measurement” “The training in E-Resources” “selection process” “EJ equipment & facilities” and “selection criteria” were considered important by 60% of the respondents.



No significant relationship was found between the three job functions (Administrative, General and Technical) and their evaluation of criteria in decision-making. Thus, **the fourth hypothesis** which states that the type of job influences the criteria considered important in EJ collection management policies is confirmed thereby indicating that the criteria of EJ decision-making differs according to job functions.




**There was not much difference found among the three managerial levels with regard to the importance of the EJ decision-making criteria.**

- ◆ **A significant relationship was found only between the senior and middle managers, which indicates that there is more agreement between these two levels on the criteria of EJ decision-making.**
- ◆ **The fifth hypothesis that states that the managerial level influences the criteria considered important in EJ collection management policies is partly confirmed.**


## **The findings of the comparative study indicate that:**

- ◆ **SALs professionals generally agree with most of the criteria in the INGs. However, they choose only one tool as important in identifying EJ and that is electronic reference databases (Ulrich).**
- ◆ **They do not have enough information or awareness about the importance of specific subscription models, aggregating journals from many publishers, and consortial efforts, which are considered as important tools in selection process.**
- ◆ **They also do not have enough information about the importance of the resource sharing & co-operative collection development. On the importance of Quality measurements SALs do not differ much from ING.**
- ◆ **The comparative study also showed that SALs do not have enough information about the importance of EJ collection management policies, training in electronic resources, and electronic journals preservation maintenance.**
- ◆ **SALs professionals consider all the evaluation criteria in EJ equipment and facilities as important tools to prepare for IT infrastructure.**



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- ◆ In the criterion of Accessing EJ, SALs differ from ING in that they do not recognize providing campus wide information systems in EJ decision-making process and also do not possess enough information about the importance of creating cataloging records for EJ in the library's local systems.

The above findings lead to the conclusion that SALs professionals agree with most of the criteria as important in accordance with ING but perhaps lack the capability to implement them. This could be due to the fact that the organization of SALs is highly centralized whereas the basis of INGs in developed countries, like USA and UK, is a decentralized system. The other reason is that SALs lack professionals with knowledge and training to implement the criteria. This is primarily because of the time gap in the development of education in general and library science in particular in Saudi Arabia.



**The final objective of the study related to the development of an MIS model on the basis of the extent to which SALs, possess the potential of applying it. It was found that:**

- ◆ SALs have developed their computer technology since 1995, and have also automated their main functions process, which can help them develop sub-systems.
- ◆ They have launched into the field of EJ in 1995 and have established information network services and the Internet.
- ◆ SALs have professional and technical librarians although there is a need for more qualified personnel in the field of electronic resources management.

**Thus, having ascertained that SALs possess the minimum requirements to apply the MIS model the researcher developed a model on the basis of:**

- Identifying the factors considered important by SALs professionals at different levels in EJ decision-making**
- Applying the basic principles of MIS in developing the model of Electronic Journal Management System (EJMS) for SALs and**
- Proposing an alternative model Decision Support System (DSS) for SALs who do not possess all the requirements for using MIS effectively.**



- ◆ **The most important problem that emerges as a result of transition is effective decision making in the management of the budget – which involves taking the right decision at the right time by the right people. Library managers can evaluate only the outputs by comparing the level of increase or decrease of services with the library budget. Therefore, planning and budgeting are closely related activities where the budget is a very important management tool, which is used to increase or decrease the level of any service in order to meet the desired goals of the library.**
- ◆ **Another important factor is the quality of staff and training programmes that help to keep pace with technological changes and offer better services. Thus, applying MIS models will help the library in providing a comprehensive collection of information, both in printed and electronic format, to fulfill user needs.**

## Follow up study

The follow up study was undertaken to assess the present situation in SALs, that is, between 2001 and 2003 focusing on their readiness to apply the EJMS model.

That during the last three years there have been changes in SALs but not significant enough to bridge the gap between them and the developed countries in EJ collection. This is because the problems that they were facing before the year 2000, mentioned earlier in this study, still remain unsolved to a great extent. However, they have indicated that they are capable of applying MIS models to help them deal with the existing problems in the process of adaptation to the developments in the field of information technology.