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Implications of Dual Status for Taiwan's Nonprofit Institutes for Economic Affairs: III's Dilemma in e-Industrialization

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This paper examines the unique role of nonprofit institutes for economic affairs (NIEAs, 經濟事務財團法人) in Taiwan's industrial transformation. The argument is that the conventional wisdom on public research institutes as state actors in industrial transformation will have to be revisited in order to better understand state intervention in Taiwan's industrialization. The dual status of the Institute for Information Industry (III, 資訊工業策進會) provides an excellent example of how an NIEA went through an institutional transformation to extricate itself from a political and economic impasse and justify state intervention in a more sophisticated way. Namely, on the one hand, NIEAs enjoy financial and politically privileged support from the state. On the other hand, the strategy of spinning off profitable units legitimizes their profit-making conduct without compromising their quasi-state nonprofit status. This paper argues that the operation of NIEAs may be controversial, but one should not ignore their unique institutional arrangement when studying Taiwan's industrial transformation.

KEYWORDS: **nonprofit institutes for economic affairs (NIEAs, 經濟事務財團法人,); Institute for Information Industry (III, 資訊工業策進會); e-Taiwan policy; public research institutes; quasi-state status.**

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From e-economy and e-democracy to e-society, there is a global trend toward "informationization," demonstrating that information technology will determine the direction of the next stage of industrialization. Thanks to the popular application of Internet technology in traditional industries, developing countries in this digital age have found a window of opportunity to catch up with developed economies by mastering information and communications technologies (ICT) through e-policy. The newly industrializing countries (NICs) of East Asia[1] are no exception. How developing states have adjusted to this global competition for e-readiness is a timely subject for further exploration.[2]

Over the past decades, social scientists and political economists have closely watched and debated the causal relationship between state intervention and economic performance in Taiwan's high-tech industries.[3] Before the 1980s, state intervention was demonized for its unproductive "rent-seek-

[1]On March 21, 1994, at the first development conference of the International Telecommunication Union, U.S. Vice President Al Gore called for efforts to construct a Global Information Infrastructure (GII), beginning from a National Information Infrastructure (NII). In August 1994, Taiwan's Executive Yuan (行政院) inaugurated its own "NII task force."

[2]According to the e-readiness index provided by McConnell International, five elements are used to evaluate e-readiness: connectivity, e-leadership of government and industries, information security, human capital, and e-business climate. The Economist Intelligence Unit (EIU) has defined the e-readiness of industry as an environment in which business opportunities are promoted through the Internet.

[3]Thomas B. Gold, *State and Society in the Taiwan Miracle* (Armonk, N.Y.: M.E. Sharpe, 1986); Robert Wade, *Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization* (Princeton, N.J.: Princeton University Press, 1990); Joel D. Aberbach, David Dollar, and Kenneth L. Sokoloffeds, *The Role of the State in Taiwan's Development* (Armonk, N.Y.: M.E. Sharpe, 1994); Sung Gul Hong, *The Political Economy of Industrial Policy in East Asia: The Semiconductor Industry in Taiwan and South Korea* (Northampton: Edward Elgar, 1997); Steve Chan, Cal Clark, and Danny Lam, eds., *Beyond the Developmental State: East Asia's Political Economies Reconsidered* (New York: St. Martin's, 1998); Stephan Haggard, "Business, Politics, and Policy in East and Southeast Asia," in *Behind East Asian Growth: The Political and Social Foundations of Prosperity*, ed. Henry S. Rowen (New York: Routledge, 1998), 78-104; Linda Weiss, *The Myth of the Powerless State* (Ithaca, N.Y.: Cornell University Press, 1998); and Hung-Hwei Liu, "The Effects of Taiwan's State-Industrial Arrangements on International Competitiveness: The Case of Notebook-Sized Computer and High-Definition Television Industry" (Ph.D. dissertation, University of Warwick, 1998).

ing" activities by scholars of comparative East Asian industrialization.[4] It was not until 1991, at the annual meeting of the World Bank/International Monetary Fund, that the managing director of the World Bank, Attila Karaosmanoglu, openly credited the governments of the Asian NICs for their positive contribution to rapid industrial growth.[5] Nowadays, how the state intervenes in industrial transformation has become the key question to be asked when examining the economic performance of NICs. For several decades, various institutional arrangements between the state and societal actors in these countries have been suggested as explanations for industrial transformation. Most prominently, Peter Evans has proposed "embedded autonomy," and Linda Weiss has raised the issue of "governed interdependence," as key concepts illustrating the political economy of high-tech industrial development.[6]

In their comparative analyses, both of these scholars have touched upon the relations between state agencies and private entrepreneurial groups in developing states.[7] In particular, Weiss mentioned the coordination capacity of Taiwan's Industrial Technology Research Institute (ITRI, 工業技術研究院) which used its para-public status in consolidating public and private capacity in ICT manufacturing in Taiwan during the last two decades of the twentieth century. However, scholars have rarely examined the quasi-state institutions themselves, such as ITRI or the government-sponsored nonprofit institutes for economic affairs (NIEAs, 經濟事務財團法人), that combine state and societal capacity to boost industrial transformation in Taiwan. In Weiss' analysis, ITRI is seen as the proxy of the state and its own institutional preferences are not mentioned. Put another way, these institutes are looked on as indispensable arms of the state in promoting industrialization. However, when private capacity develops to a certain extent, the NIEAs' ability to lead industrial transformation is ques-

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[4]Peter Evans, *Embedded Autonomy: States and Industrial Transformation* (Princeton, N.J.: Princeton University Press, 1995), 23.

[5]*Financial Times*, October 7, 1991.

[6]Evans, *Embedded Autonomy*, 10-11.

[7]Ibid., 13.

tioned. Briefly, the NIEAs need to adjust their institutional role in response to the various stages of industrial development and political transformation. This paper attempts to bridge this gap by examining the Institute for Information Industry (III, 資訊工業策進會) as a case in point to study the institutional role of NIEAs in Taiwan's "informationization."

Of the 138 nonprofit proprietary institutes[8] set up by the Taiwan government, the III and ITRI, funded by the Ministry of Economic Affairs (MOEA, 經濟部), are the two major para-public institutes that facilitate state intervention in ICT development. In Evans' words, they play the role of "demiurge," "midwifery," and "husbandry" in industrial transformation.[9] Apparently, the public perception of the III is not as favorable as that of ITRI in terms of IT manufacturing performance. While the Taiwan Semiconductor Manufacturing Company (TSMC, 台灣積體電路製造股份有限公司) and the United Microelectronics Corporation (UMC, 聯華電子公司), two spin-offs of ITRI, became showcases for Taiwan's IC manufacturing industry, III has been criticized for its incompetence in promoting indigenous development in the information and software industries.

However, in order to examine the development of an information economy in Taiwan, this paper will examine ITRI's lesser twin, the III, with special emphasis on its indispensable role in the government's e-Taiwan project. Institutionally speaking, the crucial role of the III is evident from its participation in committee meetings for the National Information and Communications Initiative Committee (NICI, 國家資訊通信發展推動小組), the core of the team implementing the e-Taiwan policy. The III is actually the key architect of the e-Taiwan policy for related state agencies.

This paper questions conventional wisdom on the state-proxy role of public research institutes in industrial transformation. In examining the institutional arrangements of state and society in the information age, the institutional linkage between the III and the government, as well as the III's capacity to coordinate the business community, draws our attention to

[8] *Shangye zhoukan* (Business Weekly), March 30, 2004.
[9] Evans, *Embedded Autonomy*, 13-14.

the quasi-state role of NIEAs in e-Taiwan development. This paper finds that the NIEAs' quasi-state status gives their governing agencies the technological know-how and financial flexibility to boost economic development. However, NIEAs need the capacity to transform themselves into organic entities that are capable of branching out institutionally through technology transfers or spin-offs.[10] In other words, even if public perception of their performance is unfavorable, due to their lack of transparency and profit-making behavior, NIEAs play an important role in sustaining the trajectory of Taiwan's industrial transformation.

NIEAs as Institutional Actors

In the United Kingdom, the government provides research grants, business loans, and various other forms of financial support for the private sector.[11] In the United States, federal government foundations, like the National Science Foundation, assist in the development of science, education, and the arts. In Japan, nonprofit special corporations (NSC, 特殊法人) were first set up during the Meiji period (1868-1912) to facilitate the government's absorption of private capital and non-bureaucratic talent in order to promote economic development.

In Taiwan, state-founded or -funded nonprofit institutes were first established during the Qing Dynasty (清朝) and the period of Japanese colonial occupation (1895-1945). Then, based on the Japanese NSC model, NIEAs were set up by the Ministry of Economic Affairs post-1945 to enhance state capacity in technology, economic development, and trade promotion.[12] Just like their counterparts in Japan, the major concern

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[10]A similar concept of a "fungus policy network" was applied in Hwei-luan Poong et al., "Networking Governance of e-Taiwan Policy," in *Rethinking the New International Order in East Asia: U.S., China, and Taiwan*, ed. I Yuan (Taipei: Institute of International Relations/Center for China Studies, National Chengchi University, 2005), 185-226.

[11]Rhona Walker, Lorraine McDonald, and Kevin Allen, *Government Funding for United Kingdom Business: A Complete Guide to Sources, Grants, and Application Procedures* (London: Kogan Page, 1993).

[12]*Caituan faren zhidu zhi tantao* (A study of nonprofit institutes for economic affairs), a

driving the institutional arrangements of NIEAs was administrative expediency, namely, to avoid the restrictions of civil service recruitment and budget constraints. However, administrative expediency may have produced negative results like the "revolving door" phenomenon or unfair competition with the private sector. Despite their management defects, NIEAs have remained indispensable throughout the decades of industrialization in Taiwan.

In addition, the importance of small and medium-sized enterprises (SMEs) in Taiwan's industrial structure has put NIEAs in a unique and indispensable position. The creation of certain NIEAs has coincided with different stages of state-led industrial transformation. For instance, the China Textile Institute (紡織產業綜合研究所) was founded in 1959 when Taiwan was implementing an import substitution policy in which the textile industry was a target. The Metal Industries Development Center (金屬工業發展中心) was set up in 1963 when Taiwan was moving to a heavy industry policy, while the founding of ITRI marked Taiwan's progression to high-tech industrial development.

According to the Ministry of Economic Affairs, which is the main source of funding for NIEAs, the main task of these institutes is to support SMEs, which account for 98 percent of Taiwan's enterprises. Over the years, guided by the ministry and its NIEAs, SMEs came to be regarded as indispensable participants of Taiwan's economic miracle in the 1970s and 1980s. Nonetheless, having lost their competitive advantage in low-end manufacturing to neighboring developing countries, Taiwan's SMEs have had no choice but to opt for industrial innovation. Thanks to a well-developed cluster of key IT components manufacturers, a state-led or coordinated (through NIEAs) industrial alliance has evolved to implement the e-Taiwan policy.

To encourage the SMEs to adopt information technologies, public research institutes or NIEAs were assigned a "demiurge role" by state

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research project coordinated by Yang Chung-sen (Taipei: Research, Development, and Evaluation Commission, Executive Yuan, 1980), 145-54.

Table 1
Nonprofit Institutes for Economic Affairs Funded by MOEA

Governing Agency in MOEA	Nonprofit Institutes for Economic Affairs
Industrial Development Bureau	China Productivity Center (中國生產力中心) CTCI Foundation (China Technical Consultants, Inc.) (中技社) Sino-tech Engineering Consultants, Inc. (中興工程顧問社) Taiwan Electrical and Mechanical Engineering Service (台灣機電工程服務社) Taiwan Electric Testing Center (台灣大電力研究試驗中心) ROC Society for Nondestructive Testing (中華民國非破壞檢驗協會) Corporate Synergy Development Center (中衛發展中心) Taiwan Bicycle Industry R&D Center (自行車暨健康科技工業研發中心) Taiwan Footwear Research Institute (鞋類暨運動休閒科技研發中心) Pharmaceutical Industry Technology and Development Center (醫藥工業技術發展中心) Printing Technology Research Institute (印刷工業技術研究中心) Precision Instrument Development Center (精密機械發展研究中心) Stone Industries Development Center (石材工業發展中心) Plastics Industry Development Center (塑膠工業技術發展中心)
Bureau of Foreign Trade	China External Trade Development Council (外貿協會) Taiwan Grains and Feeds Development Foundation (台灣區雜糧發展基金會) Taiwan Textile Federation (台灣紡織業拓展會)
Bureau of Energy	Shin Jan Research Institute of Fuel and Gas (欣然氣體燃料事業研究社)
Bureau of Standards, Metrology, and Inspection	Electronics Testing Center (台灣電子檢驗中心)
State-owned Enterprise Commission	Foundation of the Taiwan Sugar Association (台灣糖業協會基金會)*
Small and Medium Enterprise Administration	Taiwan Handicraft Promotion Center (台灣手工藝推展中心) SME Mutual Guaranty Foundation (中小企業互助保證基金會)
Department of Industrial Technology	China Textile Institute (紡織產業綜合研究所) Metal Industries Development Center (金屬工業發展中心) Food Industry Research and Development Institute (食品工業發展研究所) Industrial Technology Research Institute (工業技術研究院) United Ship Design & Development Center (聯合船舶設計發展中心) Institute for Information Industry (資訊工業策進會) Automotive Research & Testing Center (車輛研究測試中心) Development Center for Biotechnology (生物技術開發中心)
Information System Center	China Data Processing Center (中華電腦中心)
Research and Development Committee	Chung Hua Institution for Economic Research (中華經濟研究院)
Department of Commerce	China Joint Credit Information Center (中華聯合徵信中心)

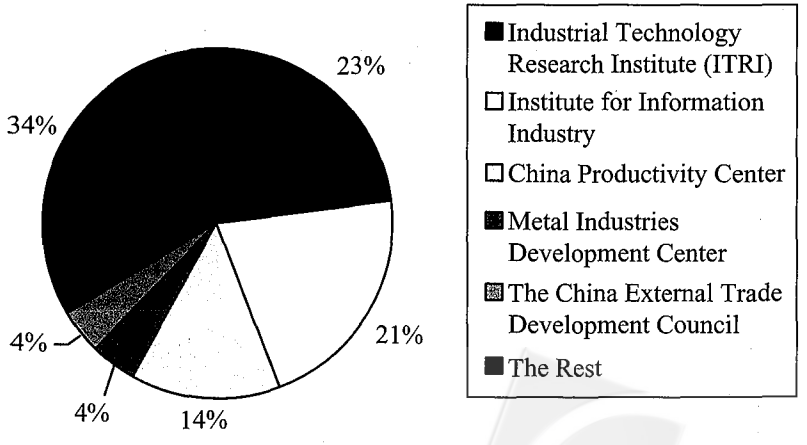
Source: http://www.moea.gov.tw/~meco/doc/ndoc/pub_p02_p08.doc.

*This Foundation was renamed the Taiwan Takechi Memorial Foundation (台灣武智紀念基金會) in 2005.

agencies in enhancing state-business collaboration for e-readiness. Ever since 1979, the MOEA has had a budget to commission industrial technology research and development (R&D) projects from research institutions. The Industrial Development Bureau (IDB, 經濟部工業局) and the Department of Industrial Technology (DoIT, 經濟部技術處) are two of the main agencies governing the 138 NIEAs under the MOEA (see table 1). DoIT supervises the R&D carried out under the various categories of the Technology Development Program (TDP, 科技研究發展專案計畫).

Through its support for the TDPs, DoIT has encouraged Taiwan's research institutions to work together to develop important cutting-edge technologies and applications. There are three categories of TDP—the corporate TDP, the industrial TDP, and the academic TDP—through which research institutes, private firms, and academics can apply for funding for their respective projects. The III and ITRI are two leading NIEAs commissioned by the state to promote Taiwan's IT industry through the corporate TDP (see fig. 1). It was only in 1997, when the industrial TDP was implemented, that private enterprises were encouraged to take part in technological innovation and applied research.

Figure 1
Top 5 Government Special Project Winners in 2002



Source: http://www.moeaidb.gov.tw/idy/method/casereport/91/Webs/new_page_8.htm#.

As the major source of funding, governing agencies usually have the final say in policy planning and top-level personnel appointments in NIEAs. NIEA annual budgets come from three major sources: interest on seed capital, government project funding, and income from services to the private sector (for instance, training programs for software technicians, market information sharing among member enterprises, etc.). Of these, government project funding accounts for the major share. Therefore, since the MOEA is their major source of funding, NIEAs have usually served as para-public channels of state intervention in Taiwan's industrial transformation.

In order to meet certain requirements as state-owned or partially state-owned entities, NIEAs need to follow certain administrative guidelines. According to Articles 11 and 12 of the "NIEA Set-up Procedure and Supervision Guidance" (經濟事務財團法人設立許可監督準則),[13] each NIEA is obliged to submit its financial statements, plans of operation, and investment projects to its governing agency in the MOEA. Article 14 states that all NIEAs have to abide by the principle of investment and apply to their governing agencies for approval of their investment plans. The III is no exception to this. All its major investment plans have to be scrutinized by the MOEA.

Politico-economic Setting for Institutional Transformation

Thanks to the out-sourcing strategy of leading transnational firms, there is a global division of labor in the East Asian IT industry. Among the East Asian NICs, South Korea and Taiwan are regarded as institutional forerunners and exemplars in IT industrial development.[14] The well-known story of Taiwan's semiconductor manufacturing, as well as

[13]The NIEA Set-up Procedure and Supervision Guidance was first adopted in 1975 and amended in 1989, 1997, 1998, and 2003. http://www.moea.gov.tw/~meco/doa/org-1.htm.

[14]Cal Clark, *Taiwan's Development: Implications for Contending Political Economy Paradigms* (Westport, Conn.: Greenwood, 1989).

the fabless-foundry business model, has been widely studied by scholars and government officials. In these studies, the institutional arrangements of state actors and the private sector (or government-industry relations) have been recognized as crucial to IT development in Taiwan.[15] ITRI, or more specifically one of its departments, the Electronics Research and Service Organization (ERSO, 電子工業研究所), was set up in the mid-1970s as one of the para-public institutions actively involved with IT development.[16] Despite the fact that its role in the IC industry is regarded as a mixed blessing, ITRI is still acknowledged as the engine of innovation for Taiwan's IT development over the past three decades.[17]

Over the years, ITRI's achievements in IT development have been so highly regarded that whoever in power were forced to sustain this legacy. However, at the turn of the millennium, due to China's rising competitive advantage in the global division of labor and the substitution effect of China's IT manufacturing capacity, Taiwan's IT industry reached a critical point where the interests of the industry conflicted with the government's political interests. This conflict of interest was aggravated after the change of government in 2000.

When the Democratic Progressive Party (DPP, 民主進步黨) assumed office in 2000, the immediate challenge for President Chen Shui-bian (陳水扁) was to equal or outperform the achievements of the Kuomintang (KMT, 國民黨) in leading Taiwan's IT industrial development. However, during the decades of KMT authoritarian rule, party membership was a prerequisite for positions in the national bureaucracy. Many recipients of KMT overseas scholarships were recruited upon their return into an IT industry "dream team" led by Li Kwoh-ting (李國鼎). In addition, most of

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[15]Denis Fred Simon, "Taiwan's Emerging Technological Trajectory: Creating New Form of Competitive Advantage," in *Taiwan: Beyond the Economic Miracle*, ed. Denis Fred Simon and Michael Y.M. Kau (New York: East Gate, 1992), 123-50; and Sung Gul Hong, "Do Institutions Matter? A Case of Taiwan's Semiconductor Industry," *Issues & Studies* 31, no. 11 (November 1995): 16-39.

[16]Weiss, *The Myth of the Powerless State*, 51.

[17]Hong Yi-yan, *Chuangxin yinqing: Gongyanyuan, Taiwan chanye chenggong de tuishou* (ITRI: the innovation engine for Taiwan's industry) (Taipei: Commonwealth Books, 2003).

the top-level technocrats in the cabinet identified themselves as supporters of the KMT. In an effort to sustain the performance of Taiwan's IT industry, Chen Shui-bian compromised in appointing Tsay Ching-yen (蔡清彦), a KMT member and a former deputy director of the National Science Council (國科會), as minister of state without portfolio (政務委員) with the task of orchestrating the e-Taiwan policy.

Tsay's appointment was a sign of the DPP's lack of technocrats. Tsay did not last long in post, however, and on May 20, 2004, he was replaced by Lin Feng-ching (林逢慶), who held the concurrent post of chairman of the III. Lin, a former president of the pro-DPP Taiwan Association of University Professors, was a more "politically correct" scholar who had served in Chen's cabinet when the latter was mayor of Taipei (1994-98).

Politics aside, institutionally speaking the III still retains its preeminent role in policy planning through its chairman's position as a minister of state. This close relationship with government has existed ever since the III's inception in 1979 (see table 2). Tsay's appointment as chairman of the III in 2000, in replacement for Yang Shih-chien (楊世緘), was an important indication of the new government's intention to break up the KMT's longstanding techno-policy network or "state-technologist

Table 2
Political Connections of III, 1979~2004

Ruling Party / Personnel Reshuffle	KMT Administration	DPP Administration
Technological Minister of State	Li Kwoh-ting (李國鼎, 1980-89) Wang Chao-ming (王昭明, 1990-96) Yang Shih-chien (楊世緘, 1996-2000)	Tsay Ching-yen (蔡清彦, 2000-04) Lin Feng-ching (林逢慶, 2004-)
Chairman of III	Li Kwoh-ting (1979-82) Wang Chao-ming (1982-2000)	Huang Ho-ming (黃河明, 2000-03) Lin Feng-ching (2003-)
President of III	Fang Hsien-chi (方賢齊, 1979-82) Kuo Yun (果芸, 1981-84, 1991-2000) Ho Yi-tser (何宜慈, 1984-91)	Lin Feng-ching (2000-03) Ke Jih-sheng (柯志昇, 2003-)

nexus"[18] and substitute a politically more like-minded one. Kuo Yun (果芸), who had been chief executive officer of the III for over a decade, was replaced by Lin Feng-ching. Lin was then promoted to be chairman of the III and, following established tradition, concurrently a minister of state. Thus no matter how controversial Lin's political appointment might have been, the institutional legacy of the III has provided a convenient cradle for nurturing the DPP's own team of technocrats.

Launching of the e-Taiwan Policy

In its 2003 declaration of principle, the World Summit of the Information Society declared the "information society" to be a global challenge for the new millennium.[19] Three organizations—IDC/World Times, McConnell, and EIU/Pyramid Research—publish comparative reports. Although these surveys employ different categorization methods, all emphasize active support from governments and well-balanced development in all areas of society. In the EIU/Pyramid Research reports, the evaluation of e-readiness is based on six main aspects: connectivity, business environment, consumer and business adoption of e-commerce, legal and regulatory environment, supporting e-services, and social and cultural infrastructure. A country's e-readiness grade shows whether it is capable of grasping the business opportunities created by the Internet.

From a statist perspective, a state's capacity to achieve e-readiness will meet new challenges in the information age. For instance, to improve connectivity, states need to provide adequate telecommunications and Internet infrastructures through liberalization and deregulation. To create a business-friendly climate, a transparent and accountable policy environment is necessary. To encourage the adoption of e-commerce among

[18]Chen-Dong Tso, "State-Technologist Nexus in Taiwan's High-Tech Policymaking: Semiconductor and Wireless Communications Industries," *Journal of East Asian Studies* 4, no. 2 (May-August 2004): 301-8.

[19]http://www.itu.int/dms_pub/itu-s/md/03/wsis/doc/S03-WSIS-DOC-0004!! MSW-E.doc.

businesses and consumers, policy incentives and education are required, while a state needs high quality bureaucrats in policy planning and implementation in order to create the necessary legal and regulatory environment. Also important is a supporting e-service network and social and cultural infrastructure, and these require states and businesses to coordinate public and private resources.

A state's capacity to achieve e-readiness may not reflect its economic power, as can be seen from the e-readiness ranking of the United States which lags behind small and medium-sized powers (see table 3). However, e-readiness has much to do with institutional construction and coordination. In the case of Taiwan, in March 2001, the Executive Yuan decided to set up a National Information and Communications Initiative Committee (NICI) by merging the National Information Infrastructure (NII) Steering Committee (行政院資訊發展推動小組), the Government IT Promotion Committee (行政院產業自動化小組), and the iAeB (industry Automation and e-Business) Steering Committee (產業電子化推動小組). The NICI was charged with the task of accelerating the development of the IT industry, e-commerce, and related business; to improve the efficiency of government services; to promote Internet and related applications usage; and to boost the competitiveness of Taiwan's IT industry.[20]

Tsay Ching-yen was the deputy convener and initiator of the NICI, and he worked with the chief officers of other government agencies, leading academic and research institutions, top enterprises, and civil organizations to formulate the "e-Taiwan project," aimed at getting Taiwan ready to cope with rising global competition in the information era. In June 2002, the "e-Taiwan project," at Tsay's initiative, was formally repackaged by the Executive Yuan with nine other plans to form "Challenge 2008: The Six-Year National Development Plan." Thereafter, the e-Taiwan project was no longer a one-man show for Tsay. Both Tsay and the project had to share resources with other sub-projects within the National Development Plan.

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[20]http://www.nici.nat.gov.tw/content/application/nici/introduction/index.php? selname=Introduction.

Table 3
Economist Intelligence Unit e-Readiness Rankings, 2004*

2004 e-readiness ranking (of 64)	2003 e-readiness ranking	Country	2004 e-readiness score (of 10)	2003 score
1	2	Denmark	8.28	8.45
2	3 (tie)	UK	8.27	8.43
3	1	Sweden	8.25	8.67
4	7	Norway	8.11	8.28
5	6	Finland	8.08	8.38
6	3 (tie)	USA	8.04	8.43
7	12	Singapore	8.02	8.18
8	3 (tie)	Netherlands	8.00	8.43
9	10 (tie)	Hong Kong	7.97	8.20
10	8	Switzerland	7.96	8.26
11	10 (tie)	Canada	7.92	8.20
12	9	Australia	7.88	8.25
13	13	Germany	7.83	8.15
14	14	South Korea	7.73	7.80
15	16	Austria	7.68	8.09
16	15	Ireland	7.44	7.81
17	17 (tie)	Belgium	7.41	7.78
18	19	France	7.34	7.76
19	18 (tie)	New Zealand	7.33	7.78
20	20	Taiwan	7.32	7.41

*According to EIU, criteria for measuring e-readiness are refined on a periodic basis. In 2004, broadband penetration was added as a new criterion. Since broadband rates are still very low just about everywhere, the addition of broadband to the equation has effectively pushed down countries' overall scores. http://graphics.eiu.com/files/ad_pdfs/ERR2004.pdf.

Source: Economist Intelligence Unit, *The 2004 e-Readiness Rankings: A White Paper from the Economist Intelligence Unit*, http://graphics.eiu.com/files/ad_pdfs/ERR2004.pdf.

Unlike the development of the semiconductor industry in the late twentieth century that focused on manufacturing, the e-Taiwan project is mainly a knowledge-based and service-oriented development plan.[21] According to the e-Taiwan office, it consists of five integral parts: "6 million broadband users," "e-society," "e-business," "e-government," and "e-trans-

[21]http://www.etaiwan.nat.gov.tw/content/application/etaiwan/vision/index.php.

portation." Of these, e-business, for example, not only has an impact on manufacturers' business models, but also has a significant influence on industrial competitiveness for SMEs in Taiwan.[22] Take IC manufacturing, for example. The vertical integration model of the IC industry has been translated into e-business in the form of "supply chain management," which turns out to be another competitive niche for Taiwan in the service sector.[23]

III and ITRI: A Comparison

Both the III and ITRI were founded by Li Kwoh-ting, the godfather of Taiwan's technological development, and both institutes are partially or fully funded by the state in order to enhance the state's capacity to pursue its industrial promotion policy (see table 4). However, up to now, the III has not attracted the same degree of admiration as ITRI has for its contribution to Taiwan's industrial transformation, and it is unlikely to do so until the information industry bears fruit thanks to widespread Internet usage.

In contrast to ITRI's role in strengthening the manufacturing capacity of private industry, the purpose of the III has always been to increase industrial productivity through the promotion of the information industry and its applications,[24] That is why the III was chosen to provide administrative assistance to the NICI in implementing the e-Taiwan policy.[25]

Quasi-state Status of III

Before the III was set up, Li Kwoh-ting sent Yang Shih-chien, a young technocrat with an electronics and engineering background who

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[22] *2001 Electronic Business White Paper in Taiwan*, by NICI Program Office, Executive Yuan.

[23] Ibid.

[24] Ibid.

[25] Ibid.

Table 4
Comparison between ITRI and III

	ITRI	III
Year of inception	1973	1979
Founding father	Li Kwoh-ting	Li Kwoh-ting
Government funding	NT$700 million	NT$75 million
Private funding	None	NT$79 million
Major revenue income	TDP	TDP
Governing agency	Department of Industrial Technology, MOEA	Department of Industrial Technology, MOEA
Role in e-Taiwan policy	Member of NICI Committee	Member of NICI Committee; personnel and administrative support for e-Taiwan Office

Sources: ITRI and III websites.

had just joined the Council for Economic Planning and Development (CEPD, 經濟建設委員會), on a visit to Japan's Information Processing Development Center. It was on the basis of Yang's proposals after this visit that the Institute for Information Industry was founded in 1979.[26] Learning from earlier experience with ITRI, Premier Sun Yun-hsuan (孫運璿) gave the III private status, so that it could enjoy more autonomy than its twin brother.[27] However, Li Kwoh-ting insisted on government funding to back up private donations. As a compromise, the III received seed funding of NT$75 million from the Ministry of Economic Affairs and NT$79 million from private enterprises.

[26]In 1979, due to policy differences with President Chiang Ching-kuo (蔣經國), Li Kwoh-ting was transferred from the Ministry of Finance to be minister without portfolio, heading a research and development task force on the application of information technology. The administrative engagement in the information industry was thus initiated.

[27]Hong Chen-yu, *Zixun meng gongchang: Zicehui — shuwei Taiwan tuishou* (Information dream house: III — engine for e-Taiwan), (Taipei: Commonwealth Publishing Company, 2004), 43.

Notwithstanding the fact that more than half (51.2 percent)[28] of its seed funding came from the private sector, the III has acted as a private NIEA with public functions. For example, the III acts as a government think-tank (its chairman is the science and technology advisor to the premier and the president) and its senior executives are members of various government task forces. The III also runs offices for the government such as the NICI office, the e-Taiwan project office, and the Industrial Science and Technology Research and Development Project (part of a TDP). The III also provides research and drafting services for government bills through its Market Intelligence Center (資訊市場情報中心) and Science and Technology Law Center (科技法律中心). Basically, since its inception, the mission of the III has been to enhance Taiwan's global competitiveness through the development of its information technology infrastructure and industry.[29] However, in 2001, the III board of directors changed its mission statement for the first time, emphasizing innovation and the application of information technology.[30]

In retrospect, the III's role in leading the software industry is controversial. Where technology transfers or division spin-offs are concerned, the III lags behind big international enterprises in setting up its own software R&D center and leading software development. The III has gradually lost its prerogative to these enterprises. Consequently, it has revised its policy targets to that of initiating joint development projects between leading international ICT companies and domestic firms, and encouraging these leading companies to set up local R&D centers. Although brokering initiatives of this kind have served the market's need for timely and efficient access to new technology, the III's long-term goal of promoting the domestic software industry was doomed to dwindle into insignificance.

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[28]Government funding was increased to NT$75 million in 1980 as a result of Li Kwoh-ting's personal dedication and perseverance in winning legislative support. Cited in Hong, *Zixun meng gongchang*, 68.

[29]Website of III, http://www.iii.org.tw/english/.

[30]*iThome*, October 24, 2001, http://www.homing.idv.tw/Article.php? TypeID=0&ArtID=65.

Notwithstanding its inhibiting role in the development of the Taiwanese software industry,[31] the III continued to benefit from state funding for R&D and innovation. For instance, in 2001, the III was granted more than 60 percent of all key government TDPs in the information sector.[32] In addition, the III was also awarded the five-year Application Development Program for Exemplary Information and a four-year Program for Research, Analysis, Promotion, and Management of Science and Technology Systems in the Industrial/Academic Field. These latter two projects accounted for more than 57 percent of projects commissioned in 2001.[33]

In essence, the III is a quasi-state institute for the following reasons. First, the MOEA is its biggest single source of funding. Second, according to its accounts for 1998-2001, government TDP funding accounts for more than half of the III's revenue income (see table 5). Apart from receiving government project funding, the III also hosts the administrative office of the e-Taiwan project under the NICI and gives it administrative and logistic support. From an institutional perspective, the informal networking that takes place between the III and the e-Taiwan project office has given the former an advantage in applying for government project funding.

Partisan Appointments in the III

The III enjoyed close relations with the state from its inception in 1979 to right up to 2000, as its successive chairmen, Li Kwoh-ting and Wang Chao-ming (王昭明), both served concurrently in the Executive

[31]Dan Breznitz, "Innovation and the Limits of State Power: Integrated Circuit Design and Software in Taiwan," in *Global Taiwan: Building Competitive Strengths in a New International Economy*, ed. Suzanne Berger and Richard K. Lester (Armonk, N.Y.: M.E. Sharpe, 2005), 223.

[32]The projects include the National Information and Communication Security Technology Service Program, a five-year Development Program for Key Technologies of Communication Software, Development Program for New Information Household Appliance Systems, and a four-year Development Program for Leading Edge Internet Application Technologies.

[33]"Explanations of the Policy on 'Encouragement of Industrial Innovation and Research and Development'" (Implementation of resolutions adopted at the Economic Development Conference, jointly issued by the Council for Economic Planning and Development, National Science Council, and Ministry of Economic Affairs, November 29, 2001).

Table 5
III Income Statement and Ratio of Revenue Source, 1998-2001

Amount: NT$ Million

		1998		1999		2000*		2001	
		Amount	%	Amount	%	Amount	%	Amount	%
Revenue	Private sector service income	16.80	43.34	13.52	37.17	23.10	38.48	13.97	37.70
	TDP income	17.96	57.66	22.87	62.83	36.94	61.52	23.09	62.30
	Total	34.76	100.00	36.39	100.00	60.04	100.00	37.06	100.00
Operating expense		34.27	98.57	35.13	96.54	58.52	97.47	36.85	99.43
Operation income/loss		0.49	1.43	1.26	3.46	1.51	2.53	0.21	0.57

Note: The end of the fiscal year changed from June 30 in 1999 to December 31 in 2000.
Source: Department of Industrial Technology, Ministry of Economic Affairs.

Yuan as ministers of state. When President Chen Shui-bian took office in 2000, he appointed a KMT member, Tang Fei (唐飛), to serve as premier as the result of a political compromise. Tang wanted to follow tradition by appointing a KMT minister of state, Tsay Ching-yen, as chairman of the III, but his decision was overridden by President Chen who appointed Huang Ho-ming (黃河明), the former CEO of Hewlett Packard Taiwan, as the III's first non-government chairman. Meanwhile, Lin Feng-ching was named chief executive officer.[34]

Huang's appointment was revolutionary, and it temporarily stifled public calls for the restructuring of the III. In addition, the III relinquished some profitable business opportunities to the private sector as a gesture of good will from the government. For instance, the annual exposition for the information industry, known as "Information Month" (資訊月), had been initiated by the III purely as a public service to local contractors. However, the income from registration fees from participants had, with

[34] *Caixun yuekan* (財訊月刊, Wealth Monthly), no. 232 (July 2001), http://monthly.wealth.com.tw/232/23272.htm.

the rapid growth of the PC market, made Information Month a lucrative activity for its organizer. It was in order to acquire the opportunity to host such a lucrative exposition that representatives of the Taipei Computer Association (TCA) strongly questioned the performance of the III when called upon by President Chen to express their concerns about ICT development.[35] As a result, in December 2001, for the first time in twenty years, Information Month was hosted by the TCA, a private-sector organization.[36]

Given the atmosphere of reform within the III under DPP rule, it was not long (2003) before Lin Feng-ching replaced Huang Ho-ming as chairman. Only one year later, institutional tradition was reestablished when Lin was given the concurrent post of minister of state. Thereafter, Tsay Ching-yen was formally replaced by Lin as key coordinator of the NICI and architect of the ongoing e-Taiwan policy.

Business Autonomy, Spin-offs, and the Networking Effect

The change of government did not alter the reality that the III is highly dependent on government project funding for its daily operation. In 2000, 61.52 percent of the III's income came from government special projects compared to 38.38 percent from services to the private sector, while in 2001 those proportions were 62.30 percent and 37.7 percent respectively (see table 5). Since the III's government funding comes from budgets reviewed annually by the Legislative Yuan (立法院), its income tends to shrink when the political climate does not favor state funding of technology development. This is especially true when politicians are competing for subsidies and social welfare funds for their constituencies. The experience of the struggles over ITRI's budget in the early 1990s taught the III the lesson that it should aim for business autonomy.

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[35]http://taiwan.cnet.com/news/hardware/0,2000064553,11010018,00.htm.

[36]*Zhongguo shibao* (中國時報, China Times), December 2, 2001.

The practical need to reduce revenue income uncertainty has encouraged NIEAs like the III to undertake profit-oriented business operations. Among other solutions, technology dissemination through spin-offs has turned out to be a popular alternative for NIEAs. An NIEA spin-off company is a commercial entity that derives a significant portion of its commercial activities from the application or use of a technology and/or know-how developed by a government-funded research program. The new enterprise is created either (1) to license an invention created as part of a government project, (2) to generate revenue income for the NIEA, or (3) to provide a service using project-derived expertise. Especially in the case of TDP, research institutes spin off profitable divisions in exchange for equity share in the resulting companies or royalties for technology transfers.[37]

There are conflicts of preference between NIEAs and the state when it comes to business operations. This is especially true in the case of business with mainland China. According to Article 4 of the "Regulations Governing Permission for Commercial Activities in Mainland China" (在大陸地區從事商業行爲許可辦法), applications to establish representitive offices in mainland China must submit to examination by the competent authority on the basis of national security and economic development.

Two archetypal cases occurred in the 1990s when the III's business autonomy came into conflict with the ban on government-funded business projects being conducted in mainland China. To circumvent this ban, two government-funded projects—Seednet and the e-ToYou Group—were spun off, and they serve to demonstrate the preference contradiction between NIEAs and the state.

Seednet[38]

SEED (Software Engineering Environment Development, 1988-92)—a TDP project conducted by the III (hereafter, SEED/III)—was commis-

[37]Telephone interview with Victor Y.L. Lu, General Director, Science & Technology Law Center, Institute for Information Industry on March 25, 2005.

[38]Website of Seednet: http://www.digitalunited.com/ea3.htm.

sioned in 1990 to kick off Taiwan's Internet-related R&D programs. However, SEED project funding covered only the initial stage of the Internet service project up to the end of 1991. After that date, the III should have concluded the project and transferred the technology to the private sector so that services to existing subscribers could continue. However, according to the project leader Cheng Chia-chun (程嘉君), the market was not mature enough to recognize the potential of the Internet service sector. Even the state-owned Chung-hwa Telecom Co. (中華電信), that was running TANet exclusively for the academic sector, did not foresee the future trend of the ISP market until 1994 when it began to be lucrative.[39] As the only Internet service provider, SEED/III chose to stay in business to provide a service to its customers without funding from the MOEA, and in 1995 the SEED project team was transformed into a business division within the III.

The reorganization of SEED/III did not provide the project with much autonomy. From the mid-1990s, lower production costs and access to a large potential market prompted a large number of Taiwanese enterprises to set up branches in mainland China. SEED/III then recognized that cross-Strait interaction and communications would provide a lucrative market for an ISP which it could not afford to be excluded from, not to mention the fact that it had to continue its services to long-term subscribers who were expanding their business operations in this area. However, the MOEA, the III's governing agency, could not endorse the III doing business in China. In June 1998, Digital United, Inc. (also known by its brand name "Seednet") was spun off from the III and in its new non-state capacity, quickly set up branches in Shenzhen (深圳) and Shanghai (上海) to offer Internet services across the Strait, including telecommunications, VPN services, and other enhanced services within China.

Despite its nominally private status, Seednet continued to benefit from its close links with the III and its governing agency. For instance, the president of Seednet, Yang Shih-chien, happened to be a former head of the Industrial Development Bureau (1986-96), as well as a former minister

[39]Hong, *Zixun meng gongchang*, 129.

of state (1996-2000). Being the pioneer ISP in Taiwan has given Seednet a privileged position in bidding for government projects, including the "e-Government Portal Site" project, under which Seednet set up an Internet network among 1,500 government organizations beginning in March 2002.

According to its mission statement, the III was set up to promote technology and industrial development. Since new applications are not always lucrative in their early stages, the "demiurge role" of the state, in Peter Evans' typology,[40] is necessary to create a potential market which the private sector can join eventually. SEED/III served the purpose of starting up the ISP market and Seednet, the spin-off, was the company that reaped the rewards from this market. Under this kind of institutional arrangement, the private sector is usually at a disadvantage in competing with NIEAs and their spin-offs.

e-ToYou Group

e-ToYou, another example of a spin-off, started out as a Financial Business Group of the III (hereafter, FBG/III). It initially focused on banking automation systems, beginning with Taiwan's first Online Transaction Processing (OLTP, 線上交易處理系統) project in 1981 for the First Commercial Bank. In view of the limited scale of the banking market in Taiwan, FBG/III began to explore business opportunities elsewhere. In the late 1990s, the opening of China's national banking and postal automation plan to international competition attracted some big enterprises, including FBG/III. To avoid unnecessary delay, FBG/III allied with international business partners, without informing the MOEA, and was successful in bidding for Chinese postal and banking software engineering projects in 1994. By setting up a Green Card system for Chinese postal savings, as well as remittance and financial IT services for the Bank of China, the Agricultural Bank of China, and other commercial banks, FBG/III rapidly expanded its business to thirteen or more cities in China.[41]

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[40]Evans, *Embedded Autonomy*, 13-14.

[41]Hong, *Zixun meng gongchang*, 129.

Although this cross-Strait business cooperation was conducted through an international joint venture, FBG/III was warned by the MOEA that its activities in China might breach the government's cross-Strait economic and trade policy.[42] To enhance its business autonomy, FBG/III decided to spin off in 1998 and was renamed e-ToYou International Inc. Under its new identity, e-ToYou quickly established subsidiaries in Beijing, Shanghai, and Nanjing (南京), and a technology research center in Wuhan (武漢).[43]

The management team of e-ToYou, including the general manager, the chief advisor, and members of the China Business Group, were all transferred from FBG/III. Meanwhile, e-ToYou had formed a strategic alliance with one of its shareholders, Taiwan's largest systems integration company, the RPTI Group,[44] giving itself the leading position in systems integration in finance, government, healthcare, and manufacturing. The extended personal network between this alliance and the III has given e-ToYou and RPTI a privileged status in competing for government-funded projects.

In sum, NIEAs in Taiwan have usually acted as proxies of the state in the initial stage of industrial transformation. However, when an industry is mature enough to compete in the market, the government-funded projects themselves turn out to be the most competitive actors. In order to evade conflicts of interest between its public and private roles, III has chosen to explore opportunities in mainland China by spinning off business projects. The two cases above demonstrate that the spin-off policy can allow NIEAs to sidestep barriers to market competition. Through shareholding and informal institutional linkages, NIEAs retain and legitimize their quasi-state status as public goods providers rather than as competitors.

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[42] Ibid., 136.

[43] Ibid.

[44] Established in 1975, RPTI International Ltd. (榮電國際股份有限公司) consists of three major business groups, which are Electrical Mechanical & Utility Business Group, Power System Construction Business Group, and I.T. Business Group. http://www.rpti3.com.tw/main-e.asp.

Enhanced Autonomy of NIEAs Due to Dual Status

According to the foregoing analysis, the very success of the III as a "demiurge" would threaten the enduring legitimacy of the demiurge role itself. To some extent, its quasi-state status has turned out to be a double-edged institutional arrangement. NIEAs give up their autonomy in exchange for favoritism in bidding for government projects which leads to a conflict of preferences between their private and public capacities. Take the e-Taiwan policy, for example. The III, in its public capacity, was delegated by the MOEA to draft a pilot project for the policy and provide administrative support for the NICI. This in turn enhanced the III's chances of acquiring the government-funded project.[45]

On the other hand, it is also true that Okimoto's industrial life cycle concept applies to NIEAs.[46] SEED/III was, until the advent of Hinet, the only ISP in Taiwan. However, due to insufficient information and the locking effect of the ISP industry, the private sector was slow in catching up with the emerging market. However, when a market is mature enough for private actors to join it, NIEAs have always been accused of unfair competition with the private sector. Its public capacity as an NIEA led to public criticism of the III for engaging in unfair competition with the underprivileged private sector.

Another case in point is the competition for ICT professionals between the III and private enterprises. Over the years, the NIEAs and other public institutions benefited from the exclusive recruitment policy of the Defense Industry Reserve Duty (國防預備役) system established in 1980. This stable source (for the four-year term of their reserve duty) of top-quality professionals with masters and doctoral degrees has been a crucial human resource for NIEAs. It was not until 1999 that this system was opened to private companies. According to Lin Feng-ching, from 1999 to 2004, about 14,636 reserve officers were released from the system, of

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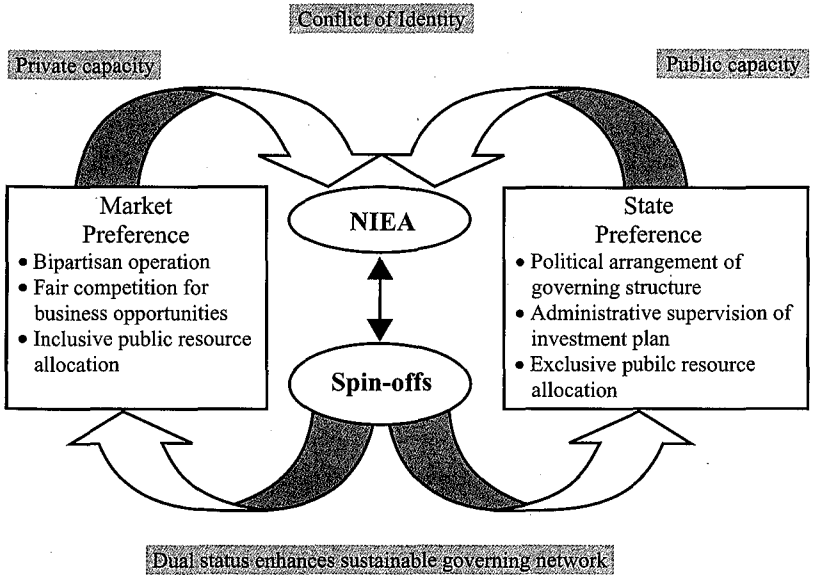
[45]Hong, *Zixun meng gongchang*, 124.

[46]Daniel I. Okimoto, *Between MITI and the Market: Japanese Industrial Policy for High Technology* (Stanford, Calif.: Stanford University Press, 1989), 50-51.

Figure 2
Analytical Framework of the Dual Status of NIEAs



whom 8,262 (74 percent) were engaged in R&D projects in the private sector.[47] However, despite more than 60 percent of reserve duty officers being allocated to private companies, demand for highly trained personnel so far exceeds supply that pressure for a bigger share of the reserve duty quota is unlikely to subside in the foreseeable. In these circumstances, the III and other NIEAs are facing the new challenge of competing for talent with the private sector on a more equal footing.

The III, like other NIEAs, needs to accommodate state preferences in three respects in order to fulfill its public capacity (see fig. 2). First, it must accept that its top-level governing structure will be politically defined. Second, it must submit to administrative guidance and supervision

[47]Quoted from a speech made by Lin Feng-ching at the 2004 Reserve Duty Program Exhibition. http://show2.tca.org.tw/eng/main8-2.html.

of its investment plan. Third, it must accept that public resources (for instance, TDP and the reserve duty quota) will be allocated exclusively in accordance with national interests. At the same time, the III must maintain its bipartisan association with its governing agency while also conducting business on a level playing field. The two inbound arrows in fig. 2 illustrate how the state (the governing agency) and market (the private sector) preferences for NIEAs sometimes contradict each other. The two outbound arrows show how the spin-off policy serves the interests of NIEAs by nominally alleviating public concern about unfair competition, while actually sustaining informal associations with the governing agency through personal and institutional contact.

In fact, the employment of well-trained professionals and a long-term working relationship with state agencies has endowed the III with unparalleled resources and capacity to compete with the private sector for government projects. Such an institutional bias is common to all NIEAs, with their dual public-private status. This dual status has been administratively expedient for the state and the private sector. However, expectations from both sectors make it difficult for NIEAs to keep a balance between the two. In the first of the two cases above, the spinning off of the TDP project in order to explore business opportunities in mainland China turned out to be a win-win strategy for the NIEA and the spun-off company. In the case of the ISP industry, the public capacity of SEED/III was welcomed by the private sector during the kick-off stage, but once the market had matured sufficiently to allow competition, the public capacity of SEED/III hampered its commercial activities. In a word, the III spins off its profit-making business units in order to legitimize its nonprofit status while holding equity in the spun-off companies and maintaining informal contacts and information sharing with former colleagues. It is their dual status that puts NIEA in a win-win position.

In sum, NIEAs complement the capacity of the state in boosting industrial transformation through flexible institutional arrangements that avoid rigid budgetary constraints and the limitations of the civil service recruitment policy. NIEAs enhance the state's capacity in policy planning and implementation, enabling the latter to meet the challenge of global

competition. Therefore, the network of NIEAs is unlikely to dwindle as long as there is a need for institutional flexibility. While serving these purposes, NIEAs have restructured their most profitable units in a way that gives them more business autonomy and financial security.

Conclusion

Empirical studies have demonstrated that state and societal collaboration is a key factor in successful industrial transformation.[48] ITRI has been singled out as the key practitioner of this collaboration in Taiwan. However, students of East Asian political economy have in the past shied away from exploring further the institutional role of NIEAs in Taiwan's industrial transformation. From their perspective, NIEAs are simply convenient institutional arrangements that the state uses to enhance its policymaking capacity through institutional flexibility.

This paper has attempted to explain the unique and indispensable role of NIEAs in Taiwan's industrial transformation. Generally speaking, NIEAs have long been neglected by institutional studies as insignificant actors. However, although they serve as quasi-state institutions, they should not be categorized as a state actor. Instead, they are quasi-state actors who usually construct their own survival system by networking with the state and the market. NIEAs enjoy financial support from the state, but the strategy of spinning off profitable units legitimizes their profit-taking strategy without compromising their quasi-state status. Therefore, as long as state intervention in industrial transformation is inevitable, the NIEA institutional arrangement will persist in Taiwan.

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[48] Evans, *Embedded Autonomy; Hong, The Political Economy of Industrial Policy in East Asia*; and Weiss, *The Myth of the Powerless State*.

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