

# A comprehensive bibliography on justification of advanced manufacturing systems

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## Abstract

Organizations use a variety of approaches in justifying their investments in new processes and technologies. This paper provides a comprehensive bibliography on the techniques and their rationale in the acquisition and justification of advanced manufacturing systems. The paper cites 231 articles from a variety of published sources. The list contains published research mainly from 1990 to 2001 and a selected published work prior to 1990.

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## 1. Introduction

This paper presents a comprehensive survey of the economic justification and acquisition of advanced technologies. Justifying or rationalizing the acquisitions of any new purchase or technology is a complex and multi-dimensional process. The economic justification for such systems is often not a straightforward, simple cost analysis of direct labor and material. Often times, there are many roadblocks in the acquisition process. In the justification process of advanced information or manufacturing systems, quantification of some of the revenue or quality improvements is often difficult if not impossible. Practicing managers often find that investments in advanced technologies is merited and advantageous, but would find it difficult to articulate and translate this “gut”

feeling into the language of finance and accounting which is a prerequisite to the funding and allocation of resources. Some have argued that accounting methodologies restrict the adoption and use of advanced technologies and are incapable of quantifying many of the benefits offered by these systems in many organizations (Jaikumar, 1986; Skinner, 1986; Kaplan, 1983, 1984, 1991). Lucas (1997) provides cogent arguments for the use of traditional and activity based costing method. Swann and O’Keefe (1990), Udo and Ehie (1996), and Kakati (1997) provide a general overview of tangible and intangibles that should be considered in the evaluation process. Luong (1998), and Chidadamrong and O’Brien (1999) describe decision support software tools for the selection and justification of manufacturing systems.

The nature of research on justification of advanced manufacturing technologies is difficult to comprehend within the confines of any specific

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discipline, the relevant materials are scattered throughout numerous scholarly journals in various disciplines. Even with new search engines, the task of finding all the relevant articles is cumbersome and time consuming. Two excellent reviews of the literature through 1986 can be found in Meredith and Suresh (1986), and Canada (1986). Son (1992) updated and extended the bibliographies by Canada (1986), and Wallace and Thuesen (1987) and provided a comprehensive listing of articles on the economic justification of advanced manufacturing technologies. This paper brings together the wide-ranging work from a number of different disciplines and diverse journals and further extends and expands Son's (1992) work with the published articles from 1990 to 2001 and provides a comprehensive bibliography on the subject. Because the title of each article provides sufficient information about the content of the paper itself, as in Son's, no additional annotations are provided. Every effort has been made to include the relevant published papers, including conference proceedings (however, working papers or abstracts from conferences are not included). The paper cites 231 articles from a variety of published sources mainly from 1990 to 2001 and a few additional published work prior to 1990.

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