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A light gray world map is centered in the background of the cover. The map shows the outlines of continents and major islands. The title 'The Development of High-Technology SMEs in ASEAN' is overlaid on the map, specifically positioned over the Southeast Asian region.

The Development of High-Technology SMEs in ASEAN

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Abstract

Small and medium sized enterprises (SMEs) play a vital role in the development of national economies, not only in providing new sources of employment and as a means of replacing declining traditional industries but also as a source of innovation, creativity and international competitiveness. High-technology SMEs have become regarded as of particular interest to governments and others in the generation of new economic activity, new industries and new means of sustainable competition, both within local and global markets. Researchers have also shown that SME development is important for both regional integration and regional development, citing the need for sophisticated and targeted SME support policies and networking facilities, for instance.

The Association of South-Eastern Asian Nations (ASEAN) has for some years paid particular attention to the development of new industries and industrial sectors; especially those that displayed export potential. More recently, member states have evolved development strategies for the high-technology sectors and for the promotion of high tech SMEs, although this approach has not been uniform despite ASEAN governmental intentions. The development of high technology SMEs and associated government policies within member states of ASEAN is assessed in this exploratory paper and issues for further development discussed.

Introduction

Since the formation of ASEAN in the 1960s and the subsequent expansion of its membership - Cambodia, the most recent member, joined in 1999 - economic activity in the region has grown significantly. In the 1990s for example, and before the Asian financial crisis of 1997-8, some member countries were experiencing on average over 7% growth rate (Ahlstrom et al, 2004). Since the crisis, growth has been more sluggish across the region but there are still individual country growth indices of note, for example Vietnam's GDP increased by 7% in 2002 (EIU, 2003).

Despite economic problems encountered in the 1997-8 financial crisis, ASEAN provides a comparatively stable, if disparate business environment for both domestic firms and inwardly-investing MNEs. While disparity between member states exists in terms of economic growth, government intervention in business and cultural and fiscal differences, significant attempts have been made to develop common approaches to business development, in particular support for the development of small and medium size enterprises (SMEs). Yamazawa (1994) suggests that most political parties in the region recognise the important contribution of SMEs to economic vitality and are keen to put forward their own policies relating to SME development.

In an increasing globalized and competitive world, ASEAN countries in general have been quick to exploit opportunities offered by new technologies and by developing high value-added industries through policy and investment programmes. The high technology SME sector has expanded significantly in the past decade, although the most significant expansion has been limited to a few member states, notably Singapore and Malaysia. Outside ASEAN, significant high technology-related economic growth has been evident in both Mainland China and in Taiwan, both of who compete with ASEAN to attract foreign investment and in foreign and domestic markets.

ASEAN and Business Development

The main purpose of ASEAN is to provide South-East Asian nations with a framework for economic and political co-operation (Day and Herbig, (1995). ASEAN has prospered, notably through the governance of individual domestic economies with export-led strategies and a strong market orientation. ASEAN's strategic geographic position relative to major trading routes has also increased its importance as an economic community.

ASEAN's economic development has not been free of problems, however, and some still exist in the less developed member countries. Yamazawa (1994) identified problems such as infrastructure bottlenecks affecting transportation and telecommunications, a lack of development of supporting industries and an absence of relevant institutions and policies. Furthermore, a major barrier to economic expansion is a lack of human resource development and skills shortfalls. In the ensuing decade, many advances have been made to alleviate some of these problems but they still constitute significant barriers to development in many member states of ASEAN. Problems have also been encountered with the reduction of tariffs and the uneven implementation of preferential trading agreements between the various states. Many ASEAN members tend to be inward looking and the existence of ethnic, cultural, political and other differences gives rise to a complex business environment (Day and Herbig, 1995).

Until the early 1990s, only Singapore of the ASEAN nations paid much attention to innovation systems (Yusuf, 2002), other countries placing a good deal of reliance on imitation or reverse engineering, and knowledge gained from sub-contracting - thus limiting growth and the establishment of a brand position. In contrast, Singapore has invested in fostering industrial innovation and the development of education systems. Singapore also has an advantage of a developed venture capital market and an open domestic market which tends to spur innovation and competition. A wide-ranging set of policies promotes start-up and growth enterprises through the development of supply chains via effective transport and other infrastructure systems, etc.

Ahlstrom et al (2004) suggest that the Asian financial crisis caused other ASEAN governments to call into question their economic reliance on small, low value-adding commodity and support industries, especially in the context of an increasingly globalized and international business environment. This has led to more attention being given to the development of indigenous high technology firms and not only by governments but also by local institutions. This in turn calls into question issues such as the professionalization of management, the development of new skills and the need for SME owner-managers to assess their product life cycles more strategically. Yamazawa (1994) was critical of the lack of what he called competent SMEs. Southeast Asian countries have gained a reputation for SME growth but Yamazawa argues that many SMEs are located in low wage and low value-added sectors of manufacturing. This can be restrictive, not only for the development of a vibrant and indigenous SME sector but may also mean that supplies for inwardly-investing MNEs cannot be provided locally, thus forcing up imports. It will be shown in this paper that SME development in higher value-added activities has gained momentum in the past ten years, enabled by a combination of government initiatives and entrepreneurial activity. However, again, such developments are not uniform across the ASEAN member countries. Other barriers to development may be the existence

of more traditional methods within overseas Chinese-owned businesses (Ahlstrom et al, 2004).

Hiley (1999) argues that ASEAN countries have taken advantage of foreign investment in the form of MNE operations in effecting industrial development and the restructuring of manufacturing sectors. Investment has also caused a move away from low-added value goods to higher value items. There has also been a convergence of FDI policies within ASEAN with respect to both the level and range of investment incentives offered and the regulations governing the operation of foreign firms.

Although many commentators would identify inward investment by MNEs as a key factor in economic development through technology and knowledge transfer through spillover and other effects, SMEs too have been regarded as an important element in economic development within ASEAN. Hiley (1999) identifies a significant development of the electronics industry in Singapore and Malaysia, possibly due to a high level of Japanese investment. This can be attributed, in part, to the fact that ASEAN countries were ready to receive such technologies and production processes through investment in education, infrastructure and the development of supporting industries (Hiley 1999). Despite this emphasis on the technological impact of large firms, SMEs play a vital role in exploiting new ideas and creating new industries, thus contributing to the future sustainability of economic development and expanding the indigenous industry base.

Developing comparative advantage has attracted the attention of several MNEs and ASEAN governments have not been slow in identifying areas of comparative advantage and targeting investment possibilities as a result. One aim has been to target investment in high-technology areas (Hiley, 1999) and it is important that if such firms are to be attracted to the area, there should be attractive business packages designed accordingly. This brings into question issues of government policies on business park and cluster development, training and human resource development and the provision of appropriate business conditions for these firms. It is also important to realise that ASEAN members may be, in effect, in competition with each other (as is the case in Europe), a factor that may act against and harmonisation of inward investment policies.

Technology transfer and knowledge transfer within the electronics industry has not been uniform within ASEAN, for example Indonesia is still one of the lowest stages of development but the electronics industry continues to grow and is overtaking other sectors of more traditional manufacturing, textiles for example. Tipton (2002) demonstrates that Thailand, Malaysia the Philippines and Vietnam have all recently announced policy initiatives and created new agencies to lead their high technology solutions. Perhaps the time is right, for as Ahrens (2002: 443) remarks 'sustained economic growth and development are not conceivable without technological progress and productivity gains'.

Conceicao et al (1997) suggest that national innovation systems comprise governments, firms, research laboratories, financial systems and other institutions of innovation. The actions and importantly, the interactions between them determine the impact of technology and of innovation strategies in various countries. It seems that ASEAN has not fully developed approaches to technology policy-making that reflect these actors and their interactions fully, although a recent agreement on SME development signed in September 2004 may address some issues. However, the disparity of technological development within ASEAN makes full implementation a longer- term goal.

SMEs and Economic Development

Developing economies increasingly depend on SMEs as a driver of economic growth and for engagement with global markets. Successful domestic SMEs also have the effect of balancing – in part at least - FDI inflows through investment by foreign-owned firms. Researchers tend to agree on the importance of developing a private SME sector, see for example, Smallbone and Welter, 2001. In South-East Asia, government policies designed to attract foreign direct investment through greenfield set-ups, acquisitions and various forms of strategic alliances, have been followed by a realisation that development of vibrant local firms also requires attention. Other potential benefits of SMEs include:

- the generation of new employment opportunities
- contribution to a competitive economy with diversified structures
- contribution to the supply base for large firms including inward investors
- provision of a source of innovative and new industries/areas of business for the economy and flexible production systems, as an example of new ideas to come from small businesses.

In developing a significant SME sector, government roles should be seen as potential, rather than already existing; much depends upon how they manage their implementation as to how SMEs provide opportunities for restructuring and for generation of a vibrant domestic business economy. Governments, therefore, have an important role to play in influencing the nature and pace of SME development, since the state is one of the key influences on the external business environment in which businesses develop and therefore can act as an enabling or constraining factor.

Government policies and their implementation have differed between ASEAN countries, despite some common needs. They have had mixed success, perhaps because of poor targeting but also because the growth of SMEs has not attracted much attention. Help for entrepreneurs in overcoming barriers to investment and what Woodward (2001) terms 'deep-seated individualism' (thus helping firms cooperate with each other), may require specific SME policies. The main problem for SMEs is not wholly related to their size, but being on their own. Small firms acting in isolation are vulnerable to economy of scale shortfalls and often encounter problems in obtaining credit. Participation in SME networks, for example, may help to overcome this.

In identifying the importance of a healthy SME sector in developing nations, some commentators argue that it is important for them to become involved in global markets through involvement in international business. For the most part, this means some form of engagement in exporting, at least initially, before expanding to other forms of international market entry and development. The stage theories of internationalization, in particular, tend to emphasise the gradual move to foreign markets as firm management gains experience and competence in foreign competition. These issues are expanded on below but there are wider implications for developing economies in facilitating management development and vocational training, in addition to developing policies for assisting in the internationalization of SMEs.

SME Internationalization

A good deal has been written in the past twenty years about the internationalisation processes of firms but most of this research has been carried out in larger companies. More recently, increasing attention has been given to the internationalisation processes of SMEs. It is generally recognised that they suffer certain disadvantages vis a vis larger organizations, such as resource limitations and other liabilities of newness, but such disadvantages have not prevented several SMEs from competing effectively in international markets.

Increasing engagement by SMEs in international activities (Reynolds, 1997) involves them in factors central to the internationalisation process, such as choice of market entry mode, the pursuit of economies of scale, the sequence of markets entered, and 'psychic distance' barriers (Wiedersheim–Paul, 1972, Bloodgood et al, 1997). However, conflicting evidence exists on how these factors affect SMEs' internationalisation decisions (Benito and Gripsund, 1992). A wide variety of patterns and timescales of internationalisation has been detected in studies (Dalli, 1994, Coviello and Munro, 1997, Bloodgood et al, 1997) and motivations to engage in international business vary, an example being in capitalising on unique resources, new technologies and cost benefits. A small and/or hostile domestic environment may also lead an SME to seek markets abroad (Colvin and Slavin, 1989).

Perhaps more than in the case of larger firms, SMEs face significant resource barriers in internationalising (Bloodgood et al, 1997), including the impact of a firm's demographics (size and resources), together with management philosophy and strategy, and both industrial and home country environment (Tyebjee, 1994). The problem of 'the liability of "foreignness"' (Lau and Peng, 1999, p 270) and the GNP of the host country (Berkema and Vermeula, 1998) also affects both initial expansion and extended involvement in international activities. The literature contains conflicting views on their impact, for example, on the relationship between firm size and exporting activities (Bonaccorsi, 1992, Calof, 1993).

Studies in SME internationalisation have also addressed - in the stage models and elsewhere - the importance of the attitudes and particular characteristics of individual SME managers (Schamp and Deschoolmeister, 1998). Not only do SME managers influence a company's international progress (Madsen and Servias, 1997) -they are in turn influenced by it. Chief among managers' desirable characteristics are experience with foreign operations, experience gained in working abroad, language skills and country of origin (Reuber and Fischer, 1997; Manolova et al, 2002). Furthermore, an ability to engage in networking, both in the domestic market and abroad, is considered important by some observers. Reuber and Fischer (1997) show that internationally experienced management teams have a greater propensity to develop foreign partners and to develop further on entering foreign markets after start-up. Such characteristics are also argued to be critical in policy development as, for example, in deciding which firms should receive institutional support in extending their foreign operations.

Up until recently, comparatively few studies have been undertaken concerning methods of acquisition of information and knowledge in the internationalization process, Liesch and Knight, (1999) for instance, argued that the process was relatively poorly understood. However more recent studies (see, for example Fosgren, 2004; Knight and Leisch, 2002) have provided more in-depth knowledge

concerning the acquisition and implementation of information during the internationalisation process. Additionally, a key issue in the growth of SMEs, and the internationalization of SMEs in particular, is that of information availability (Cooper et al, 1995), especially of that relating to markets and their dynamics (Liesch and Knight, 1999). It has been argued that SMEs usually integrate and utilise information more effectively than MNEs. Government agencies may have a significant role in the identification and provision of such information in promoting exporting and other forms of internationalization.

However, such agencies face several problems in the provision of information and other support to individual firms, not least of which is the identification of which particular characteristics of the firm and its management should be evaluated. Due to variability in the internationalisation process, progression through the various stages is not always sequential and may take longer or shorter lengths of time; so that indications of performance are difficult to assess. Performance in the domestic sector, for instance, is not necessarily a good predictor of success outside the country. However, SMEs entering export markets often benefit from government policy initiatives designed to promote both survival and growth (Smallbone et al, 1993). This could involve the use of external advisers in determining both sources of possible resources and the variety of opportunities available in foreign markets. Another factor is the ability of the firm to access the required level of financial resources, which is crucial during the early stages of internationalisation (Bilkey and Tesar, 1977).

High technology SME development in ASEAN

Yamazawa (1994: 18) contends that '(I)n reality, few developing economies have developed competent SMEs and only large firms contribute to industrial development and export expansion in those countries. This view seems dubious considering the increase of 'born global' SME activity over the past decade, especially in high technology firms. The rise of information technology-related sectors and internet-related developments has provided increasing opportunities for new and existing SMEs who can offer both original and sub-contracting services.

What is evident is that recent SME development is commensurate with the export-oriented focus of ASEAN economic strategies, for contributions to export markets has been a popular policy target in ASEAN, following the lead of Japan and Korea. Yamazawa writing in 1994 stated that SMEs in ASEAN countries largely serve domestic markets or participate in local industries, they have no close links with modern industrial sectors, and neither do they participate in export business. Recent studies suggest that this state of affairs is changing rapidly and that high tech SMEs are making a significant contribution to exports in some ASEAN countries. Ahlstrom et al (2004) argue that there was a greater emphasis after 1998 on the development of high-tech firms due to both governmental and private efforts. Taiwan fared better during the 1997-8 crisis (Clifford and Engardio, 2000) due to its technological flexibility as opposed to Hong Kong that possessed an over-reliance on property markets and slow export growth, and remains a significant competitor to ASEAN high technology industries. Ahlstrom et al (2004) suggest that governments promote sustainable productive activities in East Asia such as indigenous technology development. Many high technology, high growth firms depend on venture capital and other investors in order to attract technical talent, brand building is also important. Such developments also raise the skills levels in individual countries,

providing an incentive for inward investment by MNEs, constituting both opportunities and threats for domestic SMEs.

Ahlstrom et al (2004) note that some high-tech owner-managers trade off growth for other goals such as more personal control or the provision of a specialised area of expertise, such actions obviously affect the growth potential of SME sectors. On the other hand, other entrepreneurs spot and exploit entrepreneurial opportunities rapidly and tend to over-diversify, perhaps to the detriment of the high-tech objectives. Such factors contribute to the complicated state of the SME sector and constitute a testament to their variability. The targeting of SME support, if it is to be effective, needs to take such variability into account.

ASEAN governments have introduced a range of support policies for SMEs, however Yamazawa (1994) contends that 'their SME policies present a negative image of the social policy of prolonging inefficient firms p19). Another view is that governments interfere in industrial development and this intrusiveness tends to exacerbate inefficiencies in industries. However, it seems that on balance, despite such views, government intervention is not seen to be intrusive, but it sometimes does not always effectively target appropriate priorities or firms to be supported. In fairness, many SME owner-managers are not aware of support facilities offered by government agencies and other institutions and thus support mechanisms offered are not always utilised.

There is an increasing emphasis of SME development in fast-growth technology markets with East Asian firms increasingly tapping into foreign markets as well as into capital markets (Yeung and Olds, 1999). International competition is forcing domestic firms to adapt their products for foreign markets in addition to changing methods of competition at home and to stay in the domestic game. Ahlstrom et al (2004) note that both budding entrepreneurs as well as established firms have begun to move into the high growth high technology areas. This trend demonstrates the need for start-up support as well as support for growth companies. Ahlstrom et al (2004) also question the effectiveness of overseas Chinese firms in particular to compete effectively in these markets, given their more traditional methods of doing business.

Michie (2002) identifies the enhancement of human capital as a potentially positive effect of FDI include the driving of incumbent firms to upgrade technology and also from spill-over effects of FDI – local competitors and suppliers can learn from MNEs technological and managerial processes. In developing their educational infrastructure to support new technology industries, both Singapore and Malaysia have established successful educational and training policies and programmes. Malaysia in particular, has combined the development of policies to attract certain types of MNE and at the same time ensure that business conditions and human resources match the types of investment desired. Both Singapore and Malaysia provide good examples of human capital enhancement that not only supports current industrial development, but also acts as an inward attractor encouraging MNEs to invest. In contrast, comparatively low levels of technological transfer occur in Thailand for two main reasons, firstly the nature of inward investment which tends to be low value-adding type industries and even what high-tech industries have invested in the country, difficulties have been encountered with the wide technology gap, which has inhibited the learning capability of local workers and the need and for MNEs to provide such training.

High technology developments may be shared between ASEAN member states. An example can be drawn from the work of Konstadakopulos (2002) who has conducted

a study of a cross-border cluster of high-tech SMEs in Johor (Malaysia) and in Singapore. This brought together Singaporean R&D expertise and learning with relatively low paid but highly educated workforce in Malaysia. The cluster contributes to both economic integration and Singapore and Johor regional growth. Integration of this kind between neighbouring countries can exploit differences within ASEAN and at the same time providing a strategic pay-off for the two countries concerned. Other advantages include the usual learning effects of clusters which differentiates them from industrial districts, the existence of family ties and business networks between Singaporean and Malaysian entrepreneurs and the existence of public – private strategic alliances.

In targeting international markets, Dhingra (1991) suggests that strategic alliances can provide a fast track for SMEs into foreign markets. In the high technology industries, it seems that there is a significant role for smaller firms in the global market. SMEs can be pulled or pushed into international markets; pull elements include the desirability for growth survival and risk minimisation. Such factors include the internationalisation of economies, the increasing globalization of industries related to technological development, de-regulation of foreign markets and less expensive labour resources. Push determinants include structural changes in domestic economy, limited domestic markets (high tech SMEs require larger markets to generate revenue with which to recover the relatively high development costs), increases in domestic competition, adverse government policy and other business restrictions. The promoting of exports may result in financial incentives for firms to internationalise.

Trappey and Trappey (2001) identify key elements in the pursuit of technology policy regarding electronic communication and the use of ICT technology. Singapore, for example, has a very different approach to harnessing the business and other facilities offered by the internet as opposed to Myanmar for example where the use of such technology in business process is not so advanced. Electronic linking of value chains, for instance, may well bring new opportunities for high technology SMEs in both domestic and international market activities.

Discussion

The history of export-oriented strategies of East Asian countries (Weiss and Jalilian (2004) and their consequent ability for import substitution and the development of small enterprises forms a firm basis for further development into new technology areas and for further economic enhancement within ASEAN. Yamazawa (1994) suggested that SMEs in ASEAN countries possessed a great deal of potential and argued that economic growth would continue in the respective countries so long as this potential was realised. Although Yamazawa was writing before the Asian economic crisis of 1997, and the resultant slowing down of economic growth in many ASEAN countries, it has been shown in this paper that this assessment of SME promotion and its importance for ASEAN remains largely relevant.

Yamazawa (1994) also commented on the level of competence of SMEs and, while the definition of 'competent SME' is not made clear, there is still much to be done to promote SME development in various ASEAN member states. There seems to be evidence for a gradual move away from low value-added activities or at least a significant reduction of dependence on such industries. The past decade, for example, has seen a significant move to the development of high technology SMEs. This trend mirrors the development of SMEs in Japan (Yamazawa 1994) as the

Japanese economy expanded in the 1960s and 1970s. Evidence also exists for problems related to skills and their development, a lack of appropriate skills would be a significant discouragement for potential investment, MNEs may decide to locate elsewhere where a skills base exists. This competitive element of attracting new FDI in itself might spur countries to develop their vocational and higher education provision, for example.

Policy design and implementation regarding SME development seems to be gathering momentum within ASEAN but there are still instances of uneven application. What seems to be needed is more effective communications between government agencies and SME owner-managers such as those provided by the Singapore government who actively promote networking between entrepreneurs.

Yamazawa (1994) suggested that ASEAN governments should concentrate on supporting growth SMEs as SMEs themselves emerge in a competitive environment. It was also suggested that Japanese SMEs tend to compete on price rather than on quality and delivery. He further contends that they cannot compete in international markets; they had relatively narrow business horizons, insufficient information, access to new technology, insufficient access to capital funds and poor R&D records. These rather pessimistic views of SMEs and their support mechanisms are worth assessing in the context of ASEAN practices.

In the context of high technology development, ASEAN governments have a significant role to play in promoting both new start-ups and targeting growth SMEs. In the former case, there is an obvious case for aiding the development of targeted industrial sectors and assistance with start-up training and targeted financial incentives would stimulate SME start-ups and thus enhance economic development and, in time, international competitiveness. The stimulation of SME growth is also important in generating sustainable industries and industrial sectors, as well as sources of R&D and technology development, both relatively expensive and not always within the reach of new SMEs.

High tech SMEs tend not to compete on price alone and provide high value-added products and services, they also, by definition, tend to move into international markets relatively quickly due to the nature of globalized technology markets. Such SMEs tend to develop international competences comparatively rapidly, due to the international orientation of their management. Access to information, new technology and financial resources is probably still a significant barrier for many SMES although evidence suggests that many SMEs expand on the basis of organic growth. It is in these areas that government policy is perhaps less targeted across ASEAN member states, although there are exceptions, Singapore and to a lesser extent Malaysia for instance possess a highly sophisticated SME development set of policies and plans. Yamazawa (1994) notes that Japanese government support for SMEs include measures to help them with modernisation of equipment, improvement of technology, ensuring fair competitive opportunities and for stimulating the business environment. More recently, policies have been expanded into the stimulation of business parks and SME cluster development.

The diversity of nations and government strategies for business development remains a significant issue for ASEAN policy-makers. Recent agreements relating to the use of electronic commerce, together with high technology SME policy-making will have to deal with varying levels of skill development and 'digital divides'. Various commentators have identified human resource development as a key area for high technology development and there remains a significant education gap between the more technologically advanced member states and those with fewer high technology

needs. It may be that some internal technology transfer is needed to assist less developed countries within ASEAN; in much the same way as the EU provides institutional assistance for its new and less developed member countries.

Hoge Jnr. (2004) suggests that ASEAN countries are seriously contemplating a monetary union which would have the effect of further integrating a significant trade bloc that would account for much of Asia's economic growth. Any stimulation of the business environment such as a move towards monetary union (Day and Herbig 1995) or a common market within ASEAN, not to mention expansion in the number of members would provide a major incentive for further industrial expansion both within the region and on international markets. As ASEAN changes, it is important that SME policies and industrial incentives are reviewed to ascertain that support efforts are being targeted appropriately. Harmonisation of policies may be possible but the diversity of ASEAN member states will preclude full standardisation, at least in the foreseeable future. Competitiveness between the region and China and Japan will also change as a result of further economic integration.

Concluding Remarks

Competent SMEs are vital for the regeneration of the economy and for the innovation and expansion of new industries. What seems to be needed in ASEAN is a focussed SME policy that supports SME development and renewal in a constantly changing world. The diversity of economies within ASEAN and the level of economic development, skills base and investment attractiveness will all have a significant effect on the development of a high tech SME sector and it is evident that some countries are well advanced in harnessing the opportunities offered by high tech innovation and development. A major task for ASEAN is to manage the disparity between these nations and the less developed economies in the region. The promotion of industrial and economic restructuring is an important initial step.

SME support policies are essentially domestic issues and should be implemented by a country's own government. This is due to variations in local conditions and because SMEs tend to be localised in their provision and market. This should not, however, prevent member countries of ASEAN drawing up – as they have recently done – some common elements of SME support where such commonality exists. SME policy should nurture competitiveness away from pure price-based competition and financially support only efficient SMEs. Promoting SMEs in order to reduce the import levels would also be advantageous.

Technical change may be achieved through a firm's internal decisions but is also significantly affected by government policies that support technological renewal. Such support may be in the form of funding for education, applied research, fiscal incentives and various support mechanisms such as the construction of business and science parks. International competitiveness requires a continuous process of technological upgrading, both through the importing of foreign technology and its local adaptation and implementation.

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