Executive information systems (EIS) developers are faced with an increasingly difficult choice problem in the evaluation and selection of software packages. For many reasons, they frequently must depend on identification and evaluation of features of packages. This paper examines evaluation criteria of full-featured EIS packages in the evaluation stage and considers the prioritization of these criteria at the laboratory experiment using the analytic hierarchal process (AHP) method. A method is also presented to compute qualities of some packages.

Executive information systems (EIS) are now successfully providing computer support for senior executives. A large number of firms intending to develop successful executive EIS are faced with increasingly complex decision-making problems in the evaluation and selection of software packages (Houdeshel and Watson, 1987; Rainer, Watson, and Snyder, 1992; Watson, Rainer, and Koh, 1991). A software package is a vehicle for effectively handling the most significant problems faced in EIS development (Thierauf, 1991) of technological incompatibility of the existing applications, integration between diverse factors, and timeliness of information. Software packages are a way of enhancing the ease and effectiveness of EIS development and implementation.

The multiplicity of competing EIS software provided by vendors, the variety of EIS software features, the lack of standards by which software packages can be judged, and the lack of expertise and experience of EIS builders in the methods of software evaluation make it difficult to select appropriate EIS software. When EIS software evaluation is regarded as an unstructured or semistructured group decision making problem, the most appropriate decision-aiding tools are needed to help effective group interaction. The selection of EIS software needs to be a disciplined process of matching package options with operating procedures and reconciling any differences.

With regard to software packages as tools for information system development, there have been several attempts at discussing their features in the following areas: decision support systems (DSS) software (Blanc and Jelassi, 1989; Sussman, 1984; Waren and Reimann, 1985), expert system shells (Gevarter, 1987; Kim and Yoon, 1992, Lu and Guimaraes, 1989; Richer, 1986; Stylianou, Madey, and Smith, 1992), programming language (Meador and Mezger, 1984), computer-aided software engineering tools (Subramanian and Gershon, 1991), and systems development tools (Naumann and Palvia, 1982). However, few efforts to provide a front-end solution to systematic processes have been performed in EIS software package evaluation. Although the selection of EIS software packages may be confronted with the same problem as achieving organizational goal when comparing the characteristics of these software, EIS are very different from other management support systems based on such concern as users...
and evaluation criteria. A new methodology will be helpful in the selection problem.

This paper is primarily concerned with providing an empirical methodology for selecting the most appropriate EIS software packages by addressing significant considerations. An evaluation stage as well as an identification of the important criteria that full-featured EIS software packages should include is given as a guideline for EIS builders. A methodology combining the analytic hierarchy process (AHP) method where multiple participants exist in the process with the linear weighted attribute method for candidates selection is implemented by an experimental study.

### Stage of the Procedure

A well-defined evaluation process for EIS software packages affords EIS builders the ability to detect which activities and which methodologies to implement. The successive process presented here consists of the following five steps.

**Stage 1: Needs analysis.** The objective of this step is to informally determine what categories of software packages are necessary in an EIS project when regarding the following situations: firm’s size, complexity, and stability; personal attitude of executive sponsors and staffs; hardware environment; fulfillment within the development time required; project cost; and availability of manpower to perform the project successfully. This step is very complex and usually depends on the political situation of firms without carrying out a formal process to analyze these considerations. Sometimes a subjective and intuitive approach may be reasonable because this questions which is the better of any two tools with different characteristics of programming language, or application generator, when building an information system.

EIS may be developed from three categories of software: custom-built software; full-featured, general purpose vendor software; or a combination of the two (Rainer, Jr., Watson, and Snyder, 1992). Custom-built EIS use in-house software (Carlson, Sullivan-Trainor, and Pizzano, 1992) such as programming languages, electronic spreadsheets, favorite business graphics software packages, and financial planning languages, through general software evaluation methods (Meador and Mezger, 1984; Naumann and Palvia, 1982).

On the other hand, full-featured EIS software has a number of attributes which vary from in-house software. Even with the availability of full-featured EIS software packages, some firms prefer to choose in-house software or to purchase limited features owing to time pressure to attain the initial version of EIS quickly, the expensive acquisition cost of the software as well as efforts for justifying, selecting, purchasing, installing, and learning the software (Watson, Hesse, Copperwaite, and deVos, 1992). Nevertheless full-featured EIS software will overwhelm custom-EIS in the future. Executive interest in EIS is high and the executive requirements are becoming increasingly diverse as well as continually fluctuating. Current computing technology is creating software packages with ever higher capabilities at lower cost. In addition, EIS are becoming more and more intelligent, supported by multimedia, integrated with other management support systems such as DSS and expert systems (Frolick and Ramarapu, 1993; Turban, 1990). Still a large number of firms will choose to bring in full-featured EIS software in addition to the prototyping approach to developing an EIS.

**Stage 2: EIS team building.** The formation of an EIS software evaluation team or EIS team is an important step in the whole evaluation process. EIS software evaluation will produce different results according to individual preferences within the team. The team takes on the appearance of a task force. It is useful for the members of the team to participate in the step of EIS design and implementation stage. But, the EIS team should be separate from the EIS development team. Watson et al. (Watson, Rainer, and Koh, 1991) show four categories of personnel most commonly found in the EIS development team. They are end-user support personnel, systems analysts, programmers, and executive staff support personnel. On the other hand, the EIS software evaluation team should include the representatives from all the groups that will be affected by the EIS, including: executive sponsor, operating sponsor, executive users, functional area personnel, and EIS development/support staff (Watson et al., 1992). Of course, although the role of the EIS team is multi-purpose, the most significant responsibility is to analyze software features and capabilities provided by vendors.

Within the team each member may have conflicting interests in their evaluation criteria. The executive sponsor will be concerned with software acquisition cost; the operating sponsor may prefer to select easy-to-build software which can provide off-the-shelf application; executive users may be concerned about the functionality of the system to be built using the software and its performance; functional area personnel who will provide data to the system may focus on the ability of the software to integrate into other management information systems; and EIS development/support staff tend to take into account maintenance problems based on the overall view of the system. Among the members of the EIS team, we should focus on the role of the executive as a leader with high importance in the evaluation process. The EIS team is regarded as a decision-making group to be defined as two or more people who are jointly responsible for detecting a problem, generating and evaluating potential solutions to the problem, and formulating strategies for implementing solutions.

**Stage 3: Vendor survey.** The EIS team should first investigate prospective vendors and EIS software candidates supplied by the vendors. The vendor’s capabilities, image, package reputation, unit price, consulting services, quality and flexibility of training services, qualifications of consultants and trainers, and the number of previous installations are important considerations. These matters for investigation are similar to those successfully used with DSS software (Le Blanc and Jelassi, 1989; Reimann and Waren, 1985). Currently there are five predominant international vendors most