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Predicting survival of high-technology initial public offering firms

Anthony D. Wilbon*

*Department of Information Science and Systems, Earl G. Graves School of Business and Management,
Morgan State University, 1700 East Cold Spring Lane, Baltimore, MD 21251, USA*

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Abstract

Effectively understanding how technology management influences the performance of organizations requires a more longitudinal time horizon than traditionally used in management research. Further, the study of smaller, technology-intensive firms that are in the growth phase of the development life cycle is lacking in the literature. This exploratory study addresses these deficiencies by analyzing how the breadth and depth of technology management influences high-technology initial public offering (IPO) survival after five years. Content analysis is used to gather data on the technology management dimensions from the IPO prospectus of 95 high-technology firms that went public in the US in 1992. Using logistic regression analysis, the results show that high-technology firms who survive at least five years after an IPO have more intellectual property rights, more experienced senior executives, and spend less on R&D as a proportion of sales at the time of the IPO than their cohorts. These results suggest that enhancing structural inertia early by strengthening core technology resources contribute to survival after an event such as an IPO. Thus, effective management of technology processes may contribute to long-term survival of small- to medium-sized high-technology enterprises. © 2002 Elsevier Science Inc. All rights reserved.

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* Tel.: +1-443-885-4558 (Work).

E-mail address: awilbon@jewel.morgan.edu (A.D. Wilbon).

1. Introduction

Strategic management theories traditionally suggested that, to enhance performance, firms should implement strategies that match their environment and change with the ebb and flow of environmental tides (Andrews, 1987; Ansoff, 1986). In today's knowledge-based or learning organization, managing technology resources is a major part of strategy formulation and attempting to alter strategies in response to fast-paced changes in technology is nearly impossible. Understanding from the concept of a learning organization that strategy formation is an evolving process, one must view management of technology as evolutionary. Consequently, the successful firms must learn how to aggressively convert knowledge into tangible performance parameters to enhance its competitive advantage on a continuum as it advances through various stages of its life cycle.

Understanding the evolutionary nature of organizational development, managers and academicians must view performance from a longer time horizon when evaluating the effectiveness of firm performance. The ultimate performance parameter, particularly for small-to medium-sized firms, is the survival of the enterprise over time. Population ecology theory assists in analyzing this view by focusing on several determinants of organizational survival. This theory implies that the stronger the structural forces during the earlier stages of an organization's development, the more likely a firm is to survive through environmental turbulence. One reason for this increased survival rate is that the basic organizational structures are not likely to change drastically over time (Aldrich & Marsden, 1988; Hannan & Carroll, 1992). In other words, firms face an inertia that inhibit them from making significant alternations to the structure of the organization of time. In fact, this inertia increases the stability of an organization and helps it survive in times of tumultuous environmental crisis.

One dimension of inertia is the group of core technological resources within the firm. Consequently, if stable technological resources increase inertia, then establishment of a comprehensive strategy to effectively manage those technology resources will contribute to better long-term performance and survival, particularly in the face of significant environmental disruptions. Therefore, rather than alter technology management systems to match life cycle or business strategy as contingency theory suggested, firms should design technology management strategies to strengthen structural inertia early in the development life cycle, thus increasing chances of survival during times of environmental crisis (Freeman & Hannan, 1989). This research contributes to the literature by providing further empirical support for some of the multidimensional models for technology management and evaluates its influence on the survival of US high-technology initial public offering (IPO) firms.

2. Theoretical framework

In this research, population ecology (Hannan & Freeman, 1977) is used as a framework for examining the evolutionary relationship between technology management dimensions and long-term survival for the firm. This theory is applied to understand how technology management decisions made earlier in the firm's life cycle affect its chances of survival.

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