Technological Forecasting & Social Change 75 (2008) 1388–1395

Contents lists available at ScienceDirect

Technological Forecasting & Social Change

The determinants of internationalization: Evidence from the Taiwan high technology industry

Chao-Hung Wang [a], Li-Chang Hsu [b,*], Shyh-Rong Fang [c]

[a] Department of Marketing and Logistics Management, Ling Tung University, Taichung, Taiwan, ROC
[b] Department of Finance, Ling Tung University, Taichung, Taiwan, ROC
[c] Department of Business Administration, National Chung Hsing University, Taichung, Taiwan, ROC

A R T I C L E I N F O

Article history:
Received 19 April 2007
Received in revised form 25 October 2007
Accepted 17 March 2008

Keywords:
Internationalization
Innovation
Corporate governance
R&D intensity

A B S T R A C T

This paper employs the logit model to explore the relationship between internationalization and its determinants. Using a sample set gathered from 114 high technology firms of Taiwan, which are mostly engaged in original equipment manufacturing, empirical tests of the hypotheses find support that corporate governance, patent counts, and education level of managers had a positive effect on internationalization. Surprisingly, R&D intensity, one of the innovation capitals, had a negative effect on internationalization.

1. Introduction

Barriers to international trade are increasing and corporations are fighting competitively at home and abroad. The impact of multinational corporations (MNCs) on the growth of the world economy has made them an issue of significant interest. Thus, multinational operation has been an important research issue. In 1970s, a large amount of literature was developed to offer explanation of the measurements of the degree of internationalization and the reasons why a firm would choose to become multinational [1].

A major consensus arising from the internationalization paradigm was that the motivation of the multinational, the international market entry alternatives, and the firm's behavioral dimension were increasingly becoming critical for competitive advantage in the 1980s [2]. More recently, an emerging empirical literature has been aimed at testing whether multinationality adds to firm value [3]. Numerous studies [4–6] posited a positive relationship between internationalization and performance. Conversely, Click and Harrison [7] reported a negative relationship between internationalization and performance using U.S. firms during 1978 to 1980. Other scholars (e.g., [8,9]) have obtained findings same as those of Click and Harrison [7]. The number of studies has helped us increase our understanding on this topic [10]; however, the issue of the determinants of internationalization has been ignored. This study claims that there is a significant need for additional research on this issue.

In the academic landscape, the exploration of the determinants of internationalization in high technology industry has been one of the integral issues because of the complexity of influencing factors on technological industry. As a practical matter, scholars [11] have argued that the future trend (e.g., internationalization) of Taiwan high technology is one of the important topics in world economy because the internationalization of high technology industry changes the speed of social development in the global environment.

* Corresponding author. 1 Ling Tung Road, Nantun, Taichung, 40852, Taiwan, ROC. Tel.: +886 4 2389 2088x3642; fax: +886 4 2386 4342.
E-mail addresses: chw@mail.ltu.edu.tw (C.-H. Wang), ltctht87@mail.ltu.edu.tw (L.-C. Hsu), fangsr@dragon.nchu.edu.tw (S.-R. Fang).

0040-1625/$ – see front matter
doi:10.1016/j.techfore.2008.03.002

2. Importance of internationalization for Taiwan's integrated circuit industry

According to a report (Spring, 2006) by the World Semiconductor Trade Statistics (WSTS), Taiwanese integrated circuit (IC) foundries and IC packaging achieved the highest sale growth rates worldwide. Taiwanese high technology industries have consistently displayed vigorous creativity and have achieved significant accomplishments, making Taiwan the third-largest producer of semiconductors. In addition, Taiwan's information technology industry is also highly successful. Taiwanese high technology firms, however, face fiercely competitive rivals in other Asian countries such as Korea and Japan, and so the internationalization of its high technology industry has emerged as an imperative issue for Taiwan, as for most other industrial countries [12].

More specifically, the international operations of Taiwanese high-tech industries are growing at an explosive pace. The impact of these international Taiwanese high-tech firms on the prosperity and growth of the world economy has made them a topic of significant research interest. For example, the export sales of these international IC firms jumped from US 2504.6 billion in 2006 to US 2780 billion in 2007 (WSTS Spring, 2006). The internationalization of Taiwanese high-tech firms has been an underlying determinant for the valuation of these high-tech firms.

3. Literature review and hypotheses

A growing body of empirical literature has focused on internationalization. Early explanations of the drive to expand internationally were rooted in the advantages of ownership, production, and skills [13,14]. Transaction cost theory (TCT) offers a widely accepted rationale for internationalization [15,16]. TCT views firms and markets as alternative governance structures that differ in their transaction costs. Under certain conditions, the costs of conducting economic exchange in an international market may be higher or lower than the costs of organizing the exchange within a firm. Therefore, the costs of monitoring and enforcing agreements (i.e., governance cost) in the global market have been rooted in TCT. Within this context, internationalization means a process in which the firm goes through an effective monitoring mechanism (i.e., well-functioning corporate governance) that reduces the uncertainty embedded in cross-border activity. More specifically, in terms of internationalization, the basic implication of TCT is that if internationalization costs are absent or low, high-tech firms will favor a market mechanism. If internationalization cost are high enough to exceed the internal production cost, high-tech firms will favor internal organization, which can use good corporate governance to minimize the transaction costs.

The resource-based theory (RBT) complements the theoretical foundation of internationalization, which suggests that firms with unique, valuable, and inimitable resources (such as innovative capability, R&D capability, and patents) tend to transfer those resources to international markets in search of greater profitability [17]. These unique resources are based on proprietary information and thus cannot be easily copied or exchanged; they are only transferred to subsidiaries abroad. A high-tech firm with more unique resources will have a greater potential for innovative capability, and thus is more likely to generate more patents. From the RBT viewpoint, we assume that there is a strong correlation between valuable innovations and R&D activity. Furthermore, the implication of the RBT is that the valuation of an internationalized high-tech firm with useful innovation capability will be proportional to the degree of R&D capability and patents [18].

An alternative view to the internationalization theory is the managerial objectives theory (MOT), which argues that multinationality implies a negative effect on market value [19]. The complexity of multinational firms allows managers more opportunity to act in their own self-interest. Indeed, there is an important argument that it is more difficult for MNC's managers to make management decisions in a more complex multinational corporate structure [20]. The existence of conflicting objectives from MNC managers could reduce the market value of multinational firms. Therefore, MOT maintains that MNC's managers tend to make less effective resource allocation decisions for deployment to different firms around the world, unless the firm has good human capital. MNC managers with higher educational degree and tacit international knowledge are more likely to provide good MNC's management than managers with less education or knowledge.

This study explores the determinants of internationalization based on the previous literature. Market value and performance are focused on the topic of internationalization; however, the uneven focus invites further investigation into its relationship with effective monitoring of firms (e.g., corporate governance), innovation capital (e.g., R&D activity and patents), and human capital (e.g., education level of managers). This gap has motivated us to examine that these three factors determine what internationalization requires from the transaction cost theory, resource-based theory, and managerial objective theory. Fig. 1 represents the conceptual model which guides the current research.

3.1. Corporate governance in the internationalization of high-tech industry

Corporate governance plays a key role in the internationalization because it influences transaction costs. We define corporate governance as a structure specifics the distribution of rights and responsibilities among different participants such as the board, managers, and shareholders. Although multinational firms invest in firm-specific assets, their incentive to make specialized investments is tempered by the fact that the more specialized an investment; the lower its value is in alternative uses. The reason is that a firm-specific asset exposes the firms to a greater risk of opportunism than does a generalized asset [21]. An important task for internationalization of firms is to choose a good corporate governance structure that minimizes transaction costs and opportunism [22].

The literature on good corporate governance and on organizational performance is voluminous [23]. Much of the general discussion concerning corporate governance falls into the field of finance. Few literatures have discussed the relationship between corporate governance and internationalization. However, it is reasonably assumed that corporate governance changes are