



Density-dependent strategic action: Outcomes of structural market commitment in the global integrated circuit industry

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Abstract

This study develops theory regarding organizational survival and technology management in global, technology-intensive industries. Findings indicate that ecological effects on survival localize to the level of separate international markets as an industry becomes global. How firms structurally participate in these markets moderate these ecological forces. Strategic choices about technology management, such as centralized versus decentralized manufacturing and R&D operations, help firms “crack” densely packed markets. The developed theory is tested with firm-level data on the structure and international presence of all organizations in the worldwide population of integrated circuit manufacturers, from 1961 to 1994.

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“Indeed, organizations that neither operate in multiple countries nor are directly affected by competitors and practices in other countries are rapidly becoming the exception rather than the rule. If organization theory is to provide a way of understanding these increasingly prevalent and important organizations, a more comprehensive yet flexible concept of the environment than that found in prevailing theories must be advanced.” Rosenzweig and Singh, *Organizational Environments and the Multinational Enterprise*

1. Introduction

Most organizational researchers agree that industries are becoming increasingly “globalized” with time, notwithstanding the baggage that term carries. From an evolutionary perspective, the

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process of globalization involves a segmenting of world markets, adding to the complexity and uncertainty of an organization's environment. Several researchers have recently illustrated the fundamental changes that have been occurring in international environments, as well as the strategies necessary to successfully participate in these markets (Barkema and Vermeulen, 1998; Vermeulen and Barkema, 2002; Kotabe et al., 2002; Martin and Salomon, 2003).

When a globalized industry is also high-tech, participating firms face additional strategic complexity. Firms have to decide whether to centralize manufacturing operations and R&D capabilities within their home market or decentralize these activities across the various international markets that comprise the industry. Much of the research in this area has focused on the coordination and integration issues associated with decentralizing operations across multiple international markets. Bartlett and Ghoshal's (1989) work on transnational organizations addressed technology management from the perspective of different forms of geographically dispersed organizations. They described how different organizational configurations (hub model, local innovation model, locally leveraged model, and globally linked model) require different methods for coordinating technology.

Chiesa's (1996) work on technology structures identified the different configurations of research activities (isolated specialization, specialized contributors, and integration-based) and development activities (isolated specialization, supported specialization, and integrated labs) that can be used to facilitate a firm's technology management strategies. Several researchers have concentrated on the varying managerial styles needed to effectively manage technology in a global context (Chiesa, 1999; Brockhoff and Schmaul, 1996; Nobel and Birkinshaw, 1998; Asakawa, 1996; Sakibara and Westney, 1992).

This study focuses on a related, but distinct, issue associated with managing technology in a global industry. Specifically, I consider how the structures used to allocate technology across international markets influence a firm's survival chances by (i) influencing customer trust within these markets and (ii) facilitating the absorption of external knowledge from sources within the market.

Many previous studies of effective technology management have used either single or small sample lenses; thus, they do not capture information about the competitive effects emerging from all the other organizations in the industry. In other words, it might be possible to develop a broader set of prescriptions regarding effective technology management by using a larger lens which acknowledges the competitive and institutional contexts in which a firm is embedded. The organizational ecology analytical framework includes information about all the other competing organizations in a firm's environment, but it does not focus sufficient attention on the strategic actions that firms use to manage their destinies within these environments. The issue becomes one of capitalizing on the big picture view embedded in the organizational ecology framework, while injecting it with firm-specific information that recognizes the different ways that organizations operate across complex environments.

This study extends existing research on organizational ecology and technology management in several ways. First, by demonstrating that as an industry becomes increasingly global, the resulting separate market segments that develop around the world exhibit localized ecological forces that affect the survival chances of firms in the industry. A dynamic model of organizations is developed that straddles these multiple markets, incorporating both explicit and implicit information about their varying competitive and institutional environments. Second, by developing a model of organizational survival that acknowledges variation in how firms participate in the multiple markets that comprise their industry and the different structures used as part of their technology management strategies to influence their chances of survival. In short, organizations can influence their survival chances by cutting through population-level effects

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