An Interactive Decision Support System, Its Potential For Strategic, Tactical and Operational Decisions in a Service Type of Organization

Technology and Information Management

Abstract

This paper presents a model of utilizing a interactive decision support system as a tool in all spectrum of operations management levels – strategic, tactical and operational decision making for a service type of organization – an academic institution. Various design mix of performance indicators will be presented as part of the decision support system. The primary benefit to be derived stem from the ability to use the model to conduct alternative scenarios reflecting a wide variety of different operational policies and assumptions. The framework presents the integration of three systems: the database management system (DBMS), the model base management system (MBMS) and knowledge base management (KBMS). Validation test has been conducted to determine applicability and economic viability of the system.

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Introduction

Background of the Study

Change in the nature of work and the needs of ASEAN's future will require a similarly drastic change in the capabilities of the ASEAN Manager. Surely, he will have to develop specific skills, particular knowledge base if he is to succeed in his transformative task.

As educators face the increasing demands for more and better educational programs, there is a constant challenge to meet demands with limited resources. Performance Evaluation System is designed to aid in decision-making and decision implementation.

Statement of the Problem

This is a developmental research aimed at exploring ways of utilizing a decision support system (DSS) as a tool in all spectrum of management levels - strategic, tactical and operational decision making. Thus, the following are investigated in designing a prototype that will serve as a demonstration unit of this system.

- What is the system architecture of the DSS?
- How does DSS helps operational decision making?
- Is it possible that a better and informed decision will be attained given a model and a defined way of analysis?

Objectives

General Objective

To develop a graphic decision support system as input to operational decisions.

Specific Objectives

- To develop a suitable mix design of performance indicators that can be inputs in managing the plans of an academic institution
- To produce a prototype model designed to suit a service type of an academic institution
- To design a decision support system and evaluate its applicability and economic viability

Scope and Limitation

The study focuses in the identification of performance indicators that can be a tool in operational decision making. Performance standards to be used are based on local standards for tertiary level of institutions.

The limitations are:

- Participants assess the importance of the various goals differently.
- The decision maker(s) may change the importance assigned to specific goals with passage of time or in different decision situations.
- Goals and sub goals are viewed differently at various levels of the organization.
- The goals themselves are dynamic in response to continuous changes in the organization and its environment.
- It is difficult to express some of the goals in quantitative terms.
- The relationship between alternatives and their impact on goals may be difficult to measure.

Hypothesis

The following hypothesis were formulated to help understand the nature of the problem:

1. The performance of an academic type of organization is a function of the following:

The internal resource data, the external resource data and industry standards

P = f (IR, ER, IS)
Where
P = performance
IR = Internal Resource Data
ER = External Resource Data
IS = Industry standards

2. It is possible that a better and informed decision will be attained given a model and a defined way of analysis.

Conceptual Framework

Framework Charts

Figures 1 shows the relationship of the overall goal of the institution, the operational decisions at different levels and component variables of the decision support system

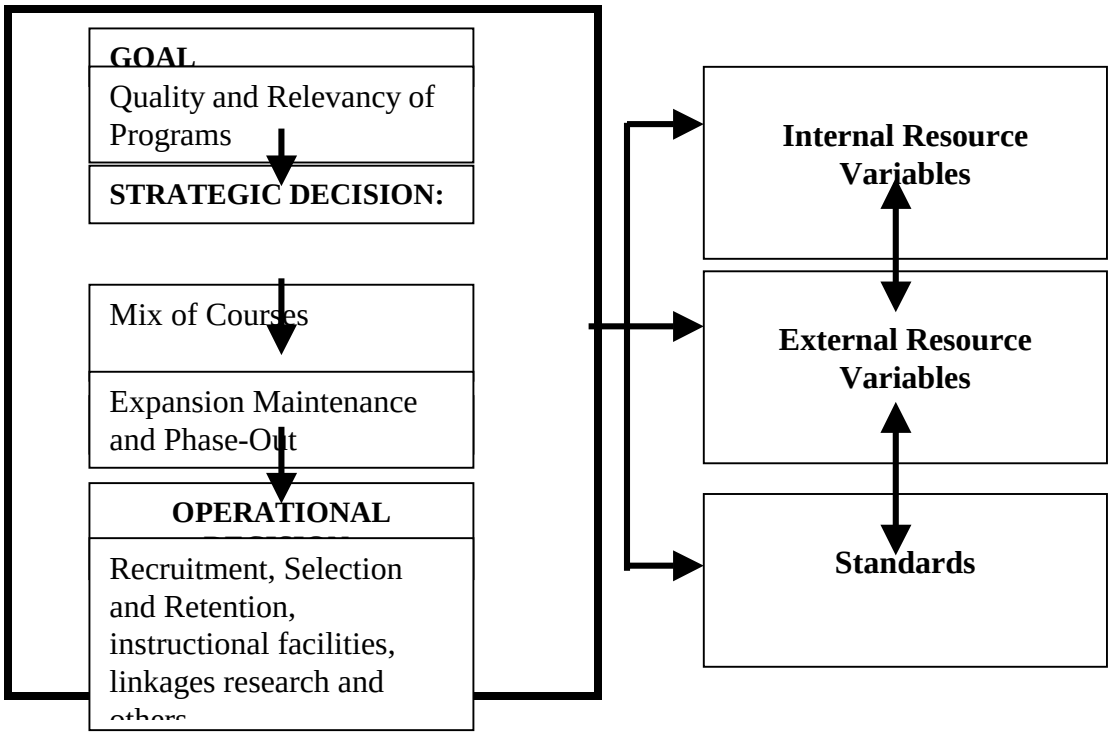

Figure 1 General Framework

Figure 2 shows the conceptual framework of the study.

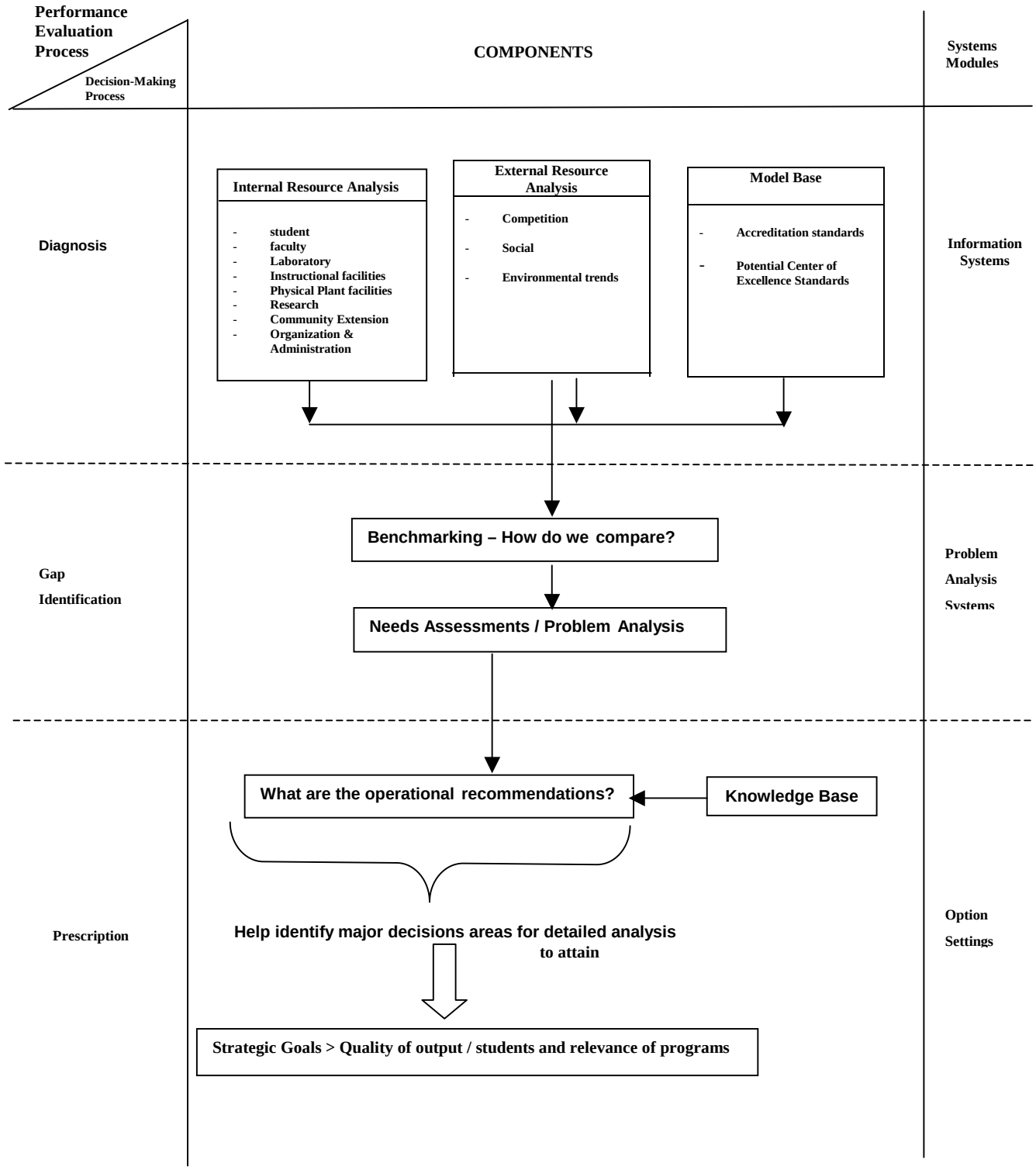

Figure 2: Conceptual Framework

Methodology

Needs Analysis

- Initial identification of indicators/variables (database structures) and parameters of the decision support system
- Development of questionnaires and data requirements for survey and interview
- Conduct of survey and interview with experts and academic institutions
- Analysis of results

Systems Design

- Evaluation of indicators and variables
- Establishment of suitable mix design of performance indicators for managing the plan
- Producing a decision support system prototype model designed to suit a service type of organization- an academic institution
- Software development - a decision support prototype system model
- Documentation

Evaluation

- Validation and evaluation of the model as to its applicability, economic viability including social acceptability.

The design process started with the identification of the needs and ends after satisfactory testing of all variables needed for its evaluation. The process included, the incorporation of all other pertinent data, internal to the institutions and external. The initial derivation of variables through interviews with expert was also important aspect of this project to justify the variables that will be included in in-depth analysis and their usability to the indicated beneficiaries.

Population and Sampling Method

The experiment is taking a purposive sample from a population whose characteristics will affect the ultimate payoff. This sample will be the five (5) leading schools in engineering based on the Commission on Higher Education ranking and Engineering Science Education Project (ESEP) recipient schools of the Department of Science and Technology. [CHED, 1997]

Statistical analysis /treatment

Both quantitative and qualitative forms are involved in data processing to arrive at precise analysis and interpretation of results.

Percentages, averaging, median, mode are some of the statistical tools to be used in the presentation especially for external resource analysis wherein comparative evaluation will be used.

Discussion and Analysis

Significance of Study

The primary benefit to be derived from the use of decision support model stem from the ability to use this model to conduct "what if' experiments; that is alternative scenarios can be generated reflecting a wide variety of different managerial policies and assumptions.

The significance of this research proposal lies in the role of Planning Department as a "bridge" between global and detailed organizational decisions through development of a performance evaluation system. As a general principle, better-informed decisions lead to a reduction in net opportunity costs between action actually taken and that which would have been taken if knowledge had been perfect. To pursue further,

By making better analyses and decisions, in that more reliable data are used, problems are studied in greater depth through the

1. incorporation of extra detail, and more thoroughly in that additional alternatives are considered
2. By making more-timely analyses and decisions, because of the ability to retrieve data speedily from storage-compared with the present often unsystematic, unsatisfactory and time-consuming scratchings in a desperate search for relevant data - and because of the availability of stored programs. When time itself is the limiting factor, more thorough analyses are achieved in the time available.
3. By avoiding unnecessary duplication of effort, resulting from different individuals and organizations being unaware that the required data already exist, or that others are in the process of collecting them.
4. By improvements in the quality and quantity of data and information, through an increasing awareness of their importance, of the ways in which analyses can be improved, and of the existence of gaps in present databases.

The Systems Architecture

A Database Management System (DBMS) is a collection of data that is organized in such a way that it corresponds to the needs and structure of a company and can be used for more than one application. It is constructed by extracting data from internal and external sources.

The Model Base Management System (MBMS) is a software system that generates new routine and reports model updates and changes and data manipulation. The MBMS is capable of interrelating models with the appropriate linkages through the database.

The Expert System (ES) employs human knowledge captured in a computer to solve problems that ordinarily require human expertise.

Figure 3 shows the Systems Architecture whereas Figure 4 shows the Flowchart of Variables.

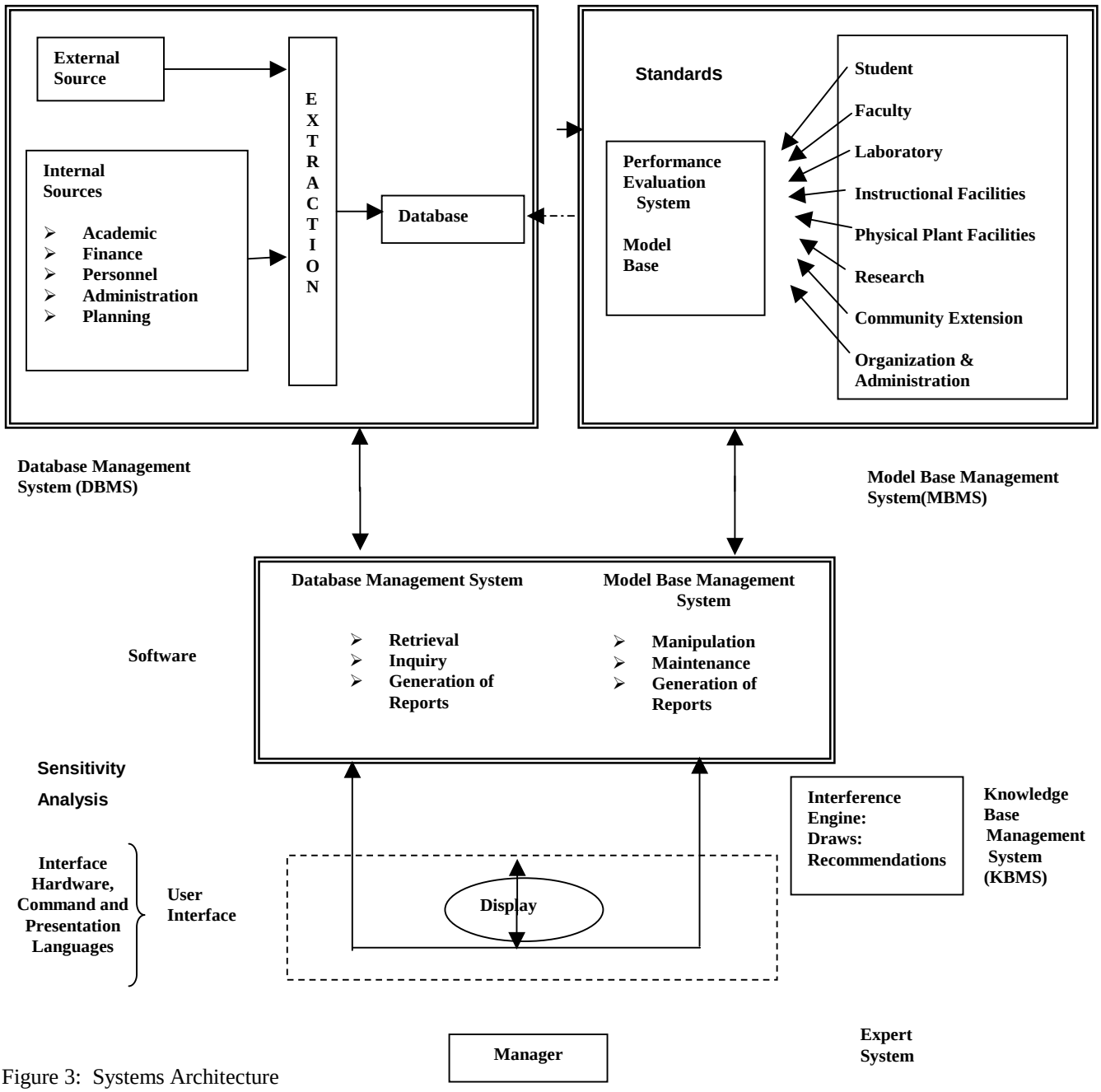

Figure 3: Systems Architecture

Conclusion

The author is currently engaged in the system validation activity. However, based on the preliminary findings, we found that a higher performance rating can be achieved by institutions with simultaneously inputs from internal, external resources and industry standards.

Another significant result was the documentation of indicators for monitoring and further improving operations.

Our analysis indicated that users of the model are recognizing that success of the system depends on the standardization of management activities. The differing responsibilities and decision making tasks at each level of particular institutions led to differences in types of measures used. This user-friendly system will improve and enhance decision-making.

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Figures and Tables

Figure 1 - General Framework
Figure 2 - Conceptual Framework
Figure 3 - Systems Architecture