



# Agency in national innovation systems: Institutional entrepreneurship and the professionalization of Taiwanese IT

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## ABSTRACT

This paper examines institutional entrepreneurship as a form of internal agency within national innovation systems. In particular, we consider the entrepreneurship of Taiwanese IT firms over 1980–2007 in creating a new professionalized organizational form markedly different from the traditional Taiwanese model of family business. We compare two successful sectors – personal computers and semiconductors – and one failure – hard disk drives. We emphasize how entrepreneurial firms used strategies of framing, aggregating and networking (F.A.N.) to build legitimacy, mobilize local resources and reach out beyond the limitations of their immediate contexts. We discuss how F.A.N. strategies may evolve from ‘introversion’ to ‘extraversion’ and develop implications for policy-makers and further research.

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## 1. Introduction

The national innovation system tradition of research has highlighted the importance to economic development of the idiosyncratic and interrelated nature of institutions within particular countries (Godin, 2009; Lundvall, 1992; Nelson, 1992). One central institution within these national innovation systems is a country's characteristic organizational form, in other words, the typical set of ownership, managerial practices, strategies and target markets adopted by national firms (Rao and Singh, 2001; Whitley, 1992). Within a national innovation system, firms are likely to benefit from fitting their organizational forms closely to surrounding institutions. The problem of adaptation, however, is that established organizational forms may come to limit innovation and change (Lundvall et al., 2006; Storz, 2008). In a dynamic world, local fit can easily become competitive constraint. To survive, firms may therefore have to innovate organizationally *against* the logics of their own national innovation systems.

This paper extends the basic national systems of innovation framework in order to accommodate such contra-system innovation. In particular, we incorporate institutional entrepreneurship, the ‘activities of actors who have an interest in particular institutional arrangements and who leverage resources to create new institutions or to transform existing ones’ (Maguire et al., 2004,

p. 657). These actors exercise agency by making a difference to the systems in which they participate (Giddens, 1984). Building on the case of Taiwanese IT firms, we show how, by enrolling diverse resources, institutional entrepreneurs may not only transcend constraints on their own account; as their strategies shift from introversion to extraversion, they may also contribute to the transformation of national innovation systems at large.

In particular, between 1980 and 2007, Taiwanese IT entrepreneurs achieved a radical shift in dominant organizational form, moving from the traditional – and successful – Taiwanese model of familial subcontracting, to a new form based on professional management and investment in innovation, design, marketing and service. The strategies behind this shift were cognitive and social as much as economic and technological: entrepreneurs framed new visions, aggregated local supporters and networked overseas. In pointing to these strategies, we emphasize entrepreneurs’ institutional creativity rather than technological fit with national systems (Chang et al., 2006; Dosi and Kogut, 1993; Hill, 1995; Porter, 1990), supportive state policy (Amsden and Chu, 2003; Dodgson et al., 2008; Wade, 1990) or wider processes of economic modernization (Kim and Utterback, 1983; Rostow, 1960). None of the three sectors we focus on – personal computers, semiconductors and hard disk drives (HDDs) – was a natural fit with Taiwan's original system. The branding involved in personal computers, and the high technology and large capital investments of the other two sectors, were alien and risky in the Taiwanese environment. State support was valuable, but firm interests and state policy conflicted sometimes and state interventions could fall short. Finally, professionalization was

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not the inevitable product of insertion into a world economy or global processes of modernization. While Taiwan's semiconductor manufacturers linked up with leading Western companies, its hard disk drive firms did not and were soon overtaken by Singapore. Hong Kong's entrepreneurs, starting with a similar Chinese familial organizational form, by and large resisted an equivalent professionalization despite their long-standing participation in the Western economy (Sharif and Baark, 2008). In short, the creation of Taiwan's professionalized IT firms was the hard-won product of entrepreneurial initiative and choice.

Our incorporation of institutional entrepreneurship has implications both for national innovation systems theory and for practical state policy. First, the concept of institutional entrepreneurship adds to national innovation systems theory a source of internal agency that, while still respecting national institutions as non-trivial constraints, has the potential of generating change on its own behalf. Second, this highlighting of institutional entrepreneurship encourages state policy-makers working within a national innovation systems framework to re-evaluate the role of firm-level initiatives and to support them with specific measures to promote wider endogenous change. A national innovation systems theory that allows for institutional entrepreneurship offers both greater explanatory breadth and a larger policy repertoire.

The paper continues as follows. The next two sections build on the existing literature on innovation systems and institutional entrepreneurship in order to develop the framing, aggregating and networking (F.A.N.) strategies of new form creation. We continue by providing details about our research methods. We next introduce the two central organizational forms – familial (old) and professional (new) – and show how our particular firms relate to them. The main empirical section outlines the framing, aggregating and networking strategies by which institutional entrepreneurs managed their shift to the professional form. We then develop propositions for how F.A.N. strategies may evolve over time, with increasing repercussions on the national innovation system at large. The paper concludes with implications for policy-makers and further research.

## 2. Innovation systems and institutional entrepreneurship

The innovation system tradition sees the nation state as a critical institutional field for the shaping of organizational forms (Lundvall, 1992; Nelson, 1992). National legal systems, education systems, research institutions, financing systems and networks of suppliers and customers combine to reinforce standard ways of organizing, competing and innovating. Organizations that conform to these standards gain both legitimacy and efficiency in their local interactions. As the nature of national institutions varies internationally, it becomes possible for countries to be characterized by quite distinctive organizational forms which are more or less competitive internationally according to the value derived from fit with their local contexts. The influence of national institutions on organizational forms can be especially strong in relatively small, culturally cohesive or politically centralized states. Accordingly, countries such as Taiwan, Singapore, South Korea, Denmark and Sweden tend to be characterized by particularly robust and distinctive organizational forms (Edquist and Hommen, 2008).

However, the circular reinforcement of national innovation systems need not always be entirely virtuous. Sometimes, systems of innovation become self-reproducing 'systems of inertia' (Hobday, 2004). This kind of institutional circularity provides a ready explanation for conservatism in organizational forms. Thus the failures of, for example, the French computer industry (Nohara and Verdier, 2001), the Brazilian leather goods industry (Schmitz, 1999) and many Japanese software firms (Anchordoguy, 2000) can be put

down partly to the constraints imposed by their immediate institutional contexts. Yet there have also been some striking cases where clusters of high-tech firms have succeeded despite strong contrasts with local institutions. For example, the Finnish telecoms industry arose in an economy traditionally characterized by state-oriented, natural-resource conglomerates (Schienstock, 2004); Israel's high-tech entrepreneurs emerged in an economy dominated by the state (Fiegenbaum, 2007); and India has produced a vibrant knowledge-based service sector despite its origins as an overprotected, low-R&D country (Kapur and Ramamurti, 2001). A circular view of national innovation systems is hard-pressed to explain how embedded actors can gain sufficient detachment for such radical organizational innovations from within.

In institutional theory more generally, this problem of contra-system innovation is known as 'the paradox of embedded agency' (Seo and Creed, 2002). Where actors are 'over-socialized' by local institutions, internal challenges to the status quo are theoretically hard to explain (Whittington, 1992). Lundvall (2007, p. 110) highlights this kind of explanatory difficulty within innovation systems theory too: 'There is an inherent risk that "system" brings with it a structuralist mode of explanation that neglects the critical role of agency'. Given the innovation system perspective's influence on policy-making (Godin, 2009), the neglect of such agency risks becoming a self-fulfilling prophecy: to the extent that system-breaking entrepreneurial agents are theoretically absent, policy-makers will minimize support to such potential agents of system change.

In drawing on notions of institutional entrepreneurship (Garud et al., 2007), we seek to introduce the agency capable of explaining the endogenous creation of organizational forms, while hanging on to innovation system theory's insights regarding the importance of national institutions. This simultaneous respect for both deliberate agency and institutional contexts contrasts with other theories of new form creation. Some theories are low on agency. For example, organizational ecology considers the emergence of new forms as shaped by the remote environmental pressures of population dynamics (e.g. Ruef, 2000), while complexity theoretic accounts attribute innovation to random or deterministic processes (e.g. Peterson and Meckler, 2001). Other perspectives underplay institutions. Thus theories of entrepreneurship from economics tend to see innovation as arising primarily from the exploitation of technological and market opportunities and characterize their entrepreneurs individually rather than as full members of local societies (Dodd and Anderson, 2007). Likewise, the dynamic capabilities tradition in strategy sees change as primarily driven by organizationally specific routines and resources, with little sense of the firm as embedded in society (e.g. Teece, 2007). By contrast with these alternative perspectives, therefore, institutional entrepreneurship theory can motivate an account that allows for creative agency even from within tightly integrated national innovation systems.

Institutional entrepreneurship refers to both individual entrepreneurs and managerial teams (Maguire et al., 2004). These actors are neither the under-socialized entrepreneurs of some economic theories, nor the over-socialized conformists of strong-form institutional theories. Their institutional positions constrain, but they can also provide them with the resources necessary for agency. Here, entrepreneurial needs are different to those of the state and large firms, alternative internal agents of system change (Larédo and Mustar, 2001). Nation states and large firms already have substantial resources and capabilities. Entrepreneurs, on the other hand, have to develop ideas, win support and build credibility more or less from scratch. This entrepreneurial predicament places a high value on cognitive and social processes (Dorado, 2005). New ideas need to both convince and mobilize supporters (Greenwood and Suddaby, 2006; Maguire et al., 2004). To a greater

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