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Turkish Performance in Exporting Manufactures:

A Comparative Structural Analysis

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This paper considers the prospects for Turkish manufactured exports, now dominated by simple labour-intensive products. The importance to Turkey of diversifying its export base has risen with its EU free trade agreement, where it has advantages in labour-intensive exports but where special preferences will vanish soon. As a high wage economy, Turkey has to compete with low-wage countries in simple, low technology products. As a technologically lagging economy, it has to compete against high technology European firms. Both are difficult, as there remain important structural deficiencies in Turkish competitiveness. Strategic implications are drawn in the conclusions.

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1. Introduction

The importance to Turkey of expanding and diversifying its export base, particularly in manufactured products, has risen with its free trade agreement with the European Union. It will rise even further as the EU relaxes many remaining trade barriers with the rest of the world (particularly Asian countries) in the next few years. Turkey has enjoyed a major advantage against export-oriented countries in the developing world from its quota and tariff free access for its labour-intensive exports to the European market. If Europe removes import quotas on textile and clothing (with the demise of the Multi-Fibre Agreement by 2004) and liberalises on products like automobiles and steel, Turkey will face a sharp increase in competitive pressures. As a relatively high wage economy, it confronts difficult problems of competing with low-wage countries in simple, low technology products. As a technologically lagging economy, it will find it difficult to compete against high technology European firms in the most sophisticated segments of manufacturing. In intermediate segments, it may find it difficult to compete with advanced Asian NIEs, particularly where these countries have developed substantial domestic capabilities, achieved scale economies or integrated themselves as global suppliers within multinational networks.

This paper considers the position and prospects of Turkish manufactured exports by analysing its technological structure. Section 2 provides the analytical background on the role of technology in trade patterns of developing countries, and for considering the technological structure of exports. Section 3 describes recent technological trends in world trade. Section 4 compares Turkey’s performance with the NIEs that are likely to be its fiercest competitors in the near future. Section 5 discusses some structural determinants of technological upgrading. Section 6 draws the conclusions.

2. Analytical background: technology, trade and export structure

Theory does not give a significant role to technology in determining comparative advantage in developing countries: some theories ignore this role altogether, while others consider it important only for developed countries. Developed countries innovate and create the technological advantages; developing countries merely import and (passively) use the technologies suited to their factor endowments. The critical premise is that existing technologies move across countries and enterprises without cost, risk, effort or externalities, making the use of technologies an easy and economically trivial, process. Thus, technology plays no role in either determining their comparative advantage or differentiating their trade patterns (since they all have equal access to technology). Developing countries emerge as a homogenous and passive group of users of foreign technologies, with their comparative advantages determined by factor endowments.

In Heckscher-Ohlin (H-O) theories, technology does not appear at all. Production functions are identical across countries; all technology is fully diffused across firms and countries. Firms automatically select the right techniques based on relative capital-labour prices. Once they have made the choice (labour-intensive techniques for developing countries), they use the technologies efficiently without lags, learning or effort. Since users automatically reach best practice levels, there can be technical inefficiency only if governments intervene to distort factor prices or prevent free trade.

Neo H-O theories, incorporating skills as a factor of production, continue to assume efficient markets for technology and its costless and efficient application. The advantage of developing countries lies in products with low-skill and labour-intensive technologies; in using these, once more, there are no technological lags or costs. A new version (Wood, 1997) assumes that capital is fully mobile and reduces the determinants of comparative advantage to two immobile factors, skills and natural resources. Comparative advantage now depends on the ratio of skills to resources: technology remains a permissive, and so irrelevant, factor.

In technology-based trade theories, comparative advantage depends upon ‘innovation’ – discrete improvements to products or processes (shifts of the production function). The use of and changes to existing technologies (reaching or moving along the production function) remain costless. Innovators are primarily in industrial countries; developing countries receive mature technologies from them and use them efficiently. As in H-O models, their comparative advantage depends on relative wages and skills. Since these theories explicitly introduce technology transfer, countries can realise or dynamise their advantages by facilitating technology inflows, by opening their economies to trade, licensing and (particularly) foreign direct investment.

Strategic or ‘new’ trade theories, based explicitly on imperfect markets, also concentrate on advanced countries. Abstracting from factor endowments, they use scale and (later) agglomeration economies to explain trade patterns (Krugman, 1986 and 1991). Its main scope is intra-industry trade between industrial countries; in developing countries, trade remains mainly inter-industry, explained by H-O factor endowments. Interestingly, 'learning' appears in some models as an explanatory variable, but it is really a form of scale economies over time: passive, automatic and predictable learning-by-doing, dependent only on the volume of production. It raises no policy issues apart from gaining first mover advantages. Some analysts also note the existence of cumulative causation, externalities and path dependence as determinants of location and competitiveness (Venables, 1996). However, this applies primarily to agglomeration processes, not to technological learning in developing countries. We should note, nevertheless, that this category of trade models has great potential for the realistic analysis of technology and trade patterns in developing countries (below).

However, another branch of analysis, the 'technological capability' approach, takes a different tack (for a review see Lall, 1999.a). This approach looks at micro-level learning in developing countries in the evolutionary tradition of Nelson and Winter (1982), and argues that technological effort can be a vital determinant of competitive advantage. Firms operate with imperfect knowledge of technological alternatives and take time to master new technologies (even if these are known to other firms). Thus, new technologies cannot be simply imported and deployed at 'best practice' levels by developing countries. Finding technologies is a difficult process. More important, once a technology is imported, there is a complex process involved in learning to use it efficiently. The process is often costly, prolonged, risky and unpredictable. It can involve externalities and coordination problems, and face failures in information, capital, skill and other markets. The failures are particularly large in markets for skills and technology, prone to widespread information deficiencies, uncertainty and externalities.

The learning process is highly differentiated by technology. Some technologies are more difficult to master than others because the learning process is longer and more uncertain, involving greater effort and more externalities and coordination problems. More difficult technologies also tend to offer greater potential for further learning and have greater scope for the application of new knowledge. As countries grow, comparative advantage has to shift from simpler to more complex technologies and from simpler to more difficult functions within given technologies. Otherwise, competitiveness would erode with rising wages and exports would stagnate.

In this approach, comparative advantage patterns can vary significantly between developing countries with similar 'endowments' in the conventional sense. These patterns, and their evolution over time, depend on how effectively firms in each country access and master new technologies, and cope with increasingly difficult learning over time. Traditional determinants of comparative advantage are relevant – but through their effects on learning. For instance, H-O relative factor costs do affect trade patterns, but only when the technologies concerned are evenly spread over the trading partners. In developing countries, this is mainly true of technologies with low scale economies, simple skills, short learning periods, limited externalities and undifferentiated products. Since these also tend to be labour-intensive technologies, H-O seems to 'explain' a substantial part of trade. However, a major element of the explanation lies in the nature of the technology and the ease with which new entrants can use it. Moreover, the capability approach suggests that there may be large differences between countries in competence, dynamism and depth even in these technologies – the H-O approach cannot draw such distinctions. The data show that there are in fact significant variations in performance between labour-abundant countries in exporting simple manufactures, which are explicable only by different national learning abilities.

Similarly, neo-HO theories are right in pointing to the importance of human resources are in complex technologies. Skill availability, however, is a *necessary but not sufficient condition* for efficiently using such technologies. Where mastering them involves costly, uncertain and externality-prone learning, establishing an advantage requires that human resources be combined with (and enhanced by) purposive technological effort. The degree of effort rises the more advanced the technology and the more technology-specific the learning required. Countries with similar skill endowments can thus vary in their export patterns, depending on learning abilities and trajectories. Neo-technology theories also confuse necessary with sufficient conditions. Access to foreign technologies or FDI is necessary to provide the initial input into learning. It does not *per se* ensure that all labour-abundant countries attract similar forms of FDI and build upon it with equal efficiency.

It is thus possible for countries with similar 'endowments' and openness to technology flows to have different levels of competence in similar technologies and develop different patterns of competence between easy and difficult technologies over time. One of the main deficiencies of received trade theories is their inability to account for such differences. Random firm level factors apart, they can be explained by differences national learning abilities.

What determines 'national learning abilities'? A number of factors interact to determine what and how well enterprises learn: macroeconomic conditions, trade and competition policies, factor markets and institutions (Lall, 1996). In the presence of widespread failures in most markets, the evolution of learning in developing countries depends on how these failures are remedied. Thus, government policies on learning become basic determinants of comparative advantage. Government interventions are not, as in much of neoclassical theory, necessarily distorting – on the contrary, policies to remedy market failures are legitimate factors deciding comparative advantage. The case is identical to that on the role of government in industrialisation more broadly (Stiglitz, 1996). There is a valid case for policies to coordinate, guide and subsidise learning, and to develop such factors as skills and technology where externalities and information failures are particularly pervasive.

To simplify, successful strategies to promote learning and dynamic comparative advantage fall under two broad headings. First, strategies to accelerate and guide learning by *domestic firms*, by promoting infant industries, coordinating investments in related activities, overcoming externalities, directing credit, and developing specific skills and institutions. Second, strategies to rely on *foreign direct investment* to lead export growth and upgrading. Both entail strong incentives to export and extensive use of foreign technologies but they differ in the agents of technological learning. Korea and Taiwan are examples of the national-led strategy, Singapore and Malaysia of the FDI-led strategy. Many countries have a mixture of both elements. With the march of liberalisation and globalisation, there is a general tendency in the developing world to move towards the FDI-led strategy in complex, technology-intensive exports.

This is understandable: MNCs have several advantages over local firms in coping with using new technologies (‘new’, that is, to a particular location) and exporting the output. They have mastered and used the technologies elsewhere (they may have created the technology in the first place). They have large internal reserves of skill, technical support and finance to implement the learning process. Their advantages in exporting include access to major markets, established marketing channels and well-known brand names. They can transfer particular components or processes from a production chain to a developing country and integrate it into an international system. This is much more difficult for a local firm, not just because it may not have the technological competence – it faces higher transaction and coordination costs in integrating into a different corporate system.

While the FDI-led strategy has advantages, and is easier in that MNCs bring in the missing factors needed for competitiveness, simply opening up to FDI is not a complete answer. It does not absolve the government from helping develop local capabilities. MNCs transfer the technologies suited to existing capabilities in host economies. Where skills, supplier capabilities and technical knowledge are low, they import simple labour-intensive technologies and create the capabilities to use these efficiently. They do not invest in creating more advanced capabilities that need more sophisticated skills, or transfer advanced functions that are efficiently centralised elsewhere. Only the government can upgrade the skill creation system or boost supplier capabilities. If they do not, MNC export activity can remain technologically stagnant at low levels. Moreover, there are market failures in the FDI process itself. Effective promotion and targeting of investors can allow a country to attract higher quality FDI, and so a more dynamic export structure, than a passive *laissez faire* policy.[2]

More important, a national-led strategy can create broader, deeper and more flexible capabilities than an FDI-dependent strategy, given the technologies used. The learning process within foreign affiliates may remain curtailed and shallow compared to that in local firms. The very fact that an affiliate can draw upon its parent company for technical information, skills, technological advances and so on means that it needs to invest less in its own capabilities. This applies particularly to such functions as advanced engineering or design, which MNCs tend to centralise in industrial countries. As they grow and mature, developing countries can undertake these functions efficiently; indeed, it is imperative that they do so to support their comparative advantage.

To return to *export structure*, different analytical approaches yield different interpretations of its significance. In approaches that ignore learning, export structure does not matter – it is only the result of efficient choices. As endowments and factor prices change, the structure evolves in response without cost, effort or risk – a movement along a given production function. As countries grow and accumulate capital or skills, they switch to more capital- or skill-intensive technologies. Any new activity is equally feasible, and in the absence of dynamic learning and externalities, all structures are equally desirable. All export structures are completely flexible, and equivalent in their welfare and growth implications. In other words, they do not matter economically. The capability approach suggests, by contrast, that structures do matter for export growth and evolution (Lall, forthcoming). Evolutionary and path dependent processes mean that export structures are inflexible and difficult to change. Whatever the strategy adopted, structural change involves the development of capabilities, which can be expensive and slow; however, some structures have greater inherent dynamism.

[2] For a fascinating study of how Costa Rica used targeted promotion to attract Intel's first major semiconductor plant in Latin

There are reasons to believe that export structures dominated by technology intensive products have better growth prospects than do others.[3]

- Activities with the rapid product or process innovation generally enjoy faster growing demand *vis à vis* technologically stagnant activities.[4] The most dynamic products in world trade use complex and fast-moving technologies (below).

- Technology-intensive activities are less vulnerable to entry by competitors compared to low technology activities where scale, skill and technology requirements are low. A low-technology export structure is a good starting point for a labour-surplus economy, but over time, it can sustain export growth only by taking shares from other low technology exporters. In relatively slow-growing final markets, this is possible but difficult. It needs considerable technical effort, high levels of skill and, increasingly, entry into differentiated segments of the market.

- *Ceteris paribus*, technology-intensive activities lead to faster *growth* in capabilities and higher *quality* capabilities. They offer higher learning potential and greater opportunity for the continued application of science to technology. This can also apply to simple activities: assembly of electronic components is more valuable for learning than assembly of garments.

- Capabilities in technology-intensive activities are more attuned to technological and market trends, and so are more *flexible* and *responsive* to changing competitive conditions.

- A technology-intensive structure is likely to have larger *spillover* benefits to other activities and to the national technology system (Guerrieri and Milana, 1998).

There are qualifications to these propositions, taken up below. Let us first consider how world exports are evolving.

America see Spar (1998).

[3] For theoretical analyses see Redding, 1999, Rodrik, 1996, and Young, 1991. These remain partial in their approach, taking into account only the possibility of applying innovation or interacting with vertically linked activities.

[4] Evidence on the faster growth of technology intensive industries and exports in 68 economies is provided in NSF (1998). “The global market for high-tech goods is growing at a faster rate than that for other manufactured goods, and economic activity in high-tech industries is driving national economic growth around the world. Over the 15-year period examined (1980-95), high-tech production grew at an inflation-adjusted annual average rate of nearly 6 per cent compared with a rate of 2.4 per cent for other manufactured goods… Output by the four high-tech industries – those identified as being the most research-intensive – represented 7.6 per cent of global production of all manufactured goods in 1980; by 1995, this output represented 21 per cent.” (Chapter 6)

3. Technological Patterns in Exports

3.1 Classification of Technologies

This section provides a technological classification of manufactured export structures and shows how different categories have evolved in world trade. There are many ways to categorise manufactures by technology. The simplest and most commonly used it to distinguish between broad groups of 'high' and 'low' technology activities based on their R&D intensity. While relatively easy to understand and apply, this measure is highly aggregated; finer differences are useful. An alternative measure, proposed among others by the OECD (1987), is to distinguish between resource-based, labour-intensive, scale-intensive, differentiated and science-based manufactures. This is more difficult since the analytical distinctions are not very clear and there are overlaps between categories. The scheme here combines and extends both the above categorisations:

- *Resource-based* (RB): mainly processed foods and tobacco, simple wood products, refined petroleum products, dyes, leather (not leather products), precious stones and organic chemicals.
- *Low technology* (LT): such as textiles, garments, footwear, other leather products, toys, simple metal and plastic products, furniture and glassware.
- *Medium technology* (MT): mainly automotive products, most industrial chemicals, standard industrial machinery, and simple electrical and electronic products.
- *High technology* (HT): fine chemicals and pharmaceuticals, complex electrical and electronic machinery, aircraft and precision instruments.

In *technological terms*, RB products span a wide range. They may 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). Since competitive advantages in these products arises generally from the local availability of natural resources, they do not raise important issues for competitiveness and are not considered in detail below.

LT products tend to have stable, well-diffused technologies mainly embodied in capital equipment, low R&D expenditures and skill requirements, and low scale economies. Labour costs tend to be a major element of cost and the products tend to be undifferentiated. Barriers to entry are relatively low and competitive advantages tend to be based on price rather than quality or brand names. There are, however, segments here with high skill/technology demands and differentiated products (e.g. fashion clothing), or with where capital-intensive technologies (textiles); the cost of 'raw' labour is not an important competitive advantage here, though technical innovation remains low.

MT products generally have complex, if not fast-changing, technologies. They have moderate levels of R&D expenditure and tend to call for advanced engineering skills and large scales of production. In engineering products in this group, there is a strong need for 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.

HT products, with advanced and fast-changing technologies and the complex skill needs, have the highest entry barriers. The most innovative technologies, calling for large R&D investment, can also require an advanced technology infrastructure and close interactions between firms, and between firms and research institutions. However, many HT activities also have simple, mature products or processes that use simple technologies, where low wages are an important competitive factor.

Received trade theory predicts that developing countries will have the strongest comparative advantages in LT and the weakest in HT products. It does not give any reason to distinguish between developing countries, though semi-industrial countries like Turkey and other NIEs should occupy (similar) intermediate positions between the least developed and industrial countries.

3.2 World Trade Patterns

Table 1 shows the distribution of world manufactured trade by these categories and their rates of growth since 1980 (for further analysis, see Lall, 1998). The data reveal a tendency for manufactured trade to *shift from simple to more complex technologies*. Rates of growth for 1980-96 are lowest for resource-based exports (5.7%), and rise progressively until they reach 11.6% for high technology products. From being the smallest category in world manufactured exports 1980, HT surpasses RB by 1985 and LT by 1996. In the crisis year 1995-96, when world trade slowed sharply (and precipitated the Thai crisis), HT and MT products kept growing while the other categories declined. The bulk of trade remains in MT products, but these also lose market share to HT over the period. Under present trends, HT products will soon be larger than MT.

Table 1: Evolution of World Manufactured Exports by Technological Categories

	Shares (%)				
	1980	1985	1990	1995	1996
Resource based	19.5	19.3	15.5	14.0	13.7
Low tech	25.3	23.4	23.7	22.0	21.3
Medium tech	38.6	37.3	38.5	36.9	37.2
High tech	16.5	20.1	22.2	27.1	27.7
	Rates of Growth (% p.a.)				
	1980-85	1985-90	1990-95	1995-96	1980-96
Resource based	2.0	10.1	6.4	-0.2	5.7
Low tech	0.7	15.3	6.9	-0.9	6.9
Medium tech	1.6	15.7	7.7	3.0	7.8
High tech	6.3	17.4	13.0	4.5	11.6
Total	2.3	15.0	8.6	2.1	8.1

Source: Calculated from UN Comtrade data.

The data support the argument that a technology-based export structure is more conducive to growth than others. If export structures are inflexible, dynamic export growth requires that countries shift towards a structure that has a growing proportion of high-tech exports. There are, however, some important caveats.

- The generalisations apply only to countries with large industrial structures, in the developing world mainly to the *newly industrialising countries*.

- The generalisations on export growth potential do not apply across entire technological categories – some low-technology products can enjoy rapid demand growth or have fast technical progress, while some high-technology ones can be stagnant. This *aggregation problem* can be taken care of by a highly disaggregated classification (see Abbott *et al.*(1989) on the USA). However, this is extremely demanding of data; we cannot calculate this for a cross-section of developing countries.

- Even if products are correctly classified technologically, the same product can have processes with different technological characteristics in different locations. For instance, semiconductor exports can involve complex processes of design and fabrication in one country and simple assembly and packaging in another. Much of the 'high-technology' exports of developing countries is in fact based on relatively simple, labour-intensive assembly of complex components made in advanced countries (Lall, 1998, Yeats, 1998). Ideally, the classification should be based on *process* rather than product, but this is not possible without detailed knowledge of local versus import content, technological inputs and production processes in each country.

- The argument is couched in terms of the technology-intensity of broad manufacturing *activities*. While necessary for analysing trade data, this can be too general — the argument can apply to technology-intensity *within* activities as well as across them, and export prospects can improve by technology upgrading within each group. Italy has done well by moving into the high quality end of clothing or footwear, where it is less vulnerable and can afford high wages. However, given the trade data available, it is not possible to analyse technology upgrading at the detailed product level. In any case, reaching the highest quality levels may be more difficult in low-technology products than it is in technology-intensive products. No developing country has been able to ‘do an Italy’ in the fashion industry: the combination of skills, design tradition, collaboration, support services, technological effort and equipment manufacture that form the Italian fashion system are extremely difficult to reproduce.

- The case for technology intensity overlooks the fact that growth in some products is based upon the *relocation of production* from high to low wage countries, not a rapid rise in final demand or innovation. This is the case with clothing, footwear and toys. Exports here have been propelled by a restructuring of production, aided by falling transport costs, liberalising policy regimes, and market access into major markets (as for Turkey in the EU). A significant part of the relocation has been influenced by market allocation under quota systems such as the Multi-Fibre Agreement for textiles and garments. Again, this does not offset the case for technological diversification and upgrading. Low technology exports can enjoy high growth during relocation, but the process will slow as restructuring matures and technological and market growth reassert themselves.

Table 2 shows the rates of growth of exports for developed and developing countries (we count Turkey, Mexico and the four Asian Tigers as developing countries). Developing countries have higher growth rates in each category, their lead over industrial countries increasing with technological complexity (from 2.2 percentage points for RB to 11.3 points for HT). This is not what we would expect given their traditional resource endowments or patterns of technological effort – they are poorly endowed in skills and technology. Their highest share is in LT, but in HT the share is only slightly lower, and growing much faster. The developed world’s smallest loss is in RB, the largest in HT. In MT, which is now its main competitive strength, it still holds 90% of world markets.

The main reason why developing countries have advanced further in high as compared to medium technology exports is technological. MT products tend to be technologically demanding, scale, skill and linkage-intensive products (automobiles, machinery or chemicals). Reaching world levels of competence here requires long learning periods; engineering products also need strong local supplier and subcontractor bases (increasingly so with just-in-time production systems). Many products are ‘heavy’, with high weight-to-value ratios, and so are uneconomical to place in distant low-wage areas. All these make it difficult to relocate many MT activities to typical developing countries; only a few NIEs have the technological or industrial base to meet the needs of efficient production. By contrast, in HT activities, especially electronics, while core production processes and product design are complex, final assembly is often low-skill and labour-intensive. This accounts for the rapid growth of HT exports from the developing world. The competitive edge of industrial countries in innovation and high skills has not eroded; the real erosion is in labour-intensive, ‘separable’ processes across the manufacturing spectrum.

Table 2: Growth Rates and Shares of Manufactured Exports by Technological Categories, 1980-96 (%)

	Growth Rates (% p.a.)				Developing Country Shares (%)		
	World	Industrialized Countries	Developing Countries	Developing less Industrialized	1980	1996	Change in share
Total	8.1	6.6	14.0	7.4	9.8	23.0	13.3
RB	5.7	5.2	7.4	2.2	17.9	23.1	5.2
LT	6.9	5.9	12.6	6.7	15.0	34.4	19.4
MT	7.8	7.2	17.4	10.2	3.0	11.5	8.6
HT	11.6	9.8	21.1	11.3	8.1	29.8	21.7

Source: As previous table.

However, relocation does not explain *all* complex exports from developing countries. An important, and increasing, part of their HT (and MT) exports relies on the deepening of local capabilities, with significant domestic inputs of intermediates, capital goods, design and research. In some cases, this applies to new export-oriented activities (as in Korea and Taiwan), in others to import-substituting industries that have upgraded in response to trade liberalisation (as in the automobile industry in Latin America). In all cases, however, it involves local learning; and learning complex technologies tends to be more demanding of skills, duration, costs, technical effort and inter-firm and inter-industry linkages than that in LT. Thus, a number of developing countries are clearly building up

4. Comparing Turkey's Export Performance

Let us now consider Turkish export performance and structures in comparison with the main industrialising countries. Table 3 shows the values and growth rates of manufactured exports for 13 leading developing countries.[5] The largest exporter is China, with $130 billion of manufactured exports in 1996, followed by Korea and Taiwan with about $110 billion each (Singapore's own manufactured exports, as opposed to re-exports, are $69 billion, less than those of Mexico). The smallest is Argentina; Turkey is next with $19 billion. The fastest growing exporters over the 1985-96 period are Thailand, Mexico, Malaysia and Indonesia, each with over 20 per cent annual growth. The slowest growing are Hong Kong, Brazil and Argentina, followed by Turkey. Note that these few countries account for nearly 95% of the developing world's total manufactured exports in 1996. The analysis of export patterns from developing countries thus finally devolves to explaining what drives exports from these few NIEs.

[5] According to national data, Philippines is also now a major exporter, with manufactured exports in 1996 of $17 billion, larger than Argentina's and growing at an average rate of 21 per cent per annum since 1990 (Lall, 1999.b). The engine behind its growth is MNC-based electronics exports (dominated by semiconductors); this has enabled it to sustain rapid export growth during, unlike its Asian neighbours. However, the UN database does not classify Philippine manufactured exports correctly, allocating a very large proportion to 'other transactions', and we could not include it in the group of large exporters here.

Table 3: Manufactured Exports by Leading Developing Countries

	VALUES (US$ m.)					GROWTH RATES (% p.a.)				
Country	**1980**	**1985**	**1990**	**1995**	**1996**	**1980-85**	**1985-90**	**1990-95**	**1995-96**	**1985-96**
Turkey (a)	1,906	5,860	9,998	18,265	19,274	32.4	11.3	12.8	5.5	11.4
Hong Kong	12,750	15,478	26,929	27,605	25,211	4.0	11.7	0.5	-8.7	4.5
Singapore (b)	14,328	18,492	48,062	107,768	114,528	5.2	21.0	17.5	6.3	18.0
Korea	14,890	23,317	57,920	111,236	111,155	9.4	20.0	13.9	-0.1	15.3
Taiwan	18,214	28,295	62,211	103,987	108,514	9.2	17.1	10.8	4.4	13.0
Indonesia	3,827	3,572	11,091	25,906	28,639	-1.4	25.4	18.5	10.5	20.8
Malaysia	5,949	8,317	20,660	63,439	67,140	6.9	20.0	25.2	5.8	20.9
Thailand	2,572	3,794	16,563	43,697	42,995	8.1	34.3	21.4	-1.6	24.7
China (c)	N/A	13,380	46,513	127,633	130,266	N/A	23.1	22.4	2.1	20.9
India	4,265	5,409	12,477	22,803	23,396	4.9	18.2	12.8	2.6	14.2
Argentina	3,113	3,501	6,342	10,962	11,098	2.4	12.6	11.6	1.2	11.1
Brazil (a)	10,556	14,599	19,036	27,935	28,556	8.4	5.5	8.0	2.2	6.3
Mexico (a)	5849.5	8432.4	13533	64689.5	77,280	9.6	9.9	36.7	19.5	22.3
Total	98,216	152,448	351,333	755,922	788,050	13.3	18.2	16.6	4.2	16.1
All LDCs	102,347	188,203	408,684	826,079	835,081	13.0	16.8	15.1	1.1	14.5
Total % LDCs	96.0%	81.0%	86.0%	91.5%	94.4%					

Source: Calculated from UN Comtrade data.
Notes: (a) 1980 figures are for 1981; growth rates for 1980-85 are thus over the four years 1981-85.
(b)Singapore's figure (unlike Hong Kong) includes re-exports, and involves some double counting. However, re-exports are not large enough to alter the broad country distribution shown. Singapore's own exports (60% of its total) are $69 billion in 1996. Re-exports also do not significantly affect Singapore's growth rates, since their share of the total has changed little over time (data from Singapore government Website).
(c) 1985 figure is for 1984; growth rate for 1985-90 is for 1984-90.

Table 4: Structure of Manufactured Exports by Leading Developing Countries (%)

	1985				1996			
	RB	**LT**	**MT**	**HT**	**RB**	**LT**	**MT**	**HT**
Turkey	22.0	62.3	13.4	2.3	17.5	63.9	12.8	5.7
Hong Kong	2.1	64.3	14.2	19.3	4.4	52.7	14.0	28.9
Singapore	42.3	10.8	14.6	32.3	12.7	7.9	14.0	65.4
Korea	7.8	59.9	12.2	20.1	9.4	28.4	26.6	35.7
Taiwan	8.7	57.3	13.3	20.7	5.1	33.9	20.2	40.9
Indonesia	72.2	19.2	5.9	2.8	34.9	41.9	8.5	14.7
Malaysia	53.7	9.7	5.5	31.0	17.8	13.1	8.7	60.4
Thailand	42.1	38.2	6.6	13.1	14.5	35.6	13.5	36.3
China	11.7	57.1	21.8	9.4	9.8	56.3	13.4	20.6
India	40.3	46.1	10.6	3.0	31.1	52.3	13.1	4.4
Argentina	67.5	15.6	11.8	5.1	49.1	18.8	28.8	3.3
Brazil	32.6	33.3	27.1	7.1	25.6	31.8	34.0	8.6
Mexico	20.2	15.0	29.2	35.6	7.1	20.9	35.2	36.9

Note: China's export structure for 1985 is based on 1990 figures.

While Turkish export performance is impressive on its own, it pales in comparison to that of other NIEs. Turkish growth rates were particularly high in the early 1980s, but slowed thereafter. In 1995-96, when world trade growth fell dramatically, the growth of Turkish exports also slowed down but they did better than many other countries in the group.

Table 4 shows the technological structure of exports. Turkey has the *weakest structure* of the group except for India. Nearly 64% of Turkish manufactured exports are accounted for by LT, and another 18% by RB, products. MT and HT products together only contribute 19% of its exports. At the other end, Singapore and Malaysia have nearly 80% from MT and HT products. Even China, with its booming labour-intensive LT exports, has a much higher proportion of high and medium technology products. The larger Asian Tigers with more depth and diversification in their industrial structures, Korea and Taiwan, have just over 60% of their exports from the MT and HT categories. Of the NIEs, these two countries have the largest share of complex exports coming from domestic firms, with the highest ratio of local physical and technological content. Most others, with the exception of India, have medium and high technology exports emanating from MNCs.

The Turkish export structure is not just technologically weak – it is stagnant. The combined share of MT and HT products has risen by less than 3 percentage points over 1985-96, a small rise in the share of HT largely offset by a decline in that of MT products. The extent and pace of structural change in other exporters, particularly the dynamic East and Southeast Asian economies and Mexico, is far more impressive. In view of the rapid changes in the structure of world trade and the growing importance of technology-intensive products, this structural stagnation is a major weakness. Table 5 gives the values and growth rates of each category of exports for these countries.

Over the 1985-96 period as a whole, Turkey has its highest growth rates in HT exports, but this reflects mainly its small starting base. In absolute terms, its high-tech exports in 1996 are a small fraction (1-2%) of those from Singapore, Malaysia, Korea and Taiwan, and only about 4% of China’s. Otherwise, the highest overall growth comes from LT products followed by MT products. Interestingly, in the 1990s, the latter group grows far more rapidly than the former, but the values of medium technology products are still only one-fifth of low technology products. There may be a sustainable structural shift under way but it still has a considerable way to go before it affects the overall pattern.

The figures thus suggest a serious structural problem in Turkish exports, with a dominance of low technology products and little evidence of an ability to shift to more dynamic products. Moreover, the growth of low technology exports (overwhelmingly textiles and garments) has been due to a large extent to Turkey’s privileged access to the European market. While producers have improved their equipment and quality significantly, and are investing in design capabilities, they do not have a marked competitive edge over leading producers in East Asia. Given that Turkey does not have a strong advantage in low wages in this industry,[6] it is unlikely to sustain rapid growth once trade is fully liberalised by the year 2005. It is not clear that Turkish exporters can establish a large enough quality lead over Asia to retain or expand its export market share, since Asian producers are investing heavily in upgrading their

[6] In 1995, the hourly remuneration of garment workers in Turkey was $1.52. While lower than the mature NIEs (e.g., Hong Kong at $4.32, Taiwan at $5.18 and Korea at $3.29), it was higher than Thailand at $1.11, Philippines at $0.72, Indonesia at $ 0.33, India at $0.29 and China at $0.25. Taking countries nearer to Europe, Egypt and Poland were cheaper than Turkey, at $0.57 and $1.42 respectively, while Hungary ($1.68) and the Czech Republic ($1.55) were slightly more expensive (but with higher skill levels and much greater proximity).

industries and design capabilities. While a significant part of Turkey’s textile exports may survive, the industry is unlikely to be the dynamo of export growth it as been in the past.

Table 5: Exports of Leading Developing Countries by Technological Categories

	Values ($ million)			Growth Rates (% p.a.)			Values ($ million)			Growth Rates (% p.a.)		
	1985	**1990**	**1996**	**1985-90**	**1990-96**	**1985-96**	**1985**	**1990**	**1996**	**1985-90**	**1990-96**	**1985-96**
	Resource Based						**Medium Technology**					
Turkey	1,291	1,757	3,369	6.4	11.5	9.1	788	922	2,471	3.2	17.9	11.0
Hong Kong	326	864	1,109	21.5	4.3	11.6	2,205	4,315	3,541	14.4	-3.2	4.4
Singapore	7,823	12,321	14,530	9.5	2.8	5.8	2,703	7,493	16,091	22.6	13.6	17.6
Korea	1,821	3,223	10,451	12.1	21.7	17.2	2,838	8,886	29,540	25.6	22.2	23.7
Taiwan	2,470	3,759	5,517	8.8	6.6	7.6	3,750	10,911	21,895	23.8	12.3	17.4
Indonesia	2,578	5,670	10,008	17.1	9.9	13.1	211	663	2,430	25.8	24.2	24.9
Malaysia	4,470	6,491	11,959	7.7	10.7	9.4	460	1,336	5,862	23.8	28.0	26.0
Thailand	1,596	4,009	6,254	20.2	7.7	13.2	252	1,606	5,825	44.8	24.0	33.0
China (a)	N/A	5,435	12,726	N/A	15.2	N/A	N/A	10,142	17,403	N/A	9.4	N/A
India	2,179	4,266	7,270	14.4	9.3	11.6	574	1,508	3,070	21.3	12.6	16.5
Argentina	2,364	3,638	5,444	9.0	6.9	7.9	413	1,036	3,197	20.2	20.7	20.4
Brazil	4,755	4,950	7,320	0.8	6.7	4.0	3,951	5,566	9,698	7.1	9.7	8.5
Mexico	1,703	2,856	5,454	10.9	11.4	11.2	2,459	6,918	27,170	23.0	25.6	24.4
	Low Technology						**High Technology**					
Turkey	3,650	6,874	12,325	13.5	10.2	11.7	132	445	1,108	27.5	16.4	21.3
Hong Kong	9,956	15,146	13,286	8.8	-2.2	2.7	2,992	6,604	7,277	17.2	1.6	8.4
Singapore	1,990	5,523	9,045	22.7	8.6	14.8	5,976	22,725	74,863	30.6	22.0	25.8
Korea	13,978	29,171	31,519	15.9	1.3	7.7	4,680	16,641	39,645	28.9	15.6	21.4
Taiwan	16,211	28,759	36,756	12.1	4.2	7.7	5,864	18,781	44,345	26.2	15.4	20.2
Indonesia	684	4,500	11,986	45.7	17.7	29.7	100	257	4,215	20.9	59.4	40.6
Malaysia	811	3,166	8,792	31.3	18.6	24.2	2,577	9,667	40,528	30.3	27.0	28.5
Thailand	1,448	6,821	15,293	36.3	14.4	23.9	497	4,127	15,623	52.7	24.8	36.8
China (a)	N/A	26,579	73,345	N/A	18.4	N/A	N/A	4,357	26,792	N/A	35.4	N/A
India	2,492	6,251	12,239	20.2	11.8	15.6	165	452	1,019	22.3	14.5	18.0
Argentina	545	1,449	2,088	21.6	6.3	13.0	180	219	368	3.9	9.1	6.7
Brazil	4,857	6,727	9,093	6.7	5.2	5.9	1,036	1,793	2,445	11.6	5.3	8.1
Mexico	1,266	2,463	16,135	14.2	36.8	26.0	3,005	1,296	28,521	-15.5	67.4	22.7

Note: Chinese exports in 1985 were not allocated over the technological categories because of many missing values.

As noted, HT exports in many NIEs do not necessarily denote advanced technological capabilities. A large part of HT exports come from MNCs assembling imported components in special zones with little linkage to the rest of the economy. The exceptions are Korea and Taiwan, and to some extent Singapore (which has been able to induce MNCs to locate advanced technological functions locally and even invest in R&D activity). However, even in MNC dependent exporters where local technological inputs are low, such as Malaysia, Thailand or Mexico, there is evidence that local content is rising over time. Once high technology export activity is firmly established, the high sunk costs of establishing production capabilities seem to ensure its continuation. It is difficult to find examples of 'footloose' behaviour by MT and HT MNCs, in contrast to those in LT activities. How far MNCs will continue to upgrade their exports is a different question; the answer depends on the ability of host countries to upgrade their skills and supplier capabilities. At least till now complex exports have continued to grow together with rising wages and technological complexity.

Turkish entrepreneurship is relatively well developed and the industrial sector has considerable depth. However, it has not, in contrast to countries like Korea and Taiwan, been able to mobilise itself to compete in advanced export activities. Nor has Turkey been able to induce MNCs with long records of import substitution in the country to switch production massively to exports, as in the automobile industry in Mexico, Brazil and Argentina. The boom in MNC high and medium technology assembly based exports has largely passed Turkey by, and it is not clear that it will be able to establish a foothold here. This suggests that it will be very difficult for Turkey to launch dynamic export growth unless it is able to upgrade domestic and foreign owned activities in complex technologies to world levels of efficiency. This will require considerable technological learning. Are the main determinants of such learning in place? Let us now look briefly at some such determinants: skills, technological activity and FDI in Turkey and its NIE comparators.

5. Some Determinants of Export Upgrading

In a simplified framework, I suggested three sets of determinants of technological learning: the incentive framework, factor markets and institutions (Lall, 1992). The incentive framework in Turkey is now broadly conducive to raising efficiency. The manufacturing sector, fostered under a regime of protected import-substitution with widespread state ownership and intervention, now faces a liberal policy regime. The government has progressively lowered trade barriers, eliminating all non-tariff restrictions, rationalising and reducing tariffs, and recently entering a free trade arrangement with the EU. It has restructured the tax, incentive and preferential credit systems, reformed state enterprises, liberalised the FDI regime, and reduced domestic barriers to entry and growth. It has shifted its investment from competing with the private sector to providing complementary infrastructure, particularly in transport and communications. While the macroeconomic setting continues to be unstable, with high rates of inflation, this has not deterred healthy levels of investment (27% of GDP in 1997) and considerable restructuring of industrial activity.

However, this liberalised regime limits the ability of the Turkish government to exercise industrial policy in support of new activities. Infant industry protection, the promotion of local enterprises, selectivity on FDI and local content rules are no longer permissible, both under WTO rules and as a consequence of its free trade agreement with the EU. It may true that Turkey failed to make good use of industrial policy instruments before liberalization, and there is no guarantee that it would do so in the future. There are other instruments of competitiveness policy available, used widely by mature industrial countries – skill upgrading, science and technology planning, enterprise technology support, R&D incentives, benchmarking, reducing business costs, attracting FDI and so on. However, it is also true that several Asian NIEs successfully used selective targeting to enter complex areas of technology and encourage domestic enterprises (Lall, 1996). Turkey cannot turn the clock back on liberalization, but we should not overlook the potential of more careful intervention.

What is the state of the other determinants? While we cannot review these in any detail, we can follow the previous approach of benchmarking Turkish performance against the NIEs. We focus on three important aspects of upgrading competitiveness: skill formation, R&D effort and FDI attraction.

5.1 Skills

The critical importance of skills to competitiveness in manufacturing is widely accepted. The move from one level or pattern of competitiveness to another requires changing the skill creation system and the way that the productive system uses it, contributes to it and interacts with it at all levels. The nature of technical change today implies even greater demands for skills, and for new kinds of skill that respond flexibly to emerging industrial needs. How does Turkey compare with other NIEs in this respect, and how does it match levels in mature industrial economies?

It is difficult to compare ‘skills’ by country, even for manufacturing. Manufacturing skills can arise from many sources, some difficult to quantify. The most readily available data are for enrolments in formal education. This is a major source of skill creation but it is not the only one; it ignores other forms of training (in particular firm-level training). Moreover, comparisons of enrolments ignore differences in quality, definition, relevance, and completion rates between countries. However, these are the only data available, and they do capture a critical element of the skill base. Table 6 shows enrolment rates for secondary and tertiary education, and for technical subjects in tertiary education, in Turkey, other major developing countries and some industrialised countries.

Table 6: Educational Enrolments (1995 or most recent year)

Country	Enrolments		Tertiary Level Technical Enrolments (numbers and as % of total population)							
	(of age group)		Natural Science		Maths/Computing		Engineering		Total technology	
	Secondary	Tertiary	Number	%	Number	%	Number	%	Number	%
Turkey	64	20	39,327	0.07	25,276	0.04	134,408	0.24	199,011	0.35
Hong Kong	N.A.	21	5,503	0.09	6,441	0.11	14,788	0.25	26,732	0.46
Singapore (a)	68	19	1,281	0.05	1,420	0.05	13,029	0.47	15,730	0.56
Korea	99	55	81,222	0.18	171,147	0.38	437,537	0.98	689,906	1.55
Taiwan	88	38	16,823	0.08	32,757	0.16	179,094	0.86	228,674	1.09
Indonesia	45	10	22,394	0.01	13,117	0.01	205,086	0.11	240,597	0.13
Malaysia	61	10	8,776	0.05	4,557	0.02	12,693	0.07	26,026	0.14
Thailand	49	21	77,098	0.14	1,292	0.00	105,149	0.19	183,539	0.32
China	55	4	95,492	0.01	174,862	0.02	1,156,735	0.10	1,427,089	0.13
India	49	6	869,119	0.10	. /.	. /.	216,837	0.02	1,085,956	0.12
Argentina	67	36	69,727	0.21	. /.	. /.	96,205	0.29	165,932	0.49
Brazil	46	11	46,322	0.03	92,701	0.06	149,660	0.10	288,683	0.19
Mexico	58	14	42,457	0.05	97,575	0.01	221,867	0.27	361,899	0.45
Some Industrialized Countries										
Japan	98	29	59,030	0.05	20,891	0.02	488,699	0.39	568,620	0.46
France	106	50	304,093	0.53	. /.	. /.	50,845	0.09	354,938	0.62
Germany	101	36	310,435	0.39	. /.	. /.	389,182	0.49	699,617	0.88
UK	94	41	105,983	0.18	76,430	0.13	219,078	0.38	401,491	0.69
USA	97	81	496,415	0.19	525,067	0.20	801,126	0.31	1,822,608	0.70

Sources: World Bank, *World Development Report 1997*, UNESCO, *Statistical Yearbook*, various, Government of Taiwan, *Taiwan Statistical Yearbook 1994*, and data from Ministry of Education, Singapore.
Notes: . /. indicates that the category is included under another technical discipline.
(a) Singapore's tertiary enrolment figures exclude polytechnics, which enrol 27 of the age group. If these were counted as tertiary institutions, this would greatly increase its tertiary enrolment figures

These data suggest that Turkey performs relatively well in human capital formation by developing world standards. However, it lags well behind not just the main OECD countries but also the larger Tigers, Korea and Taiwan, on all indicators of general and technical skill creation (Korea leads whole world in technical enrolments at the tertiary level). The last column of the table, with enrolments in the three main technology subjects as a percentage of the population, is of particular interest. It shows that Turkey is about 23% of the level reached by Korea, 32% of Taiwan and 76% of Singapore.

In comparing skill and export structures across countries, it appears that the skill base in Turkey is well in advance of the technological complexity of its manufactured exports. Countries in Southeast Asia, with lower skill endowments, have been able to develop far more technology-intensive export bases by specialising in simple assembly under MNCs. In this sense, Turkey has ‘excess’ skills for the simple end of high technology activity, which it can utilise by attracting high-tech FDI. However, if it is to match the Tigers in advanced technological activity, especially in domestic enterprises, it seems to face significant skill deficiencies. In comparison to European countries as well, the skill base is very weak, well below levels needed to integrate with the region and use its advanced technologies as a full partner (rather than a supplier of cheap labour).

5.2 Technological Activity

As with human capital, there is no easy way to compare technological activity across countries. The available data on R&D are not an ideal indicator. Technological effort can take place in many other ways, on the shop floor, in production engineering and process management, as well as in the organisation of production and procurement. However, these are difficult to measure. Formal R&D data are at least available on a roughly comparable basis across countries, and can be taken as proxies for technological effort more generally. Moreover, their relevance rises as countries mature industrially: basic technological activity is more standardised and formal R&D more accurately reflects differences in technological effort. Table 7 shows R&D in Turkey and comparator countries.

Table 7: R&D Expenditures

Country	Year	Total R&D as % GDP	Enterprise financed R&D as % GDP (a)	R&D per capita 1995 ($) (b)
Turkey	1995	0.4	0.12	11.1
Hong Kong	1995	0.1	N/A	23.0
Singapore	1994	1.1	0.69	294.0
Korea	1995	2.7	2.27	261.9
Taiwan	1994	1.8	1.00	198.0
Indonesia	1993	0.2	0.04	2.0
Malaysia	1992	0.4	0.17	15.6
Thailand	1991	0.2	0.02	5.5
China	1993	0.6	0.11	3.7
India	1995	1.1	0.14	3.7
Argentina	1996	0.3	0.05	24.1
Brazil	1985	0.4	0.08	14.6
Mexico	1995	0.4	0.09	13.3
Some Industrialized Countries				
Japan	1995	3.0	2.01	1189.2
France	1995	2.3	1.13	574.8
Germany	1996	2.3	1.40	632.7
UK	1995	2.1	1.01	392.7
USA	1996	2.5	1.50	674.5

Sources: UNESCO, *Statistical Yearbook 1995;* national sources, OECD, *Main Science and Technology Indicators*, 1997, and NSF (1998).
Notes: (a) R&D financed by productive enterprises (UNESCO), or by industry (OECD) as % of GNP.
(b) Last available total R&D as % of 1995 income using income figures from *World Development Report 1997*.

Formal technological effort is surprisingly low in Turkey. The most relevant indicator is enterprise financed R&D as a percentage of GDP: here Turkey does better than China, Indonesia, Thailand and the three Latin American countries. However, it lags well behind the mature NIEs (Hong Kong apart) and the developed countries. Korea again leads not just the developing world but also the developed world, while Taiwan comes just behind UK in the global ranking. The strategies used to achieve these impressive results have to do with industrial policy to stimulate learning in an export-oriented setting (Lall, 1996). In R&D per capita, Turkey comes very low, even below Hong Kong, Malaysia and the three Latin American economies in the table.

Turkish industry had practically no tradition of conducting R&D, preferring to rely passively on imported technologies. Only 13 per cent of national R&D is financed by the private sector. The government offers fiscal incentives for industrial R&D: in 1989, only 13 firms applied for these incentives. Private R&D is far below levels in the advanced NIEs, and too low to support sustained industrial competitiveness in advanced European markets. The lack of technological activity has led to a significant brain drain of the best Turkish technical graduates. The need for technology support is particularly pressing for the large number of SMEs that dominated Turkish industry and that tend to lag in technology.

The bulk of R&D in Turkey, financed by the government, takes place in public research institutes and universities.[7] This R&D has had few linkages to the industrial sector, and private industry has been reluctant to collaborate with or contract research work to the public laboratories. The pattern of public R&D does not match industry's technological needs. The technology infrastructure is generally inadequate to current industrial needs, and even more so to the demands of a more dynamic export structure. The metrology, standards, testing and quality system has been unable to provide the services needed by exporters, raising their costs, constraining technology development and reducing their ability to compete internationally. There is little private sector provision of technology services; there is no accreditation body in Turkey to audit and certify independent testing bodies. There are few sources of technology finance for private enterprises.

The government realises the need for a new strategy to stimulate and support technology development in private enterprise. It has recently launched policies to improve tax incentives for industrial R&D, direct procurement to encourage technological effort, and improve links between industry and the science community. It is also responding to industry demand for a more effective technology infrastructure, setting up a national metrological laboratory and strengthening the standards body. at TÜBITAK. It is encouraging the public research community to strengthen linkages with private industry, allowing public institutions to perform research and consultancy work. It is setting up 'technoparks' at five universities to act as business incubators, commercialise technology from universities and attract research work from large companies.

Despite all these encouraging policy initiatives, however, Turkish industry remains essentially a passive user of imported technologies. This strategy suits an economy at a low level of industrial development, not one that needs to upgrade its export structure significantly, and particularly one that lags in attracting export-oriented FDI (below).

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[7] This draws on the author's review of a World Bank's technology development project in Turkey.

5.3 FDI Inflows

Turkey has greatly liberalised its FDI regime and is now very welcoming to all sorts international investors, particularly in export-oriented activities. However, as Table 8 shows, it has not enjoyed very large inflows in relation to gross domestic capital formation. The trend rate is between 1.5 and 2 per cent, well below most NIEs. The actual values since 1991 range between $600 and $900 million annually, with no clear indication that they are growing (they peaked in 1995 and declined over the following two years).

Table 8: Inward FDI as Percentage of Gross Domestic Fixed Capital Formation

	1986-91	1992	1993	1994	1995	1996
WORLD	3.6	3.3	4.4	4.5	5.6	5.6
			Regions			
Developed	3.5	2.6	3.0	2.8	3.9	3.6
Western Europe	5.6	5.3	6.1	5.4	7.2	5.9
All developing	3.4	4.2	6.1	7.6	7.4	8.7
North Africa	2.5	4.4	4.4	6.6	3.2	3.3
West Asia	0.8	0.6	2.8	1.2	-0.6	0.2
L. America	5.3	7.6	6.4	8.9	9.8	12.8
S. & E. Asia	3.6	4.5	6.5	7.9	7.5	8.3
Central, East Europe	0.1	1.1	7.4	4.7	10.2	7.5
			Developing Countries			
Turkey	1.8	2.3	1.4	1.4	2.0	1.6
Hong Kong	10.7	7.4	5.3	5.1	4.9	5.2
Singapore	37.6	12.4	23.0	35.0	28.9	27.5
Korea	1.3	0.6	0.5	0.6	1.1	1.3
Taiwan	3.6	1.8	1.8	2.5	2.7	3.2
Indonesia	2.3	3.9	4.3	3.8	6.7	8.5
Malaysia	14.7	26.0	20.3	14.9	11.0	11.1
Thailand	5.5	4.8	3.6	2.3	2.9	3.0
China	2.9	7.4	12.2	17.3	15.0	17.0
India	0.3	0.4	1.0	1.4	2.4	2.9
Argentina	5.6	10.6	5.4	5.5	9.5	9.7
Brazil	1.6	2.9	1.5	1.9	3.5	7.5
Mexico	8.3	6.4	5.9	13.5	20.6	14.2

Source: UNCTAD, *World Investment Report 1998*.

Much of the FDI in most countries in the table has been highly export-oriented, and accounts for the bulk of their complex exports. The exceptions are Korea and Taiwan (in particular Korea) among the successful high-tech exporters, India among the less successful ones. The former two have export-oriented MNCs, but the engines of export growth are local firms. Both deliberately restricted FDI to build up domestic technological capabilities and encourage domestic firms to develop sophisticated exports. India also restricted FDI but failed to offer an export-oriented trade regime and to build up competitive domestic capabilities. Most of its recent FDI inflow has gone into domestic market oriented and infrastructure activities (Lall, forthcoming).

Turkey is similar to India in this respect: it has attracted relatively little FDI (even less that India now) and, more significantly, its recent efforts to increase FDI have failed to bear fruit. It is difficult to say, without further research, why this is so. To attract the export-oriented FDI, particularly in HT activities, a developing country today has to offer a skilled and disciplined work force with modern technical skills. This has to be supported by excellent infrastructure, streamlined procedures, low business transaction costs, inputs at world market prices, national treatment for MNCs and stable, transparent policies. It also needs effective FDI promotion, with well-directed targeting, incentives and the ability to assess and meet the needs of high-technology investors. Turkey has some but not all these attributes. Its political and social uncertainties may deter MNCs from committing themselves to sourcing components from Turkey. Its industrial infrastructure may not match emerging competition from Eastern Europe. The strong entrenched position of local business groups, and hidden business costs, may act as a disincentive to prospective investors. More significantly, its FDI targeting and promotion may be inadequate to change past perceptions and attract dynamic MNCs.

6. Some Conclusions on Strategy

This paper has outlined important issues concerning the nature of exports and comparative advantage in the developing world, and has illustrated these with reference to Turkish export performance. If the technological capability approach has any validity, there are grounds for concern about Turkey’s manufacturing competitiveness. The structure of exports is extremely weak, and has barely upgraded over time. Much of the recent export growth has come from low technology products, spurred by privileged access to the European market rather than global competitiveness. Its performance has been respectable, if slowing over time; it may not last even at this level after more radical trade liberalization.

If Turkey’s export structure is to move significantly into medium and high technology activities, which of the strategies followed by the NIEs seems most feasible?

The Mexican strategy of high-technology growth through assembly for a giant and rich neighbour, with minimal value added, does not appear feasible for Turkey. It lacks the geographical proximity to Europe, and there are cheaper competing locations (some, as in East Europe, with higher skill levels and lower transport costs). What about the Malaysian strategy of MNC-based high technology exports for distant markets? This has greater value added than the *maquiladoras* of Mexico, and does not depend on privileged market access. While this appears attractive, it may not be practical for Turkey. Asian NIEs, starting with low wages, have seized ‘first mover’ advantages in many electronics assembly activities, becoming major sourcing centres for leading multinationals. Turkey may find it difficult to take market share from them. However, with its good skill base, it may be able to carve a niche by attracting assembly and component supply for the European market.

Turkey needs elements of strategy from Korea and Taiwan to upgrade the capabilities of the local industry (particularly small and medium sized enterprises). Its large business houses are in close touch with international markets, but have weak technological capacity in advanced manufacturing activities. SMEs are technologically weak and find it difficult to access information on foreign markets, designs and prices. Both need assistance in upgrading their technology and benchmarking their productivity against firms in Europe and the NIEs. The base of skills available for upgrading is reasonable and apparently under-utilised. In the longer run, however, the education base needs improvement. Specialised industrial and in-firm training are likely to lag behind competitors. Perhaps the most difficult longer-term challenge for the government is to raise R&D capabilities in industry.

Given that Turkey now lacks some important tools of industrial policy, it can still attempt to create the right ‘learning conditions’ by targeting these supply-side measures towards dynamic, technology intensive activities and targeting high-tech MNCs. Here Korea, Taiwan and Singapore can offer important lessons (Lall, 1996). Each has long used strategic technology plans to direct its spending on technology support.[8] Government funding and incentives have stimulated private R&D and guided it to dynamic export activities. Skill creation has been similarly geared to the specific needs of new technologies and major exporters. The governments have mounted several measures to strengthen technological links between science institutions and industry. SMEs are supported by a battery of measures to raise productivity and use the latest technologies. Export marketing receives extensive government support.

[8] On the strategic tools used by Korea and Taiwan to promote their semiconductor industry, see Mathews and Cho (forthcoming). One valuable tool used by the Taiwanese government to promote competitiveness in high technology products was to set up ‘innovation alliances’ between local firms and technology institutions. This has proved very effective in allowing firms to innovate, negotiate with foreign firms and enter export markets. Some successful exports are the PowerPC

Singapore's FDI targeting and promotion is widely regarded as one of the best in the world (along with that of Ireland in Europe).

One final word: Turkey looks mainly to Europe for its role models. While this is understandable, it would be wise for it to cast its net more widely. Asia offers many valuable lessons in export and technology development, as do some Latin American countries. In many ways, Turkey remains a developing country. Liberalization has so far had beneficial effects, mainly by allowing its low technology activities to exploit their static comparative advantage in (sheltered) European markets. This advantage is bound to run out soon. A shift into more technology-intensive activities is imperative, and it may not come automatically. The capability approach suggests that it needs a clear strategy, not a passive reliance on free markets, to improve its competitive position.

microprocessor for IBM, videophones, laptop computers, laserfax, digital switching devices and 'smart cards'. See Poon and Mathews (1997).

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