

A Longitudinal Study of Organization and Form Creation

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Abstract

We develop a conceptual framework that considers new firm creation as outcomes of entrepreneurial actions in pursuit of technology opportunities and socio-political legitimacy. This framework extends existing organizational creation research from either the individualistic logics of innovation or the particular constraints of context to a dynamic, interactive, multi-level analysis which allows simultaneously for institution and for agency. To explain our framework, we analyze the emergence of Taiwan's information technology firms from 1978~2004 as a distinct new form of organizations in Taiwan's society and world markets. Implications for organizational emergence research, as well as innovation and institutional theories, are discussed.

Keywords: firm creation; innovation; entrepreneurship; institutional theory

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I. Introduction

Two contrasting perspectives have been proposed for understanding new firm creation, one stressing entrepreneurial innovation and the other stressing institutional dependence. Both offer their own insights, but of course neither is complete. Such incompleteness is inherent in the social sciences, but it is a heavy liability for business people and policy-makers intent on new firm creation. On the one hand, those following the entrepreneurial innovation perspective risk an over-optimistic approach that neglects the role of institutions in enabling, or constraining, economic and technological success. On the other hand, those relying on a conventional institutional perspective may tend towards a disabling fatalism that underestimates the entrepreneurial capacity to find advantage and achieve change even in unpromising institutional circumstances. In this paper, therefore, we shall develop a co-evolutionary perspective capable of accommodating both entrepreneurs and institutions in order to provide a more complete framework for explaining new firm creation and growth. We shall apply it particularly to the successful case of the Taiwanese information technology (IT) industry, but argue that this framework has general relevance in a world of mutual dependence between entrepreneurs and institutions.

Specifically, the innovation perspective frames new firm creation primarily in terms of the exploitation of technological discontinuities or opportunities that result from exogenous invention (Christenson, 1997; Schumpeter, 1934; Shane, 2001; Tushman & Anderson, 1986). Exploiting opportunities is an entrepreneurial task that is likely to break away from the status quo and generate new wealth. Studies that follow

entrepreneurial accounts of new wealth and venture creation typically do not address the broader institutional context that operates to ensure stability and preserve order for a new kind of innovators and interests (Lounsbury & Glynn, 2001). Even the networks that are more stressed nowadays are still not fully institutional, but a “flat” web of links and nodes (e.g., Hargadon, 2003). In general, the innovation literature has largely neglected the actual outcomes of organizational creation as they are reflected in the emergent matrix of institutional forms.

In contrast to innovation theorists, researchers who have adopted the broader institutional framework emphasize the ways in which the social and cultural context determine organizational emergence (Baum & Singh, 1994; Meyer & Rowan, 1977; Scott, 2001; Baum & Oliver, 1992; Ruef, 2000). However, the recognition of the institutional context that offers legitimacy and resources alone still fails to explain the creation of novel organizations because of the character of institutional isomorphism. Since new organizational forms are not reproducer organizations but are innovator organizations that are distinctively different to core features and practices of a particular social landscape, institutional theorists need to consider the role of innovative entrepreneurs in overcoming inertia and making a real difference, if they are to more fully understand the prospects for form emergence across different institutional contexts (Baum & Oliver, 1996; Carney & Eric, 2002; Rao, Morrill, & Zald, 2000).

In this study, we combine the innovation and institutional approaches to examine the creation of new organizations in context and action. Specifically, we develop an alternative explanation of new firm creation which emphasizes the ways in which technological opportunities, institutional structures and entrepreneurial actions are interrelated in a co-evolutionary system. *Technological opportunities* include not only

“a lagged function of foment and diversity in basic science, and the rapidity with which new scientific breakthroughs are being made” (Teece, Pisano, & Shuen, 1997: 523), but also patterned changes in technology that are capable of opening up new product classes, generating process substitution, or creating new business relationships and opportunities (Tushman & Anderson, 1986; Shane, 2001). *Institutional structures* are “social constructed templates for action, generated and maintained through ongoing interaction” (Barley & Tolbert, 1997: 94). Key institutions are derived from nation states that include government agencies and community organizations (Baum & Oliver, 1996: 1380; DiMaggio & Powell, 1983; Scott, 2001). *Entrepreneurial actions* concern the ways in which entrepreneurs discover and exploit technological opportunities, and manage to legitimate this venturing activity in their institutional context. Entrepreneurial actions thus involve both technology exploitation and legitimacy construction. Once unfolded and established, individual, and more often collective, entrepreneurial actions can bring into being a new population, or organizational field, that supports and promotes the persistence of new organizational forms, commonly referred to as “new embodiments of goals, authority, technology and client markets” (Rao, 1998: 912).

Our study makes several contributions. First, we extend existing organizational creation research from both the individualistic logics of innovation and the particular constraints of context to a dynamic, interactive, multi-level analysis that allows for agency at the same time as context. Second, for the innovation perspective, we add to the few studies that examine firm development as a context-dependent social process (Lounsbury & Glynn, 2001). Understanding how institutional contexts shape and legitimate firm development is important, not only because innovative entrepreneurs typically face a high hurdle in constructing legitimacy, but also because institutions

as a source of environmental heterogeneity represent context-specific, immobile, inimitable, and potentially valuable resources (Hill, 1995; Nelson & Nelson, 2002) that may allow founding entrepreneurs to achieve sustainable innovative performance. Third, we respond to the call to understand form-generating process. Dacin, Goodstein, and Scott (2002: 51) argue: “Until recently, both institutional theorists and ecologists have not accorded close attention to generative processes spawning new types of organizations – which, in turn, are often associated with the development of new industries”. Blending innovation and institutional understandings, our study examines the arrival of high technology within a particular institutional context that shapes new ventures and industry creation.

To illustrate our framework, we study the rise of IT firms in Taiwan between 1978 and 2004. The Taiwanese have successfully entered the emerging IT area and developed an industrial structure and organizational form, distinct from traditional Chinese family business, yet at the same time taking advantage of other institutional features of the environment. Taiwan’s IT sector has been described as “a silicon valley of the east” (Mathews, 1997), “the hidden center of the global economy” (*Business Week*, 2005: 18), and as “a global center of IT systems design and manufacturing” (Saxenian & Hsu, 2001: 894) that continually expands with increasing overseas investment and production. The rise of the Taiwanese IT sector involves the exploitation of technological discontinuities as innovation theorists would expect, but on their own these technological discontinuities are not sufficient to explain Taiwan’s extraordinary success. The particular kind of trajectory enjoyed by Taiwan, as opposed to for instance Singapore or Hong Kong, relies on distinctive national features of the institutional environment. The institutionalist perspective helps explain why Taiwan rather than any other country. Yet on its own a conventional institutionalist account

would hardly have predicted Taiwan's success either, given institutional starting conditions and the initial apparent advantages of other Asian economies. Institutional theory requires the innovation theorists' appreciation of entrepreneurial agency in exploiting and reshaping institutional opportunities. The combination of an authoritarian state and a fragmented Chinese family business culture was not a promising platform for what would become a global hi-tech success. We shall argue here that a more complete explanation of the rise of the Taiwanese IT sector as a distinctive form of organizing requires a theoretical perspective that is capable of integrating the entrepreneurial agency of innovation theorists and the contextual sensitivity of more pluralistic institutional theorists.

II. Theory and Framework

Figure 1 depicts our conceptual framework which links elements of innovation and institutional accounts of new firm creation. This framework emphasizes how technological opportunities, institutional structures and entrepreneurial actions are interrelated in a co-evolutionary, interactive system. To begin with, technological opportunities matter. Scholars of organization management have long been interested in the linkages between technology change and firm development. In the Schumpeterian framework, new firm creation is an important mechanism through which independent entrepreneurs exploit technological opportunities to recombine resources in a way that generates a surplus of revenues over costs (Schumpeter, 1934). Subsequent research in the Schumpeterian tradition has developed a body of entrepreneurship research centered upon the pursuit of opportunity as a source of new firm creation (Shane & Venkataraman, 2000; Shane, 2001). In general, new firm and wealth creation starts with an entrepreneurial search for emerging technological opportunities.

Insert Figure 1 about here

Similarly, researchers working in the related area of technological innovation (e.g., Christensen, 1997; Henderson & Clark, 1990; Tushman & Anderson, 1986) have examined the impact of technological discontinuities for niche openings on new organizations. Niche opening events, such as the advent of the personal computer (Langlois, 1990), the flat panel display (Murtha, Lenway, & Hart, 2001), and the 8-inch/5.25-inch/3.5-inch drive (Christensen, 1997), destroyed the demand for a wide array of products while creating huge technological and market opportunities for new ventures. In particular, such opportunities have become increasingly important to all types of new ventures, as the economic environment is characterized more by radical technological change and emerging technologies (Adner & Levinthal, 2002).

To effectively utilize, exploit and optimize a new opportunity, independent entrepreneurs need to mobilize resources, recruit and train employees, forge alliances, and seek new business partners. All of these activities are dependent on the level of legitimacy. According to institutional theory, legitimacy is an equally compelling consideration of an organization's funding attempts as its product and function (Baum & Oliver, 1992; Baum & Singh, 1994; Carney & Eric, 2002; Scott, 2001; Ruef, 2000; Thornton, 1999). As Aldrich and Fiol (1994: 645) argue, legitimation is important, as innovating entrepreneurs "appear to be fools, for they are navigating, at best, in an institutional vacuum of indifferent munificence and, at worst, in a hostile environment impervious to individual action".

Novel organizational forms are legitimate to the extent that their goals, functions, practices, and strategies mesh with those of society. Accounts of the social context that offers legitimacy vary widely, but generally nation states, including government

agencies (Dobbin & Dowd, 1997; Hillman, Zardkoohi, & Bierman, 1999; Spencer, Murtha, & Lenway, 2005) and community organizations (Orrù, Biggart, & Hamilton, 1991; Whitley, 1992; Scott, 2001), are seen to define appropriate and reasonable behavior within particular fields of entrepreneurial activity. Attention to government agencies is especially true for those sectors, or activities, that are subject to strong state regulatory pressures, such as the US health care sector (Ruef, 2000), and economic and industrial activities in East Asia (Hamilton & Biggart, 1988; Murtha, Lenway, & Hart, 2001).

Legitimacy building depends not only on conformity to the national institutional context, but also on innovative strategies to confront and resist institutional pressures (Aldrich & Fiol, 1994; Fligstein, 1997; Lounsbury & Glynn, 2001; Oliver, 1991). The emergence of specific new types of organizations is possible, because nascent entrepreneurs can innovate, act strategically, and make a difference to the environment in the flow of opportunity creation events. In particular, the possibilities of organizational actions to withstand institutional pressures are increased when the institutional environment is characterized by plural structural rules and accepted procedures for carrying out strategic choice (Whittington, 1992) and social movement (Rao, Morrill, & Zald, 2000). In general, the emphasis on entrepreneurial action as a force for institutional change and form emergence highlights the possibility of agency, which concerns episodes in which social actors could have acted differently (Emirbayer & Mische, 1998; Giddens, 1984).

Embedded in institutional structures that empower or constrain the attempts to found organizations, entrepreneurial actions create and produce a new organizational community in two ways. First, in situations where an innovation or new venture fits the matrix of the institutional context, founding entrepreneurs can easily mobilize social approval and legitimacy from external constituents to garner or build external

legitimacy and so enhance their chances of survival and success. This mobilization is further reinforced with the availability of resources that encourage entrepreneurialism (Romanelli, 1989: 225-6). Second, there are situations where technology does not attract socio-political attention (Hoffman & Ocasio, 2001) or is not viewed as appropriate and legitimate by its institutional context. In such an inappropriate circumstance, founding entrepreneurs may respond by resorting to institutional strategies that may either improve their credibility and gain recognition or eventually alter institutional structures. The ability to pursue an effective institutional strategy is reinforced by an emerging technology path that may cross-cut the more local institutional contexts of nation states to provide other sources on agency (Garud & Karnøe, 2003; Garud, Jain, & Kumaraswamy, 2002; Hung, 2004).

Note that in most instances, entrepreneurs in pursuit of opportunity are confronted by a combination of appropriate and inappropriate conditions, especially due to the fragmentation of institutional structures. As a result, entrepreneurial actions usually involve searching for strategies that manage institutional forces and confer legitimacy. Researchers have proposed a set of such institutional strategies; Oliver (1991) identifies compromise, avoidance, defiance, and manipulation. Aldrich and Fiol (1994) note maintaining internally consistent stories, mobilizing collaborative action, negotiating, compromising, and organizing collective efforts. Fligstein (1997) suggests setting agendas, maintaining “goallessness” and selflessness, continuing ambiguity, aggregating interests, and networking to outliers. Hargadon and Douglas (2001) discuss mediation, Lounsbury and Glynn (2001) consider storytelling, and Déjean, Gond, and Leca (2004) examine the development of measurement tools. Though somewhat overlapping, these strategies or tactics are available to individual founding entrepreneurs who are acting as skilled institutional operators or institutional entrepreneurs.

Entrepreneurial action as a form of strategic response to institutional forces occurs through a process of building socio-political legitimacy under conditions of ignorance. The process of legitimacy construction usually begins within a realm of individual entrepreneurs' institutional strategies and continues with the entry of followers or reproducers that enhance and extend innovation activity. During this period of uncertainty and ferment, the enactment of entrepreneurial actions is very much a collective effort, as organizational foundings tend to cluster in time and space (Dobrev, 2001; Saxenian, 1994; Stuart & Sorenson, 2003). Much of the legitimacy and market creation then takes place at the community level partly as a result of collective organizational actions, and new forms appear. While these forms reflect the historical conditions at the time of entrepreneurial attempts, surviving organizations recursively reinvent themselves by an entrepreneurial response to changes in technology and institutions in their environment.

The effective exercise of organizational founding has significant consequences for the context. New opportunities may become available as a result of innovators' searches for new business partners. The structuring of a new technology network, combined with life cycle effects (Vernon, 1979; Utterback, 1994), reinforces the capacity to destroy technological and market equilibrium and to enable the creation of future goods and services (Klepper, 1996). Changes from external constituents are likely to occur not only because of accidents or unintended consequences of social actions (Hernes & Bakken, 2003), but also because of increasing alternative avenues governing legitimacy and access to resources. Different degrees of social embeddedness and connection, in turn, may result in different degrees of restructuring from creative action. In comparative terms, the degree to which entrepreneurial actions exercised by the emergent organizational populations affect the restructuring of their national institutional context is clearly greater than their contribution to the emergence of new technological opportunities (as shown in the finely dotted line in

Figure 1), introduced broadly by an international context. Overall, with all the social forces, incentives, opportunities related to form emergence, the survival and success of a new form of organizations depends as much on the effective exploitation of technological opportunities presented as on the skilled pursuit of institutional strategies that legitimate new ventures.

In summary, to better understand the emergence of new organizational forms, we draw upon and combine the innovation and institutional perspectives to propose a new conceptual framework, which incorporates three analytical dimensions: technological opportunities, institutional structures, and entrepreneurial actions. In the next section, we discuss research methods, before applying the framework to explaining the rise of Taiwan's IT firms.

III. Research Methods

The basic methodology used for this study is an orientational qualitative approach that interprets the empirical setting through an explicit theoretical framework (Patton, 2002: 129-31). We also employ an embedded design with three units of analysis - technological opportunities, institutional structures, and entrepreneurial actions - in order to build a dynamic, multi-level understanding of the empirical data in its context (Yin, 1984: 49-50).

We chose to study the creation and rise of Taiwan's IT firms from 1978 to 2004, partly because of their rich story of expansion and partly because of their economic and social significance in demonstrating the creation of a distinctive type of collectivity. IT is broadly defined to include computers and peripherals, telecommunications, semiconductors, and optoelectronics. The Taiwanese IT firms are new, but innovative and advantaged. According to *Business Week's* (2004) recent survey of "the infotech 100", Taiwan forms the second largest group (15), behind the

US (46); Japan has 13, and Korea 3. Strongest in chip foundries and notebook PCs (with 70 per cent and 72 per cent of the market share, respectively, in 2004), Taiwanese firms have led the world in IT production. Now, more than ever, “Taiwan matters”, because “(t)he global economy couldn’t function without it” (*Business Week*, 2005: 16). With most clustering around the Taipei-Hsinchu region, these firms have developed into a community of economic dominance that is novel to Taiwan’s established community organizations. In particular, this development is reinforced by the national diffusion of many other new technology-based firms (e.g., biotechnology) which accompanied the rise of Taiwanese IT firms. In addition, we chose to study the Taiwanese IT sectors, because they are often grown from emergent technological opportunities, and because they have followed the most radical political and social transformation of the post-war period in Taiwan to date (Cheng & Haggard, 1992; Cohen, 1988).

Following Yin (1984: 90-9), our data sources are multiple, including both primary (personal interviews, casual conversations, subjective observation) and secondary (documents and quantification). Interviewees include company (owner-) managers, policy makers, and industry experts and observers, and they are developed from our previous studies in a longitudinal, cumulative and ongoing way. We began conducting case studies of Taiwan’s PC firms in 1993, and in 1996 moved to include studies of computer and peripherals, semiconductors, telecommunication and, more recently, emerging optoelectronic players in Taiwan. The first author carried out the interviews. He mostly relied on snowball sampling to identify and contact potential interviewees. Case studies and interviews include both survivors and failures. The first author also conducted fieldwork and interviews in Singapore (Seagate and Maxtor) and Korea (Samsung), to better understand the manufacture of hard disk drives, in which Taiwan had not participated since the early 1990s. The additional benefits of these international visits, together with research into failing Taiwanese IT firms, are that it

avoids the general bias in the organization literature of basing form emergence explanations on successful cases and allows us to combine retrospective and real-time analyses of opportunity creation and institutional change processes.

Data analysis involves both grounding and sense-making, an iterative process and a narrative approach (Langley, 1999). In the early stage of analysis, this research developed several detailed industry and company cases from the raw data (as suggested by Eisenhardt 1989), which were then used for MBA/Executive MBA class discussion. In considering the mutual linkages among technologies, institutions and actions, we decompose the chronological data into consecutive discrete time periods that become comparative units of analysis. This type of “temporal bracketing” (Langley, 1999), or “clustering” (Aldenderfer & Blashfield, 1984), offers more than just a descriptive convenience as it permits the explicit examination of continuity and change. Within clusters, investigator triangulation and sense-making are taken to further the saturation of core themes that allows for building in the maximum variation to the analysis (Strauss, 1987). To validate the data and interpretations, we asked key informants to review preliminary analyses, using an iterative process.

In consequence, Figure 1, introduced earlier as our conceptual framework, is empirically operationalized as Figure 2, summarizing our analysis of the rise of Taiwanese IT firms from 1978 to 2004. In each of the three distinct time periods, 1978~1990, 1991~1996 and 1997~2004, Figure 2 first establishes the conditions of technological opportunities and institutional structures, and then indicates the entrepreneurial actions that are built on these conditions. It also shows how entrepreneurial actions in one period feed into the technological and institutional conditions to the next. The following section shows this process at work over the 26 years of the study.

insert Figure 2 about here

IV. The Emergence of Taiwanese IT Firms

1. The First Stage: 1978~1990

Technological Opportunities, 1978~1990

The origins of Taiwanese IT firms began with the arrival of the information or digital age. This new age came in the 1970s, when technological breakthroughs in microprocessors, personal computers, software design and integrated circuits created a new demand for product market and application which, in turn, promised alternative avenues and opportunities for new firm and industry creation.

The emerging PC business. In late 1971, after a decade of technological stability, Intel introduced the 4004 microprocessor, which together with the series of advanced models that followed (8008 in 1972, 8080 in 1974, 8085 in 1976, 8086 in 1978, and 8088 in 1979), would enable the production of simpler, smaller and less expensive computers. MITS boldly exploited this new product technology to develop the world's first microcomputer - Altair 8800 in 1975. The Apple soon followed the Altair 8800, as did Commodore, Atari, Tandy, and others. A new business model - retail computer stores - soon emerged in the U.S. partly as a result of a high degree of product innovation and market competition.

Though late in market entry, IBM was committed to marketing the IBM PC in the early 1980s and rapidly captured more than a third of the market. The success of the IBM PC gave rise to the dominance of the Wintel system and the choice of off-the-shelf components. Compaq's development of the first IBM-compatible PC in 1982 and of 80386 PCs in 1986, coupled with the rise of clone makers, enabled additional improvements in PCs using the Wintel design, open architecture and

external outsourcing. From the mid-1980s to 1990, market demands for Wintel-based PCs and computer peripherals (such as mouse, monitors and hard disk drives) continued to rise rapidly, and competition was increasingly shifted to an emphasis on quality, price, and speed. With all these new changes, entrepreneurial opportunities became available from every part of the PC value chain, from chips, system and software to distribution.

Radical changes in IC technologies. In addition to enabling PC innovation, the complexity of the IC technological trajectory, and the planar process that underpinned it, led to the next generation of semiconductor firms. Japanese dominance of dynamic random access memories (DRAMs) over American firms during the late 1970s and 1980s signaled a new attention to manufacturing, quality and productivity that would enable a potential challenger to make significant inroads. Attempts to create differentiated products were also encouraged, as the appearance of a host of new technologies or products – including application-specific integrated circuits (ASICs) and application-specific standard circuits (ASSCs) – were providing the chance both to escape the mature, standard-cell product markets controlled by integrated device manufacturer, and to exploit the rapidly growing markets of consumer and computer applications (Langlois & Steinmueller, 2000).

Internationalization of IC production. Operating in a fragmented, decentralized industry at home, many American firms chose to concentrate on design-intensive chips, in response to the opportunities the world presented. For these vertically specialized firms, the capacity to choose was further enabled by cooperation with growing overseas manufacturers, especially in the Far East, whose advantage was built on process technology. In tandem with the expanding American chip business, IC production was steadily internationalizing.

Institutional Structures, 1978~1990

In retrospect, government agencies in Taiwan were centrally built on the Kuomintang (KMT) party-state, whereas community organizations were structured around the actions and practices of family groups as well as inward foreign investors.

The developmental state. Taiwan is politically isolated, but the party-state had pursued industrial development in order to secure military-economic independence and the legitimacy of the KMT. Acting as a developmental state, the state governed the market and concentrated on controlling factor costs and the exchange rate through intervention in factor and currency markets.

Increasing state support of high technology. Since the late 1970s, state support of high-tech industry had intensified, insofar as the new technology policy was being formulated and carried out in accordance with the radical restructuring of the world economy. Intellectual capital across the island was also expanding as the lifting of the banning of political parties in 1978 and martial law in 1987 led to a surge of brain drain in reverse.

Familialism, and opportunistic, assembly and cost orientations. Partly to prevent the concentration of local economic power and partly because of the ethnic conflict separating the ruling party from the private sector, the KMT party-state had avoided the creation of large conglomerates. The result was an economy dominated by small and medium enterprises, mainly family-run. Characterized by strong streaks of opportunism and flexibility, these small and family-operated businesses shared many of the typical features of the Chinese family businesses that were scattered throughout East Asia. Strategy relied on short-term outsourcing, networks of subcontractors, and cheap and disciplined labor to pursue low-cost manufacture. Innovation activities

were scarce, and branding and marketing rare. There was a poor record of respect for intellectual property rights (IPR).

Electronics expertise and technical orientations. Another important feature that was built into Taiwan's economy was the practice of inward foreign investments, particularly from General Instrument, Texas Instruments (TI), Philips, RCA, Sanyo, and Panasonic. Where such internationalizing firms dominated the electronics sector in the areas of assembly and packaging, they made substantial manufacturing investments to improve quality and productivity and exported most of the finished products to their home countries. The growth of investments and trades by the foreign firms resulted in greater interdependence with local organizations and institutions. To some extent, then, business in Taiwan had begun to specialize in the assembly and production of electronics, notably televisions. This specialization was reinforced by the permeation of technical orientations into Taiwan's higher education systems.

Entrepreneurial Actions, 1978~1990

PCs: cloning and low-cost strategy, together with developing international linkages, storytelling, and aggregating interests. The Taiwanese exploited the new retail-based PC business, using strategies of cloning and cheap production. Typical, and the most influential, of the firms were Mitac (1974~) and Acer (1976~).

Mitac started as a sales representative for Intel in Taiwan, persistently drawing on its owner-manager's relationships with family groups for growth. The owner-manager is Matthew Miao, who is the son of one of the leaders of the "Sun-tung (a province in the north-east of mainland China) business group". Matthew Miao was educated overseas, and in the early 1970s, worked in California for the newly formed Intel Corporation. Miao is still a close friend of Intel's president, Andy Grove, and he has

built close business links across the Silicon Valley. Despite its clear connection to family groups, Mitac was much like a “foreign computer firm”, importing many of the rationales of Silicon Valley organizations and industries for competition. Mitac’s strategy in legitimating its business then depended on connection to family groups and with the international business community.

Mitac was a pioneer but it was Acer who was able to stimulate and generate collective entrepreneurial actions towards the early formation of Taiwan’s PC sector. In 1976, with a few years of working experience, Stan Shih, with his wife and three friends, created Acer to take advantage of emerging computer business opportunities. Acer’s main office was originally in Shih’s Taipei home and, in 1981, moved to the Hsin-Chu Science Park (HSP) to begin manufacturing operations. At that time, the government’s ban on TV gambling machines, together with Acer’s initial success with PC manufacture, had driven the existing electronic parts firms to turn their attention to computer products, and their technology strategies were invariably focused on cloning the Apple II, and later the IBM-compatible PCs. Legitimacy was secured through the established business community, emphasizing opportunism, assembly, low cost, electronics and engineering orientations, combined with the absence of attacks by the Taiwanese state and society on IPR violation. The popularity of IBM-compatible PCs and the gradual penetration of the clone makers, in turn, brought an increasing emphasis on the open architecture design of the IBM PC. This reinforced the Wintel system as the industry standard.

The dominance of the Wintel system induced additional positive externalities to benefit Taiwanese firms. With the rapid growth of the IBM-compatible PC business, Acer’s revenues increased by 50 per cent in 1983 and then by almost 100 per cent between 1984 to 1986, reaching \$400 million. Mitac, together with other computer and peripherals firms, too had grown quickly, and collectively they build a new sector

of Wintel compatibles. While most of these firms, driven by their profit orientation, continued their policies of competing with the OEM products, Acer tried the own-branding route and ventured overseas, notably with the acquisition of two US minicomputer firms (Counterpoint in 1987 and Altos in 1990).

In the absence of support from family groups, Acer depended heavily on aggregating interests and storytelling to legitimate its branding and acquisition practices. Stan Shih founded the Taipei Computer Association, and served as its first chairman from 1984 to 1989. Acer was frequently in the news, with Stan Shih declaring, “I dare say, except for the Government Press Bureau, I have held the most international press conferences of anyone in Taiwan” (Chen, 1996: 163). Stan Shih published at least two books to promote his venture and forged professional and international linkages by inviting the former senior manager of IBM, Dr. Leonard Liu, to join Acer. Acer’s aggressive legitimacy-building brought greater access to the state and, by the late 1980s, the company was recognised as an emergent national star.

With the rise of Acer and the success of its 1988 initial public offering, pursuit of entrepreneurial ventures in certain computer and peripherals products became a natural and legitimate option for Taiwan’s business community, particularly across the Hsinchu-Taipei region. The rise of peripherals firms and their reliance on sub-contracting and multiple outsourcing as the preferred means of managing capacity expansion encouraged the entry of newcomers. With the Wintel-based technologies displaying increasing returns to adoption, the effects of such institutional incentives on new firm creation in peripherals was extensive, as shown in the dramatic emergence of Taiwan’s monitors, mice, keyboards, printed circuit boards, add-on cards, and scanners during the late 1980s. The exception was the manufacture of Taiwan’s hard disk drives, which began in the mid-1980s but failed to survive into the 1990s. The reasons for this failure are many, but one of the most critical is its inability

to secure the support and legitimacy from government agencies and business organizations. Nor were these small, highly mechanics-based firms able to secure international liaisons, then being increasingly structured between Singapore and the Silicon Valley.

ICs: foundry specialization, together with maintaining the authority and selflessness, international networking and collaborative and collective actions. In contrast to the hard disk drives, the semiconductor manufacturers were unusual in establishing large-scale productions in Taiwan, supporting them by relatively high R&D activity. Taiwan's IC activity started in 1975 when the ITRI (founded in 1973 as Taiwan's largest R&D statutory body) cooperated with RCA to introduce the manufacture of 7.0 μ m complementary metal-oxide semiconductor (CMOS) process technology. In 1980, with considerable state support, UMC was spun off from the ITRI, which remained an important source of technological expertise and social legitimacy. ADT (1981~), Winbond (1987~), and Hualon (1987~) soon followed UMC, and all started as the integrated design-cum-fabricator, with close technological relationships with the ITRI. However, with the increasing complexity of IC technologies that presented new opportunities, it was TSMC that was the first to create a substantial new market.

In 1987, ITRI's president Morris Chang enthusiastically founded the TSMC to establish a very-large-scale integrated circuits manufacturing capability and to provide foundry service to US semiconductor firms and fabless design houses. Not an integrated design-cum-fabricator, TSMC was completely production-oriented, taking advantage of Taiwan's electronics and engineering knowledge, while refusing to conform with the community organization's familial and opportunistic orientations.

Unlike PCs, ICs in Taiwan were blessed and legitimated by government agencies. Morris Chang's role as the former president of General Instruments, group vice

president of Texas Instruments, and ITRI chairman and president, was a source of international connections and sense of absolute authority and selflessness, available to motivate and convince TSMC's multiple shareholders (including the state, Philips and venture capitalists) and market exchange partners. Although it was rejected by family groups, TSMC was thus able to withstand some of the external institutional pressures and hence gained a sufficient legitimacy, to survive into the 1990s.

TSMC's venture was immediately followed by the creation of Acer-TI DRAM joint venture in 1989 and the emergence of an independent ASIC design sector. This expansion, along with the availability of returned US-educated Taiwanese engineers and scientists, resulted in collective entrepreneurial actions which, in turn, conferred more social approval and legitimacy upon the development of the Taiwanese IC sector. With the mutual reinforcement of a developing IC sector and a flourishing PC industry, some features of Taiwan's business community had begun to shatter and be reproduced.

2. The Second Stage: 1991~1996

Technological Opportunities, 1991~1996

Commoditization of PCs. In PCs, the failure of IBM's attempt to destroy the open system standard with the introduction of the PS/2 range during 1987-1988 reinforced Intel and Microsoft's control over the Wintel system. With their emphasis on consistency and compatibility, Intel and Microsoft have continued to create competence-enhancing shifts by developing the next generation of products. With the prevalence of industry open systems, firms found it harder than ever to differentiate their products without violating the standards. Standardized design was thus typical. This in turn led Compaq, IBM and Dell to cut prices by 30 to 40 per cent in 1991, leading to increased price competition. Adopting offshore production, these leading

players focused on maximizing distribution and service skills. Compaq's built-to-order model, introduced in the early 1990s, supported this emphasis on global logistics and cost competition. As the PC became a mature, commodity-like market, the challenge at this stage was how best to reduce production and distribution costs.

Increased convergence between PCs and other technologies, and the creation of multimedia PC systems. Although cost competition was intense, the PC industry continued to expand by merging with such high-tech industries as semiconductors, consumer electronics and telecommunications. In 1990, Microsoft cooperated with major PC players to form the Multimedia PC Marketing Council, which gave rise to the standardization of multimedia computers. This alliance, combined with the development of CD-ROMs, gave PC firms an opportunity to compete in the multimedia PC market, which was largely home-user based. Also significant was the expansion of image compression technology and high-speed modems which, in turn, stimulated Microsoft's launch of Windows 95 in 1995. In addition, the popularity of the multimedia PC inspired the design and development of new ICs, and this became a positive feedback loop.

The Internet. Relatedly, the rise of Internet in the early 1990s has accelerated the information revolution. With this emerging technological challenge and opportunity, many new ventures rose to create new market demands, such as Internet service providers, wide area information servers (WAIS), and gophers. With the introduction of Netscape by Marc Andreessen in 1994, the number of Internet subscribers surpassed 25 million people worldwide, and a new "Internet economy" became feasible.

Institutional Structures, 1991~1996

The developmental state and high support of technology industry. On the one hand, some of the dominant features of government agencies remained substantial from 1991-1996. The developmental state continued to govern the market, and there was a tendency towards increasingly high support of technology industry. On the other hand, some institutional features began to change dramatically in the late 1980s, as a result of critical political events.

Political restructuring and the rise of a Taiwanese-controlled regime. The death of President Chiang Ching-kuo, the growing importance of elections, and the rise of Taiwanization under the influence of President Lee Teng-hui in the late 1980s, restructured the Taiwanese political system. This restructuring led to the greater desire of the government to pursue a more pragmatic and flexible industrial policy and to cultivate native stars, in order to justify the Taiwanese-controlled regime.

Familism, and electronics expertise and technical orientations. Despite the rise of Taiwan's PCs and ICs in the 1980s, the role of family groups in directing industrial and business activities was extended and continuous from 1991-1996. Electronics expertise and technical orientations likewise remained important social values in the business community. Here, however, as in government agencies, some institutional regularities changed substantially in the community as a source of guiding entrepreneurial actions.

Increasing emphasis on innovation activities and increasing appearance of techno-entrepreneurs. The restructuring of the political system, together with the rapid accumulation of foreign exchange reserves and national savings, transformed the capital system, particularly in the stock market. In February 1990, the weighted average index of the Taiwan Stock Exchange (TSE) reached peaked at 12,495.34 points, with an average of 993 million shares traded daily and \$4.94 (NT\$132.98) billion in daily market turnover (see Figure 3). Partly because the stock market

continued to expand, and partly because the majority of individual shareholders preferred stock dividends to cash dividends, many nascent entrepreneurs found it easy to raise funds by issuing shares, and their search for innovation and venturing was encouraged. Equally important was the unprecedented availability of venture capital. In 1984, venture capital was formally introduced to Taiwan, and, by 1994, Taiwan's 29 authorized venture capital firms had invested \$40 million in 385 domestic and foreign technological firms, with about two-fifths of the investments going to the IT industry. With this increasing social support of innovation, coupled with the emergence of new Taiwanese PC and IC firms during and after the 1980s, the business community was increasingly characterized by techno-entrepreneurs, in addition to the traditional family-run, low-tech business.

insert Figure 3 about here

Entrepreneurial Actions, 1991~1996

PCs and peripherals: efficiency and branding, together with balancing the institutional expectation, international networking and storytelling. During a global price war, the leading domestic PC firms, such as Acer and Mitac, stressed process innovation and craft logistics in response to the challenge of a mature industry. Acer, for example, developed the ChipUp technology which enabled the consumers to upgrade their PCs without replacing the motherboard. In the pursuit of efficiency and cost leadership, Acer introduced the fast-food business model which, doubled inventory turnover by the end of 1993. In terms of organizational structure, Acer introduced corporate re-engineering in 1992, resulting in a new client-server model that was divided into several profit-centered business units.

Re-engineering was usually difficult, because Taiwan's business tended to recruit managers and employees through familial or personal relationships. Yet Acer's

identity as an emerging Taiwanese-controlled state star enabled it to draw on institutional support and legitimacy from government agencies to enforce severe layoffs and promote flexibility and internationalization. These actions were also supported by a dis-integrated yet competitive peripherals industry that was moving towards an emphasis on its global supply chain. Balancing the expectations of government agencies and community organizations, along with networking with the international technology community, helped legitimate Acer's pursuit of reengineering practices.

In early 1994, the enormous revenues from the TI-Acer DRAM joint venture and the expanding of OEM business put the Acer group back into the black after three consecutive years of losses. Furthermore, concern about growing the branding business drove Acer to identify and exploit the emergence of Internet technology and more home-oriented markets, leading to the introduction of the Aspire, a multimedia consumer PC in 1995. Initial sales were satisfactory, and next generation products soon followed. With a turnover of \$5.8 billion in 1995, Acer became one of the top seven branded PC companies in the world. Acer's resurgence was accompanied by nation-wide new peripheral firms' exploitation of a commodity-like market. An emerging multimedia PC market, combined with the penetration of new converging technologies in ICs, electronics and the Internet, also fueled the demand for peripherals, notably scanners¹. The largest scanner makers had followed Acer's example of promoting branding products. A collective venture into final consumer markets, coupled with the growing international relationships and publicized entrepreneurial stories, not only legitimated branding competition, but also intensified firms' willingness to look for and introduce technological and organizational

¹ Taiwan's scanner firms, growing from six in 1990 to over 20 in 1997, had a global market share of 31 per cent in 1995, 61 per cent in 1996 and 70.5 per cent in 1997.

innovations, commit to long-term exchange relationships, and search for the “best practices” of foreign economies and companies.

ICs: investment in scale, together with the promotion of foundry-design house interdependence, and roadmap setting. In semiconductors, investment in DRAM rose sharply as a result of firms' exploitation of the expanding market for computer applications. The continued growth of wafer foundry and DRAM businesses led to the increase in knowledge flows, industry competition, and alliances across the HSP. There was, then, a clear sense of cluster benefits and confidence in the HSP and, as a result, a rash of huge investments, growth and expansions ensued; the leading semiconductor firms – UMC (1980~), TSMC (1987~), ASMI (1988~1999)², Winbond (1987~), Mosel Vitelic (1987~), Macronix (1989~), WSMC (1994~1999)³, and Powerchip (1994~) – all invested heavily in 8-inch wafer factories. A collective investment in scale established IC foundries as a legitimated sector.

At the same time, with access to, and the support of, wafer foundry business, fabless IC design firms expanded quickly, concentrating on computer and telecommunication application markets. While exploiting the booming new Silicon Valley, some nascent entrepreneurs also ventured into peripheral or supportive industry activities of IC business, notably silicon chip materials, semiconductor testing equipment and packaging testing. Small-to-medium scale though, these IC designers and suppliers competed for technology convergence and specialization rather than cost and manufacture. This tendency towards innovation gave rise to several kinds of social networks that, in the aggregate, increased population-level learning and organized interests and, convinced IC foundries to create a technology roadmap.

² ASMI (Acer Semiconductor Manufacturing Corporation) was acquired by TSMC in 1999.

³ WSMC (Worldwide Semiconductor Manufacturing Corporation) was acquired by TSMC in 1999.

Despite the problems of garnering legitimacy from the community organization, IC manufacturers' emphasis on scale and design houses' search for specialization were viewed as socially appropriate by government agencies, embodying the features of the developmental state, high support of technology industry and the enduring search for international recognition. In particular, the growing interdependence between IC foundries and design houses, and the frequency of reports on Taiwan's success on ICs (e.g., Mathews, 1997) and on Morris Chang's identity as Taiwan's IC "godfather", mitigated the pressures from the fragmented, loosely-linked business community.

3. The Third Stage: 1997~2004

Technological Opportunities, 1997~2004

Increased demands on multimedia consumers PCs. After 1997, the global PC industry was stagnant, and margins were very low. However, with the rise of the Internet that allowed the extension of computer applications, many PC firms attempted to develop a new business model; for example, Compaq launched the Presario 2100 desktop computer, while Apple introduced the iMAC in 1998. Both machines were targeted at the low-priced consumer market, yet marked a breakthrough in ease of use. The emergence of Internet PCs, together with the popularity of multimedia consumer PCs (e.g., Acer's Aspire), brought a new emphasis on design, stimulated the development of optical storages and game software, and enforced a rising demand for flexible, lightweight notebook PCs to replace the traditional desktops.

Rising demand for flat panel displays. While technological advances in flat panel displays enabled the production of notebook PCs, an increasingly sophisticated PC market was also increasing the demand for dedicated notebook screens. With a variety of display technologies available, only TFT-LCDs (thin-film transistor liquid crystal

displays) were able to meet consumer expectations. In manufacturing terms, a TFT-LCD is similar to an integrated circuit. Both demand a clean room, photo-lithography, chemical and physical vapor deposition and advanced testing. The Japanese dominated the sector until the mid-1990s. Drawing on their experiences and knowledge in DRAMs, Korean firms like Samsung, LG and Hyundai broke into the market in 1995, and by 2000 had a combined global market share of 30 per cent. Booming notebook demand (where Taiwan's market share rose from 29 per cent in 1995 to 45.8 per cent in 1999) and the great market potential for flat panels in televisions also directed the attention of many Taiwanese manufacturers to this emerging high-tech sector, which remained monopolized and technologically immature in the late 1990s.

Increased specialization in the IC design process. This period also saw the prevalence of the repeated use of silicon intellectual property (SIP), brought about by the emergence of system-on-a-chip technology. The popularity of SIP over cell library in ASICs design, gave rise to the appearance of specialized SIP providers and design service firms, and the IC design process was subdivided into the segments of IC design, SIP provider, design server, and electronic design automation. Although critical to IC designers, mastery of SIP was increasingly difficult because of the expansion of SIP whose design principles and architecture are unique to each ASIC. In addition to outsourcing production capacity, most small-scale IC designers had preferred to rely on wafer foundry firms for management of SIP database and information – hence a closer symbiosis between foundry and fabless firms.

Digital convergence. Above all, the spread of digitalization contributed to the emergence of new information and computer technologies (e.g., spin transistors, interactivity and electronic commerce, intelligent sensors, digital imaging, and micro-machines). This development, with the rise of Internet standards, ushered in a

period of disruptions that threatened established market leaders, and brought new emphasis on digital convergence. As technologies converged, opportunities expanded.

Institutional Structures, 1997~2004

High state support of scale, innovation, and R&D. After 1997, state support of firms' commitment to scale, innovation and R&D was enhanced as the result of sense of revolution and renewal in the global economy. This enhanced state support, however, was accompanied by reduced state autonomy and capacity, as government agencies had weathered severe political jolts, caused by local political developments and the defeat of the KMT government in 2000.

Reduced state autonomy and increasing political tensions. With a less autonomous state, pressure groups grew quickly, and lobbying activities intensified. Government agencies had a greater interest in policy consensus, than in policy enforcement. Often, however, policy consensus was not fully established and institutionalized as accepted procedures for governing overseas investment in China, because of the historical animosity between Taiwan and China. This norm of "avoiding China" was complicated by the rise of China and the extensive outflow of Taiwanese investment to China (an estimated \$60 billion by 2001) (*The New York Times*, Nov 8 2001: A3), both of which exacerbated tensions and competition across the Taiwan Straits.

This, in turn, led to greater state attention to, and control of, direct investment in China, even though the pressure to join the World Trade Organization had resulted in a shift from an extremely rigid (as evidenced by the announcement of "no haste, be patient" in 1996) to a more flexible (the so-called "aggressive opening, effective management" after 2001) policy style. The entry of high-tech firms into China, nevertheless, remained heavily regulated, because of the partial dismantling of the Taiwanese state and because of the increasing fear of a resurgent China.

Family groups, combined with increasing appearance of professional groups, and increasing emphasis on growth and R&D. Family groups remained influential within the business community despite the greater visibility of high-tech professional groups and managers whose priorities were growth, scale-intensive and R&D commitments. This tendency was reinforced by the state's support of new technology-based industries and the steady expansion of production values of, and employees in, Taiwan's HSP (see Figures 4 and 5).

Insert Figure 4 and 5 about here

Entrepreneurial Actions, 1997~2004

PCs, peripherals and telecommunications: offshore production, technology focus, internationalization, and original designs, combined with loosening institutional attachments, international networking, and publicity. Despite greater market pressures, most Taiwanese computer and peripheral manufacturers survived into the 2000s. Characteristically, they sought to move early into the rising Chinese market to sustain their cost and price advantages. Operating in a stagnant industry and historically embedded in a subcontracting relationship permitted the state to tolerate the detachment of these firms from the Taiwanese-controlled regime. Legitimacy was also secured through networking with international OEM buyers such as Dell and HP who urged their suppliers to move to China for logistical and cost reasons.

Of the many early movers to China, Hon Hai, a family-created business, was perhaps the most successful. Originally founded in 1974 to manufacture plastics and expanding into PC connectors in 1981, Hon Hai began overseas production in China in 1993, with an efficiency- and cost-based strategy. This relentless pursuit of cost leadership was increasingly valuable in the IT industry, which was evolving towards standardized design, system integration, and technology convergence. Such an

exploitation of technology was considerably legitimated by Hon Hai's relationships with Taiwan's family groups. Despite its strong familial identity, Hon Hai was still characterized by its enduring quest to broaden, deepen and upgrade product range around the connector technology, an innovative strategy that bore little resemblance to the traditional opportunistic expansion and diversification of the Chinese family business.

Far from retreating to OEMs, some leading computer system firms boldly diversified into related component and telecommunication markets, and restructured their organizations to concentrate on global marketing initiatives. Typical, and also the most wide-ranging, was Acer. In particular, after its spin-off from Acer, BenQ (Acer Peripheral from 1984 to 2000) had risen rapidly because of its courageous entry into, and skilled exploitation of, emerging multimedia consumer electronics and telecommunication markets. Despite the disapproval of the business community, both Acer and BenQ's technology strategy was supported and legitimated by their institutional context which was more favourable to innovation and branding competition than ever. Both, too, frequently promoted themselves through public relations and communications campaigns. Stan Shih's retirement in 2004 brought Acer a new president - Gianfranco Lanci (then president of Acer's international operations business group) whose identity as an Italian professional manager motivated and legitimated Acer's pursuit of internationalization and branding.

Optoelectronics: leadership, innovation and scale, combined with agenda setting and international networking. With their emphasis on innovative designs, Taiwan's optical storages, too, benefited from increased demands on multimedia consumers PCs and notebooks, and like Acer and BenQ, depended on the institutional context to legitimate their ventures. This dependence was enhanced by the Taiwanese's collective attempts to promote next-generation optical storages in the global market.

Leading these attempts was Mediatek (1997~) which, as the most profitable company in the *Business Week's* (2004) IT 100, was able to buffer its innovative activities from external pressures because of its status as a subsidiary of UMC and its active networking with world technology frontiers.

Taiwan's optical storages were novel and creative, but within the emerging optoelectronics area, it was TFT-LCDs that, with their heavy investment in scale, truly made a substantial social impact. Since the late 1990s, technological advances in TFT-LCDs, along with the 1997 Asian Economic crisis, had created opportunities for the Taiwanese to break into the growing flat panel markets. Manufacturing began in 1999 and, by 2004, the Taiwanese held 35 per cent of the global market. Access to legitimacy was secured by increasing socio-political support of high technology activity. In particular, networking with the Japanese to challenge the Korean dominance brought Taiwanese firms not only a source of technology knowledge, but also an alternative source of social approval and legitimacy, one that was capable of resisting the business community's tendency towards family-run, small scale-based practices.

ICs: innovation, marketing & services, together with mobilizing collective and collaborative actions, and influencing and manipulating government regulations.

The rising optoelectronics sector was, in many senses, an extension of the ICs. As a result of their technological similarity, the emergence of Taiwan's optoelectronics reinforced Taiwan's comparative advantage in semiconductors. With this increasingly dominant position, the Taiwanese were enthusiastic in sustaining and extending their innovations and began to turn their focus from information applications to consumer electronics and telecommunications. In light of the prevalence of SIP, the foundry business, in particular, had witnessed the priority of customer service over price competition. TSMC and UMC had claimed to be more marketing-oriented, and both

were entering alliances with third-party SIP providers in order to provide their customers with IP database access service. While TSMC remained concentrated on foundry business, UMC had been ruthlessly responding to emerging technology opportunities brought about by the prevalence of SIP and the emergence of converging digital technology products.

Despite their differences in business strategy, both TSMC and UMC had turned their attention to the rising China economy, yet had difficulty in realizing their interests due to the lack of legitimacy access from government agencies. However, under conditions of diminished state autonomy, TSMC and UMC were more likely to exert power over the content of the state's expectation, resulting in the investment in an 8-inch wafer in China in 2002. This exercise to legitimate preliminary China investment was reinforced by UMC chairman's (Robert Tsao) new position as consultant to the president of Taiwan, and by Morris Chang's ability to mobilize collective and collaborative actions.

The tendency to influence and manipulate government agencies culminated in the radical restructuring of government-business relations which, with increasing socio-political approval of new technology ventures, led to the prevalence of professional groups in the business community. This result, signaled and strengthened by the appearance of Lanci as Acer's new president, institutionalized a new population of organizations, one that was built around the IT firms, and that valued long-term growth over short-term profit maximization, managerial discretion over familial management, technology focus over opportunistic diversification, innovation over imitation, and one that is different from the traditional Chinese family business (Orrù, Biggart, & Hamilton, 1991; Redding, 1990; Whitley, 1992; Wong, 1985).

Conclusion and Implications

This paper contributes to the understanding of new firm creation in two ways. First, by combining and drawing on insights from innovation and institutional approaches, we developed a new conceptual framework centered on the dynamic, interactive relationships among technological opportunities, institutional structures, and entrepreneurial actions. Second, we applied the framework to analyzing the emergence of Taiwan's IT firms as a distinct form of organizations in Taiwan's society and world markets. Our framework offers on the one hand an institutional explanation why it was Taiwanese firms in particular that were so successful in these IT sectors, and on the other an entrepreneurial account of how the initial institutional conditions were exploited and transformed in order to support the continued success of Taiwanese IT.

While our analysis is subject to the critique of a unique case study and heavy reliance on subjective interpretation of large amounts of empirical materials, our emphasis on the evolving linkages of technologies, institutions and actions may have a wider applicability to explaining the sources of new firm creation. In particular, our analysis of the creation of new technology-based firms could be extended to other emerging innovative, high-tech contexts (for instance, the rise of software firms in India and Ireland). Here institutional conditions should not be interpreted unambiguously: just as in Taiwan, even conservative societies such as India and Ireland may be capable of supporting innovation and entrepreneurship. At the same time, however, the success of one generation of firms should not be read as an endorsement of institutional conditions: as in Taiwan, institutions need constantly to change in the hands of entrepreneurs and policy-makers. Our integrated framework points to the value of both entrepreneurs and institutions, not the overwhelming power of either. This double recognition may apply equally to developed economies such as the U.S., where institutional context might be just as important but easily underestimated because it is simply too familiar and easily taken-for-granted.

Furthermore, our study has important implications for research. First, for research on the creation of new organizations or organizational forms, our study enhances and refines conceptualizations of the action-institution link. In approaching form emergence, institutional theory has been criticized for having a limited theory of action (DiMaggio, 1991; Fligstein, 1997). The innovation literature has sought to understand innovative and entrepreneurial strategies, but it has largely neglected the social and institutional context of new ventures (Lounsbury & Glynn, 2001). Our study shows that appreciation of both institution and action is critical to explaining the creation of organizations. While a focus on institutional structures can help to contextualize organizational founding, attention to entrepreneurial actions as a distinct form of agency can broaden the field-level studies of form emergence.

Second, for the institutional literature, our study highlights the importance of understanding the unfolding of technological changes within a particular institutional context that generates new organizations and industries. Often, industry development derives less from competition for scarce common resources and social conformity than from the discovery and exploitation of new technologies, characterized by network economies, increasing returns to adoption, and local positive feedback (Arthur, 1989). But examining founding organizations largely within a context of low technology or diminishing returns has led institutional scholars to minimize the role of technology in structuring firm development and industry creation. Our study shows that the creation of Taiwan's IT sectors is a product of entrepreneurial actions that were collectively pursued by the new Taiwanese IT firms whose emergence over the past 27 years was generated by the pursuit of technology opportunity on the one hand, and of socio-political legitimacy on the other. New firm and industry creation involve both technology exploitation and legitimacy construction.

Third, for the innovation and entrepreneurship literature, our study extends existing research on Schumpeterian patterns of firm formation by seeking not only to connect technology ventures with the institutional context, but also to consider the role of entrepreneurial actions in mediating between conformity and creation. The social context as a source of institutional advantage and disadvantage shapes new ventures, which typically experience resource dependence and the lack of legitimacy as a norm. Success, then, requires nascent entrepreneurs to locate their innovation activity within the resource base of the immediate social context, yet while retaining the flexibility of choosing a deliberate action to withstand institutional pressures and compensate for disadvantage. To be an entrepreneurial firm, then, is to be both technologically sophisticated and sociologically sensitive; technological expertise is a start, but a sociological understanding of institutions is necessary to translate expertise into a more unique venturing path.

Finally, in terms of implications for future research, we suggest the need to expand the boundaries of form emergence research. Additional sources of environmental heterogeneity (e.g., ethnic groups, culture, and geography) that have the potential to sustain entrepreneurial uniqueness should be explored. Another area into which this study can be extended is the examination of how a new organizational field affects the institutional regularities of a particular social context. For example, how would the rise of Taiwan's new technology-based firms influence the dominant features and practices of established family-run businesses? It would also be interesting to study the lifecycle of organizational forms. Organizational forms rise and fall, and examining environmental contingencies that underlie disorganization or changes in organizational forms should enrich our understanding of new firm creation.

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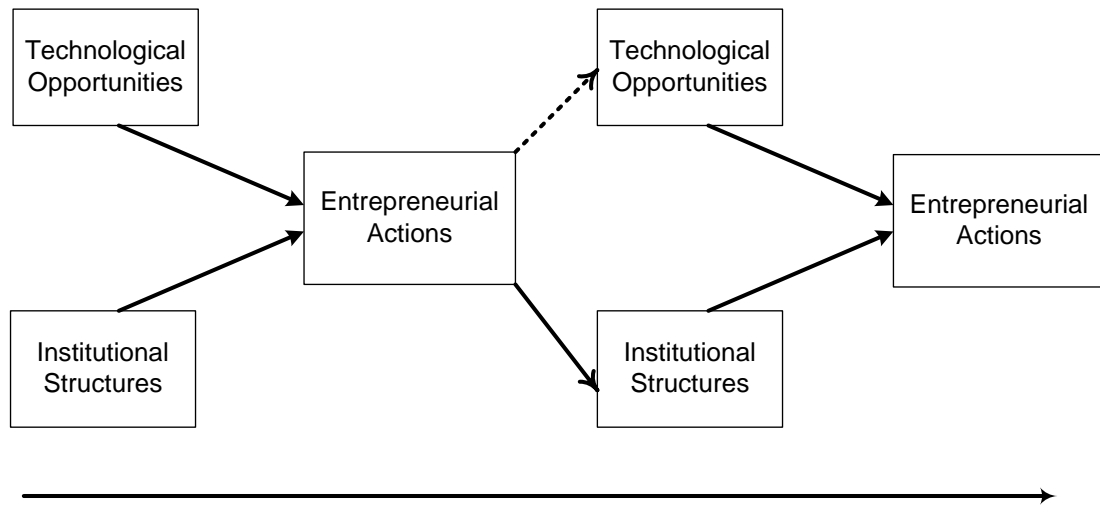


Figure 1. The conceptual framework for new firm creation

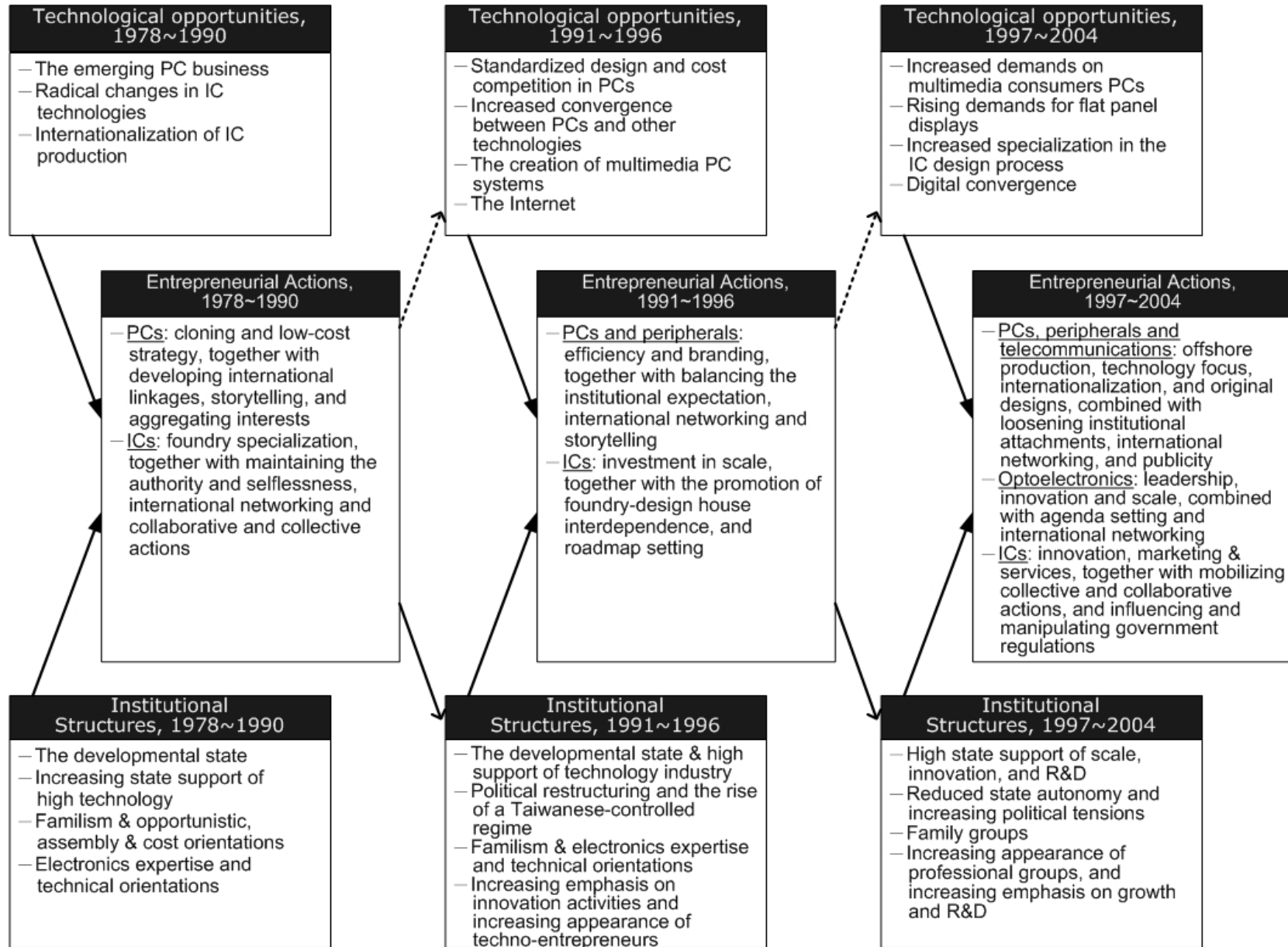


Figure 2. The Rise of Taiwanese IT Firms, 1978~2004

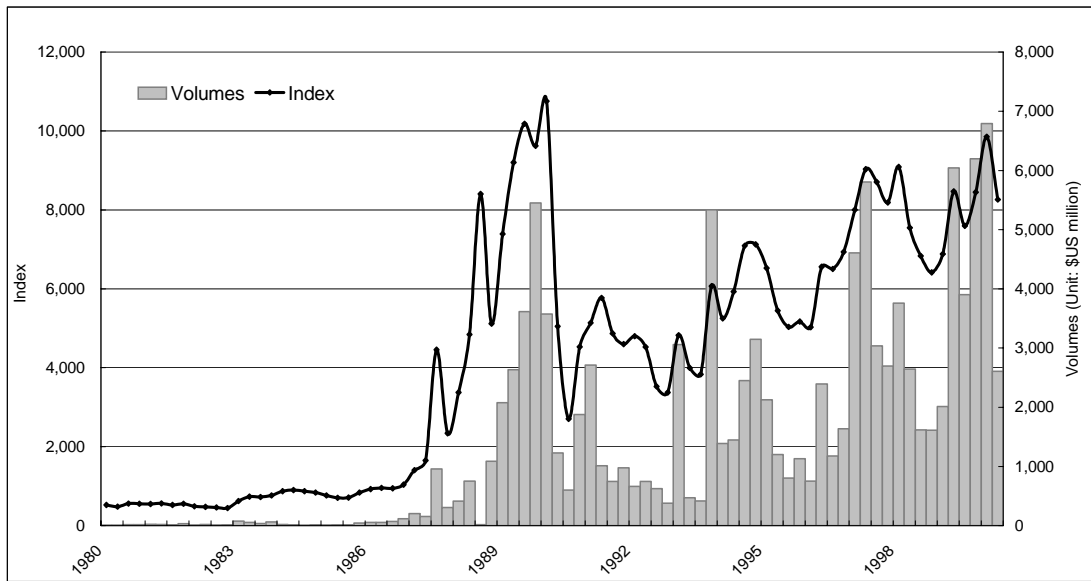


Figure 3. Taiwan stock market
(Source: Data are from the Taiwan Economic Journal Databank)

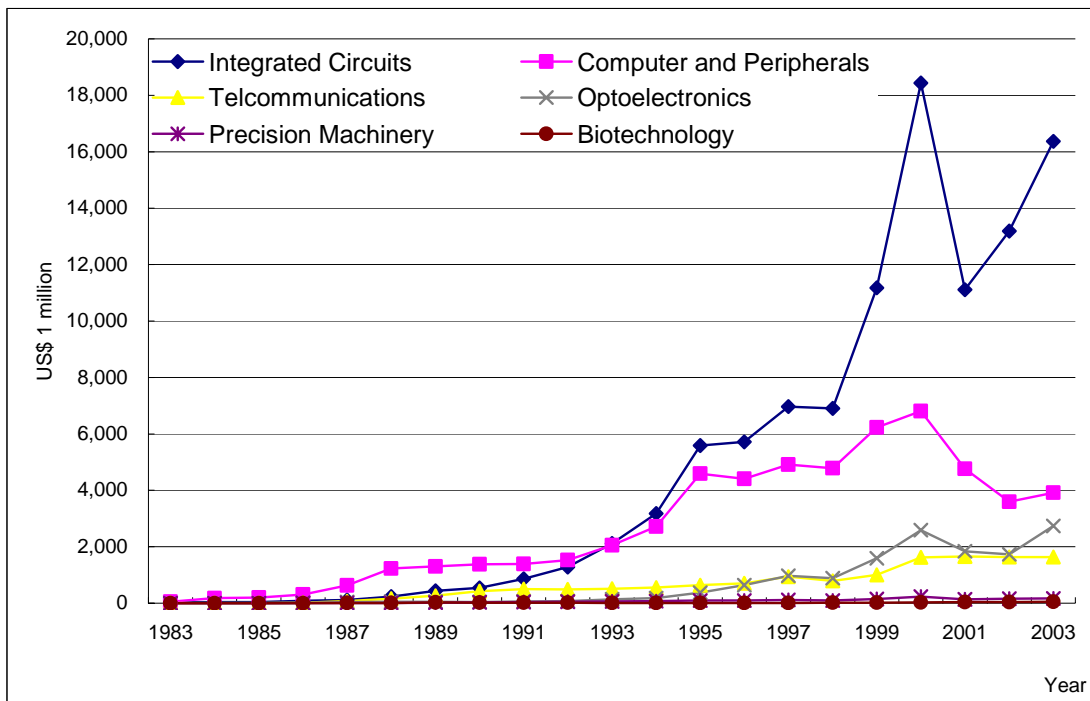


Figure 4. Yearly Production Value of Taiwan HSP (by sector)
 (Source: calculated from <http://www.sipa.gov.tw/1/in7/index-in7-1.htm>)

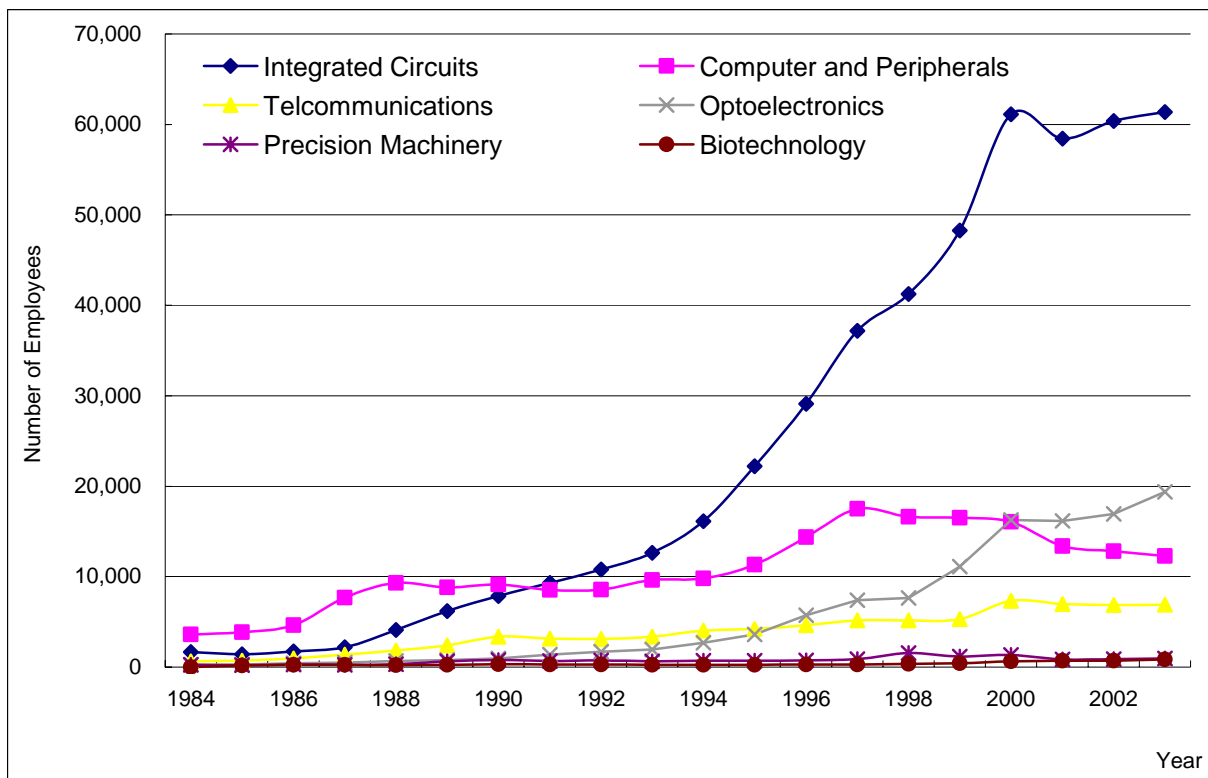


Figure 5. Number of Employees in Taiwan HSP (by sector)
 (Source: calculated from <http://www.sipa.gov.tw/1/in7/index-in7-1.htm>)