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DYNAMIC AND FOLLOWER SECTORS

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Contents

1. Introduction.....	4
2. Traditional sector classifications.....	5
3. Employment in dynamic sectors.....	7
4. Dynamic and static sectors.....	11
5. Properties of dynamic sectors.....	13
5.1 The Noland Criterion: Linkages, growth stimulus and micro specific shocks.....	13
5.2 Heo's Criteria: the Korean approach.....	14
5.3 Baumol's Criteria: Productivity.....	14
5.4 Stern's criteria measuring the gains from services trade.....	16
6. Concluding remarks.....	19
Appendix: Sector categories.....	23

Tables

Table 1 - Employment in manufacturing (% of total).....	8
Table 2 - Characteristics of dynamic and follower industries.....	16
Table 3 - Identifying gains from exports.....	17
Table 4 - Identifying gains from imports.....	19
Table 5 - 15 sector aggregation.....	23

1. Introduction

South African industrial policy has sometimes been criticised as excessively focused on promoting international trade, and industries that are highly capital intensive and increasingly skill intensive. There are calls to intensify promotional efforts vis-à-vis more labour intensive, domestically oriented sectors. This frustration is understandable in a context of a large labour surplus.

The global evidence does show that a very large proportion of new jobs are created in these, generally non-traded sectors, such as retail or personal services. This is increasingly found not only in industrialised countries, but also in developing ones. Most of these industries grow as a spin-off to other more dynamic activities or policies. The HSRC has identified three possible employment scenarios, distinguishing between sectors that “lead” and “follow” (Altman 2007). Follower sectors do well in an environment with low inflation, low interest rates, and a higher value currency. They tend to be much more labour intensive, and therefore also pay much lower wages than higher productivity sectors.

However, it is difficult to see how a long run growth strategy will be *driven* by non-tradables. There are no examples of high growth economies that did not succeed in penetrating global markets.

A minerals exporting economy like SA could continue to export highly capital intensive minerals based products to generate tax revenue, foreign exchange, etc....and support employment through non-tradables. In fact, this would be the easiest path for SA to follow. However, it would entrench high levels of inequality since the majority of employment created would be extremely low paid. A more difficult path will involve a meaningful expansion of labour-absorbing traded goods and services.

These choices are not mutually exclusive. It is very probable that a large proportion of jobs will be created in non-tradables in future no matter what path SA follows. However, the greater the proportion of new employment created in more dynamic traded sectors, the more benefit there will be to working people.

This paper therefore outlines some of the policy choices that need consideration in promoting the deepening and expansion of dynamic traded goods and services. The specific focus of this paper is to identify how sectors that are typically thought of as ‘follower’ with low potential for productivity growth, might become ‘leader’ or ‘dynamic’ sectors.

2. Traditional sector classifications

Dynamic or leading sectors refers to sectors that could deliver to growing global markets, can have substantial linkages into the local economy, and promote learning. In a developing country context, they are often newer industries that require some stimulation to get them moving and to encourage the formation of clusters. This category includes industries such as manufacturing, financial services, tourism or high-value agriculture.

Typically, policy attention will be devoted to primary sectors first (namely mining and agriculture), and then manufacturing. These are seen as the 'traded' sectors. The emphasis on manufacturing is explained by its potential contribution to growth, development and learning. In theory, services sectors are seen as 'non-traded', and will mainly receive attention insofar as they provide backbone support to the expansion of tradables. Tourism is an exception, since it is a tradable.

We believe this approach is old-fashioned. A wide range of services, such as construction and business services, form a growing share of international trade, and many developing countries such as Korea, Malaysia, Turkey, India and China are substantially benefiting from these growing markets. These countries are expanding their trade in services by about 12% to 17% pa, as compared to SA which is expanding services trade by 6% pa. We argue that the emphasis on traditional industrial categories in industrial policy formation may be growth-limiting. It is not simply the sector categorisation, but also an understanding of how global markets and demand are changing.

As a start, the HSRC's employment scenarios group sectors according to the following 15 aggregations. (More detail is provided in the appendix). The manufacturing and services sectors are categorised by their labour or skill intensity, and by whether they are investment, intermediate or final products:

1. Agriculture
2. Mining
3. Labour-intensive intermediate goods
4. Labour intensive intermediate goods - transport
5. Labour-intensive consumer goods
6. Labour-intensive capital goods¹
7. Capital-intensive intermediate goods (these are minerals and metals resource-intensive sectors)
8. Capital-intensive consumer goods
9. Electricity & water
10. Construction
11. Low skill-intensive intermediate services
12. Low skill-intensive consumer services
13. Skill-intensive intermediate services
14. Skill-intensive consumer services

¹ There are no capital-intensive capital goods

15. Government services

The critical question is related to the extent that these sectors are stimulated, and what their shape will be.

In the first instance, these sectors can be distinguished as:

- a. Labour-absorbing goods and services (tourism, business services, apparel, furniture, agro-processing, capital equipment, metal fabrication, etc.).
- b. Capital- or skill-intensive goods and services (e.g. finance, medical, beverages, non-ferrous metals, chemicals, etc.).

Capital-intensive, resource-based exports in metals, minerals and chemicals account for over 50% of South Africa's exports. Capital-intensive resource-based manufacturing employs up to 150,000 people. Even taking into account employment multipliers, growth in these sectors are unlikely to be really important contributors to ultimate employment growth. But their output and export growth influences ultimate employment outcomes substantially. This is partly because these sectors are important attractors of total investment and infrastructure spending. More importantly, their weighting in South Africa's export profile means that a global commodity boom can have the impact of appreciating the Rand and discouraging labour-intensive traded sectors.

The expansion of commodity-related exports mainly depends on global demand, as well as how conducive local conditions are. Some of the local conditions include taxation, relative profitability, the conduciveness of supply contracts from buyers (e.g. eskom contracts with the coal industry), etc.

Box 1 – the productivity conundrum

An employment strategy in SA needs to focus on both the mass creation of jobs, but also enabling real wage growth. Real wages in semi and low skill jobs have been stagnant since the mid 1990s. There seems little room to reduce them as part of an export strategy: 65% of the workforce earn less than R 2,500 per month. This includes craft workers and factory operators (see Altman, 2007). Higher productivity sectors generally pay more for any level of educational attainment, but by definition employ fewer workers per rand invested. (Here we are comparing higher productivity tradables to lower productivity non-traded services). It is generally desirable to have as much growth in higher productivity sectors as possible. Given SA's cost structure, a dramatic expansion of employment in tradables would require either falls in the real wage (perhaps as a result of a real exchange rate depreciation), or rising productivity whether through improved market efficiencies or as a result of improvements in process or physical technology. Generally, middle and high income countries succeed in export markets on the basis of productivity improvements. Both of these latter two possibilities have the growth inducing effect described by Berry (2006) of increasing resource utilisation. Ultimately, to improve or maintain competitiveness, labour costs should not rise faster than productivity growth: this is particularly important in labour absorbing industries. Therefore, the faster productivity grows, the more room there is for wage growth. But the faster productivity grows, the slower is employment expansion per unit of output.

It goes without saying that any society benefits where a larger proportion of jobs are created in dynamic sectors. Dynamic tradable goods and services are more sustainable and beneficial sources of job creation because they:

- Tend to experience rising terms of trade, relative to commodities.
- Have stronger multiplier/spread effects.
- Can have stronger learning effects.
- Pay higher wages, as shown in Altman (2007). Sectors that experience productivity growth are also able to raise wages paid. This is an essential point in a context of Asgisa's objective of halving unemployment and poverty by 2014.

An employment-development path that relies on commodity-related tradables and very low productivity services will lead to (or entrench) an extremely dualistic society.

The extent to which employment growth is linked to the production of dynamic goods and services is the big outstanding question. It is the most uncertain aspect of any economic strategy, particularly in terms of how to promote know-how and induce the required investment. It may also require those decisions that impose market-related trade-offs; alternatively, the trade-offs might be less than imagined, if there is a willingness to undergo short- to medium-term adjustments.

3. Employment in dynamic sectors

By way of stylised facts, the development process involves structural shifts over time, with labour and output shifting from agriculture, into manufacturing and increasingly services (Palma, 2006). As productivity increases in agriculture, labour is released into labour intensive manufacturing.

These two changes in themselves start generating more demand for inputs. The process of urbanisation, manufacturing and trade expansion, and rising incomes generate more demand for services. In low income, non-minerals exporting economies, labour coming off the farms may be absorbed in low wage labour intensive manufacturing export sectors. If well planned, the labour market will tighten, wages will rise, and investment will increasingly be directed to higher skill, more capital intensive sectors, paying higher wages.

All going well, at some point in the growth and development process, productivity improvements in manufacturing results in what is known as 'de-industrialisation': this can refer to a context where manufacturing output grows, but the share of manufacturing employment falls – this may due to a stabilisation of manufacturing employment, or even its contraction². The actual contraction of manufacturing

² "All going well" here means that this is not de-industrialisation arising from an implosion of the manufacturing sector – which could arise as a result of unfair international competition,

employment in the context of growing output has been a feature of high income economies since the mid-1970s.

Some countries do not follow this trajectory precisely. Some extreme examples include the trading centres such as Singapore or Dubai. Minerals-exporting economies tend to leap-frog into highly capital intensive sectors that crowd out the labour intensive ones: partly for this reason, these societies tend to have higher rates of unemployment and income inequality (Altman 2001, Auty, 1994).

Table 1 - Employment in manufacturing (% of total)

Region	1960	1970	1980	1990	1998
Sub-Saharan Africa	4.4	4.8	6.2	5.5	5.5
Latin America	15.4	16.3	16.5	16.8	14.2
Southern Cone and Brazil	17.4	17.2	16.2	16.6	11.8
West Asia and North Africa	7.9	10.7	12.9	15.1	15.3
South Asia	8.7	9.2	10.7	13.0	13.9
East Asia (w/o China and Japan)	10.0	10.4	15.8	16.6	14.9
NICs	10.5	12.9	18.5	21.0	16.1
China	10.9	11.5	10.3	13.5	12.3
Third World	10.2	10.8	11.5	13.6	12.5
First World	26.5	24.8	24.1	20.1	17.3

Source: Palma, 2006.

Notes:

Calculations made using statistics from the ILO Databank. Regional averages are weighted by economically active population.

Economies included under the heading "Third world":

Sub-Saharan Africa: Benin, Botswana, Burkina Faso, Cameroon, Central African Republic, Chad, Democratic Republic of the Congo, Côte d'Ivoire, Gabon, Ghana, Kenya, Lesotho, Malawi, Mali, Mauritania, Mauritius, Niger, Nigeria, Republic of the Congo, Rwanda, Senegal, South Africa, Togo, Zambia and Zimbabwe.

Latin America: Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru and Uruguay (within this category, the subcategory Southern Cone includes Argentina, Chile and Uruguay).

West Asia and North Africa: Algeria, Egypt, Morocco, Oman, Saudi Arabia, Tunisia and Turkey.

South Asia: Bangladesh, India, Pakistan and Sri Lanka.

East Asia: Hong Kong SAR, Indonesia, Malaysia, Philippines, Republic of Korea, Singapore, Thailand and Taiwan Province of China (within this category, the subcategory NICs 1 includes: Hong Kong SAR, Republic of Korea, Singapore and Taiwan (Province of China)).

Economies included under the heading "First world": Australia, Austria, Belgium, Canada, Denmark, Finland, France, Greece, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, United Kingdom and United States.

trade shocks, domestic firms not responding to competition or alternatively some domestic crisis.

But there is growing global evidence that these stylised facts may no longer hold and that new thinking is required in respect to industrial strategy and sources of employment growth. Output growth may still be sourced from similar sectors, with the proviso that services sectors are becoming much more prominent in global markets. However, it appears that economies are 'de-industrialising' at lower levels of per capital income and service sectors are becoming dominant earlier in the development process. Table 1 shows that manufacturing has become a smaller proportion of total employment in every global region from the 1990s. Moreover, services has accounted for an ever larger share of employment growth in a very wide range of successfully developing economies over the past 15 years.

The employment scenarios process will have to consider this evidence and what it might mean for South Africa's growth and employment agenda. There are a number of broad immediate implications:

- Employment and output stimulation may not necessarily involve the same strategies: strategies to optimise output, foreign exchange earnings, etc may not always coincide with strategies to promote employment.
- A problem may arise if these strategies compete with each other, and are not complementary. Certain policies may support one set of strategies to the unintentional stagnation of the other. For example, certain exchange rate policies benefit certain sectors and trade-orientations over others, as we have found in our project on exchange rates and employment.

As part of the employment scenarios project, we commissioned case studies of economies that managed to accelerate and sustain high economic growth rates, and also achieve reasonable employment outcomes³. The case studies focus on identifying the main sources of employment growth, contributions to income distribution outcomes, and also the main contributors to economic growth. In part, these are meant to help identify some plausible development stories for our scenario building.

To the extreme, it is surprising that not even China, despite incredible success in promoting FDI and manufactured exports, has managed to sustain growth in manufacturing employment. According to Prof Yu Yongding of the Chinese Academy of Social Sciences, this is explained by productivity growth and technology change. According to a recent study, "the service sector has been China's main source of employment growth since 1990. Of the 96.8 million jobs that the economy created between 1990 and 2003, the sector created 98.3 million jobs.... Industry created 22.2 million jobs in this period, while agriculture lost 23.7 million workers" (Lim, Spence & Hausmann, 2006: 24).

What does this mean for SA employment scenarios?

- Is it possible that South Africa could generate long-run employment growth in manufacturing, where so many successful manufacturing exporters have not? If so, under what conditions?

³ The case studies include Brazil, Chile, China, India, Indonesia, Ireland, Malaysia, Singapore and South Korea. To this have been added Nigeria and Venezuela in a comparison of minerals exporting economies.

- If it is not possible for SA to generate large number of jobs in manufacturing, where else might they be sourced? Already, services account for more than 65% of formal employment.

Services have typically not received the same attention as manufacturing in economic policy: manufacturing has generally been seen as a driving force behind the development process. As noted, services were historically mostly non-tradable, and often internalized within the firm. As local service firms and activities did not compete internationally, there was not substantial concern over their level of efficiency, product range, product quality and rates of innovation. A number of factors have challenged this orthodox approach to the services sector. With increasing externalisation and subjection to international competition, services increasingly have their own markets dynamics, with increasing diversity of market segments, technology change, etc. (Altman, 2005 Mayer, 2005):

- Non-traditional service exports, such as business services or construction, have been the fastest growing component of global trade (UNCTAD, 2004). This is partly due to growing global outsourcing and procurement in most services sectors, which enable other countries to offer services independently of domestic goods production. The imminent reduction of barriers to trade in services may further expand opportunities to export services, while exposing the domestic services sector to global competition.
- New forms of domestic business organization can in themselves encourage the establishment of new markets. As domestic firms outsource activities to other domestic firms, they create a market where one may not have previously existed. There would not have been competition for contracts previously, as certain services would have been provided in-house and were therefore simply subject to the internal managerial performance incentives. However, once outsourced, competition is made possible, with firms seeking to acquire business and search for improved ways of delivering services. In itself, this can induce new products and innovations, and create demand for new services.
- Many of the costs that undermine the competitiveness of the South African economy emanate from the services sector: commerce, communications, transport and utilities.
- In a context of high and growing unemployment, the domestic-oriented services sector provides an important avenue for employment creation. Domestic demand is expanding for commercial, personal, social and community services as a result of growing urbanization, by burgeoning middle and professional classes, and by the business sector. Unlike manufacturing, a large portion of these services must be provided near the consumer.

While we can enumerate the scale and growth of services, there is very weak ability to attribute growth to them. Manufacturing has clearly been important to growth and development; a weakened manufacturing sector is often a characteristic of a weakening economy. There are not a plethora of studies seeking to prove or disprove this for services. New methodologies are needed to investigate potential contributions by service sectors.

The problem in investigating employment in a growth strategy is that employment may or may not be derived from sectors that contribute to growth. Much depends on the character and contributors to that growth. For example, if productivity in

resources, manufacturing or services is a major source of growth, it is unlikely that the sectors driving growth will generate substantial employment.

South African industrial policy already recognises the need for different policies and sectors aimed at different objectives. Hence, policy simultaneously promotes heavy chemicals sectors, alongside business process outsourcing and bio-fuels. Yet, these sectors are promoted individually: it may be that a dominant heavy industry crowds out other more labour absorbing ones (Palma 2006). In such cases, the more labour or knowledge intensive one might continue to exist, but would not achieve any real scale economies or growth potential. To understand this dynamic, it is essential not to think about these sectors severally, but rather as a whole.

From a policy perspective, it may be necessary to modify the economic environment to shift economic bias towards more dynamic labour absorbing activities; and/or it may be necessary to sufficiently compensate for relative disadvantages caused by the dominant industries. This approach underpinned Indonesia's success in dramatically expanding its labour intensive manufacturing base, while also exporting oil, as seen in Berry(2006). Berry (2006) explains that, amongst other support measures, a convincing currency depreciation gave non-traditional exports a boost. While this is quite a common policy approach, the question is whether sustaining a depreciation is feasible. Moreover, as seen in Ngandu (2007), the right conditions need to be in place for a depreciation to have a growth-inducing (and not an inflation-inducing) impact. A growth inducing impact might arise where business responds well to the depreciation, both because they believe it will be sustained, and because supply constraints (such as poor infrastructure) are lifted.

4. Dynamic and static sectors

One of our central questions is whether an economy increasingly dominated by services sectors can still grow at the pace required for South Africa to meet its socio-economic objectives.

Baumol (1967) was the first to raise this question. He was concerned with the impact on growth of an ever greater proportion of employment being found in services, and modelled the impact of "unbalanced growth". In his initial formulation, he categorised services industries as relatively 'static' or 'non-progressive' and manufacturing as 'dynamic' or 'progressive'. His later work recognised that some sectors may have both dynamic and static characteristics (Baumol 1985)⁴. His model predicted that with time and as labour productivity increased in the progressive sectors, they would require relatively less labour. In contrast, services would become a relatively larger employer since there is less opportunity for labour replacement. In his view, since labour markets are ultimately integrated, the price of labour in the progressive and non-progressive sectors would eventually merge. This would lead to a situation where expenditure in the non-progressive services would have to rise faster than its productivity growth, drawing more resources into the static sectors. This imbalance leads to what is known as 'Baumol's Cost Disease'.

⁴ Baumol (1985) referred to these as asymptotic sectors; sectors that have a progressive and stagnant component in them and where the latter dominates over time.

It is this 'cost disease' that, in Baumol's model, eventually drag down the economy's growth. If this argument is valid, then the rising share of the services sector implies a dampening of potential economic growth in the future. Given the dominant role that services now occupy and in trying to understand the future of employment, growth and poverty, it becomes important to assess whether the growing dominance of services in value-added and employment is a problem.

Certainly, Baumol's model could hold in reality. However, there are two concerns that need to be addressed. First, labour markets are highly segmented in South Africa. Wages in low and high productivity sectors are quite different, even for precisely the same job and educational attainment. However, more work would need to be done to assess the extent of segmentation in the long run. Second, there is evidence to show that sectors do not have inherent characteristics. It may be that their contribution to growth has more to do with policy choices related to trade, regulation and competition.

Triplett and Bosworth (2003) estimate productivity for services industries in the US and find that much of the growth in productivity in the US can be explained by rapid growth in services productivity⁵. Oulton (1999) has emphasized the fact that not all services are stagnant and that relatively high productivity growth has been observed in certain service industries. The use of ICT during the 1980s and 1990s was regarded as conducive to the productivity increases seen in certain service industries such as business related and financial services. Licht et al (1999) shows that in the case of Germany the driving forces of innovation in services include the diffusion of ICT technology, deregulation and increasing tradability of services. It also goes without saying that due to the heterogeneity of services industries it would be unwise to discount them as if there were homogenous and this is a mistake that is made by Baumol.

Mizuno (2005) highlights this with an example of Japan where 4 million jobs were created in the services sector during the 1990s at a time when manufacturing shed about 1.85 million jobs. While the services sector was the main pillar for the creation of jobs and was able to absorb much of the surplus labour force from manufacturing, low productivity of the service sector had a negative impact on GDP. GDP per capita in Japan was about 25% lower than that in the US on a PPP basis in 2003. Since working hours per person in Japan and the USA are the same this indicates that labour productivity in Japan was also 25% lower. The lesson here is that in the absence of productivity growth, Baumol's concern can present a very real problem.

⁵ Hartwig (2006) disagrees with the findings by Triplett and Bosworth. He argues that first, Baumol's 'non-progressive' sector is larger than Triplett and Bosworth's services sector. After an appropriate rearrangement, Triplett and Bosworth's data fail to support their claim. Second, productivity growth in the financial sector has been a short-lived 'new economy bubble' phenomenon. Over the years 2001-2004, the average productivity growth rate has been negative in Finance and Insurance. Thirdly, 'services' should be confined to human labour. For several industries it would be very artificial to contend that human labour is involved in the production of the service. This holds for example for housing services, but also for communications services. He proposes to collect these activities in a 'fourth' sector of the economy – complementing the familiar three. This sector would contain the most productive 'services', leaving productivity growth in the redefined tertiary sector at a very low level.

In Japan, Mizuno (2005) finds that the most productive services are the renting of machinery and equipment and other business activities and financial intermediation which all achieved high labour productivity. Business services, which include various technical and professional services, management consultancy/IT services and marketing and operational services, have shown relatively high growth and productivity, and they play an important role in fostering industrial competitiveness. Business services are knowledge intensive services and they are one of the few services in which employment generation and productivity increase can coexist. This is why developed nations are placing increasing emphasis on the development of business services. As an intermediate input provider, business services contribute to improving the competitiveness of industries by reducing costs and providing added value. Community social services and personal services, wholesale and retail trade and restaurants and hotels on the other hand turned out to be the laggards either registering low or declining productivity growth during 1995 – 2001. The Japanese experience points to the dangers that arise when one generalises services and as such confirms the conclusion's of Oulton of a heterogeneous sector with both dynamic and follower services. The Japanese experience stands in sharp contrast to that of the US, where wholesale and retail trade and restaurants and hotels gained significant productivity growth during the same period, primarily because of robust US investment in ICT.

5. Properties of dynamic sectors

Industries are organised into standard classifications so that we can measure them. However, in reality, industries rarely fall into neat categories such as dynamic and follower. The contribution of a sector to growth and productivity might change over time, with a dynamic sector becoming static or a follower sector developing dynamic properties such as technological change. As in Baumol et al, we are saying an activity is classified as a follower when there do not appear to be potential for continuous technological innovations that lead to regular substantial productivity improvements. There may be occasional improvements, but not regular ones. In contrast, dynamic sectors introduce regular improvements to process and technology, and so experience continuous productivity improvements. It might be argued that this partly arises as a result of competition and specialisation. In a small open economy, export demand is a major source of growth stimulus.

5.1 The Noland Criterion: Linkages, growth stimulus and micro specific shocks

According to Noland (2004) three criteria can be used to for selecting candidates for industrial promotion.

- The sector must have strong inter-industry linkages. If the economy is at less than full employment, then the targeting of lead sectors could induce an overall expansion of economic activity and put the economy on a permanently higher growth path in growth models where scale economics play an important role. *Uses simple backward and forward linkages.*

- The sectors must lead the economy in a causal sense, so that growth stimulus would be transmitted forward through the economy. *Uses Granger causality tests to measure causality.*
- They must be characterized by substantial industry-specific micro shocks, as opposed to economy-wide macro-shocks. Variations in output must have a strong industry-specific component, otherwise, variations in output are simply due to macroeconomic shocks and there is little scope for industry-specific stimulus. The existence of industry-specific variation in output suggests the possibility for industry-specific technical change and/or scope for industry policy interventions to increase output. Industry specific policy interventions could be associated with things such as technological change, or industry-specific policy interventions. Macro shocks would be due to economy-wide phenomena such as changes in monetary policy. According to Noland if either economy-wide macro shocks or policy interventions in other industries dominate changes in an industry's output, the industry would be a poor candidate for growth enhancing interventions. *Uses econometrics to decompose changes in output into micro and macro components.*

5.2 Heo's Criteria: the Korean approach

According to Heo (2001) Korea used the following criteria to choose its six strategic industries:

1. Forward and backward inter-industry linkage effects
2. Value added inducement effects and, hence, contribution to GNP growth
3. Foreign exchange earnings or savings effects;
4. The utilization of domestic natural resources; and
5. The availability of foreign capital for particular industries to be chosen.

Selected industries had to be of such a size as to exploit large economies of scale for production efficiency. The six industries which were chosen using this criteria were steel, nonferrous metals, shipping building, machinery, electronics and chemicals. This was in line with its industrial policy which sort to promote heavy and chemical industries.

5.3 Baumol's Criteria: Productivity

The productivity of a sector is usually seen as an important indicator of its dynamism since it influences the sector's ability to contribute to aggregate output. In Baumol's model of unbalanced growth, productivity plays a central role in the classification of sectors, progressive sectors are seen as those that readily assimilate technological innovations which afford them greater productivity. Stagnant sectors are seen as those that experience sporadic and infrequent increases in productivity enhancing innovations.

In order to develop a classification along the lines of Baumol's definition of progressive and stagnant, each sector's level of productivity must be measured. To

that end, Baumol uses four different measures of productivity growth by sector to classify sectors into progressive and stagnant.

The *first measure* uses annual (compounded) rates of labour productivity growth from official data.

The *second measure* uses input-output tables gross domestic output (GDO) in constant prices which is taken as sectoral output and number of persons employed as labour input. GDO equals gross value of a sector's output or sales deflated by the sectoral price deflator. The GDO productivity measure of each sector is then compared against the average annual rate of aggregate productivity growth which is used as a cut off point for the two types of sectors.

The *third measure* is slightly more technical, the aggregate rate of total factor productivity (TFP) growth is given by:

$$\rho = \frac{(p\partial Y - w\partial L - r\partial K)}{y}$$

where d refers to the differential.

The rate of TFP growth for sector j is given by

$$\rho_j = - \frac{\left(\sum_i p_i \partial a_{ij} - w \partial l_j - r \partial k_j \right)}{p_j}$$

Y = column vector of final demand by sector

a = matrix of inter-industry technical coefficients

l = row vector of labour coefficients

k = row vector of capital stock coefficients and

p = row vector of prices showing the current price per unit of output of each industry

we have the following scalars

w = the annual wage rate in current prices

r = the rate of profit on the capital stock

$y = pY = GNP$ at current prices

$L = \mathcal{L}X$ = total employment and

$K = \mathcal{k}X$ = total capital stock

The *fourth measure* captures the changes in total input usage, direct and indirect, per unit of a sector's output which also reflects productivity growth of the sector's input

suppliers. The measure λ shows the total (direct plus indirect) labour requirements per unit of final output:

$$\lambda = l(I - a)^{-1}.$$

Productivity growth based on λ is quite similar to measure two since changes in total factor requirements are dominated by those in direct factor requirements.

One of the problems with the input-output framework in identifying key sectors is that we are trying to identify sectors with future developmental potential in an ex-post framework. Furthermore, the use of productivity as the only benchmark of an industries dynamism is very limiting since they exist other factors that can influence a sectors level of progressiveness. Table 2 below lists some factors that can be used to classify industries these might need to be split into internal and external characteristics.

5.4 Stern's criteria measuring the gains from services trade

The data requirements of the above criteria make it difficult to identify dynamic services, mainly due to the unavailability and poor quality of data. For these sectors, there is a need for an analytical framework that is able to rank sectors whilst using the little information that is available. In trying to quantify the gains from trade in services, Stern (2005) has developed a qualitative criterion which can be used to classify services sectors according to five criteria for exports and three for imports. The advantage of Stern's framework is that it uses qualitative data and it is defined over the 'four mode approach' used in the General Agreement on Trade in Services (GATS). The GATS distinguishes between four modes of supplying services: cross-border trade, consumption abroad, commercial presence, and presence of natural persons. Using Stern's framework one ends up with two matrices for identifying gains from exports and imports. See section 4 below to see how Sterns framework can be used to identify sectors that can deliver the gains from trade in services.

To make this classification more useful we can further divide services along the same lines as Park and Chan (1989) into two major categories market services and non-market services. Market services include producer services (for example banking and finance); distribution services (transport and storage); personal services (hotels and restaurants) and communications (internet). The non-market services include social services (for example, health and education)

Table 2 - Characteristics of dynamic and follower industries

Dynamic	Followers
Internal technological dynamism*	Experience infrequent and sporadic technological innovations
Stronger linkages**	No major technological innovations in the foreseeable future.
Greater contribution to value added	Weak or non-existent linkages with the rest of the economy
Important transmits of economic influence	

Strong learning economies***	
Tradability	
Innovative - product and process†	

* Easily assimilate technological innovations, Intensive R&D (Lowinger, 1975, found that US revealed comparative advantage is most pronounced in R&D intensive industries which gave the US a temporary technological lead in world markets.)

** Backward linkages, indirect linkages, these determine the spill over/knock on/multiplier effects

Dinopoulos et al (1995) found that in the presence of a competitive foreign fringe, market intervention by the domestic government enhances welfare only when the learning economies of the domestic firm are particularly strong, and so the firm is capable of competing on its own without government assistance.

***Strong learning economies may generate specific strategies of price-related competition based on winning a large market share⁶

†Licht et al (1999) find that in the case of German product innovation plays a more important role than process innovation. More than half of the companies refer to themselves as product innovators and only 35% as processor innovators.

The identification of potentially dynamic services sectors will go a long way in informing strategies that attempt to enhance their economies of scale and economies of learning. The first phenomenon refers to the cost advantages that a firm obtains due to expansion (for example, the expansion of construction services into Africa). The reduction in costs may be explained by the adoption of a different organizational structure for production as the scale of operations increase. Economies of learning on the other hand are due to the fact that complex operations are progressively better mastered, whether it is by an individual or an organization. The ICT sector is one of the sectors where learning economies play an important role. According to Robert Grant, "Japanese companies dominated the world market for active-matrix flat screens primarily because of unassailable cost leadership resulting from experience-based learning. The complexity of flat screen manufacture and the fact that a single chip defect may render an entire screen useless mean that yield rate is the key to cost advantage, and learning is the basis of high yields."⁷

The task of trying to sketch out which services sector will deliver the much needed growth is complicated by the fact that the analytical literature on the service sector is relatively scarce. The framework developed by Stern is a positive first attempt in this regard. As an illustrative example, (Table 3) Stern uses a local supermarket that has a presence in a number of African countries to highlight the possible gains from the export of retail services.

Table 3 - Identifying gains from exports

⁶Sachwald (1999)

⁷ Innovation Zen, <http://innovationzen.com/blog/2007/02/22/competitive-advantage-economies-of-learning/> Downloaded: 20/03/2008 10:11 AM

Mode of supply	Employment	Complementary exports	Foreign exchange	Knowledge and Skills	Economics of scale
Cross-border trade	n/a	n/a	n/a	n/a	n/a
Consumption abroad	Medium	Low	Medium	Low	Medium
Commercial presence	Low	High	High	Medium	Low
Temporary movement of people	Low	Low	Low	Medium	Low

Source: Stern (2005)

In table 4, Stern shows the gains from having a new entrant in fixed line telecommunication.

Table 4 - Identifying gains from imports

Mode of supply	Knowledge and skills	Product		Capital and infrastructure
		Price	Quality	
Cross-border trade	n/a	n/a	n/a	n/a
Consumption abroad	n/a	n/a	n/a	n/a
Commercial presence	Medium	High	High	Medium
Temporary movement of people	n/a	n/a	n/a	n/a

Source: Stern (2005)

Through the use of the above framework it is possible to come up with a short list of sectors that can deliver growth and employment.

Having said this, the aim may not be simply to “pick winners”. It may be that this exercise should be aimed at identifying cross-cutting characteristics of a range of activities that require a different policy emphasis. For example, these industries may benefit from the settling of certain trade arrangements, technology and innovation funding, and the easier movement of people.

6. Concluding remarks

Achieving both growth *and* employment will require the identification of a wider suite of traded goods and services, particularly in a context where goods manufacture tends to capital intensity. This is not easy to achieve, where the industrial structure, infrastructure and market incentives tend to be aligned to traditional activities and players. Nordas (2000) shows that the “lock-in effect” of the initial industrial structure is stronger for relatively resource abundant than for non-resource based developing countries. Shafer (1994) argues that the dominant sectors of a country tend to precondition how it interacts with the rest of the international economy. Traditional sectors oriented to minerals become major actors in the economy in a way that cements the prevailing economic structure. Rodrik (2004) argues that these countries need to find new non-traditional activities that can offer potential for growth. Growth is not the only consideration since mineral dependent countries tend to also experience relatively high rates of unemployment and inequality. This means resource based countries need to find non-traditional activities that address the issue of growth whilst tackling unemployment and inequality.

There is some preliminary evidence that that low productivity of key sectors due to weak regulation and limited policy support may be dampening potential growth. Regulation and limited competition will thus be reflected in weak innovation, low productivity growth and/or high prices. High mark-ups in many services sectors have been shown by both Edwards (.) and Fedderke (.). The need for increased competition and more appropriate regulation cannot be overemphasised since it can have far reaching consequences on economic performance.

It could be argued that, while a comprehensive suite of industrial policies is needed, and has already been identified in SA's National Industrial Policy Framework and the Industrial Policy Action Plan, the specific emphasis will create bias towards certain sectors. One difference that arises from the older days of promoting industries with high sunk costs is that these newer industries may arise in surprising areas. There are already areas of strong competitive advantage that built up without explicit government support. Certain generic policies need more attention than would otherwise be the case, including:

- Services trade arrangements to ensure that the interests of SA business and consumers are supported.
- Alignment of diplomacy to commercial interests since services trade is often located in situ.
- Competition policy in respect of services and especially backbone services; The promotion of entry and of "creative destruction"
- The movement of people is needed in manufacturing, but is absolutely essential in services trade. This refers to people moving in and out.
- Technology policy in support of a wider range of activities, and extended to services innovation.

The essential message is that services could be a drag on growth, unless the business and policy environment encourages them to become more dynamic. This could have a second benefit, which is to generate more traded sectors that are able to stimulate both growth and employment.

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Appendix: Sector categories

The HSRC's employment scenarios groups sectors according to the following 15 aggregations. Some sectors are simply isolated including, agriculture, mining, electricity & water, construction and government. The manufacturing and services sectors are categorised by their labour or skill intensity, and by whether they are investment, intermediate or final products:

1. Agriculture
2. Mining
3. Labour-intensive intermediate goods
4. Labour intensive intermediate goods - transport
5. Labour-intensive consumer goods
6. Labour-intensive capital goods⁸
7. Capital-intensive intermediate goods (these are minerals and metals resource-intensive sectors)
8. Capital-intensive consumer goods
9. Electricity & water
10. Construction
11. Low skill-intensive intermediate services
12. Low skill-intensive consumer services
13. Skill-intensive intermediate services
14. Skill-intensive consumer services
15. Government services

These 15 sector categories are mapped to the SIC categories in the table below.

Table 5 - 15 sector aggregation

	New Activity Code	Description	Old Activity Code	Old Description	SIC
1	AAGR	Agriculture	AAGRI	agriculture	1
2	AMIN	Mining	ACOAL	coal	21
			AGOLD	gold	23
			AOTHM	other mining	22/24/25/29
3A	ALIG	Labour intensive intermediate goods	ATEXT	textiles	311-312
			ALEAT	leather products	316
			AWOOD	wood products	321-322
			APAPR	paper products	323
			APRNT	printing and publishing	324-326
			AOCHM	other chemical products	335-336
			ARUBB	rubber products	337

⁸ There are no capital-intensive capital goods

			APLAS	plastic products	338
			AGLAS	glass products	341
			ANMMP	non-metallic metal products	342
			AMETP	metal products	353-355
			AELMA	electrical machinery	361-366
			ASCIE	scientific equipment	374-376
3B	ALIG-T	Labour intensive intermediate goods - transport	AVEHI	vehicles	381-383
			ATRNE	transport equipment	384-387
4	ALCG	Labour intensive consumer goods	AFOOD	food processing	301-304
			AAPPA	wearing apparel	313-315
			AFOOT	footwear	317
			AFURN	furniture	391
			AOTHI	other industries	392-393
5	ALKG	Labour intensive capital goods	AMACH	machinery	356-359
			ACOME	communication equipment	371-373
6	AKIG	Capital intensive intermediate goods	APETR	petroleum products	331-333
			ABCHM	chemical products	334
			AIRON	basic iron and steel	351
			ANFRM	non-ferrous metals	352
7	AKCG	Capital intensive consumer goods	ABEVT	beverages and tobacco	305-306
8	AELW	Electricity and water	AELEG	electricity and gas	41
			AWATR	water	42
9	ACON	Construction	ACONS	construction	5
10	AUIS	Low skill intensive intermediate services	ATRAD	trade services	61-63
			ATRAN	transport services	71-74
			ACOMM	communication services	75
11	AUCS	Low skill intensive consumer services	AHCAT	hotels and catering	64
			AOTHP	other producers	92, 95-96, 99
12	ASIS	Skill intensive intermediate services	AFINS	financial and real estate services	81-82
			ABUSS	business services	83-88
13	ASCS	Skill intensive consumer services	AMAOS	medical and other services	93
14	AGOV	Government services	AGOVS	government services	91, 94