THE DEVELOPMENT OF SMALL AND MEDIUM INNOVATIVE, TECHNOLOGICAL AND ENTREPRENEURIAL FIRMS IN SOUTH AFRICA

The South African government recognises that advanced or best-practice technologies and new technology-based firms are the key to industrial regeneration and the reduction of growing regional economic disparities. By acting as a seed bed for new technology-based companies, the economic profile of the regions can be raised, new jobs can be created, and the technological capabilities of existing firms can be enhanced and improved.

In order to achieve these objectives the Government has set itself the task of establishing a national business support infrastructure and a national innovation system that ensures that enterprises of every kind have access to support services appropriate to their needs. These issues need to be addressed, specifically the need to establish support for technological innovation in South African firms in order that they become more productive, increasingly more internationally competitive, and create jobs.

Support for competitiveness, the key to the global market, is generally recognized as being best focused on people know-how and skill improvement, market information, finance and capital availability, and, technology and innovation. Currently the lack of the fourth pillar, support for technology and innovation, is proving a major stumbling block to the development of South African manufacturing firms.

International competitiveness of an industry is primarily based on the efficiency of individual firms, including an efficient division of labour between firms. Competitiveness is also based on a conducive domestic environment which can add significantly to the productive performance of individual firms. This leads to the concept of structural competitiveness which in the end is based on the efficiency of individual firms, the division of labour between firms, the global efficiency of the national economy, proficient and flexible industrial structures, technological structure and economic, social and institutional framework

Globalization has resulted in unprecedented economies of scale in balancing research and

development, materials sourcing, and global production. This globalisation of almost every major industry has also meant a rapid diffusion of high-productivity manufacturing technology. This diffusion has resulted in a relentless global competition on price and quality, a steady worldwide increase in manufacturing productivity. Due to South Africa's introduction into the international economic arena, the South African economy is at an important juncture in it's development. On the one hand, it is in danger of losing some of its competitive edge derived from low labour costs, and on the other hand, it is coming under pressure from industrial countries which attempt to defend their international competitive position by constantly introducing new products and more efficient production technologies and management concepts.

Technological change is clearly an important factor for a developing economy like South Africa. Technological capabilities are widely regarded as a major means for overcoming present problems and for gaining economic growth rates sufficient to satisfy "ever-increasing private wants and social needs". The fast changing environment threatens the survival of many firms but, at the same time, opens up new opportunities. Technological progress is a major factor of this change as new techniques are developed and applied, and known techniques diffuse into new areas of application.

Producers within the developing nations are recipients of technical expertise through licensing, particularly for products intended for domestic markets and for export. Besides licensing and purchasing activities, direct investment by international corporations has definitely contributed to the technological development of firms within developing nations, but an actual transfer interface within the immediate operations of the firm has never been clearly demonstrated. South African firms, on the other hand, are relatively less fortunate than, for example Asian firms, in that there is very little or no licensing or purchasing activities. Presently faced with rising production costs and stiffer competition, South African firms need to realize that the only way to survive is to invest in research and development. Compared with developed nations, the amount of expenditure and human efforts South African firms devote to research and development is small or negligible. The ramifications of this are already being felt as the state of technology is becoming seriously unbalanced and backward. In order to keep up with and correct unbalanced technological development, South African manufacturers import parts, supplies and equipment from

industrialized countries on a large scale accumulating an ever-increasing technology trade deficit and deepening technological dependency. The need to pursue more innovative technologies is imperative in view of “shifting dynamic comparative advantages”. This need is especially apparent and crucial for small and medium enterprises, which are mostly local companies forced to increase their technological capability and manufacturing productivity in order to survive.

From the viewpoint of firms, they will have to cope with:

the growing importance of comparative advantages as a result of fundamental changes in industrial production methods in the developed countries, characterised by diminishing product life cycles, extensive manufacturing automation and new concepts of organisation and management,
the high investment needed to ensure continuous modernisation
the growing difficulty of gaining access to foreign competitors' advanced technologies,
the high license fees incurred when advanced technologies are imported,
the growing importance of time as a factor in the import of foreign technologies, some of which can be obtained only after a considerable time-lag, since foreign competitors increasingly use technology to gain dominant market positions
the growing insistence of government and enterprises in the developed countries on adherence to internationally accepted rules on the protection of intellectual property.

For small businesses to adopt technological innovative strategies, it would be necessary to overcome considerable comparative disadvantages. Important obstacles are the:

severe shortage of qualified technical staff
lack of reliable information and communication with R & D system
much greater difficulty of obtaining financial resources to supplement their own financing capacity
higher concentration of risk involved in innovation of isolated projects
small firms are in a very weak position when it comes to entering into contracts with

possible partners on technical, financial, bureaucratic or other spheres.

In most cases, the entrepreneurs are not able to identify the sources of new expertise, and thus do not know which organisation they should turn to. The establishment of innovation, technology and incubator centres is of absolute necessity to overcome such information barriers thereby assisting firms to improve on their technological innovation abilities.

Research and development is increasingly market-driven. The shortening of technology cycles, the higher expense of R & D, and high turnover among researchers and engineers make it difficult for small and medium enterprises to sustain an independent research and development operation. As a strategic alternative, South Africa's small and medium enterprises should co-operate on research and development activities, in order to compete effectively, with large domestic or foreign firms. In some cases, technologies are disseminated by imitation or research and development spillovers. In many cases technologies or intangible assets are shared as a result of licensing. Under such circumstances, South African small and medium enterprises must change to a more advanced level of technology, which would require a full set of technological learning, not only advanced, but also the basic, non-exclusive ones.

The majority of international technology transfers takes place between the more industrialised countries to the less developed. The terms and conditions of the transfer transactions between supplying and receiving countries usually give an extremely unbalanced position to the recipient. A main reason for this is that developing countries possess extremely weak technological capabilities, and therefore, any meaningful upgrading can only be sought through the import of foreign technology. This imbalance actually creates the technological dependence of developing countries on developed countries. This dependency is aggravated, if the recipient countries do not have their own capabilities to absorb or assimilate technology. *The transfer must, therefore, be conceived as an instrument for change.* The need for such change, aiming at achieving mastery over the foreign-sourced technology, stems partly from the fact that the conditions under which the technology is developed differ substantially from those in the receiving country.

In order to reduce the technological dependency with developed economies and at the same time to increase the productivity and eventual international competitiveness, South Africa

must look for an alternative technology strategy which is suitable for local and regional characteristics. Before the start of a search for needed technology, South Africa needs a "technology map" which gives direction in terms of domestic and international availability, appropriateness and sources of technology. For this purpose, the formation of a more systematic and formal mechanism through which the demand and supply of technology are matched with local characteristics would be of necessity.

Simple forms of technology transfer, such as original equipment manufacture and licensing agreements, generally relate to specific products or processes. Advanced management and marketing expertise play an increasingly crucial role for acquiring technological ability and international competitiveness. This would require a well-balanced mixture of efficient management styles and organisation (intra-firm aspects), strengthened co-operation between companies in the course of internationalisation strategies (Inter-Firm aspects) and a combination of favourable macroeconomic conditions and targeted support structures by government (Conducive Environment) in order to implement a technology-based strategy. The South African government has to play an important role in shaping a firms' technology related activities. Transformation of the government's policy to promote technological activities in South Africa is imperative. These policies influence R & D directly as such policies entail substantial costs to the firm if the government establishes product or process specifications that hinder or stimulate innovation. On the other hand, the government could complement the innovation processes by assisting to diffuse technology based knowledge and to increase net social benefits from such activities.

Dr Faizel Mulla
CEO Capricorn Foundation