

The Politics of Greater China's Integration into the Global Info Tech (IT) Supply Chain

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The most notable feature of the public 'dialogue of the deaf' taking place across the Strait separating Taiwan and China is its zero-sum logic. This logic of one-upmanship in political and security matters dictates that whatever benefits Taipei is detrimental to Beijing and vice versa. Commercial interaction between Taiwan and China, particularly in the broadly defined sector of information technology (IT), is arguably the more powerful driver of cross-Strait interaction today. Two characteristics of this accelerating dynamic of commercial interaction across the Taiwan Strait are paramount: (1) its tight integration into a global IT supply chain; and (2) the extent of symbiosis by which all participants in this global supply chain depend on the worldwide vitality of this economic ecosystem. In interpreting what cross-Strait economic integration in IT portends, political logic may be leading Taipei and Beijing along opposite paths to the same end-point: the presumption that economic integration is undermining, and destabilizing, the cross-Strait economic and political status quo. As a dominant player in global IT, the US has its own stake in a clear understanding of this globalization dynamic and in astutely maintaining its interests as the global IT supply chain continues to extend across the political fault-line of the Taiwan Strait. Non-partisan analysis of the logic of globalization suggests a different outcome for the cross-Strait commercial dynamic than either Taipei or Beijing has publicly credited: its potential to mutually enhance economic prosperity and contribute long-term to stabilizing cross-Strait political interaction.

'Politics in Command!'—Mao Tse-tung

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I

From the 1949 revolution on the mainland through to the first steps taken to dismantle China's planned economy in the early 1980s, China was cut off from the world's largest and most dynamic markets. This sustained pattern of economic isolation and negative growth¹ was accentuated by the collapse of the Sino–Soviet economic relationship, the fallout of the Great Leap Forward, and the social and economic upheaval of the Cultural Revolution.

Since the mid-1970s, policy reforms have set the stage for China's reemergence in world markets. Judged by the FDI metrics which business conventionally uses,² China's re-entry into the world economy was noteworthy in the 1980s, impressive in the first half of the 1990s, and unprecedented over the past six to seven years. Judged by historical standards, however, China is only now beginning to reclaim its traditional status as a force to be reckoned with in the world economy.³ The 30 years which China largely lost to economic development from 1950 to 1980 have meant, quite simply, that China's current economic performance is still relatively weak in global terms. Today's image of China as an economic juggernaut is largely an artifact of measuring FDI and other indices of economic performance against an anomalously low base. This, at least, will be shown to be the case for China's Information Technology (IT) industry.

During this period of travail and isolation for China, Taiwan was embarked on a fundamentally different course. Lacking the population base to mount a broad-based economic development effort, Taiwan was forced to follow a sequential strategy of development dependent upon international technology partnerships. Taiwan first reformed its agricultural base in the 1950s, and then converted the economic gains from that success into a graduated series of ensuing economic transformations—from agriculture to petrochemical-based heavy industry in the 1950s and 1960s, and from heavy industry to light industry in the 1960s and 1970s, and then on to high-tech.

II

Taiwan is now a powerhouse in the global IT business, producing the majority of the world's notebook computers and leading the world's production of keyboards, monitors, modems, and a dozen other categories of computer components and peripherals. In the chip sector, Taiwan is approaching 10% of world's semi-conductor output. In the various sub-sectors of the semiconductor field, Taiwan attained either first or second place in world share of IC design, IC foundry, IC packaging and ROM chip sub-sectors (see Table 1). How did tiny Taiwan manage to position itself so favorably on the world economy's massive IT wave?

The story, as is widely known, has much to do with K.T. Li and the drafting of regulations for the Hsinchu Science-based Park in 1979. But the story starts

1. Nicholas R. Lardy, *China's Entry into the World Economy* (1987), p. 3.

2. Wharton China Business Forum, Chad Holliday, Dupont, (29 March 2003).

3. See Gerald Segal, 'Does China matter?', *Foreign Affairs*, (September/October 1999); and S. Panitchpakdi and M. Clifford, *China and the WTO* (Wiley & Co., 2002), p. 7.

Table 1. Taiwan's position in the semi-conductor field

No. 1 in the world	No. 2 in the world	No. 3 in the world
Foundry Wafer	IC Design	PCB
IC Package	Mask ROM	Desktop PC
Notebook PC	Graphic Card	Monitor
CDR	Scanner	
Hub	LED	
Modem	Chip Set	
LAN Card	Mother Board	

Source: Industrial Technology Intelligence Service, MOEA (2002).

decades earlier. Taiwan's IC industry began in the 1960s with IC packaging, the back-end process of taking wafer-cut chips and packing them into lead-frames and substrates. Since Taiwan had little experience in the chip business, packaging was initially used as a test case to demonstrate Taiwan's ability to break into this niche of high-tech business opportunity. At the outset of this phase of development, Taiwan's per capita income was only about US\$250; agriculture, manufacturing and trade constituted almost the entire economy, with services negligible.

In the 1970s, partially in response to the oil shock and alarming domestic inflation, the government stepped in to stimulate the economy. While the thrust of this effort was concentrated on a handful of major transportation projects and on modernization programs for heavy industry, this period also saw the creation of ERSO, the Electronic Research and Service Organization. In 1976, ERSO cooperated with RCA to transfer C-MOS IC technology to Taiwan. The success of this pioneering tech-transfer project showed that, with close cooperation between industry and government, Taiwan could have success at stimulating a new high-tech industrial sector. In 1979, regulations and guidelines for establishing science and industrial parks in Hsinchu and elsewhere were drafted. These parks would be Taiwan's playbook for the 1980s.

The most notable development of the 1980s was the creation of United Microelectronics Corporation, or UMC and later, Taiwan Semiconductor Manufacturing Corporation, TSMC. The founding of these two pillars of the IC industry in Taiwan was supported originally by a broad program of governmental structural support comprising regulations and investment incentives. Meanwhile, in the United States, the breakup of AT&T's monopoly created the conditions for partnership to take root as the fledgling Baby Bells began placing a steady stream of OEM orders to the new Taiwan firms. This in turn stimulated the rapid growth of manufacturers of computers, PC peripherals and communication devices locally.

The key development of the 1990s was the addition of support industries to the supply chain of Taiwan's IC firms. Upstream and downstream proliferation in the supply-chain has given the Taiwan electronics industry critical mass needed to compete in global markets. But global competitiveness is now constrained by relatively low levels of R&D investment. Low R&D expenditure is natural given Taiwan's strong Original Equipment Manufacture (OEM) emphasis but R&D expenditure is vital for future innovation. Whereas R&D expenditures of 11% or

more are typical in the IC design industry worldwide, Taiwan's R&D expenditure for IC design has generally been less than 5%.

Looking back, the late 1980s and the decade of the 1990s were clearly Taiwan's 'Golden Years'. During this period, manufacturing prowess meshed with more efficient mechanisms for raising capital, both at home and abroad. At the same time, the WinTel standard, to whose spec the Taiwan OEM manufacturers produced, were beginning their bull-run of global expansion. This potent combination unlocked a period of unprecedented economic growth in Taiwan, coupled with near-constant manufacturing innovation in the service of global markets.

III

On the eve of the millennium, China's positioning in world markets contrasted sharply with Taiwan's secure place in the global supply chain.

In China, the local market, driven by public sector spending and an emergent consumer base, was developing rapidly but from an extremely low base. Foreign markets for PRC-based manufacture of IT hardware were for the most part in the hands of (1) North American, European, Japanese, and Korean brand-name suppliers; (2) their partners, including a relatively small number of wholly-owned Taiwan OEM manufacturers; and (3) an emerging, but still relatively shallow support tier of local joint venture entities. State-owned enterprises in China were almost entirely absent from the IT export market for the simple reason that they had no means of accessing those markets or meeting their requirements. Prior to China's WTO accession, decades of marketing opening had significantly blurred the traditional separation between import and export segments of the IT market but the separation still persisted.⁴ The quality and performance gap may have narrowed dramatically between locally sold goods and re-exported goods but the distribution and consumption patterns in China still differed significantly from established markets elsewhere in the world.

At the margins, other dynamics were also chipping away the barriers still separating the import and export segments of China's IT market. Aggressive assemblers of export-only products, mostly from Taiwan, started breaching the wall of separation by taking advantage of various loopholes in the regulations governing export-processing. For example, an allowance in the regulations governing importation for the purpose of local assembly and re-export permitted export processors to sell locally as much as 25% of their duty-free imports of componentry if those components were declared damaged upon arrival at the processing zone. Aided and abetted by local customs officials, some Taiwan assemblers managed to take liberal advantage of this allowance, undercutting the local market for high-priced imports with a steady stream of low-priced, world-class IT componentry.

From the sectoral perspective of the global IT business in early 2000, China was not yet on center-stage. High cost structures kept the local market limited, if not off-limits, to the established global network of production and distribution. Big names in the global industry had, to be sure, all placed their bets on China's future

4. Gabriel Li and Edmond Wong, *The Rise of Digital China* (China Books, 2001), ch. 1.

development as a consumer market and were relying increasingly on their presence in China to support their worldwide production, and even profitability.⁵ But major elements of the global IT supply chain—high-performance chip production, laptop/notebook assembly, original design manufacturing (ODM), and high-volume OEM manufacturing—were still mostly absent from China.

IV

Two major events—the NASDAQ implosion of March 2000, which signaled the end of the Internet bubble, and China's WTO accession on 11 December 2001—transformed this picture, bringing China front-and-center in the global IT supply chain. To fully appreciate the double impact of these two transformative events, they need to be seen in the context of two less obvious, and more gradual developments immediately prior to, and during, this period. First and most importantly, hardware manufacturers were already experiencing constant and worldwide price pressures on their production well before the year 2000. In contrast to the market's sudden correction for overvaluation of Internet-related stocks and telecom overcapacity in March 2000, this earlier price pressure was a reflection of the gradual 'commoditization' of IT hardware.⁶ As such, it reflected more fundamental rhythms of technology maturation amplified by consumer backlash against an over-hyped need to upgrade hardware.⁷

A second, regional development concerned Asia's emergence in the 1990s as an integrated production platform able to compete directly with North America and Europe. Prior to the global economic expansion of the 1990s, investment decisions in Asia had largely been dictated by the logic of national markets—locating lines of production, by and large, in a single country in order to take advantage of favorable investment terms for re-export or to gain access to that country's consumer base. Inefficiencies in trans-national logistics among Asian countries had tended to limit the degree to which production by large multi-national enterprises (MNEs) could easily be distributed across the entire platform of Asia. However, dramatic improvements in infrastructure and administrative efficiency during the 1980s had gradually changed this equation in Asia's favor. By the time of the IT-led boom throughout the 1990s, Asia was benefiting from a new, more streamlined pattern of MNE investment whereby various components of low- to mid-end production were routinely being distributed to various locations in Asia—wherever the local incentive package of cost and labor skill for that component was most favorable at the time. Logistics and information management tools tied together this web of component suppliers into an efficient network feeding final assembly and testing at some other location in Asia. If conditions or incentives for production improved or deteriorated appreciably in one link of this production

5. See Connie Ling, 'To fight downturn, Motorola focuses on China, its fastest growing market', *Asian Wall Street Journal*, (20 November 2001), p. 3.

6. Clay Ryder and Charles King, *Commoditization, Standards & the Enterprise: A White Paper* (The Sageza Group, March 2002).

7. David Gelernter, 'Candy-coated electronics', *Wall Street Journal*, (15 April 2003), p. A14.

chain, MNEs could quickly relocate production to either take advantage, or limit the fall-out, of that change.

Even prior to the sudden drop of the NASDAQ, these two developments had combined to place considerable pressure on Taiwan OEM manufacturers. Their brand-name customers, sensitive to falling prices and customer push-back, were demanding new production efficiencies but, by the end of the decade, Taiwan manufacturers had become seriously limited in their ability to take full advantage of the pan-Asia production platform. The Nationalist/KMT Administration of Lee Teng-hui had experienced, under the policy-banner of 'Go South' and 'No Haste, Be Patient', partial success in focusing Taiwan investment into Southeast Asia and diverting investment, particularly among Taiwan's large flagship enterprises, from China.⁸ By the beginning of the year 2000, Taiwan investment amounted to more than \$40 billion in Southeast Asian, putting Taiwan in the first or second rank of investors in each of the ASEAN economies. Relative to global patterns of investment at the time,⁹ Taiwan IT companies saw themselves in danger of being over-invested in the higher cost ASEAN economies and under-invested in the emergent lowest-cost production base in China.

The NASDAQ's abrupt fall was a clarion call, particularly in the global telecommunications and IT hardware markets. Taiwan's OEM producers of IT hardware, in particular, could no longer effectively stave off price pressure by making incremental increases in manufacturing efficiency and by moving to new low-cost production bases on China's periphery such as Vietnam and even Burma. After March 2000, China became, by the logic of globalization, unavoidable as a mainstay for low- and mid-end production and assembly. With its low cost structure and near-boundless supply of cheap land and labor, China emerged suddenly as the lifeline for Taiwan OEM firms manufacturing in conformity to WinTel spec. Firms in high-end sectors such as chip production and laptop/notebook production hung back due both to political concerns and the protection of their intellectual property but the rest of the high-tech community essentially migrated en masse.

In addition to the 'pent-up demand' which had built through the late 1990s, several other factors also contributed to the wholesale migration by Taiwan's tech community to China following the NASDAQ's plunge:

- (1) At a political level, high-level proponents of the twin policies of 'Go South' and 'No Haste, Be Patient', were exiting the scene¹⁰ following the KMT's loss in the Presidential elections of February 2000. The DPP, ill-prepared bureaucratically for assuming the levers of power following their inauguration to power in April 2000, were not focused on enforcing these pre-existing policies or reaffirming them as priorities under the new administration. The business

8. See Szu-yin Ho and Tse-kang Leng, 'Accounting for Taiwan's economic policy toward China', *Journal of Contemporary China*, forthcoming.

9. Cal Clark, 'Growing cross-Strait economic integration', *Orbis* 46(4), (Fall 2002).

10. For data on the relatively limited effectiveness of these two policies in controlling overall cross-Strait investment since 1990, see Table 1 in Chien-min Chao, 'National security vs. economic interests', *Journal of Contemporary China*, forthcoming.

- community, which in Taiwan has a well-recognized disposition to act en masse,¹¹ moved when they noticed nobody closely monitoring the scene.
- (2) While national-level leaders in Beijing showed public policy ambivalence¹² in 2000 about various issues related to Taiwan business engagement (particularly the fickle, politically-charged issue of Three Links but also in matters of national treatment, customs and regulatory inspection, business registration, etc.), leaders at the various local levels showed no such reticence. Decades of experience with small-scale, labor-intensive investment from Taiwan light industry firms in Guangdong, Fujian and, increasingly, the Upper Yangtze basin had demonstrated convincingly the benefits (ranging from higher tax receipts to greater ease of interaction¹³) of engagement with Taiwan businesses. At less public levels of policy, national-level leaders appear to have vigorously supported promotion of Taiwan investment, particularly in the assignment and promotion of those local-level officials who had a positive track-record of attracting and nurturing Taiwan investment in their locales.
- (3) The third, and most important, factor has to do with the nature of the Taiwan IT business model in China and its contrast from the business model pursued by North American, European and Japanese IT-related MNEs in China. The uniqueness of the Taiwan business model in China reflects the unique adaptation which Taiwan OEM producers have evolved in the 'eco-system' of global IT. That adaptation, and its effect on the Taiwan business niche in China, will be more fully explained in the following two sections.

V

Although the network of supplier–customer relationships in the global IT business is frequently referred to as a supply-chain, the most accurate and revealing analogy for the sector is not mechanical, but biological: an ecosystem.¹⁴ The terminology of the ecosystem is, in fact, the metaphor which most US IT companies consistently use, at the strategic level, to describe their current market niche and their opportunities for future growth. Sub-ecologies differ from one sub-sector of the IT market to another—say, from the PC assembly business to the production of PC peripherals—however, the health of these various sub-ecologies is naturally inter-dependent, all linked to the general health of the global IT sector and, beyond that, to the vigor of the global economy. The competitive position of a particular company in the global economy is largely a function of how expansive its

11. Different interpretations of this tendency are offered: dynamics of competition in a commercially-attuned community; the small-scale, geographic clustering, and social interaction binding business decision-makers in Taiwan; and the cultural patterning of high-risk/high-reward behavior in Chinese societies.

12. To help bolster its One Country, Two Systems policy framework toward Taiwan, Beijing appears however to have been willing to turn a blind-eye to WTO-inconsistent enticements offered by local-level officials to Taiwan investors in the form of preferential terms (based on 'compatriot' status) relative to those terms offered other foreign investors.

13. A broad range encompassing shared norms of (a) linguistic/cultural interaction, (b) management practices governing local employees and, in some cases, common understanding of (c) local bookkeeping, inventory management, and gift-giving practices.

14. For insight into the applicability of the ecology model to technology markets, see Jacques Monod, *Chance and Necessity: An Essay on the Natural Philosophy of Modern Biology* (Random House, 1972).

particular supporting sub-ecology is and what position it occupies in the value-chain, or food-chain, of that particular sub-ecology.

To understand the role of Taiwan OEM manufacturers in the global IT value chain as well as their unique adaptation to the China market, it is necessary to take a short step back. Because Taiwan's market is far too small to serve as a self-supporting base for industrial development, Taiwan has always relied on industrial partnerships to support its economic development. As a legacy of its colonial period, Taiwan had traditionally relied on Japan for those industrial partnerships but it increasingly diversified its industrial partnerships to Europe and the US, particularly in the 1960s during its expansion into textiles and petrochemicals.¹⁵ Decades later, Taiwan's partnering with the US-innovated WinTel standard occurred at the perfect moment. First, it came at the cusp of an unprecedented period of growth for the US economy. From 1987 to 2000, the general ecology for global IT flourished under conditions of greatly expanded availability of venture capital, gradually increasing bandwidth infrastructure, and cost savings introduced initially by the Electronics Manufacture Services (EMS) model. Secondly, as explained below, chance and necessity combined to establish Taiwan's preeminence across a broad range of sub-ecologies all linked to the WinTel PC standard.

During the late 1980s and early 1990s, the general ecology for all PC-related production was growing fast enough to support not only the globally established EMS players,¹⁶ but also upstart, technologically-savvy firms from Taiwan. Additionally, both the EMS players and Taiwan firms leveraged the emergence of an Asian manufacturing platform to boost their global competitiveness. However, while the Taiwan firms were not sufficiently capitalized to buy out major operations from IBM and others as the EMS players did, their weakness eventually brought distinct advantages as conditions in the ecology started to change. First, although their small size initially put them at a disadvantage to EMS firms in equity holdings, Taiwan firms compensated by taking advantage of their clustering in the Hsinchu Science-based Park in order to create vertically integrated supply chains which, over time, proved to be more nimble and cost-efficient than their EMS competitors. Also, the large EMS firms began straying from their core focus on the PC business, attracted by new technology opportunities such as PABXs and cell-phones. Taiwan companies were unable to follow the EMS firms into these new technology areas since they did not have the R&D capability to tackle technologies lacking a common platform of established and universally accepted specifications. Forced to rely on the common platform provided by the R&D of their US partners—namely, Microsoft and Intel for the PC's WinTel standard—Taiwan manufacturers had no choice during the heyday of the IT expansion to do anything other than what they were already doing well. Then, as the pressures of IT commoditization started to bite in the late 1990s and eventually came to a head with the bursting of the Internet bubble, Taiwan OEM manufacturers suddenly found themselves in a unique position of strength and weakness. Positively, Taiwan firms were not burdened and overextended as a result of acquisitions-and-mergers

15. *The Story of Taiwan's Economy*, 2nd edn (Government Information Office, Republic of China, July 1999).

16. Principally, Flextronics, Solectron, SCI Systems Inc. and Celestica.

to the degree their EMS competitors were. At the same time, they had succeeded in consolidating an iron-grip in their area of technological core-competence: delivering for their brand-name customers a supply of high-value PC-related products 'cheaper, better, faster'.¹⁷ The scale of this success can be measured by the fact that Taiwan firms delivered in 2001 over \$20 billion of products to what were then four US companies: IBM, Dell, Hewlett Packard and Compaq.

In comparison with its traditional EMS competitors, the one competitive disadvantage which Taiwan's high-tech industry faced at this juncture was its relatively smaller manufacturing footprint in China, which was emerging as the world's lowest-cost production base just as the US economy was tailing off. Over the past three years, that disadvantage has largely been eliminated as all but the high-end of IT manufacturing has migrated from Taiwan to China.

The fact that this migration to China occurred *en masse* reflects exactly the same feature of Taiwan's high tech industry which ensured its successful adaptation in the global IT ecology—the mantra of 'cheaper, better, faster'. Taiwan manufacturers had two principal audiences for this message of 'cheaper, better, faster': (1) their brand-name customers in the vital North American market (and, secondarily, their customers in the other well-developed consumer markets of Europe and Japan); and (2) their component suppliers, usually co-located with them in Hsinchu or in export-processing zones throughout Southeast Asia. For their brand-name customers, the ability of Taiwan OEMs to supply 'cheaper, better, faster' generated customer loyalty to those brands, which redounded to the benefit of the Taiwan OEMs in the form of larger, follow-on orders. For first-tier OEM suppliers to consistently deliver 'cheaper, better, faster' results to their brand-name customers, however, they had to make sure that their second-tier component and materials suppliers were also fully in-swing with this program.¹⁸

As Taiwan OEMs have moved high-tech manufacturing across the Strait of Taiwan to China in substantial scale over recent years, they have faced a dilemma. Globalization forced the move in terms of pricing for global customers, but price only represented a third of the value which their global customers had come to expect. As far as quality and timeliness of delivery were concerned, China's record has not been consistently world-standard. Hyper-competitive practices and lack of judicial recourse underlie many of the problems with quality control in China: despite contracts, foreign manufacturers working with local Chinese partners often lose control over their proprietary technologies, production methodologies, and key personnel and then find their former partner in direct competition with them, fielding a lower cost/lower-quality knock-off product. Also, distribution and logistical services has been one of the least developed areas of China's modernizing economy, hamstrung by the infrastructure's growing pains and by administrative inefficiency.

17. Mitac, a pioneer in developing the Taiwan PC-based industry, varies this formula as 'Value, Visibility, Velocity'.

18. Although I have yet to see any systematic comparison of the two systems, there are some obvious surface similarities to the kai-zen and just-in-time methods which Taiwan's erstwhile business partners from Japan developed during the post-WWII period.

On the one hand, Taiwan OEMs knew they would no longer enjoy access to high-return markets if they failed to deliver consistent, across-the-board performance for Dell and their other highly successful, highly demanding brand-name customers. Direct reliance on Chinese suppliers and distribution would jeopardize that access by posing unacceptable risks in the areas of quality control and timeliness of delivery. But, on the other hand, without taking strategic advantage of China's emergence as the world's lowest cost production platform, Taiwan high-tech manufacturers would be opening themselves up to renewed competition from their traditional EMS rivals and also to a new generation of lower-cost competitors.

The solution to this dilemma, born out of practical necessity and force-of-habit, was for Taiwan IT firms to adapt a new business model for China. Taiwan high-tech firms could not afford the same patient approach which globalized, brand-name MNEs from North America, Europe and Japan were following in China. They could not wait for a decade or more as local personnel were groomed for future management positions through MBA schooling abroad and rotations in various divisions of the corporation. Nor could they afford to build up operations slowly while developing from scratch a network of reliable suppliers in China via expensive training and local industry support programs. Instead, Taiwan IT firms did what they were used to doing—working with exactly the same network of suppliers that had supported their growth first in Hsinchu and then in numerous export-processing zones throughout Southeast Asia. In a nutshell, the shorter horizon for return on investment in Taiwan forced their high-tech firms to reduce the number of variables involved in their China investments. They would rely on China for its abundant supply of low-cost inputs to the production process: land, labor, and facilities.¹⁹ Beyond that, they would rely on their existing network of suppliers and distributors to ensure quality and delivery. This more than any other factor explains the rapidity and scale of the migration of IT manufacturing across the Strait of Taiwan in recent years. Individual firms were not making the decision to relocate. Instead, entire supply-chains or sub-ecosystems were moving *en masse*. Local officials in Kunshan, Suzhou and elsewhere accommodated this influx with industrial processing zones tailored to the needs of their Taiwan tenants.

VI

The scale of this mass migration of IT production from Taiwan to China is consequential. For example, as China overtook Taiwan for the number three spot in global IT production in 2001, Taiwan investors became equity owners of as much as three-quarters of China's IT export production. Yet, Taiwan investors still retain control of virtually all their own fourth-ranked \$23.5 billion of IT production in Taiwan.

Why has an economic flow representing tens of billions of dollars annually in the technology heart of the global economy not attracted more attention? There are four

19. While figures vary appreciably depending upon the location and sub-sector of investment, the rule-of-thumb comparables generally given are: *Land*: free for a negotiated term of lease; *Labor*: 10–15% of costs in Taiwan; *Factory or facility construction*: 20–25% of costs in Taiwan.

main reasons. First, large-scale IT investment by Taiwan into China is a recent phenomenon, driven by complex technology dynamics in the global market. More important, however, is the fact that throughout the 1990s and until mid-2002, most high-tech investment in the mainland was technically barred by the Taiwan government. Skirting these prohibitions, Taiwan investors became adept at channeling their investments into the mainland through off-shore subsidiaries in Hong Kong, the British Virgin and Cayman Islands, and other locales with limited transparency. Offshore, fragmented, and largely invisible, this pattern of investment deprived Taiwan government officials, PRC customs officials and traditional macro-economists an easy handle by which to assess its overall dimensions or underlying dynamics. A third factor is the natural reticence of the Taiwan investors themselves, the most knowledgeable group of experts on this subject. While some observers link this reticence to concerns over the technical illegality of their early investments or to a potential 'double taxation' liability, the Taiwan government has in large measure already dismantled both of these sets of sanctions. Not surprisingly, though, Taiwan investors still show markedly little appetite for inserting their companies into a direct line of political crossfire even after legal disincentives have been removed.

The fourth and perhaps most important reason involves the zero-sum nature of the cross-Strait political debate itself. So long as no one really knows who is gaining political leverage as a result of cross-Strait commercial integration, each constituency can project its own hopes and fears on the issue like a Rorschach test.²⁰ Cross-currents of public discussion and commentary in this 'dialogue of the deaf' tend to obscure, rather than highlight, the basic fact that the US, Taiwan, and China may all share common and growing interests in the extension of the global IT supply chain across the political fault-line of the Taiwan Strait. These interests need, of course, to be carefully managed, especially in the areas of high technology transfer²¹ and security. They cannot be adequately managed, however, unless they are first understood in the proper context. That context has to be, first and foremost, globalization. The context, in other words, must be the technology dynamics which are globalization's engine and the business decision-making which are in globalization's driver-seat.

VII

Economies and ecologies do not prosper in the absence of change and adaptation. While China's emergence into the global ecosystem has brought some disruption, that change appears on balance to be strengthening the global ecosystem as a

20. Political commentators would do well to borrow a clumsily-named but highly descriptive concept from the world of business in order to more accurately describe relations among the US, China and Taiwan in a globalized world: 'coop-etition'. This phrase is used in the high-tech world to describe, for instance, the relationship between Microsoft and Sun Microsystems. Despite intense rivalry between the CEO-level of the two companies, their relationship is characterized by both cooperation and competition, varying from corporate division to division and from technology product to product.

21. The microelectronics industry is a distinctive case requiring special scrutiny. At this conference, John Tkacik's article 'Technology transfer from Taiwan to China: is there a risk?' provides a valuable survey of key issues. See also Craig Addison, *Silicon Shield* (Hong Kong: Fusion Press, August 2001).

whole. Consumers worldwide have clearly benefited from lower prices for quality IT goods. Brand-companies at the top-end of the value-chain have consolidated their position and continue to reap the disproportionate ROI which their brand-names command. In the middle of the value-chain, Taiwan firms are squeezing a new revenue stream from their OEM playbook by replaying it in the Shanghai–Kunshan–Suzhou–Nanjing corridor. While no longer benefiting from the global market conditions they enjoyed in the 1990s, these firms have adapted by bringing their cost structures correspondingly lower. Back in Taiwan, the headquarters of those firms that benefited most from the IT boom have re-invested their profits by sinking new tap-roots in Taiwan for Original Design Manufacture (ODM), manufacturing-related research, and high-end production in fields as diverse as advanced TFT-LCDs, O-LCDs, and 12' wafer production. These research-led efforts, focusing on manufacturing innovation rather than basic research, represent Taiwan's attempt to feel its way into a new, decentralized computing era where even Microsoft and Intel are being forced to reinvent themselves. As production for these new technologies drops down the cost/volume curve, their manufacture will eventually be handed off to China.²² This hand-off of large-scale production will free up Taiwan, with its limited resources, to move to the next frontier of manufacturing-led innovation in support of US, European, and Japanese research-led innovation. In China, local firms that have never previously participated in a meaningful way in the global economy are now supporting the low end of the global supply chain with componentry and basic assembly.²³

WTO accession offers perhaps the best example of the symbiotic benefit which the US, Taiwan, and China have all enjoyed from an expanded global value chain. Taiwan is now positioned to trade off, incrementally, its dominance of China's IT export market in return for substantially improved access to the smaller but potentially lucrative domestic market.²⁴ China has gained limited access to high-return foreign markets under the tutelage of a Taiwan partner with two decades of experience in those markets. The US, meanwhile, experiences consumer benefit, enhanced economic prosperity and stability in the Asia–Pacific region, and a more efficient global pipeline for its own research-led innovation. A three-year depth of data indicates no significant erosion of Taiwan equity control in the overall market.

22. A striking example of how this process works concerns the 3.0 generation of LCD production. In 2000, China had an effective 0% share in world production of LCDs. Two years later, China had a 70% share. This share is almost entirely in the hands of Taiwan-equity firms on the mainland. These firms brought their technology across the Strait from Taiwan to the mainland almost in unison as they moved on to developing the 4.0 generation back in Taiwan. (Source: III/MIC & Nicholas Lardy, IIE, Asia Society Panel on China's Growing IT Industry, 17 April 2003, Washington, DC.)

23. While a superstar like Legend may eventually be able to leverage its strong position in the PRC market to mount a challenge to global brands, the experience of Acer suggests that survival at this level of the value chain by a new entrant is not easily sustained. It is more than a question of the size of the home market. Buyers in the key US market have come to expect extraordinarily high levels of customer service and support for their brand-name products. Companies that try to deliver anything short of Sigma Six levels of customer support do not fare well, neither do those who attempt to short-cut the process through acquisition.

24. According to much scrutinized data from III's Market Information Center, Taiwan-equity firms have been maintaining a 70–75% share of China's export market for IT and approximately a 60% share of China's total IT market (domestic and export).

Whatever shifts in leverage may be occurring in the IT sector between Taiwan and China appear to be happening gradually.

None of this is meant to suggest that globalization does not represent real challenge for all participants. As the SARS epidemic is demonstrating vividly, China cannot hope to enjoy the benefits of globalization (e.g. economic growth) if it is not also willing to embrace the responsibilities of globalization (e.g. transparency). In the US, a new debate about displacement of high-tech manufacturing to China is just beginning to emerge.²⁵ As for Taiwan, the government can take some comfort in the fact that its firms have earned a secure place in the global IT supply chain and are not going to be easily 'bypassed'.²⁶ Upstart firms may try to undercut them on price, but none is likely to be able to compete with the trust that Taiwan OEMs have built up over decades for consistently delivering on the 'cheaper, better, faster' formula. 'Hollowing out' represents a different sort of challenge. From the perspective of globalization, 'hollowing out' is a healthy process of sloughing off low-return industries to lower-cost global production centers. The value created through this globalization process needs, however, to be captured by the government and applied, at least in part, to retooling the skill set of the workers in the industrial sector that has been sloughed off. By retraining, these workers will then be able to participate in the higher-value activities in the global supply chain more appropriate to their country's specialized global niche. The challenge for Taiwan governments will be to find more effective means than Off-shore Banking Units (OBU) to capture and repatriate profits from mainland commercial activity for the benefit of workers in Taiwan. Otherwise, the win/win logic of globalization can be distorted into a win/lose rallying cry of politicians decrying job losses. While 'hollowing out' rests on a fundamental illusion, the idea that economic prosperity can be maintained without full embrace of the renewal and change which globalization implies, it is nonetheless potent as a political rallying cry.²⁷

VIII

The politics of China's integration into the global IT supply chain can be analyzed at the inter-party level within Taiwan's fractious democracy. Equally, the attempt can be made to divine the inner workings of the CCP's Standing Committee and the State Council's Taiwan Affairs Leading Group on these issues. I would encourage experts in these two fields to take up this analysis but I will not attempt to delve into it here.

25. See 'Impact of China-based manufacturing on Greater Minnesota manufacturing companies' (Minnesota Technology, Inc., March 2003) and 'Precision manufacturers feel the China syndrome', *Boston Business Journal*, (14 March 2003) and 'Is China becoming the Earth's technology production base', *Journal of the American Chamber of Commerce in Shanghai*, (August 2002).

26. Certain other global supply chain industries, where the product cycle is slower and the manufacturing processes easier to copy, point to the security of Taiwan's current position in IT-namely, high performance bicycles and brand-name athletic shoes. These two industries migrated from Taiwan to the mainland almost 20 years ago but have not yet been significantly dislodged from Taiwan-equity control. In contrast, industries where the global supply chain is less differentiated-like toys, portable umbrellas, etc.-have proved to be significantly more vulnerable to displacement by local Chinese firms competing entirely on the basis of lower price.

27. As the US witnessed, the similar NAFTA debate eventually resolved largely in globalization's favor, setting the stage for an unprecedented 13-year run of economic growth in the US.

The focus I will choose is the simple framework of the strategic triangle comprising the US, China and Taiwan. Given the geographic distance of the US from both Taiwan and China and the fact that China and Taiwan share a long and convoluted history of interaction from which the US stands at some remove, this is not an even-sided triangle. The US government underscores this fact in its policy vis-à-vis China and Taiwan: it does not presume to interject itself into the minutiae of the Three Links and other cross-Strait policy matters. It simply sets out its expectations for peaceful resolution of the cross-Strait issue on the basis of a limited number of basic principles.

It is useful to keep this concept of an elongated strategic triangle²⁸ in mind when considering the politics of China's integration into the global IT supply chain. China and Taiwan comprise the short leg of this triangle, with the US at some distance from both. The extremely close relationship between Beijing and Taipei produces very few points of political agreement. As such, it's noteworthy when Beijing and Taipei come to agreement on anything. One point of agreement worth noting is the idea that the investments undertaken in China by Taiwan firms is causing immediate and fundamental destabilization of the cross-Strait status quo.

Although there has been no definitive pronouncement by Beijing to this effect, it is now axiomatic among China analysts that this view is central to China's recent strategy toward Taiwan. Rather than continue to rely solely on military intimidation and heavy-handed saber-rattling, China has switched to a two-track policy which enjoys greater international acceptance. The military threat continues to build but is soft-pedaled; meanwhile, economic engagement is offered as a blandishment to pull Taiwan into China's orbit, and ultimately its control.²⁹ In Taiwan, the view of China as an economic tractor-beam pulling Taiwan into a rapidly decaying orbit is trumpeted in government, media and academic circles. (The business community, of course, largely dissents but is forced to keep its head down to avoid being fingered as the cause of the problem.)

Interestingly, there appear to be wildly divergent political motivations for Beijing's and Taipei's convergent assessment of the destabilizing effects of cross-Straits economic interaction. I encourage others to tease out these issues more expertly. I would suggest, however, that Beijing may have found the economic engagement issue to be a politically plausible, though not empirically proven, means to 'climb down' from their previous aggressive posture. For Taipei's current administration, the specter of imminent economic absorption can be useful for mobilizing the society economically and politically.

The US has vital interests in the Strait of Taiwan. Not only is this area key to the stability of the Asia-Pacific region, there are also vital and growing economic interests now spanning this political fault-line. Given the complexity of cross-Strait economic interaction and our distance from it, it's tempting for us to lazily concur that this interaction must be introducing immediate instability simply because Beijing and Taipei both tell us this is the case. But our interests in this area are too

28. A good starting point for this literature is given by David Shambaugh, 'The military-political dimension in the US-China-Taiwan triangle', a presentation to the conference on 'Taiwan and US Policy: Toward Stability or Crisis?', US Capitol, (9 October 2002).

29. Lin Chong-pin, 'Beijing's agile tactics on Taiwan', (2002).

great for us to take this conclusion on faith. My analysis suggests a contrary outcome. First, the cross-Strait IT interaction is entirely in conformity with broader globalization trends. Globalization does bring the stress of change but it also brings higher degrees of interdependence. Second, the evidence suggests that leverage in the IT sector is not in Beijing's hands but in the hands of Taiwan's IT innovators and the forces of the free-enterprise global supply chain.³⁰ With a dominant share in China's export industry, a growing share in China's local market, and strong R&D roots in Taiwan, it does not appear to be a win/lose story. Third, Taiwan manufacturers and managers are now bringing millions of Chinese workers into direct contact with global norms of business. This development would appear to directly support US policy goals of resolution of cross-Strait tension through peaceful interaction.

IX

Mao Tse-tung's dictum 'Politics in Command' expressed his conviction that politics was in firm charge of the Chinese Communist Party's socialist march toward the perfection of human society. Although the goal of Communist utopianism has now been discarded, scant decades later, on the dustbin of history, there is a curious persistence in many quarters to the notion that politics always trumps everything else.

To be sure, human affairs are not determined by objective reality. They are determined more by how actors with the political power to influence the lives of others perceive those realities prior to taking action. Incontrovertibly, a single rash finger on a nuclear button can undo, in a flash of subjective delusion, the real-world creation and industry of countless individuals built up over many years.

The converse, equally valid proposition, however, is that human action cannot be sustained for long if divorced from the conditions of objective reality.

Globalization is an imprecise, catch-all phrase for some fundamental trends objectively transforming the world we inhabit.³¹ The accelerating power and pace of technological change is one element. The increased worldwide flow of people, products, money and ideas is another element. Whether perceived favorably or not, virtually every society everywhere is now being forced to adapt to these changes in the external world.

What does globalization imply for the troubled state of cross-Strait relations over the next decade or two? Surely not any definite answers. But a few simple conclusions are warranted. First, the view of technology diffusion and business decision-making across the Strait of Taiwan can be easily distorted the more the

30. For an example of how the decision to relocate notebook/laptop production to China was jointly undertaken by Taiwan OEM firms and their brandname partners from the US, Japan and Europe, see the section on 'Multinational corporations and cross-Straits economic interaction' in Szu-yin Ho and Tse-kang Leng, 'Accounting for Taiwan's economic policy toward China'.

31. For a typology of Realist (politics trumps all) vs Global Society/Interdependence (globalization and economic interdependence) viewpoints in International Relations, see Ole R. Holsti, 'Theories of international relations' (<http://www.duke.edu/~pfeaver/holsti.pdf>).

field of vision is narrowed down from its proper global sweep. Second, to sustain the benefits of globalization, both China and Taiwan will need to keep pace with the attendant challenges which globalization ineluctably brings. The threat SARS now poses to regional growth is only one example. Third, globalization will never preclude the risk of open conflict but can, if properly managed, keep raising the costs of open conflict to more and more unacceptable levels for the two parties themselves as well as for their regional and global partners. Thousands of threads of interconnection³² can weave a strong web of interdependence.