

ABSTRACT

Design and Prototype Development of a Manufacturing System
Justification and Investment Tracking System (December 1986)

Hector R. Carrasco, M.S., University of Texas at El Paso

B.S., University of Texas at El Paso

Chairman of Advisory Committee: Dr. Leland T. Blank

An interactive microcomputer-based system which provides economic analysis support through life cycle costing for the design, development and implementation of manufacturing systems has been designed and a prototype developed. The research was divided into two major phases. The first phase resulted in an overall system design and description, database design, and model base design. The second phase included the development of the system in prototypical form to demonstrate its feasibility and effectiveness. The system, called EADSS for Economic Analysis Decision Support System, was developed using Ashton-Tate's Framework II.

The overall objective of the prototype is to provide an accurate, easy to use, and supportable economic analysis package applicable throughout the development stages of the life cycle of manufacturing systems. The prototype consists of three modules: database, model base, and processor system. The databases contain cost information about: manufacturing systems in existence, manufacturing systems

under development, and equipment and components used in manufacturing systems. The model base contains classic economic analysis models and a risk analysis model based on a modified fuzzy cash flow analysis. Finally, the system processor provides the capabilities needed to access the data and model bases, as well as providing the interface with the user. The prototype has a model building capability in which manufacturing system configuration data is organized and summarized using templates. Once a preliminary design is described, additional information may be provided and changes made until the manufacturing system has been modeled to the level desired. Economic analysis parameters are preset reducing the number of inputs necessary to obtain an analysis, making frequent calculations for minor design changes possible.

The result of this research is the design and demonstration of a decision support software tool that can be utilized throughout the design and development stages of the life cycle process. EADSS may increase the effectiveness of managers, designers, and analysts using economic analysis by expanding traditional techniques to include risk. It simplifies the process of modeling the economic aspects of manufacturing system design and offers the designer the results of an economic analysis at any stage of the design process.