



## Essential research in technology management

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### ARTICLE INFO

#### Article history:

Received 1 June 2008

Received in revised form 1 February 2009

Accepted 1 March 2009

#### Keywords:

Diffusion

Innovation process

R&D

Profitability

### ABSTRACT

Now that we live in a world full of cutting-edge breakthroughs, technology management seems to be particularly essential. The Journal of Business Research has published a special issue entitled "Essential Research in Technology Management." This special issue includes 11 papers. Six of them are from the 2007 Chinese Society for Management of Technology Annual Meeting and Conference held at Feng Chia University, Taiwan, while the other five are invited. All of them went through double-blind reviews and revisions. These papers contribute to various perspectives of technology management in different countries.

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### 1. Introduction

The discipline of technology management (TM) has a history of 50 years (Allen, 2004). TM has attracted attention from both academia and industry since the 1980s (Drejer, 1997), and has become a more self-sustained discipline in the last 20 years (Cetindamara et al., 2009). A popular definition describes TM as "a process, which includes planning, directing, control and coordination of the development and implementation of the technological capabilities to shape and accomplish the strategic and operational objectives of an organization" (NRC, 1987). The supposition is that TM fulfills the management needs of the technologies as well as to develop the implementation strategies according to the current and future conditions (Linn et al., 2000).

The TM community has developed a wide range of theory and applications for both researchers and practitioners (Liao, 2005). As a consequence, the papers published in this *JBR* special issue cover various business strategies in TM. Six of them were presented at the 2007 Chinese Society for Management of Technology (CSMOT) Annual Meeting and Conference held at Feng Chia University, Taiwan. To extend the scope of the coverage, we invited five other papers from different countries. In the following sections, the conference is introduced and the papers are summarized. The reviewers are then acknowledged with thanks.

### 2. The conference

The 2007 CSMOT Annual Conference was held on December 14–15, 2007, at Feng Chia University, Taiwan, and was sponsored by CSMOT and supported by the National Science Council, Taiwan. There were three keynote speeches and 18 presentation sessions. The keynote speakers included Arch G. Woodside from Boston College, USA, Luiz Moutinho from the University of Glasgow, UK, and Martin Kenney from the University of California, Davis, USA. There were a total of 320 submissions, and 273 of them were accepted for presentation. The acceptance rate was 74%.

The theme of the conference was profit innovation and value creation, where various research areas were covered, including industrial policies, technological strategies, competition and performance, innovation development, business models, etc. The conference drew the attendance of practitioners as well as researchers.

### 3. Special issue topics

This special issue covers a wide variety of topics relevant to the practice of and research into technology management. Six of the papers published in this issue were presented at the conference in Taiwan. This special issue includes five more papers that were invited. All of the papers went through double-blind reviews and revisions. These papers cover the issues facing different countries as Table 1 depicts.

Since industry cycles for capitalist development were identified, the topic has attracted only occasional interest. Tan and Mathews' concern is with cyclical dynamics at the sectoral level, where cyclical upturns and downturns create essential and strategic issues

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**Table 1**  
Issues of the papers.

Issue focus	Author(s)
Global	Tan and Mathews
European Union	Soriano
Taiwan and South Korea	Chen
Taiwan and China	Lin; Wang
Taiwan	Wu and Chu; Lai and Chang; Peng and Fang
Spain	Liliana Herrera, Muñoz-Doyague, and Nieto; Guadix, Cortés, Onieva, and Muñuzuri

for management. They discuss the analysis in both the time domain and the frequency domain and interpret both approaches with data from the global semiconductor industry. They suggest that the study of cyclical industrial dynamics provides the foundation for wider studies of innovation and technology management.

To learn the factors that influence performance through business productivity, Soriano analyzes the high-technology firms in the European Union. He examines different dimensions that are representative of entrepreneurial activity from a pure business standpoint, production and technology, human resources, strategy and marketing, and finance. The empirical results indicate that there are direct relationships between productivity and some strategic factors.

In an environment of rapid technological change, understanding the antecedents of firm profitability to answer the question of how and why certain private enterprises develop competitive advantages is helpful. Chen extends recent variance decomposition research in three ways to explore this topic. He compares and tests different effects between the information technology (IT) sectors in Taiwan and South Korea. In addition, Chen explores the question as to why there exist significant profitability differences among technological firms even with similar industrial structural characteristics and leveraged resources and capabilities in the same IT industry.

Using Taiwanese IT firms as an example, Lin probes into the factors that affect a firm's intention to engage in foreign direct investment (FDI) in China. Lin investigates a firm's decision to engage in FDI by taking industry and firm factors into consideration. Lin applies an event history technique to perform an empirical analysis on 667 Taiwanese firms between 1996 and 2005. From the empirical results, network linkages and the expansion of markets and China's incentive policies positively affect the firms' intentions to engage in FDI. A firm with a higher degree of export orientation and a larger size also has a strong effect on motivating FDI.

Agency theory, transactional cost economics and traditional strategic management provide key corporate financial policies. However, these policies have generally been studied separately. Wang explores the causal structure of corporate financial strategies for the high-tech firms in Taiwan and China. By employing path analysis and a directed graphs model, this paper explores the causal relationships among investment, financing, dividend policies and corporate performance. The empirical results show that the firms on the two sides of the Strait adopt different strategies in their financial decision environments.

In face of the global challenge of rapid transitions in technologies and markets, R&D has become one of the key ways for firms to engage in innovation. The problem is that simply minimizing transaction costs is no longer sufficient to ensure a firm's survival. Lai and Chang investigate corporate motivation and the performance of R&D alliances among machinery manufacturers in Taiwan. To explore the relationships between motivation and performance, they adopt two distinct but complementary perspectives on R&D alliances: transaction-cost economics (TCE) and resource-based theory (RBT). From both the TCE and RBT perspectives, corporate motivation has a significant positive relationship with the performance of R&D alliances.

Wu and Chu investigate three diffusion models and one time series model to examine which performs best during the mobile phone diffusion life span. They analyse the data for mobile telephone subscribers in Taiwan over 1988–2007. The empirical results show that the Gompertz model outperforms the others before the diffusion starts, while the Logistic model is superior after inflection and over the aggregate range of the diffusion. This longitudinal study provides evidence that a proper diffusion model for mobile telephony can be stage-dependent, and complements the case-dependent phenomenon demonstrated by previous cross-sectional studies.

Previous acquisition studies have put more emphasis on the consequences but less on what factors determine the motive for initiating an acquisition. Through the lens of organizational learning and corporate governance theories, Peng and Fang examine whether the prior acquisition experience and board characteristics affect firms' acquisition behaviour. They test hypotheses on a sample of 92 acquisition events of Taiwanese electronics firms during the period from 1997 to 2007. The empirical results show that business acquisition experiences positively influence the inclination of the acquirer to adopt a subsequent acquisition.

The issue of researchers' mobility with regard to a firm's innovation process is considered to be both new and important. Herrera, Muñoz-Doyague, and Nieto provide evidence on the mobility effects of researchers from the public R&D system with regard to a firm's innovation process. The findings confirm that scientific knowledge created by public researchers has a positive influence on both the inputs and outputs of the firms' innovation process. The firms studied here continually increased their in-house R&D investments. As a result of these investments, firms create unique and valuable knowledge. They draw two important conclusions for human resource management and the design of technology policies.

New technology management plays an important role in the development of revenue management techniques. Guadix, Cortés, Onieva, and Muñuzuri introduce a new decision support system that sets the revenue maximization criteria for hotel operations. The system includes a set of demand forecasting methods for customers and addresses a general case considering individual guests and customer groups. The system also provides deterministic and stochastic mathematical programming models. A simulation engine makes a comparison between different heuristics of room inventory control. They show the suitability of the system by using a hotel chain in Spain as the data.

One problem with implementing risk regulation relates to the asymmetries in information between regulators and licensees. A possible solution is to provide incentives if violations are disclosed voluntarily by regulated firms. Lin adapts game-theoretic work to apply to the case of risk regulation. He derives equilibrium solutions for this type of self-reporting mechanism under different model formulations, and discusses the conditions under which these solutions are better than a traditional direct-monitoring regulatory scheme. Lin expects that the results will provide new insight into the strengths and limitations of the risk regulation of accident and environmental risks.

#### 4. Other contributors

I acknowledge with gratitude the help of many esteemed scholars who reviewed the papers submitted to this special issue of *Journal of Business Research*. These reviewers, in alphabetical order, are Daniele Archibugi, Jaime Bonache, Luis M. de Castro, Gary J. Castrogiovanni, Fernando José Garrigós Simón, Don Jyh-Fu Jeng, Kuei-Kuei Lai, Iuan-yuan Lu, Daniel Palacios Marqués, John Mathews, C. Perng, Juite Wang, K.J. Wang, Junzo Watada, Chao-Tung Wen, and Berlin Wu. Their invaluable comments have really added to the value of these papers.

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