Prometheus, Vol. 26, No. 1, March 2008

Putting Innovation in Place: Policy Strategies for Industrial Services, Regional Clusters, and Manufacturing SMEs in Japan and the United States[1]

PHILIP SHAPIRA

Abstract *This paper examines the evolving situation of mature manufacturing small and midsize enterprises (SMEs) in Japan and the United States and considers some of the key challenges they now face in an era of globalization and rapid technological change. The rationale and justification for policy intervention to support mature SMEs is considered. A review is offered of illustrative policy initiatives in three areas: framework policies, industrial services, and regional industrial cluster policies. The convergence of manufacturing and regional policies is noted. The relative strengths and weaknesses of Japanese and US strategies are assessed. The paper concludes with a comparison of Japanese and US approaches to retaining manufacturing SMEs, interpreted through the various and at times interactive ways through which each country's innovation system develops and evolves technology and business support policies.*

Keywords: industrial modernization; innovation policy; small and medium-size enterprises

Introduction

As in many countries around the world, there are active policy efforts in Japan and the United States to sustain mature small and medium-sized enterprises (SMEs) in manufacturing. Despite recent declines in numbers, mature SMEs comprise by far the majority of manufacturing enterprises in both countries. The world of these mature SMEs is often quite different from that of the high-technology venture startups that typically grab headlines and garner venture capitalists' attention by promising radical new advances. Mature manufacturing SMEs are often engaged in routine production in many different industries, they may be part of a supply-chain producing components for others, they are often risk-averse, and many lag in best practice in the use of technology and management methods.

Prometheus ISSN 0810-9028 print/ISSN 1470-1030 online © 2008 Taylor & Francis
http://www.informaworld.com/journals
DOI: 10.1080/08109020701846041

The challenge of fostering innovation in mature SMEs presents an interesting lens through which to undertake comparative policy analysis, for several reasons. The problem itself is a multifaceted one: SMEs are diverse and have an array of technological capabilities; innovation can occur in multiple combinations, including through product or service development, new process technologies and methods, and organizational, marketing or other business improvements; there are various levels at which intervention can occur, from that of the manager and the firm to the region and the supply chain; and intervention itself can be direct or indirect, ranging from hands-on technical assistance to adjustments in the broader fiscal or regulatory regime that influences enterprise behavior. Moreover, the problem is not a static one. Over time, the nature of the technological and competitive challenges facing mature SMEs has evolved significantly. Examining SME innovation policy can highlight the capability of an innovation system not only to address complex, long-term, objectives, but also to sense and adjust to changing circumstances.

Prior comparisons of Japanese and US responses to common problems have often observed asymmetries in the paths that policymakers and institutions pursue.[2] In Japan, there has typically been a governmental emphasis on consistency, long-run planning, and building consensus for change, but not necessarily flexibility or local experimentation. Powerful central ministries have guided this approach, aided by a well-established civil service.[3] On the other hand, the US federal system encourages decentralization and a great willingness to foster experimentation.[4] Yet, variations in governmental capabilities and resources coupled with political changes following electoral cycles can lead to instability in policies and patchiness in administration. While national characteristics of government and governance are deeply entrenched in constitutions, institutions, and customs, the arena of SME innovation policy is one of many where increased globalization creates pressure for policymakers to adapt their systems. In the case of Japan, there is interest in developing a broad array of more dynamic and supple initiatives; in the USA there has been a recent focus not only on extending the range of measures, but on increasing effectiveness. Moreover, as the paper notes, policymakers in Japan and the USA have undertaken studies and comparisons of each other's systems and programs for promoting the modernization of SMEs. The case thus embodies a significant element of mutual benchmarking, which allows us to probe examples of how policy learning proceeds and is acted upon within the two countries. Ultimately, to be successful, policymakers have to ensure that the institutions, programs and initiatives they promulgate are able to stimulate firms to take actions they would not otherwise have taken. This raises issues about the implementation of evaluation, feedback, and accountability systems, which again this case is able to illustrate.

The paper begins by examining the evolving situation of mature manufacturing SMEs in the USA and Japan and the key challenges they now face in an era of globalization and rapid technological change. The rationale and justification for policy intervention to support mature SMEs is examined. This is followed by a review of Japanese and US policy initiatives in three areas: framework policies, industrial services, and regional industrial cluster policies. Due to limits of space, only a sample of prominent policy and program examples can be discussed, however these should be sufficient to illustrate points of contrast. The paper concludes with a comparative assessment of these manufacturing SME policies in Japan and the USA and, in so doing, raises insights related to how the innovation governance systems in each country are able to learn, adapt to change, and improve policy effectiveness.

Evolving Situation of Manufacturing SMEs in Japan and the USA

In Japan and the US, SMEs make up the majority of business enterprises in manufacturing and account for significant shares of manufacturing employment and economic value-added.[5] However, there are important differences between the two countries in the structure of the SME manufacturing sector and in enterprise and employment trends over the last decade.

In the United States, there were about 290,000 SMEs (enterprises with fewer than 500 employees) in manufacturing in 2004; these firms comprised 98.6% of all US manufacturing firms and employed some 6.1 million workers or more than two-fifths of all US manufacturing jobs.[6] In Japan, where the size definition of an SME is smaller (300 or fewer employees), there were 490,000 SMEs in 2004; these firms comprised 99.6% of all Japanese manufacturing firms and employed 6.1 million workers, or about three-quarters of all Japanese manufacturing jobs[7] (Table 1). Particularly striking is the significance of very small manufacturing companies in Japan. In 2004, there were 434,000 manufacturing enterprises in Japan with fewer than 20 employees. This was twice as many very small manufacturing enterprises as in the US. In Japan, 27% of all manufacturing employees work in enterprises with fewer than 20 employees, compared with 9% in the USA.[8]

This comparison immediately hints at important differences in the structure of the SME sectors of the two countries. Numerically, SMEs play a relatively greater role

Table 1. Small and mid-size manufacturing enterprises, United States and Japan

	United States	Japan	United States	Japan
Manufacturing	**Enterprises**		**Employment**	
	Number×1,000 (2004)		**Number×1,000 (2004)**	
Small and mid-size enterprises[a] of which:	289.4	489.1	6,080.5	7,445.5
under 20 employees	217.5	433.9	1,212.7	2,630.0
mid-size[b]	71.9	55.2	4,867.8	4,815.5
Large enterprises[c]	4.0	1.9	7,741.5	2,484.9
Total	293.5	491.1	13,822.0	9,930.4
	Percent of total (2004)		**Percent of total (2004)**	
Small and mid-size enterprises[a] of which:	98.6	99.6	44.0	75.0
under 20 employees	74.1	88.4	8.8	26.5
mid-size[b]	24.5	11.2	35.2	48.5
Large enterprises[c]	1.4	0.4	56.0	25.0
Total	100.0	100.0	100.0	100.0
	Change 1991–2004 (%)		**Change 1991–2004 (%)**	
Small and mid-size enterprises[a] of which:	–8.8	–33.8	–12.0	–28.4
under 20 employees	–8.2	–34.3	–8.9	–32.5
mid-size[b]	–10.7	–29.6	–12.7	–25.9
Large enterprises[c]	–11.6	–33.2	–32.6	–32.7
Total	–8.9	–33.8	–24.8	–29.5

Notes:

[a]Under 500 employees (US); 300 or fewer employees (Japan).

[b]20–499 employees (US); 20–300 employees (Japan).

[c]500+ employees (US); over 300 employees (Japan).

Sources: Analysis of US data from downloadable file, US Small Business Administration, Office of Advocacy, based on data provided by the US Census Bureau, Statistics of US Businesses; Japanese data from Japan Small Business Research Institute, *White Paper on Small and Medium Enterprises in Japan*, Ministry of Economy, Trade and Industry, Tokyo, 2006, and comparable data in earlier versions of this report.

in Japan. SMEs with 4–299 employees accounted for 72.4% of manufacturing employment and contributed 51.1% of the value of manufacturing shipments and 57.0% of gross manufacturing value added in Japan in 2002.[9] In the US, manufacturing SMEs (with fewer than 500 employees) were estimated to have contributed 27% of the gross domestic product of the US manufacturing sector in 1999.[10] In that year, SMEs employed about 41% of the US manufacturing workforce. These data suggest (and other research confirms) that, compared with the US, SMEs play a relatively greater role in Japanese manufacturing through subcontracting and networking (i.e. it takes more Japanese enterprises, including many more SMEs, to produce Japan's manufacturing economic product than in the USA). At the same time, we can see that in both the USA and Japan, productivity levels (value-added per employee) are significantly lower in manufacturing SMEs than in larger enterprises.

Notwithstanding these differences in structure, in both countries the post-war decades saw growth in the number of manufacturing SMEs. But, in recent years, this trend has reversed and there has been a decline in both the number of manufacturing SMEs and in employment in these enterprises. Again, the Japanese case is most striking. The number of manufacturing SMEs in Japan expanded dramatically from the 1950s through to the early 1970s, from 183,000 manufacturing establishments with 4–299 employees in 1954 to 423,000 in 1972. This flourishing of industrial entrepreneurship created a foundation upon which Japan's manufacturing success was built; it has been argued that the growth of SMEs in this period was the true source of the Japanese rapid post-war economic growth 'miracle'.[11] Growth among Japanese SMEs continued, albeit more slowly, into the 1980s (peaking at 444,000 in 1982). However, since 1991, the trajectory has turned sharply downwards. In 2004, there were 268,000 manufacturing establishments with 4–299 employees in Japan—a decline of more than 175,000 establishments. There was a decline of more than 2.1 million jobs (or about one-fifth) in Japanese SMEs between 1991 and 2001. This decline has continued: between 2001 and 2004, a further 800,000 jobs were lost in Japanese manufacturing SMEs. Indeed, since the start of the 1990s, employment has declined in Japanese manufacturing SMEs at more than twice the rate as in US manufacturing SMEs.[12]

Several factors underlie the substantial decline of SMEs in Japan over the last decade. These include the ongoing restructuring and internationalization of the Japanese economy, with large firms moving production overseas and cutting domestic SMEs out of the supply chain. Moreover, following the bursting of its 'bubble economy' in 1991, for more than a decade Japan has experienced macro-economic stagnation. This has contributed to weak home demand for manufactured products. Additionally, as the counterpoint to the boom in entrepreneurship in the post-war years, Japan has entered a period where many SMEs have problems of succession and are forced to close.

In the USA (in contrast to Japan), the decade of the 1990s was a period of relatively strong economic growth. Indeed, employment in USA SMEs (5–249 employees) increased through to 1998, whereas it decreased in Japan (in SMEs 4–299 employees) during the same period (Figure 1). Additionally, the USA does not seem to face a generic problem of small business entrepreneurship. Between 1991 and 2001, the total number of USA SMEs (enterprises with fewer than 500 employees in all private economic sectors) increased by 12%; over the same period, the total number of SMEs in Japan (enterprises with 300 or fewer employees) declined by 9.9%, with decreases in services as well as manufacturing sectors.[13] Yet, in most other respects, USA manufacturing SMEs face similar problems to those in Japan. Both the USA and Japan are

shifting to service-based economies (with the USA in the lead in terms of the pace of this transition). There are certainly issues of succession for mature USA SMEs. Large USA firms have also restructured their production and shifted many plants to offshore locations, leading to loss of supply chain orders for USA-based SMEs. Competition from low-wage manufacturing locations, particularly China, has increased, and the gap between USA manufacturing exports and imports has grown massively over the past decade. The USA trade deficit (almost all in manufactured goods) is now nearly 6% of GDP, up from 1% in 1994.[14] The rate of manufacturing enterprise closure and job loss in US SMEs was rather lower than that experienced in Japanese counterparts through to 2004 (see Table 1). However, between 2001 and 2004, job loss in all US manufacturing increased greatly, with a decline of 2.1 million jobs (or 12.8% of the 2001 total) during this period.[15]

Policy Debate, Rationales for Action, and Public Strategies

In all advanced countries, manufacturing's share of employment and output in the overall economy is diminishing. This is true for the USA and Japan, with both countries experiencing long-term structural economic shifts as demand for services increases relative to demand for manufactured goods.[16] Productivity increases also suggest that a given output can be produced with fewer employees. Indeed, between 1995 and 2003, total manufacturing employment fell at annualized rates of 2.2% in the USA and 2.4% in Japan but manufacturing output increased at annualized rates of 3.3% for the USA and 1.6% for Japan. Calculated in terms of output per hour, manufacturing productivity increased between 1995 and 2003 at annualized rates of 5.8% in the USA and 4.0% in Japan.[17]

Yet, although acknowledging these long-term trends, policymakers in both the USA and Japan have sought to maintain manufacturing jobs and to retain manufacturing SMEs. There are several reasons for this policy concern. At the broadest level,

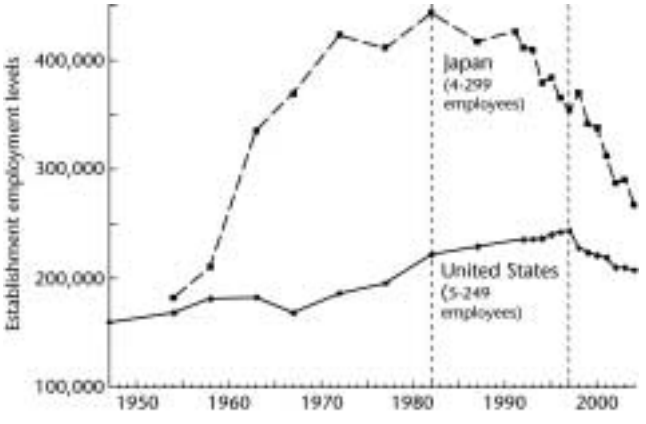

Figure 1. Manufacturing SMEs in the United States and Japan, by number of establishments.
Sources: US Census Bureau, Census of Manufacturers (1947–92) and County Business Patterns (1994–2004); METI Census of Manufacturers, in Japan Small Business Research Institute, *White Paper on Small and Medium Enterprises in Japan*, Ministry of Economy, Trade and Industry, Tokyo, 2006, and comparable data in earlier editions of this report. Data are establishment based.

there are worries about deleterious effects of the loss of manufacturing capacity on trade balances (most global trade is still in goods rather than services), supply chains, and national industrial sufficiency and dependence. Jobs in the manufacturing sector often are better paid than available jobs in services, particularly for less skilled and older workers (if such jobs are available at all). In the private sector, research and development remains concentrated in manufacturing. For example, according to the National Science Foundation's 2001 Survey of Research and Development, 60.1% of company-funded research in the USA is undertaken by firms in the manufacturing sector, and these manufacturing firms employ 58.5% of all privately-employed R&D scientists and engineers.[18] Declines in manufacturing enterprises and production facilities thus raise apprehension about negative impacts on future rounds of technological development, not only because manufacturing is a major funding source for R&D but also because of linkages between manufacturing production and technological innovation.[19] Additionally, it has been noted that as industrial systems have evolved and become more complex and interconnected, the distinction between manufacturing and services is not clear cut; rather, increasingly manufacturing and services are interlinked, including through value-added manufacturing services and product–service solutions.[20] The loss of manufacturing capability may lead to knock-on losses in related services, especially in advanced producer services including those in engineering design, technical maintenance, management, computing, and logistics.

At the sector and local level, the loss of manufacturing enterprises and employment also raises concerns, especially for state (or prefecture) and local policymakers. Manufacturing sectors frequently form specialized industrial clusters in particular locations, and the decline of these sectors can cause problems of unemployment, tax loss, and local economic adjustment that are not easily overcome. When new high technology ventures are created (and here, the USA arguably performs better than Japan), these firms tend not to locate in old industrial areas (although there are of course exceptions to this).

As manufacturing sectors and regions face declines in enterprises and employment, there is naturally pressure on policymakers (especially on elected officials) to introduce constraints on competitors—typically, these competitors are located overseas. The imposition of direct limits or barriers on import competition is today much more difficult than in the past. For example, the USA and Japan are parties to the General Agreement on Tariffs and Trade and belong to the World Trade Organization (WTO) and each country has pledged (at least in principle) not to constrain international free trade. Still, there are procedures (for example, through US anti-dumping laws) to impose trade restrictions if below-cost or other unfair market practices are said to be employed by foreign competitors. Also, non-tariff and regulatory barriers may be used to protect industries (the USA continues to raise concerns about Japan's non-tariff barriers in certain sectors). However, in general, the use of trade protectionism is not an effective policy to maintain industries. This is not only because international trade bodies may declare such policies illegal (as the WTO did in 2003 in the case of USA limits on foreign steel imports). More fundamentally, although such policies may give short-term relief to specific industries, they may raise costs to others, and they do little in and of themselves to promote improvements or changes that might increase the chances of affected industries (or parts of them) surviving over the long run.

Instead, policymakers have turned their attention to ways in which existing manufacturers might apply technology, improved management techniques, new organi-

zational forms, and other forms of innovation. SMEs in mature, existing manufacturing industries are typically the foci of such policy efforts. On the one hand, this is because large companies, particularly when viewed from the regional or local level, are felt to have sufficient resources of their own to improve their operations. Additionally, in older manufacturing regions of Japan and the USA, many large companies have moved or pared back operations, leaving local small and mid-size companies in need of support, particularly as traditional supply chains have been broken or weakened. On the other hand, it is apparent that there are significant opportunities to improve the strategies and performance of SMEs. For example, it has been observed that the relative productivity gap between large and small enterprises has increased in the USA in recent decades.[21] On average, value-added per employee in SMEs was about 80% of that of large establishments in the 1960s; by the late 1990s, value-added per employee in SMEs on average was less than 60% of that of large establishments.[22] In part, the performance gap has widened because many USA SMEs are lagging in their use of new or improved manufacturing technologies and methods. Survey research in both the USA and Japan confirms a gap in innovation and technology use between large firms and SMEs.[23] By virtue of their size, SMEs frequently lack information, resources, trained employees, and expertise to improve their products, business, and organizational approaches. Yet, USA research shows that some SMEs are able to achieve high levels of technology use and to be innovative and productive.[24] Not all SMEs can be transitioned to high performance, but the fact that some might is what policy action promises, while aiming to at least promote modest improvements among many other enterprises.

The public policy responses that policymakers have introduced to address the needs and opportunities facing mature manufacturing SMEs can be categorized into three broad categories.

- *Framework Actions*: policies to improve the business environment for manufacturing, including dealing with regulatory issues, workers' compensation and benefits costs, investment and tax credits, and other framework factors.
- *Industrial Services*: direct and focused industrial services to assist specific manufacturers, individually and in groups, to modernize operations, introduce new technologies, undertake product development, and train workers.
- *Regional Clustering*: initiatives to promote knowledge exchange and business linkages within geographical agglomerations of manufacturers, to improve local public–private partnerships, supply-chain linkages, and promote other agglomeration economies and spillovers.

The balance of this paper examines selected initiatives in each of these three categories in the USA and Japan. Given space limitations and the large number of individual policy initiatives pursued, it is not possible to be comprehensive. Rather, illustrative and important initiatives are highlighted which offer comparisons and draw out insights as to similarities and differences in the approaches in the two countries.

Framework Actions

In the period following World War II, much credit was attributed to the institutions of the Japanese government in fostering rapid growth.[25] However, the long period of economic stagnation in Japan since the early 1990s has promoted much internal

debate about the problems of Japanese central government. Compared with the United States, there are more structural constraints in Japanese systems to policy experimentation and local flexibility. National ministries—particularly the Ministry of Economy, Trade and Industry (METI) and its associated agencies—are more deeply enmeshed in industrial policy and guidance than equivalent US federal agencies (such as the US Department of Commerce).

Simultaneously, calls to revitalize Japanese manufacturing have led both to a deepening of ministerial intervention and to fresh framework actions to disengage central authority. Thus, on the one hand, among the national policy initiatives currently being undertaken in Japan to assist SMEs are measures to expand financing and loan guarantee programs (including through the centrally-controlled financing agencies of the Japanese Finance Corporation for Small Business, the National Finance Corporation, and the Shoko Chukin Bank). On the other hand, there are also initiatives to foster decentralization. A Law on Special Measures for Industrial Revitalization provides for the establishment of SME revitalization councils in Japanese prefectures, and there are also new initiatives to expand local venture funds and other startup and small business innovation activities, improve training assistance and use of human resources, and facilitate business succession.[26] One of the most interesting recent initiatives is the Special Zones for Structural Reform program through which efforts to reduce administrative restrictions are being made by establishing numerous local zones where specific regulations are eased or lifted.[27] These specific measures form part of a larger portfolio of framework actions in recent years encompassing labor-market, fiscal, legislative and regulatory reform as well as changes in the relationships between central and local policymaking and a reduction of central administrative guidance.[28]

In the USA, the domain of framework action is more tightly circumscribed, focusing particularly on regulatory and cost issues affecting the manufacturing sector. It has been reported that the per-employee cost of federal regulatory compliance is more than half as high again for small companies (with fewer than 20 employees) compared with large enterprises (with 500 or more employees).[29] Concerns over regulatory costs have prompted the Bush Administration to solicit inputs from manufacturers to address these issues. In 2003, the administration established a 'Manufacturing Initiative' with the aim of undertaking a thorough review of the factors affecting manufacturing competitiveness in the US. Industry round-tables were held around the country and a report on 'Manufacturing in America' was issued in 2004.[30] The report offers a series of recommendations. These focus on measures to lower costs of regulation, health care, tort actions, and energy for manufacturers, as well as on recommendations to foster innovation, improve education and training, reduce trade barriers imposed by international trading partners, improve monitoring of trade agreements and trading practices, and promote exports. To date, there has been little legislative action on regulatory reform. However, following other recommendations of the report, the administration has established a new Assistant Secretary for Manufacturing and Services, an Office of Industry Analysis to examine the effect on US manufacturers of proposed regulations, and a Manufacturing Council to improve government–business liaison. Additionally, in 2006, the US administration established the American Competitiveness Initiative (ACI). This is a broad interagency initiative to expand research and development investment, to increase support for education, entrepreneurship and workforce training, and to provide business tax incentives—all with the goal of strengthening framework conditions for business competitiveness.[31]

Recognition of the need to modify the frameworks within which manufacturers operate is thus evident in both Japan and the USA. However, there are differences. In Japan, framework actions aim to operate on dual fronts: liberalization, including the reduction of governmental engagement with business; and decentralization, reducing the power of central administrative guidance over local and other actors in the policy system. In the USA, where federal governance has long facilitated decentralization, the current emphasis is primarily on liberalization, also to reduce the governmental burden on manufacturing SMEs. Yet, there are also interesting US efforts to improve policy coordination in the manufacturing arena, in an effort to bring together disparate elements and foster partnerships. In both countries, framework change is not rapid, and problems of institutional 'lock-in' are evident: for example, where powerful ministries exist or there are long-established divisions of functions.

Industrial Services

Industrial services to directly assist manufacturers to modernize and upgrade their strategies, products, operations, workforce, and marketing are the 'other side of the coin' to national framework policies.[32] Whereas improvements to national frameworks are 'top-down' efforts to broadly change externally-controlled cost structures and incentives for manufacturing, the essence of industrial services is a 'bottoms-up' approach of working with specific enterprises or groups of companies to make changes from within. Such initiatives, often involving hands-on, 'face-to-face' knowledge transfer, learning, and training, seek to directly improve the capabilities of SMEs and to assist them in selecting, acquiring, and effectively deploying new technologies and methods.

Japan has a long-established and extensive system of small business support. This system provides an array of direct services including information supply, technical assistance and consulting, management and workforce training, support for new business creation, and assistance with technical upgrading and internationalization. These services are accompanied by various financial support schemes and other types of assistance, including business and machinery credit insurance and loans, tax credits, R&D subsidies, mutual insurance schemes, assistance with succession, mergers, and the avoidance of bankruptcy, and support for SMEs in specific industries (for example, in textiles).

The scale and coverage of Japanese SME assistance services is notable. In conjunction with prefectures and municipalities, there are more than 180 public industrial technology research institutes (*Kohsetsushi*) for SMEs, 251 regional SME support centers, 54 prefectural SME support centers, and eight SME venture business support centers. Support organizations also include more than 500 local chambers of commerce and industry, and thousands of other prefectural and local small business associations and societies.[33] In recent years, many new facilities to foster small business exchange, incubation, and research have been built in Japan, along with local initiatives to form research and new product development consortia involving SMEs and to encourage venture financing.

The *Kohsetsushi* centers represent one of the traditional foundation blocks for Japan's efforts to upgrade its manufacturing SMEs.[34] These are publicly-sponsored industrial research and testing institutions that offer free or low-cost services to Japanese manufacturers with 300 workers or less. Drawing on US models of agricultural extension and engineering experiment stations, these technology institutes

began to be established in Japan around the turn of the twentieth century. The system was much expanded in the 1950s and following decades. Every prefecture has at least one center, while major cities have several (the Tokyo metropolitan region has more than 20 centers). Prefectures and municipal governments administer the centers, provide most of the more than $1 billion annual budget, and employ staff (more than 6,000 researchers and engineers work in Japan's *Kohsetsushi* centers). The centers are administered by prefectural and municipal governments, who also provide most of the budget for the centers. METI and national small business agencies supply guidance and some additional funds.

SMEs are able to use *Kohsetsushi* centers in a variety of ways.[35] They may work with center researchers on applied research and development projects or benefit from knowledge transfer from these researchers. SME staff may also spend time at the center working on projects, thus providing research experience. Seminars and training programs are offered. The centers also assist SMEs in quality control, calibrating measuring equipment, testing products and materials, access to information services and databases, and in accessing advanced new machines through open laboratories and pilot production schemes. The centers provide advice and guidance services, using either their own staff or consultants, to assist companies to solve problems and introduce new technologies. Technology diffusion and network groups are also sponsored to encourage small firms to exchange information, share technology, and develop new products and markets. Services are provided to firms either for free or at low cost.

In recent years, there have been concerns in Japan that the *Kohsetsushi* centers have become outmoded, or at least insufficient, to promote innovation in SMEs. The staffing stability and nationwide service consistency of the *Kohsetsushi* centers—once viewed as a plus in the prior development of high-quality mass production and supply chains in Japan—is now seen as inadequate in an era of dynamic and fast-changing technologies and business strategies. A series of new advanced technology centers, incubators, and exchange facilities have been established to support SMEs throughout the regions and localities of Japan, although these centers too often face difficulties in embodying flexibility and customization to local conditions.

The US counterpart, and one of the primary federal programs of industrial services for manufacturing SMEs, is the Manufacturing Extension Program (MEP) administered by the National Institute of Standards and Technology (NIST) in the US Department of Commerce. Prior to the MEP, about a dozen states offered industrial extension services, but there was not a nationwide system. The MEP has remedied this. Today, the MEP consists of a network of over 70 centers and more than 300 local offices in all 50 states. The MEP developed from an earlier program of Manufacturing Technology Centers established by the Omnibus Trade and Competitiveness Act of 1988. These centers were created to transfer federally sponsored state-of-the-art technology. Experience suggested that few small manufacturers had this need and that a pragmatic approach to technology and business services, customized to company capabilities, was more likely to be effective. As MEP centers were expanded in the early-to-mid-1990s, comparisons and insights were drawn from the Japanese *Kohsetsushi* program, reinforcing the importance of geographic scale and coverage and applied technical services.[36] Current MEP centers deliver a range of services to companies, including assistance with manufacturing systems, quality, information technology, human resources, product development, and other business services. The MEP program

receives approximately $100 million of federal funding annually and requires centers to match every federal dollar with two state or industry dollars. Surprisingly, in recent budget requests, the Bush Administration has sought to restore the original federal funding sunset plan and zero-out or reduce the MEP's federal allocation. However, each year, Congress has restored the MEP's funding.[37]

The MEP assists more than 25,000 firms annually through assessments, technical assistance projects, information workshops, training, and other services. Over 90% of assisted firms are SMEs with fewer than 500 employees. Over 1,000 professional specialists work in the MEP system, most with prior industrial experience. MEP activities tend to focus on process techniques and 'soft' business and manufacturing practices rather than 'hard' new technologies such as factory automation. The top areas of assistance include process improvement, quality, business systems and management, and human resources. The typical MEP center has a budget of about $4.5 million a year, of which about 30% is derived from fee revenues, employs about 35 professional and technical staff and uses an additional 10 consultants each quarter. However, there are wide variations in individual budgets, fee revenue generation, staffing, market areas, and clients served. The proportion of fee revenues also varies by center, depending on the center's strategies, the level of state support (lower levels of state funding usually promote higher fee seeking activities), state policy (some states view manufacturing extension as a public service mission that should not be driven by high fee revenue goals), and market sophistication (firms in urban areas and in higher value-added industrial sectors may be more willing to pay). The decentralized and flexible structure of the MEP allows individual centers to develop strategies and services appropriate to state and local conditions. In addition to individual center services, groups of centers collaborate with one other, the NIST national program, and other organizations to implement shared tools and service offerings to firms. Examples include the development of benchmarking tools, supply chain initiatives, and coordinated efforts in lean manufacturing and electronic commerce. NIST and other agencies also sponsor an array of MEP review and evaluation processes.[38]

There are numerous other US federal and state programs to assist manufacturers. The US Trade Adjustment Assistance (TAA) program is designed to help small and mid-sized manufacturers adversely impacted by import competition. Technology transfer centers and programs, with services targeted to small and mid-sized firms, are sponsored by the National Aerospace and Space Agency (NASA), US federal laboratories, the Department of Defense, and other federal agencies. The Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) programs allocate a small proportion (up to 2.5%) of the research budgets of 11 federal agencies to sponsor small businesses in research that promises to lead to commercial outcomes. NIST runs the Advanced Technology Program (ATP), which has received annual funding of more than $200 million in the 1990s. Current ATP funding levels are much smaller ($19 million in FY 2007).[39] ATP provides technology commercialization awards, about one-half of which are received by small and mid-sized enterprises. There are also numerous state-level small-business programs, some focused directly towards manufacturers while others are open to all small businesses including manufacturers. These programs are administered by government, quasi-government, and educational institutions. For example, Georgia offers accelerated training programs to relocating manufacturing and service firms, provides various grant loan programs mostly to local governments and government authorities to support projects that will facilitate business

attraction, expansion, or retention, and sponsors a Traditional Industries Program which links industry and university researchers to work on critical competitiveness problems in existing industrial sectors.

Comparison of the landscape of direct industrial services in Japan and the US again offers contrasts. Originally drawing on US models, Japan has led the way in establishing extensive and comprehensive services to manufacturing SMEs, particularly through *kohsetsushi* centers which nationally offer consistent and standard services. Many decades later, the USA took inspiration from the Japanese experience, but developed a system with more flexibility and local customization in services and greater instability in funding. Japan has subsequently sought to redesign a new package of industrial services, in new centers and programs geared towards more sophisticated SMEs. Meanwhile, the US already has most of these services available in other federal or state programs, although offered by multiple providers, hence raising ongoing issues (and opportunities) for coordination.

Regional Clustering

Clustering is a relatively new arena for policy and can be viewed as a cross-cutting 'meso' level effort to promote agglomeration economies, network linkages, and other spillovers which can strengthen a region's manufacturing base, including its base of SMEs. The logic and existence of regional industrial clusters has long been established (going back to Marshall's work on industrial regions in nineteenth century England), and an array of regional clusters have developed (and declined!) in both the US and Japan. Current attention to clustering *as an active policy measure* has been fostered by analysis of the success of such regions as Northern California's Silicon Valley, Boston's Route 128 region, and the concentration of innovative small firms in Tokyo's Ota-ku and other regions of Japan.[40] Academic work, including concepts of flexible-specialization, associational economies, and—in particular—regionally-based competitive advantage has further influenced policy activity.[41]

The thrust of this work suggests that regionally-specific combinations of factors (such as labor skills, research and development, leadership, and financial resources) coupled with patterns of relationships among proximate firms and supporting industries and services, influences the performance of particular industries and localities. Moreover, within regional clusters, firms can benefit from agglomeration economies and spillover effects stimulated, for example, through labor force training or mobility, paid access to market information, collaborative relationships with nearby research institutions, or the exchange of tacit knowledge. This has given rise to the development of policies situated at the regional level to strengthen clusters, aimed between the micro-level of direct industrial service interventions with firms and the macro-level of national framework actions.

In the USA there has been a massive growth of interest in cluster analyses and policies. There is no central or federal coordination of efforts. Rather, states and localities have led activity, leading to innovation in policy development but also much diversity in definitions, analyses, and strategies. Hundreds of clusters have now been identified in the US. Initially, much of the activity at the state and local level focused on high-tech or science-driven clusters, but this has evolved into attention to clusters of traditional manufacturers (as well as in services, including creative and media industries). For example, one study in a 19-county area of North Carolina (anchored around the Research Triangle) identified more than a dozen industry clusters, classified by general and high-technology orientations.[42]

Other studies have highlighted cluster strategies for traditional manufacturing regions, inner city areas and rural areas.[43] At the national level, the Council of Competitiveness—a non-profit organization led by business and education representatives—has promoted clusters (for example, through its National Innovation Initiative) and undertaken specific cluster analyses and policy development studies in several regions, including in Pittsburgh, the Research Triangle, Atlanta, Wichita, and San Diego. The Council has also developed general guidance on strategies to promote clusters. It recommends state and local policymakers to: inventory assets, build on strengths, invest in research, build talent through improved education and training, seed innovation capital, strengthen infrastructure, foster connections, identify private-sector champions, work regionally (based on economic rather than political jurisdictions), and take the long view.[44] Federal agencies, such as the US Economic Development Administration, lack any significant funding to promote or strengthen regional clusters, and they too tend to recommend similar 'process-based' measures to states and localities. At the local level, where industry leaders and policymakers collaborate together, tangible cluster-based initiatives can emerge. For example, in New York, the Garment Industry Development Corporation (a non-profit organization of industry, labor, and government representatives) has aided companies in the city's garment cluster to introduce new technologies, upgrade worker training, and find new markets.[45] This is not a unique example, there are other cases of specific policies and programs for mature manufacturers which have emerged from cluster initiatives. At the same time, other cluster efforts elsewhere in the US have remained at the level of study and analysis rather than action.

In Japan, clusters have also become a prominent policy tool, influenced by discussions and experience about clusters in the USA and Europe.[46] However, there are Japanese variations. A recent analysis distinguishes among company town clusters (groups of enterprises in one location usually in a specialized industry usually associated with a few dominant large customers, for example Kitakyushu's iron and steel cluster); production region clusters (groups of enterprises in one location in a specialized industry, but with multiple customers, such as the producers of eye-glasses in Sabae, Fukui Prefecture); mixed urban clusters (such as the diverse complex of advanced SMEs in Ota-ku, Tokyo); and 'mixed invitation' clusters (locations where plants have more recently been attracted, often to access available labor, as in Kofu, in rural Yamanashi Prefecture).[47]

However, the implementation of cluster policy in Japan reflects as much the characteristics of the major competing Japanese ministries as the specific nuances of different local clusters. The Japanese cluster policy effort is centrally-guided, but (reflecting turf divides between the industry and education ministries) is bifurcated into 'industry' and 'intellectual' cluster initiatives. METI has been promoting 'regional industrial clusters' through a program started in 2001 that involves '19 locations, 5,000 companies, and 200 universities'.[48] The METI program provides support for academic–business–government round-tables, information exchange and workshops, and assistance from coordinators to promote cluster activities and projects. Although these are also 'process-based' actions, METI hopes they will lead to improvements in productivity and innovation among cluster SMEs and the formation of new businesses. The Ministry of Education, Culture, Sports, Science and Technology (MEXT) is implementing a Knowledge Cluster program in 10 localities to link universities, R&D institutes, companies, and local governments.[49] The MEXT program is focused on building linkages between private companies

and public and university researchers, commercializing publicly-sponsored research, and fostering new technology startup enterprises.

In total, METI's industrial cluster initiative will spend about US$350 million on its 19 regional projects over a period of years.[50] Whereas the METI program concentrates on existing industrial complexes to help them to develop their technological strengths, the MEXT cluster program focuses on universities with the aim of encouraging universities to work with area industries, as well as financiers, to commercialize new technologies. MEXT will invest about $250 million over five years in its cluster program.

These central government investments in cluster policies are relatively small (given the size of the Japanese economy) and only a tiny fraction of Japan's industrial companies are formally involved as members. Yet, the value of these projects could be significant in terms of establishing new models that can be replicated by local industrial cluster organizations throughout the country. It is not clear yet whether this is in fact happening. The old ministerial 'turf' conflicts that have dogged Japanese regional policies reappear in this latest program, with METI focusing on industry and MEXT focusing on universities and public research organizations. It is left to the localities to try to make the best of this division of labor. Japan's cluster programs have a strong concentration on the development of new technology (which plays to an area where Japan is undoubtedly strong) and on industry–university links (an area where there is agreement that strengthening needs to occur). However, there is a noticeably weak integration of cluster efforts with other regional initiatives to upgrade education, training, finance, and other necessary elements. Additionally, while many private leaders are engaged in these cluster efforts, there is an underlying presence of government which appears to be encouraging consistency and vertical coordination rather than experimentation, flexibility, and significant changes in horizontal and lateral relationships within the target industrial regions.[51]

Assessment and Insights

In both Japan and the USA, mature manufacturing SMEs face considerable pressures from processes of economic change and restructuring. These include the off-shoring of production by large companies and the subsequent weakening of supply chains, increased low-cost import competition, and rapid technological change. Human resources also present an issue. Japan's population is aging, and young skilled workers are reluctant to enter small manufacturers, while in the USA training systems for manufacturing workers in SMEs are under-emphasized. Additionally, SMEs in both countries face problems of succession, access to capital, regulation, and access resources to deal strategically with change.

On the face of it, the policy approaches pursued in Japan and the US to retain and strengthen SMEs appear similar. Each country is pursuing efforts at the level of framework actions, industrial services, and regional industrial clusters. Yet, on closer examination, there are important differences in policy organization and implementation. In terms of organization, it is apparent that US efforts to sustain mature manufacturing SMEs are relatively small in scale, diverse, and decentralized (with leadership often taken at state and local levels rather than by the federal government). In Japan, despite recent intent to the contrary, policy efforts for SMEs remain more centralized (although not without turf fights among competing ministries), standardized, and relatively larger in scale.

The US approach appears to offer an edge in the innovativeness and local customization of policy and in the ability to experiment and learn, but suffers from lack of funding, national reach, and fluctuations in policies (especially as various government offices change hands). In the USA efforts have been made to try to persuade the current federal administration to develop a more coordinated response to challenges in manufacturing. Studies have been undertaken and new offices created, although at the same time the administration has also sought to reduce budgets for manufacturing focused programs such as the MEP. In Japan, current efforts aim to persuade government to pursue a more decentralized approach, to offer more flexibility to prefectures and local communities to develop their own policies. Again, while there is much talk about decentralization in Japan, as yet policy discussion and control remains rather centralized.

In terms of the specific implementation of policy, again there are significant differences. In the US, framework actions to improve the environment for manufacturing SMEs tend to focus narrowly on cost and regulatory issues. There is less activity (particularly at the federal level) in other areas, such as upgrading systems of vocational training for manufacturing (this is seen as a state and local responsibility). Technical and vocational training remains a major hole in the US system. In Japan, framework actions are currently taking a broader focus, as attempts at structural reform are pursued not only in regulatory domains, but also labor markets, education, and other areas. Still, progress in structural reform is relatively slow—perhaps because many Japanese institutions (such as seniority-based rather than merit-based promotion) are viewed as needing reform and are as much embedded in culture and practice as in law.

In the area of industrial services, both the USA and Japan have evolved nationwide systems. Both are geographically dispersed (close to clusters of manufacturers) and provide one-on-one or one-to-group direct assistance and services. But then there are differences. The Japanese system of *kohsetushi* centers is very stable, with fixed staff, a focus on research as well as service, and a service approach that is consistent throughout the country. The US MEP (at present) has uncertain federal (and sometimes state) support, has a more flexible staffing arrangement, focuses on direct services to firms, and is able to develop diverse service approaches customized towards local needs.

Industrial cluster policies also show similarities and differences. The general aims of cluster policies are similar in Japan and the USA, and each has developed cluster policies for both science-driven (intellectual) and industry-driven clusters. Again, the Japanese approach is coordinated centrally and is standardized, while the US approach is decentralized, diverse, and experimental. In both countries, cluster policies are process-based beginning with bringing stakeholders together, then aiming to develop specific projects and activities which can strengthen the cluster.

What can be drawn from these comparisons, from Japanese and US perspectives and from the view of third countries and parties seeking insight? Fundamental differences in governmental structure mean that diverse US approaches probably will not fare well in Japan, while coordinated and standardized Japanese approaches will not work in the US. Yet, it is surely an accurate observation to suggest that each system can learn from the other in finding ways that might work at home to improve federal coordination (for the USA) and increase policy decentralization and experimentation (in Japan). Indeed, this process does go on. For example, as previously noted, in developing the MEP system in the late 1980s and

1990s, some US policymakers and program managers studied and were aware of the operations of the *Kohsetsushi* system. In turn, today, Japanese policymakers and program managers are monitoring US cluster policies to glean insights. Similarly, US industrial service providers and business managers have learned much from the quality control, inventory management, and rapid delivery systems commonly seen in Japanese manufacturing companies and supply chains, while their Japanese equivalents are now keen to learn about US university–industry technology transfer practices and emerging systems of open innovation. What is often most useful about such comparisons and learning exercises is what is exposed about one's own systems. To some extent, internal evaluation procedures can make weaknesses transparent, and in both the USA and Japan there has been an expansion in the last decade in performance measurement and assessment, including for industrial services.[52] However, often such efforts focus on program justification—producing results that satisfy current goals, and this rarely leads to significant policy reassessment. Benchmarking against a prominent external competitor is often (although not always) a useful way to prompt hard questions about internal objectives and effectiveness; it is most useful if there are complementary policy and institutional absorptive capacities to adopt new ideas.

Finally, some broader insights, along the lines of good practices, are also apparent from this comparison of US and Japanese policies for mature manufacturing SMEs. In a globalizing world, active policies to sustain and improve the capabilities of mature SMEs are appropriate and justified. Such policies might not prevent the further loss of enterprises and jobs in the SME manufacturing sector, but they can help to ensure that remaining companies are competitive. To the extent to which mature manufacturing SME policies encourage firms to become more distinctive through improved products, processes, and other innovations, such SMEs can continue to provide good jobs, anchor regional economies, and contribute to technological and economic development. Although not always achieved, a comprehensive approach is desirable, encompassing policies at the macro (framework), micro (industrial service) and meso (regional industrial cluster) level. Additionally, when industrial and cluster policies are implemented, it is important to ensure scale (otherwise impact will be small), to promote scope (to accommodate the diversity of industrial, enterprise, and regional needs), and to build in systems for learning, evaluation, and improvement.

Notes and References

1. Earlier versions of this paper were presented at the *Conference on Restructuring SMEs in the Age of Globalization*, East–West Center and the Korean Development Institute, Honolulu, HI, 20–22 July 2005; and at the *Workshop on Japanese Approaches to Local Development, Clusters, Industry–University Linkages and Implications for British Columbia*, Center for Japanese Research, The University of British Columbia, Vancouver, BC, Canada, 8–9 March 2007.
2. See, for example, the fascinating comparison of very different local and national government responses to industrial restructuring in the cities of Omuta (Kyushu) and Flint (Michigan) in T. J. Gilman, *No Miracles Here: Fighting Urban Decline in Japan and the United States*, State University of New York Press, Albany, NY, 2001.
3. The authority of Japan's governmental ministries and the role of central 'administrative guidance' are classically detailed in C. Johnson, *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925–1975*, Stanford University Press, Stanford, CA, 1982. Importantly, Johnson argues that Japan's powerful central state and the institutions it developed were vital to the country's modern development for much of the twentieth century.

4. D. Osborne and T. Gaebler, *Reinventing Government: How the Entrepreneurial Spirit is Transforming the Public Sector*, Plume, New York, 1993.
5. There are differences in how manufacturing SMEs are defined in the USA and Japan. For the US, this paper draws on data where generally SMEs are defined as independently-owned businesses with fewer than 500 employees. For Japan, the paper uses the governmental definition of manufacturing SMEs as comprising enterprises with 300 or fewer regular employees.
6. US Small Business Administration, *Enterprise and Employment Data* (downloadable spreadsheet file), Office of Advocacy, Washington, DC, available at: http://www.sba.gov, accessed February 2007.
7. Japan Small Business Research Institute, *White Paper on Small and Medium Enterprises in Japan, 2006*, Ministry of Economy, Trade and Industry, Tokyo, 2006.
8. Conversely, it should be noted that large enterprises (with 500 or more workers) employed 56% of the US manufacturing workforce in 2004, compared with the 25% of the Japanese manufacturing workforce engaged in large enterprises (more than 300 employees). US Small Business Administration, *op. cit.*
9. Japan Small Business Research Institute, *White Paper on Small and Medium Enterprises in Japan, 2004*, Ministry of Economy, Trade and Industry, Tokyo, 2004, Appendix Tables 4(3) and 5(2).
10. J. Popkin, *Small Business Share of Economic Growth*, report submitted to the Small Business Administration (Contract #SBA-HQ-00-C-0001), Joel Popkin and Company, Washington, DC, 2001. Gross domestic product is a measure of value added. There are differences in the methodologies and definitions used for the USA and Japanese estimates.
11. D. Friedman, *The Misunderstood Miracle: Industrial Development and Political Change in Japan*, Cornell University Press, Ithaca, NY, 1988.
12. Over the period 1991–2004, Japanese manufacturing SMEs lost 808,000 jobs (–28.4%) compared with 557,000 lost jobs (–12.0%) for US manufacturing SMEs. Interestingly, the job loss rate among large manufacturers was practically the same in Japan as it was in the US, at about –33% over the period 1991–2004 (see Table 1).
13. Analysis of data in Small Business Administration, *The Small Business Economy: A Report to the President*, Office of Advocacy, US Government Printing Office, Washington, DC, 2004; and Japan Small Business Research Institute, 2004, *op. cit.*
14. M. Evans, 'Evans on the economy—more jobs will be lost', *Industry Week*, 1 March 2005.
15. *Employees on Nonfarm Payrolls by Major Industry Sector, 1955 to date*, US Bureau of Labor Statistics, Washington, DC, available at: ftp://ftp.bls.gov/pubs/suppl/empsit.ceedeeb1.txt, accessed 14 July 2005.
16. Congressional Budget Office, 'What accounts for the decline in manufacturing employment?', Economic and Budget Issue Brief, Washington, DC, 18 February 2004.
17. Analysis of data in *International Comparisons of Manufacturing Productivity and Unit Labor Cost Trends, Revised Data for 2003*, US Bureau of Labor Statistics, Washington, DC, 25 February 2005.
18. National Science Foundation, *Research and Development in Industry: 2001*, NSF 05-305, Division of Science Resources Statistics, Arlington, VA, 2005.
19. S. Cohen and J. Zysman, *Manufacturing Matters: The Myth of the Post-Industrial Economy*, Basic Books, New York, 1987.
20. Australian Expert Group on Industry Studies, *Selling Solutions: Emerging Patterns of Product–Service Linkage in the Australian Economy*, University of Western Sydney, Sydney, NSW, Australia, 2002.
21. D. Luria, 'Toward lean or rich: what performance benchmarking tells us about SME performance and some implications for extension center services and mission', in P. Shapira and J. Youtie (eds), *Manufacturing Modernization: Learning from Evaluation Practices and Results: Proceedings of the Third Workshop on the Evaluation of Industrial Modernization Programs*, School of Public Policy and Economic Development Institute, Georgia Institute of Technology, Atlanta, GA, 1997.
22. US Census Bureau data, cited in American Small Manufacturers Coalition, *MEP: Productivity Growth*, Washington, DC, 2003.

23. T. Ijichi, T. Iwasa, H. Odagiri, H. Keira, T. Koga, A. Goto, Y. Tawara, A. Nagata and Y. Hirano, *Statistics on Innovation in Japan: Report on the Japanese National Innovation Survey 2003*, Ministry of Education, Culture, Sports, Science and Technology, National Institute of Science and Technology Policy, Tokyo, Japan, 2004; P. Shapira, J. Youtie, D. Hegde and K. Brice, 'Change and innovation in Georgia manufacturing: a 10 year perspective', Working Paper, Georgia Tech Policy Project on Industrial Modernization, School of Public Policy and Economic Development Institute, Atlanta, GA, 2005.
24. Shapira *et al.*, *op. cit.*
25. Johnson, *op. cit.*
26. Japan Small Business Research Institute, 2004, *op. cit.*
27. N. Yashiro, 'Japan's new Special Zones for regulatory reform', *International Tax and Public Finance*, 2005, pp. 561–74.
28. See, for example, T. Ginsburg, 'Dismantling the "developmental state"? Administrative procedure reform in Japan and Korea', *The American Journal of Comparative Law*, Fall 2001, pp. 585–625.
29. W. M. Crain and T. D. Hopkins, *The Impact of Regulatory Costs on Small Firms*, RFP No. SBAHQ-00-R-0027, Office of Advocacy, Small Business Administration, Washington, DC, 2001.
30. US Department of Commerce. *Manufacturing in America: A Comprehensive Strategy to Address the Challenges to US Manufacturers*, US Government Printing Office, Washington, DC, 2004.
31. Office of Science and Technology Policy, *American Competitiveness Initiative*, Domestic Policy Council, Executive Office of the President, Washington, DC, 2006.
32. This section draws upon and updates earlier comparisons of Japanese and US industrial services and extension policies contained in P. Shapira, 'Modernizing small manufacturers in the United States and Japan: public technology infrastructures and strategies', in M. Teubal, D. Foray, M. Justman and E. Zuscovitch (eds), *Technological Infrastructure Policy (TIP): An International Perspective*, Kluwer Academic Press, 1996, pp. 285–334.
33. Ministry of Economy, Trade and Industry, *Outline of Japan's SME Policies*, Small and Medium Enterprise Agency, Tokyo, Japan, 2005, available at: http://www.sme.ne.jp/policies/index.html, accessed July 2005.
34. W. Ruigrok and J. J. Tate, 'Public research and testing centers in Japan', Working Paper 77, Berkeley Roundtable on the International Economy, University of California, Berkeley, CA, 1995; R. Hassink, 'Regional innovation support systems: recent trends in Germany and East Asia', *European Planning Studies*, 10, 2, 2002, pp. 153–64.
35. H. Izushi, 'Creation of relational assets through the "library of equipment" model: an industrial modernization approach of Japan's local technology centres', *Entrepreneurship and Regional Development*, 17, 3, 2005, pp. 183–204.
36. Office of Technology Assessment, *Making Things Better: Competing in Manufacturing*, US Congress, Washington, DC, 1990.
37. MEP's federal funding was $105 million in FY 2006 and is estimated at the same level for FY 2007. For FY 2008, the President did not propose to zero-out the program but requested a reduction in the MEP federal budget to $46 million. Congressional action is pending. Most likely, federal funding will be restored to prior levels.
38. P. Shapira, 'Evaluating industrial extension services in the United States: experiences and insights', in P. Shapira and S. Kuhlman (eds), *Learning from Science and Technology Policy Evaluation*, Edward Elgar Publishers, Northampton, MA and Cheltenham, UK, 2003.
39. The ATP has been a 'flagship' innovation program which has been favorably evaluated; see National Research Council, *The Advanced Technology Program: Assessing Outcomes*, Washington, DC, 2001; National Institute of Standards and Technology, *A Toolkit for Evaluating Public R&D Investment*, Gaithersburg, MD, 2003. However, the program is viewed as too interventionist and unnecessary by the current administration, leading to White House efforts to zero-out the program's federal budget.
40. See, for example, Friedman, *op. cit.*; Office of Technology Assessment, *op. cit.*; A. Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Harvard University Press, Cambridge, MA, 1994.

41. M. J. Piore and C. F. Sabel, *The Second Industrial Divide: Possibilities for Prosperity*, Basic Books, New York, 1984; P. Cooke and K. Morgan, *The Associational Economy*, Oxford University Press, Oxford, 1998; M. E. Porter, 'Location, competition, and economic development: local clusters in a global economy', *Economic Development Quarterly*, February 2000.
42. M. Luger, L. Stewart and G. Androney, *Identifying 'Targets of Opportunity'. Competitive Clusters for RTRP and its Sub-Regions*, Office of Economic Development, University of North Carolina, Chapel Hill, NC, 2003.
43. S. Rosenfeld, *Just Clusters: Economic Development Strategies that Reach More People and Places*, Regional Technology Strategies, Inc., Carrboro, NC, 2002.
44. Council on Competitiveness, *Growing the Economy from the Grassroots: The Tools for Creating Prosperity in Regional Economies*, Washington, DC, available at: http://www.compete.org/nri, accessed February 2005.
45. Rosenfeld, *op. cit.*
46. The discussion of Japanese cluster policies in this section draws on a memo prepared by the author in 2004 as background for an OECD Territorial Review of Japan. The author is responsible for the observations presented (not OCED). See also: National Institute of Science and Technology Policy, *A Study on the Successful Factors of Regional Innovation and Promotion Policy through the Comparison of Examples of Advanced Clusters in the USA and Europe and Regional Clusters in Japan*, Third Policy-Oriented Research Group, Tokyo, Japan, 2003.
47. Japan Small Business Research Institute, 2006, *op. cit*, Part II, ch. 4.
48. H. Inoue, 'Activating industrial clusters: on the spot experience, industrial cluster promotion office', Regional Economy and Industry Group, Ministry of Economy, Trade and Industry, Tokyo, Japan, 29 September 2003 (PowerPoint presentation).
49. Ministry of Education, Culture, Sports, Science and Technology, *CLUSTER: Cooperative Link of Unique Science and Technology for Economy Revitalization*, Tokyo, 2002.
50. Cited in National Science Foundation, 'Third business–academia–government summit: Tokyo, Japan, November 17, 2003', Tokyo Regional Office, Report Memorandum #04-01, 2003.
51. I. Mitsui, 'Industrial cluster policies and regional development in the age of globalization: Eastern and Western approaches and their differences', Yokohama National University, paper presented at 30th ISBC, Singapore, September 2003, available at: http://www.nemw.org/smallmanufacturers/advocacyresources.htm, accessed July 2005.
52. For a discussion of the evaluation of US industrial services, see Shapira, 2003, *op. cit.*