

**Working Paper Number 101****Industrial Realities in Nigeria:  
From Bad to Worse**

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*This paper assesses the industrial performance and capabilities of Nigeria over the last decade. It explores Nigeria's export and production capacity, growth, structure and technological upgrading and compares it to other Sub-Saharan countries. Evidence shows that Nigerian industry is inexorably falling behind and becoming increasingly marginalized in the international and regional industrial scene. Total manufacturing value added and manufactured exports have significantly declined and there has been a technological downgrading of Nigeria's traditional manufacturing sectors. Moreover, increased dependency on oil extraction puts a serious threat to Nigeria's industrial competitive future. Severe flaws in the education system, technological stagnation of domestic companies, lack of foreign investment in manufacturing, negligible technology transfer and weak ICT infrastructure constitute significant factors for failure. Further analysis should however include other factors not explored in this exercise, including macro-economic and fiscal policies, governance and the regulatory and business environment.*

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## **Introduction**

Despite having plentiful natural resources, the largest domestic market in Africa, and an abundant and cheap labour force, Nigeria's industrial performance has been highly disappointing in the last decade. Between 1990 and 2000, total manufacturing value added and manufactured exports have declined, and the country has become dangerously dependent on petroleum as the only means to obtain foreign exchange. As a result, Nigeria is losing its competitive manufacturing edge and is becoming increasingly marginalized in the international industrial scene. Nigeria faces severe flaws in its production and export structures, which have been the outcome of inappropriate policies, macro-economic instabilities, a distorting business environment, lack of transparent governance and weak industrial capabilities.

This paper presents an industrial assessment for Nigeria. It uses quantitative indicators to compare Nigeria's industrial performance and capabilities to those of other countries in the region. The objective of this paper is to position Nigeria in the industrial scene and to shed some light on what capability factors may explain its poor performance. This paper follows UNIDO's Industrial Development Report 2002-2003 in its approach as it uses its 'structural drivers' for industrial competitiveness: human resources, technology effort, FDI, technology transfer, ICT infrastructure. It however acknowledges that industrial performance is influenced by a wider range of factors, which cannot be always measured and therefore escape the scope of this exercise. A more comprehensive study on the determinants of industrial performance in Nigeria should certainly make use of more qualitative material to improve or question the findings of this paper.

The country comparators used for benchmarking Nigeria's industrial performance and capabilities are: Senegal and Ghana in West Africa; Kenya in East Africa; Zimbabwe and South Africa in Southern Africa; and Algeria, Egypt and Morocco in Northern Africa. The paper also uses oil exporting economies in the Middle East (Bahrain, Saudi Arabia and Oman), Latin America (Venezuela and Ecuador), and East Asia (Indonesia) to benchmark Nigeria's performance in the oil industry.

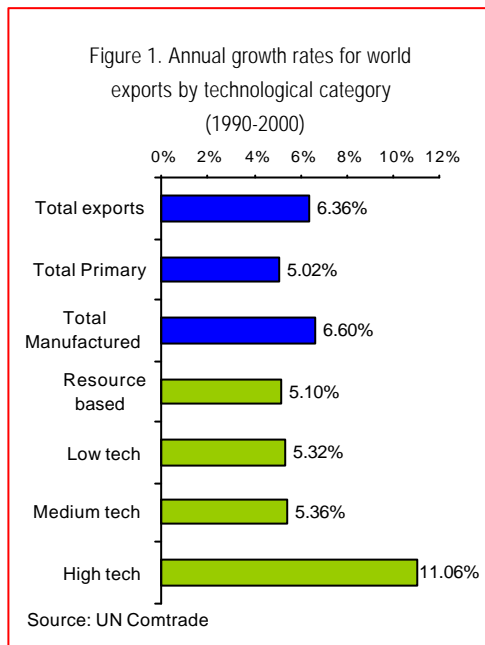
The paper is structured as follows. Sections I and II set up the conceptual underpinnings of the paper. While section I emphasises the importance of manufacturing as the engine of growth, section II presents the dynamic competitiveness approach and the significance of moving up in the manufacturing technological ladder. Section III positions Nigeria in UNIDO's Competitive Industrial Performance (CIP) index and compares it to other Sub-Saharan and oil exporting countries. Nigeria's industrial capacity and growth, and structure and upgrading are analysed in sections IV and V respectively. Section VI throws light on Nigeria's sectoral performance in resource-based (oil and food), low-tech (textile/clothing) and medium-tech (engineering) manufacturing sectors. Section VII deals with the industrial capabilities as explanatory factors to Nigeria's industrial performance. Finally, section VIII presents the conclusions.

## **I. Manufacturing: the engine of growth**

There is no doubt that manufacturing remains one of the most powerful engines for economic growth. It acts as a catalyst to transform the economic structure of countries, from simple, slow-growing and low-value activities to more productive activities that enjoy greater margins, are driven by technology, and have higher growth prospects. But its potential benefits are even greater today. With rapid technological change, sweeping

liberalisation and the increased defragmentation and internationalisation of production, manufacturing has become the main means for developing countries to benefit from globalisation and bridge the income gap with the industrialised world. These are some of the many arguments that justify the importance of promoting manufacturing in the developing world:

- *Manufacturing is growing faster than the primary sector in total world trade.*



Between 1990 and 2000, total manufactured exports grew at an annual rate of 6.6 per cent, outpacing primary goods exports (figure 1). In 2000, manufactured exports accounted for nearly 86 per cent of total world exports – gaining 2 percentage points since 1990. Many primary exports have faced declining growth rates in the last decade – including many for which Nigeria seems to have a competitive edge (i.e. cereals and cotton) (UN comtrade). If Nigeria is to achieve dynamic competitiveness it must increase its participation in fast growing sectors that not only benefit from higher value added but also generate greater externalities to other sectors of the economy.

- *Manufacturing is less exposed to external shocks, price fluctuations, climatic conditions and unfair competition policies.* Nigeria's economy is very unstable due to its dependency to the oil sector – economic growth has often coincided with peaks in oil prices. In the longer run however, primary goods exports face declining terms of trade due to their low value added relative to manufactured goods (Prebisch-Singer hypothesis), and the constant fluctuations in world prices. In addition, unfair competition policies have distorted primary goods markets around the world. For instance, subsidised farming in developed countries has closed down market prospects for primary goods exporters from poor nations.
- *Manufacturing is the main vehicle for technology development.* Manufacturing represents today the hub for technical progress not just in developed countries but also in developing countries. Industry uses technology in many forms and at different levels to increase returns to investment by shifting from low- to high-productivity activities. This entails a process of constant technological upgrading and learning. In Nigeria, manufacturing should be seen as catalyst to technological progress and the main means to achieve higher and more sustainable industrial margins.
- *Manufacturing drives and diffuses innovation.* Research and development (R&D) financed by manufacturing enterprises account for the bulk of innovation activity carried out in the developed world. But R&D expenditure is only the tip of the technology effort iceberg. Manufacturing also offers great potentials for informal innovation activities, or 'clever gimmicks', such as incremental improvements in products and processes. A strong R&D is important for Nigerian firms to absorb and modify technologies more quickly and efficiently, adapting them to the local conditions and needs.

- *Manufacturing has a 'pull effect' on the other sectors of the economy.* The development of the manufacturing sector stimulates the demand for more and better services: banking, insurance, communications and transport. Without them, manufacturing is unlikely to realise its full potential. In Nigeria, manufacturing can be used to stimulate a more productive agricultural sector making use of technological advances. Manufacturing can also contribute to help reform Nigeria's weak banking sector through reforms driven by the increased demand of working capital for manufacturing activities.
- *The internationalisation of production has spread the benefits of manufacturing.* The spread of multinational corporation (MNC) activity around the globe has benefited manufacturing more than any other sector of the economy. The trend towards vertical disintegration of production activity in industrialised countries means that developing countries can now participate in the global economy by inserting themselves into international value chains. This is not easy though, as competition to host MNC activity in developing countries is becoming tougher. Indeed, evidence shows that only a handful of developing countries have participated in global manufacturing activity (UNIDO, 2002). Low FDI in Nigeria's manufacturing sector is a clear sign that the country has so far not benefited from the internationalisation of production.

## **II. Moving up in the technology ladder: an imperative to achieving dynamic competitiveness**

Increasing industrial capacity is the first step towards achieving dynamic competitiveness, but it might not be enough. Today countries face more international pressures than ever before because the nature of competition has changed: it is now more intense and based on a wider range of factors. While price continues to matter, particularly in third world markets, factors such as innovation, fashion, quality, flexibility, reliability and speed of delivery have become increasingly important. Export markets have become so demanding that producers in developing countries feel that they are expected 'to produce at third world prices to first world standards'. Relying primarily on prices can lead countries to 'race to the bottom' in market segments where industrial rents are low and competition high. Achieving dynamic competitiveness really comes down to the countries' ability in increasing industrial capacity while shifting production and export structures towards higher value-added and technology-intensive activities or sectors. This moving up in the technology ladder has proved to be more desirable for economic growth for the following reasons:

- *Within manufacturing, complex activities are growing faster in trade than simple activities (figure 1).* Between 1990 and 2000, high technology industries grew by 11 per cent per annum, outpacing the growth rates experienced by other manufacturing sectors. Within high-tech industries, semiconductors have been the fastest growing sector (17 per cent) accounting for 5 per cent of world trade in 2000. Medium and low-technology products grew at fairly similar rates over the period, though medium-tech products, despite some slippage, dominates world trade with around 32 percent of total exports. Resource based continues to be the slowest growing sector within manufacturing, and if we take the period between 1995 and 2000, the decline is even more significant (the growth rate for this period is only 3 per cent per annum). Within resource based, agro/forest based products are clearly the main losers, but still growing a bit faster than most primary commodities (UN Comtrade).

- *Technology-intensive sectors are less vulnerable to entry by competitors, and therefore enjoy higher and more sustainable margins.* Resource based and low technology activities are more exposed to competitive pressures as the overall capabilities to enter in the industry are relatively lower and can be met by newcomers. Competitive advantages in these sectors often come from price rather than quality or brand names. In contrast, technology-intensive activities call for more complex capabilities and processes that impose greater barriers to entry. Developing countries, including Nigeria, often specialise in labour-intensive sectors where labour cost is the predominant competitive factor. The ability of countries to scale up in the technology ladder, between or within sectors, will determine their capacity to sustain or even enrich margins.
- *Technology-intensive activities often offer greater learning prospects and spillover benefits to other sectors.* For instance, the skills developed in high technology sectors have more applicability to other sectors than those skills learned, say, in resource based industries. This is of course an oversimplification of the reality, but yet it holds truth in many cases. Capabilities in technology-intensive industries are grounded in shared disciplines, notably mathematics, physics, engineering, and computing. Strong capabilities based on scientific knowledge can be adapted to the particular demands of industries at a faster pace. As technology in these sectors also changes rapidly, the learning component is always very high. By contrast, in sectors where technology hardly changes the learning process is rather limited

### III. Nigeria in UNIDO’s Competitive Industrial Performance (CIP) Index

UNIDO’s latest flagship report, the Industrial Development Report 2002-2003, presents the new competitive industrial performance (CIP) index for 87 countries in two years – 1985 and 1998. This CIP index comprises in only one indicator several dimensions of industrial competitiveness – capacity, growth, structure and upgrading – and is used to benchmark countries’ current industrial performance and evolution over time. The CIP

Table 1. CIP ranking for Nigeria and Other Sub-Saharan Countries

CIP Ranking		Country
1998	1985	
39	32	South Africa
51	38	Zimbabwe
56	47	Mauritius
62	64	Kenya
72	N.a	Mozambique
75	72	Cameroon
76	59	Senegal
77	68	Zambia
<b>78</b>	<b>75</b>	<b>Nigeria</b>
80	70	Tanzania
81	78	Malawi
82	73	Madagascar
83	77	Central African Republic
84	80	Uganda
86	76	Ghana
87	N.a	Ethiopia

Source: UNIDO 2002

Note: N.a is data not available

index is made up of four industrial performance indicators: manufacturing value added (MVA) and manufactured exports per capita, and the share of medium- and high-tech goods in MVA and manufactured exports. The underlying message behind UNIDO’s CIP index is that in order to achieve sustainable industrial development, countries have to increase their industrial capacity in domestic and international markets, while also deepening their industrial and export structures towards higher value-added activities and sectors.

Sub-Saharan Africa lags behind other developing regions in all indicators of industrial performance (UNIDO, 2002). Nigeria is not exception. In 1998 it ranked 78 out of 88 countries in the CIP index dropping

3 places since 1985 (table 1). In the region, Nigeria only performs better than Tanzania, Malawi, Madagascar, Central African Republic, Uganda, Ghana and Ethiopia. Note that even the regional leaders dropped substantially in overall industrial performance from

1985 to 1998 – South Africa by 7 places, Zimbabwe by 13, and Mauritius by 9. Only Kenya has improved its competitive position, though this is primarily the result of the deterioration in the ranks of other countries in the region.

Table 2. CIP ranking for Nigeria and Other Oil-exporting Economies

CIP Ranking		Country
1998	1985	
42	31	Bahrain
46	35	Venezuela
49	65	Indonesia
54	41	Saudi Arabia
59	39	Oman
61	58	Ecuador
74	54	Algeria
<b>78</b>	<b>75</b>	<b>Nigeria</b>

Source: UNIDO 2002

Table 2 compares Nigeria's CIP ranking to those of other oil-dependent economies in the world. These countries often rank poorly in the CIP index due to their dependency on natural resources and the low technological sophistication of their production and export structures. As can be seen, all oil-exporting countries (as classified by UNCTAD), have lost places in the CIP ranking, excluding Indonesia, for the period 1985-1998. Nigeria is the laggard among these because, as we

shall see later, it has neither diversified into manufacturing activities nor has capitalised on its oil potential by moving up into more value added and technologically sophisticated activities within the value chain. By contrast, other oil-exporting countries have made significant progress on these fronts and have coped better with increased competitive pressures.

In sum, Nigeria's poor showing on the UNIDO index is the outcome of weak performance in each of the four indicators of industrial performance: out of 88 countries in the world, it ranks 74<sup>th</sup> in manufacturing value added per capita, 85<sup>th</sup> in manufactured exports per capita, 40<sup>th</sup> in the share of medium and high-tech products in MVA, and 77<sup>th</sup> in the share of medium- and high-tech products in total manufactured exports. Given its size, Nigeria's industrial capacity is very low and mainly geared to domestic markets – its export propensity is one of the lowest in the world. Though its MVA structure appears to be relatively sophisticated, this is a bit misleading given its low MVA levels.

#### IV. Industrial Capacity and Growth

Manufacturing value added is the basic indicator of industrial performance. Let us first position Africa and its sub-regions in the international industrial scene. The first striking thing that emerges in the comparison is the massive difference in total industrial output (annex table 1). Total MVA in Sub-Saharan Africa was almost 2 times lower than in South Asia, and 8 and 12 times lower than in Latin America and East Asia in 1999. Excluding South Africa the difference doubles. The positive annual growth rates experienced by Sub-Saharan Africa between 1985 and 1999 are statistical illusions derived from small bases rather than promising signs of industrial growth. And even so, annual growth rates are lower than the average for developing countries. There is now clear evidence that the region is becoming more marginalised in the industrial scene: Sub-Saharan Africa's MVA share in the developing world has gone down from, already low, 5 per cent in 1985 to 4 per cent in 1999.

It is however important to note that significant intra-regional variations do exist. For instance, the industrial performance of Northern and East African countries is quite remarkable when compared to the rest of the region – both sub-regions have grown for more than 6 per cent in total MVA between 1985 and 1998, above the average for South Asia and Latin America (annex table 1). By contrast, West and Central Africa have stagnated in the last decade.

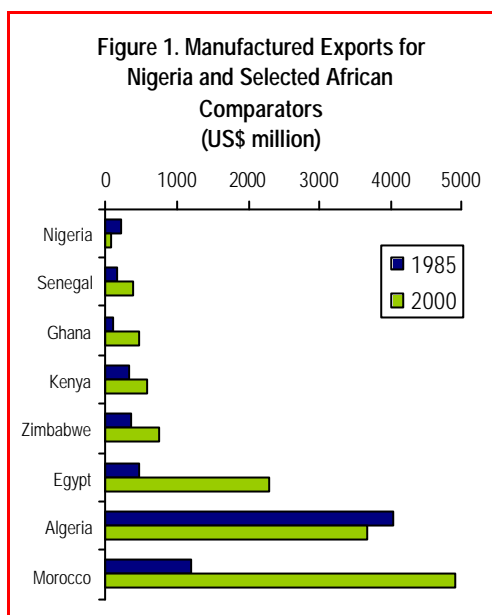
	1985	1990	1999	Growth rates (85-90)	Growth rates (90-99)	Growth rates (85-99)	MVA per capita 1990	MVA per capita 1999
<b>Nigeria</b>	<b>2,449</b>	<b>1,562</b>	<b>1,752</b>	<b>-8.6%</b>	<b>1.3%</b>	<b>-2.4%</b>	<b>16.3</b>	<b>14.1</b>
Ghana	519	572	700	1.9%	2.3%	2.1%	37.9	36.8
Senegal	330	747	808	17.8%	0.9%	6.6%	102.3	89.8
Kenya	631	862	1,170	6.4%	3.5%	4.5%	36.7	40.4
South Africa	11,476	24,040	24,914	15.9%	0.4%	5.7%	707.1	593.2
Zimbabwe	1,023	1,799	953	12.0%	-6.8%	-0.5%	183.6	79.4
Algeria	5,788	4,597	4,787	-4.5%	0.5%	-1.3%	184.6	159.6
Egypt	4,519	14,403	17,830	26.1%	2.4%	10.3%	257.2	283.0
Morocco	2,388	4,753	5,950	14.8%	2.5%	6.7%	206.7	212.5
<b>Sub-Saharan Africa</b>	<b>23,930</b>	<b>42,341</b>	<b>51,856</b>	<b>12.1%</b>	<b>2.3%</b>	<b>5.7%</b>	<b>94.5</b>	<b>80.6</b>

Source: WDI 2001

Nigeria's industrial performance has been highly disappointing. Total MVA declined from US\$ 2.4 billion in 1985 to US\$ 1.7 billion in 1999 (table 3). MVA per capita dropped from US\$ 16 in 1985 to US\$ 14 in 1999, one of the lowest in the region. Now compare with other countries. Neighbouring Senegal has emerged as a solid industrial performer, experiencing growth rates above the average for Sub-Saharan countries – mainly due outstanding growth rates between 1985 and 1990 – and over performing Ghana and Nigeria. Despite some slippage in the 1990s, Senegal's MVA per capita in 1999 was still 6 times higher than that of Nigeria. Take now North Africa. Egypt and Morocco seem to have maximised their location advantages to serve and access European markets with labour intensive products (especially garments). As a result, industrial production in Egypt and Morocco grew at 10.3% and 6.7% respectively for the period 1985-99. In per capita terms, they are far ahead of Nigeria. In East Africa, the most outstanding case is that of Mauritius. MVA in this island economy has grown at 13.3 per cent per annum for the period 1985-99, the highest in Africa. Kenya has also done quite well, almost doubling industrial output in 15 years.

MVA is not always exposed to international competition as policies and other barriers to trade can limit the exposure of domestic industrial output to international markets. Thus, MVA on its own does not capture all the dimensions of industrial competitiveness. Export performance nicely complements MVA performance as it reflects firms' abilities to compete internationally as the main means to earn foreign exchange.

As in total MVA, the first striking thing in manufactured exports is the regional differences in volume (annex table 2). Manufactured exports in Sub-Saharan Africa, excluding South Africa, were about 8 and 36 times lower than in South Asia and Latin America in 1998, and 132 times lower than in East Asia. This shows that when it comes to export markets, industrial divergence in the developing world is even more acute. Sub-Sahara's manufactured exports share in the developing world went down from 1.1 per cent in 1985 to only 0.5 per cent in 1998. The average annual growth rate for developing countries for the period 1985-98 is 13.3 per cent, almost double than that of Sub-Saharan Africa excluding South Africa. None of the African sub-regions have experienced higher growth rates than those of South Asia, East Asia and Latin America.



Nigeria’s export performance has been even more disappointing. Manufactured exports have plummeted from US\$ 216 million in 1985 to a dismal US\$ 88 million in 2000 – only Algeria has experienced a decline of manufactured exports in the region for that period (figure 1). This makes Nigeria one of the less export-oriented economies in the region. Manufactured exports in Nigeria only accounted for 0.2% of total exports in 2000, declining from already low 1.5% in 1985 (annex table 4). This is among the lowest manufacturing propensity ratios in Sub-Saharan Africa, and is the result not only of declining manufactured exports but also an increased dependency on primary exports, particularly oil. Indeed, Nigeria’s share of oil exports in total exports has increased from 95.4% in 1996 to almost 99.6% in 2000, making it one of the less diversified economies within the

region and in the world.

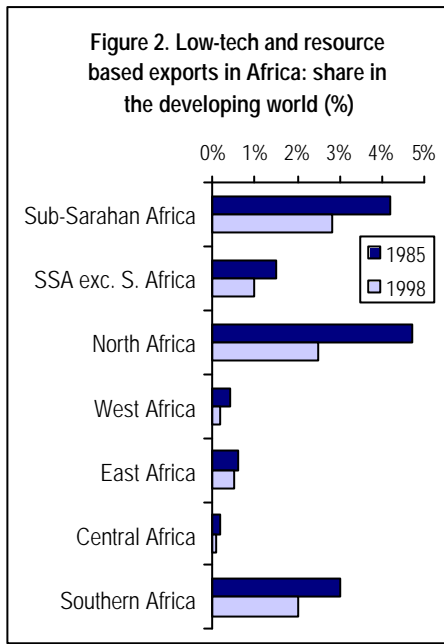
### V. Industrial Structure and Upgrading

As already mentioned, all manufacturing sectors are not equally beneficial for industrial competitiveness and hence economic growth. Technology-intensive manufacturing sectors – that is, medium and high-tech sectors (MHT) – grow faster, have greater learning prospects and often breed more externalities to the rest of the economy. They generate higher value added and impose higher entry barriers to newcomers. By contrast, simple sectors – i.e. resource-based (RB) and low tech (LT) – generate lower and less sustainable margins as competition is much tougher. These sectors – often labour-intensive – do not need a strong human resource base and are considered major entry points in industry by most developing countries.

Expectedly, Sub-Saharan Africa has less complex MVA structures, (i.e. MHT products in MVA) than the rest of the developing world (annex table 5). Moreover, complex structures in Sub-Saharan Africa have hardly evolved for the period 1985-98. By contrast, East Asia has the most sophisticated industrial structure in the developing world (the share of MHT in MVA is around 55 per cent), followed by Latin America. Again, variations within Africa are significant. Central Africa has the less sophisticated production structure, and East Africa specialises in LT industries, particularly garments. Southern Africa has the most complex industrial structure in Africa, mainly because of South Africa, but still simpler than that of South Asia.

Take now the export structure for Sub-Saharan Africa and other developing regions (annex table 6). It is clear that the competitive strength of Sub-Saharan Africa lies in resource-based manufactured exports – its share of RB in total manufactured exports is 45.9% in 1998, compared to 21.4% in South Asia, 24.9% in Latin America, and 12.1% in East Asia. Unlike all other developing regions though, Sub-Saharan Africa, excluding South Africa, has experienced a downgrading in its export structure as the share of MT and HT exports have declined between 1985 and 1998. Annual growth rates for each technological category in Sub-Saharan Africa are lower than those for other developing regions, not just in complex activities but also in simple sectors. This evidence is even more worrying when taking into account Sub-Saharan Africa’s small base in





manufactured exports. Figure 2 presents Africa’s share of RB and LT manufactured exports in the developing world. Two things are striking. The first is Africa’s low share in what it is supposed to be its “bread and butter” (less than 3% of the developing world market share in 1998). The second is that this share has declined for the period 1985-99 in all sub-regions, including North Africa. This means that the region is even losing ground in those manufacturing sectors where it is supposed to have a competitive edge. How does Nigeria’s MVA and export structure compare to that of other countries in the region? Table 4 shows the degree of technological sophistication in MVA at the country level. South Africa, as expected, has the most sophisticated MVA structure in the region, followed by Egypt. Nigeria’s MVA structure appears to be quite sophisticated, though this should be read carefully. As shown

earlier, and unlike other Sub-Saharan countries, total MVA in Nigeria declined by 2.4%

Table 4. Technological structure of MVA for Nigeria and Selected African Comparators (%)

	1985			1998		
	MHT	LT	RB	MHT	LT	RB
<b>Nigeria</b>	<b>34.0%</b>	<b>23.3%</b>	<b>42.6%</b>	<b>37.7%</b>	<b>33.7%</b>	<b>28.5%</b>
Ghana	11.8%	8.9%	79.3%	16.8%	10.8%	72.5%
Senegal	21.0%	21.2%	57.8%	33.6%	9.7%	56.8%
Kenya	28.3%	17.2%	54.5%	23.6%	16.8%	59.6%
South Africa	43.5%	17.5%	39.0%	44.4%	18.0%	37.7%
Zimbabwe	34.3%	25.0%	40.7%	27.3%	22.3%	50.4%
Algeria	32.4%	31.3%	36.3%	29.1%	15.3%	55.7%
Egypt	31.1%	22.9%	46.1%	38.8%	16.4%	44.8%
Morocco	25.2%	25.4%	49.4%	25.4%	22.7%	51.9%
<b>Sub-Saharan Africa</b>	<b>35.4%</b>	<b>21.6%</b>	<b>43.1%</b>	<b>37.8%</b>	<b>20.8%</b>	<b>41.3%</b>

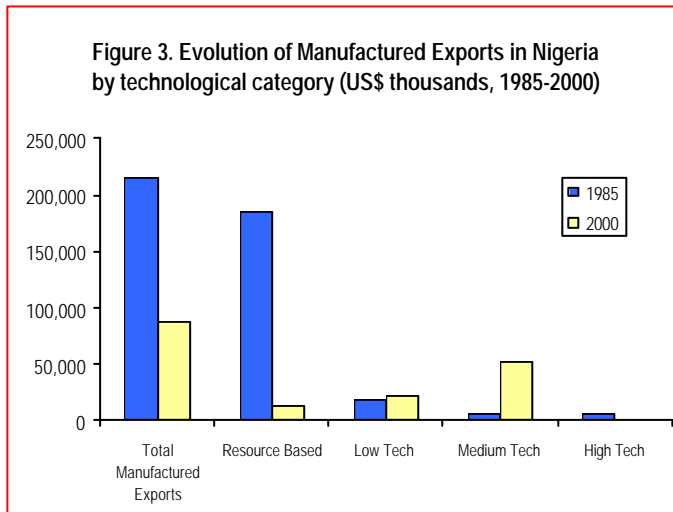
Source: Calculated from UNIDO (2002)

Notes: MHT stands for ‘medium and high technology’, LT for ‘low technology’ and RB for ‘resource based’.

between 1985 and 1999. This puts less credibility on the foundations of Nigeria’s industrial structure. Moreover, production structures do not always reflect how internationally competitive industry is, because both industrial output and structure can be distorted by pervasive

protectionist industrial regimes with strong orientation to domestic markets. One needs to explore whether production structures match export structures.

Although MT and LT exports have slightly risen in Nigeria between 1985 and 2000,



total manufactured exports have plummeted in the last 15 years. The RB sector has been badly damaged with exports declining from US\$185 million in 1985 to only US\$13 million in 2000 (figure 3). For instance, Nigeria’s food and agro-forest sector declined in export markets by 17.3% only in 4 years (between 1996 and 2000). HT exports also declined to the extent that the sector is almost non-existent in world markets today. As a result of this, Nigeria’s export

structure has dramatically shifted in the past 15 years (table 5). The share of HT products in total manufactured exports have declined from 2.6% in 1985 to only 0.5% in 2000. The RB sector has however suffered the most: from accounting by nearly 86% in total manufactured exports in 1985 it fell to less than 15% in 2000. The beneficiaries have been LT and MT sectors, though share increases should be interpreted cautiously as export volumes have dramatically dropped.

Although Nigeria’s share of MT is the highest in the region (of course relative to other exports), the country only exported US\$ 52 million of MT products in 2000, similar to Kenya and lower than Senegal (UN Comtrade). Take country size into account and

Table 5. Technological structure of manufactured exports for Nigeria and Selected African Comparators (%)

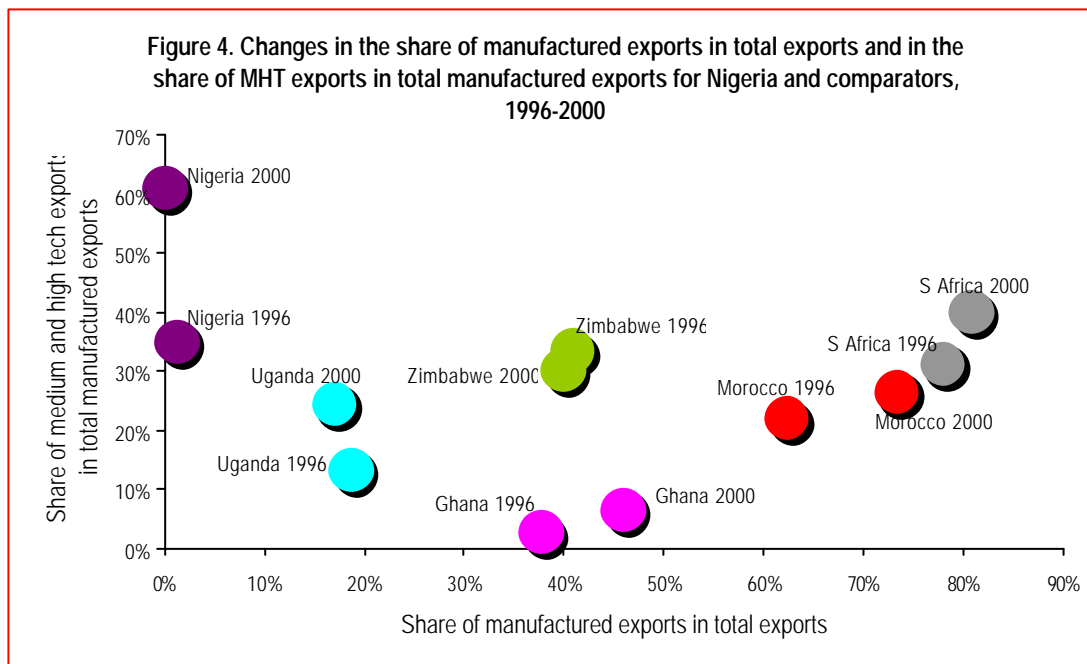
	1985				2000			
	HT	MT	LT	RB	HT	MT	LT	RB
<b>Nigeria</b>	2.6%	3.0%	8.6%	85.8%	0.5%	60.3%	24.4%	14.8%
Ghana	0.8%	2.0%	0.8%	96.4%	1.0%	5.5%	12.7%	80.8%
Senegal	2.0%	10.9%	10.3%	76.8%	2.1%	18.7%	8.6%	70.7%
Kenya	2.0%	6.8%	12.1%	79.0%	5.5%	9.5%	27.6%	57.5%
South Africa	9.0%	21.2%	16.5%	53.4%	6.1%	33.8%	16.6%	43.4%
Zimbabwe	1.5%	48.1%	23.4%	27.0%	1.7%	28.4%	31.0%	38.9%
Algeria	0.1%	1.2%	0.2%	98.5%	0.6%	2.9%	1.3%	95.1%
Egypt	1.1%	1.7%	35.2%	62.0%	2.4%	10.9%	31.9%	54.8%
Morocco	0.7%	15.4%	28.7%	55.2%	11.7%	14.8%	43.3%	30.2%

Source: Calculated from the UN Comtrade database

Notes: HT stands for 'high tech', MT for 'medium tech', LT for 'low tech' and RB for 'resource based'.

Nigeria is well below most African countries in manufactured exports by each technological category.

For a country such as Nigeria it is important not only to increase the contribution of manufacturing in the economy but also to upgrade within existing industries. These are the two main messages of the conceptual sections of this paper. The figure below provides visual insights on this and compares Nigeria’s manufactured export performance to that of other countries in the region. The desirable path would be to raise the share of manufactures in total exports (moving right along the X axis) while shifting the export structure towards complex sectors (upwards along the Y axis).



Morocco, Ghana and South Africa have done both. South Africa has the most complex export structure in the region. Its competitive advantage lies in technology-intensive

sector, notably as a world class supplier of parts and accessories of motorised and passenger vehicles, and in process engineering industries as a main producer of steel and iron in primary forms. Morocco, together with other Mediterranean countries including Egypt, Turkey and Tunisia, has experienced an outstanding upgrading from resource-based to low-tech industries mainly driven by foreign investment. Zimbabwe has gone backwards due to recent political woes: its share of manufactured exports in total exports has declined and so has its share of complex sectors in total manufacturing. Uganda and Nigeria show similar negative patterns, though the case of the latter is more acute. Nigeria lags behind other African countries in manufacturing performance: between 1996 and 2000 its dependency to oil exports has increased while manufactured exports have sharply fallen. Though its export structure appears to be highly sophisticated, this is more the result of falling manufactured exports rather than promising signs of industrial dynamism in technology-intensive sectors. Next sections explore Nigeria’s export performance in selected industrial sectors.

**VI. Sectoral Performance**

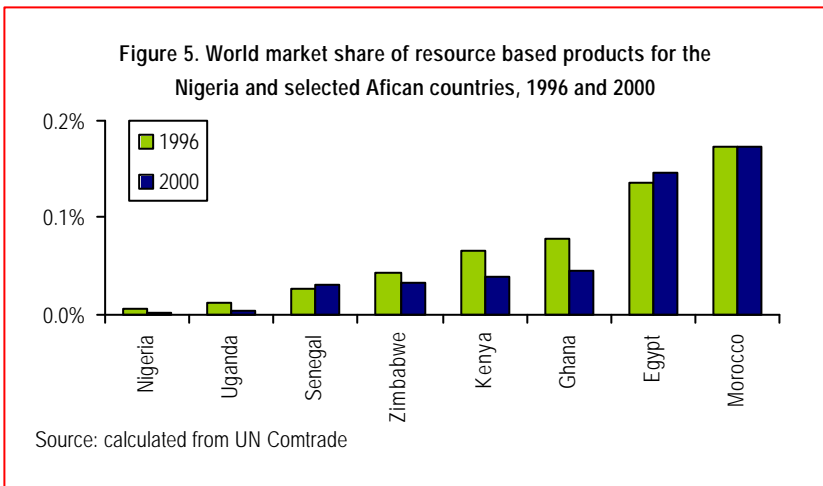
**Resource-based Industries**

Resource-based industries include food, agro-processed products (e.g. wood manufactures), refined petroleum and rubber products, ore and metal concentrates, cement, cut gems, glass and the like. These industries tend to grow slower than other manufacturing industries in world trade – they grew at only 5.1 per cent per annum between 1990 and 2000 but lost ground in world trade as their share fell from 17 percent in 1990 to 15.1 percent in 2000.

These industries play a vital role in development of countries with rich resources: they can act as a catalyst for the transformation of agrarian economies and constitute the entry point to simple manufacturing activities.

Nigeria’s resource-based industries have underperformed in recent times: exports

declined from US\$46 million in 1996 to US\$13 million in 2000. As a result, Nigeria’s world market share in resource-based products has dropped to become one of the lowest in the region (figure 5). If we take the country size into account, the situation is even gloomier:

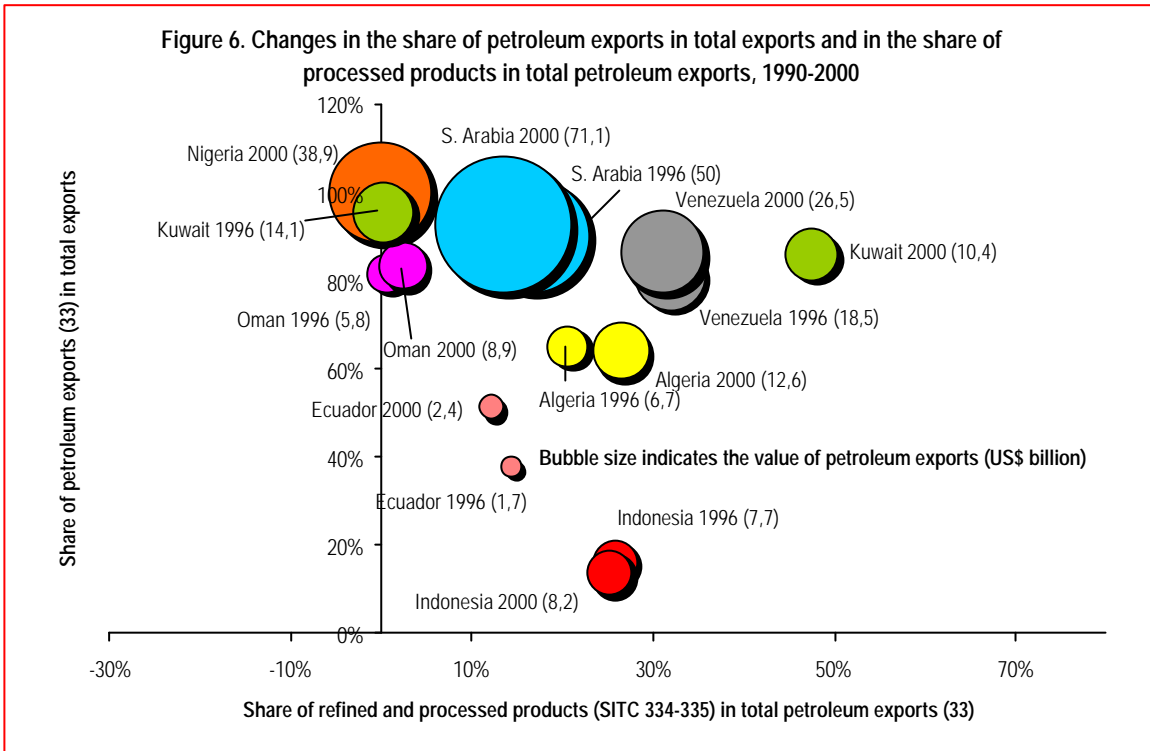


despite having abundant natural resources, Nigeria exports less resource-based products than most countries in the world. But the prospects are not much brighter for the region. Most Sub-Saharan countries have felt strong international pressures in the industry and have not kept the competitive pace of other developing countries. Thus, countries such as Uganda, Kenya, Zimbabwe and Ghana have experienced a significant erosion of their market shares in resource-based industries between 1996 and 2000. By contrast, Senegal, Egypt and Morocco have been able to sustain or even increase their shares due

to the good performance of food-processing industries in Senegal, and of processed petroleum industries in Egypt and Morocco (UN Comtrade).

**Oil**

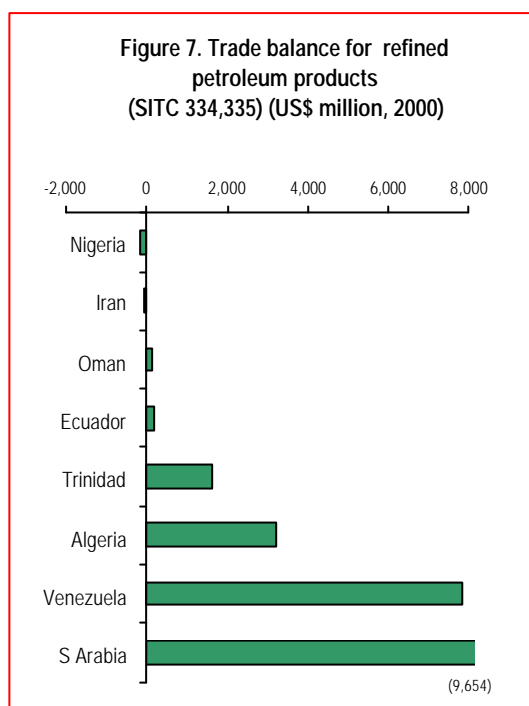
Oil extraction is vital for the economy of many developing countries, not just in the Middle East but also in Latin America, Asia and Africa. Between 1990 and 2000, crude and refined petroleum exports grew by more than 7 per cent, which is higher than the average for primary exports and even manufactured exports. The world market share for



crude and refined petroleum exports increased from 7.9 per cent in 1990 to 8.3 per cent in 2000, making the sector not just one of the most dynamic but also one of the largest in world exports. Yet, high dependency to it is considered inappropriate for sustainable economic growth as the sector is often badly affected by changing world prices.

First discovered in 1956, petroleum has become vital to the Nigerian economy and is today the most important source of government revenue and foreign exchange. Increased world oil prices in the mid-1970s produced rapid economic growth in Nigeria, but constant world price fluctuations since then have contributed to economic deceleration, with a feeble manufacturing sector not being able to reverse the trend.

Within the oil value chain, refined and processed products have higher value added and so bring more economic benefits than crude petroleum. They also embody a higher degree of technological sophistication and require more specialised skills. Figure 6 shows some oil-exporting economies in their attempt to either reduce their oil export dependency or maximise value added within the oil value chain.



Nigeria's total oil exports are relatively large compared to other oil-exporting countries – it accounts for more than 12 per cent of world market share for oil. Nigeria has become increasingly dependent on the oil sector as petroleum exports account for more than 99 per cent of total exports (the bubble for Nigeria for 1996 is behind the one for 2000). However, Nigeria has not capitalised on its oil potential as its refined and processed oil exports have been wiped out from international markets – exports in higher stages of the oil value chain have declined from US\$ 21 million in 1996 to nil in 2000. Nigeria lacks the oil refineries that can produce the low sulphur light products required by export markets. This has made Nigeria become the biggest net importer of refined petroleum products among all oil-exporting countries (figure 7). For a country that exports nearly US\$40 billion in crude, this

is rather distressing and really calls for imminent policy action.

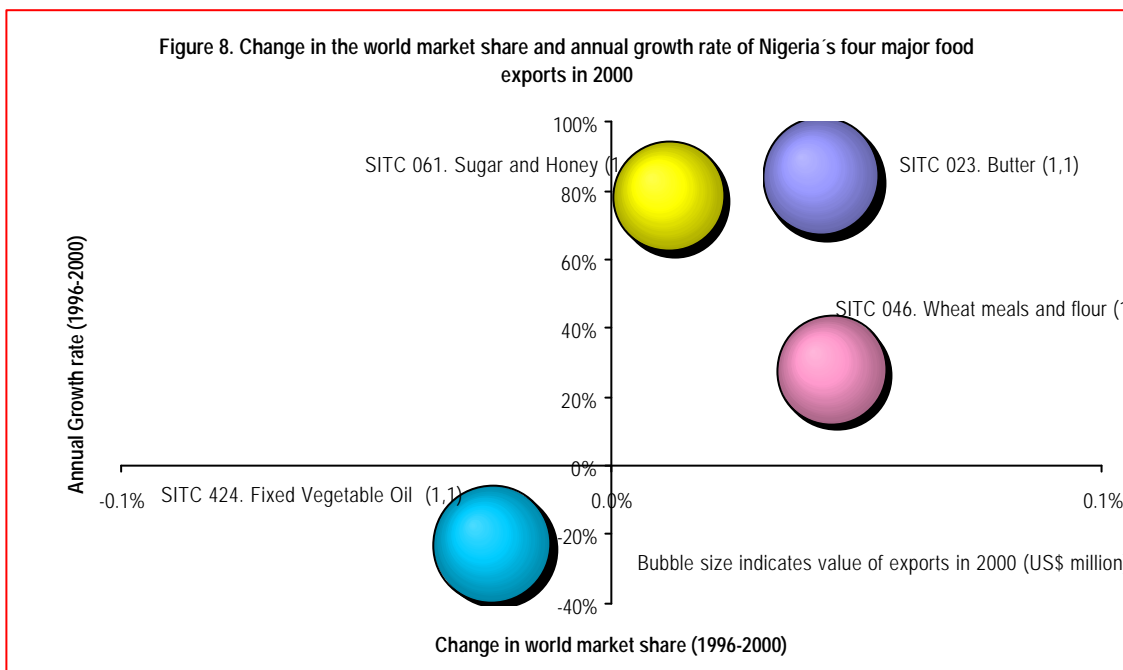
Other oil-exporting countries are facing similar challenges, but have been able to diversify into non-oil industries or move up in the value chain (figure 6). Nigeria should learn from these successful stories. For instance, Indonesia exports US\$ 8.2 billion in crude and refined oil products but has reduced its dependency on oil due to the expansion of manufactured exports. It is also high up in the oil value chain as refined and processed oil products account for almost 30 per cent of total oil exports. Oman and Algeria have slightly moved up in the value chain, though Oman has become a bit more dependent on oil exports between 1996 and 2000. Like Nigeria, Kuwait is highly dependent on oil: revenues from crude and oil-related exports accounted for nearly 86 per cent of total exports in 2000. However, in the last decade, Kuwait has managed to reduce this dependency by diversifying into resource-based manufactures while moving into higher value activities within the oil chain. As shown in the figure, almost 50 per cent of Kuwait's oil exports in 2000 come from refined or processed products. Together with Saudi Arabia, Kuwait has among the most advanced and efficient oil refineries in the world. Although crude exports have been declining since the early 1990s, this has not affected the economy as export diversification and technological upgrading have raised Kuwait's competitive potential. The Latin America oil exporters – i.e. Ecuador and Venezuela – have not been able to diversify due to increased oil exports and a shrinking manufacturing sector while have also experienced a downgrading within the oil value chain – a significant share of their crude is now being processed by Mexican refineries to serve the US market.

## Food

Nigeria's food industry has traditionally served the domestic needs of a fast growing population. Food exports only accounted for US\$ 4.5 million in 2000, one of the lowest in Africa if taking into consideration country size. Sugar and honey, butter, wheat meats and flour and fixed vegetable oil represent more than 90 per cent of Nigeria's food exports. Among these, sugar and honey and butter have grown at a annual rate of more

than 80 per cent between 1996 and 2000 (figure 8). The figures are however so small that the gains in world market share are minuscule (less than 0.1 per cent in 4 years). Fixed vegetable oil, by contrary, is facing declining growth trends as exports have plummeted from US\$3.2 million in 1996 to US\$1.6 million in 2000. Most food exports in Nigeria are experiencing similar failing trends in world markets. In fact, the situation has deteriorated to the extent that none of Nigeria’s food exports (excluding the four sub-sectors above) sell more than US\$0.1 million in world markets. This is very disturbing for a country with a relatively strong agricultural sector.

One of the many factors explaining the weak performance of the food industry in Nigeria is the disconnection between the agricultural sector and the domestic food industry. Nigeria has a solid agricultural sector for export markets based on three major



products: fish and shell fish (fresh and frozen), cocoa, and vegetable oils. These products put together accounted for half of Nigeria’s manufactured exports in 2000. However, they have not been used as inputs for the food industry, which would have increased their value added in world markets. Take for instance the case of vegetable seeds. Nigeria exported nearly US\$30 million of seeds for vegetable oil in 2000 (soft and others), while it only exported US\$1.1 million of vegetable oil. The potential benefits of the vegetable oil industry are still far from being realised. This would require building up the capabilities of domestic oil processing companies while establishing the appropriate mechanisms to link up agricultural output with the food industry.

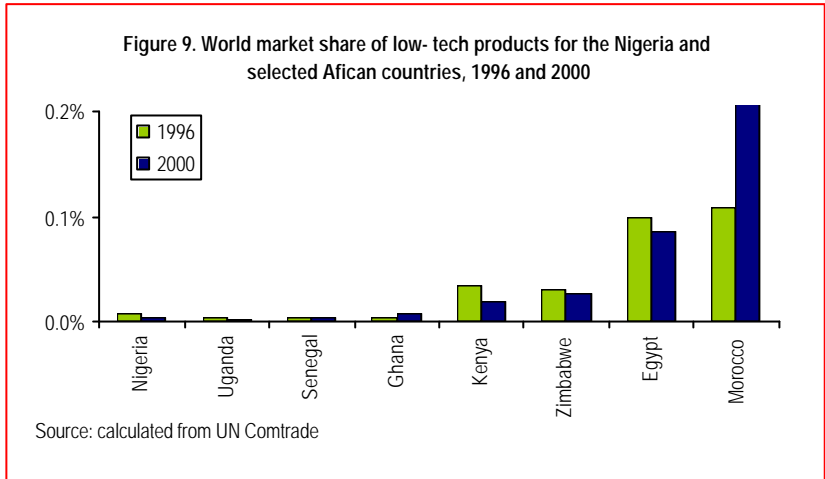
### Low-tech Industries

Low-tech industries include the textile and fashion cluster, pottery, simple metal parts and structures, furniture, jewellery, toys, plastic products and the like. On average, these products have had a slightly higher growth rate (5.3 per cent per annum) than resource-based industries over the 1990s, though this is lower than the average for manufacturing. In global terms, low-tech industries accounted in 2000 for 15 per cent of world trade, declining from 16.6 per cent in 1990.

Low-tech industries are the main manufacturing activity in the developing world. Low-tech products tend to have stable, well-diffused technologies embodied in capital

equipment. They have low R&D expenditures and labour costs and skill requirements are simple and easy to meet. As a consequence of low barriers to entry, competition in particular segments of low-tech industries is fierce.

Between 1996 and 2000, Nigeria’s low-tech exports declined from already low US\$ 58 million to US\$ 21 million. This represents an annual decrease of 22 per cent for the four year period.

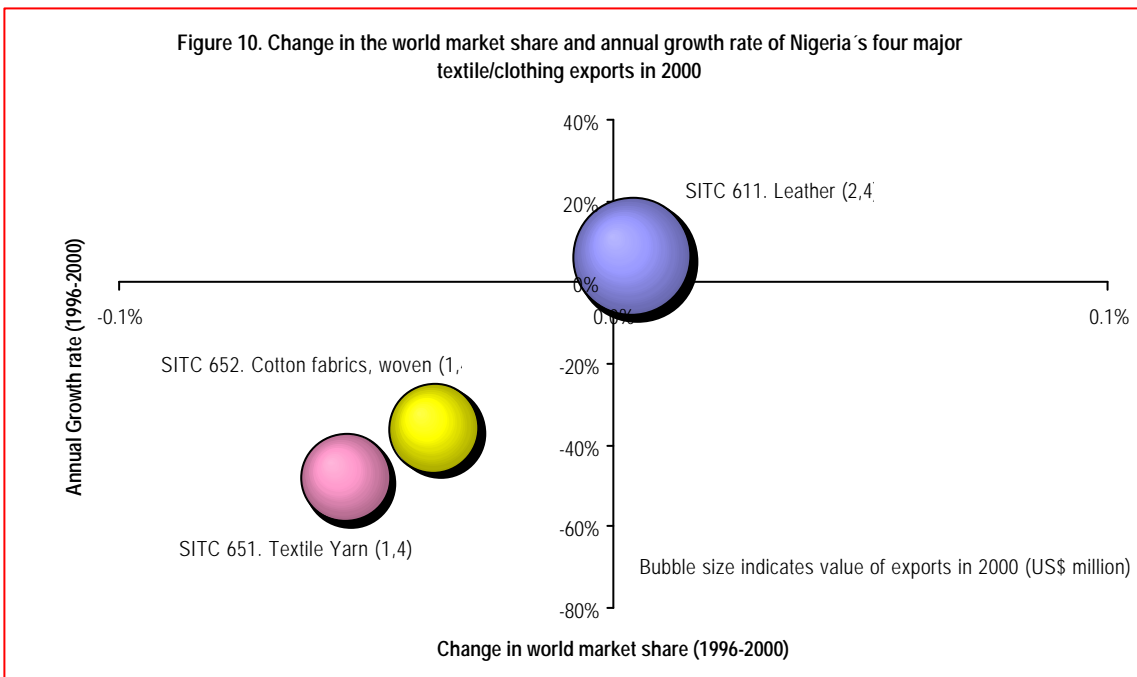


Nigeria’s reputation as a competitive low-tech exporter within the region does not hold true anymore. Today neighbouring Senegal and Ghana export more low-tech products than Nigeria, despite the size difference. As a consequence of its poor export performance and increased competitive

pressures from other developing countries, Nigeria’s world market share in low-tech products has significantly declined (figure 9). Other Sub-Saharan countries, including Kenya, Zimbabwe and Egypt are also facing similar trends, though their export levels are higher than that of Nigeria.

### Textile/Clothing

The textile and clothing industry has seen massive relocation from developed to developing areas in the last two decades. The simpler assembly operations have shifted to low wage sites while complex design and manufacturing functions have been retained in the advanced countries. This relocation has been the engine of export growth

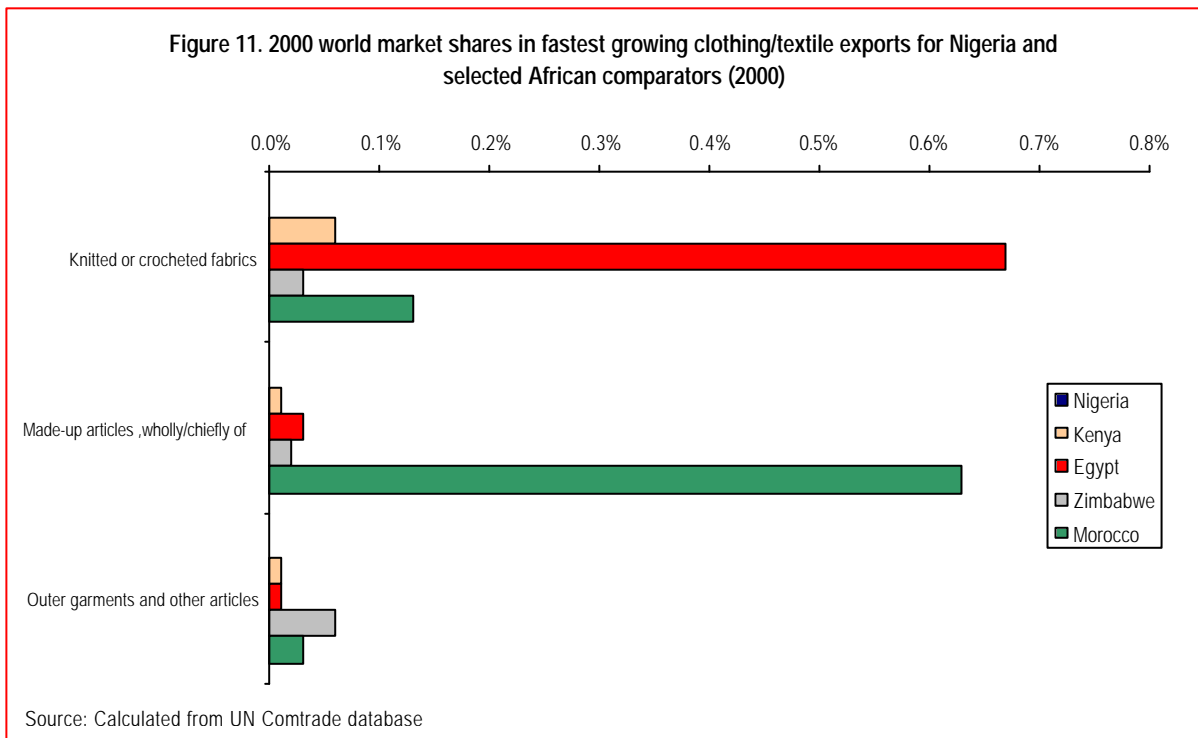


for many poor countries, but not for Nigeria. Indeed, Nigeria’s clothing and textile

industry has suffered increased competitive pressures from other African countries (mainly Mauritius, Egypt, Tunisia and Morocco) but primarily from South Asia and China. Only between 1996 and 2000, Nigeria’s textile and clothing exports plummeted from US\$41.5 million to US\$8.2 million: this represent an annual drop of 32 per cent in four years. Take now Nigeria’s main clothing and textile exports in 2000 (figure 10).

The leather industry has experienced positive growth trends in world markets between 1996 and 2000, with exports increasing from US\$1.9 to US\$2.4 million. This is however the exception rather than the rule: other textile and clothing sub-sectors in Nigeria have faced declining exports in world markets. Take for instance textile yarn where exports sharply fell from US\$19 million in 1996 to US\$1.4 million in 2000. Nigeria has not been able to keep up with the fast pace of other yarn producing countries in and outside the region (e.g Egypt, Turkey, China), which have benefited from improved quality and location advantages as well as increased production of raw cotton. Nigeria’s cotton yarn sector has been restricted in export markets due to its low quality and declining cotton production. Cotton fabrics have faced similar constrains as exports declined by more than US\$7 million between 1996 and 2000.

Other African countries have coped with increased competition by specialising in fast growing sub-sectors. Take the three fastest growing textile and clothing products in the world: knitted or crocheted fabrics, made-up articles, and outer garments (figure 11). Egypt has found its niche in the knitted fabrics industry as it currently owes nearly 0.7 per cent of the world market. Morocco has done so in made-up articles and Zimbabwe in outer garments. Kenya, with a somehow smaller presence in world markets, has been



able to retain market shares in highly competitive sub-sectors. Nigeria’s textile and clothing industry, by contrast, has been almost wiped out from the international scene.

**Medium-tech Industries**

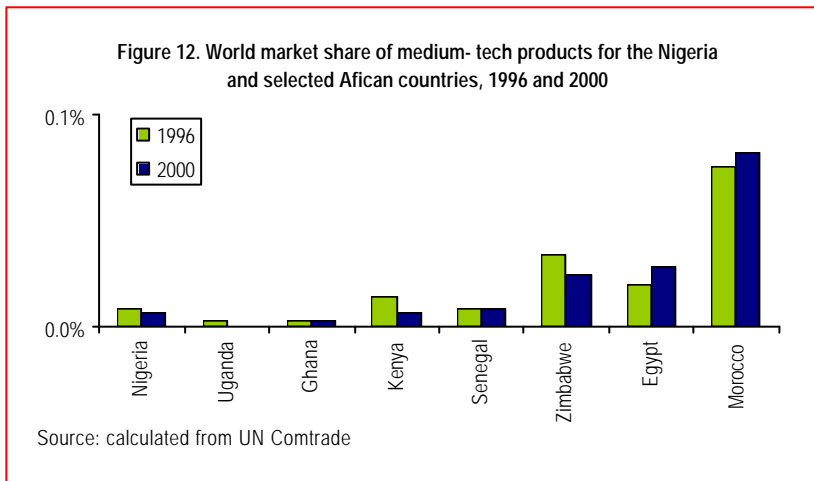
Medium-tech industries are the heartland of industrial activity in mature economies, comprising the bulk of skill and scale-intensive technologies in capital goods and intermediates. Medium-tech industries comprise *automotive products* such as passenger vehicles, motorcycles and parts, *process products* such as synthetic fibres, chemicals



and paints, fertilizers and plastics, and *engineering products* such as engines, motors and industrial machinery.

Medium-tech industries generally are capital-intensive, use complex technologies, have high levels of R&D spending and need advanced technical skills. Most require lengthy learning periods to master technologies. Barriers to entry in these industries tend to be high particularly where there are large capital needs, strong demand for technical skills, and long learning periods in design and product development. Barriers to entry are lower in the most labour-intensive processes of medium-tech industries (e.g. assembly in the automobile industry). Only a few developing countries, mainly in East Asia and Latin America, have benefited from the relocation of assembly operations to low wage areas.

Medium-tech exports grew at 5.4 per cent per annum between 1990 and 2000, but they continue to account for the bulk of world trade (31.4 per cent). They lost ground to high-tech exports in the last decade; indeed, high-tech products grew at 11.1 per cent per annum between 1990 and 2000, rapidly raising their market share to 24.2 per cent. Should the trend continue, high-tech products will soon be the largest component of world trade.



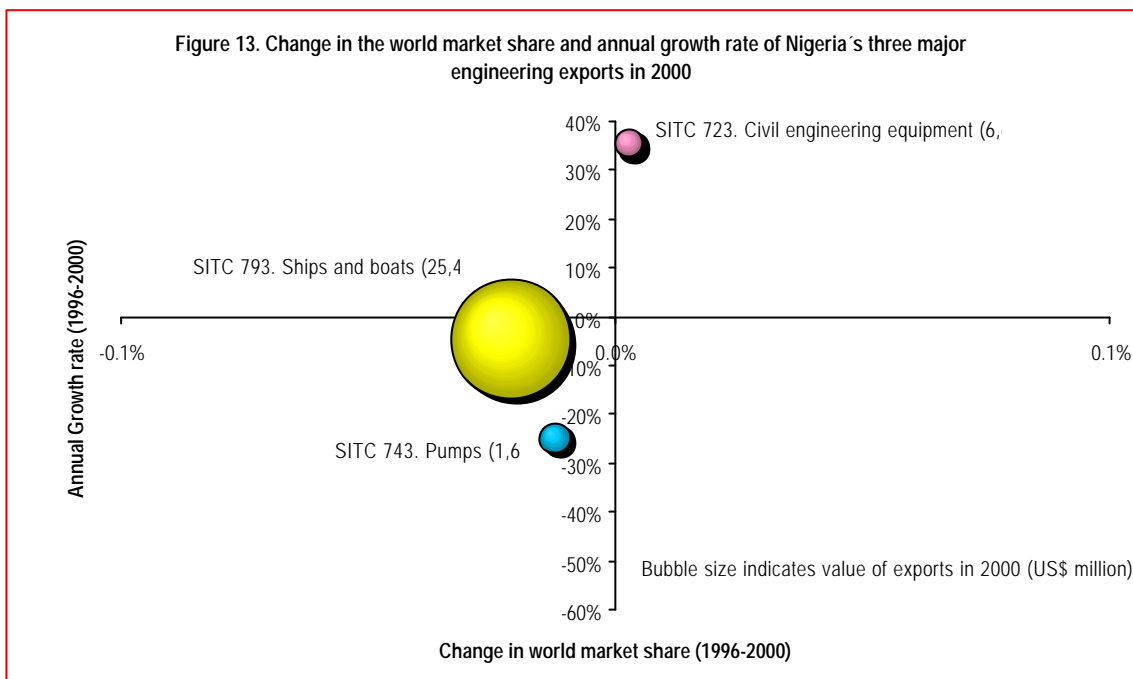
Nigeria’s medium-tech industries are far from being competitive internationally, but have coped with global pressures better than expected (figure 12). Medium-tech exports declined by only US\$3 million between 1996 and 2000 (from \$55 million to \$52 million). This 1 per cent drop can be seen with a certain degree of optimism if we bear in mind that total

manufactured exports in Nigeria declined by 14 per cent in only four years. And yet, as in many other economies in Sub-Saharan Africa, Nigeria’s world market share in medium-tech industries is dismal.

### Engineering

The engineering sector accounts for almost 69 per cent of Nigeria’s medium-tech industry. Moreover, this sector is the only manufacturing industry in Nigeria where exports have increased: from US\$34 million in 1996 to US\$36 million in 2000. According to many, some of Nigeria’s engineering sub-sectors are relatively sophisticated for African standards and are starting to be more competitive in regional markets. Empirical evidence however shows that export volumes of engineering products in Nigeria are still very low when taking into consideration the country size. All in all, three sub-sectors account for the bulk of Nigeria’s engineering exports: ships and boats, pumps and civil engineering equipment (figure 13) . Take for instance the ship and boats industry, which is Nigeria’s most important manufactured export. Between 1996 and 2000, the industry has faced strong competition and exports have declined from US\$31 million to US\$ 25.4 million, hence losing a significant share in world markets. Yet, Nigeria’s ship and boats exports are one of the highest in Africa, accounting for more than half of those of South Africa in 2000. Civil engineering

equipment is another interesting sub-sector showing dynamic growth: exports have increased by US\$6.5 million between 1996 and 2000, though this is still very low to have a significant presence on world markets. Other products such as mechanical handling equipment, metalworking machinery, and medical instruments are also showing interesting growth patterns, though export figures are still relatively small to be



considered as emerging sectors. Only time will tell.

## VII. Industrial Capabilities

What explain Nigeria's weak performance? We now consider some structural factors for industrial competitiveness in Nigeria: human capital, technological effort, FDI, technology import and information and communication technology (ICT) infrastructure.

### Human Capital

The importance of human capital is a vital element for industrial competitiveness. With the pace of technical change, the spread of information technologies and intensifying global competitiveness, the need for skill development has become even more commanding. More importantly, the patterns of skills needed for competing in the 'new economy' have changed as well as the institutional structures around them. Thus, while general industrial development in the past required simply improving general levels of education, the emerging competitive setting calls for greater emphasis on high-level, specialised training, with the private sector extending the learning process in the company.

These dimensions cannot, however, be captured with quantitative data, at least on a national basis. Enrolment data is not an ideal measure of the skill base for industrial activity. It does not take into account the quality, completion and relevance of formal education and it ignores important forms of skill formation such as on-the-job training. However, it is the only data available and does capture the base of education on which other skills are grafted. As technical skills have become more demanding, we shall concentrate on enrolments at the tertiary level, and particularly in technical subjects: science, mathematics and computing, and engineering.

Sub-Saharan Africa, with the lowest enrolment rates in secondary and tertiary education in the developing world (annex table 7). Moreover, the education gap between Sub-Saharan Africa and other developing regions has widened for the period 1985-1997. For instance, while enrolments in secondary education in South Asia, East Asia and Latin America have increased by 17, 13 and 10 percentage points respectively, enrolments in Sub-Saharan Africa have only increased by 7. Similar trends are seen in tertiary education, with Sub-Saharan Africa only enrolling 3 per cent of people in the age group compared to 25 and 22 per cent in East Asia and Latin America.

Where does Nigeria’s human base stand within the region? Take general enrolment levels (table 6). In secondary education, Nigeria enrolled more people (as % of relevant

Table 6. Enrolments in secondary and tertiary education for Nigeria and selected African comparators (% of relevant group)

	Secondary		Tertiary	
	1985	1997	1985	1997
<b>Nigeria</b>	33	33	3	4
Ghana	40	n.a	1	1
Senegal	14	16	2	3
Kenya	21	24	1	2
South Africa	n.a	95	n.a	17
Zimbabwe	41	50	4	7
Algeria	51	63	8	13
Egypt	61	78	18	23
Morocco	35	39	9	11

Source: World Bank, WDI2002  
 N.a: data not available

group) than Senegal and Kenya in 1997, though much less than most Southern and Northern African countries. In 1997, Nigeria’s enrolment levels in tertiary education were higher than those of Ghana, Senegal and Kenya, but again far from those of South Africa, Algeria, Egypt and Morocco. Nigeria has however seen little improvement in enrolment levels between 1985 and 1997. This stagnating trend, particularly in secondary education, is rather worrying for future competitiveness.

Intra-regional differences are even more acute in tertiary technical enrolment (annex figure 1). In 1997 North Africa alone had twice the number of students enrolled in high-level, technical subjects than the rest of Africa, including South Africa. With the exception of Central Africa, most Sub-Saharan regions have experienced positive growth rates in the number of students enrolled in technical subjects between 1985 and 1997. However, one should not be overoptimistic with such findings given the small educational base of Sub-Saharan countries: the number of students enrolled in technical subjects in Sub-Saharan Africa account for only 2.8 per cent within the developing world.

Given previous education figures, Nigeria's enrolment levels in technical subjects is quite impressive. Nigeria enrolled 63 thousand students in technical subjects in 1997, which accounted for almost 1 per cent of tertiary technical enrolment in the developing world. Nigeria has experienced an annual growth rate of 13.2 per cent in tertiary technical enrolment between 1985 and 1997. This is above the average for the

Table 7. Tertiary Technical Enrolment in Nigeria and selected African countries (total numbers, distribution and growth rates)

	1985		1997		Annual Growth Rate (1985-97)
	thousands	Developing country share	thousands	Developing country share	
<b>Nigeria</b>	<b>23.5</b>	<b>0.5%</b>	<b>63.3</b>	<b>0.9%</b>	<b>13.2%</b>
Ghana	1.9	0.0%	2.1	0.0%	1.3%
Senegal	3.3	0.1%	4.4	0.1%	3.7%
Kenya	5.5	0.1%	4.6	0.1%	-2.2%
South Africa	68.9	1.4%	68.1	1.0%	-0.1%
Zimbabwe	0.9	0.0%	9.5	0.1%	34.3%
Algeria	29.8	0.6%	115.1	1.7%	18.4%
Egypt	75	1.6%	69.6	1.0%	-0.9%
Morocco	56.8	1.2%	66.7	1.0%	2.0%

Source: UNESCO, various issues

developing world and for most African countries (except Zimbabwe and Algeria). These figures suggest that Nigeria has a structural strength in technical skill formation which may be used to boost its competitive position in the longer term. However, specialised training does not pay off if

basic education is still lacking, which appears to be the case of Nigeria. This is an important precondition to strengthen Nigeria's huge body of technical manpower, which may enjoy concomitant advantages of critical mass, externalities and agglomeration benefits.

### Technology Effort

There is no doubt that the intensity and effectiveness of technological activity performed by enterprises determine a country's competitive performance in manufacturing. Technological effort in developing countries consists less of formal R&D than of diffuse engineering and technical work for absorption, adaptation, learning and improvement of existing technologies. Technological effort is very difficult to measure as it takes many forms, and occurs in many facets of manufacturing activity. R&D focus on the tip of the technological activity iceberg – but it is still important for developing countries to assimilate, adapt and improve imported technologies. Indeed, a strong R&D base permits a better and faster diffusion of technologies, facilitates greater and more efficient use of local resources, and makes indigenous firms more attractive to TNCs.

National R&D data can be misleading, as it may contain many elements not relevant to industry (e.g. R&D performed in research institutions, universities or even military centres). R&D expenditure in productive enterprises is, perhaps, the best indicator of 'technologically useful' R&D. Although it is a rough indicator of technology effort, it provides a first insight on the intensity of technological activity, and data can be obtained for many countries, including in Africa.

R&D expending is highly concentrated in rich countries; around 95 per cent of the world R&D financed by productive enterprises is performed in industrialised countries (UNIDO, 2002). Within the developing world the concentration is also remarkable: East Asia alone accounts for almost 78 per cent of the R&D spent in the developing world; Latin America follows with 15.4 per cent and next is Sub-Saharan Africa with 2.8 per

cent. This latter figure is distorted by South Africa, which on its own accounts for 99 per cent of R&D expenditure in the region (annex table 8). Excluding this country, R&D expenditure in Sub-Saharan Africa is than US\$ 1 million: this is almost 30 times less than North Africa's spending in R&D. On a per capita basis, Sub-Saharan Africa, excluding South Africa, is practically absent in R&D spending. The private sector in North Africa, on the contrary, shows interesting signs of technology effort, though its R&D figures are still far from those of most East Asian and Latin American countries.

**Table 8. Enterprise productive R&D in Nigeria and selected African countries**

	1995 (US\$ million)	Per capita 1995
<b>Nigeria</b>	<b>0.4</b>	<b>0.00</b>
Ghana	0.0	0.00
Senegal	0.0	0.00
Kenya	0.1	0.00
South Africa	499.6	11.90
Zimbabwe	0.1	0.00
Algeria	4.8	0.16
Egypt	17.8	0.28
Morocco	3.5	0.12

Sources: Calculated from UNESCO, Statistical Yearbook 1998

Table 8 shows enterprise productive R&D spending for Nigeria and other African countries. As expected, South Africa leads R&D spending in the region with almost US\$ 0.5 billion in 1995 (US\$ 11.90 in 1995). This puts it ahead of transition economies such as Hungary (US\$ 11.3), Poland (US\$ 8.3), the Russian Federation (US\$ 7.5), and fast-growing developing countries such as Malaysia (US\$ 6.7), and Costa Rica (US\$5.5) (UNIDO ,2002). Nigeria, as well as Kenya and Zimbabwe, appear to be performing some R&D, become it becomes insignificant when deflating by its population.

## Foreign Investment

World trade in manufacturing is increasingly related to MNC activity. The new global setting has opened up new alternatives for firms in developing countries to tap into export markets and use FDI as a means to access advanced technologies and know-how. The importance of attracting FDI has risen with faster technical change, trade liberalisation and the internationalisation of production. Internalised technology transfer refers to the transfer of technology within the firm, that is, from parents to affiliates of MNC, as distinguished from arm's length or externalised transfers between firms.

Today, MNCs account for large shares of world trade, particularly in technologically advanced industries, suggesting that entry into a large and most dynamic MNCa are seeking to decentralise labour-intensive stages in the production process to countries with cheap and abundant labour, while keeping the innovation and research sites in their home countries. This international division of labour brings potential benefits to companies in developing countries, as their changes to compete internationally on their own are remote. However, attracting FDI and getting integrated into global value chains do not necessarily mean the neglect of skill upgrading and domestic technological capability in firms. While FDI can be used for firms in developing countries to stimulate industrial activity and to start accumulating capital and skills, building indigenous technological capabilities is a must in order to move up in the technology ladder and to generate more profitable and sustainable industrial rents.

Inward FDI data have important caveats to bear in mind. First, it does not distinguish between investment in manufacturing from that in other activities, therefore not fully capturing industrial technology transfer *per se*. Second, it does not distinguish between export-oriented FDI from that aimed at domestic markets. While such fine distinctions cannot be explored with the FDI data on its own, one can, however, look at complementary data, (e.g. exports) and other sources to distinguish whether countries

are really ‘plugged into’ integrated value chains, and whether technology transfer is likely to be occurring.

In the last decade, the amount of FDI received by Sub-Saharan Africa increased from US\$ 2 billion in 1990 to more than US\$ 7 billion in 1999 (UNCTAD, World Investment Report 2000). This 15 per cent annual growth rate in the 1990s was, however, below the performance of the other developing regions in attracting foreign investment. FDI in South Asia grew at 22 per cent, in East Asia at 19 per cent and in Latin America at nearly 30 per cent. This explains why Sub-Saharan Africa’s FDI share within the developing world went down from 6.9 per cent in 1990 to 3.5 per cent in 1999 (see annex figure 2). Excluding South Africa, the share goes down to only 2.9 per cent. As R&D spending, FDI is highly concentrated in Sub-Saharan Africa: only South Africa and Nigeria accounted for 38 per cent of all FDI in the region in 1999. North Africa on its own attracts more FDI than West, East and Central Africa altogether.

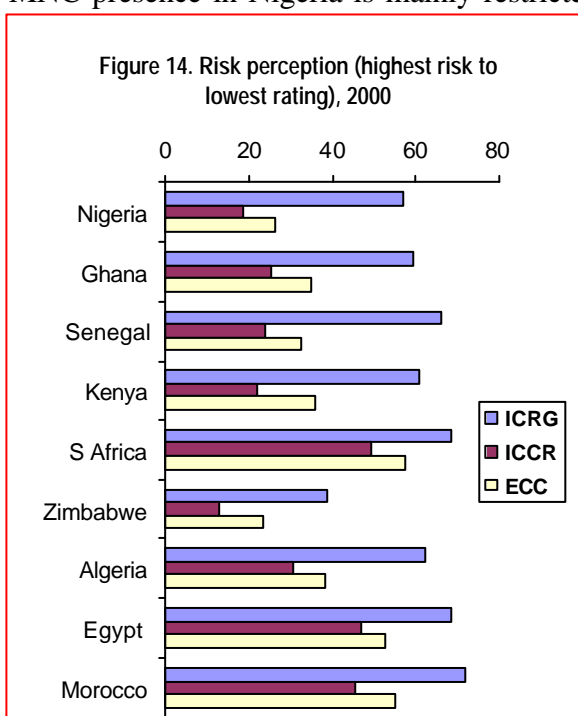
Inward FDI flows in Nigeria have grown from US\$317 million in the period between 1982 and 1997 to a high US\$1,400 million in 1999 (table 9). This represents an annual growth rate of 10 per cent for the period, though between 1995 and 1999 FDI inflows

Table 9. FDI inflows in Nigeria and selected African countries (US\$ millions)

	1982/7	1990	1995	1999	Growth rates (82/7-90)	Growth rates (90-95)	Growth rates (95-99)	Growth rates (82/87-99)
<b>Nigeria</b>	<b>371</b>	<b>588</b>	<b>1,079</b>	<b>1,400</b>	<b>9.6%</b>	<b>12.9%</b>	<b>6.7%</b>	<b>10.0%</b>
Ghana	6	15	107	115	20.1%	48.1%	1.8%	23.5%
Senegal	-1	-3	35	60	24.6%	-263.5%	14.4%	-
Kenya	24	57	32	42	18.9%	-10.9%	7.0%	4.1%
South Africa	44	-5	1,241	1,376	-164.7%	-401.3%	2.6%	27.9%
Zimbabwe	-4	-12	118	59	24.6%	-258.0%	-15.9%	-
Algeria	-7	0	5	6	-100.0%	-	4.7%	-
Egypt	809	734	596	1,500	-1.9%	-4.1%	26.0%	4.5%
Morocco	42	165	335	847	31.5%	15.2%	26.1%	23.9%

Source: UNCTAD, World Investment Report 1994 and 2000

significantly slowed down. In 1999, Nigeria attracted more FDI than South Africa and only US\$100 million less than Egypt. Within West Africa, Nigeria is by far the main destination for FDI. However it is important to note that most FDI inflows in Nigeria go into oil-related and other resource-based activities rather than manufacturing. In fact, MNC presence in Nigeria is mainly restricted to the petroleum extraction industry (e.g.



Shell, Chevron Texaco Corp., Canadian Occidental Petroleum Ltd., Agip, Total Fina Elf, etc.) and the food industry (e.g. Nestle, Coca Cola, Danone, Novartis, etc.) Although the government benefits from joint ventures – the largest joint venture is operated by Shell Nigeria and produces nearly 50 per cent of Nigeria’s crude oil – Nigeria lacks the manufacturing investments required to boost the industrial small-scale sector through subcontracting arrangements and inter-firm cooperation.

What is impeding Nigeria from attracting more investment in manufacturing?

MNC presence in a country depends on a number of economic factors and host country government policies and institutions (Belderbos *et al.*, 2001; Dicken, 1998; Dunning, 1993, Lall, 1980). While corporate strategies and the location of MNCs are demand-side factors, local firms' technological capabilities, macro-economic policies and the policy and regulatory environment constitutes supply-side factors. International risk and credit ratings can be a useful indicator of how a country is perceived by the international investment community. According to the World Bank's composite risk ratings (WDI 2002), which capture in one index the political, financial and economic risk factors affecting foreign investment, Nigeria has the among the highest investment risks within Africa (figure 14)<sup>1</sup>. Only Zimbabwe, under Mugabe's dictatorship, has become a riskier country for foreign investment in Africa. The underlying factors depicted in these composite indices, though quiet simplistic, may shed some light on the reasons for low manufacturing investment in Nigeria. Further research is however needed to explain the direct causes for low FDI inflows in the region and particularly in Nigeria.

### Technology Licensing

Arm's length purchases of know-how, patents, trademarks and licenses are other important means of technology transfer, which occur between independent firms and not between parent MNC and affiliates. The advantages of externalised technology transfer are similar to those happening within a firm, though, the process tends to be, if anything, richer as the partnership is often founded upon equal conditions where independent firms can set up their own objectives. Externalised technology transfer is often measured by *payments abroad of technology licences and royalties*. Two main problems arise. First, royalties and technical fees are not necessarily for industrial technology; they could well be to obtain franchises or brand names in the service sector. Second, they often include non-arm's length transactions, that is, by affiliates to MNC parents. Despite all this, this indicator is the best proxy for technology purchases by local firms, and data are available for cross-country analysis.

Like FDI, technology licence payments are highly concentrated within the developing world: East Asia and Latin America account for nearly 86 per cent of total royalty payments in the developing world (UNIDO, 2002). Between 1990 and 1998, technology licence payments in Sub-Saharan Africa went up from US\$128 to US\$258 million, though this is a slower growth rate when compared to other developing regions. As a consequence, Sub-Saharan Africa's technology licence payments share in the developing world declined from 7.1 per cent in 1990 to 3.2 per cent in 1998 (annex figure 3). Interestingly, this share has substantially gone up for North Africa, whose private sector today spends in technology licensing twice the total amount spent in the rest of the continent.

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<sup>1</sup> The most well-known risk ratings are: the *PRS Group's International Country Risk Guide* (ICRG), which provides data on political, financial and economic risk, expressed as a single rating ranging from 0 to 100 (highest risk to lowest). The *Institutional Investor Country Credit Ratings* (ICCR), based on information provided by international banks, and measuring risk similarly from 0 to 100 (highest risk to lowest). The *Euromoney country creditworthiness index* (ECC) assess country risk, again on a scale of 0 to 100, from a broader range of variables including debt, economic performance, political risk and access to financial markets.

Table 10. Technology licence payments in Nigeria and selected African countries		
	1998 (US\$ million)	Per capita 1998
<b>Nigeria</b>	<b>0</b>	<b>0.00</b>
Ghana	0	0.00
Senegal	2	0.22
Kenya	44	1.52
South Africa	162	3.86
Zimbabwe	0	0.00
Algeria	0	0.00
Egypt	329	5.22
Morocco	210	7.50

Sources: Calculated from UNESCO, Statistical Yearbook 1994 and 1998

Statistical evidence shows that technology transfer through royalty payments in Nigeria is negligible (table 10). Low MNC presence in manufacturing sectors and the country's weak technological base are important explanatory factors for this. Again, Northern African countries show impressive records: Morocco and Egypt are first in royalty payments within the region. In per capita terms, these two countries spend more in technology licensing than Poland (US\$ 5), Indonesia (US\$ 4.9) Chile (US\$ 3.8) and the Philippines (US\$ 2.1) (UNIDO, 2002). As can be noted, many African countries have negligible figures in royalty payments (not only the country comparators shown here), which combined with low FDI, represents a major handicap to

technology transfer and know-how, and therefore, to industrial development.

### ICT Infrastructure

Information and communication technologies (ICTs) are at the heart of technical change both in industrialised and developing countries. As their potential benefits are being realised and their costs continue to fall, such technologies are being applied throughout all sectors of the economy. In the developing world, the spread of ICTs brings new opportunities to reduce the gap by shrinking economic distance and providing instant and economical access to information. They also allow enterprises to reach markets in new ways, inconceivable in earlier times. It is partly in response to this underlying economic reality that many governments in third world countries are developing national ICT strategies to build 'knowledge societies' to support their development objectives (Mansell and Wehn, 1998). While general traditional infrastructure remains as a major factor in economic development, ICTs are growing their importance in industrial competitiveness, particularly in technology-intensive activities.

This section uses telephone mainlines, personal computers, PCs and internet hosts as proxies of ICT infrastructure. Data are reliable and available for most countries in the world. East Asia and Latin America accounted in 1999 for 92, 84 and 90 per cent of all telephone mainlines, PCs and internet hosts within the developing world (UNIDO, 2002). South Asia and Sub-Saharan Africa are clearly lagging behind in ICTs. Within Africa, the distribution ICT indicators is very similar to that of other industrial capabilities (annex figure 4). North Africa, on its own, has nearly the same number of telephone mainlines than the rest of the continent, including South Africa. In terms of 'advanced' ICT (PCs), only four countries in North Africa – Algeria, Morocco, Egypt and Tunisia – have one third of what the continent has excluding South Africa.



How is Nigeria doing in ICTs? Table 11 provides some interesting insights. In total terms, Nigeria has more than 60 per cent and 80 per cent of West Africa's telephone mainlines and personal computers respectively. However, when taking into

Table 11. ICT in Nigeria and selected African countries, 2000

	Telephone mainlines (thousands)	Distribution in the sub-region	Per 1000 people	Personal Computers (thousands)	Distribution in the sub-region	Per 1000 people	Internet hosts (thousands)	Distribution in the sub-region	Per 10000 people
<b>Nigeria</b>	<b>496.0</b>	<b>61.2%</b>	<b>4</b>	<b>793.6</b>	<b>81.2%</b>	<b>6.4</b>	<b>0.1</b>	<b>17.8%</b>	<b>0.01</b>
Ghana	152.0	18.8%	8	47.5	4.9%	2.5	0.1	16.4%	0.06
Senegal	162.0	20.0%	18	135.9	13.9%	15.1	0.5	65.9%	0.51
Kenya	290.0	29.7%	10	121.8	28.9%	4.2	0.9	18.6%	0.32
South Africa	5,250.0	92.0%	125	2,297.4	89.1%	54.7	181.1	97.8%	43.12
Zimbabwe	252.0	4.4%	21	156.0	6.0%	13	3.1	1.7%	2.61
Algeria	1,560.0	18.2%	52	174.0	12.7%	5.8	0.0	0.5%	0.01
Egypt	4,725.0	55.1%	75	756.0	55.2%	12	5.4	83.7%	0.85
Morocco	1,484.0	17.3%	53	302.4	22.1%	10.8	0.9	14.4%	0.33

Source: World Bank, WDI2001

Note: Sub-regions are North, West, East and Southern Africa

consideration country size, Nigeria lags behind neighbouring Ghana and Senegal in telephone mainlines (per 1000 people) and internet hosts (per 100000 people). In fact, Nigeria has the lowest ICT figures within the region except for personal computers per 1000 people.

## VIII. Conclusions

In a rapid changing world driven by technological progress and the increased access to capital flows, knowledge and goods, Nigeria's manufacturing sector is clearly underperforming. This paper shows that Nigeria is caught in a low equilibrium trap where weak domestic capabilities have translated into a disappointing industrial performance. In the last decade, Nigeria's industrial sector has faced a decline in production and export capacity and the economy has become even more dependent on primary exports, notably oil. This trend puts serious questions to Nigeria's future industrial competitiveness. The approach of this paper emphasises Nigeria's weak industrial capabilities in explaining its performance: severe flaws in the education system, technological stagnation of domestic companies, lack of foreign investment in manufacturing, negligible technology transfer from TNCs and weak ICT infrastructure constitute significant factors for failure. Further analysis should however include other factors not explored in this analysis, including macro-economic and fiscal policies, governance and the regulatory and business environment.

Nigeria is calling for a 'vision' on industrial strategy. Important questions that the government faces include: which factors are hampering industrial development today? What can be done to revitalise existing industries? In which industrial sectors might Nigeria have a competitive edge in the future? What domestic capabilities should be strengthened or created and through which policies? Rather than answering these questions, this paper has provided a comprehensive picture of where Nigeria's industry stands in the international scene and what factors may explain its disappointing performance.

However, Nigeria has important strengths that need to be taken into account. It has the biggest domestic market in the region and is rich in natural resources, particularly oil. It

also counts with an abundant and cheap labour force and an increased number of students enrolled in technical subjects. These are important ingredients to compete in resource-based and low-tech manufacturing sectors. There is evidence that there are a growing number of private small scale firms that serve local markets with simple technologies and that have a reservoir of artisanal skills. There is immense untapped opportunities here if their skill base and technology could be strengthened, and if they could be linked to large domestic enterprises or MNCs as suppliers or subcontractors. However, FDI inflows into Nigeria have not gone into the manufacturing sector, depicting that a cheap and abundant labour has not been enough to attract manufacturing MNCs.

Nigeria faces greater weaknesses in its industrial capabilities and policies that need to be addressed by the government. At the highest level are macroeconomic imbalances, severe flaws in the business environment, and a poor governance record. This has resulted in Nigeria being considered a high risk country by the international investment community. Unconditional government support to oil extraction (as the main means for the government to earn foreign exchange) has somehow meant the neglect of manufacturing activity. The result is an economy highly dependent on the primary sector, with an uncompetitive and isolated industrial sector completely unaware of global trends and technological progress. As shown in the industrial assessment, Nigeria's industry remains at low levels of value and quality, mainly serves the domestic market and is badly positioned in terms of market growth. On the capability side, the stagnation of school enrolments in secondary and tertiary education is a serious concern for Nigeria's competitive future, and so is its low levels of technology transfer through royalty payments, R&D spending, and ICT development.

Bilateral and multilateral trade agreements will allow Nigeria's industrial sector to access new and more demanding markets within and outside the region. The potential benefits of opening up to global markets can become *threats* however. Experience shows that sweeping liberalisation can have ruinous consequences when: a) capabilities have not been built up to face the new challenges; b) the pace of liberalisation is too fast that firms and institutions cannot adjust to the changing environment; and c) there is not efficient supply-driven initiatives to help firms cope with increased competitive pressures. The costs of liberalisation could be huge for Nigeria's industrial sector if these strategic elements are not tackled by the government. For some years, Nigeria will remain being dependent on oil revenues. How fast can the country undertake an industrial reform to diversify away from oil and benefit from a robust industrial sector is indeed a key issue for its future competitiveness. Delays on this front constitute a real threat for Nigeria's industrial sector as competition from other developing countries is increasing. A major constraint for industrial upgrading is remaining marginalized from international flows of capital, technology and know-how. These should be key policy areas to be addressed by the government if industrial performance is to be enhanced in the near future.

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## Statistical Annex

Annex table 1. Manufacturing Value Added for Sub-Saharan Africa and other Developing Regions (current US\$ million and annual growth rates)						
	1985	1990	1999	Growth rates (85-90)	Growth rates (90-99)	Growth rates (85-99)
<b>Developing Countries (1)</b>	<b>476,634</b>	<b>623,053</b>	<b>1,201,248</b>	<b>5.5%</b>	<b>7.6%</b>	<b>6.8%</b>
North Africa	13,964	25,828	32,336	13.1%	2.5%	6.2%
West Africa	3,299	2,881	3,260	-2.7%	1.4%	-0.1%
East Africa	1,774	2,811	4,281	9.6%	4.8%	6.5%
Central Africa	975	1,735	1,013	12.2%	-5.8%	0.3%
Southern Africa	13,159	26,795	27,016	15.3%	0.1%	5.3%
<b>S. Saharan Africa</b>	<b>23,930</b>	<b>42,341</b>	<b>51,856</b>	<b>12.1%</b>	<b>2.3%</b>	<b>5.7%</b>
<b>S. Saharan Africa exc. S. Africa</b>	<b>12,454</b>	<b>18,301</b>	<b>26,941</b>	<b>8.0%</b>	<b>4.4%</b>	<b>5.7%</b>
<b>South Asia</b>	<b>43,450</b>	<b>61,070</b>	<b>92,990</b>	<b>7.0%</b>	<b>4.8%</b>	<b>5.6%</b>
<b>East Asia</b>	<b>181,450</b>	<b>263,090</b>	<b>625,332</b>	<b>7.7%</b>	<b>10.1%</b>	<b>9.2%</b>
<b>Latin America</b>	<b>227,804</b>	<b>256,552</b>	<b>431,071</b>	<b>2.4%</b>	<b>5.9%</b>	<b>4.7%</b>

Source: World Bank, WDI2001

Notes: Subtotals in the African regions are only for the following countries: North Africa (4 countries): Algeria, Egypt, Morocco and Tunisia; West Africa (3 countries): Ghana, Nigeria and Senegal; East Africa (6 countries): Ethiopia, Kenya, Madagascar, Mauritius, Tanzania and Uganda; Central Africa (2 countries): Cameroon and Central African Republic; Southern Africa (5 countries): Malawi, Mozambique, South Africa, Zambia and Zimbabwe.

However, totals for Sub-Saharan Africa and other developing regions include all countries.

(1) excludes the Middle East.

Annex table 2. Total Manufactured Exports for Sub-Saharan Africa and other Developing Regions (current US\$ million and annual growth rates)			
	1985	1998	Growth rate (85-98)
<b>Developing Countries</b>	<b>194,049</b>	<b>987,647</b>	<b>13.3%</b>
North Africa	6,539	13,372	5.7%
West Africa	489	874	4.6%
East Africa	859	2,667	9.1%
Central Africa	316	530	4.0%
Southern Africa	5,508	14,436	7.7%
<b>S. Saharan Africa</b>	<b>7,172</b>	<b>18,507</b>	<b>7.6%</b>
<b>S. Saharan Africa exc. S. Africa</b>	<b>2,210</b>	<b>5,172</b>	<b>6.8%</b>
<b>South Asia</b>	<b>9,702</b>	<b>41,041</b>	<b>11.7%</b>
<b>East Asia</b>	<b>118,429</b>	<b>685,847</b>	<b>14.5%</b>
<b>Latin America</b>	<b>42,884</b>	<b>187,776</b>	<b>12.0%</b>

Source: Calculated from UN Comtrade databases

Notes: Subtotals in the African regions are only for the countries specified earlier (see annex tables for country level data). Total figures for developing countries do not match with subtotals for developing regions as these do not include all countries and Middle East countries are not given. *South Asia* covers Bangladesh, India, Nepal, Pakistan and Sri Lanka; *East Asia* covers China, H. Kong, Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand; *Latin America* includes Argentina, Bolivia, Brazil, Chile, Colombia, C Rica, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela

<b>Annex table 3. Total manufactured exports in Africa (current US\$ million)</b>			
	1985	1998	Growth rate (85-98)
Algeria	4,045	2,848	-2.7%
Egypt	458	2,242	13.0%
Morocco	1,200	3,108	7.6%
Tunisia	836	5,173	15.0%
<b>North Africa</b>	<b>6,539</b>	<b>13,372</b>	<b>5.7%</b>
Ghana	119	396	9.7%
Nigeria	216	177	-1.5%
Senegal	154	300 <sup>(b)</sup>	5.2%
<b>West Africa</b>	<b>489</b>	<b>874</b>	<b>4.6%</b>
Ethiopia	n.a	85 <sup>(b)</sup>	n.a
Kenya	341	829	7.1%
Madagascar	52	124	6.9%
Mauritius	407	1,602	11.1%
Tanzania	57	93	3.8%
Uganda	2	19	18.3%
<b>East Africa</b>	<b>859</b>	<b>2,667</b>	<b>9.1%</b>
Cameroon	269	477	4.5%
CAR	48	53	0.8%
<b>Central Africa</b>	<b>316</b>	<b>530</b>	<b>4.0%</b>
Malawi	43	61 <sup>(b)</sup>	2.8%
Mozambique	62	60	-0.3%
South Africa	4,962 <sup>(a)</sup>	13,334	7.9%
Zambia	80	107 <sup>(b)</sup>	2.2%
Zimbabwe	360	874	7.0%
<b>Southern Africa</b>	<b>5,508</b>	<b>14,436</b>	<b>7.7%</b>
<b>Southern Africa exc. S. Africa</b>	<b>546</b>	<b>1,101</b>	<b>5.6%</b>

Source: Calculated from UN Comtrade database

Notes: Regional subtotals are only for the countries shown

(a) data for 1986

(b) data for 1997

<b>Annex table 4. Share of Primary and Manufactured Exports in Total Exports for Nigeria and Selected African Comparators (%)</b>							
	1985			2000			Exports: Annual Growth rates(1985 -2000)
	Total Exports (US\$ '000)	Of which:		Total Exports (US\$ '000)	Of which:		
		Primary (%)	Manuf. (%)		Primary (%)	Manuf. (%)	
<b>Nigeria</b>	<b>14,180,705</b>	<b>98.5%</b>	<b>1.5%</b>	<b>39,014,086</b>	<b>99.8%</b>	<b>0.2%</b>	7.0%
Ghana	527,933	77.4%	22.6%	1,035,557	54.0%	46.0%	4.6%
Senegal	330,708	53.3%	46.7%	690,911	46.2%	53.8%	5.0%
Kenya	953,860	64.3%	35.7%	1,551,569	62.6%	37.4%	3.3%
South Africa	9,014,853	45.0%	55.0%	22,596,082	19.1%	80.9%	6.3%
Zimbabwe	936,952	61.5%	38.5%	1,894,123.00	60.0%	40.0%	4.8%
Algeria	10,148,814	60.1%	39.9%	19,739,451	81.4%	18.60%	4.5%
Egypt	1,830,760	75.0%	25.0%	3,215,919	29.0%	71.0%	3.8%
Morocco	2,164,257	44.5%	55.5%	6,698,882	26.6%	73.4%	7.8%

Source: Calculated from UNIDO (2002)

**Annex table 5. Technological structure of MVA for Sub-Saharan Africa and other Developing Regions (%)**

	1985			1998		
	MHT	LT	RB	MHT	LT	RB
<b>Developing Countries</b>	<b>35.4%</b>	<b>21.6%</b>	<b>43.1%</b>	<b>37.8%</b>	<b>20.8%</b>	<b>41.3%</b>
North Africa	28.4%	27.4%	44.2%	28.1%	23.3%	48.7%
West Africa	22.3%	17.8%	59.9%	29.4%	18.0%	52.6%
East Africa	15.7%	28.0%	56.3%	15.9%	25.2%	59.0%
Central Africa	15.6%	10.8%	73.6%	15.6%	8.6%	75.8%
Southern Africa	35.1%	22.1%	42.8%	30.9%	20.4%	48.7%
<b>S. Saharan Africa</b>	<b>22.2%</b>	<b>19.7%</b>	<b>58.2%</b>	<b>22.9%</b>	<b>18.1%</b>	<b>59.0%</b>
<b>S. Saharan Africa exc. S. Africa</b>	<b>21.5%</b>	<b>20.1%</b>	<b>58.5%</b>	<b>21.8%</b>	<b>18.3%</b>	<b>59.9%</b>
<b>South Asia</b>	<b>32.6%</b>	<b>24.8%</b>	<b>42.6%</b>	<b>34.3%</b>	<b>32.0%</b>	<b>33.7%</b>
<b>East Asia</b>	<b>44.3%</b>	<b>23.8%</b>	<b>31.9%</b>	<b>54.4%</b>	<b>17.6%</b>	<b>28.0%</b>
<b>Latin America</b>	<b>42.5%</b>	<b>18.0%</b>	<b>39.6%</b>	<b>39.7%</b>	<b>15.7%</b>	<b>44.6%</b>

Source: Calculated from UNIDO (2002)

Notes: For country coverage, see note in table 3. MHT stands for 'medium and high technology', LT for 'low technology' and RB for 'resource based'.

**Annex table 6. Technological structure of manufactured exports and growth rates (%)**

	1985				1998				Annual growth rates (85-98)			
	HT	MT	LT	RB	HT	MT	LT	RB	HT	MT	LT	RB
<b>Developing Countries</b>	<b>11.6%</b>	<b>21.9%</b>	<b>32.3%</b>	<b>34.1%</b>	<b>28.2%</b>	<b>25.6%</b>	<b>28.0%</b>	<b>18.2%</b>	<b>21.3%</b>	<b>14.7%</b>	<b>12.1%</b>	<b>8.0%</b>
North Africa	0.5%	7.2%	13.4%	78.9%	2.5%	11.6%	38.7%	47.2%	19.5%	9.6%	14.6%	1.6%
West Africa	2.0%	5.3%	7.2%	85.6%	0.6%	11.9%	12.2%	75.3%	-5.0%	11.3%	8.9%	3.5%
East Africa	1.6%	5.4%	29.7%	63.4%	1.6%	5.4%	53.3%	39.8%	9.2%	9.1%	14.1%	5.3%
Central Africa	0.7%	0.7%	3.8%	94.8%	0.3%	6.4%	9.6%	83.8%	-3.7%	23.0%	11.7%	3.1%
Southern Africa	8.2%	22.4%	17.0%	52.4%	6.5%	30.9%	18.7%	43.9%	5.8%	10.4%	8.5%	6.2%
<b>S. Saharan Africa</b>	<b>6.6%</b>	<b>18.2%</b>	<b>17.3%</b>	<b>57.9%</b>	<b>5.4%</b>	<b>25.6%</b>	<b>23.1%</b>	<b>45.9%</b>	<b>5.8%</b>	<b>10.4%</b>	<b>10.0%</b>	<b>5.7%</b>
<b>S. Saharan Africa exc. S. Africa</b>	<b>1.4%</b>	<b>11.6%</b>	<b>19.2%</b>	<b>67.8%</b>	<b>1.3%</b>	<b>11.5%</b>	<b>36.2%</b>	<b>50.9%</b>	<b>6.1%</b>	<b>6.7%</b>	<b>12.1%</b>	<b>4.4%</b>
<b>South Asia</b>	<b>2.8%</b>	<b>9.2%</b>	<b>55.8%</b>	<b>32.3%</b>	<b>4.4%</b>	<b>11.4%</b>	<b>62.8%</b>	<b>21.4%</b>	<b>15.7%</b>	<b>13.6%</b>	<b>12.8%</b>	<b>8.2%</b>
<b>East Asia</b>	<b>15.8%</b>	<b>23.3%</b>	<b>38.2%</b>	<b>22.7%</b>	<b>36.1%</b>	<b>23.6%</b>	<b>28.1%</b>	<b>12.1%</b>	<b>21.7%</b>	<b>14.3%</b>	<b>11.5%</b>	<b>8.8%</b>
<b>Latin America</b>	<b>7.0%</b>	<b>24.8%</b>	<b>16.9%</b>	<b>51.3%</b>	<b>19.7%</b>	<b>37.2%</b>	<b>18.2%</b>	<b>24.9%</b>	<b>20.8%</b>	<b>15.1%</b>	<b>12.2%</b>	<b>5.5%</b>

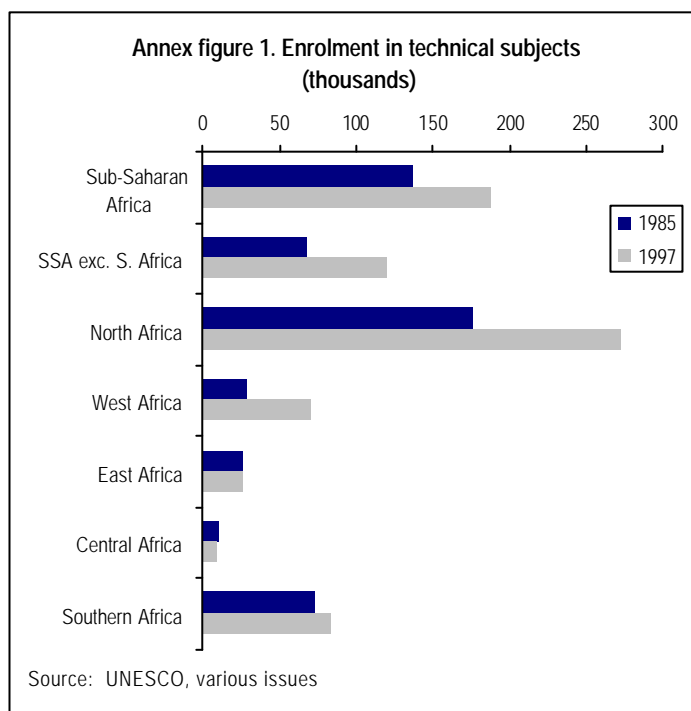
Source: Calculated from the UN Comtrade database

Notes: For country coverage, see note in table 3. HT stands for 'high tech', MT for 'medium tech', LT for 'low tech' and RB for 'resource based'. Annual growth rates are calculated based on actual export figures and do not reflect the differences in export structures between 1985 and 1998. This explains, for instance, that a decrease of HT in the export structure may be accompanied with positive growth rates in total HT exports.

Annex table 7. Enrolments in secondary and tertiary education (% of relevant group)				
	Secondary		Tertiary	
	1985	1997	1985	1997
<b>Developing Countries</b>	<b>39</b>	<b>51</b>	<b>10</b>	<b>14</b>
North Africa	47	61	10	15
West Africa	24	25	2	3
East Africa	19	22	1	2
Central Africa	20	27	2	3
Southern Africa	18	39	2	5
<b>S. Saharan Africa</b>	<b>20</b>	<b>27</b>	<b>2</b>	<b>3</b>
<b>S. Saharan Africa exc. S. Africa</b>	<b>20</b>	<b>25</b>	<b>2</b>	<b>3</b>
<b>South Asia</b>	<b>32</b>	<b>49</b>	<b>4</b>	<b>5</b>
<b>East Asia</b>	<b>56</b>	<b>69</b>	<b>14</b>	<b>25</b>
<b>Latin America</b>	<b>50</b>	<b>60</b>	<b>18</b>	<b>22</b>

Source: World Bank, WDI2001

Notes: Subtotals in the African regions are only for the countries specified before



Annex table 8. Enterprise Productive R&D, 1998			
	Value (US\$ million)	Distribution in developing countries	Per capita (US\$ unit)
<b>Developing Countries</b>	<b>18,121.7</b>	<b>100%</b>	<b>4.20</b>
North Africa	26.3	0.1%	0.20
West Africa	0.4	0.0%	0.00
East Africa	0.5	0.0%	0.00
Central Africa	0.0	0.0%	0.00
Southern Africa	499.6	2.8%	5.43
<b>S. Saharan Africa</b>	<b>500.5</b>	<b>2.8%</b>	<b>0.78</b>
<b>S. Saharan Africa exc. S. Africa</b>	<b>0.9</b>	<b>0.0%</b>	<b>0.00</b>
<b>South Asia</b>	<b>397.6</b>	<b>2.2%</b>	<b>0.30</b>
<b>East Asia</b>	<b>14,125.8</b>	<b>77.9%</b>	<b>8.70</b>
<b>Latin America</b>	<b>2,783.7</b>	<b>15.4%</b>	<b>6.30</b>

Sources: Calculated from UNESCO, Statistical Yearbook 1994 and 1998, Iberoamerican Network of Science and Technology Indicators ([www.ricyt.edu.ar](http://www.ricyt.edu.ar)), Central Banks and other national statistics.

Notes: Subtotals in the African regions are only for the countries specified earlier (see annex tables for country level data). Total figures for developing countries do not match with subtotals for developing regions, as these do not include other countries in the region and Middle East countries.

