Strengthening SMEs for International Competitiveness

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Abstract

With increased globalization, accelerated technical change and the growing demand for higher quality modern products, many traditional small and medium sized enterprises (SME), in developing countries face closure or very difficult upgrading. Even modern SMEs in developed countries face very difficult competitive challenges in the emerging setting. This paper ultimate aim is to lay out some general principles of support to help increasing the competitiveness of SME in developing countries. It starts by identifying three sets of competitive problems that SME are currently facing. The first set are inherent to being small, the second reflects distortions in markets and institutions and the third are caused by policy intervention. Drawing on the experience of supporting SME in the UK and some East Asian countries, the study concludes that while a conducive business environment and private support mechanisms are necessary conditions for SME promotion, they are not sufficient. Provocative policies are needed to promote SME competitiveness, and while part could be self-financed, a large component may need to be subsidized. It also stress that the success of such policies should be based on a thorough understanding of SME strengths and weakness, and should also be geared to each country's conditions and institutions.

ملـخص

فى ظل تنامى الاتجاه نحو العولمة وتسارع التغيرات التكنولوجية بالإضافة إلى تزايد الاهتمام بمستوى جودة المنتجات، تواجه المشروعات الصغيرة والمتوسطة التقليدية فى الدول النامية العديد من التحديات التى تهدد نشاطها. كما تواجه أيضاً المشروعات الصغيرة والمتوسطة الحديثة بالدول المتقدمة العديد من الصعوبات التى يفرضها واقع النظام العالمى الحالى. وتستهدف هذه الورقة إرساء بعض المبادئ العامة لدعم الوضع التنافسى للمشروعات الصغيرة والمتوسطة بالدول النامية. وتبدأ الدراسة بتحديد ثلاث مجموعات من المشاكل التى تضعف من القدرة التنافسية لهذه الوحدات الإنتاجية. وتنبع المجموعة الأولى من المشاكل من صغر الحجم النسبى لهذه المشروعات، بينما تعكس المجموعة الثانية التشوهات فى الأسواق والمؤسسات التى تعمل فى إطارها هذه الشركات، وأخيرا ترجع المجموعة الثالثة من المشاكل الى سياسات التدخل الحكومى. واستناداً الى تجارب بعض الدول المتقدمة مثل إنجلترا وكذلك بعض الدول النامية فى شرق آسيا تنتهى الدراسة إلى أنه وإن كان توافر مناخ مشجع للأعمال وآليات خاصة لمساندة المشروعات الصغيرة والمتوسطة يعدان من الشروط الضرورية لتنمية القدرة التنافسية لهذه المشروعات، إلا إنها غير كافية. وعليه توصى الدراسة بضرورة وضع سياسات تحفيزية لتنمية المشروعات الصغيرة والمتوسطة، على أن يتم تمويل تلك السياسات جزئياً من خلال الموارد الذاتية، بحيث لا يعتمد التمويل على الدعم وحده. كما تؤكد الدراسة فى النهاية على أن نجاح هذه السياسات يستلزم فهم دقيق لنقاط الضعف والقوة بهذه المشروعات، كما يستلزم أيضا أن تتسق تلك السياسات مع الخصائص الاقتصادية والمؤسسية لكل دولة على حدة.

I. Introduction

This paper deals with the competitive problems facing small and medium sized enterprises (SMEs) in developing countries. It concentrates on the manufacturing sector, where the competitive threat is felt most directly at this time and where there is enormous export potential.[1] It draws on the experience of the advanced and newly industrializing countries, and upon an ongoing study of SMEs in Europe and East Asia in which I am engaged.[2] Following an introductory discussion of the importance of increasing the competitiveness of SMEs, the paper identifies the types of problems SMEs are currently facing in Section II, and then goes on to evaluate how various countries are addressing these problems in Section III. After evaluating the relative successes and failures of these support schemes, the study then concludes by offering a set of policy implications in Section IV.

SMEs form, by number, the majority of manufacturing enterprises at all levels of development. In many economies they provide the bulk of employment. In some they are also substantial contributors to exports and innovative activity. In developed economies, SMEs tend to be in 'modern' manufacturing and services, often in cutting edge technology based activities. It is generally the case, in all economies but particularly the more industrialized ones, that SMEs learn most from each other and from larger enterprises (Levy, 1994). However, these market based learning mechanisms are often not enough to support technology development, particularly when competition intensifies and technical change becomes very rapid.

In a world where precisely this is happening, governments are trying to enhance the benefits offered by SMEs, even in mature industrial countries where market based information and support systems are well developed. Governments are investing considerable effort and resources in supporting SME growth and upgrading.[3] However, the recognition of

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[1] The service sector, where SMEs are most prominent, is also of great competitive significance. The liberalization of investment flows and the international spread of service providers from advanced countries means that developing country SMEs in services are facing increasing pressure. However, this paper does not deal with this sector.

[2] The EU project is on "Small And Medium Enterprises In Europe And East Asia: Competition, Collaboration And Lessons For Policy Support" and involves several groups in Europe, Israel as well as Japan, Korea and Taiwan. I am grateful to the following members of the Queen Elizabeth House team: Manuel Albaladejo, Mike Albu (now with the Intermediate Technology Development Group), and Henny Romijn (also lecturing at Eindhoven University, Holland).

[3] See the references to SME related activities in the UK and the European Union in the bibliography.

the competitive significance of SMEs is relatively recent, even in the developed world. As Albu (1998, p.1) puts it:

> The revival of interest in small manufacturing enterprises as important agen ts in the industrial economy is a relatively recent phenomenon in Europe. In the UK, and other early industrializing countries, small firms' share of manufacturing output was in decline for most of this century. This decline was regarded by many as inevit able: the reflection
>
> of large companies' inherent potential to realize economies of scale and technological proficiency, as well as to exploit their market power... The end of the 1960s also marked a turning point: evidence suggests that a resurgence in small manufacturing firms' economic importance began at this time. For example, small firms' share of manufacturing, which had fallen to 19 percent in the 1960's, rose to 32 percent by 1990. The number of manufacturing establishments with 10 or fewer empl oyees, which had fallen to only 35,000 during the 1960's, subsequently rose to over 100,000 by 1985. Although these striking patterns were not visible in all European countries, it is clear that a shift in the structure of manufacturing industry was (and s till is) taking place. In Germany, USA and Italy a similar, but weaker or delayed pattern is discernible.

Smaller enterprises have been active in manufacturing since before the dawn of the industrial revolution. Even with the advent of large-scale production, they have flourished in niches where economies are scale economies are unimportant – or where flexibility, customization, locational advantages, subcontracting to larger firms can offset their importance. They have also been able to reap scale economies in functions like marketing, information, training, design and so on by co-operating with each other or 'clustering' together. The revival of interest in SMEs may reflect a growing recognition of their basic advantages; it also reflects *new trends*. The ability of SMEs to grow, compete, export and innovate has been enhanced by several factors such as:

- The declining competitiveness of developed countries in mass-production activities, forcing them into activities with a greater skill and technological edge, sometimes in smaller facilities, that respond better to what Best (1990) calls 'the new competition'.
- The turbulence caused by rapid and continuous technological progress, favoring small enterprises that have an advantage in the early stages of innovation before technologies 'settle down' and scale economies in production, marketing or research and development (R&D) become important.
- The growing availability of risk capital for small technology-based firms in the form of venture capital, special government financing or specialized financial services.
- The increasing demand for specialized, custom-made products, combined with information-based technologies that reduce SME handicaps in accessing and processing information.

- The availability of computerized technologies that allow smaller, more flexible production units to compete directly on cost with larger, more specialized ones.
- Competitive pressures on larger firms to cut costs by subcontracting traditional 'in-house' activities to SMEs, or to spinning off smaller affiliates.
- Technological changes in transport and communication, enabling subcontracting to be more efficient, with closer linkages (one result being just-in-time production).
- Policy changes favoring smaller enterprises such as strong competition policy within developed countries, stronger SME support, incubator schemes and so on.
- The liberalization of trade and investment flows, opening up new opportunities for overseas investment by small firms.[4]
- The growth of dynamic 'clusters' of SMEs, in both developed and developing countries, with active cooperation to achieve international competitiveness.

In developing countries, there are also significant numbers of SMEs flourishing in modern activities, often exporting significant amounts. However, the proportion of 'modern' SMEs differs considerably between countries; most are found in the newly industrializing countries with strong entrepreneurial bases, vibrant export sectors and a large base of educated and technical manpower. Table 1 illustrates the situation in some East Asian and developed countries.

Table 1. Role of SMEs in Selected Countries

A. East Asian Countries			
Country	Share in employment (%)	Share in number of enterprises (%)	Share in exports (%)
China	84		50
Hong Kong	63	97	>70
Korea	78	99	43
Taiwan	68	96	56
Philippines	50	98	
Thailand	74	98	
Indonesia		97	
B. Industrial Countries			
Japan	79	99	13
Germany	66	99	
Italy	49*	99	
Greece	91	99	
France	57	99	
UK	58		
USA	53	99	29

Source: Van Houtte (1997)
Note: * Manufacturing only

[4] On the growth of small transnational enterprises see UNCTAD (1999).

In many developing countries, particularly the less industrialized ones, there is a sharp divide between modern and traditional SMEs. A significant section of SMEs in developing countries remains in traditional activities generally with low levels of productivity, poor quality products, serving small, localized markets. There is little or no technological dynamism in this group, and few 'graduate' into large size or modern technologies. In many poor countries, there is also a large underclass of (formal and informal) micro enterprises that ekes out a bare survival. Some of these small and micro enterprises may be economically viable over the long-term, but a large portion is not. With import liberalization, changing technology and the growing demand for higher quality modern products, many traditional SMEs face closure or very difficult upgrading (see below).

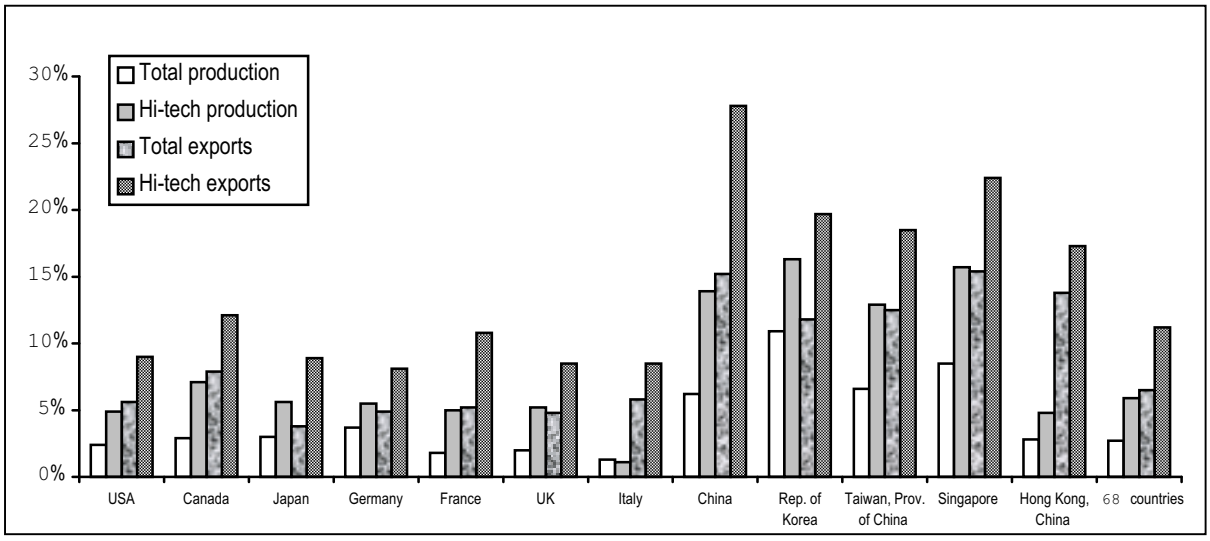
Even 'modern' SMEs in many countries face very difficult competitive challenges in the emerging setting. The threat is one aspect of the larger competitive challenges posed by accelerating technical change, globalization and liberalization. The pace of change is so rapid, and its scope so wide, that some analysts see the emergence of a new technological 'paradigm' (Freeman and Perez, 1990). Others, like Best (1990), point to the changing competitive context. Traditional modes of competition, based on low costs and prices, are being replaced by the 'new competition', driven by quality, flexibility, design, reliability and networking.

This change is not just in advanced manufactures but also in mundane consumer goods like clothing, footwear and food products. Firms are specializing increasingly in different segments of the production chain, outsourcing segments and services to other firms to reap economies of scale and specialization. At the same time, most leading firms are broadening their field of technological competence to manage effectively the complexities of supply chain management and innovation. Information flows, interaction and networking are the new weapons in the competitive armory; in technology intensive activities these often include strategic partnerships with rivals and close collaboration with vertically linked enterprises.

The new technological paradigm defines the world in which SMEs have increasingly to grow and compete. The paradigm is leading to large shifts in the location of productive and innovative activity and patterns of comparative advantage. The world is increasingly driven by technological competence within given activities and by a structural shift from low to high technology activities (those with rapidly changing technologies and high rates of research and development spending). Technology-based

activities are growing more rapidly in production and trade in all major developed and developing economies (Chart 1).

Chart 1. Growth Rates of Total and High Technology Production and Exports, 1980-1995



Recent analysis of patterns of export growth shows that trade dynamism is increasingly correlated with technology intensity (Lall, 1998). Primary products are the slowest growing category of world exports. Within manufactures, resource based products lag behind others, while the leading group is high technology products. This pattern is even more marked for developing countries than developed ones, though technological dynamism in the developing world is highly concentrated in a few countries, largely in East Asia (see Appendix A).

II. Competitive Problems Facing SMEs

SMEs in general tend to face *three sets* of competitive problems. Some are inherent to being small. Some reflect distortions in markets and institutions. And some are caused by policy intervention. The 'remedies' to these problems clearly differ according to their nature and source.

The Disadvantages of Small Size

The first set relates to disadvantages of small size *per se.* Where manufacturing, marketing, technological or other functions have inherent scale economies, small size imposes cost and innovative penalties on SMEs. However, these are structural features of the industrial scene – they simply mean that SMEs have to specialize in different activities or processes from large firms. By doing so they can flourish and exploit their own advantages of flexibility and

internal coordination. The relative advantage of SMEs is where scale economies are less marked, or where they can offset such economies by choosing technologies that allow them to offset their cost handicap by responding rapidly to changing conditions, finding niche markets or customizing their products. In the early stages of technological innovation, before the industrial structure has 'settled down', small firms can be more innovative than large firms can. Many electronics and software technologies illustrate this clearly. The spread of computer controlled equipment helps SMEs, since large investments in specialized machinery become less important in certain activities.

Where SMEs cannot individually establish a competitive advantage, they can realize scale advantages by cooperating with other small enterprises and subcontracting from larger enterprises. As noted at the start, SMEs learn collectively – from each other, large firms and support services and institutions. The growing literature on clusters[5] suggests that firms in close proximity (or able to establish information and other linkages across geographical distance) reap various agglomeration economies. Some of these are enjoyed by a simple act of being in the right place – the availability of particular skills, materials or markets, saving transaction costs for buyers, the development of ancillary activities and institutions. Others need active collaboration. Enterprises can jointly undertake functions where scale economies arise: for instance, training workers, designing new products, conducting quality control or research activity, storing and transporting goods, and so on. This generally involves setting up institutions, but it may involve others forms of collective action, to influence existing institutions or policy makers.

Subcontracting to large firms, with or without a cluster, is also an effective way for SMEs to build on their advantages. As noted, the growing trend on the part of large firms to specialize, 'downsize' and network has increased their reliance on small suppliers and contractors. In many industries, it has also made them more willing to integrate SMEs into their technological activities. The falling costs of information technology and communication enhance this tendency, and it makes extensive networking by SMEs themselves less dependent on geographical proximity.

However, small size does impose certain disadvantages despite potential clustering and subcontracting. SMEs are at a handicap in activities where the risks involved are large,

[5] See Advani (1997), Bianchi (1993), Luthria (1998), Nadvi (1999), Nadvi and Schmitz (1994), Pyke et al. (1990, 1992), Rabellotti (1997), Schmitz (1992, 1995), Swann et al (1998), Van Dijk and Rabellotti (1997), UNCTAD (1994).

technology is exceptionally fast moving and based on massive R&D, or investments have to aim at global markets from the start. As noted, their advantages of flexibility and innovativeness diminish as technologies stabilize and large-scale production and marketing become more important. Clustering also has its limitations. Some activities may be too difficult to manage on a cooperative basis: where valuable proprietary knowledge, marketing branded products, tapping particular markets or creating very specific skills is involved. Many agglomerations do not develop into genuine clusters, but remain technologically stagnant, low productivity groups of traditional SMEs. This may be because of the larger environment in which they operate (say, with policy constraints of growth or low levels of general skill and technology development) or because they are unable to undertake cooperative activity to enhance competitiveness. This may, in turn, reflect a lack of trust between SMEs, cultural traditions of non-cooperation, or the absence of an internal or external catalyst to collective action. Clustering can also have cost – such as congestion, excessive duplication, free rider problems or domination by a few members – that lead to inefficiency, lack of innovation or inflexibility. Clusters may breed inward-looking attitudes and deter members from seeking external alliances.

Distortions in Markets and Institutions

Second, SMEs may face segmented factor markets. In other words, large firms may have greater or more privileged access to input, credit, labor, infrastructure, information and technology markets. There are economic reasons for this: providers of productive factors find it easier, safer and cheaper to deal with a few large customers than a range of small and dispersed ones. It is difficult to collect detailed information on the latter. They are more difficult to monitor and the cost of enforcing contracts may be disproportionately large in relation to the size of the transaction.

The best-known case of this is in credit and capital markets, where the literature on information economics analyses how SMEs face problems created by missing markets and asymmetry. However, there are similar tendencies in all other factor markets where transactions are discrete and involve direct relations between buyer and seller. In the present context, an important asymmetry is in the ability of SMEs to find, evaluate, purchase and master new foreign technologies. International technology markets are notoriously imperfect, and finding the right technology at the right price can be a costly and lengthy task. More important, learning to master a new technology, particularly one involving new skills, materials and methods, can be an uncertain and costly process. The problems of technological

mastery are far greater when, as in most developing countries, factor markets and institutions are themselves underdeveloped and unresponsive.

Empirical research in less developed countries shows that SMEs are poorly placed to deal with technical change and upgrading (Lall, ed., 1999). Not only do they lack the information and resources to access new technologies and skills, they often do not know how weak they are. They may be unaware of competing technologies in other countries. They may not realize the nature of the new skills and techniques needed to keep up. They may lack the entrepreneurial knowledge and education to seek the technology or assistance needed. The problem is clearly much greater for SMEs in the traditional and rural sectors of developing countries, but information and skill problems affect SMEs everywhere. Even in highly industrialized countries like the USA and Japan, SMEs find it difficult to keep abreast of international technological and market trends (OTA, 1990).

Biases in Government Policies

Third, policies and institutions relevant to manufacturing can be biased against SMEs. This is particularly the case in developing countries, where the widespread use of investment and import licenses and controls, directed credit, location incentives, infrastructure provision and so on may favor firms with better resources and connections. Corruption and rent seeking by bureaucrats and politicians generally enhances the ability of large firms and groups to exploit the system.

Interestingly, some policies intended to favor SMEs also have undesirable effects on their dynamism and competitiveness. For instance, tax privileges given to smaller firms – and the effective exemption of micro and informal enterprises from the tax system – provide strong incentives to 'stay small' rather than grow large. It can lead to a proliferation of units below the taxable size, some of which may be technically efficient (although many are not). In countries like India where certain industrial products are reserved for SMEs, it has led to the stifling of competition and retardation of technological upgrading. In areas of export strength like textiles, the Indian reservation policy has eroded an established area of national competitiveness.

Finally, most developing countries tend to provide much weaker support systems for SMEs compared to developed or newly industrializing ones. We describe elements of SME support systems in some of these countries.

III. SME Support Policies in Selected Countries

Most governments are aware of the costs and market failures facing SMEs. Thus, the promotion of clusters has recently become a popular means of promoting competitiveness. The policy responses fall under three broad headings:

1. *Lowering transaction costs*: Removal of policies that discriminate against SMEs, raise entry, exit and operational costs, reduce access to support services and institutions;
2. *Remedying market failures*: Proactive measures to overcome market deficiencies by institutional support, incentives and subsidies, special access to finance, targeted training and consultancy. Some of the most important stem from inadequate technological development. As Bessant (1999) puts it in his analysis of UK policies, "The reality is that many SMEs lack the capability to understand and articulate their needs, and rarely scan for sources of new technological opportunity. Even those that have an awareness of their needs may lack the information or capability to find and access sources of technology" (p. 3).
3. *Promoting clusters*: Encouragement of existing or potential agglomerations by provision of suitable infrastructure, promotion of linkages among SMEs and with large firms, encouragement of local support institutions.

Some of the strongest, best organized efforts to support SMEs are found in the mature industrial economies such as the United Kingdom, and in some developing East Asian countries.

UK Policies

The UK, as the most mature industrialized country in the world and traditionally very open to trade and investment, offers interesting lessons in support for SMEs. Under the long period of Conservative rule, the approach embodied the free market beliefs of the government. Despite these beliefs, there was the clear felt need to help SMEs cope with intensifying competition and accelerating technical progress. The following description, taken from Albu (1998) provides a brief map.

The UK government considers favorable tax treatment for SMEs as distorting the free market. Instead, it seeks to influence the enterprise environment, which entails capital markets, advisory services and the science, engineering and technology (SET) base. Where SMEs have featured in UK public policy, it has been principally within the context of promoting "competitiveness". Some general support for SMEs is found in recent attempts to modify and simplify various statutory and financial systems. Business rates, income tax, National Insurance and VAT systems have been adjusted, as have regulations governing audits and accounts. The government has also sought to reduce the obligations of SMEs in respect of labor rights. In general however, the delivery of significant fiscal concessions or

subsidies to SMEs in the UK has been felt to conflict with wider economic policy objectives. As a result, public support to SMEs aimed at reducing barriers in areas such as access to capital markets, business advisory services and technological developments.

Policy measures thus fall into two spheres. First, removing regulatory obstacles and reducing statutory costs faced disproportionately by SMEs. Second, information, advisory and counseling initiatives aimed at improving performance in relation to exports, design, innovation & technology. Responsibility for developing and managing these policies lies with the Department of Trade and Industry's (DTI's) Small Firms and Regional Development section.

Business Link – One of the most tangible outputs of public policy and investment in SMEs since 1992 has been the Business Link (BL) program. This is intended to provide single points of easy access for SMEs to an integrated range of business support services. Government support to BL is worth £120 million p.a. The national BL network currently has over 200 outlets and achieves significant coverage. In any quarter, around 35 percent of firms between 50–200 employees are using BL services, although the proportion is less for the more numerous smaller firms. Client firms get personal business advisors, access to counselors specializing in export development, design and innovation and technology, and other services such as loan guarantees. In around 40 percent of cases examined, the assistance-enabled firms to achieve results and improvements in performance that would not otherwise have been possible.

UK Benchmarking Index – One of the services being promoted through BL is designed to encourage greater use of performance benchmarking by SMEs. A central database of information on over sixty indicators of financial, operational and managerial performance has been collected nationally. The object of the exercise is to benchmark around 10,000 SMEs per annum, comparing company performance in comparison with national, regional or sectoral standards. The comparison is used to offer subsidized consultancy services to firms to help them improve their performance. Large firms conduct intensive benchmarking exercises on their own, or with the support of the Confederation of British Industry (the Probe software they use contains benchmarks based on thousands of leading EU firms). In addition, the government conducts productivity comparisons of major industries to assess if and why there are gaps *vis-à-vis* major competitors. The importance of benchmarking as a practical policy tool must be stressed: Not only is it a skill and information intensive tool, but is also able to provide essential micro data to feed into policy support.

Small Firms Loan Guarantee Scheme (LGS) – LGS provides DTI-secured loans to SMEs through the commercial banks, worth about £250 million per year. These loans are for all types of firms; only about 6 percent go to technology-based firms.

Small Firms Training Initiatives – Three initiatives were designed exclusively for small firms from 1994 onwards. *Skills for Small Businesses* provided £63 million to train 24,000 key workers; *Small Firms Training Loans* offered deferred repayment loans of up to £125,000 for skill upgrading; and the *Small Firms' Training Challenge* provided awards for joint training by groups of 10 or more firms: £3.5 million was awarded in the first year.

Regional Selective Assistance – This is a discretionary scheme to attract investment and create or safeguard jobs in assisted regions. Grants of up to 15 percent of project costs are made for a company to carry out an investment project. Qualifying projects include purchase of fixed assets, including new plant, modernizing or adding new facilities to existing plants.

LINK scheme – This is quite distinct from the Business Link mentioned above. LINK is the principal mechanism for supporting collaborative research partnerships between UK industry and the research base (also see Bessant, 1998). LINK aims to enhance the competitiveness of UK industry through support (including 50 percent finance) for "managed programs of pre-competitive S&T in market or technology sectors, and by encouraging industry to invest in further work leading to commercially successful products, processes, systems and services" (LINK mission statement). LINK currently has programs in Electronics, Communications & IT; Food & Agriculture; Biosciences & Medical; Materials & Chemicals; Energy & Engineering. Public sponsorship comes from a variety of government departments and research councils, totaling £40 million p.a.

Working Party – DTI is sponsoring the Confederation of British Industry's Tech-Stars group, which aims to identify ways of removing barriers to growth of small, technology-based firms, in particular by effective management-teams and corporate alliances. All DTI supported SME services are now supplied through the Business Links network of outlets.

Services for technology-based SMEs include:

The Smart Scheme – Re-introduced April 1997, this provides grants to SMEs for pre-competitive feasibility studies into innovative technology and for development up to pre-production prototype stage of new products and processes. It combines previous

SMART, SPUR schemes and the innovation element of Regional Enterprise Grants. Awards are made on a competitive basis in two forms:

1. Feasibility Studies: Small businesses with fewer than 50 employees may submit proposals for support with feasibility studies. Assistance will be 75 percent of eligible project costs up to a maximum of £45,000.
2. Development Projects: All SMEs may compete for support with development projects. The awards are 30 percent of eligible project costs up to a maximum grant of ECU 200,000. A very small number of exceptional development projects may receive a higher grant (up to ECU 600,000).

Innovation & Technology Counselors (ITCs) – As part of the Business Links service, networks of local advisors coordinate the use of local sources of innovation support by business links' clients. Approximately 70 ITCs were in place in 1997 at a cost of about £2.5 million p.a. The impact is difficult to assess from the information available, but will depend largely on the quality of the innovation support available from local Research & Technology Organizations (RTOs) or other services to which they refer their clients.

Focus Technical – A £6 million program launched in 1995, initially for 3 years, is an attempt to address this last problem. The program aims to assist Research & Technology Organizations (RTOs) to extend their technological products and services to better meet needs of SMEs, and to improve RTOs networking capabilities with other business support organizations including BL so as to direct innovation and technology services to SMEs.

Business Incubators – are special estates to create a nurturing, instructive and supportive environment for "fast track" small companies, providing access to a range of business skills, training and finance. Incubator directors are directly involved in selecting companies, and assessing these companies' success in growing and graduating from the incubator. The Enterprise Panel, a Treasury-established working party, reported a positive potential for developing more incubators as a means of promoting development of high-tech and innovative SMEs. At least 50 incubator-type projects exist in the UK.

Asian Newly Industrializing Economies (NIEs)

In terms of developing countries, Asian NIEs offer several outstanding and successful examples of SME support policies. Let us now consider the following: Taiwan, Korea, Singapore, and Hong Kong.

Taiwan[6]

Taiwan has perhaps the best developed system of any developing country. It has around 700,000 SMEs, accounting for 70 percent of employment, 55 percent of GNP and 62 percent of manufactured exports, and an impressive set of programs to support them. In 1981, the government set up the Medium and Small Business Administration to support SME development and coordinate the several agencies that provided them assistance. As a result, the range of services currently available for SMEs in Taiwan includes financial assistance from several banks, funds and centers; government subsidized management and technology assistance; and R&D support.

Among the centers created for SME support, the most important is the Industrial Technology Research Institute (ITRI), which conducts R&D on projects considered too risky for the private sector. ITRI's seven laboratories deal with chemicals, mechanical industries, electronics, energy and mining, materials research, measurement standards and electro-optics. Electronics, however, are the principal focus of their research, with two-thirds of its $450 million budget allocated to the Electronics Research & Services (ERSO) division.

ERSO has spun off many laboratories as private companies, including United Microelectronics Corporation (UMC) in 1979; Taiwan Semiconductor Manufacturing Company (TSMC) in 1986, Taiwan's most successful integrated circuit makers. TSMC, which was a joint venture between the government and Phillips of Holland, illustrates the governmental strategy to play a lead role in orchestrating technology import, absorption and development.

The government also offers a variety of highly specialized programs that target such industries as handicraft and automation, and topics of especial concern to SMEs such as the promotion of technology and production efficiency. In terms of research, the government strongly encourages SMEs to contract research to universities, dedicating half of the National Science Council's research grants (about $200 million per year) to matching funds to industry for such contracts. It has also set up a science town in Hsinchu where 13,000 researchers in two universities, six national laboratories (including ITRI) and a huge technology institute, as well as some 150 companies specializing in electronics operate, integrate, and promote SMEs.

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[6] Based on findings from Dahlman and Sananikone (1990), Hobday (1995), Lall (1996), Mathews and Cho (forthcoming). For more information, see Appendix B.

In addition, the government orchestrates technological activity in a number of what it considers strategic activities, where free markets by themselves will produce insufficient innovation. As Poon and Mathews explain:

> IBM unveiled its first PC based on the new PowerPC microprocessor, a product made by the alliance of IBM, Motorola and Apple, in New York in June 1995. It was followed one day later by the unveiling in Taipei of PowerPC based products by a group of 30 firms from Taiwan (China). Taiwan was the first country outside the US to have developed a range of state-of-art products based on the new technology. The Taiwanese firms had not done this on their own: they were part of an innovation alliance, the Taiwan New PC Consortium formed by a government research institution, the Computing and Communications Laboratory (CCL). The Consortium was set up in 1993 to bring together firms from all parts of the information technology industry in Taiwan. The firms involved were relatively small by international standards, and CCL brought them together and negotiated on their behalf with IBM and Motorola.
>
> This was not the only instance of strategic alliance formation by the Taiwanese government to stimulate innovation and take industry to technological frontiers. The Industrial Technology Research Institute (ITRI) had led in the formation of some 30 consortia in the IT industry over the 1990s. In each case, ITRI identified the products, tapped channels of technology transfer, mobilizing the firms, handling the complex negotiations with developed country firms, and covering intellectual property issues. The individual firms developed their own versions of the jointly developed core products and competed in final markets at home and abroad. Their size limited their ability to have done this on their own.[7]

Korea

Korea deliberately promoted large private conglomerates, the *chaebol*, to spearhead its strategic drive into heavy and high-tech industry at world class technological levels, under national ownership (Lall, 1996). However, it has also sponsored a range of SME support programs, including the promotion of R&D by these enterprises. The results have been impressive. The number of SME R&D units has grown from 24 in 1985 to 2,278 in 1997, and by 1996 their R&D expenditures accounted for 13 percent of total manufacturing R&D (Chung and Park, 1998). SMEs have also set up several collaborative centers, and contracted universities and research institutes to conduct R&D on their behalf. The Korean government promoted the import of technology by tax incentives. Transfer costs of patent rights and technology import fees were tax deductible. Income from technology consulting was tax-exempt; and foreign engineers were exempt from income tax. In addition, the government gave grants and long-term low interest loans to participants in "National Projects", which

[7] Poon and Mathews (1997).

gave tax privileges and official funds to private and government R&D institutes to carry out these projects.

Since the early 1980s a number of laws were passed to promote SMEs, leading to a perceptible rise in their share of economic activity (over 1975-86 the share of SMEs in employment, sales and value added rose by at least 25 percent). This policy support, which covered SME start-up, productivity improvement, technology development and export promotion, was crucial to the reversal in their performance. A host of tax incentives was provided to firms participating in these programs, as well as finance at subsidized rates for using support services, credit guarantees, government procurement and the setting up of a specialized bank to finance SMEs. A number of other institutions were set up to help SMEs (such as the Small and Medium Industry Promotion Corporation to provide financial, technical and training assistance and the Industrial Development Bank to provide finance). The government greatly increased its own budget contribution to the program, though SMEs had to pay a part of the costs of most services provided to them.

Singapore

Singapore is justly renowned for the excellence of its infrastructure, in technology as well as in other fields. While relying heavily on giant multi-national corporations (MNCs) to lead its industrial drive, the government has also attempted to boost indigenous SMEs. In 1962 the Economic Development Board (EDB) launched a program to help SMEs modernize their equipment with funds provided by the UNDP. In the mid-1970s several other schemes for financial assistance were added; of these, the most significant was the Small Industries Finance Scheme to encourage technological upgrading. The 1985 recession induced the government to launch stronger measures, and the Venture Capital Fund was set up to help SMEs acquire capital through low interest loans and equity. A Small Enterprises Bureau was established in 1986 to act as a one-stop consultancy agency; this helped SMEs with management and training, finance and grants, and coordinating assistance from other agencies. In 1987, a US$ 519 million scheme was launched to cover eight programs to help SMEs, including product development assistance, technical assistance to import foreign consultancy, venture capital to help technology start-ups, robot leasing, training, and technology tie-ups with foreign companies.

In addition, the Singapore Institute of Standards and Industrial Research (SISIR) disseminated technology to SMEs, and helped their exports by providing information on foreign technical requirements and how to meet them. The National Productivity Board provided management advice and consultancy to SMEs. The Technology Development

Center helped local firms to identify their technology requirements and purchase technologies; it also designed technology-upgrading strategies. Since its foundation in 1989, the TDC provided over 130 firms with various forms of technical assistance. It also administered the Small Industry Technical Assistance Scheme (SITAS) and Product Development Assistance Scheme to help firms develop their design and development capabilities. In fact, it gave grants of over $ 1 million for 29 SITASs in the past 5 years, mainly to local enterprises. Its earnings have risen to a level where its cost-recoverable activities are self-financing.

The EDB encouraged subcontracting to local firms through its Local Industries Upgrading Program (LIUP), under which MNCs were encouraged to source components locally by 'adopting' particular SMEs as subcontractors. In return for a commitment by the MNCs to provide on the job training and technical assistance to subcontractors, the government provided a package of assistance to the latter, including cost sharing grants and loans for the purchase of equipment or consultancy and the provision of training. By end-1990, 27 MNCs and 116 SMEs had joined this program. Over 1976-88, the total value of financial assistance by the Singapore government to SMEs amounted to S$ 1.5 billion, of which 88 percent was in the Small Industries Financing Scheme. Grants of various kinds amounted to S$ 23.4 million and the Skills Development Fund for S$ 48.6 million.

Hong Kong

Despite its *laissez faire* approach to industry, the colony provides strong technical support to its SMEs through the Hong Kong Productivity Council (HKPC). HKPC was the first support institution of its kind in the region, started in 1967 to help the myriad small firms that constitute the bulk of industrial sector. The focus of the Council has been to help firms upgrade from declining intensive-intensive manufacturing to more advanced, high value added activities. It provides information on international standards and quality and gives training, consultancy and demonstration services on productivity and quality to small firms at subsidized rates, serving over 4,000 firms each year. Its on-line information retrieval system has access to over 600 international databases on a comprehensive range of disciplines. Its library takes over 700 journals and has over 16 thousand reference books.

The HKPC acts as a major agent for technology import, diffusion and development for all the main industrial activities in the economy. It first identifies relevant new technologies in the international market, then builds up its own expertise in those technologies, and finally introduces them to local firms. Successful examples of this approach include surface mount technology and 3-D laser stereo-lithography. HKPC has also developed a number of

CAD/CAM/CAE systems for the plastics and moulds industry, of which over 300 have been installed already. HKPC provides a range of management and technology related courses, reaching some 15 thousand participants per annum. For firms unable to release staff, it organizes in-house training programs tailored to individual needs. To help the dissemination of information technology, the council has strategic alliances with major computer vendors, and provides specially designed software for local industry, consultancy and project management in computerization. HKPC provides consultancy services in ISO 9000 systems, and has helped several firms in Hong Kong to obtain certification. It assists firms in automation by designing and developing special purpose equipment and advanced machines to improve process efficiency.

HKPC is a large organization, with over 600 consultants and staff, a laboratory and a demonstration center that can show the application of new technologies (in CAD/CAM, advanced manufacturing technology, surface mount technology, micro-processor technology, rapid prototyping and so on). In 1993-94, it undertook 1,354 consultancy and technology assistance projects, trained over 15 thousand people and undertook 2,400 cases of manufacturing support services. Because small firms have trouble in getting information on, and adopting, new technologies, and are exceptionally averse to the risk and cost involved, the HKPC has always had to subsidize the cost of its services. Despite the growth in the share of revenue-earning work and its withdrawal from activities in which private consultants have appeared, the government still contributes about half its budget. It is important to note that technological information market failures, and the need for subsidized services, occur even in countries like Hong Kong with highly market-oriented economies and highly developed financial services.

The Hong Kong government also supported local design capabilities by joining the private sector in starting a school of design. It financed the Hong Kong Design Innovation Company from the government because private sector design services were lacking and local firms were not aware of their value. Over the four years of its existence (mainly on government financing) this value has been recognized, but the HKDIC (now under the HKPC) is still not financially self-supporting. Nevertheless, the growth of garment design capabilities in Hong Kong has helped its exporters to upgrade their products and start to establish their own brands in international markets.

IV. Conclusion and Policy Implications

The above descriptions illustrate clearly the need to support SMEs. Since the most mature or dynamic industrializing countries in the world, with well functioning markets and institutions, feel the need to mount such comprehensive measures, the need is even greater in countries at lower levels of development. The competitive challenges for the latter are just as great, and the response capacity of SMEs is far more limited.

To start with, the business environment must be conducive to private sector development, with minimal transaction costs for smaller enterprises, clear and transparent rules and a stable macroeconomic environment. As Levy (1994) puts it, "The leading source of support [for SMEs] comes from private channels – from buyers and traders, similar firms, suppliers and subcontracting principals, from banks and from the determined efforts of SMEs themselves… The first order of business … is to ensure that the private marketplace can work, that liberal rules govern the international flow of technical and marketing resources, and that private banks can go about their business of making and collecting loans and earning profits in the process." (p. 55).

However, private support mechanisms, while necessary, are not sufficient. Proactive policy is needed to promote SME competitiveness. While some of it can be self-financing, a large component may need to be subsidized. In a globalizing context, perhaps the first need is to make firms fully aware of the competitive challenges they have to face. The next is to help them prepare to meet the challenge, by understanding their strengths and weaknesses (by benchmarking, technology audits or skills audits), and providing the inputs they need to help them upgrade. The main inputs are finance, market information, management tools, technology, skills and links with support institutions. The experience of Taiwan suggests that the best way to provide these inputs is by combining them in an attractive *package* rather than delivering them piecemeal. SMEs tend to avoid going to support institutions where a lot of time and formalities are involved in getting assistance. They often cannot identify and define their own needs clearly enough to seek the best remedies. Thus, a service that can reach out, help firms to define their problems and devise a package of measures to deal with these problems has the best chance of success.

There are too many specific policies that can be undertaken to support SMEs to merit full discussion here. What is perhaps more useful is to lay out some general principles of support, taking support policies for SMEs *per se* separately from clusters.

Support Policies for SMEs

Romijn (1998) provides a useful catalogue of policy recommendations, which she terms the 'nine-fold C' approach, building upon the 'Triple C' approach proposed by Humphrey and Schmitz (1996). Romijn's recommendations are the following:

'Nine Fold C' approach to supporting SMEs[8]

1. *Customer-orientation*: An approach in which project efforts are driven by meeting customer needs and demands rather than 'supply push' by support institutions.
2. *Collectivity*: Support is likely to be more effective when it is provided to groups of SMEs rather than individual producers. Group-based assistance is not only more cost-effective and practical than individual support, it can also lead to the establishment of linkages between SMEs that can lead to increased efficiency and interactive learning.
3. *Cumulativeness*: One-off improvements are of limited use. Being competitive is not a state but a process that requires continuous improvements. This in turn requires that firms (or clusters of firms) build up a capacity to continuously upgrade their products, processes and production organization and become more self-reliant in this respect. A similar criterion of self-reliance is now also applied to some support programs themselves, in that they must evolve institutional forms of (usually collective) self-help that will, over time, start to function independently from an external aid agency.
4. *Capability focus:* Although the non-availability of appropriate 'hardware' (i.e. machinery and equipment) can sometimes be a crucial constraint on the competitiveness of SME, the development of the capabilities is as important. Usually, SME need to acquire enhanced knowledge and skills about how to choose, use and improve technology.
5. *Context and Complementarity*: A supportive macro-economic environment is of the utmost importance. In the current context, 'supportive' is primarily defined in terms of the presence of growing and technologically dynamic markets that constantly provide new potential opportunities for technological upgrading of SME. The content of the assistance has to be tailored to fit the general level of economic and technological development of the economy in question. This may appear obvious, but older projects did suffer from such lack of fit. For example, many low-income countries tried to promote subcontracting schemes prematurely. Only now, it is only in the relatively advanced economies of Southeast and East Asia such as South Korea where the weaknesses in local subcontracting is emerging as a bottleneck. This is the sort of 'demand-pull' environment where there is a lot of scope to build technological support programs for SME around backward linkage development in the economy in general.
6. *Concentration*: Earlier programs often lacked effectiveness because the institutions delivering them were 'spreading their efforts too thinly' in terms of the number and variety of economic activities. Thus, it was very difficult to build up in-depth expertise about the technological and market characteristics of specific industries and the main actors in these industries, how SMEs are positioned in these industries and what their main industry-specific problems might be.

[8] Romijn (1998)

Research and assistance should concentrate on commodity-specific sub-sectors. By giving considerable weight to the study of interactions between firms of different sizes and at different stages in the supply chain, this approach can provide a more thorough insight into the competitive context in which the target enterprises operate.

7. *Competence and Credibility*: The 'thin spread' of technical assistance projects and programs was not the only factor responsible for the inadequate expertise of agencies. The quality of many projects also suffered due to inadequate professional and educational background of the assistance personnel. In recent assistance interventions a trend towards professionalization of assistance is noticeable, especially in the more advanced developing countries in Asia. This has also improved their credibility to beneficiaries and other actors whom they need to involve in their projects and programs.
8. *Coordination*: Early assistance efforts also suffered from lack of coordination between different service providers and support activities. This is most evident in the East and Southeast Asian countries where governments have tended to establish very elaborate and wide-ranging support structures for SME, encompassing many different financing, training, and consulting projects and programs. The responsibility for these programs would be distributed widely over different governmental institutions and departments. Inefficiencies in assistance delivery were common because of duplication of effort. To make matters worse, programs would frequently be revamped, merged with other initiatives, or replaced with new ones. Such obvious lack of transparency must have been a nightmare for many potential beneficiaries. It must have been a big effort simply to find out how the support structure worked and where to turn for which type of assistance. In recent years, one sees that governments in these countries have begun to improve matters by introducing 'one window' assistance delivery (Meyanathan, 1994).
9. *'Carrot-and-stick' approach*: We have seen that the flawed incentive structure both for the assistance providers and the beneficiaries was perhaps the single most important cause of failure in the early SME technology (and other types of) support projects. A more effective approach is a combination of 'carrots', i.e. potential rewards that will motivate the participants to take action, and 'sticks', i.e. a set of sanctions that come into operation when they fail to do their best. The design of a balanced combination of carrots and sticks is a difficult task. It generally requires that one not only pay attention to economic aspects but also to the institutional and socio-political context within which projects are to be implemented.

Cluster Development

In the context of clusters, it is useful to look at the recommendations by Albaldejo (1999) based on his study of a toy-manufacturing cluster and the assistance provided by AIJU, the Toy Institute, in Spain. His practical advice for support centers focuses on the principles of networking and coordination. He offers advice for support centers on such important things as selecting an accessible location, the best way to provide their service, and setting reasonable fees to attract the targeted companies. He also addresses other important duties

such as encouraging active SME participation in policy reform, fostering the capabilities of local firms, acting as an intermediary in technological diffusion, and encouraging the development of well-researched and innovative products. (see Appendix C)

Other measures to promote SMEs involve the encouragement of subcontracting locally and internationally. Some of the most dynamic SMEs in East Asia are in export activities, with foreign buyers or subcontractors providing the 'missing elements' they need to be fully competitive. These generally include technical and quality assistance, help with purchasing the right equipment and inputs, product design and, of course, marketing. Apart from providing suitable infrastructure (EPZs), a conducive trade and FDI policy environment and flexible, trainable labor, the government can assist subcontracting linkages by various means (see Singapore's example above).

Appendix A:

Changing Technology Composition of World Exports and Developing Countries

The share in world trade of technologically complex products has risen steadily in recent years. In fact, the higher the level of technological sophistication, the higher the growth rate – and the differences in dynamism increase over time. World exports of primary products grew at a modest 2.3 percent *per annum* during 1980-1990 and at only 1.4 percent over 1990-96. At the other end of the spectrum, high technology products (fine chemicals, electronics, aircraft and precision instruments) grew at around 12 percent p.a. compound in both periods. Medium technology products (machinery, simple electronics, chemicals and transport equipment) grew at 8.4 percent and 6.9 percent. Low technology products (textiles, clothing, toys, simple metal and plastic products, footwear) grew at 7.7 percent and 5.6 percent, and resource based manufactures at 6.0 percent and 5.3 percent. When export growth rates generally declined after the 1980s, complex products maintained their growth better than simpler products.

Of the value of the fifty most dynamic exports in the world over 1980-1996, medium and high technology products accounted for a full 75 percent. Within these 'ultra-dynamic' exports, high technology products again grew the fastest, followed by medium technology products. Low technology products were the slowest growing category. Technological sophistication is thus increasingly important for trade growth.

Over 1980-96, developing countries had faster rates of export growth than developed ones in all categories. In line with received trade theory, their share was highest (around 34 percent) in low technology products at the end of the period. However, contrary to expectations, their growth rates rose with technological complexity. Consequently, their share in high technology exports (30 percent) was higher than for resource based and medium technology exports, and will soon overtake their share of low technology exports. In 1996, the value of their high technology exports ($299 billion) was higher than low technology exports ($266 billion), and comprised the largest single category. This was partly due to the relocation of intensive-intensive processes in high technology production by TNCs, and partly to the growth of indigenous capabilities in countries like the Republic of Korea and Taiwan Province.

Export success in the developing world, however, was highly concentrated by region and country. Asian developing countries accounted for 78 percent of total manufactured exports,

and 89 percent of high technology exports. Latin America accounted for 17 percent of the total, 28 percent of resource based, 12 percent of low technology, 28 percent of medium technology and 11 percent of high technology manufactures. Mexico dominated Latin American export activity after 1990, mainly because of NAFTA: in 1996, it alone accounted for 90 percent of the region's high technology, 62 percent of medium technology and 50 percent of low technology, exports. Sub-Saharan Africa contributed 1.4 percent of the developing world's manufactured exports in 1996; if South Africa and Mauritius are excluded are excluded, the share drops to 0.1 percent (in high technology products, to 0.2 percent and respectively),

Just 12 economies account for 92 percent of total manufactured exports by developing countries in 1996. These are composed of nine countries in Asia (the four mature newly industrializing economies (NIEs), the three new NIEs, India and China) and three in Latin America (Argentina, Brazil and Mexico). The level of concentration has increased over time, from 78 percent in 1985. The level of concentration rises by technological sophistication, being lowest in resource based developing country exports in 1997 were: high technology 98 percent. Medium technology 87 percent, low technology 84 percent and resource based 72 percent. The concentration level for total manufactured exports was 85 percent.

Source: Lall (1998).

Appendix B:
SME Support in Taiwan

Taiwan has around 700,000 SMEs, accounting for 70 percent of employment, 55 percent of GNP and 62 percent of manufactured exports, and an impressive set of programs to support them.

The following provides a thumbnail sketch.

In 1981, the government set up the Medium and Small Business Administration to support SME development and co-ordinate the several agencies that provided them assistance. Financial assistance is provided by the Taiwan Medium Business Bank, the Bank of Taiwan, the Small and Medium Business Credit Guarantee Fund, and the Small Business Integrated Assistance Center.

Management and technology assistance was provided by the China Productivity Center, the Industrial Technology Research Institute (ITRI) and a number of industrial technology centers (for metal industry, textiles, biotechnology, food, and information). The government covered up to 50-70 percent of consultation fees for management and technical consultancy services for SMEs. The Medium and Small Business Administration established a fund for SME promotion of NT$ 10 billion. The "Center-Satellite Factory Promotion Program" of the Ministry of Economic Affairs integrated smaller factories around a principal one, supported by vendor assistance and productivity raising efforts. By 1989 there were 60 networks with 1,186 satellite factories in operation, mainly in the electronics industry.

Several technology research institutes support R&D in the private sector, primarily in SMEs. The China Textile Research Center, set up in 1959 to inspect exports, was expanded to include training, quality systems, technology development and directly acquiring foreign technology. The Metal Industries Development Center was set up in 1963 to work on practical development, testing and quality control work in metal-working industries. It later established a CAD/CAM center to provide training and software to firms in this industry. The Precision Instrument Development Center fabricates instruments and promoted the instrument manufacturing industry, and has moved into advanced areas like vacuum and electro-optics technology.

The most important center is ITRI, which conducts R&D on projects considered too risky for the private sector. It has seven laboratories, dealing with chemicals, mechanical industries, electronics, energy and mining, materials research, measurement standards and electro-optics,

but electronics is the principal focus, with its Electronics Research & Service (ERSO) division accounting for two-thirds of its $450 million budget.

ERSO has spun off laboratories as private companies, including United Microelectronics Corporation (UMC) in 1979 and Taiwan Semiconductor Manufacturing Company (TSMC) in 1986, Taiwan's most successful integrated circuit makers. TSMC was a joint venture between the government and Philips of Holland: an illustration of the strategy of the government willingness to play a lead role in orchestrating technology import, absorption and development. TSMC's growth has supported design and manufacturing capabilities in many small electronics firms in Taiwan, leading to further entry of private manufacturers of semiconductors, microprocessors and related electronics products. TSMC has grown into the world's largest dedicated chip manufacturing foundry, with a 24 percent global market share, followed by UMC with 20 percent. These foundries are increasingly used, not just by local chip design houses without in-house manufacturing capabilities, but also by US giants like Intel and Motorola, which out-source chips because of business cycles in the industry and the rising cost of new wafer fabrication plants.

The government also strongly encourages SMEs to contract research to universities, and half of the National Science Council's research grants (about $200 million per year) provide matching funds to industry for such contracts.

The Taiwan Handicraft Promotion Center supports handicraft industries, particularly those with export potential. Its main clients are small entrepreneurs, most with fewer than twenty employees. In addition, the Program for the Promotion of Technology Transfer maintains close contact with foreign firms with leading-edge technologies in order to facilitate the transfer of those technologies to Taiwan.

The China Productivity Center (CPC) promotes automation in industry to cope with rising wages and increasing needs for precision and quality. It sends out teams of engineers to visit plants throughout the country, demonstrate the best means of automation, and solve relevant technical problems. CPC also carries out research projects on improving production efficiency and linked enterprises to research centers to solve more complex technical problems.

The government has set up a science town in Hsinchu, with 13,000 researchers in two universities, six national laboratories (including ITRI) and a huge technology institute, as well as some 150 companies specializing in electronics. The science town makes special effort to attract start-ups and provides them with prefabricated factory space, five-year tax holidays and generous grants. In the 1980s the government invested US$ 500 million in Hsinchu.

The Program for the Promotion of Technology Transfer maintains close contact with foreign corporations that have developed leading-edge technologies in order to facilitate the transfer of those technologies to Taiwan.

Sources: Dahlman and Sananikone (1990), Hobday (1995), Lall (1996), Mathews and Cho (forthcoming).

Appendix C:
Advice on Supporting Clusters: The Experience of Toy Manufacturing in Spain

- Service centers should be located close to the industry they serve. Toy firms acknowledge that the provision of some technical services such as training and laboratory testing require weekly or even daily contact, and that many SMEs would not benefit from technical assistance if the service center was not located in the cluster itself. Close location to the SMEs means a reduction of transaction costs and a quicker response to technical problems. In terms of innovation, technological upgrading and innovation processes gain from local institutions. Developing countries should ensure that centralized administrations and bureaucratic barriers do not impede the location of these institutions.
- Service centers should benefit SMEs more than large firms, especially in developing economies where the difference between large and small tends to be more acute. Membership entrance fees and prices for services should be fixed according to profits and size. Such prices should also be lower than market prices for the same or similar services. For instance, AIJU membership fee system is oriented to benefit the weakest with a minimum membership fee of £176 for firms with less than 50 employees. Toy-related firms point out that this extraordinarily low entrance fee is an incentive for SMEs to become members and actively participate in AIJU´s services. Policy-makers should ensure that service centers located in SME-clusters adopt a policy oriented to benefit groups of small firms rather than large individual firms. This collective approach strengthens inter-firm co-operative links.
- Although horizontal institutions are of great importance, sectoral institutes can be crucial for the welfare of particular industrial sectors because they reflect the specific needs of the SMEs they serve. A participatory approach to the planning and design of policy interventions offers the advantage of a more precise understanding of the SME needs. In order to achieve this, SME representatives should sit on the Supervisory Board of every support institution; this is the case of AIJU. Policy-makers should be aware of the great benefits of sectoral institutes and the importance of SME involvement and participation in their policy design and intervention.
- Service centers should be run on business lines, with a demand base to ensure their sustainability. The ability to earn a substantial portion of the budget is a good indicator of an institution's credibility and relevance. The higher the SME control and ownership the higher the institution's capacity for sustainability and success. A good indicator of AIJU´s

sustainability is that 85 percent of its revenues come from the private sector. Support policies designed and implemented with the help of SME representatives tend to result in more practical, cost-effective and realistic technical services.

- Being aware of the technological limitation of clusters, services centers should foster the capabilities of local firms making a good use of external technological resources. But innovation processes are uncertain, costly and very risky, especially in the case of SMEs, since they have to struggle to find the appropriate equipment as well as to develop the necessary skills and capabilities to use the machinery efficiently. From the AIJU experience, service centers in developing countries should learn to reduce these "limitations on innovation" that SMEs face by doing the following:
    - Designing support services on the basis of the indigenous capacities and the spread of technologies through inter-enterprise learning. Service centers should act as intermediaries in technological diffusion and upgrading in the cluster rather than triggering off change and growth.
    - Focusing on R&D-intensive services to encourage SMEs to move towards more innovative products.
    - Putting science on the shop floor by having technological commissions where scientists and entrepreneurs work together. The AIJU experience shows that this is one of the most practical and efficient ways to increase innovation within firms.
    - Innovation means nothing if there is no market niche for the new product. Thus, service centers should focus on the final stages of the production process (i.e. marketing and commercialization), and marketing research should be encouraged in SMEs to find out about the viability and prospects of new innovations.
- Finally, the effectiveness of support centers also depends on the wider institutional framework. Governments should design policies to create an appropriate consensual and regulatory environment for SME development. Financial support schemes by commercial banks, private organizations and so forth can help SMEs in technology upgrading. Other local institutions like employers' organizations and trade unions can act as vehicles for decentralizing initiatives in favor of local producers. However, an effective support system does not rely as much on the number of institutions actively functioning as on their *networking* and *co-ordination*.

Source: Albaladejo (1999)

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