



An examination of the relationships between JIT and financial performance

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Abstract

Despite abundant information explaining the expected benefits from successful just-in-time (JIT) implementation, only tenuous validation of the linkage between financial performance and JIT exists. Managers act rationally in implementing JIT if they are convinced that JIT enhances firm performance. From both a cross-sectional and longitudinal perspective, this survey study of 253 US manufacturing firms finds significant statistical relationships between measures of profitability and the degree of specific JIT practices used. The evidence provides empirical support to the premise that firms that implement and maintain JIT manufacturing systems will reap sustainable rewards as measured by improved financial performance.

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1. Introduction

Over the last two decades, just-in-time (JIT) and other world-class manufacturing (WCM) practices have been scrutinized and championed around the globe, as firms seek to attain and sustain competitive advantage. The economic benefits of these techniques must be real and long lasting to warrant their application, given the costs and challenges in their implementation. Lower production costs, higher and faster throughput, better product quality, and on-time delivery of finished goods are benefits from successful implementation of a JIT system that are documented in the literature (e.g. Goyal and Deshmukh, 1992; Nakamura et al., 1998; Norris, 1992; Orth et al.,

1990). Increased profitability is often assumed as an outcome of JIT, yet Johnson and Kaplan (1989) note a frequent disparity between improved operations and financial performance.

Empirical studies that examine the direct relationship between JIT implementation and financial performance have reported mixed results (Balakrishnan et al., 1996; Callen et al., 2000; Huson and Nanda, 1995; Inman and Mehra, 1993; Kinney and Wempe, 2002). Moreover, Japanese transplant manufacturing firms that employ JIT methods consistently have shown lower profitability in the short term than their counterpart domestic US firms (Nakamura et al., 1998). Cooper (1995) argues that this difference results from the Japanese preference for stability, long-term reliability, and growth. Supporting this view, Johnson and Bröms (2000) demonstrate how Toyota's stable performance relates to its manufacturing strategies that foster growth and stability over the long run,

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as opposed to the achievement of short-run financial targets. Investment returns from JIT adoption are not immediately observable, due to the long-run nature of its implementation process. This phenomenon may provide a partial explanation of limited empirical validation for a direct association between financial performance and JIT adoption.

The purpose of this study is to evaluate empirically whether *the degree* to which a firm implements a combination of JIT practices systematically affects that firm's financial performance. The focus on the degree of JIT implementation underscores the notion of complementarity, which "suggests that a firm adapting to environmental change will be most likely to find profitable new activities in areas that are complementary to the newly increased activities" (Milgrom and Roberts, 1995, p. 186). In response to a changing environment, a firm's coherent set of modifications to strategy, structure, and process is "plausibly associated with increasing income levels" (Milgrom and Roberts, 1995, p. 192).

The empirical evaluation is done using a two-pronged approach. First, data from 253 US manufacturing firms are examined to determine the static relationship between firm profitability and the degree of JIT implementation in terms of various JIT practices. These practices represent a measurable set of JIT elements suggested in prior research as indicative of JIT. Second, the sample is stratified to focus on the subset of firms that self-identify as JIT adopters and that have a sufficient pre-JIT and post-JIT implementation history to evaluate the time-dependent effects of JIT adoption levels on firm profitability. This longitudinal perspective takes into consideration the traditional annual performance measures that may be askew in the first year or two after implementing a major business-level strategic change such as JIT.

This study contributes to the literature in four areas. First, the key contribution is its additional insight into the uncertain relationship between a firm's financial performance and its adoption of a comprehensive JIT system. The study augments the growing body of empirical evidence by its careful documentation of the various JIT-implementation schemes used by firms and their link to financial performance. This contribution is derived from both a static cross-sectional comparison of firms that have adopted different degrees of world-class JIT manufacturing practices, and a longi-

tudinal setting that allows time for conventional profitability indicators to reflect more fully adjustments by firms that formally have implemented a JIT strategy. Second, the current study further resolves the differing results of Balakrishnan et al. (1996) and Kinney and Wempe (2002). Both of these studies classified their sample firms as either JIT or non-JIT and focused on the impact of JIT adoption on return on assets (ROA). The current study presents additional evidence of JIT's positive influence on ROA. In contrast to these prior studies, this research examines the *degree* of JIT implementation by capturing the extent to which sample firms have adopted a combination of JIT elements. These data allow for a more comprehensive assessment of JIT implementation and its effect on financial performance. Third, the study uses publicly reported financial data to test the association between financial performance and the degree of JIT implementation. This approach extends the work of Inman and Mehra (1993), which relied upon survey respondents' self-evaluation of financial success. Finally, firm-specific responses are collated with their publicly available financial information from the COMPUSTAT database. Balakrishnan et al. (1996) and Kinney and Wempe (2002) relied solely on publicly available data. Callen et al. (2000), which classified its sample as either JIT or non-JIT adopters, is the only other known study to combine both public and private data to assess the financial benefits achieved from implementing JIT.

2. JIT adoption and financial performance

2.1. Definition and benefits of JIT

Manufacturing capabilities can be used as a strategic, competitive weapon (Hayes and Wheelwright, 1984). Voss (1995) discussed three major manufacturing strategic paradigms, one of which is "best practices." This paradigm is supported by the concept of WCM. Embodied within WCM is the JIT manufacturing philosophy, which emphasizes excellence through the continuous elimination of waste and improvement in productivity. Much more than the narrow notion of reduced inventory and optimal batch size (Blackburn, 1991; White and Prybutok, 2001; Yasin et al., 1997), JIT is the genesis of time-based

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