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Export Performance and Competitiveness in the Philippines

Sanjaya Lall*

After decades of weak growth, Philippine manufactured exports have performed impressively in recent years, better than those of most other South East Asian economies. This paper examines the sources of Philippine export dynamism and asks whether the current pace of growth is sustainable. It finds that the competitive base is very narrow, dominated by one product group and, within that, one product (semiconductors). This is a fast growing, high technology product, with great potential for future growth and spillovers; however, Philippines specialises in low-end final assembly and testing, where it is vulnerable to competitive entry and technological change. The paper ends with policy implications.

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* Queen Elizabeth House, University of Oxford

A. Introduction

Philippine manufactured exports have expanded vigorously in recent years. The compound annual growth rate (in current dollar values) exceeded 21 percent over 1990-97, a massive improvement over the 9.6 percent rate during the 1980s. More exceptionally, exports have continued to perform strongly during the crisis, when those of its traditionally more dynamic neighbours have flagged. While there are some signs of falling off in the rate of growth in the past two months, growth continues to be at double-digit rates and it may be that the slowdown is a short-term cycle. Philippines has overtaken its main (and much longer established) competitor in the region, Malaysia, in semiconductors, its main export product. This export is well positioned in terms of growth prospects, and is handled entirely by leading global companies, ensuring access to technology and markets. The particular products made in the Philippines are less susceptible to price falls than more standard memory chips. This augurs well for its export competitiveness. Nevertheless, it is not clear how sustainable this export growth is. An overwhelming reliance on one subset of products, however dynamic and globalized, is risky. In this product, recent export growth seems to be due mainly to new investments by multinationals; if so, it will slow down once new capacities have been 'run in' and new facilities are built up in other locations. Other exports, including labour-intensive ones like clothing where the country should have a strong comparative advantage, are doing badly (and have been even before the crisis). Philippines is not utilizing its competitive edge in its cheap skilled labour force fully. Even the skill base suffers from problems of quality and relevance – these will loom larger as industry moves into more complex products. It suffers from other competitive handicaps, in particular in its infrastructure and the low levels of capability of domestic firms (which deter greater local content in sophisticated exports). Technological and design activity is very low, and technical support for domestic firms, in particular SMEs, is weak. FDI policies lag behind best practice in the region in effectiveness. It is imperative for the country to diversify its competitive base, deepen its advantage in its main export activities and strengthen local enterprises. This chapter considers the main policy issues that arise in this context.

B. Recent Export Performance

B.1 Growth Rates

Philippines is not a large exporter by regional standards. The value of its manufactured exports was $17.6 billion in 1996, the smallest of its export-oriented neighbours. The main exporters were China ($130.3 billion), Korea ($111.2 billion), Taiwan ($108.5 billion) and Singapore ($59 billion of own exports). Its ASEAN neighbours were also much larger exporters: Malaysia $67 billion, Thailand $43 billion and Indonesia $29 billion. Philippines' growth was robust over 1990-95, a vast improvement over the 1980s, but several neighbours did better (from larger bases). From 1996 onwards, however, Philippine exports outpace the others and continue to do so into 1998. Table 1 shows the growth of merchandise exports for Philippines and its neighbours till late 1998. In 1996, when a drop in world trade growth caused a sharp deterioration in exports elsewhere, Philippines raised its growth rate. In 1997, growth accelerated further, with only China recording a comparable (but lower) rate. In the first 11 months of 1998, Philippine export growth slowed (but to a healthy 17%). In contrast, rates for all its neighbours turned negative, even in those (e.g. China and Taiwan) not directly involved in the crisis. The regional slowdown had a progressive impact on these countries, while Philippines exports revived in the third quarter to 19%. This revival continued in the fourth quarter of 1998: the annualized export growth for November was 12%, compared to 9.3% for October. Thus, Philippine exports have escaped the regional 'contagion',

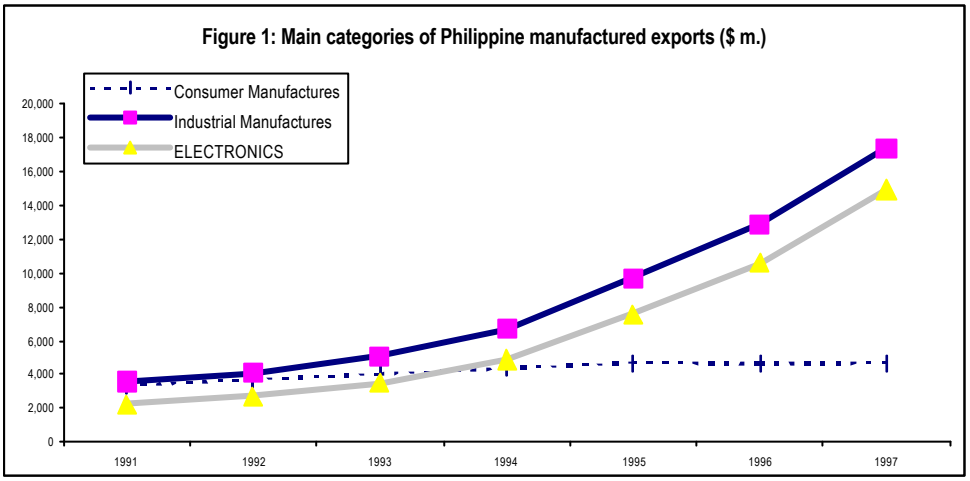
Table 1: Annual growth rates of merchandise exports (% pa)

	1980-90	1990-95	1996	1997	1998	1998		
					Jan-Nov	1 quarter	2 quarter	3 quarter
Philippines	4	16	17	24	17	24	15	19
Korea	14	14	4	5	-12	9	-2	-10
Taiwan	13	11	4	5	-9			
Singapore	11	18	6	-1	-	-7	-9	-8
Malaysia	9	20	5	1	-4	-9	-11	-
Indonesia	2	12	10	7	-6 (a)	1	-8	-
Thailand	14	21	-1	3	-14 (a)	-3	-5	-9
China	NA	19	2	21	-0.2	13	3	-2
World	7	7	4	3	-	-1	-2 (b)	-

Sources: UN Comtrade, WTO *Annual Report 1998*, IMF *IFS* October 1998, national statistical offices on the Internet.

Notes: (a) January-September. (b) Exports by industrial countries only; imports by industrial countries were stagnant in this period.

and their performance is matching that of the most dynamic countries before the crisis struck. Its main export product continues to thrive (below). Its main market, USA (taking 37% of its exports in January-June 1998) is importing more from Philippines. While total US imports of electrical machinery (the main manufactured export) fell by 0.6% in January-September 1998, its imports of machinery and transport equipment from the Philippines rose by 21%.



B.2 Manufactured Export Structure

Manufactured products and have steadily increased their share of the total, now accounting for over 80 percent of Philippine merchandise exports. In recent years, their growth has accelerated faster than total exports; the growth rate in 1994-97was over 11 percentage points higher than in 1991-93. Despite a slowdown in the first three quarters of 1998, manufactured exports continue to rise at over 20% per annum. However, the pattern is highly skewed (Figure 1). Over 1991-97, 84% of the rise in the value of manufactured exports comes from *electronics*, with one group of electronics, semiconductors, accounting for 64% (Table 2). The corresponding figures for the first 9 months of 1998 are 113% and 98%. This pace of growth more than doubles the share of electronics, from below one-third to over two-thirds; semiconductors alone contribute over half of the total in 1997 and nearly 60% in January-September 1998. The other major products with substantial (20% plus) growth over 1991-97 (textiles, machinery and transport equipment) contribute only 5% of the total in 1997.

If electronics are excluded, Philippines' export performance is more modest, and deteriorates from 1996 onwards in reaction to the financial crisis. The growth rate of consumer manufactures falls from 10% in 1991-3 to negative between 1996 and 1998, due mainly to the poor performance of *garments*, Philippines' main traditional export. However, many other consumer products – footwear, toys, and leather goods – also do badly. Some fared poorly even before the crisis: the value of garment exports was virtually stagnant over 1994-97; their growth over (pre-crisis) 1990-95 was lower than for its ASEAN neighbours and China.[1] Since Philippine wages are lower than in Malaysia and Thailand (though higher than in Indonesia and China), this suggests a weak competitive base in this labour-intensive activity. The recent performance of garment exports in non-quota markets, which face the most intense competition from low-wage countries like China, Sri Lanka and Bangladesh, has been even worse. This reinforces the impression that quality and technology upgrading in the Philippines is lagging. Other labour-intensive products like *footwear, toys* and *leather goods* also perform poorly, with growth rates of below 3% over 1994-97. The most important resource-based export, processed foods, shows a generally weak and cyclical growth performance. The crisis is only partly to blame for this – the causes must lie in the competitive base of the Philippines.

C. Structural Competitiveness

C.1 Positive Aspects

Electronics, and within this one product, *semiconductors*, are the engine of Philippine export growth. While other countries in the region are longer-established exporters of semiconductors, the industry has grown much faster in the Philippines.

[1] The annual rate of growth of garment exports from the Philippines in 1990-95 was 7.7%, compared to 11.5% for Malaysia, 12.3% from Thailand, 15.7% from Indonesia and 20.1% from China.

Table 3: Evolution of World Manufactured Exports by Technological Categories (1980-96)					
	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 'high technology' products that dominate Philippine exports comprise the most dynamic group in trade. Table 3 shows the evolution of world manufactured trade for four technological categories[2]. The long-term trend is clearly for trade to *shift from technologically simple to complex products.* Over 1980-96, resource-based exports grew the slowest (5.7%) and high-tech exports the fastest (11.6%). From being the smallest category in world exports in 1980, high-tech products surpassed resource-based products by 1985 and low-technology products by 1996. At present rates of growth, high-technology products will soon be the largest single traded group.

There are many reasons for their rising importance in trade (and production): the rapid introduction of new high value products, high income elasticity of technology-intensive products (and related services), and their falling costs because of new processes. Moreover, the presence of high-tech manufacturing activities tends to generate advanced skills and have beneficial spillover effects on related activities. A specialization in high-tech products is thus the best 'positioning' for exports.

[2] *Resource-based* products are mainly processed foods and tobacco, simple wood products, refined petroleum products, dyes, leather (not leather products), precious stones and organic chemicals. *Low technology* products are textiles, garments, footwear, other leather products, toys, simple metal and plastic products, furniture and glassware. *Medium technology* products are mainly automotive products, most industrial chemicals and industrial machinery, and simple electrical and electronic products. *High technology* products are fine chemicals and pharmaceuticals, complex electrical and electronic machinery, aircraft and precision instruments. For a more detailed analysis see S. Lall, 'Exports of manufactures by developing countries: emerging patterns of trade and location', *Oxford Review of Economic Policy,* 1998, pp. 54-73.

Table 4: Technological structure of manufactured exports by country, 1996 (% of each country's total manufactured exports)				
	Resource Based	Low Technology	Medium Technology	High Technology
Philippines	5.9	19.1	7.2	67.8
Hong Kong	4.4	52.7	14.0	28.9
Singapore	12.7	7.9	14.0	65.4
Korea	9.4	28.4	26.6	35.7
Taiwan	5.1	33.9	20.2	40.9
Indonesia	34.9	41.9	8.5	14.7
Malaysia	17.8	13.1	8.7	60.4
Thailand	14.5	35.6	13.5	36.3
China	9.8	56.3	13.4	20.6
Mexico	7.1	20.9	35.2	36.9
World	13.7	21.3	37.2	27.7
Source: Calculated from UN Comtrade and Philippine DTI data.				

Table 4 shows the technological structure of Philippine exports in relation to its neighbours (and to Mexico, the most dynamic exporter to the US since NAFTA). The Philippine structure is now more 'high-tech' than that of Malaysia and Singapore, which are longer-established and larger exporters of electronics and (like the Philippines) are part of integrated MNC production networks. It is far more so than countries like Korea and Taiwan, which have considerable indigenous technological capabilities in these sectors but retain substantial low-technology exports and are significant exporters of medium-technology engineering goods. Other countries in the region lag the Philippines in technological sophistication of exports. In fact, the Philippines probably has the world's most 'advanced' export structure by this measure.[3]

[3] The largest exporters, the mature industrial countries where the technologies originate, have more diversified export structures. For instance, high-tech exports accounted for 28% of total exports for the USA in 1995, 27% in Japan and 25% in the UK. Data from Appendix Table 6.5, National Science Foundation, *Science and Engineering Indicators 1998*, US Government, Washington DC.

Table 5: Philippine Electronics Exports ($ million)							
	1991	1993	1995	1996	1997	1997(9 months)	1998 (9 months)
Semiconductor devices	1,767.3	2,674.9	6,060.1	8,468.4	11,495.2	8,193.3	11,416.2
Electrical machinery	42.9	98.1	214.7	206.2	280.8	215.1	351.5
Telecom/sound apparatus	220.0	369.7	550.4	746.9	831.7	624.6	517.5
Office, data processing mach.	106.9	215.0	440.9	878.5	2,101.1	1,502.6	1,922.3
Consumer electronics	102.0	160.3	290.8	310.1	253.1	182.8	235.5
o/w Audio visual products	86.2	136.6	257.8	270.8	214.8	151.3	208.9
Household appliances	13.4	19.5	26.8	31.6	34.4	27.9	25.6
Other consumer products	2.4	4.2	6.2	7.8	3.8	3.6	1.0
Total	2,239.1	3,518.1	7,556.9	10,609.9	14,961.9	10,718.4	14,442.9
Source: Philippines Department of Trade and Industry							

Philippines' *specialization within 'high-tech'* (Table 5) is even more desirable. The product group in which it falls is the largest and fastest-growing of the fifty most dynamic exports in the world in 1980-95. The value of global exports under this group was $171 billion in 1995 (7% of world manufactured exports). Its rate of growth over 1980-95 was 18% per annum, compared to 12% for the 50 dynamic products and 9% for all manufactured exports.

Moreover, the semiconductor products assembled in the Philippines, mainly microprocessors and specialised chips, are less prone to price fluctuations than standard DRAM chips made by Korea. For instance, between 1997-98 the price of 64-M DRAM chips fell from $16 to $9 each and of 16-M DRAM from $3 to $1.8. The breakeven prices for these chips are $14 and $3 respectively.[4] These massive falls were one of the main factors affecting Korean export earnings before the crisis; the different specialization allowed Philippine exports to continue growing. Moreover, much of Philippine manufacturing is 'contract manufacturing', where wafers are supplied by foreign customers (including the parent companies of MNCs) to be assembled into individual chips according to buyers' specifications. This reduces inventory-holding requirements for

Philippine producers and ensures that capacities are booked well in advance (typically one year). This arrangement may explain the far better performance by Philippine as compared to Malaysian exporters of semiconductors (below).

The *nature of electronics exporters* is another important asset. Practically all exports come from affiliates of multinationals. In 1996, there were 118 Japanese, 38 Korean, 29 US, 18 Taiwanese and 11 German subsidiaries in this activity, as well as some smaller foreign companies. All were producing for export under facilities offered by the Board of Investments or the Philippines Export Zone Authority. Table 6 shows the leading 50 exporters from the Philippines. The list contains most major electronics firms in the world. New investment in electronics has grown steadily from $44 million in 1992 to $1.3 billion in 1995, and has kept growing since. During the first 9 months of 1998, BOI approvals for electronic and electrical investments rose by 164% over the same period in 1997. PEZA reports that investments in ecozones rose by 18% in 1998. Among the leading investors were SMI-ED Philippines Technology Inc. ($150m. semiconductor plant), Fujitsu (second semiconductor plant for $140 m.), NEC (second semiconductor plant for $137 m.) and GNF ($61 m. semiconductor plant).[5] While fears have been expressed of a decline in FDI inflows, the available data do not suggest that these have any strong foundation.

[4] *Korean Herald*, May 28, 1998.
[5] *Philippines Daily Enquirer*, January 7, 1999.

Table 6: Leading 50 Philippine exporters in 1996 (in descending order of export earnings)

1 Intel Philippines	11 Philips Semiconductors	21 National Semiconductors	31 San Miguel	41 NEC Technologies
2 Texas Instruments	12 Hitachi Computer	22 Asahi Optical	32 Philippines Phosphate	42 EDS Manufacturing
3 Amkor/Anam	13 Laguna Electronics	23 Uniden Philippines	33 Petron Corporation	43 Team Pacific
4 Ionic Circuits	14 Matsushita	24 Analog Devices	34 Phil International Trading Corporation	44 Best Electronics
5 Phil. Associated Smelting and Refining	15 Acer Information Prods	25 Fujitsu Computer Products Corporation	35 Cargill Philippines	45 Legaspi Oil Company
6 Integrated Microcircuits	16 Uniden Phils. Laguna	26 T M X Philippines	36 International Wiring Systems	46 United Technologies
7 Cebu Mitsumi Inc.	17 Motorola	27 Shell Petroleum	37 International Copra Export Corporation	47 Benguet Corporation
8 Automated Micro-Electronics	18 Yazaki-Torres Manufacturing	28 American Microsystems	38 Dole Philippines	48 Del Monte
9 Electronic Assemblies	19 Rohm Electronics	29 Maxon System	39 Kita Corporation	49Tsukiden Electronic Industries
10 Telefunken Semiconductors	20 Zilog Philippines	30 Shell Gas	40 Best Electronics and Components	50 Philippine Sinter Corporation

Source: Export Development Council, Government of the Philippines

A comparison of semiconductor exports by Philippines and other countries is instructive (Table 7). However, the data should be treated carefully. Product composition differs between countries: Korea is specialized in D-RAM chips, while Philippines and Malaysia specialize in microprocessors. Singapore makes a range of advanced semiconductor devices and is an important re-exporter for other countries in the region. Taiwan makes application specific chips. The level of technology and local content involved also differ. Philippines, Malaysia, Thailand, China and Mexico are mainly in the final assembly and testing stages.

Table 7: Comparative Exports of Semiconductors ($ m. and %)							
	1991	1993	1994	1996	1997	1997 (9 months)	1998 (9 months)
	Values						
Philippines	1,767.3	2,674.9	3,767.9	8,468.3	11,495.2	8,193.3	11,416.2
Malaysia	4,744.3	7,289.3	9,512.1	13,993.1	14,569.6	11,003.7	10,533.8
Thailand	1,121.0	1,708.9	2,242.1	2,956.0	3,376.4		
China	184.0	359.9	614.4	1,476.9	1,945.7		
Singapore	4,586.7	6,852.6	12,053.9	19,751.2	20,519.3		
Korea	6,645.2	8,078.3	11,848.0	17,305.2			
Taiwan	2,759.7	4,187.5	5,691.8	9,553.1			
Mexico	45.0	671.1	916.0	1,875.0	1,869.3		
Total above	21,853.3	31,822.5	46,646.2	75,378.8	53,775.6		
	World Market shares						
Philippines	2.7%	3.0%	3.1%	4.9%	8.4%		
Malaysia	7.2%	8.2%	7.9%	8.0%	10.6%		
Thailand	1.7%	1.9%	1.9%	1.7%	2.5%		
China	0.3%	0.4%	0.5%	0.8%	1.4%		
Singapore	7.0%	7.7%	10.0%	11.3%	14.9%		
Korea	10.1%	9.0%	9.8%	9.9%			
Taiwan	4.2%	5.6%	4.7%	5.5%			
Mexico	0.1%	0.8%	0.8%	1.1%	1.4%		
Total above	29.0%	30.9%	38.5%	43.3%	39.1%		
Source: UN Comtrade, national sources.							

Malaysia, the nearest direct competitor, has a much longer record of semiconductor exports. Many of the same MNCs are present there, and over time have made massive investments in physical facilities, training and technological activity (Intel recently doubled its production capacity in Penang). Affiliates in Malaysia have been involved in process design and development for new products. In view of this, it is remarkable that Philippine semiconductor exports exceeded Malaysian in the first 9 months of 1998, when they were only 40% of Malaysian export values in 1994.

It is vital to Philippines' export prospects to understand if this is a temporary or longer-term trend. If temporary, Malaysian exports may revive and other production sites may grow more rapidly: the main engine behind Philippine export growth will then slow or stagnate. If longer-term, prospects for future growth seem very bright. There are arguments on both sides. On the pessimistic side, the surge in Philippine exports may be temporary if it only reflects the contracting of new facilities. Philippines has enjoyed a surge in electronics investments in the past 4-5 years; once new capacities are fully used, the rate of growth will moderate and over time other sites will catch up.

On the optimistic side, however, there are reasons for the surge to continue. New FDI is flowing into the industry. The main competitive strength, its relatively skilled, English-speaking workforce, is lower cost than in Malaysia. Shopfloor wages are $200-250 per month, compared to $300-350 in Malaysia. A new graduate engineer is available at $400-500 in the Philippines, compared to $800-1000 in Malaysia, a production manager at $1000-2000 compared to $3600, a production supervisor at $500-600 compared to $1300. Moreover, the availability of engineers in the Philippines is much better than in Malaysia, where companies have to use (expensive) expatriate technical staff. This is a critical factor in a highly skill-intensive industry. Some MNCs are using the Philippines for more technology-intensive jobs. Labour turnover rates are lower in the Philippines than in Malaysia, conducing to greater skill formation in the former. Japanese investors regard the discipline, trainability and loyalty of Filipino workers very highly; in mission interviews, some rated the workforce as the 'best in the world'.

The educational base in the Philippines compares well with many neighboring countries. Table 8 shows general educational enrolments as well as tertiary level enrolments in technical subjects in the Philippines and other countries. The last column is perhaps the most relevant for high-tech industries: the numbers of scientists, engineers, mathematicians and computer specialists. Here, the Philippines scores better than all the other countries in the region except for Korea, Taiwan and Japan, and is not too far from the advanced industrial countries. Given its long lag in industrial and export development behind the 'new Tigers', it has excellent prospects for promoting export-oriented manufacturing and services based on its lead in education.

C.2 Negative Aspects

Table 8: Educational Enrolments (latest available year)										
	Enrolment Ratios		Technical Enrolments at Tertiary Level (Numbers & % Population)							
	Secondary	Tertiary	Natural Science		Math's & Computing		Engineering		Total Technical subjects	
	% Age Group		Numbers	%	Numbers	%	Numbers	%	Numbers	%
Philippines	79	27.4	27,200	0.040%	121,000	0.178%	225,700	0.333%	373,900	0.551%
Hong Kong	75	21.9	13,400	0.219%			16,600	0.271%	30,000	0.490%
Singapore	62	33.7	1,300	0.039%	1,400	0.042%	13,000	0.391%	15,700	0.472%
Korea	101	52.0	163,700	0.365%			577,400	1.286%	741,100	1.650%
Taiwan	88	38.0	16,800	0.078%	32,800	0.153%	179,100	0.834%	228,700	1.065%
Indonesia	48	11.1	25,100	0.013%	128,000	0.065%	293,900	0.149%	447,000	0.226%
Malaysia	58	10.6	8,800	0.044%	4,600	0.023%	12,700	0.063%	26,100	0.130%
Thailand	55	20.1	22,500	0.039%	27,100	0.047%	58,700	0.101%	108,300	0.186%
China	69	5.7	167,700	0.014%	99,400	0.008%	971,000	0.080%	1,238,100	0.101%
Memo Item: Some industrialized countries										
France	111	49.6	304,100	0.523%			50,800	0.087%	354,900	0.611%
Germany	103	42.7	142,400	0.175%	116,700	0.143%	371,600	0.455%	630,700	0.773%
UK	134	48.3	120,700	0.208%	98,300	0.169%	216,200	0.372%	435,200	0.749%
Japan	99	40.3					805,800	0.644%	805,800	0.644%
Canada	106	102.9	47,200	0.161%	52,800	0.180%	103,500	0.352%	203,500	0.692%
USA	97	81.1	496,400	0.186%	525,100	0.197%	801,100	0.300%	1,822,600	0.682%
Source: UNESCO, *Statistical Yearbook 1997*, and national sources for Taiwan, China.										

This section highlights some of the *main structural weaknesses* in the competitive and export structure of the Philippines. It focuses on human capital and technology, and on the two major

export activities, clothing and electronics. The most obvious weakness, touched on already, is the level of concentration of exports: this high dependence on one activity is inherently risky. Any downturn caused by a slackening of FDI or a technological shift that affects costs in the Philippines can be disastrous. The very fact that the activity is so technologically dynamic and globalized in production increases the risk. Skill and technical requirements are changing constantly. All industrializing countries are trying hard to attract electronics multinationals, and keeping ahead of the rest is likely to be a very demanding task.

The risk of dependence on semiconductors is exacerbated by the anemic performance of other products. Exports of labour-intensive consumer products show unexpected competitive weaknesses, both against higher wage economies like Malaysia and Thailand as well as lower wage economies like China and those in South Asia. Given the skill base and openness to FDI, it is not clear why garments and similar products are performing so poorly. As noted, the financial crisis only provides part of the explanation – there are evidently lags in upgrading of process technology and product quality. Relative to most of its neighbours, the Philippines still has a strong underlying advantage in labour-intensive exports, but maintaining this advantage requires sustained upgrading as cheaper competitors emerge in China, South Asia and Vietnam.

Human Capital

Despite its enrolment record, the Philippine education and training system faces problems of quality and relevance. There is a 40% dropout or failure rate at universities and colleges. The school cycle is one year shorter than in most other countries, so that higher education institutions have to spend more time bringing entrants up to required levels. The curriculum is not geared to modern technological needs and has little inputs from industry, unlike the NIEs where there is much more direct and continuous interaction between providers and users of higher education. Standards in many higher education institutions are below international levels. In an exercise ranking 105 state and over 1000 private colleges into four categories (the highest level, 4, being equivalent to a good foreign university), the Commission for Higher Education found in 1996 that only 2 institutions in the country achieved Level 4. The vast majority clustered in the two lowest levels. The Commission identified 18 ‘Centres of Excellence’, to be given special assistance to upgrade faculties and equipment. However, the bulk of the higher education sector is turning out graduates of variable, rather indifferent, quality.

Technical education and training for industry also suffer widespread quality problems. In 1992, the Educational Commission found the technical training system to be ill managed and under-financed: it had one of the lowest per capita expenditures in the region (only Bangladesh was lower). There is a significant of mismatch between the skills provided by the system and those needed by employers, resulting in large numbers of unemployed trainees. Most large manufacturing firms, especially foreign affiliates, invest significantly in employee training, but to date no systematic survey has been made if industrial training. However, without a comprehensive and continuous monitoring of industrial training, the government cannot systematically encourage it. There is no government levy to promote employee training; such levies exist in most neighboring countries, along with other schemes to encourage or subsidize firms to invest in upgrading employee skills. SMEs invest little or nothing in formal training of their workforce, and are largely unaware of the need for this: special schemes are needed to upgrade their human capital.

Technological Activity and Support

There is a striking mismatch in the Philippines between local technological effort and the high-tech structure of exports. Overall levels of R&D are low, especially that financed by enterprises (Table 10). The public sector dominates R&D, with poor quality R&D management and institutions delinked from productive activity. While this is also true of some countries in the region (e.g. Indonesia and Thailand), it is not typical of the technology-oriented NIEs like Singapore, Korea and Taiwan.

Such low technological effort may not matter as long as enterprises can remain competitive with heavy reliance on imported technologies. This is adequate for export activity when only simple assembly is involved and MNC participation ensures the continuous inflow of new know-how and components. However, the lack of local technological effort can constrain competitiveness as wages rise and more complex, value-added activities have to be undertaken. R&D becomes necessary, not to replace imported technologies, but to use them more effectively and to go back in the value chain from assembly into design and manufacturing. In Malaysia, electronics MNCs have gradually raised the technological level of activity and several now use R&D by local affiliates to design and develop new versions of mature products (mainly in consumer products). In both Malaysia and Singapore, much of the enterprise-financed expenditure shown in the table

comes from foreign affiliates. Outside MNCs, R&D capability is increasingly needed to promote the growth and competitiveness of local suppliers and subcontractors.

Table 10: R&D Employment and Expenditures

	R&D Personnel			R&D Expenditures	
	Year	Scientists & Engineers in R&D		Total R&D as % GNP	Productive enterprise financed
		Per m. pop.	Numbers		R&D % GNP
Philippines	1992	157	9,960	0.20	0.05
Hong Kong	1995	98	574	0.30	0.01
Singapore	1995	2,728	7,695	1.10	0.69
Korea	1994	2,636	117,486	2.80	2.35
Taiwan	1995	3,022	63,457	1.80	0.99
Indonesia	1995	N/A	N/A	0.10	0.08
Malaysia	1992	87	1,633	0.40	0.17
Thailand	1995	119	6,899	0.10	0.01
China	1995	350	422,700	0.50	...

Source: UNESCO, *Statistical Yearbook 1997* and national sources for Taiwan (China).

A weak technological support structure, manifested in low public R&D, reduces the ability of smaller enterprises to innovate and raise productivity. This is why the NIEs invested heavily in promoting R&D, both in public institutions and, more importantly, in private industrial enterprises, while encouraging the import of new technology from advanced countries.[6] Singapore, a highly MNC-based economy, targeted MNCs for particular activities (most recently, into R&D itself) and induced existing investors to upgrade their technological levels over time. It provided comprehensive technical and financial support for local SMEs, an essential means of enabling them to subcontract to MNCs and so benefit from technological spillovers. Korea had the most comprehensive and ambitious policies for technology development, combining high technology import with a strategy of developing local capabilities. This involved promoting the *chaebol* to spearhead investment and technology development; the top few *chaebol* now account for over three-quarters of total private R&D in the country. Taiwan also mounted a broad array of technology support measures aimed largely at its SMEs, with public provision of technological support and a very pro-active system of extension and contract research.

[6] See Sanjaya Lall, *Learning from the Asian Tigers*, London: Macmillan, 1996.

The Philippine government has neglected private R&D. Its trade and industrial regimes have failed to foster an autonomous technology culture, and its SME support system is weak. Despite its ambitious Science and Technology Agenda for National Development (STAND), much of the effort remains on paper. Technology finance is weak and there is little effort to raise an awareness of the need for technological effort among private enterprises. The *Department of Science and Technology system* is large. It encompasses the National Academy of Science and Technology and the National Research Council, as well as five research Councils. It also contains 7 research institutes — for industrial technology; metal industry; nuclear power; textiles; advanced science and technology; food and nutrition; and forest products — and 6 other institutes, for science education, technology information, technology application and promotion, atmospheric geophysics and astronomy, seismology and a science high school.

However, its practical relevance for industrial technology development is limited. Only 2 percent of DOST staff in 1995 have doctorates, and another 9 percent masters' level qualifications. Staff is poorly compensated and tends to be out of touch with international scientific trends and research being done by counterparts overseas. [7] There has been relatively little direct interaction with, or contract research from, the private industrial sector (the whole system had 23 contract research projects from private industry in 1995). Few of the technologies created are in commercial production. R&D into designated 'export winners' has yet to yield tangible benefits, and its focus does not seem directly relevant to areas of dynamic competitive advantage to the Philippines.[8] DOST also provides a number of industrial testing and laboratory services; these account for most of its budget and employment.

The *Bureau of Product Standards* provides testing facilities, promotes quality standards, and accredits independent laboratories. It has been promoting the spread of ISO 9000 standards in the Philippines, but cannot offer any incentives to firms to adopt these standards. This may hold back the spread of an important competitive tool among smaller local enterprises in the country (many countries offer subsidized consultancy services to firms seeking ISO certification). The Bureau has no financial autonomy and government scales dictate its salaries. This makes it difficult to recruit

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[7] Jose A. Magpantay, 'Streamlining the Science and Technology Sector for the Country's Development Goals', Report to the Department of Budget and Management, Philippines Institute of Development Studies, 1993.

[8] The major activities under the 'export winners' scheme include glass from processed 'lahar', low-sugar mango product, bamboo products, human identification systems, waxing technology, para-rubber, stripping machinery and calcinated marble dust. Page 3 of the DOST *1995 Annual Report.*

and retain good technical graduates. Its equipment limits its testing facilities, and many exporters, in particular smaller companies that cannot afford in-house facilities, have to use expensive tests abroad.

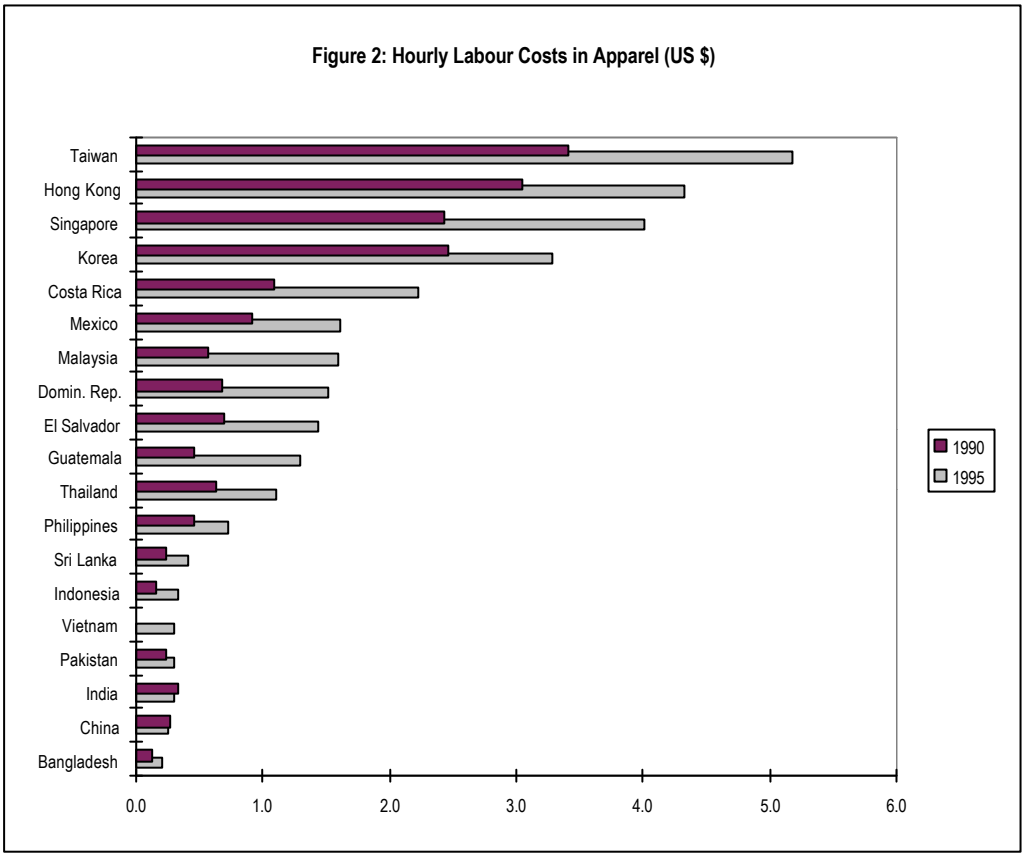
In general, therefore, the technology system in the Philippines is of limited effectiveness. There are too many institutions with different programs and objectives, a major source of weakness. The management and funding system does not conduce to effective operation or to close linkages with industry. To quote, "Most institutions involved are significantly under-funded for the scale of tasks to be accomplished. Many companies complained of the difficulty and delays involved in obtaining basic services such as equipment calibration … Most institutions appeared to be taking a passive role in working with firms rather than proactively seeking opportunities to initiate upgrading programs. There also appears to be a serious difficulty on the part of the institutions in retaining skilled people because wages are too low."[9] Government programs to help SME technology suffer from similar problems: they are "too unorganized, weakly motivated, and under-funded, and have too many different objectives."[10] The financing of SME technology upgrading is a serious problem; technology finance for all sizes of enterprises is still in its infancy. The technology information system is not very helpful to private firms who need to locate and buy new technologies from abroad.

Garments

Philippines has no comparative advantage in low-wage garment exports. Its labour costs now are considerably higher than China or South Asian exporters (Figure 2), though they are still below those in ASEAN competitors like Malaysia and Thailand. The cost of semi-skilled labour is most important at the low quality, mass-produced end of the garment industry; as wages rise they have to be offset by improvements in quality, productivity and flexibility. Philippine wages are lower than in Malaysia and Thailand, but these countries have expanded their garment exports faster. China has about the same hourly wages as India and Pakistan but its exports have grown over twice as fast. Latin American exporters have considerably higher wages but their competitive position has been transformed by the entry of US producers and their privileged access to the US

[9] Foreign Investment Advisory Service, *The Philippines: Promoting Backward Linkages: A Pilot Program for the Electrical Appliance and Electronics Industry*, World Bank, 1995, p. 16.
[10] *Ibid*. p. 19.

market. Italy remains one of the world's leading clothing exporters despite very high wages ($14 per hour in 1996). Other factors explain the evolution of competitiveness in this industry.



Market access, the operations of multinational producers, and the allocation of quotas under the MFA are significant influences on the pattern of garment exports. In Asia, the export thrust has come mainly from local (and regional) firms, while in Latin America foreign (particularly US) affiliates have been predominant. The MFA has long dictated the location of garment exports, and has sheltered many quota holders from the full force of competition. Its abolition by 2005 will lead to a massive 'shake-out' in all exporting countries. The OECD market has been moving to higher quality products, where the cost of labour *per se* counts for less. Wages will remain the overwhelming consideration for the slowly diminishing segment of the lowest quality products. In others, technology, specialization, design, marketing and flexibility will be the dominant competitive factors. The future of Philippine clothing exports will depend on quality upgrading. This will depend in turn on the use of new technologies, better access to the best fabrics and other inputs (a strong domestic textile, dyes and accessories industry), advanced technical, management, design and marketing skills, and timely delivery and flexibility. High degrees of vertical

integration, needed in the past to ensure reliable quality and delivery, will be less of an advantage: higher quality products tend to require smaller firms and greater inter-firm specialization and subcontracting.

The garment industry has reasonable human capital, especially in fine embroidery (important for infant wear and certain dresses where the Philippines has a leading position in US markets). However, it is weak in several specialized technical skills (pattern making, draping and design). Worker productivity is variable, but there have been few attempts to raise productivity by benchmarking. Small producers are the furthest behind world 'best practice', but several large producers have also not introduced appropriate process and quality management techniques. As far as equipment is concerned, investments and FDI in the industry have fallen behind those in other industries. Imports of textile machinery grew at 6% per annum during 1990-95 as compare to the growth of total machinery imports of 23% (and of electrical machinery by 24%) per annum. Investment in clothing fell from 6% of total investment in the Philippines in 1987 to 0.09% by 1995; foreign investments in the industry fell from 7% (of total foreign investments) to 0.11% over this period.[11] Some large exporters have invested in CAD/CAM equipment, containerization of shipments and advanced process systems, and so improved their quality and turnaround times. However, the bulk of the industry remains uncompetitive by best practice standards.

Design capabilities in the Philippines clothing industry, while growing, remain weak. Existing design schools are inadequate and firms often hire expensive foreign designers. Design weaknesses hold back quality upgrading, since producers are unable to offer buyers their own collections and find it more difficult to 'shop around' for different, more rewarding, markets. Delivery times by Philippine exporters are variable: good firms can deliver products to the EC in 30-40 days, but most need 60 days for repeat orders. While this is better than the regional average (for South Asia, China, Indonesia or Thailand) of 90 days, it does not match East Europe or Turkey's 21-40 days, or West Europe's 14-28 days. In terms of quality as shown by average unit price, Philippine garments fetch lower prices than those from Hong Kong, Korea, Malaysia, India, China, Thailand, Indonesia, Mexico or Turkey. The industry suffers from weaknesses in the upstream local textile industry, which has poor dyeing and finishing capabilities. This forces garment producers to rely heavily upon imports, often adding to their lead times. Moreover, there

[11] M. S. Austria, *The Effects of the MFA Phase Out on the Philippine Garments and Textiles Industries*, Philippine Institute for Development Studies, Manila, 1996, Discussion Paper Series No. 96-07.

has been a decline of textile production, possibly weakening the downstream industry: a restructuring and upgrading of the textile industry would greatly help the competitive position of clothing exporters. The recent growth in textile exports is encouraging, though these may be from plants that do not serve local garment producers.

Subcontracting is widely used in the Philippines. It involves large firms 'putting out' the assembly of garments to small assemblers rather than the specialized, integrated fashion production characteristic of advanced producers (as in the 'industrial districts' of North Italy). Filipino subcontractors tend to remain in low-skill, low value activities and there is a risk that they will suffer as the MFA goes and competition intensifies. These firms find the greatest difficulty in finding the financial, human and technological resources to improve their technology. It is important to strengthen their competitive base at all levels: improving training facilities for operatives; creating and improving training facilities for garment design, pattern making, draping and other advanced skills; benchmarking technical efficiency; assisting firms with productivity-raising measures and in-house training; improving the competitive position of the upstream textile industry; and encouraging the formation of specialized 'clusters' where firms share facilities, information, technology and skills.

Electronics

The main weaknesses in electronics arise from the low technological and local content levels in the Philippines. Much of the activity in MNC affiliates is still at the simple assembly and testing level (despite the fact that some MNCs use local engineers for advanced activities). This may not constrain exports for the time being, but the capabilities developed for low level assembly may not automatically grow into those needed for more advanced products and processes. Yet these advanced technologies will be increasingly needed if growth are to be sustained in the future. Semiconductor technologies are subject to rapid change, and without a flexible and advanced base the Philippines may not be able to compete with lower cost competitors. There is also the possibility that new technologies will not be sensitive to labour costs, but seek locations that offer advanced production, design and supply capabilities despite higher wages.

Low local value added in the Philippines is another reflection of its weak technological capabilities. Average local content is only 20% in semiconductors. It is higher, 25%, in simple items like printed circuit boards and lower, 10-15%, in complex products like microprocessors (made by companies like Intel), below the average levels reached in Malaysia (around 45%) and

Taiwan (75%). However, a rough indicator of local content (exports divided by imports) suggests that it has been growing over time (Table 5.9). However, this *is* a very rough indicator – it is possible that many exports and imports are unrelated to each other. It is widely acknowledged that local supplier capabilities (especially among SMEs) are weak; they need to be strengthened if local content is to keep rising. There are practically no local producers with the capability to take on 'original equipment manufacture' (OEM), which was one of the main arrangements used by firms in Korea and Taiwan to access new technologies and export advanced electronics products.

D. Policy Implications

The most important immediate issue facing the Philippines in the competitiveness area is clearly the sustainability of the electronics export boom. However, there are other important, longer-term, strategic issues related to export competitiveness: the overwhelming dependence on one activity is risky, labour-intensive exports show disturbing signs of declining competitiveness, and institutional support for the upgrading of enterprise capabilities remains inadequate.

It is not possible to give an unequivocal answer to the issue of electronics export sustainability. The critical factor is the international sourcing pattern of leading US and Japanese multinationals, and these are based on economic as well as other factors (including corporate

Table 9: Exports as % of Imports in Philippine Electronics Industry

Products	1991	1992	1993	1994	1995	1996	Average
Semi-conductor devices	106.0	105.0	108.5	104.1	124.2	131.6	117.9
Electrical machinery	11.0	11.3	13.5	20.1	21.5	14.8	16.2
Telecom/sound apparatus	70.9	71.3	67.1	58.6	48.5	48.7	55.8
Office, data processing mach.	77.9	54.9	85.5	75.0	89.1	105.7	86.9
Consumer electronics	251.9	290.8	232.0	214.3	163.3	177.6	200.3
Audio visual products	319.3	367.2	309.0	263.4	205.3	261.9	262.2
Household appliances	112.6	171.8	92.0	90.7	57.8	48.5	76.1
Other consumer products	150.0	48.5	113.5	151.4	101.6	130.0	113.6
Total	87.6	82.8	86.6	85.9	98.3	102.3	93.7

Source: DTI data

strategies). It is not immediately obvious why there has been a regional shift in sourcing of semiconductors towards the Philippines from traditional centers like Malaysia. The main economic advantage of the Philippines appears to lie in its relatively cheap and plentiful technical labour, but it has to be established whether this is the driving force behind recent FDI and sourcing patterns. If it is, the Philippine advantage is a genuine one in comparison with the other 'new Tigers' and all efforts should be made to maintain and improve it. If it is not, and the sourcing simply reflects the timing of new investments, the boom may fade in a year or two as new plants are 'run in'.

It is imperative for the Philippines to strengthen its competitiveness in other activities. Not only is it necessary to diversify the export base (and so reduce the risk inherent in the present level of product concentration), it is inappropriate for labour-intensive exports to lose their international edge at this stage of development. To revive their competitiveness, the Philippines needs to formulate and implement strategies aimed specifically at skill, technology and marketing weaknesses in a range of manufacturing activities. The government appears fully aware of these needs, and has mounted a comprehensive response – unfortunately, much of this remains on paper. There are widespread institutional weaknesses in the major support institutions that need to be tackled, backed by efforts to benchmark and raise enterprise level productivity.

While the Philippines' most valuable resource is human capital, it needs sweeping improvements at all stages of the education and training system. The quality, relevance, and completion rates need to be raised, the length of schooling brought into line with international norms, and access among the poorer sections of the population improved. The quality of higher education institutions is highly variable and there are few centers of excellence by international standards: a broad improvement of teaching standards and equipment is needed to create the high level technical and management skills that competitiveness will require. The technical training system needs better funding and has to reorient its curricula to employer needs. The specific skills needed by traditional industries (garments) as well as new ones (electronics) are not being properly met. Employee training by firms is undertaken mainly by large firms, but smaller firms invest little in upgrading skills of workers. There are no studies of how much training is being provided and by whom, so appropriate policy cannot be undertaken.

The technology support system has all the necessary elements on paper, but lacks implementation and coherence. There is no systematic analysis of the technological needs of the country and how to achieve them: current plans are too broad and general. The private sector

invests little in technology development, and there is no program to stimulate technological activity in industry. There is a need for a 'technology foresight' exercise of the type being undertaken in most OECD countries to involve industry, technology institutions and academia in evaluating the most pressing technological needs facing the Philippines. This would involve all concerned sections of the population in understanding the implications of technological change and gearing up to meet evolving needs effectively.

The technology infrastructure is unable to provide effective support to private industry. Its salary structures and management are not conducive to seeking out and helping enterprises with technical problems and upgrading. There is too much attention to routine testing and laboratory services, which could be in the private sector, and not enough to providing real public goods like basic or contract research, information collection and dissemination, and extension services to SMEs. The large number of institutions need to be rationalized and better structured and funded. A thorough analysis needs to be carried out of DOST's functions, structure and management, and measures undertaken to link it more tightly to the productive structure. More generally, there is a need for launching consultancy and productivity raising measures for industry, using benchmarking techniques and drawing upon the experience of countries like Taiwan that cater to large numbers of export-oriented SMEs.

Finally, the specific needs of the major export industries have to be addressed. The electronics industry is growing rapidly but not deepening sufficiently. The garment industry is falling behind relative to both higher and lower wage competitors, and needs to upgrade its product range and quality. Strategies for restructuring and upgrading may be needed for these and other important activities. These are not being devised adequately by the EDC but there is no other institution present charged with this function. Industry associations themselves do not conduct the kind of analytical work needed to influence policies on competitiveness: the government needs to catalyze such work.