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**CRISIS AND INNOVATION IN JAPAN: A NEW FUTURE  
THROUGH TECHNO-ENTREPRENEURSHIP?**

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## Introduction

The 1990s have been called Japan's lost decade. The decade began with the collapse of Japan's "bubble" as share prices plunged 40 percent in 1990, followed by a sharp decline in land prices. The heady spiral of the late 1980s "bubble economy" now became a vicious circle of bad debts and declining asset values. A string of high profile corporate failures followed, and the decade closed without a full resolution of Japan's financial crisis. Nor was the crisis limited to the financial sector. Major construction companies which had rashly offered developers collateral or guarantees during the bubble boom were only kept alive by massive injections of public funds in the form of stimulus packages.

Eventually, malaise hit Japan's dynamic manufacturing heartland. After a period of massive investment in the late 1980s a substantial cyclical adjustment was to be expected, but at the same time the cumulative hollowing out effects of foreign direct investment (FDI) and difficulties in reorienting domestic operations towards higher value added, knowledge intensive goods and services began to be felt, particularly in the SME (small and medium-sized enterprise) sector. Large trade surpluses continued, with new opportunities for equipment exports to power the growth in East Asian manufacturing prior to 1997, but there were now growing signs that many Japanese companies were falling behind in the fast-moving, fiercely competitive, global "new economy" which was emerging.

As companies set about restructuring, insecurity spread, and consumers kept their wallets shut. Exhortations to spend by politicians and bureaucrats were to no avail. On the contrary, their inability to deal with the country's crises — and a string of high-profile scandals — undermined their credibility, and with it, faith in Japan's future. The loss of confidence was palpable. People began to talk about "system fatigue" and "system failure", and calls for root and branch reform mounted. Now all Japan's woes were bundled into a box marked "system" — the same box to which all its strengths had been assigned a decade earlier.

What *were* the causes of Japan's crisis (or crises)? Were they linked to those of the Asian Crisis? Were they "systemic," curable only by a thoroughgoing dismantling of the "Japanese system?" More pointedly, what has been done to address Japan's crisis (crises)? This paper will explore these issues, particularly the last of these questions, by focusing on attempts to nurture/rekindle "techno-entrepreneurship". The paper also considers whether these attempts are being carried out under the spirit of "techno-nationalism," or are likely to lead to "techno-globalism."

The focus on techno-entrepreneurship is deliberate. Popularized versions of Japan's developmental state model (held responsible first for Japan's economic miracle, and more recently for its crisis) frequently present an oversimplified view of business-state relations in Japan, and devalue the role of entrepreneurship. Samuels (1988: 19) notes that such models "rest on four often contradictory assumptions": harmony

among interests in society; state independence and state control; state strength, and often prescience; and the inexorability of development. His “reciprocal consent” model sees different and sometimes competing interests, a distinction between jurisdiction and control, negotiation and compact, and choices and contingency. Regarding entrepreneurship, the issue is not just recognizing its contribution, but also different sources or types. Most attention has focused on large firms and their links to the state through industrial policy, but as Morris-Suzuki (1994) shows, in addition to this central or core dynamic, a “peripheral” dynamic featuring small firms and local communities has been vital in Japan’s industrialization and technological transformation.

Together, Samuels’ “reciprocal consent” and Morris-Suzuki’s “social networks” point to diverse sources of innovation as well as problems, which must be examined when considering prospects for techno-entrepreneurship. Concretely, after looking at Japan’s financial crisis and changes in the financial sector, I will look at crisis and response in the large firm (technology champion) sector as well as the small firm sector, science and technology policy and the changing role of universities, and “competitive government”. A third criticism of much developmental state writing is that it focuses almost entirely on “pie” creation, and either ignores or oversimplifies distributional issues. The section on competitive government will consider this dimension.

Japan is seen as a paradigmatic techno-nationalist country. Samuels defines this as “the belief that technology is a fundamental element in national security, that it must be indigenized, diffused and nurtured in order to make a country rich and strong”.<sup>1</sup> While it is hard to imagine this belief disappearing, contested visions and competing ideologies might weaken its effectiveness. The importance attached to making the nation rich and strong – the *ism* – might also become weaker, and techno-globalism might either supplement it, or be used to pursue it. The concluding section considers these possibilities.

### ***Japan’s Financial Crisis***

As in the Asian Crisis countries, Japan’s financial crisis was preceded by a program of financial liberalization, and some dubious policy choices, although Japan’s crisis itself was not triggered by a sharp reversal of fund flows and currency turmoil. From the late 1970s Japan came under strong pressure to stimulate domestic demand as its trade surpluses mounted. Monetary policy was relaxed in 1983 and again in 1985, setting in train an investment spree which should have been reined in long before 1989, by which time Japan’s asset bubble had grown to enormous proportions (cf. Whittaker and Kurosawa, 1998). The “lost decade” of the 1990s began with share prices plunging 40 percent, followed by a sharp decline in land prices. The heady ascent of the late 1980s now became a vicious spiral of bad debts and declining asset

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<sup>1</sup> Samuels, 1994, x. Techno-nationalism may be a shared belief, but pursuit of it involves “contested visions and subordinated preferences.”

values. As the bubble collapse gradually turned into a full-blown crisis, with a string of financial institution failures of increasing magnitude, criticism mounted over prevarication and mismanagement by the financial authorities. In part the indecision was linked to the belief that an upturn in the economy would eventually take care of many of the problems; in part it was also linked to questions over how the blame — and hence the pain — for imprudent loans should be apportioned.

Stronger banks, already struggling to meet BIS capital requirements, became increasingly reluctant to bail out weaker institutions in traditional “convoy system” manner. Three failures in November 1997, including the first “city bank” (Hokkaido Takushoku) and, a week later, the fourth largest securities company (Yamaichi), marked the culmination of this process. Coming hard on the heels of the Asian Crisis, these failures marked a fundamental turning point in views on reconstructing the financial sector. The subsequent injection of public funds was small and shown to be ill-judged when the Long Term Credit Bank (LTCB) went bankrupt shortly after, but in June 1998 a Financial Reconstruction Commission was set up, and a massive financial stabilization package was put in place.<sup>2</sup>

Restructuring in the financial sector followed, partly stimulated by Japan’s Big Bang financial de-regulation program. First, a string of mergers among leading city banks was announced which would have been considered unthinkable a few years earlier, as they crossed traditional zaibatsu/keiretsu boundaries (such as Sumitomo with Sakura [Mitsui], IBJ with DKB and Fuji). Accompanying these announcements were mergers among related financial institutions, and eventually life insurers.<sup>3</sup> These mergers, which created four big financial groups, may not mark the collapse of the main bank system, as the credit squeeze has forced companies to strengthen ties with main banks, but they do mark the beginning of a new chapter in Japan’s financial system.

Second, there has been a conspicuous increase in participation — ownership, activities and influence — in Japan’s financial markets by foreign financial institutions. In some cases this has been achieved by picking up the pieces of failed Japanese institutions, such as Merrill Lynch of Yamaichi and Ripplewood Holding of the LTCB. Seven of Japan’s life insurance companies have also been absorbed by foreign insurers. But in other cases this participation has been actively sought by Japanese institutions struggling to survive in a rapidly changing and competitive environment. Foreign institutions are seen to have more competitive financial products and management know-how, and tie-ups with them are sometimes seen as preferable to tie-ups with rival domestic institutions. The trend has also been encouraged by the dissatisfaction of individual savers, customers and policy holders

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<sup>2</sup> The total stabilization package represented the equivalent of 12 percent of Japan’s GDP: Sakaiya, 1999.

<sup>3</sup> On the announcement of the Sumitomo-Sakura merger, the Asahi Shinbun (15 October, 1999) commented: ‘The merger of these former zaibatsu banks heralds the end of the era of postwar Japanese corporate society.’ The four financial groups were Mitsubishi-Tokyo, Mitsui-Sumitomo, Sanwa-Tokai and Mizuho (IBJ-DKB-Fuji).

with poor products and services of domestic institutions. Increased participation by foreign institutions also marks a new chapter in Japan's financial sector in terms of openness, which many believe will spur — is spurring — fundamental changes to Japanese capitalism.

Third, there has been a reduction in cross shareholding, a practice in which companies with business relations also hold a portion of each others' shares (also called "safe shareholding" because it inhibits hostile takeovers). Speculation over the demise of this practice goes back to the 1980s, but sales of mutual shares increased markedly from about 1997, as banks set about improving their capital adequacy ratios and clearing up their bad debt problems. In addition to banks, life insurance companies, trading companies and restructuring businesses have also been selling such shares to the tune of \$20 billion per year. The introduction of market value-based asset accounting from 2001 (cross-held shares from 2002) is expected to accelerate the sell off, as it will inflate asset bases and reduce return on investment (ROA).<sup>4</sup> Increasing foreign participation in Japanese stock markets — foreign companies and individuals owned 18.6 percent of Tokyo SE-listed shares by value in 1999, up from 8.1 percent in 1994 — exerts a similar pressure, as it makes companies more mindful of share prices, capital efficiency and investor relations. It would still be premature to forecast the end of cross-shareholding, but stable shareholders are beginning to express more "voice" than they did in the past.<sup>5</sup> And the increasing centrality of the stock market and its volatility also marks a new chapter in Japanese corporate society.<sup>6</sup>

Japan's financial system was undoubtedly very effective in providing stable funds for industrial development. But the wealth that this generated, and the transition from the late 1980s was much less effectively managed, resulting in Japan's financial crisis. Underutilized funds in Japan ultimately fueled bubbles elsewhere in East Asia: from

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<sup>4</sup> *Nikkei shinbun*, 8 September 2000. Some businesses like Hitachi, Mitsubishi Heavy Industry and Sumitomo Chemical introduced such accounting practices from mid 2000. The move is part of a drive to introduce 'global standards' and transparency in accounting practices in Japan.

<sup>5</sup> Cf. Inagami and Rengo soken, 2000. Their 1999 corporate governance survey of listed company executives found an average 'stable' shareholding ratio of 53.8 percent of shares issued (most surveys cite around 40-50 percent), with main banks, employee shareholding associations, other Japanese financial institutions and key customers figuring prominently. 61.3 percent thought that the current ratio was 'about right', 22.9 percent thought it desirable to reduce the ration, and 12.9 percent to increase it.

<sup>6</sup> The chairman of the Financial Reconstruction Commission called on Japanese banks to refrain from selling cross-shareholdings in November 2000 to decrease stock market volatility. Some observers pointed out that the FRC had previously approved cross-shareholding sales as part of reconstruction plans submitted by banks to receive public funds under the recapitalization program (*Nikkei Weekly*, 4 December 2000). The contradiction encapsulates the dilemmas this development poses.

just \$40 billion in early 1994, loans by Japanese institutions to Asia surged to \$265 billion in 1996. In this sense, Japan contributed to the Asian Crisis.<sup>7</sup>

### ***Japan's technology champions***

The Japanese “system” should not be understood as a static set of practices; it has evolved according to endogenous and exogenous pressures over the past hundred years. Perhaps the irony is that its recognition as a “model” (in the normative sense), and the worldwide attention it gained in the 1980s, may well have reduced the incentives to address these pressures just when they needed serious attention; if failure leads to success, the reverse is also true.<sup>8</sup> This becomes even more clear when we look at Japan’s large manufacturing “technology champion” sector.

In the early 1990s Japan’s post-bubble recession seemed to be largely confined to the financial sector, and the vitality of its manufacturing appeared largely intact. There were, to be sure, pessimists who argued that the relocation of manufacturing operations abroad was causing a hollowing out of domestic industry, that as the most productive operations were being relocated, Japan would be left with a high-wage, low productivity domestic economy. And there were others who argued that large manufacturers were resting on their laurels, were failing to keep up with rapidly changing markets, and that there was a conspicuous shortage of entrepreneurial start-up firms.<sup>9</sup> But by and large, Japan's manufacturers continued to operate in profit, stratospheric trade surpluses continued, and the performance of this sector made Japan's recession bearable. In terms of technology, too, despite alarm in some quarters about U.S. domination of new high-tech industries, surpluses in technology trade expanded rapidly, and the structure of Japan’s exports showed a steadily increasing share of capital goods.<sup>10</sup>

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<sup>7</sup> Subsequently, too, Japan’s domestic malaise limited its ability to absorb exports from the Crisis countries, delaying their recovery. Conversely, while Japanese exports to East Asia were negatively affected, Japanese manufacturers with FDI operations were able to insulate themselves from the worst effects through internal balancing, and their medium term strategies regarding where to locate production were not fundamentally changed: e.g. Takii and Fukushima, 1998. Japan’s global trade surplus actually rose by almost 30 percent in 1998.

<sup>8</sup> A similar argument is made by Y. Funabashi, citing Cees van Lede (Chairman of Akzo Nobel Arnhem), who argues that the recent vogue for acclaiming Holland as a new model is a ‘kiss of death’. Belief in models creates rigidity in thought, and inhibits responsiveness to major changes (*Asahi shinbun*, 20 April, 2000)

<sup>9</sup> See, for example, some of the contributions in *Made in Japan: Revitalizing Japanese Manufacturing for Economic Growth*. As the title suggests, this book was a response to the MIT Productivity Commission's *Made in America*. It was published in Japanese in 1994.

<sup>10</sup> Imports of technology (licenses, blueprints, etc.) in 1997 were valued at ¥438 billion, largely unchanged from 1992, when exports began to surpass imports, while

Such optimism evaporated in 1998. Gloomy news of the Asian Crisis, Japan's financial crisis, bureaucratic scandals and political maneuvering, was joined by reports of mounting losses in the manufacturing sector, factory closures, downsizing and rising unemployment. Subsequent developments to some extent mirror changes in the financial sector; consolidation and restructuring, increased foreign participation and rationalization of trading relations. The automobile industry not only saw Renault acquire a 37 percent stake in the troubled Nissan, and Daimler-Chrysler raise its stake in Mitsubishi Motors to 34 percent, Ford in Mazda to 34 percent, GM in Isuzu to 49 percent and in Suzuki to 20 percent (January 2001 figures), but a string of new collaborative alliances which had upstream and downstream knock-on effects. Nissan's restructuring plan, for instance, which called not just for the closure of several factories but a halving of the number of suppliers, prompted consolidation in the steel industry around the giant New Japan Steel on the one hand and Kawasaki-NKK on the other. In the electronics sector Hitachi and NEC merged most of their DRAM operations, NEC and Toshiba merged their satellite operations, and Hitachi, Toshiba and GE their nuclear fuel operations. In October 2000 Sony took the hitherto inconceivable step of selling two of its domestic factories to leading U.S. contract manufacturer Solectron.

Globalization of production networks, global alliances to reduce development and marketing costs, and intensifying competition are clearly factors behind these developments, but they fail to explain fully the difficulties faced by many manufacturing companies, or why the global dominance some industries enjoyed in the 1980s was eroded in the 1990s. There was, of course, a problem of over-investment (and over-recruiting) during the bubble years, but that was not all. To risk a broad generalization, past success led to failure in at least three ways. (It is a generalization because in some capital goods sectors Japanese dominance in world markets has strengthened in the 1990s.) First, success generates wealth, and as Porter (1990) argues, in the wealth-driven stage of corporate development, stewards replace entrepreneurs in senior management positions, reducing the drive to innovate.<sup>11</sup> The Japanese manifestation of this was large firm malaise of the 1990s. In retrospect, the beginnings of this transition can be traced to the turbulence of the 1970s, when ambitious new projects were reined in and decision-making began to gravitate

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exports had almost doubled to ¥831 billion (<http://www.stat.go.jp/053313.htm>, accessed 18 October, 1999. Export figures include licensing arrangements with foreign subsidiaries, and should be treated with some caution, but the US was the largest importer of Japanese technology, and Japan's technology BOP with the US moved into surplus in 1996-97. Japanese sources accounted for 20.7 percent of US patents in 1990, 17.7 percent in 1999. (US sources rose marginally, from 55.1 percent to 55.5 percent): USPTO online figures.

<sup>11</sup> 'Stewards ascend to senior management positions in place of entrepreneurs and company builders. Belief in competition falls not only in companies but in unions, which both lose the taste for risk-taking. The compulsion to innovate diminishes as the willingness to violate norms and bear disapproval falls' (Porter, 1990, 556).

upwards to over-burdened senior executive committee meetings. Second, the response to that turbulence was aggressive process innovation and the introduction of microelectronics based technology which, combined with co-operative industrial relations and wage restraint (from 1975), propelled Japan's machine industries onto the global stage. The success of this strategy established the pattern for reacting to future problems into the 1990s, a tendency reinforced by international attention and acclaim. As Baba (1997) observed, however, new sources of competitiveness were emerging, from outside Japan.<sup>12</sup> Whatever might be said about brutal downsizing methods, the focus by U.S. and some European manufacturers on raising white collar productivity, and using information technology to achieve it (in addition to learning from Japan) shrank the productivity gap which Japanese companies had earlier opened.

Third, indirect workers in Japanese companies expanded rapidly during the 1970s, and while support staff collar productivity was recognized as a problem, few concerted efforts were made to resolve it. To address it fundamentally would probably have required major reforms in personnel management, potentially threatening industrial relations stability, which was also beginning to attract world-wide attention. The combined effect of these three factors created an inertia towards new conceptions of innovation as long as profits were still being made.

It is ironic that companies which gave the world "just in time" manufacturing, *kaizen*, etc., should have to import ERP (enterprise resource planning) systems from abroad and hire foreign consultants to advise on business process re-engineering and outsourcing in the late 1990s. Such ironies might be related not just to the success of the Japanese system, but the fact that it is a *production-oriented* system, which has placed greatest emphasis on value creation through production.

### ***The case of the giant Hitachi***

A case study lends empirical weight to these comments.<sup>13</sup> While no single company can be considered representative of the whole Japanese manufacturing sector, Hitachi is a major bedrock presence, ranked third globally in terms of sales in the electric, electronic and computer industries by Fortune in 1997 (after GE and IBM), with consolidated sales in the financial year 1997-98 of \$64 billion. The core company Hitachi Ltd. had around 70,000 employees, but employees of the 1000+ Hitachi Group companies totaled around 330,000. Founded in 1910, the company became a giant through a combination of entrepreneurship (including a strong commitment to R&D and technology development) in a growth economy, internal organization characterized by a rigorous and decentralized factory profit centre system, top-down

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<sup>12</sup> 'The era for manufacturing is coming to an end in which competitiveness is determined by superiority of shop floor technologies. The principles forming a new type of competitiveness have appeared from outside Japan' (Baba, 1997, 221).

<sup>13</sup> This section draws on extensive interviews on restructuring and HRM reforms at Hitachi, 1996-2001, a fuller presentation of which is forthcoming.

and bottom-up improvement processes, and after the landmark Hitachi Dispute of 1950, an employment system characterized by welfare corporatism (Dore, 1973). Having never made a loss since its postwar listing in 1949, however, the company announced a massive projected loss for the financial year 1998-99 of over \$2 billion. Reacting to the announcement, the leading economic newspaper commented:

Japan's economic woes have now reached the major electric machine companies which support the nation's very economic foundations. The picture of this gigantic battleship Hitachi, losing its way, unable to take effective measures before this massive loss materialized, is the very picture of Japan today.<sup>14</sup>

Why could the company, which was reputed to be able to weather any recession, not take effective measures before the loss materialized? What went wrong, and what measures have been since taken to set things right? Certainly the situation was not helped by the “silicon cycle”; semiconductors generated half Hitachi’s profits in 1995, and half its losses in 1998. Nor was it helped by recession within Japan and fallout from the Asian Crisis. But operating and after tax profits had been declining since the 1970s, and it was clear to all that the problems were more fundamental. In general terms, the problems were those referred to above; Hitachi had become a victim of its own success. It had lost its erstwhile vigor, decision making had become too slow, and it was now an “also-ran” in too many markets, a situation which prompted “Neutron Jack” Welch’s famous restructuring of GE in the early 1980s. As competition had intensified, Hitachi had begun to be outmaneuvered, by smaller more focused manufacturers in Japan, and by the combination of de facto standard technology generators within Silicon Valley on the one hand and upgrading Taiwanese and Korean manufacturers on the other.

Hitachi’s 1998 loss was turned into a crisis — intensified by the sense of crisis elsewhere in the economy — through which a broad consensus was generated for more radical reform than previously attempted. The reforms, however, were different from those of GE. Hitachi attempted to downsize to speed up decision making and improve responsiveness to market conditions without massive layoffs (organization reforms), to increase profitability and ROE without sacrificing the interests of other stakeholders (corporate governance reforms) and to improve white collar productivity without precipitous delayering (HRM and BPR reforms). Let us look at these briefly in turn.

In June 1998 Hitachi announced that it would take advantage of changes in the Commercial Code and Antimonopoly Law to institute a holding company structure. Unlike Toshiba it would not separate most of its operating divisions into legally separate companies, but observers assumed it would move in this direction eventually. In the meantime, mature operations would be spun out as separate companies, and the company would concentrate on information business.

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<sup>14</sup> *Nikkei shinbun*, 4 September, 1998. The actual loss for the year, including special write-offs, was \$3 billion.

Headquarters staff would be slashed, and board members would be limited to those responsible for corporate planning. The level of investment requiring corporate approval would be raised by a factor of ten.

Analysts believed that this attempt to cure “large firm malaise” was vague and lacked strategic vision. Organization reform was one thing; they wanted to see evidence of strategic focus, and plans for exit from non-profitable areas. The media, too, became scathing when the projected losses were announced in September (as suggested by the quote above). In October the company announced that its operating units would be organized into 11 virtual companies, each with a CEO, one of which would be spun out immediately. In effect, it was trying to create a number of smaller “companies,” each of around 6,000 employees, with authority and ability to respond rapidly to changes in markets and technology, and crucially with the potential to set separate pay and conditions, but without losing the benefits of access to the larger company’s resources. Still the skeptics were not convinced.

On 1 April 1999 a new president told new recruits that he would eschew time consuming *nemawashi* and *ringi* consensus building in favor of “real time” decisions. He told CEOs of the new business groups that he did not want to deal with things they should be deciding. Within weeks the fortnightly top Management Meeting was said to be dealing with a fraction of the business of its forerunner, the Senior Executive Meeting, and decisions were being made on the spot. Internal skeptics began to think that change *was* possible. For external skeptics the “i.e.Hitachi Plan” was unveiled in November 1999, setting out in unprecedented detail how strategic focus in information and electronics (“i.e.”) would be achieved (including the investment of some \$500 million in new internet-based solutions business, \$3 billion in acquisitions, equity participation and alliances and \$2 billion in existing information technology business), and exit from unprofitable business would be carried out. It was an aggressive plan which focused on business expansion rather than employee reduction.

An important part of the plan was the pledge to raise ROE from 1.2 percent in 1999 to 7.5 percent by 2003, and subsequently to 8 percent. Declared the president at the press conference: “Our priority is to imagine ourselves in the shoes of shareholders. We must change our mindset.”<sup>15</sup> Behind growing attention to ROE and “IR” (investor relations) were legal changes making it easier for disgruntled minority shareholders to sue corporate managers, and a decline in stable shareholding and reluctance by Japanese investors to invest in the stockmarket on the one hand, and growing participation by foreign investors in Japan’s stock markets. In 1989 foreign investors owned 10 percent of Hitachi’s shares; in 1997 the figure was 27 percent. Eight percent was considered the minimum level to achieve global standards in ROE. But it was also considered the minimum level needed for management purposes, to restore the company to health and ensure future development. Changing mindsets meant forging more active relations with investors, improving information disclosure

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<sup>15</sup> Cited in *Financial Times*, 11 November 1999.

and paying greater attention to profitability, but it did not mean disregarding the interests of other stakeholders. The executive stock option scheme introduced in 2000 was also designed to change mindsets, but not to bring about wholesale conversion to shareholder capitalism. (There were, of course, different views within the company on stakeholder interests and conversion to “global standards”.)

Human resource management (HRM) reforms began in 1998 with the introduction of a new system designed to stimulate the productivity and creativity of the company’s “knowledge workers”.<sup>16</sup> Personnel managers were particularly keen to move away from what they described as “management based on time (worked)” and “management based on seniority,” and to give greater recognition to achievement. They introduced a new qualification system, designed to make the criteria for promotion transparent; a new wage system, which retained a 40 percent base component but emphasized results in the remaining 60 percent; and a new work system with more flexible working patterns. Subsequently a package of family-friendly measures was introduced and welfare schemes were reformed to offer greater choice, modifying but not eliminating the communitarian basis of employment relations. Employment relations are moving from a “corporate community” model to a “partnership” model.

Hitachi was also beginning to raise its payback to individual researchers as a result of technology license income.<sup>17</sup> Such moves by leading Japanese companies in 1997-99 reflected a growing pro-patent mood in Japan, the growing contribution of license fees to corporate income, and a desire to keep leading researchers and their know-how.

The organization reforms highlighted the issue of leadership within the company — “it was like trying to find 11 CEOs all at once” — and the need to rethink staff development. They also raised questions about what jobs should be done where, which led to a business process re-engineering movement in 2000 targeting personnel, procurement and accounting functions, underpinned by IT investment. The BPR movement was significant not only in its attempt to link the other pillars of reform together, but also in marking a basic rethinking of indirect functions and work. From “support staff,” indirect employees were to become value-enhancing professionals.

A further stage of this reform process will see the spinning out of some of these tasks into separate companies to provide specialist services for Hitachi Group companies in

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<sup>16</sup> In the 1960s, when its former HRM system was put into place, over half the employees were production workers; by the mid 1990s this proportion was less than 30 percent. The proportion of graduates had increased from 10 percent to over 30 percent.

<sup>17</sup> In 1997 it raised the upper limit from c\$50,000 per year to c\$100,000. The top amount actually paid to a researcher in 1998 was c\$75,000: *Nikkei shinbun*, 28 July, 1997; 12 May, 1998.

a “knowledge JIT”. This will add to the growing prominence of service companies within the group and the transition from manufacturer to solutions provider. The creation of Hitachi Capital in October 2000 (from the merger of Hitachi Credit and Hitachi Lease) also symbolizes this transition. Again, while it is tempting to draw parallels with GE, the president of this company is adamant he will not follow GE Capital’s business plan; his job is to support manufacture and improve investment efficiency, and growth will be mainly organic.<sup>18</sup>

How successful will these reforms be? The answer is important because the continued dynamism or otherwise of giants like Hitachi will have a major impact on the generation and diffusion of technology in Japan in the coming years. There is a tendency by some in the U.S. and U.K. to judge restructuring and reforms in Japan according to an Anglo-Saxon yardstick, or rather an Anglo-Saxon-ization yardstick, and to dismiss anything else as cosmetic. Rather, we should see these reforms as drawing some inspiration from the U.S., but attempting to extend rather than abandon the traditional productionist model, and transform rather than abandon the productivity coalition in which it is based.

Time (measured in years rather than months) will tell how successful the reforms are, in terms of restoring entrepreneurial vigor, and in forging a new system. The prospects of tapping hitherto neglected areas of productivity appear positive, but Hitachi’s repositioning brings it into direct competition with some fierce competitors like NEC. The reforms are mainly directed at Hitachi’s domestic operations, and Hitachi still has a long way to go before it can be considered a global company (despite having about 300 subsidiaries outside Japan, alliances with major foreign companies and a number of R&D facilities abroad). The long-term objective of 50 percent of sales outside Japan (compared with a 1998-99 figure of 21 percent) announced in the “i.e.Hitachi Plan” suggests a future round of reforms in this direction. It was envisioned that a substantial chunk of the ¥300 billion earmarked for acquisitions, equity participation and alliances would be spent abroad.

The “i.e.Hitachi Plan” also announced the objective of increasing patent activity overseas, and increasing intellectual property sales. In 1997 Hitachi’s license income (on a consolidated basis) came to around ¥50 billion, which was less than 1 percent of turnover, but a substantial chunk of profits.<sup>19</sup> Can Hitachi create de facto technology standards which will significantly boost this kind of income? Again, time will tell, but it is clear to corporate managers that the objective is important, and its realization depends not simply on stimulating the creativity and productivity of their own

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<sup>18</sup> M. Hanabusa, interviewed in *Nikkei Business*, 5 June 2000. GE Capital accounted for two thirds of GE’s 100 or so acquisitions (worth a cumulative \$51 billion) between 1997 – 2000. It also accounted for over 40 percent of GE’s profits (FT.com, 31 July, 2000).

<sup>19</sup> *Nikkei shinbun*, 28 July, 1997.

employees, but on forging various kinds of alliance, not only within Japan, but increasingly with partners outside Japan.<sup>20</sup>

Hitachi might be considered a champion of techno-nationalism in terms of its origins and early growth. Though this ideology might not have disappeared, other potent forces animate corporate managers today, including pride in their company, and a sense of responsibility to stakeholders, particularly to employees and those who created and built the company. Fulfilling these responsibilities might require the acquisition and development of technology, but it also requires a wide range of cross-border alliances and co-operation.

### ***New Entrepreneurial Champions?***

Some 80 percent of Japanese R&D takes place in the private sector, and most of this takes place in large firms.<sup>21</sup> While the research labs of large companies might generate most fundamental new technologies, however, small firms also play a crucial role in new technology development, application and diffusion into new markets. This has been true in key periods of Japan's industrial history, and has been particularly true in the United States and United Kingdom in the recent upswing of economic activity based on new technologies. Indeed the United States' lead in many new technologies has been extended by mechanisms which accelerate the incubation and growth of small firms so that they create standards to which others must work. Commentators have pointed to the lack of this dynamic as a contributing factor in Japan's lost decade, arguing that unless this dynamic can be generated, Japan will not regain its economic vigor.

The irony here is that while small firms hardly feature in the "Japanese model," Japan had, and still has, the highest proportion of SMEs (small and medium-sized enterprises) and employment in them of any major industrialized country, SME resurgence in the United States and United Kingdom notwithstanding (cf. table 1 at end of document for their presence in high tech manufacturing). They were traditionally considered a problem —too small, too many, an impediment to modernization – and were long synonymous with "subcontractor" in a dual structure,

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<sup>20</sup> At the 10<sup>th</sup> anniversary of its semiconductor collaboration with Cambridge University, Hitachi announced a breakthrough in the quest for a single-electron memory device, with the goal of commercialization by 2005 (cf. *Financial Times*, 18 May, 1999).

<sup>21</sup> In 1997 SMEs (in terms of employees, less than 300 in manufacturing, and less than 50 in other sectors) accounted for only 5.5 percent of corporate R&D according to a government survey. Those which engaged in R&D devoted an average of 1.9 percent of turnover to it, versus 3.5 percent for large firms: Chusho kigyo cho ed., 1999: 220. These figures undoubtedly underestimate the extent of R&D in small firms, much of which is not listed as a separate activity.

though a substantial number of them were not subcontractors.<sup>22</sup> Even today SMEs tend to be lumped together in the protected sector, and seen as a brake on attempts to create a more open and market-based economy.

In reality the SME sector has always been very mixed, with dynamic, entrepreneurial SMEs as well as static, livelihood businesses (cf. Whittaker, 1997). Change and transition have produced winners as well as losers — this has been part of the upgrading dynamic in the SME sector. The “new SME problem” of the 1990s is the breakdown of this Darwinian dynamic. Startup rates declined steadily from the late 1960s, and from around 1989, were exceeded by closure rates in most sectors of the economy (figure 1 at end of document). These rates, moreover, were much lower than in the United States,<sup>23</sup> and a rising proportion of startups were subsidiaries of large firms rather than independent companies.

There are a number of factors behind the decline in startups, such as greater sophistication and more resources needed; it became difficult to accumulate the necessary financial, technological, and human resources. Also, however, “stability-oriented social consciousness, as represented by progression through a single firm rather than founding a firm and developing it, has been one factor in stagnating start-up activity,” despite a “reserve army” of over a million would-be founders (Kamata, 1995: 4). Such “stability-oriented social consciousness” may be declining, but to date has been replaced more by apprehension of losing a job or being transferred permanently to a small subsidiary than the actual step of starting a business.

As for rising closure rates, on the face of it these appear to be caused by factors such as deregulation and large firms moving their production bases offshore, concentrating their orders in a smaller number of middle-sized subcontractors. An additional factor, however, has been generational change; retirement by 1950s and 1960s founders with no successor. Where there *are* successors, some have lost the entrepreneurial drive of their parents, but some inject new innovative vigor by introducing new technology, launching a new product or diversifying into a new field.

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<sup>22</sup> The proportion of manufacturing SMEs reliant on subcontracting for all or part of their income was less than half in the early 1960s, peaked in 1981 at 65.5 percent, and dropped back to 47.9 percent by 1998: c.f. Chusho kigyō cho, 2000: 408. Even when their subcontracting contribution came to be celebrated in the 1980s, the impetus for quality and technological upgrading was seen to come from ‘parent’ firms.

<sup>23</sup> Chusho kigyō cho, 1998, pp.306-07; Kokumin kin'yu koko ed., 1998, p.210. Between 1994 and 1996 annual startup rates in Japan were estimated at 3.5 percent of total stock, while closure rates were estimated at 3.7 percent. By contrast, startup rates in the US in 1994 were estimated at almost 14 percent, with closures at less than 12 percent. The figures are not directly comparable, however, since the method of calculation differs, and the Japanese method understates both startups and closures. Moreover, the larger Japanese ‘stock’ base should also be noted, but seldom is.

This points to a second SME upgrading dynamic – upgrading by *existing* SMEs, which have an established human resource base, a track record for borrowing money, and an income base to support diversification. Existing business are able to benefit from long term relationships while startups are often handicapped by them. Nintendo, whose Pokémon have captured the hearts and minds of children (and wallets of parents) worldwide, is the ultimate expression of this dynamic: it was founded as a trump card company in 1889! If this second dynamic is alive and well, the decline of the Darwinian (birth and death) dynamic gives less cause for worry. But is it?

The decline in subcontracting rates, referred to above, was accelerated in the late 1980s when large firms began to concentrate their orders into a smaller number of medium-sized firms. At the same time, however, increasing numbers of SMEs strategically attempted to diversify order sources or quit subcontracting because the traditional advantages — steady orders, not needing functions like marketing, etc. — began to be outweighed by continuous pressures to cut prices and adapt to “parent” company demands. While some built a strong technological platform, rising closure rates pointed to polarization within the sector. More recent surveys point to the continuation of this transition; those SMEs with either the least, or the most, subcontracting dependence on a specific “parent” report the greatest growth or stability of orders, while those in the middle suffer.<sup>24</sup> Some SMEs, therefore, have succeeded in joining the ranks of independent product makers or specialist process businesses, some are thriving through dependent subcontracting, while others are struggling.

Not surprisingly, Japan’s financial crisis affected small firms, especially from late 1997, when city banks and regional banks reduced their SME loans sharply in order to improve their own financial health and reduce risk. Extra loans from government financial institutions and credit banks, as well as special loans and credit guarantees, however, softened the impact and kept the number of bankruptcies in 1998 to 1985 levels (in terms of numbers, but not value).

A serious challenge is internationalization. If this is difficult for giants like Hitachi, it is even more difficult for SMEs. To give one example, die and mould makers in Ota Ward, Tokyo are renowned for their high technological levels, which contributes to the competitiveness of Japanese manufacturing. While they have been forced to look for new order sources or diversify in the face of rationalization by large companies, much of this has been done within the context of domestic markets. By contrast, Taiwanese die and mould makers may not boast the same technological levels —

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<sup>24</sup> Survey reported in Chusho kigyo cho ed, 2000: 409. According to another survey, ‘escaping from subcontracting’ was the third most common reason for SMEs to carry out R&D after ‘to produce competitive products’ and ‘to make products not made by other companies’, and ahead of ‘at the request/demand of clients’. The proportion responding to this option jumped markedly in the 1990s, moreover; *ibid*, 145.

though these are rapidly rising — but they have been aggressively seeking orders, not just from Japan and Chinese-speaking Asia, but the United States, South America and Europe.<sup>25</sup>

Moreover, those SMEs which set up production bases in East Asia (where most of their FDI is concentrated) were more severely hit by the Asian Crisis than were large firms. SMEs shed 21.4 percent of their employees in ASEAN and NIEs subsidiaries between late 1997 and 1998, while large firms shed only 6.6 percent, reflecting their relative ability to absorb the turbulence internally. Subsequent FDI also plummeted.<sup>26</sup>

Still, there are strong expectations that existing SMEs will emerge from the trials of the 1990s even stronger, and moreover that the former Darwinian dynamic can be rekindled. At the close of the decade, there were significant developments towards this end. Changes to the listing conditions of the over-the-counter (OTC) market in 1995 failed to produce a decisive surge, but in November 1999 a new Market for High Growth and Emerging Stocks (MOTHERS) market was created by the Tokyo Stock Exchange, and in June 2000 NASDAQ Japan was opened in a joint venture between Softbank and the Osaka Stock Exchange. Large funds were amassed both from abroad and domestic sources in anticipation of a boom in initial public offerings (IPOs).

Media attention focused particularly on the monthly parties of “Bit Valley,” attended by hundreds of young would-be entrepreneurs in their 20s and 30s, shunning the “salaryman” way of life or escaping from it: students, venture capitalists, consultants, and representatives of large computer firms.<sup>27</sup> A significant number of people involved in the Bit Valley phenomenon had lived abroad, particularly in the United States, and critically, a growing band of serial entrepreneurs were themselves becoming actively involved in incubating and accelerating the growth of new businesses. In the words of former NTT and DDI manager-turned-serial entrepreneur and professor, 1999 marked the beginning of a fundamental change in Japan towards an (SME) entrepreneurial-driven economy.<sup>28</sup>

Time will tell if he is right. A more cautious view —warranted in view of the past history of premature obituaries for Japan’s large firms on the one hand and

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<sup>25</sup> Interviews of die and mould makers in Japan and Taiwan in 1996. From 1991 to 1996 die and mould exports from Taiwan more than doubled (and the *proportion* of overall production exported almost doubled as well; Taiwan Mould and Die Industry Association mimeo); from Japan they rose by 17 percent (proportionately by slightly more, as overall production declined; JDMIA mimeo).

<sup>26</sup> MITI survey, cited in Chusho kigyo cho ed., 2000: 400.

<sup>27</sup> ‘Bit Valley’ is derived from the English translation of Shibuya (literally ‘bitter valley’), centre of a burgeoning cluster of 400-500 net companies (as of early 2000).

<sup>28</sup> S. Senmoto, interviewed in *Aera*, 27 December 1999 – 3 January 2000, p.29. Cf. also *Asahi Shinbun*, 10 October, 1999.

proclamations of a new entrepreneurial dawn on the other<sup>29</sup> — would be that future entrepreneurial dynamism will be a combination of restructured large firms and their small firm progeny, diversifying SMEs, and entrepreneurial businesses and startups, and the evolving relationships between them. This is particularly true in high tech industries, where small firms actually lost ground to large firms in the 1990s, both in manufacturing and in services.

### ***Creating a science and technology (S&T) policy***

Asserting the importance of entrepreneurship in Japanese economic development does not mean denying the role of government policy. While science and technology cannot produce economic growth without entrepreneurship — a common lament in the United Kingdom — entrepreneurship for a major economy ultimately (and increasingly) needs a pool of scientific and technological knowledge to draw from. And few would deny that the Japanese government and particularly the Ministry of International Trade and Industry (MITI) has, at least in the past, played an important role in making available to entrepreneurial businesses such a pool of knowledge, whether by assisting transfer from abroad, or encouraging its generation and diffusion in Japan.

The problem is the overwhelming prominence it was given in the “Japanese model” of innovation in the 1980s, often in an over-simplified form. Ironically, as in the corporate model (in fact, *linked to* the corporate model), success in the turbulent 1970s masked nascent problems, and made it difficult to address them fundamentally until the late 1990s. Equally ironic, Japan’s earlier success provoked a reaction in other countries, notably the United States, and the results of this reaction ultimately provided a new model for change for Japan. In 2001 Japan got its equivalent of the (US) NSTC, and inhibiting rigidities in business-state interaction were addressed under reforms inspired by the Bayh-Dole Act in the United States.

This interpretation does not see a linear decline in the relevance of industrial and S&T policy, to be solved simply by de-regulation. Major companies certainly do not see things in this way. While government money constitutes only 1-2 percent of Hitachi’s overall R&D budget, for instance, R&D managers contend that if anything its value has increased in the late 1990s. In a difficult business environment it has not only enabled them to maintain and expand research in key IT areas, but to move into new research areas like genome-informatics and micromachines, as well as medical

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<sup>29</sup> Dual structure critic Nakamura pointed to the large numbers of leading specialist medium-sized businesses (*chuken kigyō*) in the 1960s, and in 1970 to the sprouting of a new kind of knowledge-intensive, innovative small business, which he and his colleagues dubbed ‘venture business’. His claim that the age of large firms was over, and that Japan’s future belonged to such businesses, proved premature however. Large firms went on to give the world JIT, etc., while it was the venture businesses which were the casualties of the 1970s economic turbulence. There was a similar boom and fizzle in the 1980s, and to some extent in the 1990s.

and welfare-related equipment. They do, however, believe that change is necessary, and some of their senior managers have been on the commissions drawing up plans for reform.

The remainder of this section looks at attempts to create a coordinated national science and technology policy regime; improving structures to implement that policy and removing red tape rigidities limiting program effectiveness; and rehabilitating universities for S&T development.

By the 1980s Japan's leading manufacturers had emerged as powerful competitors in technology-intensive goods, creating not just massive trade surpluses, but accusations that they had been free-riding on basic technologies developed abroad under the orchestration of MITI. With diminishing opportunities for "catch-up" development, continued economic development, and disarming such accusations, required Japan to place greater emphasis on basic S&T development. Difficulties in this transition have been charted by Callon (1995). It resulted in jurisdictional conflict, for instance between MITI and the Ministry of Education, intensified by bureaucratic rigidities and technological change itself.<sup>30</sup> It led to both a proliferation of projects — partly in order to hedge technological bets, partly as a result of interministerial rivalry — and a lengthening of program timespans, increasing vulnerability to technological obsolescence. And the increased size and competitiveness of technology champions like Hitachi reduced the relative importance to them of government R&D funding, and their willingness to contribute to R&D consortia pursuing increasingly risky basic research under problematic conditions (*ibid.*).

Heightened by successes in the 1970s and fanfare accompanying projects like the Fifth Generation "thinking machine," expectations were often not met. Domestic criticism in the 1990s mounted over the S&T budget, the debilitating effects of interministerial rivalry, rigidities and red tape in research programs, and the weak contribution of universities. Passage of the Science and Technology Basic Law in November 1995 marked the beginning of a significant policy response. The enabling first Science and Technology Basic Plan of 1996 declared the objective of doubling government R&D investment from the 1992 level as soon as possible, with 2000-2001 as the target financial year. A former chairman of the Science and Technology Council of Japan hailed the announcement as a major turning point for Japan.<sup>31</sup> Apart from ¥17 trillion of investment, the Basic Plan addressed a number of qualitative concerns as well. It called for a more competitive funding and evaluation process, for more university-industry research cooperation, less encumbered by restrictions, and for greater post-doctoral researcher support.

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<sup>30</sup> The increasing overlap between computers and telecommunications resulted in 'turf wars' between MITI and the Ministry of Posts and Telecommunications (MPT), graphically depicted in Ebato's (1989) novel *Tsusansho* (MITI).

<sup>31</sup> M. Ito, quoted in National Science Foundation, Tokyo Office report 7 April, 1998.

These qualitative concerns were long-standing, and the continued lack of co-ordination of S&T policy at the highest level, and the resulting inability to allocate funds strategically according to nationally set priorities, were seen as fundamental obstacles still needing to be addressed. The need for further reform was underlined by problems with national projects like the H-II rocket, and the failure, despite cumulative capital investment of over \$2 billion by 2000 of Key Technology Promotion Center projects to generate patent income.

In January 2001 a new Science and Technology Policy Council was launched, situated in the new Cabinet Office and hence above individual ministries. Its 28 councillors included 14 politicians, 7 bureaucrats and 7 from the private sector (academics and business leaders, headed by the Nobel Laureate Shirakawa), and it had a staff of 60, mostly bureaucrats, but also private sector participants. This was to be the “control tower” ensuring joined up policy making and implementation. The second Basic Plan envisaged an expenditure of ¥24 trillion over 5 years from 2001, bringing S&T expenditure up to the target 1 percent of GDP, focusing on the four areas of IT, life sciences, environment and new materials/nanotechnology. Policy would be implemented and money allocated in these areas according to a Program concept, which considered not just R&D, but enabling legislation, institutions, dissemination, and downstream reforms.

Much of the inspiration for the “national strategy” reforms came from the US.<sup>32</sup> A second area of reforms drew inspiration from the UK, where chunks of the civil service were spun out as agencies by Mrs. Thatcher in 1988. The agencies had set budgets and performance targets, but they were given considerable freedom over how to attain those targets. In Japan, the 2001 Independent Administrative Body Law placed national research institutes and national universities under an agency structure, including the 15 research institutes under the new Economy, Trade and Industry Ministry (successor to MITI). Agency directors would have considerable discretion over designing strategy to meet targets, securing and allocating resources, and pursuing efficiency. New fixed-life centers and thematic programs in line with nationally set objectives would be established. Funding would be allocated competitively, and participation from the private sector solicited, both on boards of governors and active project management.

In addition, a Japanese version of the (US, 1980) Bayh-Dole Act was passed in 1999, liberalizing ownership of intellectual property rights (IPR) derived from publicly funded research. Companies had long felt IPR to be a sticking point in pursuing partnerships with national research institutes and universities, and indeed in R&D consortia, and compromise in the form of joint ownership did little to assuage this perception. Removal of this obstacle, and other rigidities under the administrative

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<sup>32</sup> The revamping of Key Technology Promotion Center activities, and the switch from capital investment to subsidy funding, also draws its inspiration from US practice: cf. *Nikkei shinbun*, 25 August, 2000.

bodies (such as greater flexibility in setting and spending budgets), might well see a surge in new partnerships.

Universities have been a weak plank in Japan's efforts to strengthen its basic S&T knowledge base and techno-entrepreneurship. There are historical reasons for this, including caution because of the pre-war association of university research with Japan's military-industrial complex, as well as a lack of funding. Expansion of higher education in the 1960s produced a remarkable growth in science and technology graduates, who fed the booming corporate central research laboratories and development centers, but the expansion was not funded sufficiently to maintain spending, and hence standards, on the research side. Subsequent budgetary restraint, especially in the 1980s, exacerbated the situation. University spending as a proportion of national R&D expenditure declined from 20 percent in 1978 to just 11.6 percent in 1990, and within this figure, the proportion spent on basic research declined from 57.3 percent to 52.9 percent.<sup>33</sup> As research facilities in universities declined, the tendency towards R&D concentration in corporate sector labs intensified. In 1997 universities accounted for a miniscule proportion (0.3 percent) of patent applications in Japan.

Such statistics conceal a more complex picture. Because of red tape in collaborative arrangements and intellectual property rights, university researchers have sometimes given their research findings to companies in return for donations to their labs.<sup>34</sup> Such relationships have tended to be multifaceted, but on balance, red tape inhibited the development of university-industry collaboration, and major companies sometimes found it easier and more fruitful to pursue such collaboration with universities abroad, which were more aggressively pursuing links with industry.

In 1998 a new law was passed to change to encourage technology transfer from university to industry. As noted, Bayh-Dole-type legislation was enacted the following year. A further step will be the change of status of national universities under the agency structure, which will be effected in 2004. Universities, like national research institutes, will acquire effective control over the management of their technological resources, including those developed with government funds, while their faculty members, no longer strictly national civil servants, will be freed from many of the former restrictions on commercial activities.

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<sup>33</sup> In national research institutes, the picture was similar: the proportion of R&D spending declined from 27.5 percent to 21.7 percent over the same time, and within this, basic research expenditure from 18.5 percent to 14.2 percent: Lee, 1997: 161, 188. The figures are for natural science only. See Kobayashi 1997 for a historical overview.

<sup>34</sup> Before it set up its technology licensing office, inventions at Tokyo Institute of Technology allegedly resulted in 230 corporate patents in one year (presumably 1997), only 20 of which were reported to the Institute's evaluation committee. In 1999, after the TLO had been established, the number of inventions reported to the committee jumped to 230: *Nikkei Weekly*, 8 January, 2001.

By late 2000, 17 universities had set up TLOs, with the objectives of auditing saleable and patentable research, assisting in patent acquisition, marketing the technology, and allocating revenues. In addition, there has been a rush by universities, in partnership with public and private organizations, to set up business incubators. Courses on entrepreneurship and business plan competitions are booming (and are particularly attractive in view of difficulties with graduate employment: roughly 20 percent of graduates in 2000 reportedly failed to find a job). Internships and short-term project placements, too, are on the rise (Mizuno, 2000). These developments mark the beginnings of a process evident in the US and UK; the establishment of wealth creation — through links with business, technology creation and commercialization and entrepreneur incubation — as a major objective of university activities, alongside teaching and research.

One effect may be to open up research conducted in Japanese universities to foreign companies. In October 2000, in the first such deal, Australian materials company Silex Systems Ltd acquired worldwide patents for a new semiconductor material technology from Keio University and its inventor Itoh. Said Itoh: “We first tried Japanese companies, but they said the technology wasn’t proven enough to have commercial potential. But when I contacted the Silex people, they immediately flew to Japan and made the decision quickly.”<sup>35</sup>

Attempts are being made to make Japanese universities more attractive to foreign students. Consternation that Japan is missing the benefits the United States gains from attracting ambitious students from around the world, and keeping some of them, is evident. The number of foreign students studying at Japanese universities plateaued in the mid-late 1990s at just over 50,000, but the government announced at the Okinawa Summit in July 2000 that it would seek to double this to 100,000. Visa requirements were also relaxed for IT specialists.

While techno-globalism may have been forced on MITI in the 1980s, there are compelling reasons why greater international collaboration and exchange are being sought in the areas of S&T development, even if for the end of making Japan richer and stronger. In closing this section, we should note growing fears in Japan that the public education system is failing in basic education, one of the state’s greatest contributions to industrialization. To the worry that schools stifle creativity, new fears have emerged of a wholesale decline in academic standards, or dumbing down, which many attribute to the Education Ministry’s more relaxed policies of the 1990s (*yutori kyoiku*).<sup>36</sup> Critics fear that these policies may become even more entrenched in forthcoming revisions to key legislation on education. Basic education is set to become a key focus of debate and reform in the coming years.

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<sup>35</sup> Quoted in *Nikkei Weekly*, 8 January 2001.

<sup>36</sup> Eg. the lead article of *Nikkei Business*, 5 June 2000: ‘Undermining Japan: the Collapse of Academic Standards’

## **Competitive government**

Recent changes to S&T policy and its implementation, designed to strengthen Japan's S&T generation capabilities, have as a backdrop changes in the state itself. As noted, criticism mounted of the Ministry of Finance's handling of the post-bubble financial clear-up, which reached a crescendo in late 1997-98 with the emergence of full-scale crisis. The Bureaucrats in the Ministry of Finance (MOF) appeared unable to judge the real situation of institutions they were supposed to supervise. It was also widely reported that they accepted lavish hospitality from financial institutions. Perceptions that MOF's obsession with fiscal prudence choked off a recovery in the making added to these criticisms, as did the snail's pace of administrative reform in general. Bureaucrats came to be seen as primarily concerned with protecting vested interests, a cause rather than a solution to Japan's woes.

This backdrop prompted two thrusts of reform. On the one hand there was a welter of legislation, some of which has already been noted. But in the context of techno-entrepreneurship, we might also note the Industrial Regeneration Law. Introduced in October 1999, its purpose was to promote corporate refocusing through, for instance, mergers and acquisitions and management buyouts. Additionally, various laws were passed by the November 1999 "SME Diet" to promote entrepreneurial business. These had the aim of doubling the number of startups within five years, raising IPO levels to those of the US, and to facilitating winding down and bankruptcy. The means used to devise these laws were familiar. Deliberation councils came up with recommendations, bureaucrats drafted legislation, and politicians enacted it. But they were characterized by three factors: their sheer volume, foreign — U.S. and U.K. — inspiration, and growing calls for competition and evaluation in the policy process itself. Ironically, however, many of the foreign policies used for inspiration were not evaluated in a similar way, resulting in the impression of frenetic change for change's sake.

On the other hand were efforts to reform the state itself. The most striking expression was proposals drawn up by the Administration Reform Council under the Hashimoto government in 1997 and eventually implemented in January 2001. These featured an attempt to strengthen the Prime Minister and cabinet function, to provide more effective leadership; restructuring the ministries and improving ministerial co-ordination through a new Cabinet Office; introducing an agency structure to make policy implementation more efficient; and streamlining central government, reducing national civil servants by 25 percent by 2010.<sup>37</sup> The objective of these reforms was to bring about shifts "from the public sector to the private sector" and "from the central government to the local governments".<sup>38</sup>

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<sup>37</sup> 'Central Government Reform of Japan' brochure of the Headquarters for the Administrative Reform of the Central Government, 1999, p.2. Cf. also <http://www.kantei.go.jp/jp/cyuo-syocho/>

<sup>38</sup> Critics fear the former may involve the continued proliferation of 'special corporations' designed to provide early retirement and *amakudari* ('descent from heaven') posts for

In the new environment, the state should not only be implementing measures to foster techno-entrepreneurship in the business world, it should be turning a critical eye on itself, and make itself more efficient and competitive. Both of these thrusts can be seen in the “e-Japan” campaign launched at the close of the decade to, make Japan the world’s most advanced IT nation within five years. The campaign was launched amid growing fears that Japan was missing out on the IT revolution, even falling behind some of the more nimble Asian states like Taiwan, Singapore and Korea. In 2000 the IT Strategy Council established four priorities – the creation of an ultra-high speed network infrastructure and competition policies, facilitation of e-commerce, nurturing high quality human resources, and digital e-government.

This was not the first e-government initiative. In 1994 plans were made for a local area network (LAN) for each ministry, and for each bureaucrat to be equipped with a personal computer. As in private industry, however, it was not clear why each individual had to have a computer, and work processes were not redesigned to improve efficiency. Critically, efficiency across ministries was not tackled. In preparations for the Budget forms from the various ministries had to be retyped for the MOF system, different forms continued to be needed for export permission (MITI) and customs/tax (MOF), and so on. Six years later, and with the benefit of observing the effects of legislation in the United States,<sup>39</sup> a new attempt was made. A bridge certification (digital authentication) authority linking key ministries was to be established by 2001, with all central ministries linked by 2003. By this date, too, central and local governments should be linked, more than 10,000 application and notification forms should be made available electronically, public procurement (except for public works) be done electronically, and new security technology developed. Industry observers, however, are not at all optimistic that these goals will be achieved (cf. Ishii et.al., 2000).

The problem is not just bureaucratic sectionalism, but political leadership. The 2001 state reforms in theory gave politicians decisive control over policy formulation and implementation but — and this is a dangerous irony — as a group they have shown themselves *least* capable of reform. Despite a decade of scandal, turbulence, tactical coalitions and indeed electoral reform, factional politics continue to hold sway, frequently under the children of an earlier generation of political leaders. Can those unable to reform themselves undertake the job they have given themselves? Worse, if “vote gathering machine” politics drive distributional policies unchecked, Japan’s public finances will continue to deteriorate.

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bureaucrats, and the latter continued ‘colonization’ of local government by central government bureaucracies, in addition to their colonization of the new central structures.

<sup>39</sup> E.g. the Federal Acquisition Streamlining Act, 1994; Paperwork Reduction Act, 1995; Federal Financial Management Improvement Act, 1996; Information Technology Management Reform Act, 1996; and Government Paperwork Elimination Act, 1998.

The Japanese state has not simply been concerned with pie creation but with pie distribution. Not just with making the nation rich and strong, but socially stable as well. In 1955, the year the Liberal Democratic Party was formed, the Japan Productivity Centre was launched under the three principles of employment: stability, labor-management consultation, and a fair distribution of the fruits of productivity increases among management, labor, and consumers. Shareholders were not mentioned! But full employment was established as government policy. The fruits of economic growth were also distributed to other groups such as farmers and SMEs through modernization funds and subsidies. Pie production and distribution were linked in this way, but by the late 1960s social goals such as full employment were being reached, and the Prime Minister Tanaka infamously appropriated the distribution side for private, political ends, a process which grew in the turbulent 1970s, and mushroomed in the 1990s. The vehicle was public works projects, fueled by a series of stimulus packages which have left Japan with the dubious distinction of having the highest level of public debt among OECD countries.<sup>40</sup> Such packages have been encouraged by foreign pressure, but chunks of them coincide with the LDP's attempt to stay in power through vote gathering machine politics. Unfortunately, it may well take a government bond crisis before this dynamic is seriously addressed.

### ***Concluding Discussion***

Problems relating to entrepreneurship and governance in Japan built up over the past two decades. Adherence to hitherto successful formulae in the face of a rapidly changing environment delayed transitions, intensifying the problems. The bursting of Japan's economic bubble in 1990 is often taken as a turning point, but in fact 1997-98 may be more decisive in terms of determination to confront the problems decisively. Japan's financial crisis deepened sharply in 1997, management problems in manufacturing intensified, and the Yamaichi shock gave a new significance to share price and corporate governance issues. The Asian Crisis added to the sense of vulnerability, and MOF's ability to rehabilitate the financial sector and steer the economy was called into question.

By contrast, the US economy appeared to be romping away, setting new records for sustained growth, and performing particularly impressively in the development, commercialization and standard setting in new technologies. Japan, it was feared, was missing the "new economy" boat, and bold reforms were necessary to catch it. There were a number of responses. First, a willingness to embrace new ideas embodied in inward investment and direct foreign management. Statistics tell this story. The ratio of the *stock* of inward FDI to outward FDI rose from 9.7 percent in

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<sup>40</sup> As Japan's 'Mr Yen' put it: '(G)overnment fixed capital formation is on a far higher level in Japan than other major industrial nations. Recently it has amounted to 6.6 percent of GDP and 41 percent of government expenditures... When one reviews the process of this system's formation, one can feel justified in calling Japan a public works state' (Sakakibara, 1998, 32. See also McCormack, 1996).

1998 to 18.5 percent in 1999 (compared with 35.7 percent for Germany, 70.3 percent for the UK and 102.5 percent for the US at the end of 1998). But in terms of *flows*, the ratio jumped from 13.2 percent in 1998 to 53.7 percent in 1999 (Kaji, 2000). The rush in 1999 was headed by French companies, who included not just Renault, but L'Oreal (cosmetics), Carrefour (retail), Axa Life (insurance), to name a few.

The jump in inward investment reflected not just a grudging willingness that foreigners might play a useful role in rebuilding failing institutions, but a growing acceptance that the importation of foreign management could stimulate and accelerate transition in Japan, and even that as a result investment friction would decline, and Japan would become more open and “normal” (which presupposes, of course, acceptance of the view that Japan has not been “normal”).

Second, at the policy level there was a flurry of new policy initiatives, many drawing inspiration from policies in the United States and United Kingdom, which were seen as having moved more swiftly to address economic stagnation problems in the 1980s. Here a growing mistrust of bureaucrats to deliver solutions in the public interest also increased the attractiveness of United States and United Kingdom concepts of accountability and government competitiveness. Third, at the corporate level (in manufacturing at least) management models were imported more dialectically. They stimulated debate on reform and possible solutions to problems which had been building up, but there was also a reluctance to abandon practices which had generated past competitiveness. At both levels, numerical goals inspired and justified by Western standards were used to overcome inertia to reallocating resources. (These included initiating S&T spending as 1 percent of GDP, doubling startups in five years, 8 percent ROE, doubling spending on employee training.)

At a deeper ideological level there was a swing from faith in social contract institutions and practices towards market-based solutions, often led by US-trained academics and an increasingly receptive media. This swing was less pronounced or shorter lived in manufacturing companies, where past productivity coalitions remained more intact. (Social justice concerns, however, had not disappeared. The IT strategy made much of avoiding a “digital divide,” and the “e-Japan” concept itself was balanced by others addressing the environment, ageing, and urban renewal.)

There were, not surprisingly, counter currents, some inspired by the Asian Crisis, which warned of the dangers of unfettered global capitalism, hasty financial deregulation and ideology-driven market reforms. Books such as *The End of Marketism* (Sawa, 2000) rejected not reform itself, but the way it was being carried out in Japan. Predominantly, however, the ideological air space of the late 1990s belonged to the Anglo-Saxon-inspired reformers.

This does not mean that nationalism is dead. As Dore (2001) argues, even those calling for a dismantling of “the barriers within,” far-reaching market reforms, the tonic of individualism and English as an official second language (notably the Prime Minister’s Commission on Japan’s Goals in the 21<sup>st</sup> Century) based their arguments

on what was good for the nation. While clearly different from exclusive or aggressive variants, this was a form of nationalism nonetheless.<sup>41</sup> Conversely, however, even the nationalist governor of Tokyo (co-author of *The Japan That Can Say No*) argued that independence from the United States must not be equated with isolationism, and expressed support for opening Japan up to large-scale immigration and “mixed blood” which would eventually produce a new Japanese culture (Ishihara and Tahara, 2000, 80; 238). The difference between Anglo-Saxon-inspired reformers and nationalist positions, therefore, was a matter of degree, reflecting the shared perception that Japan needed to change, while rejecting autarky.

Regarding *techno-nationalism*, it is inconceivable that policy makers and business leaders in Japan will stop believing that technology is a fundamental element in national security, that it must be indigenized, diffused and nurtured in order to make a nation rich and strong,<sup>42</sup> although for many (now rich) citizens the importance attached to making the country strong has diminished. But like nationalism, techno-nationalism has been predominantly outward-looking, even techno-globalist in expression.

The interplay of techno-nationalism and techno-globalism will have an increasingly important regional dimension in coming years. Within Japan, the late 1990s saw the beginnings of a rediscovery of Asia. Beyond ethnic cuisine, an Asian business presence is becoming more apparent, notably in high tech — including IT — sectors. Conversely, investment in Asia has grown, not just in manufacturing, but in services as well. This two-way process is a spur to new entrepreneurship.

The Asian Crisis prompted a flurry of reforms in many Asian countries, but also a questioning of the medicine handed out through the IMF. Japan’s proposal for an Asian Monetary Fund in the wake of the Crisis was squashed by the United States, but has subsequently been resurrected in a revised form under the Chiang Mai Initiative, which envisages a regional currency stabilization system based on bilateral agreements. Leaders from the “ASEAN plus three” (China, South Korea and Japan) countries agreed in November 2000 to consider holding regular summits towards creating a unified market. However regional integration develops — and it is likely to be slow — Japan’s engagement with Asia will differ from that under aggressive nationalism in the past.

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<sup>41</sup> Cf. Brown’s (1955) contrast of ‘new’ postwar Japanese nationalism with ‘aggressive’ prewar and wartime nationalism.

<sup>42</sup> This belief, in fact, has gained ground in many countries. Economic growth or well-being is increasingly understood to derive from the mobilization and use of technological resources. In an age of ‘globalization’, innovative practices abroad are more visible than ever, prompting benchmarking and fueling debates on competitiveness, which elected governments ignore at their peril. Nowhere is this more evident than the UK, where it features Foresight exercises, targeted science and technology funding, initiatives to foster techno-entrepreneurship, clusters around universities, mobilization of social science for these ends...

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Table 1 Small firm employment in high tech manufacturing industries in Japan, US and UK.

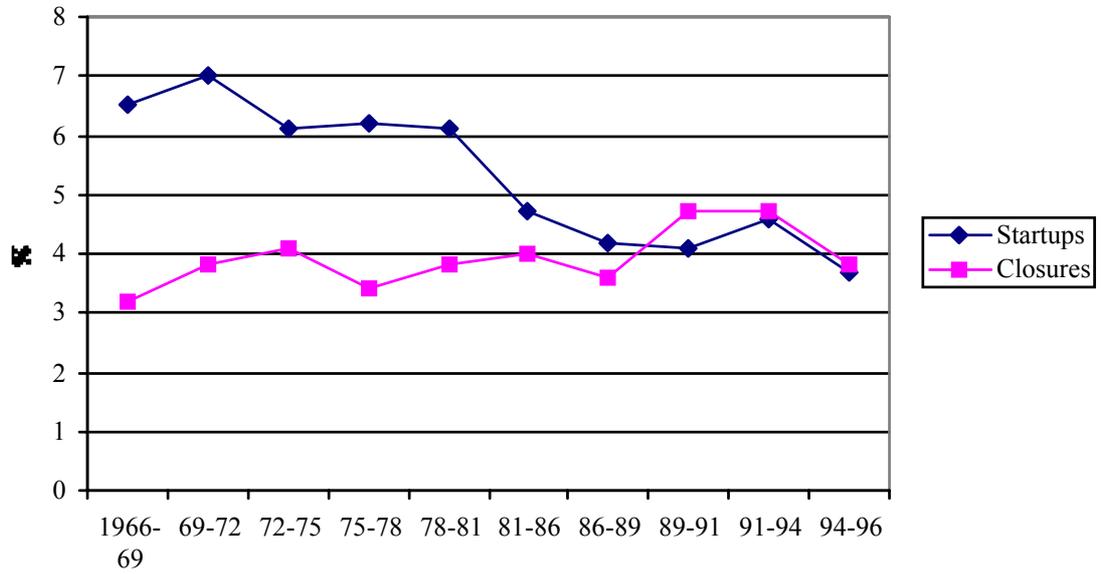
	Japan (1996)	US (1997)	UK (1998)
Chemicals	19	10	9
<i>(pharmaceuticals)</i>	<i>13</i>	<i>9</i>	<i>5</i>
Metal working, textile and special purpose machinery	46	42	39
<i>(special purpose machinery)</i>	<i>45</i>	<i>32</i>	<i>35</i>
Ordnance	9	10	5
Office machinery and computers	20	9	15
Electricity distributing, generating and control equipment	32	16	16
Electronic components and other equipment	20	16	17
Radio, TV communication and related equipment	14	12	11
Medical instruments	44	20	41
Instruments for checking, testing, navigating, industrial control and other purposes	20	15	16
Optical instruments	37	13	28
Aerospace	21	4	5
(All manufacturing)	(45)	(22)	(25)

Notes: UK figures are for businesses with 1-49 employees, Japanese figures for 4-49 and US figures for 0-99.

Definition of “high tech” based on Butchart, 1987 and Heckler, 1999.

Sources: Japan – MITI *Kogyo tokei*; US – SBA online figures; UK – DTI *SME Statistics for the UK*.

Figure 1 Startups and closures in Japan, 1966-96



Notes: establishment base, all sectors excluding primary; startup (closure) rates =

$$\frac{\text{no. of startups (closures) during period}}{\text{no. of est.s at beginning of period}} \times \frac{1}{\text{years during period}} \times 100$$

Source: Chusho kigyo cho ed. (1999) *Chusho kigyo hakusho* (SME White Paper), p.219.