

## Chapter 7.6

# A Strategic Framework for Managing Failure in JIT Supply Chains

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### ABSTRACT

Supply chains can be disrupted at both local and global levels. Just-In-Time (JIT) companies should be particularly interested in managing supply chain failure risk as they often have very little inventory to buffer themselves when their upstream supply chain fails. We develop previous research further and present a strategic framework to manage supply chain failure in JIT supply chains. We identify two dimensions along which the risks of failure can be categorized: location and unpredictability. We go on to identify strategies which companies can use either before (proactive) or after (reactive) the failure to manage supply

chain failure. We support our framework with examples of actual responses to supply chain failures in JIT companies. It is also hoped that our strategic framework will be validated empirically in the future leading to specific guidance for managers.

### INTRODUCTION

Just-in-time (JIT) manufacturing, with its focus on continuous improvement through waste reduction and problem solving, has been widely hailed as a philosophy that improves organizational performance. JIT principles include only having

required inventory; improving quality; trimming lead time by reducing setup time, queue length, and lot sizes; and reducing costs in the process (Cox & Blackstone, 2002). The philosophy offers organizations some significant cost and quality benefits (e.g., Funk, 1995; Duguay, Landry, & Pasin, 1997; Claycomb, Germain, & Droge, 1999), so it is not surprising that large numbers of organizations around the world have implemented or are in the process of implementing JIT manufacturing.

However, there are several disadvantages and implementation difficulties associated with JIT (Im, Hartman, & Bondi, 1994; Inman & Mehra, 1989), including supply chain failure (Altenburg, Griscom, Hart, Smith, & Wohler, 1999; Zsidisin, Ragatz, & Melnyk, 2005; Kleindorfer & Saad, 2005; Craighead, Blackhurst, Rungtusanatham, & Handfield, 2007). The risk of supply chain failure refers to the combination of the probability that an element of the supply chain will fail, and the magnitude of the disruption caused by the failure throughout the remainder of the chain. A recent McKinsey survey found that managers face increasing supply chain risk (Krishnan & Shulman, 2007). Understanding supply chain failure is particularly important for JIT organizations because companies using JIT are especially susceptible to failures in their upstream supply chain as they have limited inventory to protect them if the parts do not arrive on time.

Tang (2006) categorizes supply chain risk as operational or disruptional. Operational risk refers to inherent uncertainties such as uncertain customer demand, uncertain supply, and uncertain cost. Disruption risks relate to natural and man-made disasters or economic crises. This article focuses on the disruptional risk aspect of JIT supply chains since, as Tang points out, the impact of disruptional risk is far greater than that of operational risk.

We begin by briefly outlining research on risk within supply chains, and on the particular challenges facing managers within JIT supply chains.

We then go on to develop two dimensions of supply chain failure based on our inference from industry practice reported in the literature: (1) the location, and (2) the unpredictability of the supply chain failure (or unpredictability in recovering from failure). While others have focused on dimensions of supply chain failure such as controllability of the risk or severity of impact, we extend these treatments by emphasizing the location of the supply chain failure: whether the risk of supply chain failure is internal to the firm, external to the firm but internal to the supply chain, or whether it is systemic within an industry/region external to the supply chain. We illustrate the framework by categorizing some of the proactive and reactive processes used by companies to mitigate JIT supply chain failure. We conclude with a discussion of the implications of our framework for research on supply chain failure and JIT, and for practitioners. Our location-based view provides managers with an additional lens with which to view JIT supply chain risk, and an organizing framework to generate potential strategic risk management options.

It is hoped that this exploratory framework will lead to future studies using empirical approaches such as case-based research to validate the proposed framework. Case-based research (Miles & Huberman, 1994; Yin, 1994) can be used to explore in depth the use of different risk management approaches, among others. This type of in-depth research will allow the development of specific guidelines that managers can use to address supply chain risk within the enterprise.

## **SUPPLY CHAIN FAILURE AND JIT SYSTEMS**

Sudden or catastrophic supply chain failure in JIT environments can have serious organizational impacts. The most common response has been to reduce or stop production until systems were operational again. The September 11, 2001 (9/11)

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