ADB Institute-Pakistan Resident Mission Seminar Paper

Industrial Competitiveness

The Challenge for Pakistan

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The findings, interpretations and conclusions expressed in this study are those of the authors and should not be attributed in any manner to the Asian Development Bank (ADB), the ADB Institute or the countries they represent.

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Foreword

The Asian Development Bank (ADB) and Pakistan have been development partners for almost 35 years. The first loan provided by ADB to Pakistan was in 1968. ADB's cumulative assistance to Pakistan in the form of public sector loans amounts to over $12.45 billion, and the country programme has been significantly enhanced over the last few years, averaging over $1 billion in 2002-03. During the period 2004-06, ADB plans to provide assistance of about $2.7 billion to the country, as detailed in ADB's Country Strategy and Programme (CSP) for Pakistan, discussed by the ADB Board of Directors in May 2002. ADB's Poverty Reduction Strategy, approved in November 1999, articulated poverty reduction as the Bank's overarching goal, and the Bank is committed to supporting poverty reduction efforts in developing member countries. ADB shares a vision for poverty alleviation with the Government of Pakistan and supports the ongoing wide-ranging and extensive reform agenda.

To complement ADB lending operations in Pakistan, in early 2003 ADB's Pakistan Resident Mission (PRM) in association with the ADB Institute, Tokyo, initiated a series of policy seminars in Pakistan to be delivered by the ADB Institute. These are intended to inform the policy community in Pakistan of international thinking and experience in a number of important areas. The first set of these seminars was held in Pakistan in November 2003 on the important topic of `Industrial Competitiveness`. As part of the preparation for the seminars, the ADB Institute produced a detailed background paper written by Sanjaya Lall of Oxford University and John Weiss of ADB Institute.

Given the importance of this topic, PRM feels that it would be useful to circulate the paper to a wide audience. Hence it is produced here as a joint publication of PRM and the ADB Institute. We hope that it will not only contribute to the debate on this key issue in Pakistan but will also prove useful for scholars, development practitioners and policy analysts.

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Preface

The Pakistan Resident Mission (PRM) of the Asian Development Bank (ADB) in association with the ADB Institute has launched a series of policy seminars for Government officials and other stakeholders in Pakistan. The seminars centre on policy issues of interest to the Government and civil society, and aim to disseminate best practice thinking in selected policy areas. The first of the series of seminars, on "Industrial Competitiveness: The Challenge for Pakistan", was held in Islamabad, Lahore and Karachi respectively in November 2003. PRM is now pleased to publish the full paper on which the seminars were based in the form of an ADB Institute-PRM seminar paper.

The paper has valuable insights on the nature of industrial competitiveness, which is the ability to compete with firms at the international frontier of best practice. It provides an overview of the competitive situation facing Pakistan and compares its competitive performance with selected countries in Asia. It also benchmarks Pakistan's performance relative to other countries in the region, discusses trends in export markets and highlights the key lessons that can be derived from the recent economic history of Asian economies which have achieved spectacular success in export performance.

The authors of the paper are John Weiss, Research Director, ADB Institute and Sanjaya Lall, Professor of Development Economics, Queen Elizabeth House, Oxford University. The authors would like to acknowledge the helpful comments of Ishrat Husain, Governor, State Bank of Pakistan. The paper was edited and prepared for publication by Sara Mahmood, while the cover was designed by Cecilia Caparas at ADB Headquarters. An earlier draft of the paper was circulated within ADB and to key officials in Government and has benefited from their views and comments, as well as comments received at the three seminars. We hope that this paper generates further debate on competitiveness in Pakistan and contributes meaningfully to the literature on trade and globalisation issues in the country.

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Abbreviations

ADP	Automatic Data Processing
EA	East Asia
EPZ	Export Processing Zone
FDI	Foreign Direct Investment
FY	Fiscal Year
GDP	Gross Domestic Product
HT	High Technology
ICT	Information and Communication Technology
LAC	Latin America and Caribbean
LT	Low Technology
MENA	Middle East and North Africa
MHT	Medium and High Technology
MT	Medium Technology
MSTQ	Metrology, Standards, Testing and Quality
MVA	Manufacturing Value-Added
NAFTA	North American Free Trade Agreement
NIE	Newly Industrialised Economy
PIHS	Pakistan Integrated Household Survey
PRC	People's Republic of China
R&D	Research and Development
RB	Resource-Based
SITC	Standard International Trade Classification
SME	Small and Medium Enterprise
SSA	Sub-Saharan Africa
T&C	Textiles and Clothing
TNC	Trans-National Company
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
WMS	World Market Share
WTO	World Trade Organization

Executive Summary

1. Introduction

It is now a truism that acceleration in the global movement of capital and goods, termed conventionally 'globalisation', carries both immense opportunities and serious potential threats. Ultimately, it will be the international competitiveness of firms, in particular economies, that will determine how far opportunities are converted into lasting national benefits and how far potential threats from heightened international competition result in serious cost. There is widespread agreement that with important domestic policy changes and with the imminent end of the international textile and clothing quota regime, the economy of Pakistan is at an important crossroads. The competitiveness of the industrial sector in the new, more liberal international and domestic environment will have a critical bearing on economic prospects for the foreseeable future.

Competitiveness means the ability to compete with firms at the international frontier of best practice. It must be recognised that it is firms that compete not nations

This paper aims to place the current situation of industry in the country in an international context by 'benchmarking' various indicators of national capability and performance against competitor economies and by highlighting key lessons from the experience of the successful Asian economies.

2. Understanding Industrial Competitiveness

Competitiveness means the ability to compete with firms at the international frontier of best practice. It must be recognised that it is firms that compete not nations. Firms have their own strategies for lowering cost, improving product quality and finding marketing networks. However, due to the intrinsic failure of markets in critical areas, government support for

firms has in some contexts proved to be an important component of the process of attaining competitiveness.

The essence of a competitiveness strategy is to: promote in-firm learning, skill development and technological effort; improve the supply of information, skills and technology from surrounding markets and institutions; and coordinate collective learning processes that involve different firms in the same industry, or across related industries popularly known as 'clusters', geographical or activity-wise.

Support for firm-level upgrading and technical change should be essentially promotional, supporting rather than driving the initiatives of the firms themselves

Firms develop their capabilities within different 'markets', using the term broadly, for example those relating to physical infrastructure, human capital, finance, technology and cluster effects. The need for a competitiveness policy arises when any of these 'markets' fails to function efficiently. The experience of the 'Tigers' of East Asia indicates that coherent and carefully crafted policies can accelerate shifts in competitiveness and promote entry into very complex and high technology activities.

However, while it is conceptually true that whenever markets fail to function effectively there is in principle a case for government intervention, recent history has shown that the capacity of different governments to intervene effectively has been very mixed. East Asian experience has been considerably more successful than elsewhere. Hence current policy advice is normally to recommend limited interventions to tackle clear and well-understood market failures (such as under-investment in Research and Development (R&D) or training) rather than wider-ranging systems of protection or subsidy. Further, in the context of an economy like Pakistan, support for firm-level upgrading and technical change should be essentially promotional, supporting rather than driving the initiatives of the firms themselves.

3. The Changing Nature of Competitiveness

Rapid technical change, shrinking economic distance, new forms of industrial organisation, tighter links between national value chains and widespread policy liberalisation are all altering radically the environment facing developing country enterprises. Competition now arises with great intensity from practically anywhere in the world. To compete, enterprises must use new technologies and organisational methods at best practice, and link up to global value chains.

Economic distance is shrinking, driven by technical progress in information processing, transport and communications. This means that international competition now appears quickly and intensely but also that there are many new market opportunities. Rapid technical change pervades all activities, rendering older technologies obsolete even in low wage economies. Enterprises in all countries have to use new technologies to remain viable (new 'technologies' include not just products and processes but

also organisation of firms, supply chains, human resource development, technology links and so on). All countries, even developing ones, have to undertake constant technological effort to create or access, absorb and adapt new technologies. The ability to compete depends vitally on the ability to move up the technology scale in all activities, including services.

However, capabilities develop slowly, in a cumulative and path-dependent manner. Thus economies that start off on a virtuous circle of growth, competitiveness and investment in new capabilities can carry on doing better than those that are stuck in a 'low level equilibrium' and cannot muster the resources to break out. Countries can reverse these trends but only if they can mount a concerted strategy to shift the economy, its human capital and technology base, its institutions and infrastructure from a low to a high competitiveness path.

4. New Dynamics of World Markets

High technology activities have grown faster both in terms of production and trade than other manufacturing activities (and trade has grown faster than production, indicating the increasing internationalisation of industry in all economies). Not only are technology-intensive industrial activities more dynamic, they tend to offer greater potential for sustained learning and productivity increase, more spillover benefits to other activities and more scope for foreign direct investment (FDI) in integrated production systems that offer enormous export possibilities. All production and export structures are not, in other words, equal in terms of promoting industrial growth and competitiveness.

This does not mean that low technology and resource-based products should be neglected in competitiveness strategy. On the contrary, such products are the starting point for building industrial competitiveness in developing countries. The 'bottom line' of competitiveness is to upgrade technologies in all activities, building new capabilities and finding new markets and market niches. At the same time, the dynamics of world markets suggest that it is necessary to promote structural change, and nearly all countries that have maintained high rates of export growth have upgraded the technological composition of exports.

Nearly all countries that have maintained high rates of export growth have upgraded the technological composition of exports

In manufactured exports, developing countries have grown faster than industrial ones in all categories and periods since 1981. Their lead has been greatest in high technology, followed by medium technology, products. This seems to go against received wisdom: the comparative advantage of poor countries *vis a vis* rich ones is supposed to lie in simple technologies, not advanced ones. There are, however, good explanations for why developing country exports of technologically complex products are growing faster:

- Some developing countries, led by the mature Tiger economies of East Asia, Korea and Taipei,China, have built domestic capabilities in

high technology. This accelerated development of capabilities was driven in the early stages by strong and pervasive industrial policy, with restrictions on inward FDI, protection of infant industries, allocation of credit, and promotion of local R&D and specialised skills.

In simple categories, rates of export growth are limited both by slow expansion of trade overall and maturing of the relocation process

- Several other countries without strong local capabilities have become major high technology exporters by plugging into integrated production systems, starting by performing relatively simple assembly. Over time, many countries have upgraded their role, moving into greater local content, design and development, regional marketing and so on. Singapore, for instance, is one of the world's leaders in advanced electronics, with impressive design capabilities and growing local linkages.

- Trans-national company (TNC) systems have also spread in some medium technology products like automobiles. Unlike electronics, these systems tend to be in proximate countries because of transport costs. The three large Latin American economies, Argentina, Brazil and Mexico, are good examples of complex medium technology exports led by the auto industry. This value chain is unlikely to spread to many other developing regions because of its enormous scale economies and high skill requirements, but it does raise the competitive profile of the developing world in sophisticated products.

- In simple categories, rates of export growth are limited both by slow expansion of trade overall and maturing of the relocation process in labour-intensive activities like textiles and clothing. Within these products, it is difficult for developing countries to upgrade to the most advanced end of the value chain because of very demanding skill, design and branding requirements. High fashion exports, for instance, remain the preserve of rich countries, as do differentiated food products.

- Growth of developing world exports of some resource-based and low technology products is held back by trade barriers, tariff escalation (higher tariffs being levied on imports of processed products than on the raw materials) and subsidies in industrialised countries.

South Asia is a weak performer in the competitiveness stakes. Its world market shares remain small and its export structure dominated by low technology and low sophistication products.

5. Pakistan: The Current Policy Environment for Manufacturing

International competitiveness requires ready access to international inputs at close to world prices and a domestic market subject to competitive pressure, among domestic producers and between them and imports. Experience in Pakistan and elsewhere suggests that highly protected domestic markets not only reduce incentive to export but also penalise the economy by allowing inefficient domestic producers to extract policy-induced rents from domestic consumers. While there is a plausible theoretical case for infant industry support of activities with strong learning effects and positive externalities, experience suggests that if such a policy is to be pursued, it should be time-bound and performance-linked.

Pakistan has liberalised its trade policies significantly over the last decade or so. At present it is one of the more open trade regimes in South Asia, although South Asia itself remains relatively protectionist by international standards. Pakistan has unilaterally reduced import tariffs so that its applied rates are often below the bound rates to which it is committed by World Trade Organization (WTO) membership. The maximum average import tariff for Pakistan was reduced from 30 per cent to 25 per cent in 2002. The simple average applied tariff of around 10 per cent in 2003 must be compared with an average of 56 per cent in 1995 and nearly 80 per cent in 1985.

Highly protected domestic markets not only reduce incentive to export but also penalise the economy

Under the investment policy introduced in 1997, policies towards inward FDI to Pakistan have also become liberal by regional standards. Foreign investors are guaranteed national treatment, face low import duties on plant and equipment, and receive a first year profits tax allowance. Full foreign ownership is allowed (for all but a small number of activities) as is full repatriation of capital, dividends and profits, and there is no restriction on the level of royalty payments. Measures have also been taken to introduce an Intellectual Property Rights regime compatible with the WTO.

Pakistan is a low wage, labour surplus economy. However, firm-level comparisons suggest that while wages in Pakistan are low by international standards, they are often significantly higher than in Bangladesh and slightly higher than in India. Allowance for differences in labour and capital productivity suggests that on average Pakistan is a higher cost location than the People's Republic of China (PRC), India or Bangladesh.

It is widely acknowledged that slow growth in private investment, particularly in large-scale manufacturing, has been one of the key constraints on Pakistan's economic growth. Part of the explanation lies in the uncertain political scene, but more narrowly economic and institutional aspects of the general investment climate have also had a negative impact on investment decisions.

Until very recently, Pakistan fared relatively poorly by the criteria of the time and cost required to start up a new business. However, changes introduced in 2002 appear to have significantly improved the situation.

High cost and poorly functioning infrastructure can clearly impede the operation of enterprises

High cost and poorly functioning infrastructure can clearly impede the operation of enterprises which may be efficient in terms of mastery of their own production processes. There is evidence that infrastructure, in particular in the power sector, has been a key bottleneck. Problems with lack of a reliable power supply are indicated by the relatively high proportion of power that firms in Pakistan estimate is lost on average due to power outages. In addition, there can be a lengthy waiting time for connection to the grid.

In the telecom sector there is a shortage of fixed line connections. The time taken to get a telephone connection is still high by international standards. Furthermore, waiting times for connections have increased, not fallen, over recent years. Connection costs for phone lines are also high by international standards. These constraints and high costs in telecoms are a contributory factor to relatively low internet usage among enterprises in Pakistan.

Transport has also been discussed as a potential bottleneck, particularly in relation to exports. In relation to ports, for example, there are estimates which suggest that port handling costs in Karachi and Port Qasim are higher than the regional average. These infrastructure deficiencies clearly need to be addressed to strengthen the competitiveness environment.

6. Benchmarking Pakistan's Performance

Manufacturing in Pakistan grew at a compound real annual rate of 5.5 per cent between 1980 and 2000, and its per capita GDP at 2.2 per cent. Performance was better in the 1980s than in the 1990s: manufacturing value-added grew at 7.2 per cent per annum in the former and at 3.8 per cent in the latter (and in the 1990s growth slipped from 8.7 per cent in 1990-95 to -1.6 per cent in 1995-2000).[1] More recently the manufacturing sector has picked up again. Between FY2001 and FY2004 manufacturing value-added grew at an annual average of 8.5 per cent.[2]

In terms of structure, Pakistan has a very low share of medium and high technology products in both production and exports, and only a slow upgrading over time. (What little upgrading there has been has occurred in production rather than exports.) Moreover, exports are concentrated at the low sophistication level of the spectrum according to a new index developed

1. This data is from the UNIDO database and the World Bank, *World Development Indicators, 2002*. It should be noted that these figures do not necessarily correspond with the figures given in the annual Pakistan Economic Survey.
2. Pakistan Economic Survey 2003-04.

in this paper to gauge the product sophistication of a country's exports.

Pakistan's largest export product in FY2004 was made-up textile articles; this product is also a 'champion', in that the product is dynamic in world trade and Pakistan gained world market share during the 1990s. However, its next two largest exports (cotton fabrics and textile yarn) are stagnant in world trade; Pakistan gained world market share in the former and lost in the latter. Future growth is vulnerable to the slow growth of the market. Most apparel products are in the non-dynamic segment of trade, and Pakistan is unfortunate in being heavily dependent on these products. There is one major product, medical instruments, where Pakistan is losing market share in a dynamic product. (In fact, this is the most dynamic in the set of its top 20 exports.)

The picture for Pakistan is thus one of weak product positioning within its areas of export specialisation. Sustaining rapid export growth with this positioning - if world trade continues to follow recent patterns - would involve Pakistan in raising its market share in declining markets. Since these markets are fiercely competitive and are being liberalised, this would require massive upgrading of production capabilities, quality and marketing relative to competitors.

7. Benchmarking Pakistan's Skills and Technological Capabilities

Competitiveness today requires a strong base of human and technological resources, able to support enterprises in handling, adapting and improving new technologies, and selling the output to sophisticated and demanding global markets. By most common indicators of skill creation, Pakistan performs poorly by regional standards (themselves low relative to East Asian levels). For example, by the Harbison-Myer index, a classic index of skills based on school and university enrolments, Pakistan ranks below all other South Asian economies. Further, Pakistan's score and its relative position have deteriorated since the mid-1980s, making it the only country in Asia in which the index declined over the 1985-1997 period; however, several countries, including all in South Asia, have declined in the relative rankings.

Competitiveness today requires a strong base of human and technological resources

By its nature, it is very difficult to measure technological effort in practice. It is clear from official statements that the Government of Pakistan has recognised fully the need for increasing local technological effort. However, per capita R&D spending in Pakistan is among the lowest for all countries for which data is available, and enterprise-financed R&D is negligible. Other indicators, such as number of scientists engaged in R&D per million inhabitants, number of technicians in R&D, number of scientific and technical journals per million inhabitants, and royalty and technical fees per capita, also highlight the lag that Pakistan suffers with respect to its comparators in the region.

8. Lessons From East Asia

The economies of East Asia, both the first tier newly industrialised economies or NIEs (Korea, Taipei,China, Hong Kong and Singapore) and a second tier group (Thailand, Malaysia, the Philippines and, more recently, PRC) offer a dramatic illustration of what rapid growth of manufactured exports can achieve. These economies are located at various positions on the ladder of comparative advantage, but to varying degrees they have each succeeded in diversifying out of traditional primary exports into more dynamic manufactured goods.

In practice, among the high growth NIEs there were substantial national variations in the way exports were promoted, with governments using a range of additional (often non-trade) measures to raise the profitability of exporting. In the current context of economies like Pakistan wishing to diversify their export structure and establish links with global value chains, this experience needs to be understood but not copied simplistically. In general, selective bureaucratic interventions in support of individual firms have had a poor track record, apart from the early experience of Korea and Taipei,China.

Further, in the South Asian context where there has been a long tradition of direct government involvement, current policy is based on withdrawal of government from direct intervention in enterprise decisions. It is a lighter form of industrial promotion - providing support, not direction, for the private sector - which is most appropriate.

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An aspect of experience elsewhere which is of particular interest are the policies on skill formation and training in Singapore and policies on stimulation of and support for local technological development in Korea and Taipei,China. These experiences in first tier NIEs are clearly at a technological level well above that of Pakistan at present. Nonetheless, they serve to show what can be achieved over a relatively brief period of time with well thought out initiatives of public-private collaboration. The challenge for Pakistan will be to forge suitable alliances to foster technological capability in sectors operating at a lower technological level.

9. Conclusions

The development of industrial strategies involves five main steps. The first is a detailed assessment of the industrial sector and main sub-sectors. This involves evaluating industrial performance in domestic and export markets and the main drivers of performance (macroeconomic and policy framework, human resources, technology, FDI, finance, physical infrastructure and supporting institutions).

Where possible, evaluation should use quantitative benchmarks against selected comparators (within the region, in other developing regions

that are likely to offer direct competition to Pakistan and in more advanced countries that serve as role models). We hope to have made a start in this benchmarking exercise by drawing on readily available international data and some recent work on the investment climate in Pakistan. Naturally, informed qualitative judgements require a much more in-depth knowledge of the local industrial sector than we possess.

The second stage is the development of a national 'strategic vision'. The vision should reflect the interests of all stakeholders, including the private sector, government institutions, employers' organisations, trade unions and so on. In this step, the government needs to define short and long-term industrial goals and to start planning how to strengthen or create capabilities to reach these goals. The vision should inform priorities for public expenditure.

International experience suggests the value of setting up an industrial competitiveness agency

The third stage is to design policies and programmes. The fourth is to implement these policies and programmes. The fifth is to monitor the progress of the strategy, assessing its success and adjusting it as necessary.

International experience suggests the value of setting up an industrial competitiveness agency headed at a very senior political level which can mount a strategy to cut across competing interests and coordinate the ministries concerned. For example, in the Pakistan context this might involve combining the work of the Export Promotion Bureau and the Board of Investment.

Then comes the task of allocating resources at various levels. At the highest level, it has to be decided which generic areas - education, infrastructure, finance, science and technology, and so on - have to be addressed. This needs a strategic 'vision' of what the main engines of industrial competitiveness are going to be. At the sectoral and sub-sectoral levels, the government has to decide on which activities to support, not 'picking winners' in detail but allowing winners to emerge in the sets of activities that hold most promise of long-term economic and technological growth. These activities have to be identified from clusters of inter-linked industrial activities that share strong technological externalities, use the existing base of skills and capabilities, can develop good backward linkages and face rising competition both locally and abroad. The best way to proceed is to examine closely the experience of countries that have similar endowments but have been successful in developing competitive bases. This is an art rather than a science and involves considerable benchmarking and policy analysis.

We note that there are already various initiatives in place in Pakistan concerning competitiveness and technological upgrading. As we do not presume to know the effectiveness of current measures, we would simply make a few basic points.

First, in the light of the international benchmarks noted above, adequate government support for a competitiveness strategy requires a significant commitment in terms of public investment in relevant technical and general education, as well as strengthening of public R&D activities. Some of these problems will require long-run, not short-run solutions.

It is at the firm level that critical competitiveness problems need to be addressed, and here the role of government is to facilitate and support

Second, there are a number of weaknesses in the area of physical infrastructure, such as power. Any further measures to improve the investment climate, whether reducing bureaucratic restrictions or ensuring continued macro stability, will also help in competitiveness terms.

Third, it is at the firm level that critical competitiveness problems need to be addressed, and here the role of government is to facilitate and support. The issue is whether current plans - such as the measures to support technological upgrading and joint ventures with foreign investors through an Upgradation Fund - go far enough. In principle, support can take a range of forms, including the standard tax incentives for training and R&D expenditure, cost sharing for various consultancy services (as covered by the Upgradation Fund), a lower level version of innovation consortia and provision of finance for technology support, particularly a form of venture capital or matching grants for relatively high risk or innovative initiatives.

1. Introduction

It is now a truism that acceleration in the global movement of capital and goods, termed conventionally 'globalisation', carries immense opportunities but also serious potential threats. Ultimately, it will be the international competitiveness of firms, in particular economies, that will determine how far opportunities are converted into lasting national benefits and how far potential threats from heightened international competition result in serious costs.

However, the activities of firms may be helped or hindered by governments. There is widespread agreement that with important domestic policy changes and with the imminent end of the international textile and clothing quota regime, the economy of Pakistan is at an important crossroads. The competitiveness of the industrial sector in the new, more liberal international and domestic environment will have a critical bearing on economic prospects for the foreseeable future.

There is widespread agreement that with important domestic policy changes and with the imminent end of the international textile and clothing quota regime, the economy of Pakistan is at an important crossroads

This paper aims to place the current situation of industry in the country in an international context by examining trade data over a 20-year period and 'benchmarking' various indicators of national capability and performance against competitor economies. As such it should be seen as a contribution to the debate on international competitiveness in Pakistan and not the result of a detailed assessment of the efficiency of various branches of industry.

We begin with a conceptual discussion of what is meant by international competitiveness, highlighting not only why it is important but also how the nature of international competition has changed in recent years. We then consider aspects of Pakistan's performance in relation to

international trade and national capability. We refrain from making detailed policy recommendations but end with some general comments on industrial strategy and competitiveness.

2. Understanding Industrial Competitiveness: A Framework

Competitiveness means essentially the ability to compete with firms at the international frontier of best practice. It must be recognised that it is firms that compete, not nations (Krugman, 1996). Firms have their own strategies for lowering cost, improving product quality and finding marketing networks. However, due to the intrinsic failure of markets in critical areas, government support for firms has in some contexts proved to be an important component of the process of attaining competitiveness. Use and development of technology is central. However, using technologies efficiently is not a passive, automatic process of simply importing a set of machines and instructions on how to use them. It involves building technical understanding and information skills, managerial practices and links with other firms and institutions: what we may term 'capabilities' in a broad sense.

Government support for firms has in some contexts proved to be an important component of the process of attaining competitiveness

Such capability development can be a slow, often costly and risky learning process. Adding to 'capacity' (i.e. physical plant and equipment) is only part of this process. What is critical is the *ability* to understand how to operate capacity at optimal levels, adapt it to local factors and conditions, and upgrade it as technologies improve and new products appear. There is ample evidence that the same technologies are used by different firms at vastly different levels of efficiency. More importantly, different countries differ greatly in their ability to produce efficient firms, and so in their abilities to compete internationally, even if they start with similar initial factor endowments. Why? Because they tackle differently the intrinsic market failures that affect learning by firms. *The secret of competitiveness lies in the effectiveness with which countries promote the development of technological and managerial capabilities.*

Note that developing technological capabilities does not mean innovation in the sense of 'reinventing the wheel' to create technologies that are available elsewhere, often at lower cost. It does mean learning to use existing technologies efficiently, an enormously challenging task. It can involve a lot of investment, effort, time, risk and constant interaction with other actors with whom information and skills are shared. It is thus far more complicated than travelling down a given 'learning curve' with predictable costs and outcomes.

In developing countries, firms often do not know how to go about making new imported technologies work at world best practice levels. They do not understand what new skills, technical knowledge and organisational techniques are involved and where to access them. When exposed to import competition, they find it difficult to 'relearn' their capabilities and get rid of inherited practices and bad habits. Interactions with other firms or institutions itself requires effort and overcoming problems of 'leakage' (of trained workers or technical know-how) and trust. Firms may not have access to the information, skills, finance or other factors needed to develop their capabilities.

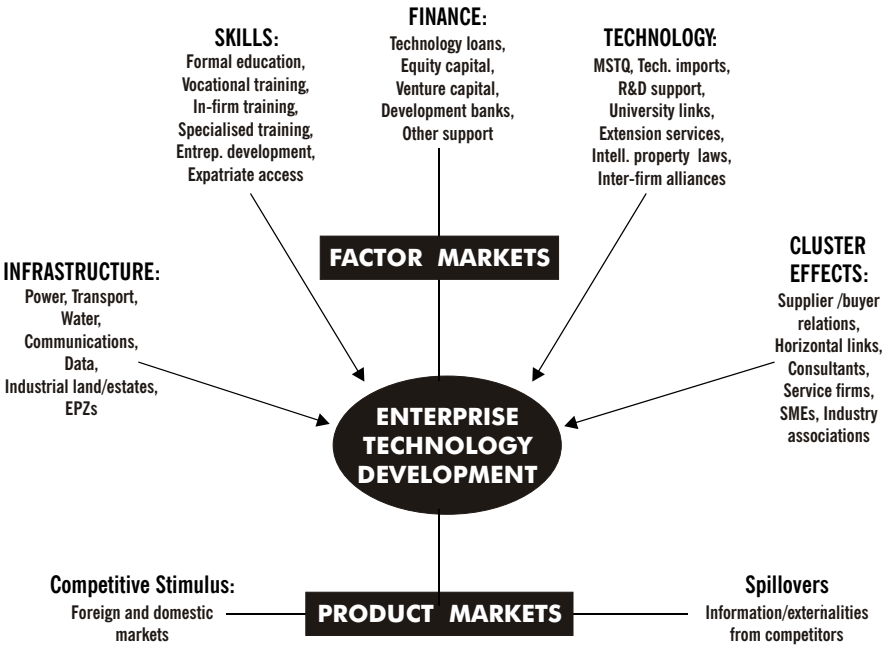
The essence of a competitiveness strategy is: to promote in-firm learning, skill development and technological effort; to improve the supply of information, skills and technology from surrounding markets and institutions; and to coordinate collective learning processes

Of course, not all activities involve the same degree of effort or cost: learning needs may be less in relatively simple industries like apparel manufacture and very large in advanced electronics or machinery making. Learning needs also vary with ownership: transnational affiliates may be able to undertake learning more easily because of the support of parent companies. But such needs exist in every case, and firms differ enormously in the success with which they conduct learning.

Effective learning faces market failures, both within firms (their reluctance, lack of knowledge, risk aversion or inability to undertake learning processes) and between them (or between them and institutions). These market failures give rise to the need for corrective policies. The essence of a competitiveness strategy is: to promote in-firm learning, skill development and technological effort; to improve the supply of information, skills and technology from surrounding markets and institutions; and to coordinate the collective learning processes that involve different firms in the same industry or across related industries (popularly known as 'clusters', geographical or activity-wise, see Porter, 1990).

These factors are given in Figure 1, which shows the different 'markets' within which firms develop their capabilities. At the firm level there are several random factors (entrepreneurial, managerial or accidental) that also affect its success, but these are not directly amenable to policy influence and so are excluded. Also not shown are broad macroeconomic, legal, political and similar factors, which affect the environment within which all firms function.

Figure 1: Factors Affecting Enterprise Technology



This still leaves a number of critical factors. In product markets these include competition and trade policy, providing the incentives, rules and regulations which determine whether or not firms invest in their capability development. In factor markets there are five sets of influences - physical infrastructure, human capital, finance, technology and cluster effects - which provide the wherewithal for firms to undertake successful learning. The need for a competitiveness policy arises when any of these 'markets' fails to function efficiently. The experience of the 'Tigers' of East Asia indicates that coherent and carefully crafted policies can accelerate shifts in competitiveness and promote entry into very complex and high technology activities.

Current policy advice is normally to recommend limited interventions to tackle clear and well understood market failures rather than wider-ranging systems of protection or subsidy

However, while it is conceptually true that whenever markets fail to function effectively there is in principle a case for government intervention, recent history has shown that the capacity of different governments to intervene effectively has been very mixed. The East Asian experience has been considerably more successful than elsewhere. Hence current policy advice is normally to recommend limited interventions to tackle clear and well understood market failures (such as under-investment in Research and Development (R&D) or training) rather than wider-ranging systems of protection or subsidy. Further, in the context of an economy like Pakistan, where state regulation has in the past been perceived by the private sector as intrusive and where relatively high effective rates of protection have

supported high cost, uncompetitive producers for many years, support for firm level up-grading and technical change should be essentially promotional, supporting rather than driving the initiatives of the firms themselves.

3. The Changing Nature of Competitiveness

Rapid technical change, shrinking economic distance, new forms of industrial organisation, tighter links between national value chains and widespread policy liberalisation are all altering radically the environment facing developing country enterprises. Competition now arises with great intensity from practically anywhere in the world. It is based on a bewildering array of new technologies. It calls for a range of new and advanced skills, and sophisticated supply-chain and distribution techniques. It is organised in complex systems spanning many countries, tapping differences in costs, skills, resources and tastes to optimise the efficiency of the entire system. It is supported by international brands and networks with the capacity to deliver vast amounts of information at negligible cost. Manufacturing is becoming more information-intensive: growing parts of value-added consist of 'weightless' activities like research, design, engineering, marketing and networking. To compete, enterprises must use new technologies and organisational methods at best practice and link up to global value chains.

The policy context for competing is also changing. Most countries are lowering barriers to trade, capital, technology and information flows - and even some 'people flows', but on a much more restricted scale. Most are also giving the lead role in productive activity to private enterprise, reserving the state for provision of basic public goods. In fact, policy changes in the direction of open trade and investment, a level playing field for all economic actors, transparency and non-discrimination in legal systems governing business and strong protection of private property rights are becoming the *sine qua non* of participating in the global economy. Many traditional tools of industrial promotion - infant industry protection, foreign direct investment

To compete, enterprises must use new technologies and organisational methods at best practice and link up to global value chains

(FDI) restriction, local content and other performance requirements, reverse engineering and copying, and so on - are increasingly constricted or ruled out altogether. In this setting, no industrial enterprise can grow, even survive, without being internationally competitive and taking into account the following significant changes.

Economic distance is shrinking, driven by technical progress in information processing, transport and communications. This means that international competition now appears quickly and intensely but also that there are many new market opportunities. With some exceptions, global markets are more open than before and exporters can reach markets more cheaply and efficiently.

Coping with new technologies calls for new skills, production structures, infrastructure and institutions

Rapid technical change pervades all activities, rendering older technologies obsolete even in low wage economies. Enterprises in all countries have to use new technologies to remain viable. (New 'technologies' include not just products and processes but also organisation of firms, supply-chains, human resource development, technology links and so on.) Coping with new technologies calls for new skills, production structures, infrastructure and institutions. This affects not just industrial enterprises but the whole national economic system, its legal and human infrastructure, institutions and ways of doing business.

All countries, even developing ones, have to undertake constant technological effort to create or access, absorb and adapt new technologies. Industrial leaders have to invest in technology innovation; followers have to invest in absorbing and adapting technologies, a more difficult and demanding task than it appears at first sight. The ability to compete depends vitally on the ability to move up the technology scale in all activities, including services.

While technical change affects all activities, it benefits some more than others. In general, innovation-based activities - normally referred to as 'high technology' - are growing faster than other activities. Table 1 shows the growth of manufacturing value-added (MVA) for three sets of activities: resource-based (RB), low technology (LT) and medium and high technology (MHT) (see Box 1). For exports, it is possible to show high technology (HT) separately from medium technology (MT) products. Over the past two decades exports have grown faster than production, and complex activities have grown faster than other manufacturing.

Developing countries have done better in all technology categories than industrialised economies, both in terms of production and exports. This is considered further below.

National and regional patterns of competitive advantage are changing as exports grow in response to two forces: *innovation* and *relocation* of processes or functions. Both exist in most industries but their importance

Table 1: Growth of Manufacturing Value-Added and Manufactured Exports by Technology (% per annum, 1980-2000)

Activity	World	Industrialised Countries	Developing Countries[1]
Manufacturing Value-added			
Total MVA	2.6	2.3	5.4
RB MVA	2.3	1.8	4.5
LT MVA	1.7	1.4	3.5
MHT MVA	3.1	2.6	6.8
Manufactured Exports			
Total manufactured exports	7.6	6.6	12.0
RB manufactured exports	5.6	5.2	6.7
LT manufactured exports	7.4	8.4	11.4
MHT manufactured exports	8.4	7.3	16.5
Of which:			
HT exports	11.5	9.9	20.2

1. Developing countries include Singapore, South Korea and Taipei,China.
Source: Calculated from UNIDO and Comtrade data.

differs by technology and physical characteristics. Some products (like pharmaceuticals) grow rapidly mainly because of innovation; there is little relocation to take advantage of low wages. Some (like electronics) benefit from both innovation and relocation - they have low technology assembly processes that can be placed in poor countries. Some (like apparel) are driven primarily by relocation. Some (like automobiles) undergo some relocation, but their technological complexity and 'weight' - critical components are, unlike electronics, heavy in relation to their value - mean that distances have to be small (North American Free Trade Agreement (NAFTA) is a good example). Exports in which neither innovation nor relocation are relevant tend to grow slowly. In the service area, there is explosive relocation of functions like data entry, call centres and so on to low wage countries.

Productive resources - goods, inputs, capital, technology and high-level skills - move around the globe easily and rapidly. While some of this mobility does not involve ownership, in general it does, leading to a growing role for transnational companies (TNCs). Their growth is accompanied by a growing trend to internalise more tightly the most valuable technologies, so that entering these activities necessarily involves investment by TNCs. However, FDI in the developing world remains highly concentrated and is growing more so over time. The share of the leading five and ten recipients of FDI in the developing world has grown, while declining in the world as a whole.

Productive resources move around the globe easily and rapidly, leading to a growing role for transnational companies

Organisational structures and location of production are changing in response to technical change. Industrial firms, including leading TNCs, are becoming less vertically integrated and more specialised by technology. Under competitive pressure, they are scouring the world for more economical locations. Technical progress in transport and communications is allowing

Box 1: Classification of Manufactures[1]

Resource-based manufactures (RB) include processed foods and tobacco, simple wood products, refined petroleum products, dyes, leather (but not leather products), precious stones and organic chemicals. RB products can be simple and labour-intensive (e.g. simple food or leather processing) or capital, scale and skill-intensive (e.g. petroleum refining or modern processed foods).

Low technology manufactures (LT) include textiles, garments, footwear, other leather products, toys, simple metal and plastic products, furniture and glassware. These products tend to have stable, well-diffused technologies with low R&D expenditures and skill requirements, and low economies of scale. Labour costs tend to be a major element of cost and the products tend to be undifferentiated, at least in the mass-produced (non-fashion) end of the scale. Barriers to entry are relatively low; competitive advantages in products of interest to developing countries come from price rather than quality or brand names.

Medium technology manufactures (MT) are 'heavy' products like automobiles, industrial chemicals, machinery, and standard electrical and electronic products. These products tend to have complex but not fast-changing technologies, with moderate levels of R&D expenditure yet advanced engineering and design skills, and large scales of production. In engineering products, there is an emphasis on product design and development capabilities as well as extensive supplier and subcontractor networks. Barriers to entry tend to be high, not only because of capital requirements but also because of strong 'learning' effects in operation, design and, in certain products, product differentiation.

High technology manufactures (HT) are complex electrical and electronic (including telecommunication) products, aerospace, precision instruments, fine chemicals and pharmaceuticals. Products with advanced, fast-changing technologies and complex skill needs have the highest entry barriers. The most innovative ones call for large R&D investment, advanced technology infrastructures and close interactions between firms, universities and research institutions. However, many HT activities, particularly electronics, entail simple technologies for final assembly, where low wages are an important competitive factor.

1. For a longer description of the categories and the rationale behind the classification, see Lall, 2001.a.

them to locate and manage activities in far-flung parts of the globe. Some facilities are under the control of TNCs (mainly from industrial countries) but others are under the control of independent local firms, interwoven with the leaders in intricate webs of contractual and non-contractual relations. International industrial value chains are more tightly coordinated than before, both within firms (by TNCs)[3] and externally (by contractual or informal relationships). There is a tendency for lead firms to rely on a smaller number of 'first tier' suppliers, which in turn deal with and coordinate second

3. Thus, some 30-40 per cent of the trade handled by TNCs is actually within the firm (between different affiliated companies) and is not transacted on open markets (UNCTAD, 1999).

and third tier suppliers. First tier suppliers may be major TNCs in their own right. Functions and processes are being subdivided and relocated to take advantage of fine differences in costs, logistics, markets and innovation.[4]

Locations able to plug into dynamic value chains have seen large, sustained increases in production, exports and employment (UNIDO, 2002). A large part has been in relatively low-skill assembly activities, but at the high technology end, like electronics, activities have tended to 'stick' rather than move on as wages rise. It is low technology activities like clothing that have been relatively footloose. However, only a few countries have become significant players in global supply-chains, even in low technology activities. (One of the main drivers, the successor to the Multi-Fibre Agreement - the Agreement on Textiles and Clothing - is about to expire.)

Strong local capabilities and institutions are needed, whether or not countries rely on national firms or FDI

The determinants of competitiveness are changing. The possession of primary resources or cheap unskilled labour *per se* is no longer sufficient. Strong local capabilities and institutions are needed, whether or not countries rely on national firms or FDI; the most effective strategy is to combine both and leverage foreign skills, technologies and marketing systems to develop local competencies. The United Nations Industrial Development Organization (UNIDO, 2002) calls this the 'triple-L' (linking, learning and leveraging) strategy, drawing on Mathews and Cho's (2000) analysis of East Asian entry into high technology electronics exports. Thus, technological competence, skills, work discipline and trainability, competitive supplier clusters, strong support institutions, good infrastructure and well-honed administrative capabilities are the new tools of comparative advantage.

Global value chains, particularly integrated production systems, are unlikely to spread to all developing countries because of their technological features. Most advanced activities have strong economies of scale and agglomeration, and concentrate in the few locations that can provide the critical mass of skills, suppliers, services and institutions they need. There is unlikely to be continuous cascading of production facilities to other countries as wages rise; on the contrary, there may be large discontinuities in the relocation process. Once established in particular countries, TNCs are likely to 'stick' for long periods, at least until wage and congestion costs rise to uneconomic levels or the supply of relevant skills runs out.

Globalisation and technical change have strong policy implications for countries at all levels of development. Countries require new skills to manage technical change and so have to change the institutional structure for

4. In some low technology activities like apparel, lead coordinators are international buyers rather than TNCs. The role of direct ownership (i.e. of FDI) in coordinating globalised activities depends on nature and pace of change of technology and availability of specialised suppliers; it is also changing rapidly over time as systems become more open.

education and training (Narula, 2003). They need strong technical support agencies in metrology, standards, testing and quality (MSTQ), R&D, productivity and small and medium enterprise (SME) extension, in addition to institutions concerned with technology and innovation. They need advanced infrastructure in information and communication technologies (ICTs). They need new rules, legal systems and agencies to encourage enterprises to build competitive capabilities and allow knowledge to flow across nations. It is not easy to meet such demands; this is why many governments mount competitiveness strategies (Lall, 2001.b).

However, capabilities develop slowly, in a cumulative and path-dependent manner. Thus economies that start off on a virtuous circle of growth, competitiveness and investment in new capabilities can carry on doing better than those that are stuck in a 'low level equilibrium' and cannot muster the resources to break out. Industrial performance can diverge across countries and continue diverging over time, with no inbuilt forces to return them to greater convergence. Countries can reverse these trends but only if they can mount a concerted strategy to shift the economy - its human capital and technology base, its institutions and infrastructure - from a low to a high competitiveness path.

4. New Dynamics of World Markets

Rapid technological progress is, as noted, changing the structure of industrial activity. Activities with higher 'technological intensity' - those with higher than average expenditures on R&D - are growing faster than other activities. While every activity uses new technologies, differences in innovative potential, speed of application of new innovations and different rates of demand expansion affect relative growth rates. Table 1 on page 9 showed that high technology activities grew faster in both production and trade than other manufacturing activities, and trade grew faster than production, indicating the increasing internationalisation of industry in all economies.

Not only are technology-intensive industrial activities more dynamic, they tend to offer greater potential for sustained learning and productivity increase, more spillover benefits to other activities and more scope for FDI in integrated production systems that offer enormous export possibilities. All production and export structures are not, in other words, equal in terms of promoting industrial growth and competitiveness.

Not only are technology-intensive industrial activities more dynamic, they tend to offer greater potential for sustained learning and productivity increase

Countries that wish to strengthen their export market positioning and diversify out of slow-growing activities to tap rapid technology transfer, promote technological deepening and exploit the growing fragmentation of production should shift their structures from simple to complex technologies. To some extent, the deepening of the industrial structure is a normal consequence of the development process, but the most successful and competitive countries have made deliberate efforts to accelerate the process through policy.

This does not mean that low technology and resource-based products should be neglected in competitiveness strategy. On the contrary, such

products are the starting point for building industrial competitiveness in developing countries, and they continue to remain significant exports in mature industrial countries. In 2000, developed countries were the top 10 exporters in the world of resource-based manufactures and comprised 7 of the top 10 exporters of low technology products. Both groups also have technology-intensive products (see Box 2).

The 'bottom line' of competitiveness is to upgrade technologies in all activities, building new capabilities and finding new markets and market niches

Technical change produces pockets of unexpected innovation even in mature and stable technologies. Biotechnology, for instance, is making food processing into a high technology industry. The 'bottom line' of competitiveness is to upgrade technologies in all activities, building new capabilities and finding new markets and market niches. At the same time, the dynamics of world markets suggest that it is necessary to promote structural change; nearly all countries that have maintained high rates of export growth have upgraded the technological composition of exports and production.

4.1 Export Structure by Technology

Figure 2 shows the evolution of different categories of manufactured exports between 1976 and 2000. RB products have lost shares since the early 1980s, LT since 1993 and MT since 1998. The only group to raise its market share steadily is HT. These trends suggest that the conclusion drawn earlier about the dynamism of technology-intensive products is well founded. Box 2 discusses the technology composition of the 50 most dynamic products in world trade.

4.2 Export Performance in Different Regions

Here we focus on manufactured exports from different regions defined as follows:

- EA (East Asia) includes PRC and all countries in the Southeast Asian region apart from Japan, while EA2 excludes PRC where relevant.
- LAC (Latin America and the Caribbean) includes Mexico and LAC2 excludes it.
- S. Asia includes Bangladesh, India, Pakistan, Sri Lanka and Nepal.
- MENA (Middle East and North Africa) includes Turkey but not Israel.
- SSA is Sub-Saharan Africa, including S. Africa.

Figure 3 shows world market shares for different regions for 1981 and 2000, separating PRC from the rest of East Asia and Mexico from the rest of

Box 2: The Fifty Most Dynamic Products in World Trade, 1990-2000

The fifty most dynamic products (at the 3-digit level of Standard International Trade Classification (SITC), Rev 2) in world merchandise exports in the 1990s accounted for 38 per cent of total merchandise exports in 1990 and 50 per cent in 2000. They grew at 9.4 per cent per annum over the decade as compared to 6.4 per cent for total exports and 6.6 per cent for manufactured exports.

The list has products from all technology categories, including primary products, but as the table below shows, technology-intensive products dominate. Primary products only account for 14 per cent of their value in 2000, and of this oil and gas account for 97 per cent. Within manufactures, mineral-based RB products account for 13 per cent of the value of the 50 products in 2000, down from 16 per cent in 1990. The 'fashion cluster' (textiles, clothing and footwear), the group of main interest to many developing countries, only accounts for 4 per cent of value in 2000, down slightly from 5 per cent in 1990. In the MT group, the engineering sub-group has the most dynamic products, with 13 per cent of total value in 2000.

Table 1: Fastest Growing 50 Exports, 1990-2000

	Value 1990	Share (%)	Value 2000	Share (%)	Growth Rate (%)
Total 50 products	1,167,240.1	100.0	2,874,428.8	100.0	9.4
Primary	190,188.8	16.3	411,104.1	14.3	8.0
o/w oil & gas	185,138.0	15.9	399,587.0	13.9	8.0
Manufactured	977,051.27	100.0	2,463,324.7	100.0	9.7
Resource-based	173,225.1	17.7	358,571.7	14.6	7.5
Agro-based	20,192.9	2.1	42,528.6	1.7	7.7
Mineral-based	153,032.2	15.7	316,043.1	12.8	7.5
Low technology	160,219.5	16.4	332,585.2	13.5	7.6
Fashion	49,318.3	5.0	104,430.0	4.2	7.8
Other LT	110,901.1	11.4	228,155.1	9.3	7.5
Medium technology	258,538.6	26.5	551,247.6	22.4	7.9
Automotive	52,506.1	5.4	104,354.2	4.2	7.1
Process	59,140.4	6.1	118,991.3	4.8	7.2
Engineering	146,892.0	15.0	327,902.1	13.3	8.4
High technology	383,078.2	39.2	1,218,920.2	49.5	12.3
Electronics	299,366.6	30.6	1,001,742.0	40.7	12.8
Other HT	83,711.6	8.6	217,178.2	8.8	10.0
All exports	3,072,385.3		5,692,357.2		6.4
All manufactures	2,576,443.5		4,883,038.7		6.6

Each technological group within manufacturing loses shares to the high technology category, mirroring trends in aggregate exports as HT products grow significantly faster than other dynamic products. As a result, they raise their share of the total for the dynamic group from 39 to 50 per cent over 1990-2000. They account for 25 per cent of total manufactured exports by 2000, up from 15 per cent ten years earlier.

This has implications for developing countries since over 80 per cent of the value of dynamic HT products comes from electronics, and nearly 40 per cent of electronics exports now come from the developing world. This is a product that seems ideally suited to drive exports from poor countries: it is growing rapidly in world trade, it is highly income elastic, it can provide enormous technological and spillover benefits and it has processes that can be segmented easily. However, the segmentation process so far has encompassed only a handful of countries: the East Asian Tigers (increasingly including PRC), Mexico and Costa Rica. It is spreading to some East European countries and to North Africa, but the main production system seems to be in place in East Asia. The prospects for its spreading to other regions are unclear.

Figure 2: Shares of Manufactured Products in World Exports by Technology (%)

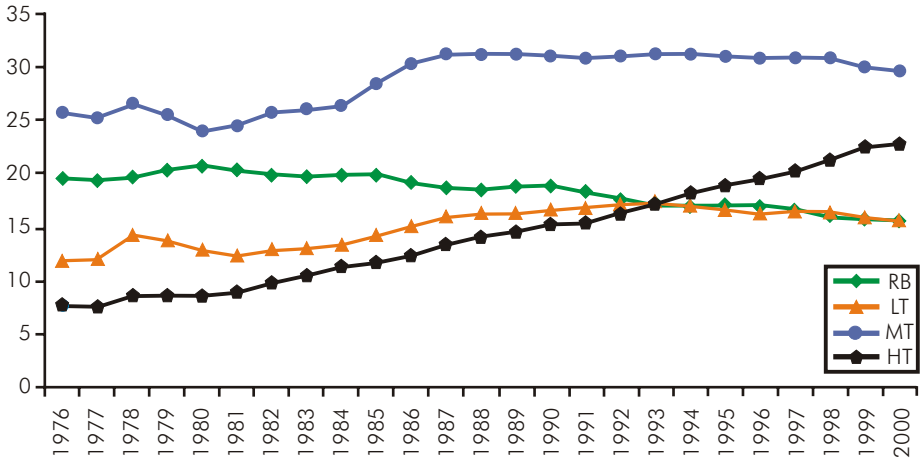
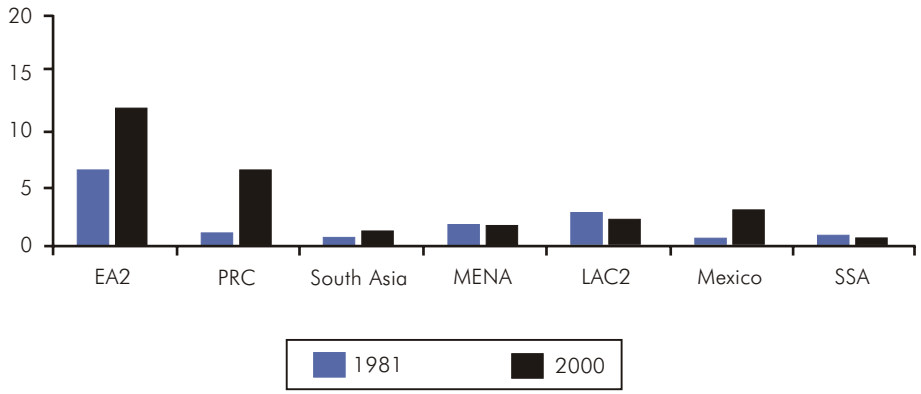


Figure 3: World Shares of Manufactured Exports (%)



Latin America. East Asia as a whole accounted for 18.4 per cent of world manufactured exports in 2000, up from 6.8 per cent in 1981; within it, EA2 raised its share from 5.8 per cent to 12 per cent and PRC from 1 per cent to 6.5 per cent. LAC as a whole lost world market share in 1981-90 (from 3.2 per cent to 2.4 per cent) then raised it over the next decade to 5.1 per cent. The initial fall was due to LAC2 (from 2.7 per cent to 1.9 per cent), with Mexico steady at a 0.5 per cent share. Over 1990-2000, LAC2 raised its share marginally while Mexico had a six-fold increase to reach 2.9 per cent. South Asia raised its share slightly from 0.6 to 1.1 per cent but, given its size, remains a peripheral player in export markets. MENA and SSA each lost around 0.2 points of global market share.

Let us now consider exports by *technological category*. Table 2 shows the world market share of regions by technology category. There is a dramatic growth of East Asian economies in HT and, to a lesser extent, MT products. This trend is not restricted to the more advanced countries of the region like

Table 2: World Market Shares of Manufactured Exports in Different Regions (%)

	1981					2000				
	Total	RB	LT	MT	HT	Total	RB	LT	MT	HT
East Asia	6.8	8.7	17.6	3.9	6.7	18.4	11.8	26.5	11.0	27.4
EA2	5.8	7.6	14.8	3.6	6.5	12.0	8.1	10.0	7.2	21.9
PRC	1.0	1.1	2.8	0.3	0.2	6.5	3.7	16.5	3.7	5.6
S Asia	0.6	0.5	1.9	0.2	0.1	1.1	1.4	3.8	0.3	0.2
Latin America	3.2	6.8	2.5	1.5	2.1	5.1	6.5	5.2	5.0	4.2
LAC2	2.7	6.3	2.1	1.2	0.9	2.2	5.5	2.2	1.5	0.8
Mexico	0.5	0.5	0.4	0.3	1.2	2.9	1.1	3.0	3.5	3.4
MENA	1.8	4.7	1.6	0.4	0.2	1.6	4.0	2.8	0.8	0.4
Sub-Saharan Africa	0.7	1.9	0.5	0.3	0.1	0.6	1.9	0.6	0.4	0.1
Total Developing	13.1	22.5	24.2	6.2	9.2	26.8	25.6	38.8	17.5	32.3

Note: EA2 is East Asia excluding PRC; LAC2 is Latin America excluding Mexico.
Source: Calculated from Comtrade database.

Singapore and the Republic of Korea (henceforth Korea), as relatively less advanced countries such as Malaysia, Thailand and the Philippines have also seen a major rise in HT and MT exports.

This seems to go against received wisdom, with Newly Industrialised Countries (NIEs), rather than mature industrial economies, experiencing the most rapid growth in advanced technology products. There are, however, good explanations for these trends.

Some developing countries have built domestic capabilities in high technology, led by the mature Tiger economies of East Asia, Korea and Taipei,China. This accelerated development of capabilities was driven in the early stages by strong and pervasive industrial policy, with restrictions on inward FDI, protection of infant industries, allocation of credit, promotion of local R&D and specialised skills, and so on (Lall, 2001.a; UNIDO, 2002).

Accelerated development of domestic capabilities was driven in the early stages by strong and pervasive industrial policy

Several other countries without strong local capabilities have become major HT exporters by plugging into integrated production systems, starting by performing relatively simple assembly. Over time, many countries have upgraded their role, moving into greater local content, design and development, regional marketing and so on. Singapore, for instance, is one of the world's leaders in advanced electronics, with impressive design capabilities and growing local linkages. However, some countries, like the Philippines or Mexico, are still at the bottom of the value chain and remain vulnerable to relocation by TNCs to cheaper or more competent areas.

TNC systems have also spread in some MT products like automobiles. Unlike electronics, these systems tend to be in proximate countries because of transport costs. The three large Latin American

economies, Argentina, Brazil and Mexico, are good examples of complex MT exports led by the auto industry. This value chain is unlikely to spread to many other developing regions because of its enormous scale economies and high skill requirements, but it does raise the competitive profile of the developing world in sophisticated products.

In the simple categories, rates of export growth are limited both by slow expansion of trade overall and maturing of the relocation process in labour-intensive activities like textiles and clothing. Within these products, it is difficult for developing countries to upgrade to the most advanced end of the value chain because of the very demanding skill, design and branding requirements. High fashion exports, for instance, remain the preserve of rich countries, as do differentiated food products.

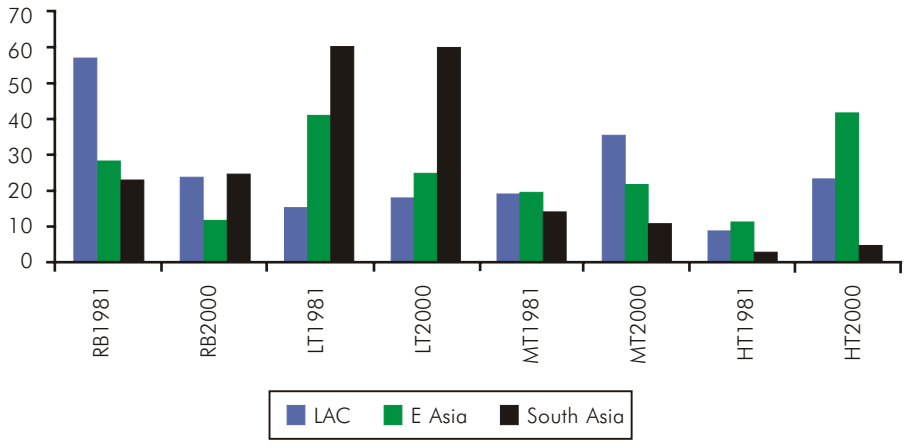
It is difficult for developing countries to upgrade to the most advanced end of the value chain because of the very demanding skill, design and branding requirements

Growth of developing world exports of some RB and LT products is held back by trade barriers, tariff escalation (higher tariffs being levied on imports of processed products than on the raw materials) and subsidies in industrialised countries.

Table 2 shows that East Asia dominates each category, particularly in high technology products. South Asia gains market share in all categories, particularly in resource-based and low technology products; however, it remains a small player in both by global standards. LAC's performance is weak if Mexico is excluded and only moderately good if it is included. PRC is making large market share gains in all categories, particularly in LT products - in this group it seems to be taking market share from other East Asian countries (Lall and Albaladejo, 2003).

Figure 4 shows the technology structure of exports in South Asia, East Asia and LAC in 1981 and 2000. There are striking differences between the regions. South Asia has a preponderance of LT exports and a very low share of

Figure 4: Technology Structure of Manufactured Exports (%)



HT products (barely higher than Africa); its export structure has remained relatively stagnant over the two decades. LAC reduces its dependence on RB products greatly, with significant rises in MT (mainly the automotive industry) and HT products (led by electronics in Mexico). East Asia also shifts significantly from RB and LT products to MT and HT products, ending the period with the most advanced export structure of all developing regions. Note that the most dynamic exporters in the developing world (East Asia, including PRC, and Mexico but not the rest of LAC) have rapidly upgraded from 'simple' (LT and RB) products to 'complex' (MT and HT) products. As noted, such structural upgrading is a characteristic of countries that are successful exporters for long periods.[5]

Such fast-growing products as semiconductors, automatic data processing (ADP) equipment and accessories for ADP machines are being rapidly relocated in lower wage countries

4.3 Sophistication of Manufactured Exports

We now consider the dynamics of world trade in terms of *sophistication of manufactured exports.* Box 3 describes this new method of analysing the structure of manufactured exports, one which allows investigation at a more detailed level than permitted by the broad technology classifications used above.[6]

The distribution and growth rates of world manufactured exports by sophistication are shown in Table 3. The largest category of such exports is now sophistication level 4; it contains such important and fast-growing products as semiconductors, automatic data processing (ADP) equipment and accessories for ADP machines, which are being rapidly relocated in lower wage countries. The next largest category is sophistication level 1, but this grows relatively slowly and loses share over the decade. The smallest and slowest growing category is the last one, sophistication level 6.

Table 3: World Exports by Sophistication Levels

	Value ($ millions)		Distribution (%)		Growth Rate (%)
	1990	2000	1990	2000	1990 - 2000
Level 1	657,248.2	981,123.2	25.5	20.1	4.1
Level 2	556,036.7	788,901.5	21.6	16.2	3.6
Level 3	443,921.6	938,816.5	17.2	19.2	7.8
Level 4	307,429.8	1,098,440.2	11.9	22.5	13.6
Level 5	242,141.0	583,404.1	9.4	11.9	9.2
Level 6	368,632.8	491,371.6	14.3	10.1	2.9
Total	2,575,410.1	4,882,057.0	100.0	100.0	6.6

5. UNIDO (2002) and Lall (2001.a) find at the country level that sustained growth of manufactured exports was associated with such upgrading.

6. We owe the original idea behind this index to C.H. Kwan (see for example Kwan, 2002) although we have developed the index in a slightly different way.

Box 3: The 'Sophistication Index' for Manufactured Exports

The sophistication index, a new concept, is based on average income level of the exporter of each product: the higher the level the more sophisticated the product. 'Sophistication' captures technological and other product characteristics based on location of export production: a product exported by richer countries has features that allow relatively high wage economies to compete and are (in the relevant period) out of reach of lower wage economies. For a given product, greater sophistication presumably embodies higher levels of processing and greater value-added; inability to raise sophistication with rising wages leads to loss of competitive advantage. This simple index, with these underlying premises, can be very useful in the analysis of competitiveness and its upgrading over time.

What determines if a product is 'sophisticated' or not? Theory suggests several factors, policy interventions apart, that decide whether a high wage economy can competitively produce a manufactured product. The main ones fall under the following headings:

- *Technology:* Technology is probably the main source of competitiveness in rich countries. Using the term broadly, it includes not just frontier innovation but also the ability to handle efficiently and improve complex processes, provide the range of skills needed for advanced and fast-changing technologies and furnish the infrastructure of a strong national innovation system (state-of-the-art R&D institutions and universities, strong intellectual property protection and tight links between firms and institutions).
- *Marketing:* This includes 'high' design, product branding and differentiation, customisation to demands of customers and control over distribution channels.
- *Scale and agglomeration economies:* These reflect the ability to set up and manage large-scale facilities with complex organisational and supply-chain management skills, and benefit from externalities in agglomerations of suppliers, competitors and institutions.
- *Infrastructure*: Some products, particularly ICT, require advanced infrastructure to be competitive, and only countries able to finance such infrastructure can remain competitive.
- *Proximity to major markets:* Rich countries are the dominant markets for manufactured exports, and proximity is an important competitive advantage in products that require rapid turnaround times or have heavy transport costs.

The index also captures the effect of such factors as availability of natural resources (e.g. some furs only come from rich countries), trade distortions (say, protection by rich countries in textiles and clothing, agriculture and processed primary products) and established manufacturing traditions that are difficult to replicate elsewhere (some varieties of cheese).

While it is difficult to disentangle the factors affecting sophistication, the index provides a useful map of comparative advantage and its dynamics over time. Since there is a rise in developing countries' share of world exports, there is a general lowering of sophistication levels. (This shows, in effect, growth of capabilities in lower income countries and relocation of processes by integrated production systems rather than 'de-skilling' of industrial activity.)

There is no presumption of a positive, linear relationship between sophistication and export growth; on the contrary, the shifting location of export-oriented production from rich to poor countries (i.e. falling sophistication) has been a major driver of export expansion in many products with the relevant skill and technological features. Thus developing countries seeking rapid export growth should tap into export segments where there is significant de-sophistication; at the same time, within these segments they have to raise sophistication levels to offset rising wages and exploit greater domestic capabilities.

The sophistication index has many possible applications in competitiveness analysis. For instance, by identifying activities and products on the sophistication scale, it can show appropriate export products for countries at each level of development, those needed at higher levels and those that countries should be shedding. By allowing identification of countries that are major players in each product, it can show how competitive advantage is evolving geographically and by development level. It can show whether changes in sophistication are linked to higher or lower growth rates and, if sustained growth depends on a move to lower income exporters, whether a particular country is situated at the right level to benefit from this relocation.

As the index can be constructed at any level of detail, it allows investigation of product characteristics at much greater depth than the technological categories used above. One acknowledged disadvantage of technological categories is that they are broad: each has products that do not conform to its general characteristics (Lall, 2001.a).

For instance, the high technology group has some mature, low technology products; it also has some genuinely innovative products that have simple labour-intensive processes. Both can be relocated efficiently in low income countries without strong innovation systems. Similarly, some low technology products may be highly skill-intensive and differentiated (fashion items) or may be shifting into the innovative category (say, by the application of biotechnology to food production and processing). These are unsuited to production in typical low income countries.

In fact, a comparison of technological categories with product sophistication provides valuable information on product characteristics. Where de-sophistication coincides with low technology levels, it reflects the 'natural' evolution of comparative advantage according to availability of cheap, relatively unskilled labour. Where de-sophistication coincides with high R&D intensity, however, it reflects the relocation of particular processes, most probably under the aegis of TNCs setting up integrated production systems. At the other end of the spectrum, where low technology products remain rooted in high wage countries, they clearly have design, organisational or production needs that are out of reach of poorer countries. The sophistication index allows a clearer mapping of such trends than anecdotal evidence on global value chains and fragmentation provides.

The sophistication index can also be used to plot the technology and skill structure of a country's export activities over time and to benchmark these against competitors. This can be done at a general level by calculating an overall sophistication score for all exports; this would show, for instance, if countries at similar income levels have managed to build significantly different technological and skill bases. It can also be done - and this is probably more meaningful - at the industry level to show if countries are pulling ahead of or falling behind competitors in terms of moving along the value chain in given activities. This is illustrated below for Pakistan's textile and clothing exports.

The general sophistication index shown below is calculated at the *three-digit SITC* (Revision 2) level for 237 products (of which 181 are manufactures) for 1990 and 2000, exported by 97 countries for which data were available. More detailed four-digit level data are used to analyse the textile and clothing industry. To calculate average sophistication score, exporting countries are divided into *ten income groups* in each benchmark year; the composition of each group differs over time as countries move up or down the income scale. The percentage share in world exports of each product by each income group is multiplied by the group's average income, and the final value is standardised from zero to 100. This yields a unique score for each product, and allows each country's export basket to be assigned an overall score. To facilitate presentation, products are grouped into *six categories* according to sophistication. No *a priori* criteria are applied in dividing products into these groups: the total of 181 products is simply divided into sets of 30 each (31 for the last group) ranging along the sophistication scale.

There is considerable correspondence between broad technology levels and sophistication. Most medium and high technology products score relatively high on the sophistication scale while most low sophistication products are from the low technology or resource-based technology categories. The most sophisticated product at the three-digit level is a medium technology product, armoured fighting vehicles (SITC 951), followed by a resource-based product, uranium and thorium alloys (SITC 688) and non - electrical machinery and motors (714). Then come several high technology products like precision instruments (874), turbines and steam engines (712) and electrical apparatus for medical use (774). Note, however, that the largest and fastest growing electronics products in world trade, like office machines, telecom apparatus and semiconductors, come fairly low on the sophistication scale, ranking respectively 70, 89 and 98 out of the total of 181 manufactured products; parts and accessories for office machines are as low as 115 in the sophistication ranks.

Among low technology products, the highest ranks are held by 'other LT' products, led by musical instruments (898) and railway rails (676) at positions 37 and 38. The fashion cluster segment of LT starts fairly low in the index, led by special textile fabrics (657) at rank 113, followed by lace and embroidery (656) at 125. Major textile and apparel exports by developing countries (like woven cotton fabrics, undergarments and non-knitted outerwear) figure in the bottom 30 products in the sophistication ranks. The last place, at 181, is occupied by jute fibres (264), with non-soft vegetable oils (464) next, both resource-based products from tropical regions. Ranks 179 to 177 are held by apparel, headgear and accessories (SITC 848), miscellaneous textile articles (SITC 658) and travel goods and handbags (SITC 831).

These ranks are generally in line with expectations, but there are deviations of interest. Some medium technology products, like radio receivers, are low in the sophistication ranks because their production has shifted overwhelmingly to low wage countries, while some relatively simple resource-based products (chocolate and cheese) are high on the sophistication index because of advanced skill requirements or manufacturing traditions. As noted, R&D-based products like semiconductors, while retaining technology-intensive core processes in rich countries, have moved many production processes to lower wage countries, but to the middle group rather than the bottom since even assembly of such complex products requires a base of industrial skills and strong infrastructure.

Source: Research under progress by Lall and Weiss, calculations by Jinkang Zhang.

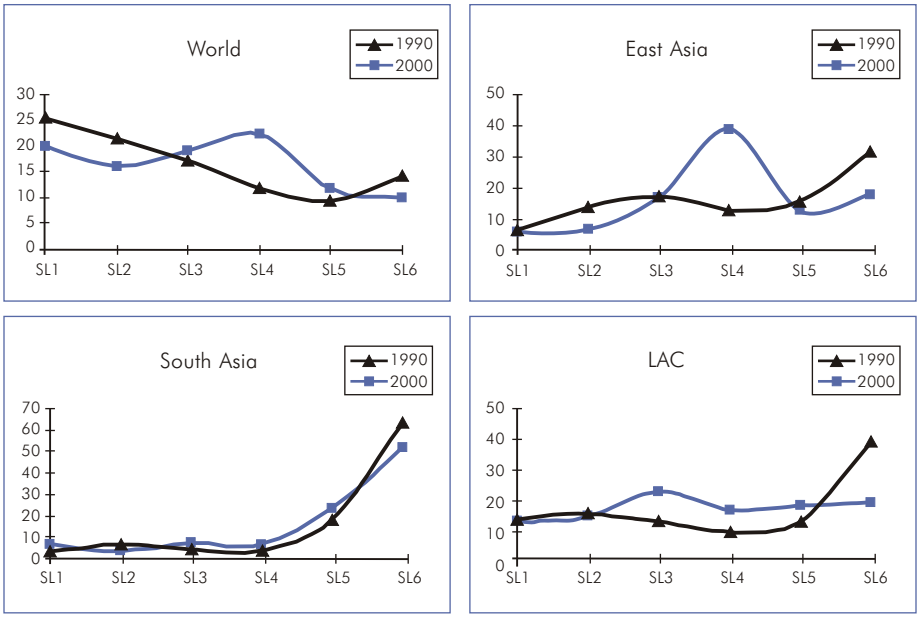
In South Asia, exports are preponderantly in the low sophistication group, but there is a small fall in its share over time with a corresponding gain in the medium sophistication group

The best product 'positioning' for growth are categories 4, 5 and 3 - *high sophistication is not necessarily the route to rapid export expansion.* This is in line with the finding that exports by developing countries are generally growing faster than those by industrialised countries. The distinction between the technological and sophistication classifications shows up clearly here: high technology products are the most rapidly growing segment of world trade but high sophistication products are not. The reason is that many high technology products are becoming 'less sophisticated' because they have labour-intensive processes that have led to their relocation in lower wage countries. However, they do not move to the bottom of the sophistication scale: relocation is not to the poorest countries but to those with relatively low wages in combination with skilled and disciplined labour, growing industrial capabilities, efficient infrastructure and stable, welcoming policy regimes. These economies are in the middle rather than low income range.

Figure 5 shows the distribution of manufactured exports by sophistication levels in the world as a whole and in three developing regions in 1990 and 2000. (The data for South Asia are for 1990 and 2001.) There are striking differences in the patterns. Some highlights are:

- In South Asia, exports are preponderantly in the low sophistication group, but there is a small fall in its share over time with a corresponding gain in the medium sophistication group. The gain is due largely to India; the rest of the region remains at the low end of the sophistication range.

Figure 5: Distribution of Manufactured Exports by Sophistication Levels (%)



- The structure of East Asian exports moves significantly towards the medium sophistication category, driven by semiconductor, automatic data processing machines and their parts and accessories in level 4. However, East Asian level 3 exports like electrical machinery and telecommunications apparatus are also very large, over 2.5 times larger than LAC in value. The share of highly sophisticated products in East Asian exports remains relatively small and falls slightly over time.

- LAC exports also move towards medium sophistication, but there is a less pronounced shift towards level 4 than in East Asia. LAC starts with and retains a higher share of sophisticated products than East Asia (mainly category 1 products like auto engines and components, aircraft and pharmaceuticals). In the medium category, its dynamic products include telecommunications, automobiles and electrical machinery (level 3); it also has significant values in category 4 exports but East Asian exports are nearly 10 times larger. However, a very large part of its level 3 and 4 exports comes from Mexico; the rest of LAC lags in high technology exports.

Table 4 shows world market shares of manufactured exports by sophistication for South Asia, East Asia and LAC in 1990 and 2000 and the annual rates of growth. South Asian shares are highest in level 6 products, with a very low presence in levels 1 to 4 and insignificant increases in market share in these. South Asia's slow growth rate in level 6 drags down its overall export expansion, overriding fairly healthy growth in levels 1, 3 and 4 (but this is from very small bases in each). East Asia has a significant global presence in all sophistication categories, with around one-third world market share in

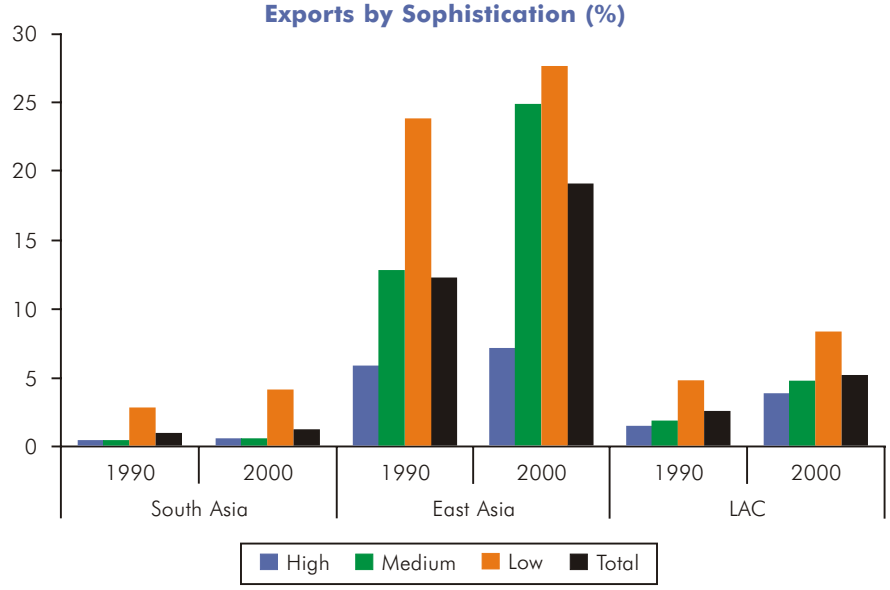
Table 4: World Market Shares of Manufactured Exports by Sophistication Levels (%)

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	All Manufactures
				1990			
S Asia	0.1	0.3	0.2	0.3	1.6	3.6	0.8
E Asia	3.4	7.9	12.0	13.1	20.6	26.6	12.0
LAC	1.1	1.6	1.6	1.7	3.0	6.2	2.3
				2000			
S Asia	0.4	0.3	0.4	0.3	2.2	5.7	1.1
E Asia	5.6	8.3	16.6	32.7	20.5	34.2	18.9
LAC	3.1	4.2	5.7	3.5	7.2	9.1	5.0
				Growth Rates (1990-2000)			
S Asia	15.1	3.1	14.7	14.5	11.7	6.9	8.9
E Asia	9.5	4.1	11.3	24.4	9.1	5.5	11.6
LAC	15.0	14.4	22.3	22.0	19.0	7.1	15.3
World	4.1	3.6	7.8	13.6	9.2	2.9	6.6

Notes: Data for 2000 for South Asia pertain to 2001; its growth rate is thus for 11 years.

levels 4 and 6, and around one-fifth in level 5. The main drivers of its export expansion are levels 4 and 3, which contain the dynamic HT products that have been relocating to the developing world. Latin America's main market presence is in levels 6, 5 and 3, but with a more even spread than in East Asia. Its main drivers have again been levels 3 and 4, with strong support from level 5. Figure 6 illustrates the world market share (WMS) picture for these regions by three broad sophistication categories: high (levels 1 and 2), medium (levels 3 and 4) and low (levels 5 and 6).

Figure 6: Regional Shares of World Manufactured Exports by Sophistication (%)



4.4 In Sum

The dynamos of change are technology-based products, in particular electronic products related to information technology

Industrial competitiveness is evolving rapidly. Technical change, changing patterns of demand, falling transport and communication costs, and policy liberalisation are changing the structure of production and trade. Globalisation of production is changing the geography of international competitiveness at a pace unimaginable, say, three decades ago. The dynamos of change are technology-based products, in particular electronic products related to information technology.

These products enjoy very high income elasticity of demand and have pervasive links through the industrial and technological system. While highly complex and technology-intensive in their design, development and core manufacturing processes, these products also have labour-intensive segments that make them prime candidates for relocation to lower wage countries. However, low wages *per se* are not the main determinants of their location. The TNCs that dominate their production have only integrated a small handful of developing countries into their global production systems, predominantly in East Asia and (after NAFTA) Mexico.

While high technology electronics products have led the export drive of the most competitive developing countries, they are certainly not the only element. Resource-based and low and medium technology products also figure prominently in their export growth. Thus East Asia dominates the export scene in the whole range of manufactured products, the result of a systemic ability to build new capabilities, attract export-oriented FDI, capture the spillover and learning benefits of export activity and sustain sensible macroeconomic policies. Note, however, that setting a market-friendly environment may not be enough to dynamise competitiveness - some other parts of the world have done the former without doing the latter. LAC is perhaps the most prominent example.

Setting a market-friendly environment may not be enough to dynamise competitiveness

South Asia is a weak performer in the competitiveness stakes. Its world market shares remain small and its export structure is dominated by low technology and low sophistication products. As shown below, its economies have not tapped the mainsprings of export dynamism in a globalising world.

5. Benchmarking Pakistan's Performance

Our analysis below only goes up to either 2000 or 2001 since comparable data across countries from the UN Comtrade data base (for trade) and the UNIDO database (for value-added) are only available up to these years. We are aware that growth rates for Pakistan, for manufactured exports in particular, have improved significantly since FY2003. For example, in FY2003 and FY2004 total exports increased at an average annual rate of 16.25 per cent.[7] However, it appears that this increase was driven by substantially the same traditional export products. Much of our focus here is on the structure of both exports and manufacturing value-added; it appears that structure has been little affected by the recent recovery.[8] Hence we feel that the broad thrust of our somewhat pessimistic analysis remains valid despite the recent encouraging revival in exports.

5.1 Manufacturing Value-Added (MVA)

Manufacturing value-added in Pakistan grew at a compound real annual rate of 5.5 per cent between 1980 and 2000, and its per capita GDP at 2.2 per cent

MVA in Pakistan grew at a compound real annual rate of 5.5 per cent between 1980 and 2000, and its per capita GDP at 2.2 per cent (Table 5). Performance was better in the 1980s than in the 1990s: MVA grew at 7.2 per cent per annum in the former and at 3.8 per cent in the latter. In the 1990s growth slipped from 8.7 per cent in 1990-95 to - 1.6 per cent in 1995-2000. In South Asia, Pakistan's MVA growth was higher than in Bangladesh but lower

7. State Bank of Pakistan website.
8. Cotton fabrics and yarn were only a slightly smaller proportion of total exports in FY2003 as compared with the previous year: 20 per cent as opposed to 22 per cent (Federal Bureau of Statistics website).

Table 5: Manufacturing Value-Added and Per Capita GDP in Pakistan and Comparators, 1980-2000 (constant dollars)

	1980			1990			2000			Growth 1980-2000	
	MVA	GDP p.c.	MVA/ GDP	MVA	GDP p.c.	MVA/ GDP	MVA	GDP p.c.	MVA/ GDP	MVA/ p.c.	GDP p.c.
Pakistan	3,043.6	265	14.1	6,123.5	361	15.5	8,921.5	413	15.3	5.5	2.2
Bangladesh	2,904.7	214	15.9	3,698.5	264	12.7	7,192.1	337	15.5	4.6	2.3
India	24,575.0	251	14.2	50,938.0	362	16.6	90,661.0	516	17.4	6.7	3.7
Sri Lanka	592.1	365	11.1	1,076.5	472	13.4	2,320.5	706	17.4	7.1	3.4
Indonesia	7,623.9	427	11.9	23,643.0	627	20.7	45,830.0	816	26.5	9.4	3.3
Malaysia	4,645.5	1743	19.4	11,344.0	2400	26.5	30,427.0	3810	35.9	9.9	4.0
Philippines	10,068.0	781	26.9	11,003.0	726	24.8	14,194.0	777	24.2	1.7	0.0
Thailand	9,057.4	871	22.6	23,217.0	1559	27.2	44,895.0	2083	34.3	8.3	4.5

Source: UNIDO database and World Bank, *World Development Indicators,* 2002. It should be noted that the data for Pakistan does not necessarily correspond with the data in the annual Pakistan Economic Survey.

Manufacturing activity in Pakistan is dominated by resource-based and low technology activities, but the share of complex products has risen over time

than in the other large economies; in terms of per capita incomes, it had the lowest growth rate in the region. In comparison to Southeast Asia, Pakistan did better than the Philippines but significantly worse than the other economies.

Manufacturing activity in Pakistan is dominated by resource-based and low technology activities, but the share of complex products has risen over time. Figure 7 compares distribution of these categories for the world and Pakistan. Figure 8 shows the share of complex activities in MVA in Pakistan and selected comparators.

Figure 7: Structure of MVA: World and Pakistan (%)

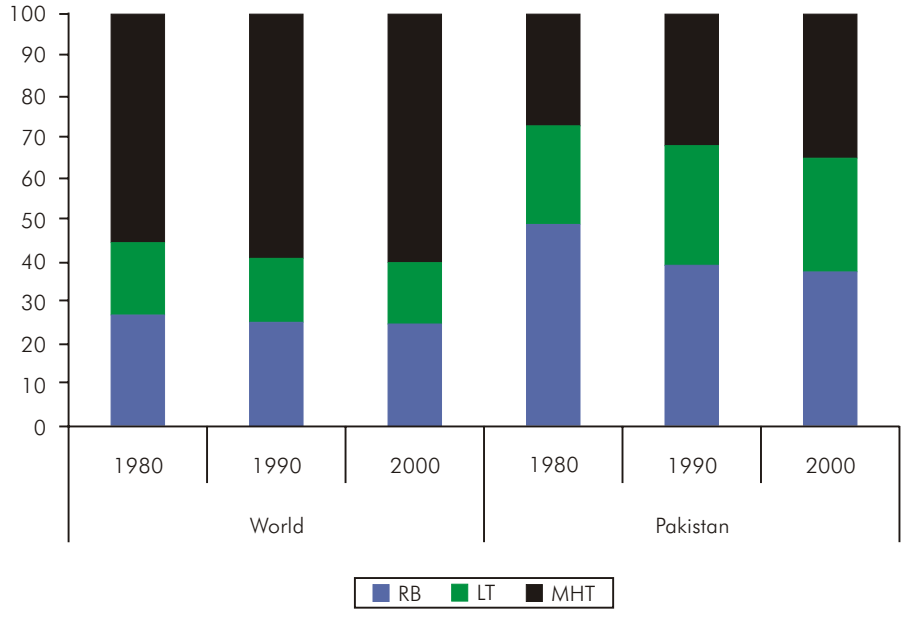
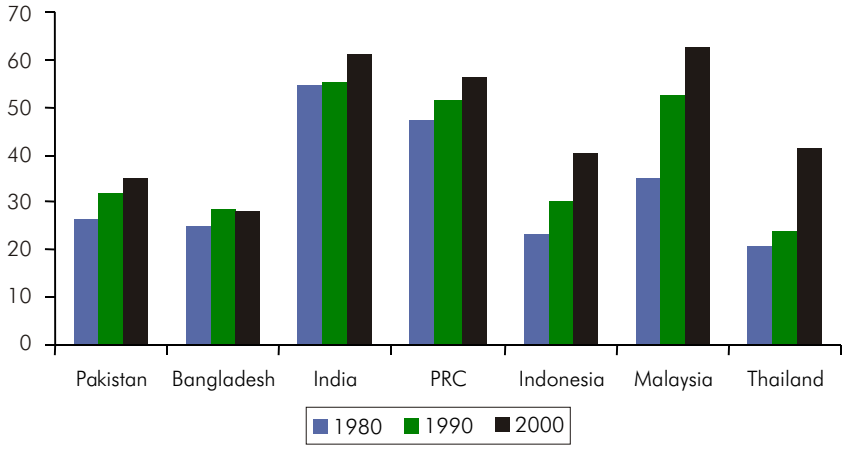


Figure 8: Share of MHT in MVA (%)



Pakistan's manufacturing performance, over the longer run, has not been optimal. It is not so much that it did not develop heavy industry - India did so behind heavy protection and suffered inefficiency as a result - but that it failed to get into technology-intensive activities. This has affected its export performance, particularly relative to the East Asian Tigers, who used insertion into high technology value chains as exporters to dynamise their production structures. This deficiency also applies to other South Asian countries: despite its high technology profile in IT exports, India has a very weak base in high technology manufacturing and exports.

5.2 Manufactured Exports

Table 6 charts Pakistan's export growth by technology category 1985-2002. Whilst Pakistan's exports have moved from primary products to manufactures,[9] in manufactures it has a heavy and growing reliance on low technology products (primarily textiles and clothing). The 'fashion cluster' accounts for over 70 per cent of total exports and for 80 per cent of manufactured exports. Such concentration is inherently risky, but the nature of the products makes it even less desirable. These are not dynamic activities: as noted, they are among the slowest growing industrial activities in the world. Their export growth is reaching a plateau as the relocation from high to low wage countries matures. They offer limited potential for learning or technological and skill spillovers. They attract relatively little and low value FDI. Its current export structure gives Pakistan a weak competitive base that is unlikely to drive sustained industrial growth.

Whilst Pakistan's exports have moved from primary products to manufactures, in manufactures it has a heavy and growing reliance on low technology products

In fact, Pakistan had a steady and significant slowdown of growth in textile and clothing exports between 1985 and 2000. There has been a reversal

9. The total export figures include special transactions like gold, works of art, electric power and so on. Their values are not shown in the table but are minuscule, accounting for around 0.1 per cent of total export earnings.

Table 6: Pakistan's Export Performance, 1985 - 2002

Technology Group	1985	1990	1995	2000	2001	2002
			Values (current dollars million)			
Primary Products	904.8	1,049.5	1,036.4	1,178.0	1,071.4	1,059.2
Manufactures	1,775.6	4,456.5	7,061.2	7,933.3	8,085.1	8,774.6
Resource-based	111.4	144.3	347.3	233.7	328.0	388.1
RB 1 (agro-based)	59.3	88.3	285.5	140.3	176.3	214.9
RB 2 (mineral based)	52.1	56.0	61.9	93.4	151.7	173.2
Low Technology	1,449.0	3,915.4	6,037.4	6,879.9	6,925.6	7,503.5
LT 1 (fashion cluster)	1,372.8	3,750.2	5,749.0	6,494.4	6,547.7	7,028.2
LT 2 (other LT)	76.2	165.2	288.4	385.5	377.8	475.4
Medium Technology	210.5	379.0	641.5	768.0	777.7	822.8
MT 1 (automotive)	0.9	1.3	2.2	4.6	7.6	8.3
MT 2 (process)	139.8	287.6	520.3	616.4	607.3	628.8
MT 3 (engineering)	69.8	90.1	119.1	147.1	162.8	185.8
High Technology	4.6	17.8	34.9	51.7	53.9	60.2
HT 1 (electronic/electrical)	1.6	3.2	1.5	2.8	11.7	19.4
HT 2 (other HT)	3.0	14.6	33.5	48.9	42.2	40.8
Total Exports	2,687.3	5,511.2	8,105.5	9,116.4	9,162.3	9,842.1
			Distribution (%)			
Primary Products	33.7	19.0	12.8	12.9	11.7	10.8
Manufactures	66.1	80.9	87.1	87.0	88.2	89.2
Resource-based	4.1	2.6	4.3	2.6	3.6	3.9
RB 1 (agro-based)	2.2	1.6	3.5	1.5	1.9	2.2
RB 2 (mineral-based)	1.9	1.0	0.8	1.0	1.7	1.8
Low Technology	53.9	71.0	74.5	75.5	75.6	76.2
LT 1 (fashion cluster)	51.1	68.0	70.9	71.2	71.5	71.4
LT 2 (other LT)	2.8	3.0	3.6	4.2	4.1	4.8
Medium Technology	7.8	6.9	7.9	8.4	8.5	8.4
MT 1 (automotive)	0.0	0.0	0.0	0.1	0.1	0.1
MT 2 (process)	5.2	5.2	6.4	6.8	6.6	6.4
MT 3 (engineering)	2.6	1.6	1.5	1.6	1.8	1.9
High Technology	0.2	0.3	0.4	0.6	0.6	0.6
HT 1 (electronic)	0.1	0.1	0.0	0.0	0.1	0.2
HT 2 (other HT)	0.1	0.3	0.4	0.5	0.5	0.4
			Annual Growth Rates (% per annum)			
	1985-90	1990-95	1995-2000	2000-01	2001-02	1985-02
Primary Products	3.0	-0.2	2.6	-9.0	-1.1	0.9
Manufactures	20.2	9.6	2.4	1.9	8.5	9.9
Resource-based	5.3	19.2	-7.6	40.3	18.3	7.6
RB 1 (agro-based)	8.3	26.4	-13.2	25.6	21.9	7.9
RB 2 (mineral-based)	1.4	2.0	8.6	62.4	14.1	7.3
Low Technology	22.0	9.0	2.6	0.7	8.3	10.2
LT 1 (fashion cluster)	22.3	8.9	2.5	0.8	7.3	10.1
LT 2 (other LT)	16.7	11.8	6.0	-2.0	25.8	11.4
Medium Technology	12.5	11.1	3.7	1.3	5.8	8.3
MT 1 (automotive)	8.4	10.8	15.9	65.1	9.3	14.1
MT 2 (process)	15.5	12.6	3.4	-1.5	3.5	9.2
MT 3 (engineering)	5.2	5.7	4.3	10.7	14.1	5.9
High Technology	12.5	11.1	3.7	1.3	5.8	8.3
HT 1 (electronic)	15.1	-14.5	14.0	316.1	66.4	15.9
HT 2 (other HT)	37.4	18.0	7.9	-13.7	-3.3	16.6
Total Exports	15.4	8.0	2.4	0.5	7.4	7.9

Source: Calculated from UN Comtrade database.

since FY2002, however, it is difficult to forecast future performance after the end of the global quota regime, when highly competitive East Asian producers enter the arena without quota handicaps. Given Pakistan's cotton resources and upgrading of textile facilities, it will remain a major player in world textile and apparel markets, but for long-run dynamism a diversification of exports will be necessary.

Given Pakistan's cotton resources and upgrading of textile facilities, it will remain a major player in world textile and apparel markets, but for long-run dynamism a diversification of exports will be necessary

Figure 9 shows the share of complex MHT products in production and exports for Pakistan and comparators in 1990 and 2001. A balanced structure would have roughly similar shares for MHT in MVA and exports. In industrialised countries both are just over 60 per cent, with the share of MHT in exports slightly higher than in MVA because of intense trade in high technology products. In highly export-oriented economies with strong export - oriented FDI, as in Thailand, the share of MHT in exports is much higher than in MVA. In South Asia, the share of MHT in exports is well below its share in MVA, reflecting competitive weaknesses in complex activities. Pakistan has very low MHT shares in both production and exports, and slow upgrading over time; the upgrading that does occur is in production rather than exports.

Figure 9: Changes in the Share of Medium and High Technology Products in Pakistan's Manufactured Exports and MVA, 1990-2001 (%)

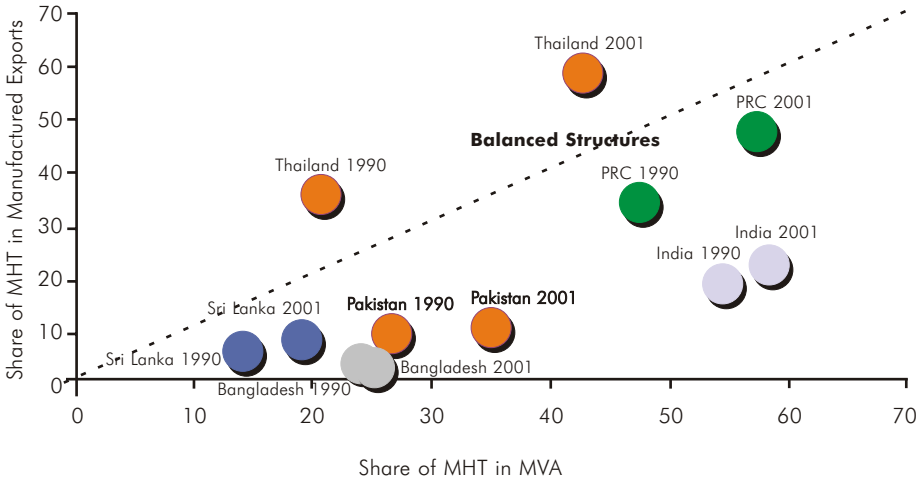


Figure 10 shows the values of manufactured exports by Pakistan and its comparators over 1981-2000. (PRC is not included here because its size overwhelms the chart.) Figure 11 shows that Pakistan is a relatively small exporter but despite its small base, its growth rates remain relatively low. Bangladesh and Sri Lanka record much higher growth rates even though they are, like Pakistan, predominantly apparel exporters: they are in faster growing products or have become more competitive (see below for more detailed analysis). In the 1990s, PRC pulls ahead of all other countries and continues to do so after 2000, with a momentum that belies the huge value of its exports (now over $300 billion).

Figure 10: Values of Manufactured Exports ($ million)

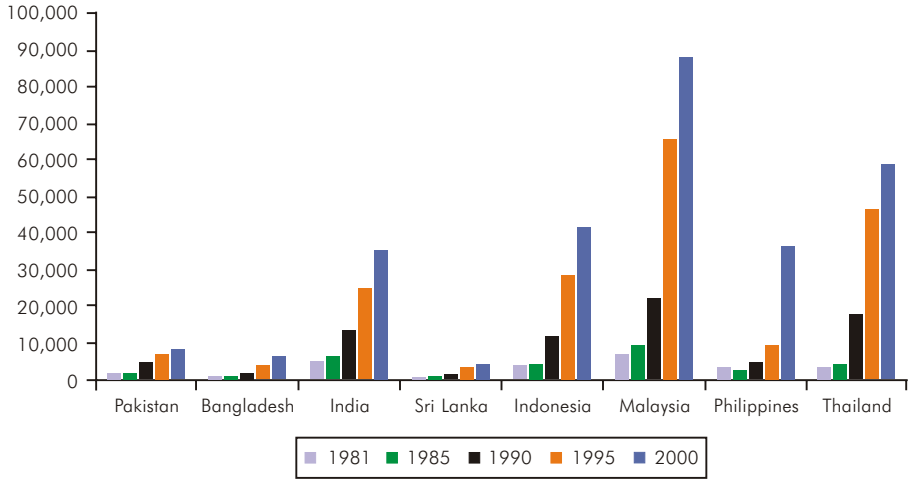
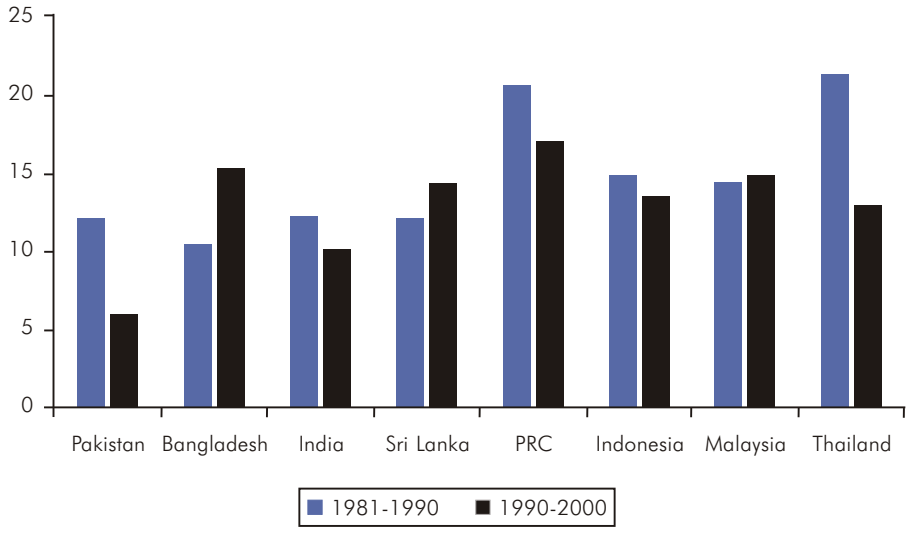


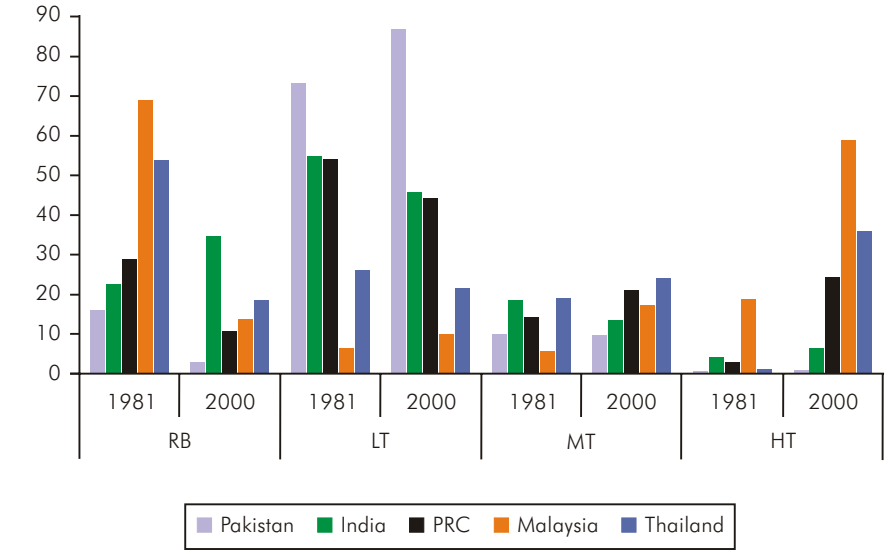
Figure 11: Growth Rate of Total Manufactured Exports (%)



While Pakistan's wage levels are comparable to those of India and PRC, its export structure is far more biased towards low technology activities

Figure 12 shows the relative structure of manufactured exports in Pakistan. While Pakistan's wage levels are comparable to those of India and PRC, its export structure is far more biased towards LT activities. Over time, all countries lower their share of LT products, apart from Pakistan and Malaysia (though in the latter the shift is tiny and the share is very low). HT products' share remains negligible in Pakistan's exports throughout the period; MT exports do slightly better because of the growth of synthetic textile exports. India has a somewhat larger presence in HT because of its pharmaceutical exports. PRC starts the period with a small share of HT products, lower than India's, but over time raises it sharply with a diverse range of electronic and electrical exports. Malaysia and Thailand have far

Figure 12: Structure of Manufactured Exports (%)

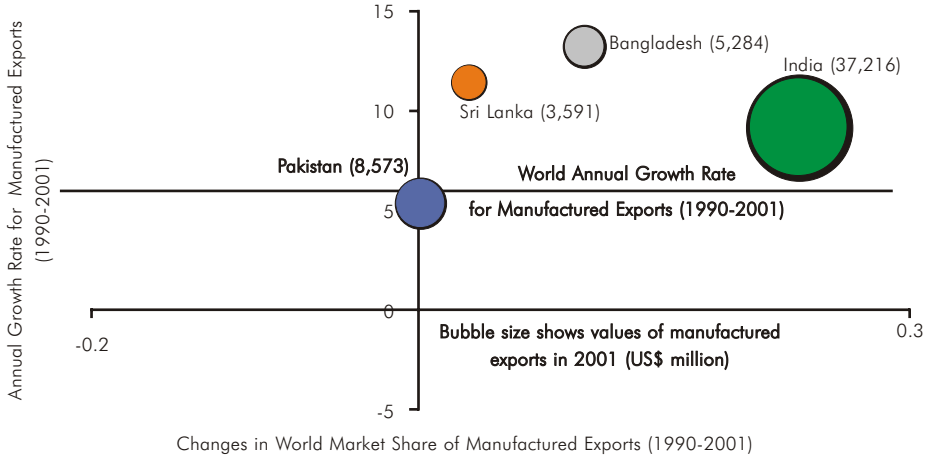


more advanced export structures, with HT products accounting for the largest segment of manufactured exports.

5.3 World Market Shares and Positioning

The standard measure of competitive performance is *world market shares* (WMS). Figure 13 shows WMS of manufactured exports for South Asia in 1990-2001, along with their growth rates and 2001 values, and the growth of world manufactured exports. Pakistan barely retains its WMS in this period, in contrast to the other three large regional economies.

Figure 13: South Asia: World Market Shares and Growth Rates of Manufactured Exports, 1990-2001 (%)



We may analyse further Pakistan's competitive performance by looking at the distribution of its exports in a 'market positioning matrix'. The matrix relates the dynamism of exports to that of world exports (Table 7). This matrix has four sets of products: 'champions', 'underachievers', 'achievers in adversity' and 'declining sectors'.

Table 7: Market Positioning Matrix

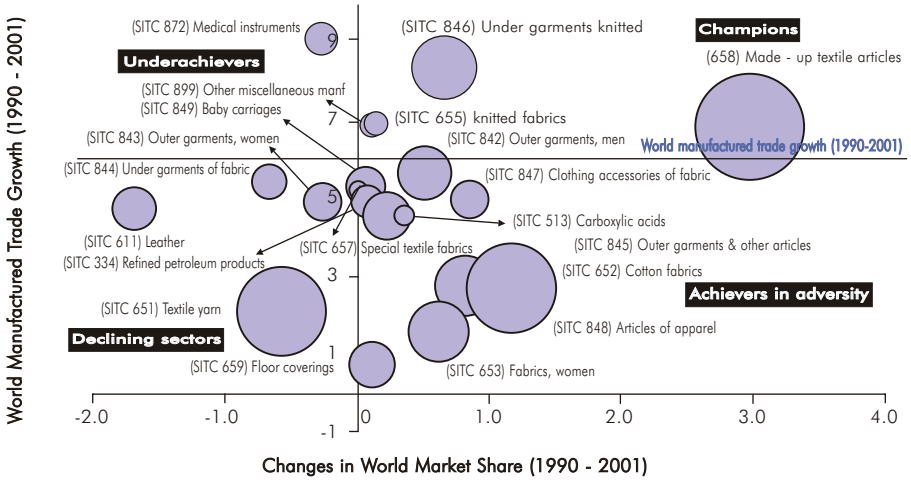
	Share of Product in World Trade	
Share of Country's Exports in World Trade	RISING (Dynamic)	FALLING (Stagnant)
RISING (Competitive)	Optimal "Champions"	Vulnerable "Achievers in Adversity"
FALLING (Non-competitive)	Weakness "Underachievers"	Restructuring "Declining Sectors"

The best position is champions, products in which the country is gaining market share and which are dynamic in world trade. The worst is underachievers, products that are losing market share in dynamic areas. In between are declining sectors (stagnant products in which the country is losing market share, a desirable form of restructuring) and achievers in adversity (stagnant products in world trade in which the country is gaining market share). Figure 14 shows the positioning of Pakistan's leading 20 manufactured exports at the 3-digit SITC level.

Pakistan's largest export product in 2001 was made-up textile articles; this product is also a 'champion' in that the product is dynamic in world trade and Pakistan gained world market share during the 1990s. However, its next two largest exports (cotton fabrics and textile yarn) are stagnant in world

Figure 14: Performance of Pakistan's 20 Main Manufactured Exports (%)

Note: bubble size indicates value of exports in 2001 (US$)



trade; Pakistan gained WMS in the former and lost in the latter. Pakistan has only 5 products above the line for the average world rate of export growth. In the large number of products below the line, Pakistan gains WMS in several but the gains have been relatively modest. Future growth is vulnerable to the slow growth of the market. Most apparel products are in the non-dynamic segment of trade, and Pakistan is unfortunate in being heavily dependent on these products. There is one product, medical instruments, where Pakistan is losing WMS in a dynamic product; in fact, this is the most dynamic in the set of its top 20 exports.

Most apparel products are in the non-dynamic segment of trade, and Pakistan is unfortunate in being heavily dependent on these products

The picture for Pakistan is thus one of *weak product positioning within its areas of export specialisation.* Sustaining rapid export growth with this positioning if world trade continues to follow recent patterns would involve Pakistan raising its market share in declining markets. Since these markets are fiercely competitive and are being liberalised, this would require massive upgrading of production capabilities, quality and marketing relative to competitors. This is possible, of course, but will not be easy. After all, all the major competitors, like PRC and India, are also investing in modernisation, new technology, design and skills. And latecomers like Bangladesh and Sri Lanka have already shown strong competitive capabilities in similar products.

5.4 Sophistication of Pakistan's Exports

We now benchmark the sophistication of Pakistan's manufactured exports. The first indicator is *average sophistication* for manufactured exports at the country level (Table 8).[10] The four industrialised countries are, expectedly, at the top, with the US in the lead. Each shows a decline in its sophistication score over time, reflecting the fact that most exports are shifting to lower wage countries. Japan has the largest relative decline (10.5) of this group, the UK the smallest (8.2).

Table 8: Sophistication Score

Country	1990	2000
USA	84.44	74.83
Japan	85.14	74.62
Germany	83.87	74.57
UK	81.82	73.59
Singapore	74.59	68.11
Taipei,China	73.37	67.05
Korea	69.21	66.52
Philippines	60.53	64.08
Malaysia	68.08	63.43
Thailand	65.12	61.88
PRC	65.04	56.55
Indonesia	57.33	55.37
India	61.05	55.21
Hong Kong	67.62	53.74
Pakistan	55.24	41.61
Sri Lanka *	54.60	41.50
Bangladesh*	46.62	35.64

Note: * data for 2001 instead of 2000.

The three Asian NIEs - Singapore, Taipei,China and Korea - come next, also

10. This score is arrived at in the following way. The share of each manufactured product in a country's total manufactured exports is multiplied by the sophistication score of that product in world trade; the figure is then totalled across all products.

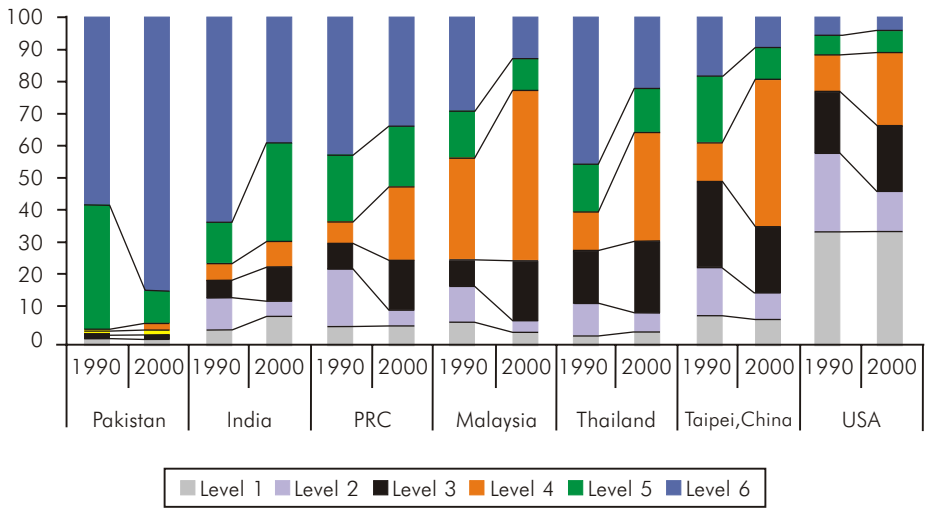
with a decline in sophistication scores. Then comes a set of second tier NIEs led by the Philippines, which has a relatively high score in 2000 because of its overwhelming specialisation in semiconductors; it also shows a rise in score. PRC ranks ahead of Indonesia and Hong Kong; the latter is a clear outlier since in terms of income it comes immediately after the UK. This illustrates that the sophistication score, while clearly related to per capita gross domestic product (GDP) levels, captures other elements that influence export specialisation. Hong Kong is able to sustain high incomes despite the low sophistication of its manufactured exports because of its strong performance in service exports.

Pakistan scores relatively low on export sophistication

Pakistan scores relatively low on export sophistication. Its score falls by 13.6 points, the second largest drop in the group after Hong Kong. The low score for Pakistan reflects its dominant specialisation in low technology products and, within these, on products that are at the low commodity end of the sophistication spectrum. The sharp drop in its score is due to the rigidity of its export patterns and does not, as with most East Asian Tigers, reflect a shift to fast growing products that are shifting to developing countries.

Figure 15 benchmarks the distribution of sophistication scores across six levels in 1990 and 2000; Bangladesh and Sri Lanka are not shown because their distributions are very similar to those of Pakistan. Taipei,China and the USA are included as examples of an advanced NIE and a leading industrialised country. The most striking feature of Pakistan's export structure is the sharp rise in the share of level 6 exports; it is the only country in the chart for which this is the case. In India, the share of level 6 falls while that of level 5 (which contains cut gems) rises. In PRC both these categories, while large, lose shares to levels 3 and 4. In Malaysia and to a lesser extent Thailand this trend is much more pronounced. The US structure retains a constant

Figure 15: Sophistication of Manufactured Exports (%)



share of level 1 products, with a significant decline in level 2 offset by a rise in level 4.

Table 9 shows the values, distribution and growth rates of Pakistan's exports by sophistication levels relative to various comparators and some developed countries. The table also shows the extent of competition arising in other countries in the region, particularly in PRC and Southeast Asia.

Table 9: Values of Manufactured Exports by Sophistication Levels, 1990 ($ million)

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Total
				1990			
India	648.5	1,373.6	781.8	667.3	1,729.1	8,786.3	13,986.6
Sri Lanka	30.5	35.7	39.2	54.0	42.7	881.7	1,083.8
Bangladesh	12.6	1.9	9.8	12.0	227.3	1,076.0	1,339.6
Pakistan	93.4	28.6	28.7	65.2	1,695.1	2,545.6	4,456.5
PRC	2,714.3	8,429.0	3,668.2	3,024.6	10,044.5	20,154.4	48,035.0
Hong Kong	1,711.9	5,702.6	4,799.0	1,311.4	3,435.6	10,873.2	27,833.7
Taipei,China	5,748.7	9,506.9	16,834.3	7,819.3	12,912.1	11,157.9	63,979.1
Korea	4,668.1	7,099.7	9,785.6	11,629.3	11,886.5	17,339.9	62,409.1
Singapore	5,094.0	8,089.9	12,944.6	6,042.8	3,073.7	13,631.8	48,876.8
Malaysia	1,480.6	2,483.7	1,772.5	6,653.5	3,267.8	6,113.8	21,772.0
Indonesia	201.8	469.5	459.2	975.0	1,856.0	7,939.2	11,900.8
Thailand	497.4	1,713.4	2,831.7	2,033.3	2,523.6	7,655.7	17,255.0
Philippines	80.8	318.9	286.3	881.3	714.5	2,173.2	4,455.0
USA	106,416.2	74,118.3	57,341.3	34,204.5	17,924.3	15,439.6	305,444.2
Japan	101,491.3	75,746.1	52,775.6	28,599.3	13,691.5	6,390.8	278,694.7
Germany	132,158.7	90,655.7	60,837.2	33,566.1	28,162.9	19,603.7	364,984.3
UK	39,358.1	40,749.8	27,778.2	22,343.1	12,008.5	13,622.8	155,860.5
Mexico	3,473.6	3,381.2	2,068.5	1,355.3	1,257.1	1,680.6	13,216.3
World	657,248.2	556,036.7	443,921.6	307,429.8	242,141.0	368,632.8	2,575,410.1
				2000			
India	3,220.8	2,001.7	3,834.4	2,695.9	11,568.4	14,403.4	37,724.4
Sri Lanka	101.0	52.5	78.6	313.0	270.6	2,772.5	3,588.3
Bangladesh	43.2	19.9	27.1	112.1	148.6	4,933.9	5,284.8
Pakistan	184.5	64.1	82.4	187.6	748.1	6,666.6	7,933.3
PRC	12,785.7	10,719.1	36,390.3	51,361.6	41,892.6	76,097.7	229,247.0
Hong Kong	1,539.3	1,276.6	2,667.6	4,254.7	1,475.1	10,934.7	22,148.0
Taipei,China	10,561.5	11,956.4	29,534.4	66,020.3	13,758.7	13,070.8	144,902.0
Korea	10,222.8	21,352.3	29,560.2	66,988.2	20,536.5	17,790.5	166,450.5
Singapore	12,078.2	9,594.1	18,696.7	72,190.4	15,470.9	4,655.9	132,686.1
Malaysia	3,212.1	2,812.7	16,114.7	45,735.5	8,055.0	11,021.5	86,951.6
Indonesia	1,191.9	3,745.5	6,180.9	7,974.1	8,298.7	15,120.1	42,511.2
Thailand	2,257.6	3,588.2	12,709.0	19,977.5	7,552.6	12,609.9	58,694.9
Philippines	1,145.8	501.8	3,601.5	24,703.0	2,191.7	4,428.2	36,571.9
USA	215,219.0	79,775.7	122,517.6	141,338.9	40,586.5	23,285.9	622,723.6
Japan	106,537.6	99,715.8	96,766.2	124,856.8	16,168.9	11,447.5	455,492.7
Germany	128,421.5	127,982.2	96,138.3	70,207.9	36,332.1	20,774.4	479,856.3
UK	72,619.1	37,013.6	44,406.1	52,114.9	23,686.9	10,390.3	240,230.9
Mexico	17,363.7	23,830.6	37,443.0	26,634.0	17,940.4	20,383.5	143,595.2
World	981,123.2	788,901.5	938,816.5	1,098,440.2	583,404.1	491,371.6	4,882,057.0
				Growth Rates (1990-2000) (%)			
India	17.4	3.8	17.2	15.0	20.9	5.1	10.4
Sri Lanka	11.5	3.6	6.5	17.3	18.3	11.0	11.5
Bangladesh	11.9	23.6	9.7	22.5	-3.8	14.8	13.3
Pakistan	7.0	8.4	11.1	11.2	-7.9	10.1	5.9
PRC	16.8	2.4	25.8	32.7	15.4	14.2	16.9
Hong Kong	-1.1	-13.9	-5.7	12.5	-8.1	0.1	-2.3
Taipei,China	6.3	2.3	5.8	23.8	0.6	1.6	8.5
Korea	8.2	11.6	11.7	19.1	5.6	0.3	10.3
Singapore	9.0	1.7	3.7	28.2	17.5	-10.2	10.5
Malaysia	8.1	1.3	24.7	21.3	9.4	6.1	14.9
Indonesia	19.4	23.1	29.7	23.4	16.2	6.7	13.6
Thailand	16.3	7.7	16.2	25.7	11.6	5.1	13.0
Philippines	30.4	4.6	28.8	39.6	11.9	7.4	23.4
USA	7.3	0.7	7.9	15.2	8.5	4.2	7.4
Japan	0.5	2.8	6.3	15.9	1.7	6.0	5.0
Germany	-0.3	3.5	4.7	7.7	2.6	0.6	2.8
UK	6.3	-1.0	4.8	8.8	7.0	-2.7	4.4
Mexico	17.5	21.6	33.6	34.7	30.5	28.3	26.9
World	4.1	3.6	7.8	13.6	9.2	2.9	6.6

6. Benchmarking Pakistan's Textile and Clothing Exports

6.1 Performance of Pakistan's Textile and Clothing Exports

Here we benchmark Pakistan's exports of textiles and clothing (T&C). Pakistan's T&C exports in 2001, $6.8 billion, lay between those of Thailand ($5.8 b.) and Indonesia ($7.9 b.). PRC was by far the largest exporter in this industry, with values approaching $55 billion in 2001 (Figure 16).

Pakistan's growth over 1990-2001, 4.5 per cent per annum, was below that of its neighbours but above that of high wage countries like Korea and Hong Kong

In terms of growth rates, Pakistan was a modest performer. As Figure 16 shows, its growth over 1990-2001, 4.5 per cent per annum, was below that of its neighbours but above that of high wage countries like Korea and Hong Kong. The world growth rate for T&C exports was 4 per cent; after a spurt during the 1980s, it slowed down to one of the slowest growing segments of

Figure 16: Values of Textile and Clothing Exports ($ million)

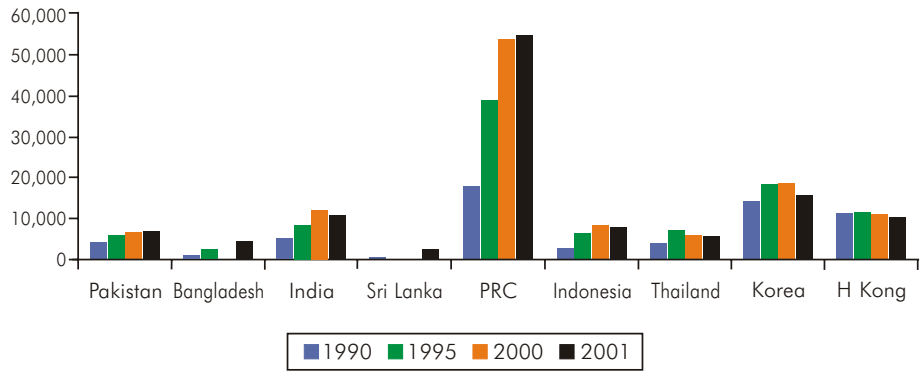
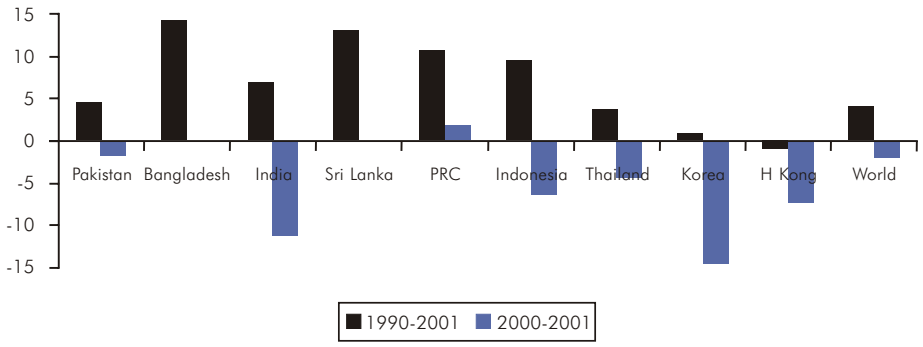


Figure 17: Growth Rates of T&C Exports (% per annum)



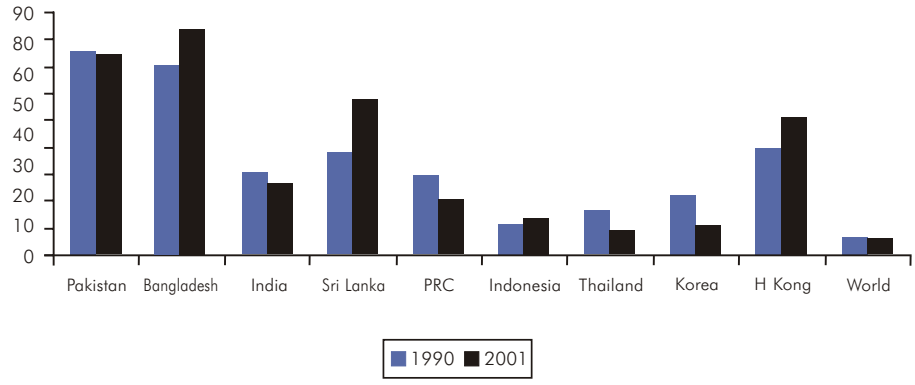
world trade in the 1990s. Therefore, in terms of market positioning for future growth, it was clearly an undesirable segment.

Given that global textile and clothing markets are relatively stagnant, entry is relatively easy and the industry offers few technological and skill spillover benefits

Pakistan, however, is heavily reliant on T&C exports, and this reliance has hardly changed over time. Given that global T&C markets are relatively stagnant, entry is relatively easy and the industry offers few technological and skill spillover benefits, this specialisation does not bode well for future growth: Pakistan must diversify into faster growing and technologically more advanced products. Most East Asian Tigers also started with a strong reliance on T&C exports but over time quickly moved into other activities. Electronics offered the main avenue for diversification but it was not the only one.

As Figure 18 shows, Pakistan comes next only to Bangladesh in its dependence on T&C products. Even PRC, with its dominance of T&C markets, is rapidly reducing the share of the industry in exports (down to 20.5 per cent by 2001). Of the East Asian economies, only Hong Kong raises its reliance on T&C exports, and it is the only Tiger economy whose exports have been declining in absolute terms.

Figure 18: Share of T&C in Total Exports (%)



The T&C industry contains some 100 products at the 4-digit SITC (Rev. 2) level, and some of these are growing faster than others. The ability to specialise in dynamic products and to move from slow to fast growing products (flexibility) is an important aspect of competitive performance within the industry. Another aspect is product sophistication: some T&C products are more sophisticated than others, and there is a presumption that these offer greater scope for value addition. This section benchmarks Pakistan in terms of positioning in dynamism, flexibility and sophistication in the T&C industry, using a set of different measures all based on available trade data.

6.2 Dynamism and Flexibility of Textile and Clothing Exports

Dynamism and flexibility are assessed in terms of the 'market positioning' matrix discussed in section 5.3 above. To reiterate, the four positions in the matrix in order of desirability are: *champions* (dynamic products in which the country is gaining market share, the best position for an exporter), *achievers in adversity* (stagnant products in which the country is gaining market share), *declining sectors* (stagnant sectors in which the country is losing market share) and *underachievers* (dynamic products in which the country is losing market share, the worst position).

While Pakistan's overall positioning appears relatively weak, it is 'flexible' in raising significantly the share of exports in the dynamic segment

Table 10 shows Pakistan's market positioning relative to PRC, India and Indonesia. The share of *champions* has risen in all four countries, but Pakistan has the lowest share of *champions* of the group in both years. In 2000, it also has the highest share of *declining sectors* and *underachievers*. PRC and Indonesia have the highest shares of *champions* while India is more similar to Pakistan - but with a higher share of *achievers in adversity* (products gaining market share in stagnant products).

Table 10: Market Positioning in Textile and Clothing Exports (Share of T&C Exports in each Category) (%)

	Pakistan		India		PRC		Indonesia	
	1990	2000	1990	2000	1990	2000	1990	2000
Champions	20.9	40.3	28.39	45.9	38.4	63.5	47.9	60.5
Achievers in Adversity	24.4	28.0	47.4	49.4	31.7	27.1	33.7	35.1
Declining Sectors	45.6	23.7	20.8	3.1	29.8	9.4	8.1	1.7
Underachievers	9.1	8.1	3.5	1.7	0.1	0.0	10.2	2.8
Share in Dynamic Products	30.0	48.4	31.8	47.6	38.5	63.5	58.1	63.3
Share in Stagnant Products	70.0	51.6	68.2	64.4	61.5	36.5	41.9	36.7

Source: Calculated from UN Comtrade database.

While Pakistan's overall positioning appears relatively weak, it is 'flexible' in *raising significantly* the share of exports in the dynamic segment ('champions' plus 'underachievers') over time, with a gain of 18.4 percentage points, which is a little more than the gain of India at 15.8 percentage points.

Indonesia raises its share by 5.2 points but maintains a high share in dynamic products in both years. PRC starts with a smaller share of dynamic products in 1990 than Indonesia (if higher than Pakistan or India) but raises it by an impressive 25 points.

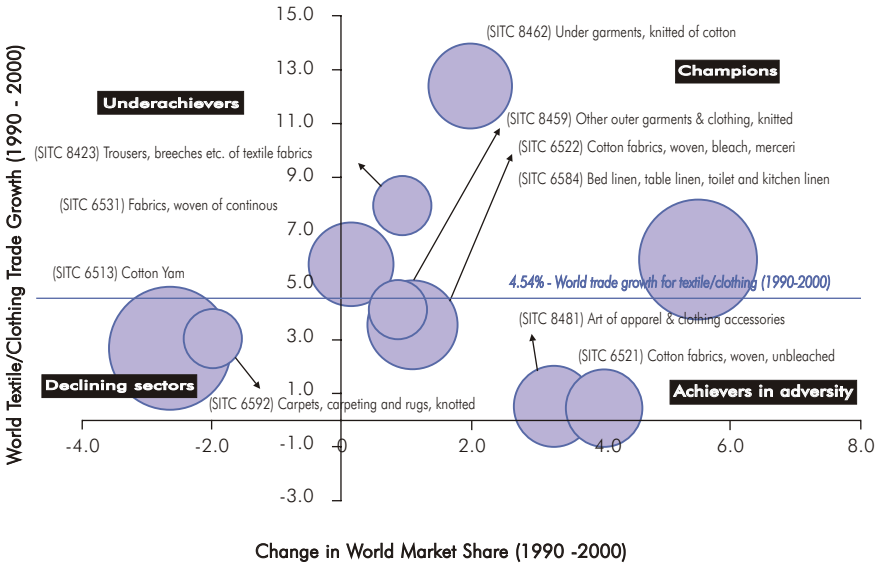
PRC starts with a smaller share of dynamic products in 1990 than Indonesia (if higher than Pakistan or India) but raises it by an impressive 25 points

Now consider Pakistan's performance for its *10 largest T&C exports* during 1990-2000. Figure 19 shows the distribution of these products over the matrix for Pakistan. (The size of the bubble is related to the 2000 export value.) Products above the line for world growth rate (4.54 per cent per annum in the 1990s) are dynamic products in world trade, and those to the right of the vertical line are products in which Pakistan gains market share. The top right segment of the figure shows the *champions*, the bottom right *achievers in adversity* and so on. Figure 20 shows the same information for PRC.[11]

It appears that the leading 10 T&C exports of PRC are better positioned than those of Pakistan, with more *champions* than *achievers in adversity*. Table 11 shows the values of and world market share changes for each of the top 10 T&C exports for Pakistan, India and PRC. Note the similarities as well as differences between the product ranges of these countries.

Figure 19: Performance of Pakistan's 10 main T&C Exports (%)

Note: Bubble size indicates value of exports in 2000 (US$ thousand)



11. The dollar values of the top Chinese exports are, of course, much higher than those of Pakistan, but the size of the bubbles is geared to the value of its own exports; see Table 11.

Figure 20: Performance of PRC's 10 main T&C Exports (%)

Note: Bubble size indicates value of exports in 2000 (US$ thousand)

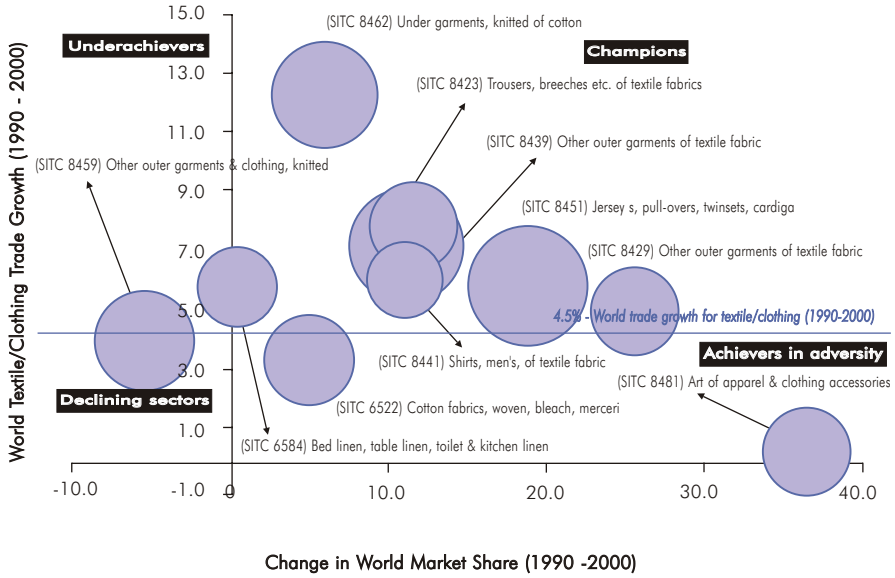


Table 12 shows a different performance measure, the world market shares of Pakistan and comparators in the *10 fastest growing T&C exports in the world in the 1990s*. This allows us to assess how each country is doing in the most dynamic global exports. The results are somewhat different from those of the flexibility exercise.

Each of the countries in the table gains market share in the 10 products taken together. PRC continues to be the leading performer with the largest gain, an increase of a massive 8.6 percentage points. India comes next in the group, with 1.4 points. The lowest gain (0.4 points) is by Pakistan. More interestingly, Pakistan loses market share in 5 of the 10 dynamic products. India and Indonesia lose in 2 products each while PRC and Sri Lanka raise shares in all products. Pakistan's overall market share gain is due predominantly to one product, undergarments knitted of cotton, which, fortunately, are also the fastest growing T&C export in the world. However, it is also a very simple product in which entry is very easy, and is vulnerable to competitive erosion. Pakistan's market share losses in 5 of the 10 dynamic products are worrying, but without further investigation, we cannot evaluate their cause or significance.

Pakistan's overall market share gain is due predominantly to one product, undergarments knitted of cotton

6.3 Sophistication of Textile and Clothing Exports

We now consider *sophistication* of textile and clothing exports at the 4-digit level. The 100 products that fall under this industrial category show a fairly wide range of sophistication (see the statistical appendix). The sophistication score for the industry is calculated independently of the scores

Table 11: Ten Largest T&C Exports in 2000

SITC	Product	World Market Share Change (%)	World Growth Rate (1990-2000) (%)	Value 2000 ($ m.)
	Pakistan			
6513	Cotton yarn	-2.64	2.70	1,105.0
6584	Bed linen, table linen, toilet & kitchen linen	5.49	5.99	1,063.4
6522	Cotton fabrics, woven, bleached, mercerised	1.11	3.56	627.5
8462	Under garments, knitted of cotton	1.97	12.42	515.5
6531	Fabrics, woven of continuous synthetic fibres	0.13	5.81	508.8
8481	Articles of apparel & clothing accessories	3.26	0.49	467.6
6521	Cotton fabrics, woven, unbleached	4.03	0.53	445.4
8459	Other outer garments & clothing, knitted	0.88	4.13	286.3
8423	Trousers ,breeches etc. of textile fabrics	0.93	8.01	280.2
6592	Carpets, carpeting and rugs, knotted	-1.99	3.07	277.0
	Total T&C, Pakistan	0.12	4.54	6,955.1
	India			
6513	Cotton yarn	15.44	2.70	1,405.0
8462	Under garments, knitted of cotton	3.64	12.42	1,054.2
8441	Shirts, men's, of textile fabrics	1.59	6.24	894.9
6589	Other made-up articles of textile m	2.23	11.52	796.0
8435	Blouses of textile fabrics	2.36	2.38	761.7
6522	Cotton fabrics, woven, bleached, mercerised	2.13	3.56	696.2
8433	Dresses, women's, of textile fabrics	8.51	5.20	521.3
8481	Articles of apparel & clothing accessories	3.10	0.49	512.9
8439	Other outer garments of textile fabrics	0.50	7.36	503.6
6521	Cotton fabrics, woven, unbleached	1.96	0.53	406.4
	Total T&C, India	1.22	4.54	12,305.6
	PRC			
8451	Jerseys, pull-overs, twin-sets, cardigans	18.77	6.07	4,699.0
8439	Other outer garments of textile fabrics	11.14	7.36	4,425.0
8462	Under garments, knitted of cotton	5.95	12.42	3,595.0
8459	Other outer garments & clothing, knitted	-5.47	4.13	3,178.6
8423	Trousers, breeches etc. of textile fabrics	11.52	8.01	2,564.0
8481	Articles of apparel & clothing accessories	36.46	0.49	2,553.6
8429	Other outer garments of textile fabrics	25.52	5.16	2,498.5
6522	Cotton fabrics, woven, bleached, mercerised	4.98	3.56	2,478.0
6584	Bed linen, table linen, toilet & kitchen linen	0.47	5.99	1,943.7
8441	Shirts, men's, of textile fabrics	10.94	6.24	1,808.7
	Total T&C, PRC	7.43	4.54	53,512.4

Table 12: World Market Shares in 10 Fastest Growing Global T&C Exports (%)

SITC	10 Fastest Growing T&C Exports Product	World Growth Rate	Pakistan		India		Sri Lanka		PRC		Indonesia	
			1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
8462	Cotton undergarments knitted	12.4	0.31	2.29	1.04	4.67	0.38	1.57	9.99	15.94	1.66	2.24
6589	Other made-up textile articles	11.5	5.13	4.57	14.89	17.12	0.05	0.08	3.46	11.28	0.61	0.38
6552	Knitted/crocheted fabrics	8.9	0.47	0.53	1.25	0.25	0.03	0.11	5.52	9.64	0.28	0.57
8423	Trousers, breeches etc.	8.0	0.92	1.85	0.38	1.50	0.92	1.45	5.39	16.91	1.81	3.08
8439	Other outer garments	7.4	0.67	0.43	1.71	2.21	0.58	1.40	8.30	19.45	1.77	2.39
8442	Under garments, excl. shirts	6.8	7.10	4.14	2.25	3.76	0.44	3.24	20.76	33.29	1.52	3.28
6560	Tulle, lace, embroidery	6.6	0.15	0.17	0.53	1.55	0.00	0.22	1.66	5.28	7.35	1.91
8472	Clothing accessories, knitted or crocheted	6.5	1.60	1.98	0.05	0.76	0.95	1.75	13.87	16.72	0.23	2.27
6582	Tarpaulins, sails, awnings	6.3	5.98	4.14	0.20	0.93	1.03	4.26	6.87	40.77	0.02	0.33
8441	Shirts, men's, of textile fabrics	6.2	1.57	1.11	7.36	8.95	1.08	1.44	7.14	18.09	2.07	3.94
	Total above	8.6	1.06	1.47	2.34	3.68	0.56	1.25	7.41	15.98	1.81	2.24

Source: Calculated from UN Comtrade database for the four-digit SITC (Revision 2) classification.

assigned to all 181 manufactured products at the 3-digit level (reviewed in section 4.3 above), but most T&C products rank fairly low in terms of manufacturing sophistication.[12]

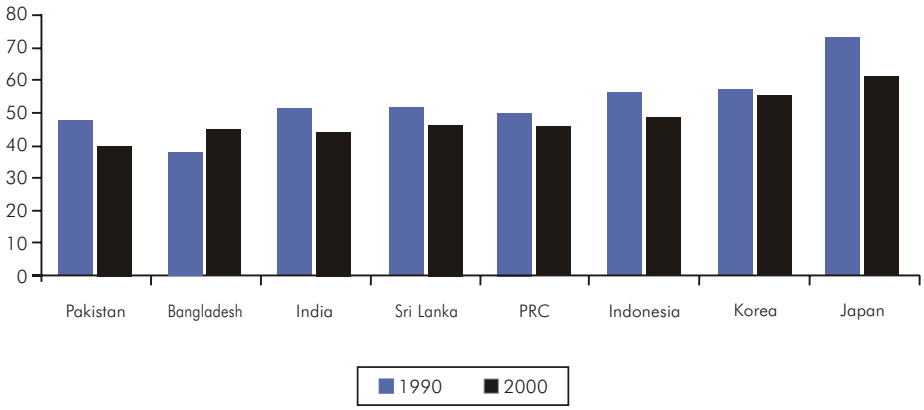
Figure 21 shows the average sophistication score of T&C exports by Pakistan and comparators; here the scores range from zero to 100 for textile and clothing products only. The scale is thus quite different from that used to assess total exports, with the top in T&C being relatively low on the overall scale. Two advanced exporters, Japan and Korea, are also shown for comparison.

Most textile and clothing products rank fairly low in terms of manufacturing sophistication

Pakistan ends the period with the lowest average sophistication level in the group. Japan and Korea, as expected, have the highest levels. They are followed by Indonesia, Sri Lanka and PRC. India is second from bottom in the group. Over the 1990s nearly all the countries in the chart see a decline in their sophistication scores, a manifestation of the rapid relocation of most T&C products to low wage economies. The only exception is Bangladesh, which moves into more sophisticated products; this is, however, probably due to the

12. The analysis reported in section 4.3 assigned scores at the 3-digit level, so the ranks are not really comparable with those reported here, but the highest scoring product in the overall manufacturing ranks is synthetic fibres, a highly capital intensive medium technology product, which ranks 34 out of 181 manufactured products. The next most sophisticated textile product is special textile fabrics at rank 113; most clothing products start after rank 145.

Figure 21: Sophistication Scores for T&C Exports in 1990 and 2000



very low level of sophistication it started with in 1990. Korea has the smallest decline of the other countries; combined with its high average sophistication score, this suggests that it has managed to shift production into more complex products while relocating simpler ones to cheaper sites.

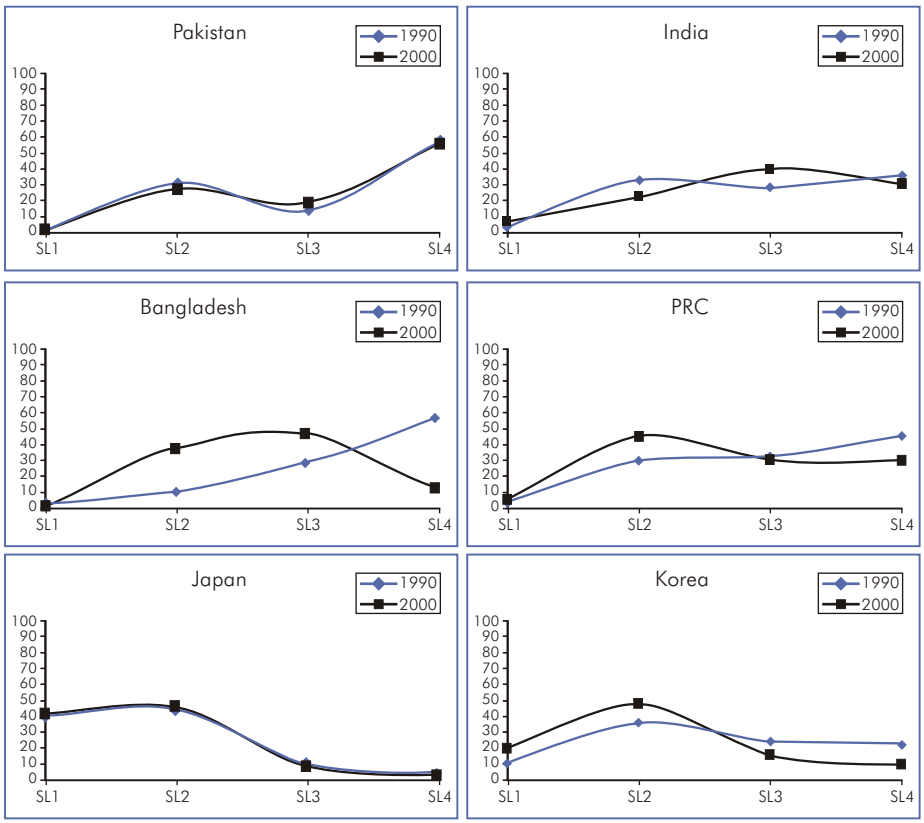
Pakistan's relatively low score in 2000 suggests that it is specialising in low value-added segments of the industry. This is explored further by dividing T&C products into four groups according to product sophistication scores and tracing distribution of exports by countries over these groups. Figure 22 shows the 1990 and 2000 distributions for Pakistan and five comparators, with SL1 being the most sophisticated T&C products and SL4 the least sophisticated.

Pakistan's relatively low sophistication score in 2000 suggests that it is specialising in low value-added segments of the industry

This figure shows interesting differences in the evolution of T&C sophistication over the 1990s. Pakistan's structure remains stable with a very low share of highly sophisticated products SL1, a moderate share of SL2 and very high concentration in SL4. Indian exports start fairly similar to Pakistan's but then shift more towards SL3 products, with corresponding losses in SL2 and SL4. Bangladesh moves significantly from the lowest level to SL2 and SL3, with SL1 remaining steady at a very low level. PRC shifts from SL4 to SL2. Japan's structure is practically unchanged, with SL levels 1 and 2 dominating its T&C exports. Korea shifts its structure upwards, with the top two levels gaining over the bottom two. Again, the rapid upgrading of Bangladesh's T&C exports is noteworthy.

In 2000, Pakistan has the highest share of SL4 category products (nearly 55 per cent) in its T&C export basket. All other countries in the figure with similar wages - India, Bangladesh and PRC - have much lower shares, the lowest being Bangladesh with only 13 per cent. (Recall from Figure 17 that Bangladesh also records the highest export growth rate in the industry in 1990-2001.) While it is beyond the scope of this paper to analyse this in greater detail, there are important policy issues here in terms of evolution and drivers of product upgrading in Pakistan relative to its main competitors.

Figure 22: Distribution of Sophistication Levels of T&C Exports (%)



6.4 Some Final Thoughts

Given the prime importance of textiles and clothing to Pakistan's exports, the analysis here, simple as it is, has some disturbing implications. It is clear that overwhelming specialisation in this industry is not desirable for Pakistan's future competitiveness: it is unlikely to yield sustained growth in a world where dynamism resides increasingly in technology-intensive products. Our analysis suggests that over the period studied, even *within* the T&C industry, Pakistan's performance is weak in several aspects.

Overwhelming specialisation in the textile and clothing sector is not desirable for Pakistan's future competitiveness

Pakistan's textile industry has invested substantially in new equipment and technologies in recent years. It is well placed, given its raw material base and vertical integration across stages of production, to continue to be a major T&C player once quota restrictions are lifted. However, its major competitors are also investing heavily in upgrading the industry, and most are also upgrading their skill and design base and moving into better quality products. It is not clear if a raw material base will suffice for Pakistan to maintain a strong export position if it does not match its competitors in terms of technology, skills, designs and quality. The data here suggest, albeit indirectly, that it is lagging in this. It continues to focus on the least sophisticated products. It has a low share of *champions* and is losing market share in many of the most dynamic global T&C exports.

There are many issues here that need more detailed benchmarking and analysis than is possible in this paper. It would appear imperative to undertake such an effort quickly if Pakistan is to formulate and implement a coherent strategy on export competitiveness.

7. Benchmarking Pakistan's Capabilities

7.1 Investment Climate

An important aspect of competitiveness will be the policy environment facing investors both domestic and foreign, and it is widely acknowledged that slow growth in private investment, particularly in large-scale manufacturing, has been one of the key constraints on Pakistan's economic growth.

There is now a clear understanding that, in trade policy terms, international competitiveness requires ready access to international inputs at close to world prices and a domestic market subject to competitive pressure, both among domestic producers and between them and imports. Experience in Pakistan and elsewhere suggests that highly protected domestic markets not only reduce the incentive to export but also penalise the economy by allowing inefficient domestic producers to extract policy-induced rents from domestic consumers.

Experience in Pakistan and elsewhere suggests that highly protected domestic markets not only reduce the incentive to export but also penalise the economy

While there is a plausible theoretical case for infant industry support of activities with strong learning effects and positive externalities, experience suggests that if such a policy is to be pursued, it should be time-bound and performance-linked. Theory also suggests that tariff protection is not the most economically efficient means of providing such support, although in practice it has been by far the most common.

Pakistan has liberalised its trade policies significantly over the last decade or so. At present, it is one of the more open trade regimes in South Asia, although South Asia itself remains relatively protectionist by international

standards. Pakistan has unilaterally reduced import tariffs so that its applied rates are often below the bound rates to which it is committed by World Trade Organization (WTO) membership. Table 13 shows average manufacturing tariffs for selected economies and Pakistan circa 2001-02.

Table 13: Average Tariffs on Industrial Products (unweighted) (%)

Country	Share of Bound Tariff Lines	Average Final Bound Tariff Rate	Average Applied Tariff Rate	Year
Pakistan	36.5	36.0	20.1	2001-02
Bangladesh	0.9	50.0	21.9	1999-2000
India	68.2	36.2	31.0	2001-02
Korea	90.6	9.4	7.5	2000
Malaysia	59.0	14.9	9.9	2001
Singapore	63.6	6.3	0	2000
Brazil	100.0	29.6	13.8	2000
Costa Rica	100.0	43.1	4.7	2000

Source: WTO Annual Report 2003 Table 2.1.

The average for Pakistan has fallen since then to around 10 per cent [13] as the maximum tariff was reduced from 30 per cent to 25 per cent in 2002; most tariffs are now in one of four tiers from 5 per cent to 25 per cent, but a few sensitive items, like motor vehicles and certain textile goods, continue to have higher rates. There has also been a phasing out of quantitative import restrictions for balance of payments purposes and a running down of the system of exemptions from tariffs, the Statutory Rules Orders. The simple average applied tariff of around 10 per cent in 2003 must be compared with an average of 56 per cent in 1995 and nearly 80 per cent in 1985.[14]

Pakistan has unilaterally reduced import tariffs so that its applied rates are often below the bound rates to which it is committed by World Trade Organization (WTO) membership

Exporters meeting minimum local value-added ratios are eligible for import duty drawbacks for imports of raw materials and plant and equipment, which face modest tariffs of 5 per cent or 10 per cent. Full access to imported inputs duty-free and other fiscal concessions are available to firms located in Export Processing Zones (EPZs) in Karachi, Risalpur and Sialkot, and the two Special Export Zones that are to be established in Karachi and in one of the industrial cities of Punjab.

Under the investment policy introduced in 1997, policies towards inward foreign direct investment to Pakistan have also become liberal by regional standards. Foreign investors are guaranteed national treatment, face low import duties on plant and equipment of between 5 per cent and 10 per

13. This simple average tariff has been calculated as a percentage of total imports. The average tariff, if calculated as a percentage of dutiable imports, is 15.6 per cent. (Pakistan Economic Survey 2002-03)
14. The figure for 1995 comes from WTO (2002) and for 1985, 77 per cent, from World Bank (2002) Table 2.7.

cent, and receive a first year profits tax allowance of between 50 per cent and 90 per cent of the cost of plant and equipment. Full foreign ownership is allowed for all but a small number of activities as is full repatriation of capital, dividends and profits, and there is no restriction on the level of royalty payments. Measures have also been taken to introduce an Intellectual Property Rights regime compatible with the WTO. The Board of Investment in Pakistan has contrasted the FDI regime in Pakistan with that in other parts of the region and argues that in no sense is it more restrictive than elsewhere.

The investment climate and the uncertain national and regional political situation have kept FDI inflows into Pakistan low

However, as discussed below, the investment climate and the uncertain national and regional political situation have kept FDI inflows into Pakistan relatively low in the past. This is brought out clearly in the index of FDI performance calculated by United Nations Conference on Trade and Development (UNCTAD 2002). The FDI performance index relates a country's share of global FDI to its economic size and is taken as the ratio of a country's share in global FDI to its share in global GDP. Hence a value of above unity for the index implies that a country attracts more FDI than is warranted by its share in total economic activity and conversely for a value of below unity. Pakistan's value by this index for 1998-2000 is low at 0.2. Moreover it has fallen over the period since the late 1980s.

On the other hand, South Asia as a whole attracts much less FDI than its economic size would suggest. Pakistan's position by this index is better than that of India and Bangladesh but not as good as the position of Sri Lanka. Performance in attracting FDI is markedly different in parts of Southeast and East Asia, where a number of countries, principally Malaysia, Thailand, PRC and Singapore, attract more FDI than would be implied by their economic size (see Table 14). However, figures for Southeast and East Asian economies in the late 1990s are distorted by the impact of the 1997-98 financial crisis and its aftermath; this is particularly acute for Indonesia.

It should be noted, however, that since FY2001 FDI in Pakistan has been increasing rapidly. Between FY2001 and FY2004 FDI grew at an average annual rate of 45 per cent to reach $951 million.[15]

In terms of regulation, it is a common complaint from the private sector that Pakistan still has a fairly regulated business environment. A particular cause for concern is the lengthy delay in customs clearance, though this seems to be changing. Delays at customs make it very difficult for businesses to keep optimal levels of inventories and undermine the notion of 'just-in-time' planning.

15. State Bank of Pakistan website.

Table 14: UNCTAD FDI Performance Index (FDIPI): Pakistan and Other Countries

Country	FDIPI 1988-1990 (Country Ranking)	FDIPI 1998-2000 (Country Ranking)
Pakistan	0.6 (77)	0.2 (114)
Bangladesh	0.1 (127)	0.1 (122)
India	0.1 (121)	0.2 (119)
Sri Lanka	0.5 (85)	0.4 (103)
South Asia	0.12	0.16
PRC	0.9 (61)	1.2 (47)
Indonesia	0.8 (63)	-0.6 (138)
Malaysia	4.4 (8)	1.2 (44)
Korea	0.5 (93)	0.6 (87)
Taipei,China	0.9 (58)	0.3 (112)
Singapore	13.8 (1)	2.2 (18)
Thailand	2.6 (25)	1.3 (41)
East and South East Asia	1.73	1.20

Source: UNCTAD (2002) World Investment Report, Table 2.1.

There is an awareness of regulatory problems, in particular of the need to streamline tax administration, and measures have been introduced to reform the Central Bureau of Revenue. For example, a system of universal self-assessment has been introduced with a view to minimising contact with tax officials, and there has been an experiment with a new form of customs documentation designed to minimise the number of forms to be completed with a view to speeding up customs clearance.

A system of universal self-assessment has been introduced with a view to minimising contact with tax officials

One way of looking at the degree of regulation is to estimate the time and cost required to start up a new business as a proportion of GDP per capita (see Table 15). From the comparative data available for the late 1990s, Pakistan does not fare well by this criterion relative to the NIEs and Sri Lanka, but does better than India and Indonesia. Changes introduced in 2002 appear to have improved the situation, with a fall in stamp duty reducing the cost of start up; also simplifications in the requirements of the Registrar of Companies and the establishment of an electronically-linked tax administration should save start up time.

Table 15: Starting a Business: Comparative Data

Country (late 1990s)	No. of Procedures	Time in Days	Cost as % of National Income Per Capita
India	10	77	88
Sri Lanka	8	23	29
Indonesia	11	128	105
Thailand	9	35	20
Malaysia	7	42	43
Pakistan	8	50	55

Source: Djankov *et al* (2001).

High cost and poorly functioning infrastructure can clearly impede the operation of enterprises which may be efficient in terms of mastery of their own production processes. There is evidence that infrastructure, in particular in the power sector, has been a key bottleneck. Unreliability of and difficulty in accessing the grid will force enterprises to invest in their own generators, which will normally be a high-cost source of power supply.

In the telecom sector there is a shortage of fixed line connections. The time taken to get a telephone connection is still high by international standards. Connection costs for phone lines are also high by international standards. These constraints and high costs in telecoms are a contributory factor to the relatively low internet usage amongst enterprises in Pakistan.

Transport has also been discussed as a potential bottleneck, particularly in relation to exports. In relation to ports, for example, there are informal estimates which suggest that port handling costs in Karachi and Port Qasim are higher than the regional average. These infrastructure deficiencies clearly need to be addressed to strengthen the competitiveness environment.

However, competitiveness today requires much more than adequate infrastructure, cheap labour and liberal economic policies. It needs a strong base of human and technological resources, able to support enterprises in handling, adapting and improving new technologies, and selling the output to sophisticated and demanding global markets. The range and level of skills required is rising, calling not just for an initial base of schooling but for constant training and retraining of the workforce at all levels, with competence in the use of information technology playing a larger role. No industrial activity or enterprise, regardless of its technological level or size, is immune to this need.

Competitiveness today requires much more than adequate infrastructure, cheap labour and liberal economic policies

The development of technological capability is a related but different process. It goes beyond creating skills to creating technology-specific knowledge and organisational routines. It arises partly from on-the-job experience but largely from conscious effort to absorb, adapt, improve and create technologies, and to interact with other enterprises and technology-related institutions (Lall, 2001.a). Thus it is just as crucial to competitiveness as having skilled employees: it is the glue that binds formal skills to production efficiency.

A significant part of technological capability arises from informal production activity; in complex activities it also involves product and process engineering and R&D is often considered to be unnecessary in developing countries that can use technologies created elsewhere, but this is mistaken. While it is probably wasteful for these countries to invest in 'reinventing the wheel', formal R&D effort is often necessary for *using* advanced technologies efficiently in production. Hence we next consider indicators of skills and technology development in Pakistan.

7.2 Skills

By most common indicators of skill creation, Pakistan does not perform well by regional standards - themselves low relative to East Asian levels. Take, for instance, the Harbison-Myer index, a classic index of skills based on school and university enrolments, used by UNIDO (2002) to benchmark 87 countries. Pakistan ranks below all other South Asian economies, (Table 16).

Table 16: Harbison-Myer Index of Skills

Country	1998 (Country Ranking)	1985 (Country Ranking)
Korea	36.1 (10)	26.8 (6)
Taipei,China	27.8 (23)	22.5 (21)
Singapore	23.1 (29)	14.8 (37)
Philippines	21.6 (32)	21.3 (23)
Thailand	15.6 (45)	10.8 (48)
Malaysia	11.1 (55)	9.2 (51)
Indonesia	10.4 (56)	8.3 (57)
Sri Lanka	10.1 (58)	9.1 (53)
PRC	9.8 (59)	5.2 (67)
India	8.1 (69)	7.1 (60)
Nepal	6.4 (71)	5.4 (66)
Bangladesh	4.3 (76)	4.0 (72)
Pakistan	4.1 (77)	4.4 (69)

Note: The Harbison-Myer index is the average of the percentage of the relevant age groups enrolled in secondary & tertiary education with tertiary enrolments given a weight of five.
Source: UNIDO (2002) Table A.2.18.

What is more worrying, Pakistan's score and its relative position have deteriorated since the mid-1980s, making it the only country in Asia in which the index declined over the 1985-1997 period; however, several, including all in South Asia, have declined in the rankings.

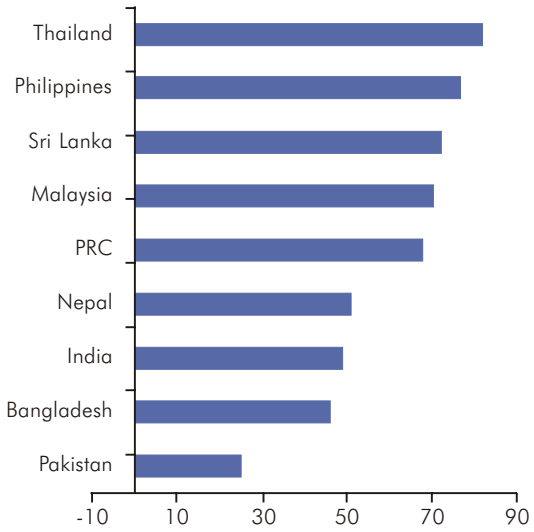
By most common indicators of skill creation, Pakistan does not perform well by regional standards - themselves low relative to East Asian levels

The charts below compare Pakistan with other Asian countries in different aspects of education. Given the different means of financing education, it is preferable to look at enrolment data rather than at statistics on government expenditure. Figure 23 shows relative gross enrolment rates at secondary school, using the most recent data from the United Nations Educational, Scientific and Cultural Organization (UNESCO) website.[16]

Figure 24, also from UNESCO, shows a measure of *high level technical skills:* enrolments in technical subjects (science, computing and mathematics, and engineering) at the tertiary level expressed as a percentage of the total population.

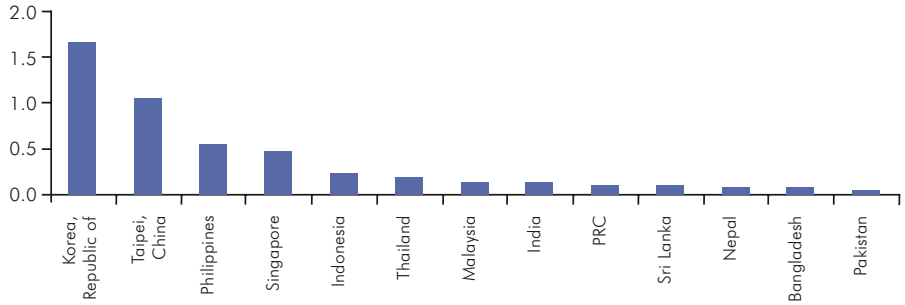
16. The figures for Pakistan are not substantiated by the Pakistan Integrated Household Survey (PIHS) for 1998-99 and 2001-02, which give gross enrolment rates of 40 and 41 per cent respectively.

Figure 23: Secondary School Enrolments (% of age group)



Note: Pakistan, Bangladesh, PRC, Malaysia, Nepal, Philippines and Thailand 2000-01, India 1999-2000, Sri Lanka 1998-99.
Source: UNESCO website

Figure 24: Tertiary Technical Enrolments (% of population, 1997)



Simple as it is, this measure seems appropriate for assessing human capital available for handling complex modern technologies. It has, however, to be adjusted for the *stock* of trained engineering and scientific manpower available for industrial uses; these are likely to be particularly large in countries like PRC and India.

7.3 Technological Effort

There is universal recognition that increasing technological effort plays a central role in improving competitiveness

It is, by the nature of the phenomenon, very difficult to measure technological effort in practice although there is universal recognition of its central role in competitiveness. It is clear that the Government of Pakistan has recognised fully the need for increasing local technological effort. The 1993 National Technology Policy, for instance, stated, "Technological development and rapid economic growth are two sides of the same coin. Development planners consider technology to be one of the most important

factors determining economic and social development ... Pakistan must join the world economic community as a member of the group of Newly Industrialised Countries before the current century closes. The goal of the National Technology Policy is to help attain this vision by promoting the best use of international and indigenous technology in various sectors of the economy and thereby accelerating economic growth and improving the quality of life of all Pakistanis". The Eighth Five Year Plan set a target for R&D of 1 per cent of GDP by 1998.

Enterprise-financed R&D in Pakistan is negligible

How does Pakistan compare in technological effort? Accepting that R&D is not a perfect measure of technological effort, it is the only activity on which there is comparable data across countries. Table 17 gives the latest available R&D data (unfortunately out of date for several countries). Pakistan spends around 0.3 per cent of its GDP on research and development, slightly more than Sri Lanka, Indonesia, Philippines, Thailand and Hong Kong. Most R&D in Pakistan is financed by the government. Enterprise-financed R&D is negligible and the lowest in the sample. On a per capita basis also, R&D spending in Pakistan is the lowest in the sample. More up to date figures for Pakistan are not available to us, but as yet there is no evidence that the 1 per cent of GDP target for R&D, noted above, has been met.

Table 17: R&D in Pakistan and Comparator Countries

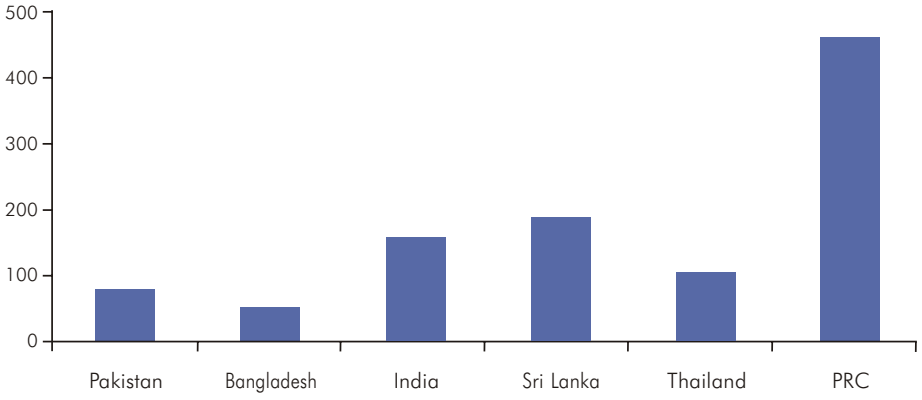
Country	Year	R&D as % GNP or GDP	Enterprise-financed R&D as % GNP or GDP	Total R&D Per Cap. ($)
Pakistan	1990	0.3	0.00	0.8
India	1999	0.6	0.16	2.4
Sri Lanka	1994	0.2	0.02	1.4
PRC	1999	0.8	0.41	6.5
Indonesia	1993	0.1	N/A	1.0
Malaysia	1999	0.4	0.26	13.0
Philippines	1984	0.1	0.03	0.7
Thailand	1999	0.3	0.14	5.8
Hong Kong	1995	0.1	N/A	23.0
Singapore	1999	1.9	1.18	396.7
Korea	1999	2.9	2.3	261.9
Taipei,China	1994	1.8	1.00	198.0

Sources: UNESCO, Statistical Yearbooks; OECD; national sources; Brooker Group (Thailand) unpublished data.

There are three more figures that illustrate Pakistan's technological activity. Figure 25 shows the number of scientists engaged in R&D per million inhabitants. Figure 26 shows the number of technicians in R&D, and Figure 27 shows the number of scientific and technical journals per million inhabitants.[17] All the figures highlight the lag that Pakistan suffers with respect to most of its comparators in the region.

17. Sources of these figures are again the UNESCO website.

Figure 25: Scientists in R&D (per million people, latest year)



Note: 1997 data for Pakistan; 1995 for Bangladesh; 1996 for the rest.

Figure 26: Technicians in R&D (per million people, latest year)

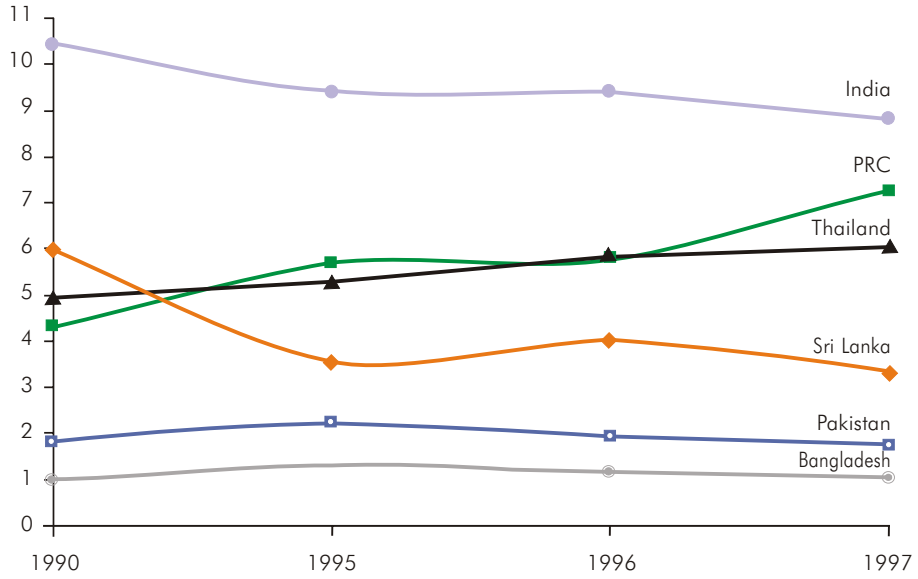
Note: 1997 data for Pakistan and Thailand; 1995 for Bangladesh; 1996 for the rest.

Not only are total R&D expenditures low in Pakistan, the share of the total science budget directed to industry is low and declining. In the Fifth Plan, the percentage of total scientific research for industry was 17.7 per cent, in the Sixth Plan 14.3 per cent and in the Seventh Plan 11.4 per cent. The utilisation of Plan allocations to science and technology also declined, from 80 per cent in the Fifth Plan, to 39 per cent in the Seventh Plan and to 15 per cent in the first three years of the Eighth Plan.

Not only are total R&D expenditures low in Pakistan, the share of the total science budget directed to industry is low and declining

There are, nevertheless, a large number of institutions engaged in R&D. At the end of 1988 there were 166 research organisations (118 under the federal government); there were also around 50 educational institutions that could conduct research. Technology infrastructure organisations like the Pakistan Standards Institute and a number of technical extension and training services also conduct R&D. However, according to the findings of a

Figure 27: Scientific and Technical Journals (per million people, latest year)



Commonwealth Secretariat mission to Pakistan, it appears that this structure is de-linked from the productive sector.[18] Industrial firms, to the extent that they are even aware of these institutions, are unsure about their capabilities and the services offered. Universities are even further removed from productive activity and the consciousness of industry managers than the public sector laboratories. Among SMEs which need institutional support the most, there is also very limited awareness of the technology institutions, and the institutions, with some notable exceptions, fail to reach out to them to assess and address their technical needs.

One indirect indicator of technology effort relevant to export competitiveness is the number of ISO 9000 certificates awarded at the national level

One indirect indicator of technology effort relevant to export competitiveness is the number of ISO 9000 certificates awarded at the national level. While this relates to quality management rather than technical effort, and covers all activities and not only manufacturing, it is roughly in line with export performance. Table 18 shows the number of ISO 9000 certificates granted till end-2002 in Pakistan and comparators. Pakistan has enjoyed a significant rise in the number of awards, particularly since 1999, but still lags behind major competitors.

Finally, let us consider inflows of technology into Pakistan through licensing, as measured by payments overseas of royalties and technical fees. Figure 28 shows such payments on a per capita basis over time and Figure 29

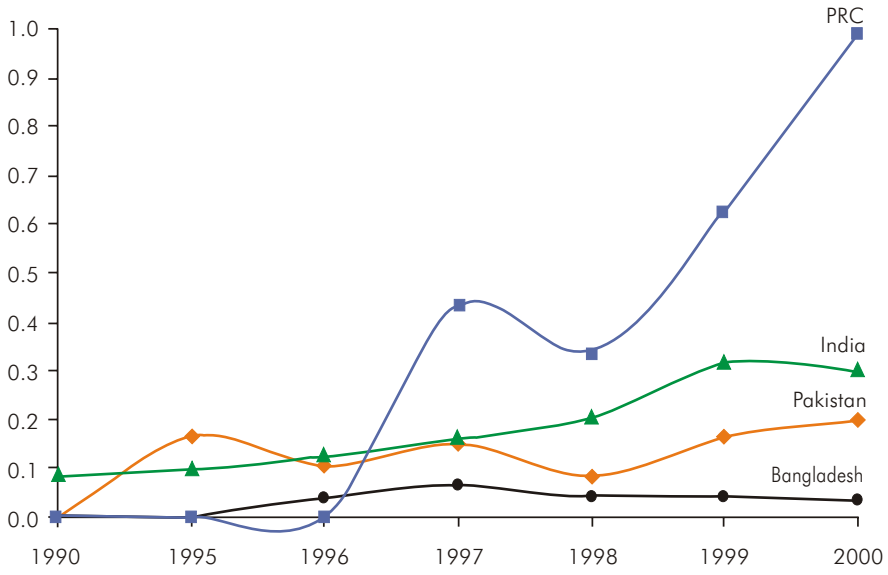
18. This is based on the (unpublished) findings of a Commonwealth Secretariat mission to Pakistan in 1998 to analyse export competitiveness. One of the present authors (Lall) led that mission. The situation may, of course, have improved significantly since that time.

Table 18: ISO 9000 Certificates: 1993 to end-2002

Countries	Jan. 1993	June 1994	Dec. 1995	Dec. 1996	Dec. 1997	Dec. 1998	Dec. 1999	Dec. 2000	Dec. 2001	Dec. 2002
Pakistan		1	7	22	56	145	194	611	539	795
Bangladesh				1	1	4	25	25	38	43
India	8	328	1023	1665	2865	3344	5200	5682	5554	8110
Sri Lanka	1	1	7	22	38	59	82	82	155	322
PRC	10	150	507	3406	5698	8245	15109	25657	57783	75755
Korea, Republic	27	226	619	892	5806	7729	11533	15424	17676	14520
Taipei,China	43	337	1354	1889	2608	3173	3807	4319	5405	3182
Singapore	243	662	1180	1808	2909	3000	3140	3900	3513	5379
Hong Kong	69	336	739	1312	1637	1940	2150	2570	3814	3868
Malaysia	122	258	690	1123	1610	1707	1921	2355	3195	3733
Indonesia	1	22	125	340	1273	1442	1525	1860	1395	1947
Philippines		13	102	155	629	668	723	1027	961	766
Thailand	3	24	143	182	1104	1236	1527	2553	3870	4556

Source: International Standards Organization website.

Figure 28: Royalty Payments Per Capita (US$)

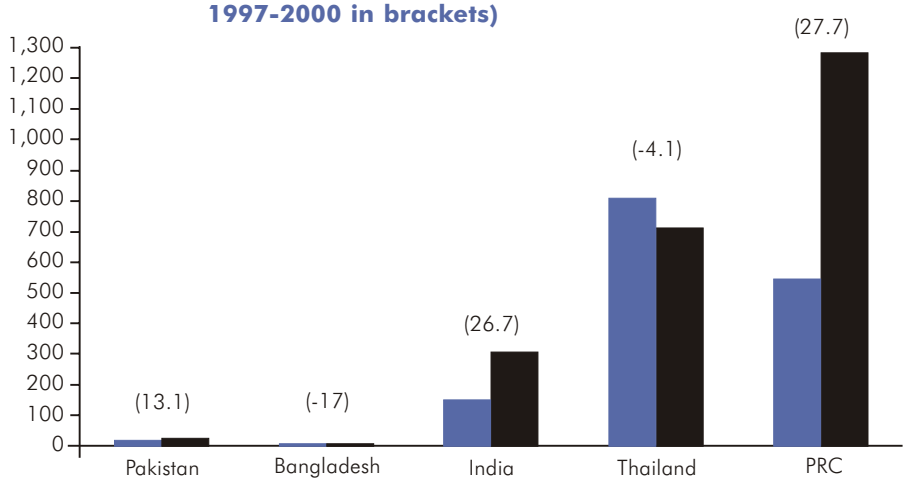


the dollar values of the payments and their rate of growth in the late 1990s. The comparators here are India, PRC and Bangladesh (plus Thailand for Figure 29).[19]

In Pakistan technology imports by this method have largely stagnated on a per capita basis, though there is an encouraging rise after 1997. India has a slow but steady rise, with a setback in 1999-2000. Bangladesh stagnates at a low level. By contrast, PRC enters the scene in a big way after

19. The source for royalty figures is UNIDO.

Figure 29: Royalty Payments (US$ million, annual growth rate 1997-2000 in brackets)



	Pakistan	Bangladesh	India	Thailand	PRC
1997	19.34	7.73	150.49	803.95	543.00
2000	28.00	4.42	305.85	709.87	1,280.97

1996 and raises its purchases of licensed technology rapidly thereafter. Since a large part of such payments is made by foreign affiliates to their parent companies, this reflects inflows of FDI.

7.4 In Sum

The picture of the main 'drivers' of competitiveness in Pakistan - human resources, technological effort, technology inflows and supporting institutions - seems clear and consistent, and it is far from encouraging. Pakistan has a weak base for building competitive capabilities, and it is not improving over time in response to growing international challenges.

Pakistan has a weak base for building competitive capabilities

Its long experience in textiles and clothing seems to have given it an adequate competitive base in these activities, but even here new niche markets need to be sought out to keep pace with international competition. The base of skills and capabilities in essentially low and stable technologies may not, in other words, allow Pakistan to diversify into the more dynamic and complex activities that are the new engines of export growth in the global economy. And the base may not be sufficient to attract foreign capital and technology into export-oriented activities in competition with many other low wage economies that are vying for similar investments.

The indicators used here are preliminary and need much more refinement. They are very general, sometimes out of date and based on secondary information. They cannot capture the intricacies of skill creation and technological effort 'on the ground' in Pakistani industry, and it may well be the case that in reality there is more of both than they suggest. However, to the extent that they indicate, even roughly, the underlying structure of capabilities relative to competitors, they are cause for serious concern.

8. Conclusions: The Need for a Competitiveness Strategy

Globalisation means a number of things:

- shortening of distance as transport and telcommunications costs fall
- accelerated technical change with emphasis on ICT-driven technology
- heightened fragmentation of production as global production networks emerge to replace unified production systems
- acceleration of international trade and investment and a tendency towards emergence of regional trading blocs
- greater emphasis on international rules for trade under the WTO.

None of these trends are completely new, but the last decade or so has seen their emergence to a greater degree than before. Competitiveness means the ability of enterprises to take advantage of the opportunities offered by these trends, and a competitiveness strategy is the response of national governments to this problem. Governments of most OECD countries, for example, have been debating issues of competitiveness and what they can do to support their firms for a number of years.

Competitiveness means the ability of enterprises to take advantage of the opportunities offered by global trends

In principle, intervention should have a clear economic rationale in support of externalities and correction of 'market failures', which are in effect real world conditions. It should have both macro and firm-level dimensions and involve a range of initiatives, from investment in education and R&D to maintenance of a favourable climate for investment, through to support for

firm-level technological upgrading.

A competitiveness policy needs to be informed by a 'strategic vision'

Most importantly, policy for competitiveness needs to be informed by a 'strategic vision'. This vision should reflect the interests of all stakeholders, including the private sector, government institutions, employers' organisations, trade unions and so on. There is a need for setting out a view of where it wants the economy to go, define short and long-term goals and start planning how to strengthen or create the capabilities to reach those goals.

Essential background to the development of such a long-term perspective is benchmarking of an economy's current competitive strengths and weaknesses. This involves evaluating industrial performance in domestic and export markets and the main drivers of performance: the macroeconomic and policy framework, human resources, technology, FDI, finance, physical infrastructure and supporting institutions.

Where possible, evaluation should use *quantitative* benchmarks against selected comparators within the region, in other developing regions that are likely to offer direct competition to Pakistan and in more advanced countries that serve as role models. However, many indicators cannot be quantified. Here the benchmarks have to be *qualitative:* comparison with best practice in the comparators. This is the procedure commonly used in competitiveness strategy analysis throughout the developed and newly-industrialised countries (Lall, 2001.b). Here we hope to have made a start in this benchmarking exercise by drawing on readily available international data. Naturally, informed qualitative judgements require a much more in depth knowledge of the local industrial sector than we possess.

After benchmarking comes the task of allocating resources at various levels. At the highest level, it has to be decided which generic areas - education, infrastructure, finance, science and technology and so on - have to be addressed. This needs a view of what the main engines of industrial competitiveness are going to be. At the sectoral and sub-sectoral levels, the government has to decide on which activities to support, not 'picking winners' in detail, but allowing winners to emerge in the sets of activities that hold most promise of long-term economic and technological growth.

Benchmarking an economy's current competitive strengths and weaknesses is essential to developing a long-term perspective

These activities have to be identified from clusters of inter-linked industrial activities that share strong technological externalities, use the existing base of skills and capabilities, can develop good backward linkages and face rising competition both locally and abroad. The best way to proceed is to examine closely the experience of countries that have similar endowments but have been successful in developing competitive bases. This is an art rather than a science and involves considerable benchmarking and policy analysis.

Most governments are not structured for designing and mounting effective industrial strategies. The responsibilities and functions that affect industrial competitiveness are scattered over an array of ministries and institutions: finance, trade, industry, labour, education, science and technology, and others. These often have different objectives and do not communicate with each other on a regular basis. There is a strong case for locating responsibility for competitiveness policy in a single high-level agency.

We note that there are already various initiatives in place in Pakistan concerning competitiveness and technological upgrading (Government of Pakistan 2003). Official statements have recognised clearly the need for amongst other things:

- export diversification
- development of clusters
- firm-level technological upgrading
- encouragement of export-oriented FDI.

The key issue therefore is how to go about achieving these important objectives. As we do not presume to know the effectiveness of current measures, we would simply make a few basic points.

An effective competitiveness strategy requires commitment in terms of public investment in technical and general education, as well as strengthening of public R&D activities

First, in the light of the international benchmarks noted above, adequate government support for a competitiveness strategy requires significant commitment in terms of public investment in relevant technical and general education, as well as strengthening of public R&D activities. Some of these problems will require long-run, not short-run, solutions.

Second, there are a number of weaknesses in the area of physical infrastructure, such as power. Besides infrastructure development, any further measures to improve the investment climate, whether reducing bureaucratic restrictions or ensuring continued macro stability, will also help in competitiveness terms.

Third, it is at the firm level that critical competitiveness problems need to be addressed, and here the role of government is to facilitate and support. The issue is whether current plans - such as measures to support technological upgrading and joint ventures with foreign investors through an Upgradation Fund - go far enough. In principle, support can take a range of forms, including the standard tax incentives for training and R&D expenditure, cost sharing for various consultancy services (as covered by the Upgradation Fund), a version of innovation consortia in which firms collaborate in information sharing and technology development, and provision of finance for technology support, particularly a form of venture

capital for relatively high risk initiatives or matching grants for innovative activities.[20]

Development of industrial strategies is not easy; if it were, all countries would have mounted effective strategies. The 'bottom line' of all strategies is, of course, how well they can be designed and implemented in practice. *Government capabilities* are therefore vital. The history of development policy is replete with cases of failed policies. The failure of some interventions does not, of course, mean that all interventions are undesirable as long as market failures exist. The experience of East Asia in developing highly competitive export-oriented industries shows what can be achieved. Wholesale reliance on free markets will be inefficient compared to a situation where policy can improve or create markets; the trick is to find ways to support and accelerate, rather than hinder, enterprise development.

20. Mathews (2001) discusses the collaboration between firms in Taipei,China in R&D consortia stimulated by government involvement. Lall (2001.a) discusses training initiatives by the government to support firms in Singapore.

Appendix

Appendix : Sophistication of Textile and Clothing Products at the 4-digit SITC (Rev 2) Level, 1990 and 2000

Sophistication Levels and Scores of Textile & Clothing Exports (SITC 4-digit, Revision 2)
Ranked by 2000 Scores

Product SITC	Product Name	1990		2000	
		Level	Score	Level	Score
6553	Knitted/crocheted fabrics elastic	1	77.23	1	100.00
2671	Regenerated fibres suitable for spinning	1	93.67	1	82.21
6546	Fabrics of glass fibre	1	94.56	1	79.91
6577	Wadding. Textile fabrics for use in m	1	97.22	1	79.48
6571	Felt & article of felt n.e.s	1	97.25	1	78.05
2672	Waste of man-made fibres, not carded	1	96.43	1	76.83
6572	Bonded fibre fabrics, similar bonded	1	100.00	1	75.25
6595	Carpets, rugs etc. of man-made textiles	1	91.62	1	74.89
6579	Special products of textile materials	1	95.08	1	74.37
6517	Yarn of regenerated fibres, not for	1	86.52	1	73.13
6574	Elastic fabrics and trimmings	3	55.96	1	73.02
6549	Fabrics, woven, n.e.s.	1	83.20	1	70.49
6532	Fabrics, woven contain.85% of discontinuous fibre	1	80.10	1	69.60
6518	Yarn of regenerated fibres, put up for (?)	4	43.69	1	68.77
2666	Continuous filament tow for the man	1	87.58	1	67.79
6560	Tulle, lace, embroidery, ribbons & others	2	76.97	1	67.61
6515	Yarn contain.85% by wgt. of synth. fibre	2	73.56	1	67.32
6514	Yarn contain.85% by wgt.of synth. fibre	1	85.44	1	66.62
2665	Synth. fibres not carded, combed	1	81.35	1	66.28
2634	Cotton, carded or combed	2	74.86	1	66.25
8465	Corsets, brassieres, suspenders	2	74.51	1	66.01
6519	Yarn of text. fibres, n.e.s.	1	78.53	1	65.94
6535	Fabrics woven of contin. regenerat.	1	86.65	1	65.63
6538	Fabrics ,woven of discontinuous regenerated	1	90.05	1	65.60
6596	Carpets ,rugs etc. of other textile m	2	76.87	1	65.12
2686	Waste of sheep's/lamb's wool or of	1	77.01	2	64.01
2651	Flax & ramie ,flax tow, ramie noils	2	71.93	2	63.97
6539	Pile & chenille fabrics, woven of ma	2	76.49	2	63.25
6591	Linoleum and similar floor covering	1	85.27	2	63.06
6573	Coated/impregnated textile fabrics	1	78.95	2	62.80
6512	Yarn of wool or animal hair	1	77.90	2	60.69
6552	Knitted/crocheted fabrics of fibres	2	72.17	2	60.46
6522	Cotton fabrics, woven, bleached, mercerised	2	71.70	2	60.28
2667	Synth. fibres, carded, combed or other	2	76.76	2	58.99
6542	Fabrics,woven,contain.85% of wool/f	1	82.56	2	56.93
6536	Fabrics, woven contain.85% of discon	2	74.91	2	56.58
2652	True hemp, raw or processed, not spun	1	86.12	2	55.97
8431	Coats and jackets of textile fabrics	2	65.58	2	54.81
6594	Carpets, carpeting, rugs, mats & matting	2	61.76	2	54.70
8434	Skirts, women's, of textile fabrics	2	67.40	2	54.01
6543	Fabrics, woven, of wool or of fine an	1	86.13	2	53.46
2631	Cotton (other than linters),not car	2	62.48	2	53.31
8483	Fur clothing, articles made of furs	3	57.15	2	52.71
6531	Fabrics, woven of continuous synthetic	2	63.31	2	52.60
6516	Yarn of discont. synth. fibres	2	65.16	2	52.17
8451	Jerseys, pull-overs, twinsets, cardigans	2	62.43	2	51.45
8423	Trousers, breeches etc. of textile fabrics	3	57.72	2	50.47
6582	Tarpaulins, sails, awnings, sunblinds	3	59.14	2	49.51
8439	Other outer garments of textile fabrics	2	60.75	2	49.31
2632	Cotton linters	2	66.58	2	48.97

Product SITC	Product Name	1990 Level	1990 Score	2000 Level	2000 Score
2633	Cotton waste	3	57.02	3	48.85
6589	Other made-up articles of textile m	3	59.67	3	48.64
8484	Headgear and fittings thereof n.e.s	3	59.85	3	48.00
8424	Jackets, blazers of textile fabrics	3	53.45	3	47.96
8422	Suits, men's, of textile fabrics	2	65.47	3	47.70
6575	Twine, cordage, ropes & cables & manu	3	54.59	3	47.66
8452	Dresses, skirts, suits etc. knitted	3	52.89	3	47.02
6544	Fabrics, woven of flax or of ramie	2	61.02	3	46.82
8433	Dresses,women's,of textile fabrics	3	56.10	3	46.50
8435	Blouses of textile fabrics	3	50.14	3	46.34
8421	Overcoats and other coats, men's	3	57.83	3	45.95
8461	Under garments, knitted or crocheted	4	34.27	3	45.86
8471	Clothing accessories of textile fabrics	2	62.17	3	45.29
6534	Fabrics, woven, of discontinuous synt	3	56.93	3	45.23
2682	Sheep's or lambs' wool ,degreased	2	64.08	3	45.10
8482	Art. of apparel & clothing accessories	3	50.45	3	44.92
2685	Horsehair & other coarse animal hair	3	52.38	3	43.97
8462	Under garments, knitted of cotton	3	46.76	3	43.70
6551	Knitted/croch. fab. not elast. nor rub	4	32.70	3	42.22
8463	Under garments, knitted, of synthetic	3	49.85	3	41.77
8472	Clothing accessories, knitted or crocheted	3	53.85	3	41.42
8432	Suits & costumes,women's,of textile fabrics	3	53.19	3	41.36
8441	Shirts,men's,of textile fabrics	4	43.21	3	41.05
6576	Hat shapes,hat-forms,hat bodies and	3	50.08	3	40.75
2681	Sheep's or lambs' wool, greasy	2	72.65	3	39.38
6583	Travelling rugs and blankets,not kn	3	48.77	4	38.66
2687	Sheep's/lamb's wool/other animal hair	4	40.94	4	38.03
2683	Fine animal hair, not carded or combed	3	44.55	4	37.27
8459	Other outer garments & clothing,knitted	4	40.62	4	36.75
6593	Kelem, schumacks and karamanie rugs	4	40.73	4	34.63
8443	Under garments, women's, of textile fabrics	4	33.08	4	34.57
8429	Other outer garments of textile fabrics	3	44.97	4	34.44
6511	Silk yarn & yarn spun from noil/other	4	41.91	4	34.43
8442	Under garments, excl. shirts, of textiles	4	35.26	4	32.43
6584	Bed linen, table linen, toilet & kitchen fabrics	4	37.59	4	31.89
6541	Fabrics, woven, of silk, of noil	3	44.52	4	31.11
6521	Cotton fabrics, woven, unbleached	4	36.02	4	30.32
6513	Cotton yarn	4	36.32	4	28.82
8481	Art. of apparel & clothing accessories	4	34.31	4	27.89
6597	Plaits and similar products of plai	4	28.67	4	27.13
6581	Sacks and bags, of textile materials	4	27.83	4	24.52
6592	Carpets, carpeting and rugs, knotted	4	26.35	4	20.64
8464	Under garments, knitted of other fibres	4	12.76	4	17.97
2614	Silk worm cocoons suitable for reeling	4	20.37	4	15.26
2659	Vegetable textile fibres, n.e.s. and	4	13.52	4	11.67
2654	Sisal & other fibres of agave family	4	10.30	4	7.19
2613	Raw silk (not thrown)	4	7.73	4	5.30
6545	Fabrics, woven, of jute or of other t	4	5.84	4	4.96
2640	Jute & other textile bast fibres n.e.s.	4	2.64	4	2.25
2655	Manila hemp, raw or processed	4	0.00	4	0.00

Note: The four levels of sophistication are composed of 25 products each according to sophistication scores in each year.
Source: Calculated from UN Comtrade.

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It is widely accepted that globalisation carries both immense economic opportunities and potential threats for developing countries such as Pakistan. The extent to which countries will benefit from globalisation depends, ultimately, on the international competitiveness of the private sector.

From a policymaking-perspective, it must be kept in mind that it is firms that compete and not nations. Thus, the government's role in promoting competitiveness should be secondary to that of the private sector. However, due to the intrinsic failure of markets in critical areas, government support for firms has in some contexts proved to be an important component of the process of attaining competitiveness.

This study examines the international competitiveness of Pakistan's industrial sector by 'benchmarking' various indicators of national capability and performance against competitors and by highlighting key lessons from the experience of successful Asian economies. In particular, Pakistan's textile and clothing sector, investment climate, labour force and technological capacity are examined. Based on the analysis, the paper concludes with a discussion of the economic policy options available to Pakistan.

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