

Enterprise-wide Decision Support Systems: PSE Contributions & Promise

G. V. Rex Reklaitis
School of Chemical Engineering
Purdue University
West Lafayette, IN 47907-1283

Abstract

While traditionally the process systems engineering community has focused its attention on the design, operation and control of process units or processing trains, within the last decade the boundaries of systems being investigated have expanded to encompass entire plants and networks of plants. Particularly in the operations domain, planning and scheduling applications have extended to networks of production and distribution facilities, such as refinery networks. Furthermore these supply chain applications have moved from the operational level to the tactical level, involving considerations such as inventory policy and transportation mode selection, and even advancing to strategic levels, including decisions such as capacity expansion, site selection, go/no-go decisions on new facilities and/or new technologies, and new product and/or new market introductions. More recently still the scope of research has been further expanding to include not only the physical aspects of the supply chain but also the research and development pipeline, the financial flows of the enterprise, as well as consideration of external entities such as suppliers, partners, competitors and even governmental and regulatory bodies within the decision framework. As the system boundaries have expanded, the resulting decision support systems have correspondingly had increasing impact on core issues central to the management of the entire enterprise. From a methodological point of view, the scope and complexity of the decision models have also increased tremendously, the need for dealing with the dynamics of the decision processes has become unavoidable, the importance of uncertainty and risk has come very much to the foreground, and the relevance of multicriteria optimization strategies has been well established. In this paper the contributions of the process systems engineering community to the study of enterprise-wide decision problems will be reviewed, examples of noteworthy contributions will be highlighted and a prognosis of promising new developments given.

