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Manufacturing Competitiveness in South Africa: Matching industrial systems and policies

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Abstract

The effectiveness of countries' different industrial policy packages is increasingly determined by the government capacity to design, implement and monitor a complex set of interdependent measures, acting upon different factors and across different industrial sectors and technologies. The paper aims to provide insights to the South Africa industrial policy debate by mapping its current industrial policy mix, then, by revealing the major challenges the government is facing and, finally, by suggesting feasible ways forward. In particular, the paper develops new metrics and taxonomies to disentangle the complex mix of policies adopted in South Africa; also, it reveals the extent to which such measures are framed within a coherent industrial policy agenda. Within the new industrial policy revolution, countries are increasingly stressing their need to match industrial systems and policies, that is, responding to the specific and dynamic needs expressed by their manufacturing sectors with appropriately designed and targeted policies. In order to reach such matching and policy coherence, the paper suggests and applies in the context of South Africa a three stages approach in which after having benchmarked the country's manufacturing competitiveness, the country's policy mix is revealed within an 'industrial policy matrix'. On this basis, then, critical policy challenges cross-cutting the entire policy mix are analysed and feasible strategies identified and compared.

Keywords: Manufacturing competitiveness; industrial policy; South Africa; policy mix; policy matrix; selectivity; coordination; developmental linkages; policy learning.

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1. Introduction

Industrial policy has been gradually reappearing as a central component of economic development strategies, partially as a response to the financial crisis, more fundamentally because the resulting economic recession has accelerated and, thus, strengthened the ongoing profound transformations of the global industrial landscape. Clear signs of a paradigm change in industrial policymaking can be found in both developed and developing economies, although different policy responses have been provided. This is partially due to the fact that industrial policies reflect countries' differences in terms of their development strategies, sectoral, technological and institutional contexts as well as their understanding of global industrial trends.

The effectiveness of countries' different industrial policy packages is increasingly determined by the government capacity to design, implement and monitor a complex set of interdependent measures, acting upon different factors and across different industrial sectors and technologies. However, beyond the new consensus on the need to implement policies for industrial development, there is an open debate on which types of sectors, activities and technologies can different countries promote, and by which policy mix. The paper aims to provide insights to the South Africa industrial policy debate by mapping its current industrial policy mix, then, by revealing the major challenges the government is facing and, finally, by suggesting feasible ways forward. In particular, the paper develops new metrics and taxonomies to disentangle the complex mix of policies adopted in South Africa; also, it reveals the extent to which such measures are framed within a coherent industrial policy agenda.

Within the new industrial policy revolution, countries are increasingly stressing their need to match industrial systems and policies, that is, responding to the specific and dynamic needs expressed by their manufacturing sectors with appropriately designed and targeted policies. In order to reach such matching and policy coherence, the paper suggests a three stages approach in which after having benchmarked a country's manufacturing competitiveness, the policy mix is revealed within an 'industrial policy matrix' mapping different policies according to their impact on certain factor inputs and the level of policy intervention. The last step within our approach consists in the selection of critical policy challenges cross-cutting the entire policy mix. Specifically, in the specific context of South Africa, the analysis reveals the importance of focusing on three main challenges: (i) focusing on policy coordination and selectivity; (ii) exploiting the opportunities offered by 'developmental linkages' to address manufacturing as well as employment objectives; finally, (iii) improving the policy process and inter-institutional coordination within a policy learning approach to monitoring and evaluation. Within the new industrial policy revolution context, many countries at different stages of industrial development are facing these challenges. Therefore the paper also represents a contribution to the broader debate on industrial policies.

The paper is structured in three main sessions. After this introduction, section 2 highlights the major global trends in the organization of production and innovation and it highlights the positioning of South Africa in the new global and African context. Section 3 then provides a structured overview of the South Africa's industrial policy mix by highlighting the kinds of measures that are implemented, the associated budgets, the levels of intervention and the institutions associated with policy design and implementation. In particular, based on the analysis of the industrial policy matrix developed for South Africa, section 3 focuses on four main selected axes within the overall policy agenda and, thus, it questions their effectiveness in addressing the

most binding constraints. The first two axes are related to measures aimed at enhancing production capacity from a supply (financial support) and demand side (public procurement) respectively. The last two axes refer mainly to increasing the South Africa's manufacturing competitiveness by supporting the development of special economic zones and a modern innovation-oriented technological infrastructure.

Taking stock of the detailed analysis developed in section 3, the last section assesses the policy mix and its alignment/disalignment given the stated policy goals as well as the major challenges arising from the industrial policy analysis. Particular emphasis is assigned to the discussion of the tensions arising from a welfarist (job creation) approach with a more techno-industrial transformation perspective in discussing priorities and policy measures. The importance of rethinking policies' selectivity, coordination and the cross-sectorial effects (which unfold as a result of developmental linkages) constitute fundamental intersections and opportunities to go beyond current policy trade-offs. This section also sketches a series of feasible 'ways forward' for improving the industrial development strategy taking into account both the diagnostics at the global and national level, and the policy mix and the institutional capacities in South Africa.

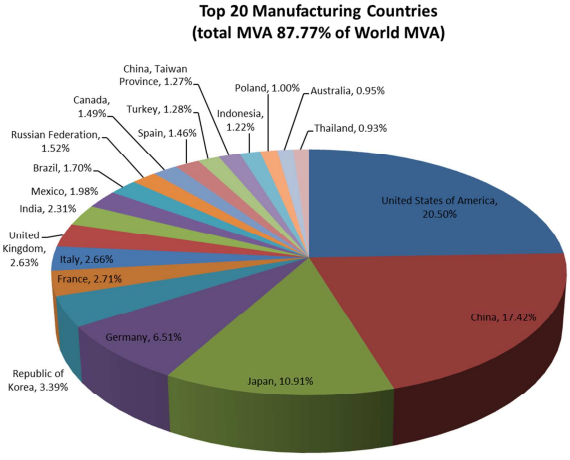
The paper concludes by summarising main results and further potential developments of the analysis.

2. The new global manufacturing landscape: benchmarking South Africa's manufacturing competitiveness

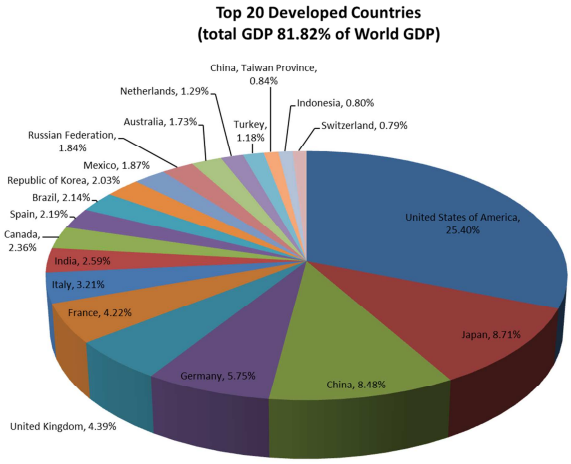
Over the last three decades, the importance of manufacturing in the political economy debate has steadily declined. The dominant pro-service vision even suggested that developing countries were undergoing a historically novel pattern of structural change determined by a new technological paradigm. However, recent years have witnessed a rediscover of manufacturing, its potential as an engine of technological dynamism and a source of the wealth of nations (Andreoni and Gregory, 2013; OECD 2013; UNIDO, 2013). De-industrialisation, loss of strategic manufacturing industries, increasing trade imbalances and decreasing technological dynamism have been major concerns in advanced economies. Meanwhile in middle income countries, governments have begun to question the sustainability of a growth model mainly focused on natural resource extraction more than manufacturing development. Finally, developing countries have been increasingly threatened by emerging giants capturing global manufacturing production and export shares and aggressively engaging the global technological race. In particular, China built over time a complex industrial matrix that is reshaping the global production landscape thanks to a combination of open economy, huge domestic market, public policies and competition (Dahlman, 2011; see also figures 1 and 2).

Figures 1 and 2:

Top 20 Countries by share in World MVA, 2012



Top 20 Countries by share in World GDP, 2012



Source: Authors based on UNIDO, 2013

The majority of international competitiveness indexes indicate the dominant role of developed countries as well as China in the global economy today (UNIDO, 2013). At the same time most

assessments concur that South Africa is still lagging behind these economies significantly. While some of the well-known indexes (e.g. the ones published by WEF and IMD) analyze competitiveness factors for the whole economy, the Deloitte Index as well as UNIDO's CIP index focus on the manufacturing sector specifically. The main difference between the Deloitte and the UNIDO index is the focus on CEO *perceptions* of countries' *performance and capabilities* (outputs and inputs) in the former and the exclusive usage of *objective quantitative performance* data (only outputs) in the latter.

In the CIP index, South Africa currently ranks 41st, leading within Sub-Sahara Africa but facing a significant gap with the global top 15 countries (headed by Japan, Germany and the USA). Table 1 shows the respective position of the top 15 countries as well as South Africa in the CIP as well as other competitiveness rankings. Despite the different methodologies that lead to significant variations in the rankings, it is evident that South Africa needs to enhance its competitiveness significantly in order to catch up with global frontrunners.

Table 1: South Africa's position in the CIP, WEF, IMD and Deloitte Index

CIP Index Ranking: Top 15

UNIDO CIP Index Top 15 (2010)		WEF –Global Comp .Index – 2012/13	IMD –World Competitiveness Scoreboard – 2012/13	Deloitte - Global Manufacturing Comp. Index - 2013
1	Japan	10	27	10
2	Germany	6	9	2
3	USA	7	2	3
4	Republic of Korea	19	22	5
5	China, Taiwan Province	13	7	6
6	Singapore	2	4	9
7	China	29	23	1
8	Switzerland	1	3	22
9	Belgium	17	25	27
10	France	21	29	25
11	Italy	42	40	32
12	Netherlands	5	11	23
13	Sweden	4	5	21
14	United Kingdom	8	18	15
15	Ireland	27	20	37
41	South Africa	52	50	24

Source: UNIDO

In order to put the current South African industrial competitiveness challenge into perspective, it is useful to compare its performance over time and to benchmark it with competitors that are within closer reach. Table 2 pursues this goal by comparing the changes of South Africa's competitiveness ranking with that of the other BRICS countries over the last 15 years. The

comparison suggests that China's manufacturing sector has outrun its BRICS peers significantly in the last two decades. South Africa is also lagging behind Brazil and Russia despite their comparatively poor performance during this period. Furthermore, as a result of the recent negative trend, it can be expected that South Africa will be overtaken by India's manufacturing sector that has recently improved its competitiveness significantly.

Table 2: The BRICS in UNIDO's CIP index from 1995 to 2010

The Performance of the BRICS in UNIDO CIP index

	1995	2000	2005	2010	Trend
South Africa	37	42	39	41	↓
India	48	52	52	43	↑
China	26	23	18	7	↑↑
Russia	36	39	36	36	=
Brazil	29	31	34	33	↓

Source: UNIDO

The CIP index abstracts from reality by mashing up several dimensions of competitive industrial performance. While the above assessment is helpful for policymakers to monitor the current situation in general terms, it doesn't provide a nuanced picture and hence doesn't allow for many relevant policy conclusions. Hence, a more detailed analysis of the various dimensions of industrial production and export competitiveness is required in order to understand the current strengths and weaknesses of the South African manufacturing sector.

A disaggregated analysis of the eight CIP indicators in Table 3 suggests that during the last decade, South Africa's industrial competitiveness has mostly been slowed down by poor performance of the industry side of the scoreboard, while the export performance was more favourable. Despite a marginal increase in industrial capacity over the last ten years, the countries impact in global manufacturing production has declined slightly due to more dynamic global competition. The structural change process towards more manufacturing in the economy has been turned on its head, as indicated by a 2% decline in the share of MVA in GDP over the last decade. In terms of industrial deepening, the share of more complex medium and high technology activities has declined slightly compared to low-technology and resource-based manufacturing activities.

Table 3: South Africa's performance in the CIP dimensions from 2000-2010

The South Africa Scorecard: CIP Indicators (macro level)

Dimensions	Industry Indicators				Trade Indicators			
	2000	2005	2010	2000-2010	2000	2005	2010	2000-2010
Capacity (MVA/MnfExp pc)	796	863	889	↑	417	688	977	↑
Impact (World share)	0.62 %	0.57 %	0.61 %	→	0.37 %	0.41 %	0.46 %	↑
Structural Change (MVA/MnfExp in GDP/total Exp	17 %	16%	15 %	↓	70 %	69 %	68 %	↓
Industrial Deepening (share of MHT in MVA and mnfd exports)	38 %	38%	37 %	→	40 %	48 %	46 %	↑

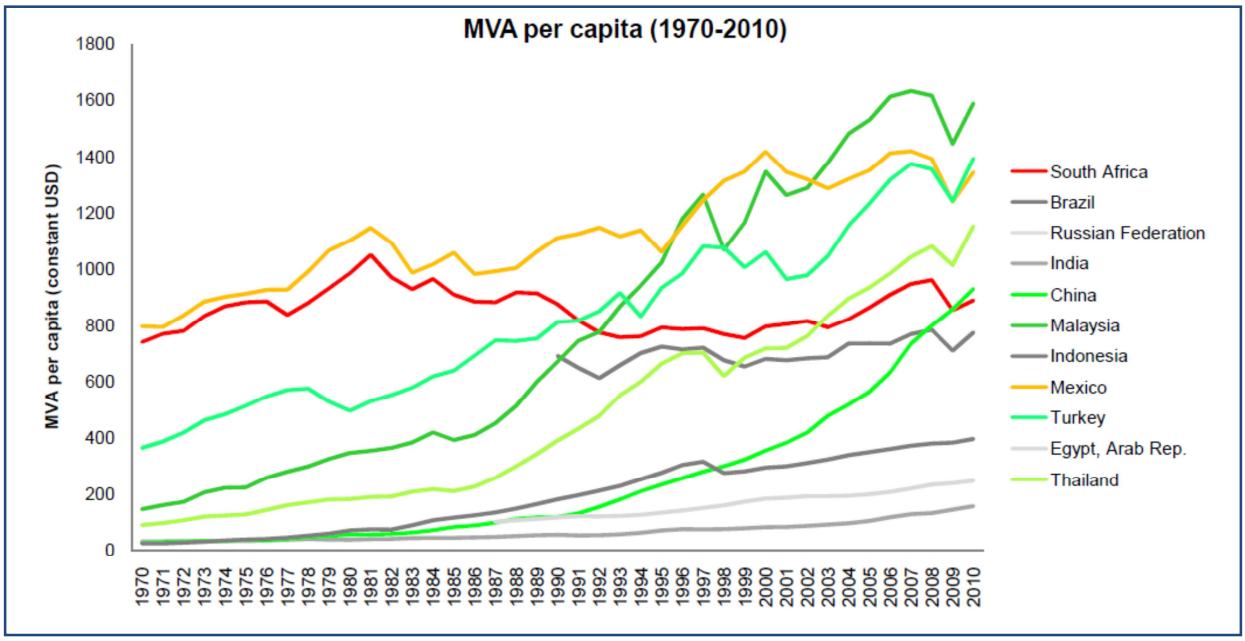
Source: UNIDO

The scorecard also highlights that South Africa's industrial competitiveness has benefitted recently from increased global demand for the country's manufactured products. Its manufactured export capacity has increased significantly faster than global demand, which indicates that South African goods have partially replaced those of global competitors and thus increased their share in world markets (impact). On the other hand, the sharp increase in both prices and demand for South African primary commodities has reversed the structural change process from commodities to manufactured exports recently. Within the manufactured export portfolio, the earlier improvement of the quality of South African manufactured exports (deepening) has also slowed down in the last five years because of a relative increase in less complex resource-based manufactured exports rather than technology-intensive products.

The above analysis points to the conclusion that the recent unsuccessful industrial competitiveness performance of South Africa was mainly brought about by the absence of a significant expansion of value-addition in the manufacturing sector in general and in more technology-intensive sub-sectors in particular.

The situation was worsened by the fact that several global competitors have increased their production capacities significantly in the last decade and thus marginalized South African industry further. In particular the East Asian tigers Malaysia and Thailand as well as China, but also competitors like Mexico and Turkey have managed to increase their industrial capacity rapidly from the 1990s onwards, leaving South Africa behind. Figure 3 shows that South Africa has lost its former edge in terms of manufacturing value added per capita due to its stagnation over the last 40 years. The slight upward trend of the last ten years was not sufficient to withstand this competition.

Figure 3: Industrial capacity (MVA per capita) of South Africa and comparators, 1970-2010

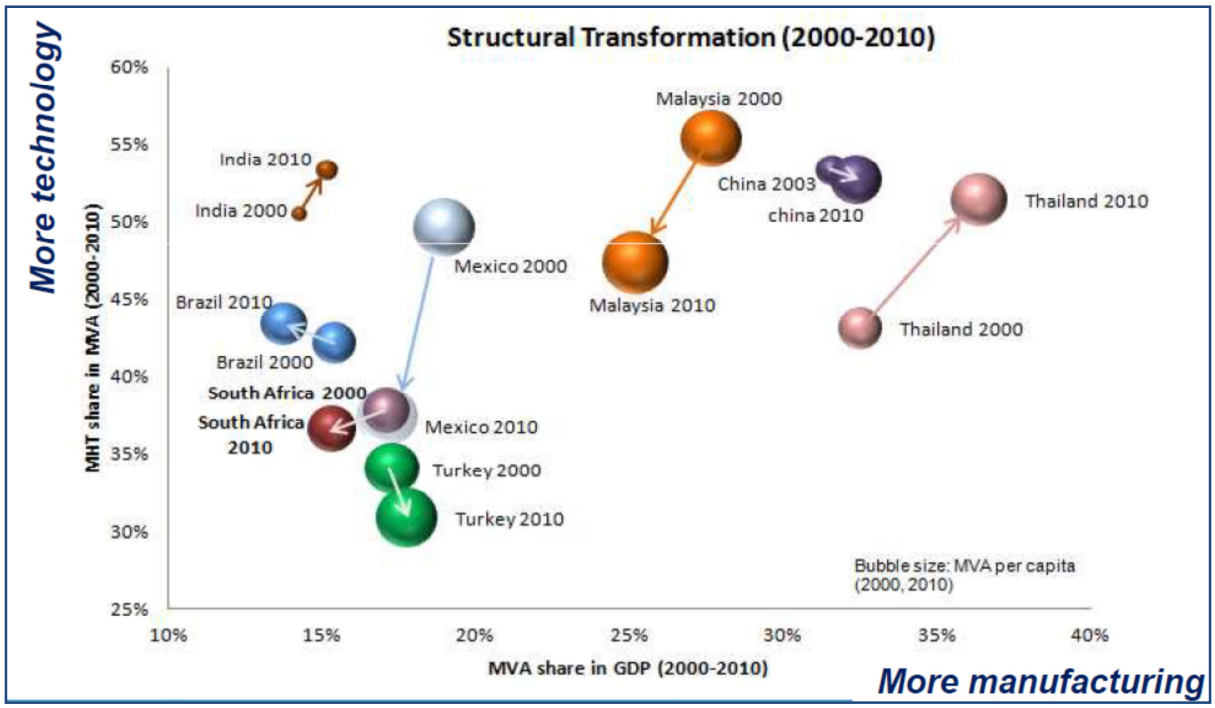


Source: UNIDO

The lack of an increase in industrial capacity also prevented the South African manufacturing sector from initiating the desired structural transformation process. Given its current level of development, the country has been trying to transform its economy over the last decades. However, a move towards more manufacturing in the economy (first tier structural change) and more technology within manufacturing (industrial deepening or second tier structural change) did not materialize. At the same time, several competitors managed to transform their economies significantly – as shown in Figure 4 – pointing to the potential role that manufacturing could also play in the South African economy in the future.

While South Africa's reversed structural transformation is illustrated by its move towards the lower-left quadrant of the graph, the more successful industrializers, China and Thailand, continue to move in the more desirable upper-right quadrant and hence present a suitable role-model. In particular Thailand showed the most significant improvements towards more manufacturing as well as higher-technology sub-sectors in the last decade and now generates more than 35% of its GDP through manufacturing and mostly from medium-and high technology activities. India, despite its significantly earlier development stage (in terms of income per capita), has also initiated an enduring structural transformation process recently, with manufacturing already today playing a similar role in its economy as it does in the South African. Furthermore, Indian manufacturing shows a significantly higher share of medium and high-technology activities which has further increased over the last ten years. These findings provide further evidence for the possible scenario that the Indian manufacturing sector could soon overtake the South African one in the CIP ranking.

Figure 4: Structural change & industrial deepening of South Africa & comparators 2000-10

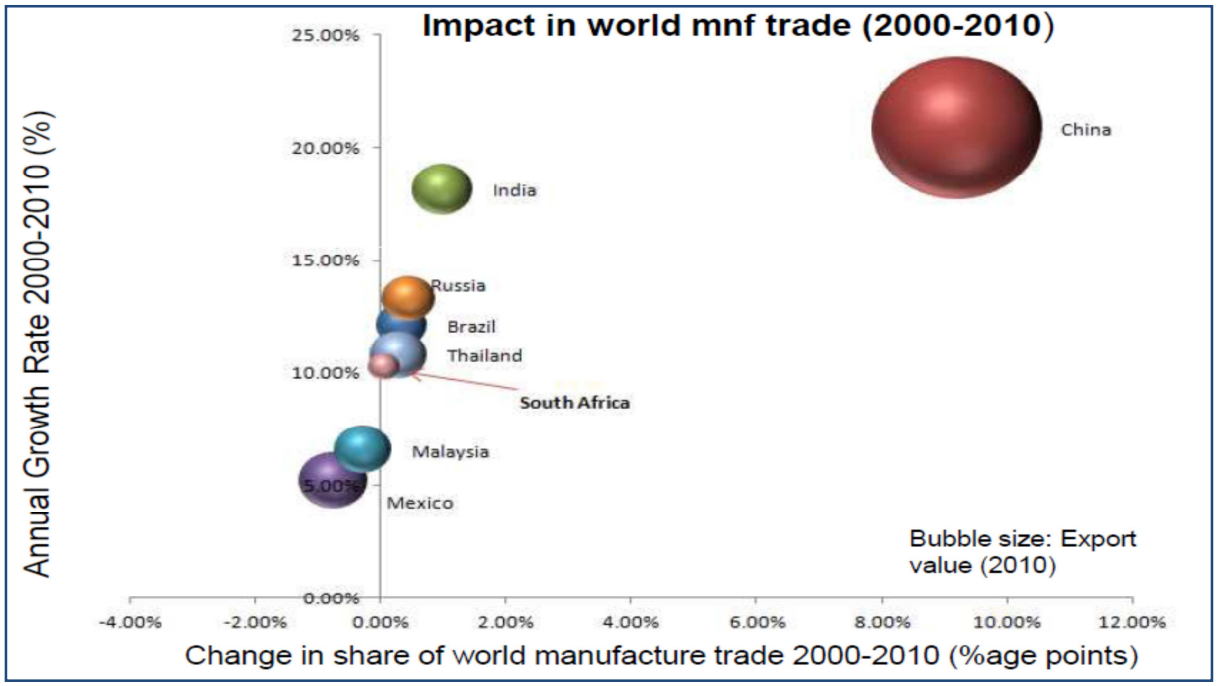


Source: UNIDO

As discussed above, the South African manufacturing sector is doing significantly better on the export compared to the production side. However, despite the recent expansion of export activities, the country still falls short of keeping pace with some of its key competitors in global markets as illustrated in Figure 5. The average annual growth rate of 10% during the last decade did not suffice to close the gap to any of the BRIC economies, which all outperform South Africa in terms of their impact in global markets for manufactured goods. Benefitting from growth rates twice as high as South Africa, India and China have increased their shares significantly since the year 2000. The more mature sectors in Malaysia and Mexico did not sustain their earlier growth rates more recently but nevertheless still export significantly more manufactured products to world markets than South Africa, both in absolute and per capita terms.

In terms of the structural transformation in manufactured exports, South Africa exhibits fairly similar patterns to Brazil. Both countries still rely on primary commodities for more than 30% of their foreign sales and complex (medium-high tech) products account for less than half of the manufactured products they export. On the one hand, Russia is highly dependent on primary exports (>65%), while on the other hand Malaysia, Thailand and China have shown that manufactured goods can make up more than 85-90% of all exports. They also demonstrate that medium and high-technology sectors can contribute more than 60% to the manufactured export baskets of emerging industrial powerhouses. These findings suggest that the South African industry should still be able to speed up its export driven path to manufacturing competitiveness significantly. Our findings on the production side do however suggest that a significant increase in export earnings will need to be nurtured by a major leap of value addition in the country. Trade promotion and liberalization, which have already progressed significantly in recent years, are unlikely to be sufficient drivers for a sustainable industrialization process.

Figure 5: The impact of South Africa & comparators in world manufactured trade, 2000-10



Source: UNIDO

In summary, this sub-section has outlined the key features of South Africa's industrial competitiveness over the last decade and has benchmarked the country against several important competitors. While some progress is evident in particular on the export side, the manufacturing sector will only be able to keep pace with global competition if productive activities with higher value addition can be nurtured to drive the sectors maturation process beyond its strong reliance on resource-based manufacturing. The indicators that were applied in this section can be monitored in regular intervals (preferably annually) without much effort, which will allow us to track the respective changes in all eight dimensions of industrial competitiveness.

3. The industrial policy revolution: mapping the South Africa industrial policy mix

Over the last two centuries all today's industrialised countries adopted a wide spectrum of policies aimed at orienting and enabling the structural transformation of their national manufacturing systems (Johnson 1982; Hall 1986; Dore 1986; Okimoto, 1989; Amsden 1989; Wade 1990; Stiglitz 1996; Evans, 1996; Chang 2002; Cimoli, Dosi and Stiglitz 2009). After having analysed the main turning points, rationales and approaches in industrial policy, the following section provides a structured overview of the South Africa's industrial policy mix by highlighting the kinds of measures that are implemented, the associated budgets, the levels of intervention and the institutions associated with policy design and implementation. In particular, based on the analysis of the South Africa industrial policy matrix, this section focuses on four main selected axes within the overall policy agenda. Finally, it questions their effectiveness in addressing the most binding constraints. The first two axes are related to measures aimed at enhancing production capacity from a supply (financial support) and demand side (public procurement) respectively. The last two axes refer mainly to increasing the South Africa's manufacturing competitiveness by supporting the development of special export zones and a modern innovation-oriented technological infrastructure.

3.1 Industrial policy revolutions and the South Africa experience

3.1.1 Industrial policy revolutions

Turning points

The theory and practice of industrial policy have gone through three main turning points. Table 4 offers a detailed stylisation of these three main turning points and references to their distinctive features with respect to a number of elements.

After the Second World War, during the so called 'golden age of capitalism', industrial policy was adopted as one of the main tools for countries' indicative planning. It took many forms, from import substitution to export promotion, from infant industry protection to state ownership of enterprises in strategic sectors or national champions' development (Cimoli et al., 2009). This 'picking winners' approach was grounded in the idea that market failures are pervasive (especially in developing economies) and that governments have to take a role in countries' structural transformation.

Table 4: Evolving industrial policy for development: crafting strategies to face a more complex scenario

Main features	40s to 60s/70s	80s to 90s	2000 onwards
Prevailing economic development model	Development through industrialisation and accumulation of endogenous scientific, technological and production capabilities	Stabilisation, liberalisation, and development through international trade and poverty reduction programs	Development through virtuous participation to global knowledge economy. Focus on export-led and domestic demand as growth drivers
Industrial policy framework	Industrialisation through Import Substitution. Selective policies and gradual opening to competition once the capabilities are acquired	The best industrial policy is "no industrial policy". Exposure to competition and horizontal approach.	Targeted strategies in open economies. (Local, regional and global competitive strategies)
Objectives	Diversification (transition from agricultural and natural-resource based activities to industrial ones with higher technological content).	Specialisation and modernisation	Increasing the density and productivity of the production system and fostering diversification and specialisation
Mechanisms to identify priorities for action	Centralised identification of national priorities by public agencies	No prioritisation (Market-led)	Public-private and multi-level identification of priorities.
Sectoral dimension	High (focus on technology intensive industrial sectors)	None	High (focus on clusters of competences/capabilities)
Policy space	High room of manoeuvre and high political legitimacy of national development strategies	Reduction in the room of manoeuvre (WTO, TRIPS commitments, etc.) and low political legitimacy of national development strategies.	Moderate room of manoeuvre in traditional fields (in the new policy space there are flexibilities that countries could apply) and high room of manoeuvre in emerging fields; regain of legitimacy of national development strategies
Priority policy mix and instruments	Capital movement management Financing for production development mostly targeting "national champions" Infant industry protection Coordinated actions in the field of hard infrastructure and human capital.	Innovation policies and ICT diffusion Focus on competitiveness projects instead of structural programmes.	Credits and grants for production development and innovation Public procurement Promotion of entrepreneurship (venture capital, angel investors and support to business capabilities) Improvement in hard and soft infrastructure Human resources, technical competences and skills development
Institutional architecture	Creation of domestic institutions for scientific and production development (e.g. national councils for S&T development, development banks, targeted agencies for production development)	Weakening and/or dismantling of institutions and instruments for industrial development	Re-strengthening of institutions for industrial development (modernisation of institutions for science, technology and innovation. New forms of governance to fostering alliances between public and private sector, across levels of government and among national and international stakeholders)
The FDI and international trade dimension	In Asian economies: carefully managed to allow domestic learning and catching up and to foster "healthy" competition to sustain productivity growth and innovation. In Africa and in Latin America mostly seen with suspiciousness and poorly managed.	Auspicated vehicle for technology transfer and catching up. In practice it favoured modernisation in some sectors, but it also contributed to the truncation of previous industrialisation efforts, especially in Latin America.	Strategic management of FDI inflows (conditionalities to foster learning), emerging FDI outflows and increasing participation in global value chains.
Territorial dimension	Low priority. Compensation policies for lagging areas.	Moderate priority. Some industrial policy initiatives remained active at the regional/local level (especially the support for SMEs)	High priority. Explicit regional industrial policy strategies and tools (focus on competitive regional/cities clusters)

Source: adapted from Primi, 2013.

During the second half of the last century, the so called 'Washington Consensus era', the idea that government failures might be even worse than market failures and structural coordination problems became dominant. As a result of this radical shift in the academic debate, the industrial policy discourse changed and industrial policy increasingly became a banned word. The reality is however different, as even in more neoliberal countries where mainstream economics was dominant, governments' interventions were reduced only to a certain extent, or simply reshaped or scaled down.

The third turning point can be identified in the influential *East Asian Miracle Report* (World Bank, 1993) and the acknowledgment that fastest catching up economies like Japan, Taiwan, South Korea, Singapore and Hong-Kong were adopting a variety of industrial, trade and technology policies based on 'wrong' economic theories and rationales (Chang, 1994; Stiglitz, 1996).

The new modern debate on industrial policy started is long run towards a slow process of increasing 'normalisation' (Rodrik, 2007).

Rationales

The debate on industrial policy has traditionally focused on two main sets of rationales justifying government intervention, namely *market failures* determined by information asymmetries, externalities and public goods, and *structural coordination problems* related to demand and technological complementarities, resource scarcity and production factors specificity (for a review see Pack and Saggi, 2006; Rodrik, 2007; Ciuriak, 2011; Chang et al. 2013). All these failures have both static and dynamic implications and, thus, implies trade-offs between 'allocative' and 'growth' efficiency. As a result of the intertwining of the industrial and innovation policy debates, over the last decade a new set of *systemic failures* have been increasingly recognised while relatively less emphasis has been given to sectoral explanations of technology push and demand pull dynamics, at least in the context of most developed economies (Soete, 2007; see also Laranya et al. 2008).

To begin with market failures, we will consider *information problems*, namely insufficient information and lack of price signals, leading to underinvestment (Greenwald and Stiglitz, 1986 and 2013). Investment in new non-traditional industrial sectors might be strictly limited by capital market failures, lack of effective equity markets or sufficient financing resources internal to the firm. Moreover, the price mechanism does "not provide clear enough indication of the profitability of resources that do not actually exist (e.g. new skills and technology)" (Ul Haque, 2007:3). To deal with these market failures, governments can become direct surrogate for the capital market through development banks focusing on long-term loans, venture-capital schemes and alternative forms of risk-sharing through 'bailouts' (Stiglitz, 2001); also, they can nurture infant industries by providing subsidies for a limited period of time balanced with strong performance requirements – e.g. export market requirements (Chang, 1994). Some of these policies can also address problems related to *informational externalities* and 'appropriability' in the process of 'self-discovery' which drastically affects investment in new activities and technologies (Hausmann and Rodrik 2004; Rodrik, 2004). Problems of returns appropriability and, thus, under-investments become also severe when we deal with highly specific public goods (Tassey, 2005) and commonly available manufacturing capabilities (Pisano and Shih, 2013).

Structural coordination problems tend to arise as dynamic market failures, especially as a result of 'strategic uncertainty' (Chang, 1994; Lin and Chang, 2009; Aghion et al. 2010; Lin, 2012). The first problem of coordination is related to the existence of demand complementarities and increasing returns to scale in manufacturing industries (Roseinstein-Rodan, 1943; Nurske, 1952). Any sectors and industries require a series of complementary investments in interconnected activities in the early phases of their development as their returns, and sometimes even existence, depend on their being all structurally connected through a web of forward and backward linkages (Hirschman, 1958). This argument does not stand for developing economies only, as countries at the technological and production frontiers might also require complementary investments in sets of interrelated new key enabling technologies or production activities. This is increasingly the case given the systemic (and cross-sectoral) nature of manufacturing production and technologies (Tassey 2007). In order to overcome structural bottlenecks along countries' transformation trajectories and facilitating the alignment over time of strategic investments (Andreoni and Scazzieri 2013), governments can adopt a series of specific subsidies and incentives which may even not imply any money transfer such as 'ex ante guarantee schemes' (Rodrik, 2004:14).

Another problem of structural coordination occurs in the presence of 'competing investments'. In modern industries, large firms sustain initial huge investments in machinery and productive capacity in order to achieve efficient scale of production. As these initial costs are generally specific and 'sunk', oligopolistic competition in these sectors may lead to price wars that may destroy parts of firms' assets or may lead them to bankruptcy. The state can intervene ex ante in many ways. For example in Japan the state adopted a system of 'entry licenses' and in South Korea a 'conditional entry system' that artificially tries to 'clear' the market adjusting the supply to the evolution of demand (Chang, 1994). However, collective-action problems may be related not only to investment but also to situations of temporary disinvestment or structural change in the industrial sector. Recession cartels and mechanisms of negotiated exit have been widely used to face periods of economic crisis or accompany structural transformation. In these situations industrial policies introduce "a 'protective' element – that is 'helping losers' by temporarily shielding them from the full forces of the market" (Chang, 2003:262). More generally, the state can introduce mechanisms of socialisation of risk to encourage and sustain the process of structural change, economic diversification and overall productivity growth.

In recent years, the classical industrial policy rationales have been enriched and partially reformulated within a new understanding of techno-innovation dynamics as well as the increasing systemic nature of the modern global economy structured around multi-supply chains (see section 2.1). The Systems of Innovation literature pioneered by Freeman (1987), Lundvall (1992) and Nelson (1993) gave way to the identification of innovation policy rationales addressing among the others: infrastructural and institutional problems; technological lock-in, path dependency and transition failures; quality of linkages and networks configuration failures; finally, issues related to learning dynamics at the firm, local networks and system levels (Lall, 1992; Bell and Pavitt, 1993; Metcalfe, 1995; Edquist, 1997; Malerba, 2002; Klein Woolthuis et al., 2005). Some of these policy rationales have been gradually adopted also in the industrial policy debate under the heading of *systemic* or *network failures* (Chaminade and Edquist 2006; Coe et al, 2008; Cimoli et al., 2009; Dogdson et al. 2011; Kuznetsov and Sabel, 2011; Wade 2012). These contributions share a holistic conception of the innovation process and, more distinctively, a multi-layered representation of industrial systems whereby agents (i.e. firms, research centres, intermediaries etc.) are embedded in a network of horizontal and vertical interdependences that determine their production and innovation performances. Systemic failures may unfold both within and across

regional and national industrial systems, all of them being interconnected through global supply chains.

Variety of industrial policy approaches

Countries' contextual characteristics, defined in terms of their institutional matrix, sectoral composition and manufacturing system configuration, technological structure and resource endowments, are all factors shaping and defining the scope of different *industrial policy approaches*. Differences in industrial policy approaches across countries can be identified along four main axes (Table 5 frames these four axes and provides countries' examples).

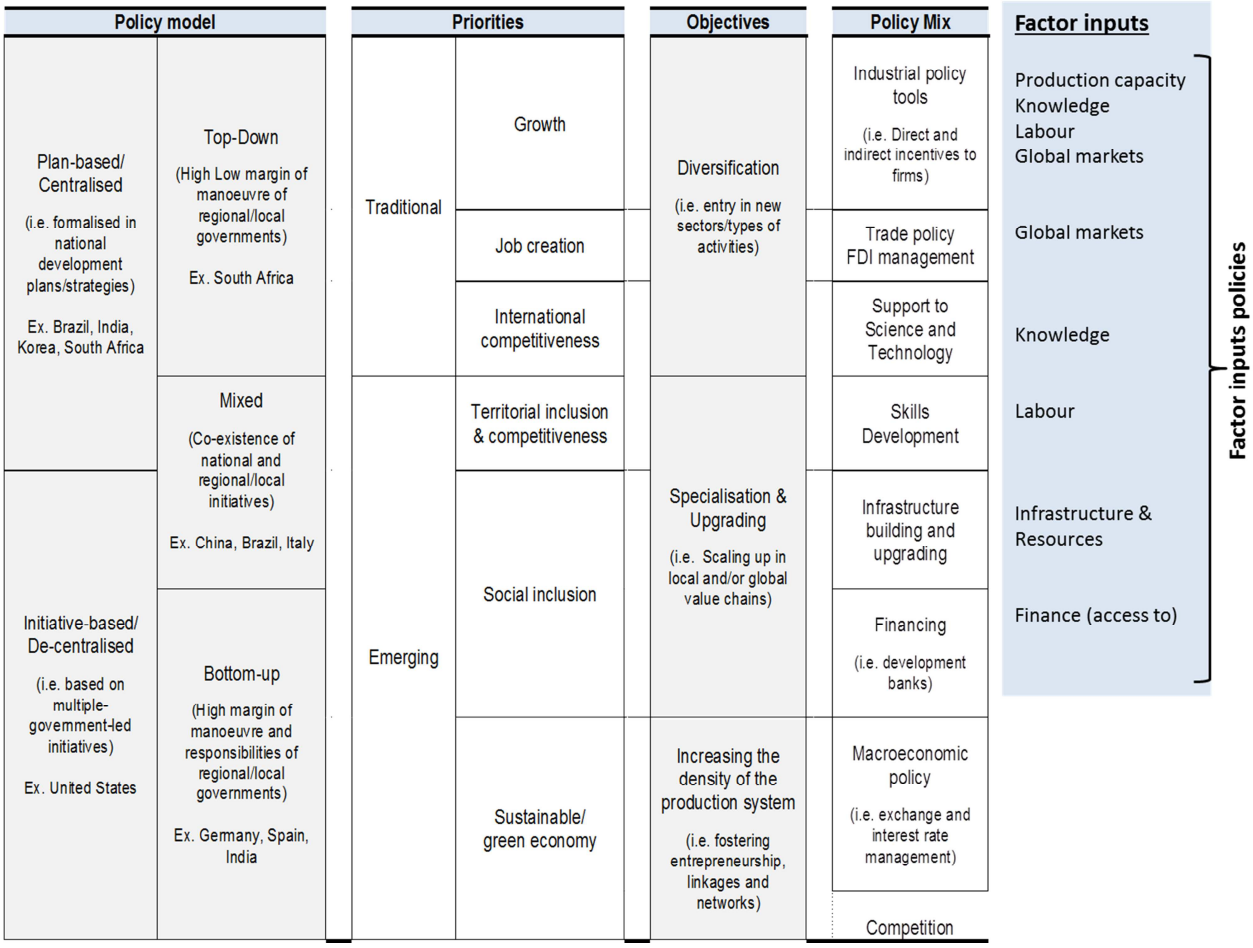
Firstly, the *policy model* defines the degree of centralisation of the industrial policy approach and its main reliance on either articulated plan-based strategies or multiple initiative-based measures. In the centralised/plan based model, targets are set and objectives and lines of action are fomalised in national plans or strategies (e.g. East Asian economies, but also Brazil, India and South Africa). Countries adopting a de-centralised/initiative based model rely on several actions and programs each targeting a specific component of the competitiveness strength of the country (typically US). The way in which national plans or initiatives are designed and implemented may also vary. Indeed, countries may follow a top-bottom, bottom-up (or mixed) framework, defined according to the way in which the design and implementation functions are performed at the national or sub-national level (or in a mixed form).

Secondly, the *policy priorities* may be different, from more traditional such as boosting growth, employment creation or competitiveness enhancement to emerging ones such as social and territorial inclusion.

Within these general priorities, a number of specific *policy objectives* can be identified. This third axis includes, at least on general terms, three sets of broad objectives, namely: diversification, specialisation & upgrading and finally increasing the density of the production system.

Based on a specific combination of policy objectives framed within a certain policy model, countries will adopt different industrial *policy mixes*, each of them combining an array of tools, measures, programmes and institutions. A way to capture the variety of tools, measures, programmes and institutions constituting each country's industrial policy mix is to group them according to the specific factor input they are affecting and the level of policy intervention at which they operate. Building on an established industrial policy matrix (O'Sullivan et al, 2013), the next section presents the general matrix framework through which the South Africa industrial policy mix will be mapped and analysed.

Table 5: Variety of industrial policy approaches



Source: adapted from Primi, 2013.

3.1.2 Policy mix: Factor inputs policies and levels of policy intervention

Taken all together, *market, structural* and *systemic failures* provide governments with an articulated set of policy rationales reflecting the mutated conditions of the global industrial system. Also, they expand the industrial policy space and force to rethink the role of regional, national and supranational governments. Industrial policy definitions have been shaped by these rationales and articulated along the distinction between *selective* (also called vertical) and *horizontal* policies, the former being firm- or sector- based while the latter mainly macroeconomic.

Often comparative analysis of countries' industrial policy packages have relied upon policy rationales and degrees of selectivity of different policy measures. For example, Weiss (2011) proposes a taxonomy listing 'market-based measures' according to the policy rationale and coverage (i.e. degree of selectivity); Kuznetsov and Sabel (2011) build on the vertical-horizontal distinction for comparing different generations of industrial policies across countries; Benhassine

and Raballand (2009) consider different degrees of selectivity against the extent of subsidisation; Cimoli et al. (2006) propose an exploratory taxonomy distinguishing domains of policy intervention and for each of them policy measures underpinned by different policy rationales; Di Tommaso and Schweitzer (2013) contrast three more or less selective policy targets and nine policy goals in the analysis of industrial policy in US; finally, Warwick (2013) proposes a 'typology of industrial policy instruments' structured by policy domains and their horizontal contra selective nature. Within the innovation policy literature, these types of taxonomy have been also used. For example, the SI-policy framework developed by Klein Woolthuis et al. (2005) contrast 'Rules' (different system failures) and 'Actors' (missing actors) while Dodgson et al. (2011) develop a policy approach schema comparing countries' trajectories according to their mix of market and coordination logics.

In order to investigate the emerging industrial policies across countries, we build on the *Industrial Policy Matrix* developed in O'Sullivan, Andreoni et al, 2013 which firstly reflects main features of the new industrial policy context and, secondly, attempts to overcome some limitations of currently available taxonomies. The industrial policy matrix is structured along two main axes and presented in Figure 6.

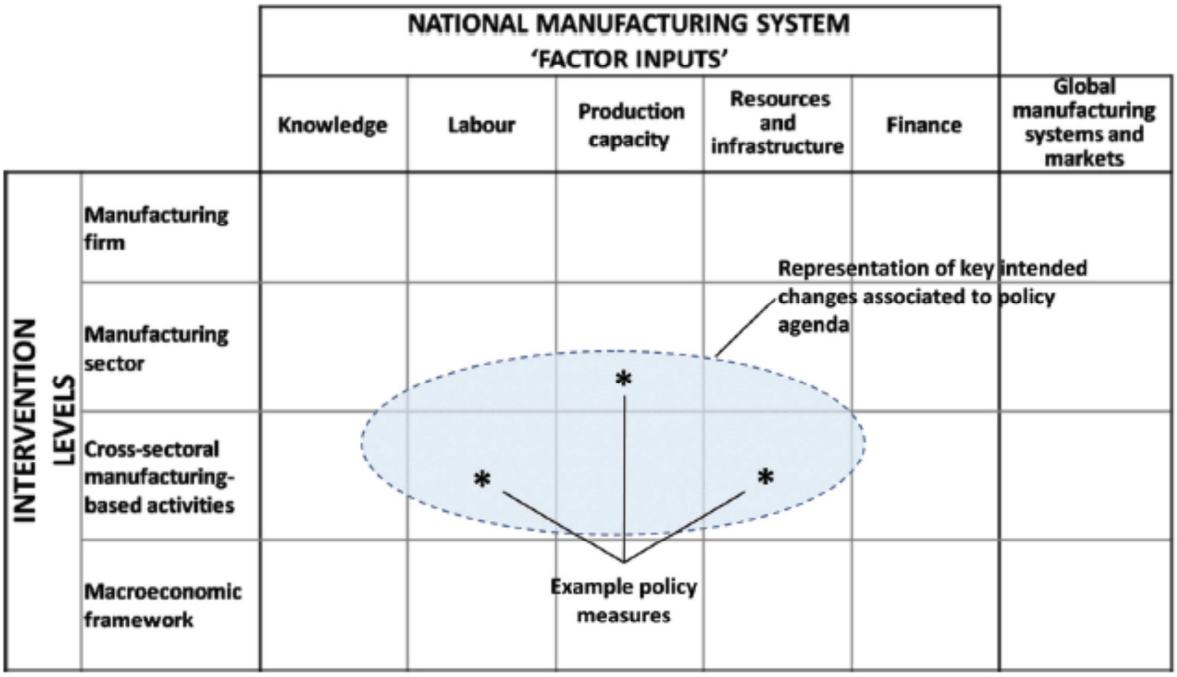
Factor Inputs policies

As increasingly recognised (e.g. Chang et al, 2013), horizontal measures tend to have unintended vertical effects; also, even at the same level of policy intervention, policy measures might be more or less selective according to the way in which they affect factor inputs' productivity and, secondly, the different role that such factor inputs play in different manufacturing sectors and along different value chains (Okimoto, 1989:9; Peneder, 2001). Thus, instead of focusing on their different degrees of selectivity, we distinguish policy measures according to the *factor inputs* they act upon, namely *knowledge* (in particular R&D), *labour* (including skills and education), *production capacity* (availability and capacity to use and organise manufacturing machinery, factories, equipment, etc), *resources and infrastructures* (in particular support for energy/resource efficiency), *finance* (mainly credit and financial capital). The functioning of the national manufacturing system (NMS) critically depends upon the availability, productivity and integration of these factor inputs. However, the success of the NMS also depends on its capacity to interact with global markets and production networks. This is why together with the consideration of factor inputs policies we complete our analysis with an additional category grouping policy measures related to *global manufacturing systems and markets.*

Levels of Policy Intervention

As a response to the dramatic changes in the global manufacturing system, firm-, sector- or macro- interventions tend to be increasingly complemented with systemic/cross-sectoral measures. Thus, together with the standard levels of policy interventions, namely *manufacturing firms*, *manufacturing sectors* and *macroeconomic framework*, the matrix identifies measures acting upon *cross-sectoral manufacturing activities*. Of course, other levels of policy intervention might be more explicitly considered (e.g. clusters or value chains). Within the cross-sectoral manufacturing activities category we included all those measures having an impact across multiple sectors and along various supply chains of the national manufacturing system.

Figure 6: The Industrial Policy Matrix



Source: O'Sullivan, Andreoni et al 2013: 437

Policy Mix and Policy Agenda

A country's industrial policy mix can be composed by different interdepended policy measures and framed within different policy agenda. The way in which these measures are coordinated and aligned over time in a coherent dynamic framework is increasingly a key success factor. This taxonomy not only does allow for mapping single policy measures at each level of policy intervention and according to each factor input, but also allow the visualisation of the new policy agendas.

3.2 South African industrial policy today

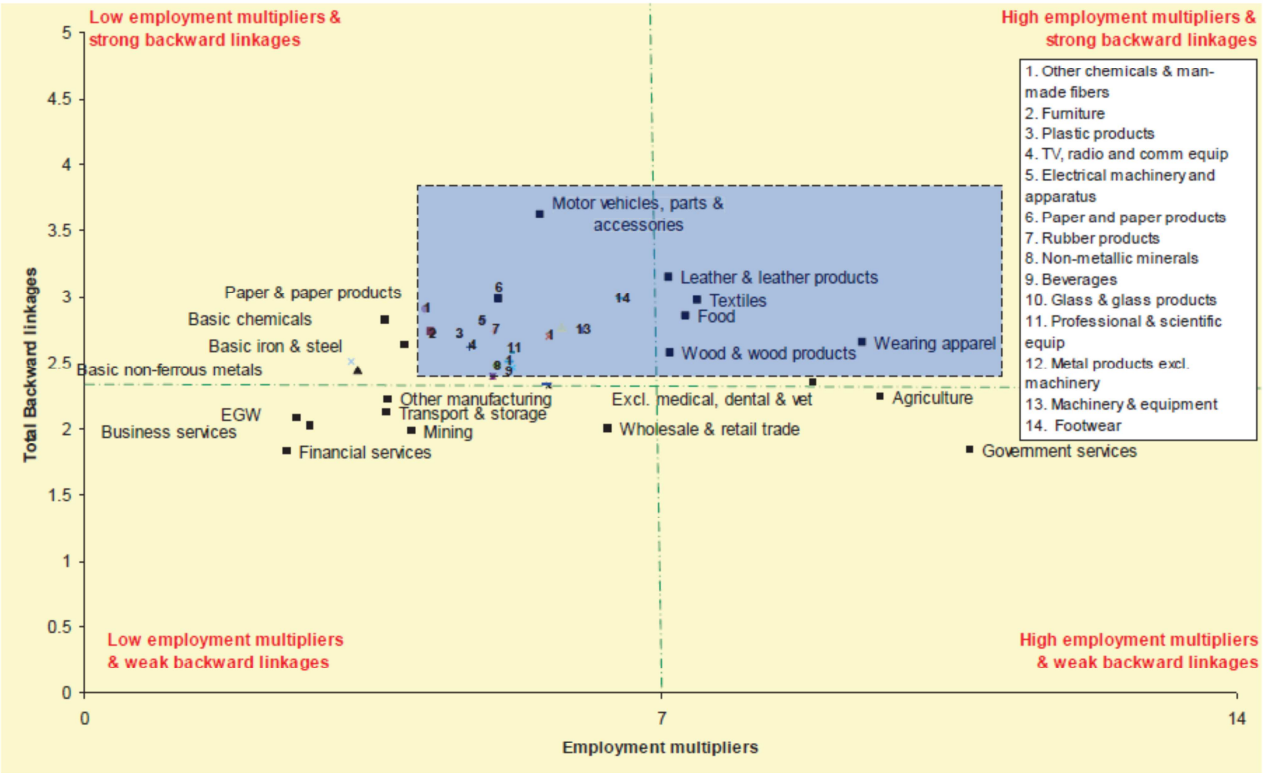
Before we attempt mapping specific industrial policy measures in South Africa with the help of this matrix in section 3.3, we will first summarize the most recent strategic industrial policy efforts in the country to provide some context.

The post-apartheid industrial policies in South Africa focused on widespread trade-liberalization which led to a decrease in average industrial tariffs from 28% in 1990 to 8% by 2006. In terms of sectoral priorities, the government mainly supported a relatively narrow set of manufacturing sectors such as automotive, steel, chemicals, aluminum and paper and pulp. Without going into the detailed results of this period of less proactive industrial policy interventions in the country, one can summarize that it did not lead to a substantial deepening of the industrial base, it did not promote significant industrial diversification away from mining and minerals and it largely ignored the challenges of an overvalued exchange rate. Some observers even get to the conclusion that this lack of strategic interventions contributed to an overall decline in the manufacturing sector of the country (Zalk 2011, Barnes et al. 2003).

Other observers emphasize that the effectiveness of these supply-side interventions (e.g. investment incentives, human resource development, support for R&D) was often undermined by a number of persisting contextual factors, namely institutional weaknesses, lack of government capabilities and strong oppositions from powerful economic interest groups (Chang, 1998; Tregenna, 2012).

With more proactive industrial policy being back en vogue globally, the Industrial Policy Action Plans (IPAP 1 in 2007 & IPAP 2 in 2010) also marked a shift to a new policy making process in South Africa. The new approach to industrial promotion did not only become more vocal on the need for active government intervention, in fact it considered several principles that new industrial policy advocates highlight as key success factors. First of all, the design of the interventions was based on extensive consultations with the private sector and a broader cabinet-level coordination of policies was introduced and pursued. Second of all the IPAPs build on a rigorous identification of key constraints and opportunities for sub-sectors and accordingly developed detailed action plans. Thirdly, as summarized in figure 7, strategic sector selection was pursued in an evidence-based fashion with the prioritization of focus industries on the basis of the quantitative evaluation of the existence of high employment multipliers and strong backward linkages (Source: IPAP 2012/13). In many ways, this makes South Africa a pioneer in the formulation of well-designed new industrial policies in the Sub-Saharan region.

Figure 7: Definition of priority sectors in IPAP 2012/13-2014/15



Source: CSID calculations using Quantec data

Despite these major efforts undertaken since 2007, some key challenges for Industrial policy persist in South Africa today.

1. With regard to manufacturing as a whole, the intra governmental co-ordination of industrial policies and related policies does still pose significant challenges. This is particularly important as some key issues of concern for the industrial sector today - such as the over-valued exchange rate, the weak skills base, the high logistical costs, the monopolistic provision of key inputs into manufacturing and the Global Economic Crisis - require the expertise and alignment of several Ministries.
2. With regard to specific sub-sectors, some success has been recorded, but many challenges are still very evident. For instance, the automotive production volumes and efficiency improved considerably over the last years but the import dependency for components remains very high and employment generation is still limited. At the same time textile production has lingered in a long-term downward trend (Alfaro et al 2012).
3. Given the dramatic social tensions and inequalities the country experienced during its transition (Tregenna and Tsela, 2012), the government still has to address a fundamental challenge that is related to the composition of two main industrial policy goals. On the one hand, there is a *productive transformation policy goal* consisting in the expansion of the manufacturing base and, in particular, in the development of medium- and high-tech manufacturing sectors (i.e. capital intensive sectors). On the other hand, there is an *employment generation policy goal* consisting in the reduction of unemployment and social tensions through the support of those economic sectors that are expected to have a relatively higher jobs absorption capacity in the short- to medium-term.

Against the background of these high burdens for industrial policy in South Africa, the National Development Plan 2030 issued by the National Planning Commission marks a shift in the articulation of the importance of industrial development for the long-term growth path of the country. In particular, the document is very clear about a shift of expectations from the earlier notion of manufacturing as an important direct source and generator of employment to that of a linkage creator for other sectors that are more likely to create significant numbers of jobs (in particular services). This assertion which partially conflicts with the strong notion of employment creation in manufacturing in the IPAP shows that the intra-governmental alignment of industrial policy objectives and efforts is not a foregone conclusion (NDP 2030; IPAP 2013/14-2015/16).

In fact, with regard to the challenge of the productive transformation vs. employment generation objectives of industrial promotion, the NDP acknowledges that the country's strength is mainly in capital-intensive manufacturing (mineral processing, metals, chemicals), which cannot be the key generator of employment in the country. Hence, the plan projects that the share of manufacturing in total employment is expected to decrease from the current 12% to 8-10% in 2030 (Table 6 on employment scenarios). Accordingly, as far as manufacturing is concerned, the focus of government interventions should be on the promotion of inter-sectoral linkages to construction, energy, waste reutilisation and mining (inputs and downstream). At the same time, employment generation is instead expected mostly in domestic-oriented activities in the services sector (incl. commercial & public/community based services) rather than in manufacturing (Source: NDP 2030).

Table 6: Employment distribution scenarios for South Africa in the NDP 2030

FIG 3.2 INDICATIVE SCENARIOS - SECTOR DISTRIBUTION OF EMPLOYMENT				
Sectors	**2010**	**2030**		
		Scenario 1 mediocre minerals	**Scenario 2** solid minerals	**Scenario 3** diversified
Agriculture	4.8%	2.2%	2.6%	3.4%
Mining	2.3%	1.1%	1.6%	1.8%
Manufacturing	11.8%	7.9%	9.1%	9.6%
Leader & high paid services (e.g. finance, transport)	15.4%	12.7%	15.4%	17.6%
Follower services (e.g. retail, personal services)	14.7%	17.6%	20.5%	20.9%
Construction & utilities	6.3%	4.4%	5.4%	5.9%
Informal sector & domestic work; excl EPWP	22.3%	17.2%	19.4%	21.1%
Public sector, private social services & parastatals	19.3%	13.8%	14.8%	17.8%
EPWP	3.2%	23.1%	11.1%	1.8%
Total	100.0%	100.0%	100.0%	100.0%

Source: NDP, page 126.

The latest iteration of IPAP which was launched in 2013 to set the roadmap for South Africa's industrial development efforts for the next 3 years (2013-2016) also addresses this complex scenario and the trade-off between manufacturing development and employment expansion discussed above. The development of manufacturing has been increasingly recognised as the priority, especially considering that the consumption driven sectors are growing twice as fast as the productive sectors. At the same time, high structural unemployment (oscillating between 22 and 25 percent in 2013) still represents a major challenge (IPAP 2013/14-2015/16).

While this recent IPAP is informed by the broad development vision set out in the National Development Plan, it clearly goes beyond the expectations of the NDP in its objectives when it emphasizes that 'the overriding goal of the IPAP in this policy context is to prevent industrial decline and support the growth and diversification of South Africa's manufacturing sector'. It recalls that 'the balance of international evidence is that manufacturing is the engine of growth and employment of all economies that have achieved high gross domestic product (GDP) and employment growth'. Finally it re-emphasizes that 'manufacturing can generate significant job creation directly as well as indirectly in a range of primary and service sector activities' (underlining added by author) (IPAP 2013/14-2015/16)

In fact, this latest IPAP in several parts also echoes the vision set out in earlier iterations that 'manufacturing has a vital role to play in dynamising employment and growth in the economy'. It also stresses that industrial policy should be framed and driven by a particular focus on value-adding sectors that embody a combination of relatively high employment and growth multipliers.

In this respect it clearly gives a larger precedence to the employment generation objective of industrial policy than the NDP 2030 (IPAP 2013/14-2015/16; NDP 2030).

Ambitious policy objectives require concerted efforts. Hence, one way to evaluate the significance of a government's industrial policy process is to look at the relevant budgetary allocations. An analysis of the South African case in table 7 shows that the Industrial Development budget increased significantly over the last 3 years from R 5.8 billion in 2010 to R 9.4 billion in 2013. This equals an average annual growth rate of 18% and clearly supports the notion that industrial policy made a prominent return in the country (Treasury 2014).

Table 7: National expenditures for Industrial Development in comparison to other economic services between 2010-2016

	Audited expenditure outcome		Revised estimate		CAGR	Medium-term expenditure estimates		Estimated CAGR
National expenditures for main Economic Services in R million	**2010/11**	***% of economic services 2010/11***	**2013/14**	***% of economic services 2013/14***	***2010-13***	**2016/17**	***% of economic services 2016/17***	***2013-16***
Trade and Industry	**5.797**	***32%***	**9.443**	***34%***	***18%***	**11.984**	**37%**	***8%***
Rural Development and Land Reform	7.123	*39%*	9.460	*35%*	*10%*	10.673	33%	*4%*
Agriculture, Forestry, Fisheries	3.830	*21%*	6.182	*23%*	*17%*	6.674	21%	*3%*
Tourism	1.144	*6%*	1.521	*6%*	*10%*	2.076	6%	*11%*
Economic Development	401	*2%*	772	*3%*	*24%*	717	2%	*-2%*
Sum of above Economic Services	18.294	*100%*	27.377	*100%*	*14%*	32.125	100%	*5%*

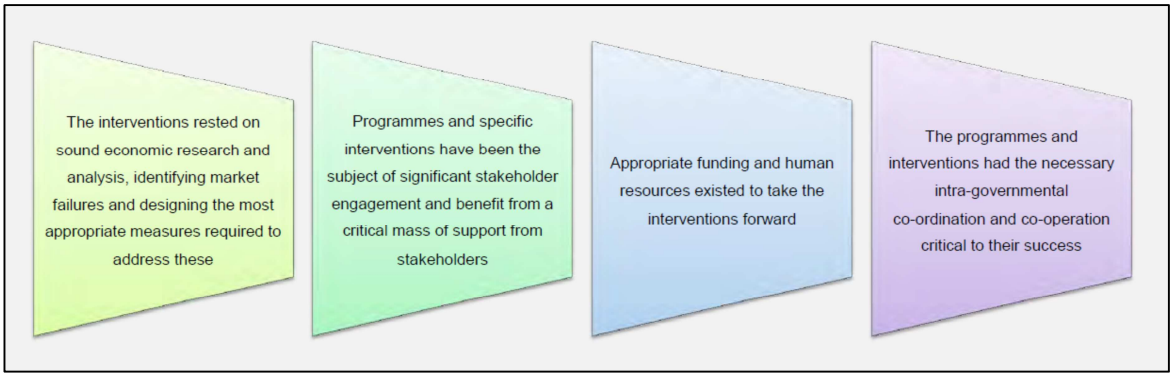
Source: Authors on basis of National Treasury 2014: Estimates of National expenditure

In relative terms, the Industrial Development budget is now larger than most other economic services due to this significant increase. In fact, industrial policy related expenditures account for 34% of the main economic services, on par with Rural Development but ahead of Agriculture and Tourism today. Furthermore, the medium-term expenditure estimates in the 2014 budget of the National Treasury indicate that Industrial Development will continue to receive growing shares of the available budget until 2016 when it is expected to reach almost R 12 billion or 37% of the main economic services (Treasury 2014).

In view of this increasing relevance of industrial policy within the country, the latest IPAP also takes stock of earlier industrial policy interventions and comes to the conclusion that the dti succeeded in many of their interventions because it followed some core guiding principles of good practice in new industrial policy which are summarized in the figure 8. The principles that

are highlighted refer to the fact that interventions were designed on the basis of a thorough evidence-base and were subject to significant stakeholder engagement. They also clarify that the interventions were executed with appropriate funding and human resources and benefitted from intra-governmental coordination. While it is difficult to find objective evidence for this claim, the reference to these principles as such is already an indication for the fact that Industrial Policy in South Africa stands at a significantly more advanced stage than in other Sub-Saharan countries where several (or all) of these principles are commonly not considered (IPAP 2013/14-2015/16).

Figure 8: The principles for Industrial Policy success under IPAP



Source: IPAP 2013/14-2015/16

In summary, one has to acknowledge that the recent period of determined industrial policy efforts in South Africa stands out as a good practice in Sub-Sahara Africa both in terms of the thoroughness of the strategy and policy design process as well as the wholehearted implementation with significant financial and human resources. On the other hand, some significant challenges remain with regard to the consensus among key institutions/stakeholders on the justified policy ambitions and expectations in the area of employment generation in industry. It can only be hoped that the remaining competitiveness challenges for manufacturing as a whole as well as for core sub-sectors can nevertheless be addressed with a set of coherent and effective industrial and related policy interventions.

3.3 The South Africa industrial policy matrix

This section will look more specifically into the current industrial policy mix of South Africa and systematically map the major ongoing policy interventions. This will be done by applying the industrial policy matrix that we introduced above which classifies measures according to their level of intervention as well as the way in which they hope to affect the productivity of factor inputs.

With regard to the level of intervention, the most recent iteration of IPAP marks a continuation of earlier editions when distinguishing between transversal (i.e. cross-cutting) and sectoral aspects. The transversal interventions are generally introduced as horizontal measures which are meant to have an impact across multiple manufacturing sub-sectors, while the sectoral interventions consist of vertical measures that are more strategically focused on priority sub-sectors in manufacturing.

With regard to the focus on specific factor inputs, IPAP introduces 8 areas of transversal interventions on Financing, Innovation/Technology, Skills, Public Procurement, Competition Policy, Trade Policy, Regional integration and SEZs. This provides a fairly broad set of horizontal industrial policy activities and each of the areas is targeted with several specific key action programmes that will continue to be updated according to progress in each annual reiteration of the plan (IPAP 2013/14-2016/17).

The table 8 presents an analysis of the main policy interventions in the current IPAP, covering all eight transversal as well as the major sectoral interventions. It summarizes some key programmes for which information is publicly available and on that basis compares the significance and achievements of the schemes, their underlying rationale as well as some additional key aspects of each programme (e.g. sectoral focus areas).

Table 8: Significance and rationale of selected major industrial policy interventions (Source: Author on basis of government documents and expert discussions)

Policy intervention		Key programmes	Significance and achievements	Rationale	Additional information
Transversal	Financing	MCEP *Also in 'competitiveness cluster': EMIA (grants for export promotion) with R 500 million in ten years and smaller CPFP (grants for feasibility studies)*	Incentive of R 5.8 billion started in May 2012; R 1 billion committed to 197 firms in FY 2012/13; largely disbursed as cost-sharing cash grants for capital expenditure of individual firms	Increase competitiveness of manufacturing firms through better access to suitable finance (resolve market failure)	Exclusion of selected sectors. Currently strong sectoral concentration of grants in Agro and Metal sectors.
		'12I' Tax Allowance Incentive	R 8.1 billion tax allowances in 2 years (2011/12-2012/13); for very large projects (only 12 in 2012/13)	Accelerate economic growth through new large manufacturing projects. Job creation, training and energy efficiency	So far focus on medium-large manufacturers in Chemicals and Non-metallic mineral projects
	Innovation / Technology	SPII (support Programme for Industrial Innovation) THRIP (Technology and Human Resource for Industry Programme)	Review of SPII & THRIP ongoing. Plan to propose and implement new institutional arrangement	Promote technology in industry through the provision of financial assistance for the development of innovative products and processes (from basic research to prototype)	Both administered by IDC. Importance of coordination with DST highlighted. Also inquiries for new technology platforms and incubator programme.
	Skills	Industry-Skills-Hubs and Industrial Centres of Excellence	Baseline studies completed. Plan: Pooling of training infrastructure to optimize skills delivery for IPAP priority sectors. Provision of long-term funding	Better long- and short-term alignment of skills supply with industry needs	Strong focus on priority sectors (advanced manufacturing, clothing/leather and aerospace). Separate artisan programme
	Public procurement	Legislation for local procurement and verification process for SABS finalized	25-80% local content to be achieved depending on project in designated sectors	Verify local content of public procurement and create new demand for national manufacturers	Designated sectors incl. coaches and locomotives, pharma, furniture, electrical component, renewables
	Competition policy	Strengthen implementation of competition policy	Various large cases settled by competition commission in various sectors (fuel, steel, cement, telecom, food, etc.)	Increase compliance and reduce anti-trust behaviour to reduce dominance of monopolistic input providers	Includes also tightening of conditionality for large firms that receive state support
	Trade Policy	Developmental tariff reform	Ongoing review and tariff setting for priority sectors (sector/product scope definition, etc.)	To increase value addition, employment, etc. as response to global trade liberalization that poses risks of industrial decline	Includes also selected decreases of tariffs for intermediate inputs
	Regional integration	Industrial work programme with RECs (Regional Economic Communities)	Development of Regional IP for SADC and SACU and industrial roadmap for the Tripartite	Increase real economic integration of productive capacity in the region (e.g. infrastructure and support of regional VCs)	Includes also cooperation on technical infrastructure and industrial Finance and ODA for industry
	SEZs	Designation of SEZs, SEZ bill, planning and capacity building	Ongoing process of designation of SEZs, pre-feasibility studies and legislative process R 3.6 billion committed by treasury for 2014-16	Strengthen terms of trade through export, creation of stronger value chains and provision of jobs in disadvantaged regions	The evaluation of the viability of proposals for SEZs has selectivity implications for both sectors and regions

Policy intervention		Key programmes	Significance and achievements	Rationale	Additional information
Sectoral	Textile	CTCP (Clothing and Textiles Competitiveness Programme includes: PIP (Production Incentive Programme with 85% of budget) & CIP (Competitiveness Improvement Programme) both funds managed by the IDC on behalf of the dti	Grants of R 2.1 billion (of total R 3.8 billion) approved (IDC 2013) and almost 50% of jobs in the sector supported within 581 assisted companies; grants for plant and equipment upgrade (PIP) and skills/process improvements (CIP)	Reverse decline in employment and transform competitiveness for local market success (through improved quality, cost & delivery)	Also stronger prevention of illegal imports and some niche market programmes (e.g. crocodile leather cluster)
	Automotive	APDP (Automotive Production and Development Programme) includes cash component AIS (Automotive Investment Scheme) and import duty rebates (VAA & PI) as well as import tariffs	AIS: R 3.4 billion of incentives for 128 approved projects with taxable cash grant of 20% of the value of qualifying investment in productive assets (machinery, equipment, buildings)	Support light motor vehicle and components manufacturers to increase production, and jobs and strengthen value chains (higher production capacity with more local components)	Former export focus of MIDP removed
	Agro-processing	Agro-processing Competitiveness Fund (managed by the IDC on behalf of EDD) and other Food industry support programmes	APCF: R 205 million loans approvals so far. Several ongoing food-processing strategies and action plans being developed with private companies.	Labor-intensive growth, rural development and smallholder benefits expected	Additional support of niche producers in Food industry (e.g. maize millers, fruit/vegetable canning, soybean and organic food)
		Fiscal Incentive for biofuel	Incentive announced and rules/arrangements to be defined	Expected creation of 55,000 new jobs, reduce import dependency and emissions	
	Metal fabrication and capital equipment	Support through public procurement	Ongoing analysis and review of opportunities	Stimulate industry through public infrastructure programmes	Also: Specific skill programmes for tooling industry and foundry industry
	Pharma	Increase local procurement in pharma tenders Ketlaphela (APIs) project	Procurement: Ongoing review of rules of designation for tenders with DoH Ketlaphela: Public-private venture started, building in progress	Strengthen local pharma sectors competitiveness and increase locally available medicines Ketlaphela: Produce active pharmaceutical ingredients locally	Also: Pharmaceutical skills strategy to be developed

Source: Authors on basis of government documents and expert discussions

On the basis of this analysis, it deserves to be highlighted that several of the cross-cutting interventions nevertheless indicate certain vertical (i.e. sub-sector specific or even manufacturing firm specific) aspects. The most striking examples for transversal interventions that are characterized by their firm-level approach can be found in the Finance area. The '12I' Tax Allowance Incentive and the Manufacturing Competitiveness Enhancement Programme (MCEP) both tackle the finance constraint on the firm level with significant tax allowances (12I) and grants for capital expenditure (MCEP) that are awarded to individual enterprises. While the 12I so far supported a few new very large investment projects of Chemicals and Non-metallic mineral firms, the MCEP disbursed grants for 197 specific investment projects mostly to firms in the Agro-processing, Metals and Chemicals sectors (IDAD 2013; DTI 2013 on 12I).

The Export Marketing and Investment Assistance (EMIA) programme also provides grants to specific enterprises that want to engage in export promotion activities, while the Support Programme for Industrial Innovation (SPII) also works with individual firms and supports them in the development of innovative products and processes. Other transversal interventions are less firm specific but explicitly mention sectoral focus areas. A good example for this phenomenon is the Public procurement intervention that consists of local content requirements for designated sectors (incl. coaches and locomotives, pharma, furniture, electrical component, renewables) (DTI 2010; DTI 2011).

A transversal intervention that will receive significant additional funding between 2014-2016 for infrastructure investments is the development of SEZs, which was initiated in the early 2000s but reinforced with the Special Economic Zones Bill in 2013. The decision on which zones will be supported will have selectivity implications both from a regional and a sub-sector perspective.

With regard to industrial policy interventions (within IPAP[2]) that aim more broadly at the macroeconomic framework, the transversal interventions on Regional Integration and Competition Policy are good illustrations. While they also refer to some sector-specific examples, they are less targeted on specific sub-sectors than the other transversal interventions. In terms of factor inputs, the regional integration agenda focuses on regional infrastructure and market access aspects while the competition policy is concerned with the concentration of the supply of critical raw material inputs/resources as well as the concentration of production capacity due to a lack of new entrants (IPAP 2013-16).

In addition, the IPAP 2013/14-2015/16 also features a large number of sectoral interventions, which are broadly divided between sectors that were already supported since 2007 (cluster 1) and several additional priorities that include qualitatively new areas of intervention in cluster 2 (e.g. green industries) as well as longer-term targets for the development of capabilities in advanced manufacturing in cluster 3 (e.g. nuclear and aerospace industry). While the issue of selectivity will be discussed in more detail in section 4 below, it is evident that there are a large number of sectoral interventions ongoing (IPAP 2013-16).

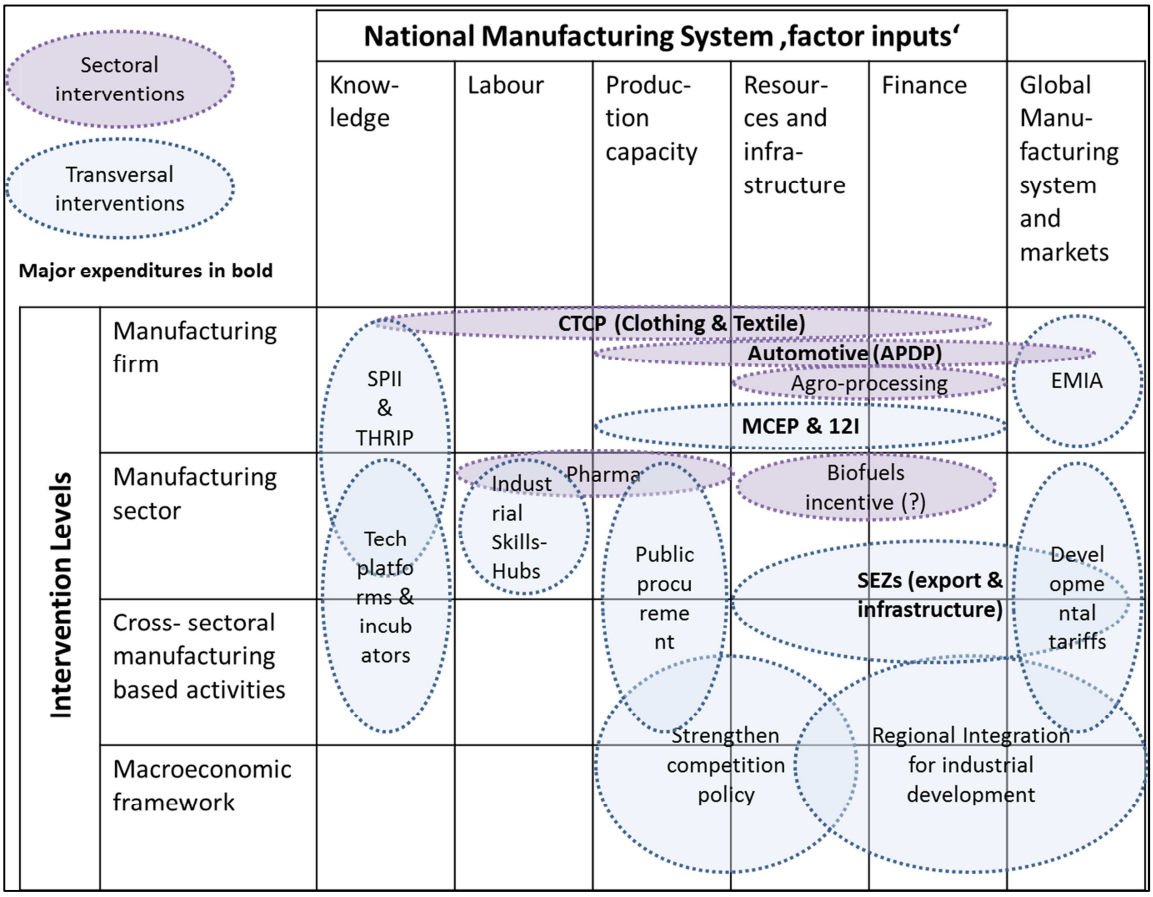
Among these vertical interventions, it is possible to roughly distinguish between approaches which generally affect the whole sub-sector and approaches that more directly impact specific manufacturing firms. Examples for the first group are the newly proposed intervention for Biofuels (including a mandatory blending of biofules and fiscal incentives) as well as the Pharma sector intervention that aims at the increase of production capacity and skills enhancement for the whole sub-sector (e.g. through new criteria for local procurement in tenders of the Department of Health as well as the development of a sectoral skills strategy) (IPAP 2013-16).

On the other hand, the sectoral interventions for several key sub-sectors more directly affect individual firms. In particular the Automotive scheme (APDP) awards cash grants to individual firms to invest into productive assets (machinery, equipment, etc.), the Clothing/Textiles scheme (CTCP) provides grants to individual firms to upgrade the skill-level of their labour force or to invest into product and process improvements and the Agro-processing fund develops strategies and action plans with selected individual enterprises (DTI 2012).

[2] This policy analysis mainly considers the IPAP. There are possibly other relevant policy interventions by the government of South Africa on the macroeconomic framework that are not referred to in the IPAP but are nevertheless relevant for industrial policy.

Figure 9 provides a mapping of the main interventions analysed above. It visualizes the key characteristics of the current industrial policy mix in South Africa, both in terms of the levels of intervention and the focus on specific factor inputs.

Figure 9: Industrial Policy matrix of South Africa today



Source: Author on basis of government documents (IPAP 2013-16 and others) and expert discussions

Notes:

- The size of the circles does not indicate the scale or relative relevance of interventions but rather suggests their spread across different levels of intervention and/or factor inputs.
- The analysis does not consider government incentives that are not framed under IPAP (e.g. science and skills support by DST, etc.)

On this basis, it can be summarized that:

1. The South African industrial policy mix is mainly characterized by a large number of sector-level and firm-level interventions and only relatively few macro and cross-sectoral schemes (see O'Sullivan et al., 2013 for a comparison with Japan, US, Germany and UK).
2. In addition to specific (vertical) sectoral programmes, also several initiatives that were primarily designed as horizontal measures (transversal interventions) nevertheless intervene on the level of individual firms or sub-sectors. The position of the transversal interventions in the upper part of the matrix (e.g. MCEP and '12I') suggests a certain level of inconsistency between the vision to support the whole manufacturing sector with these schemes (impact), and the fact that they generate firm-specific effects.

3. Even industrial policy interventions on factor inputs which are traditionally tackled more with macroeconomic or cross-sectoral schemes (i.e. Knowledge and Labour) are dealt with more on the sub-sector level in the South African case (e.g. Industrial Skills Hubs and SPII).
4. The largest interventions in terms of allocated budgets are firm-level interventions that target Finance rather than other factor inputs (MCEP, 12I, APDP) suggesting that access to finance is considered the most binding constraint for manufacturing growth.
5. Direct financial support through grant schemes also features prominently in measures that aim at skills upgrading, innovation and international market access (e.g. EMIA), suggesting that a lack of financial capital is (partially) considered the underlying cause for challenges in these other factor inputs.
6. Competitive Industrial performance (i.e. the enhancement or preservation of production capacity) is commonly the ultimate objective of interventions that tackle finance, international market access and skills issues.
7. Employment creation and/or retention are commonly mentioned as other key objectives in interventions of various types.

3.4 Resolving the most binding constraints? Selected axes of policy agenda

This sub-section will introduce four important features of the current South African Industrial Policy mix: 1) the large scale industrial finance interventions that mainly aim at enhancing the manufacturing production capacity; 2) the strategic public procurement policy that is designed to support industrial capacity expansion from the demand side; 3) the recent re-emphasize on SEZs as a means to create the relevant infrastructure for more competitive manufactured exports; and 4) the latest efforts to enhance the technological infrastructure for innovation and manufacturing upgrading in the country.

3.4.1 Provision of Finance to enhance production capacity

The analysis of the policy matrix has shown that one of the main focus areas of the current industrial policy mix in South Africa is the provision of Finance to facilitate the enhancement of manufacturing firms' production capacity. According to the latest IPAP, access to finance is a key constraint for manufacturing and the governments Industrial Financing instruments are mainly expected to provide 1) a longer term of financing; 2) a grace period allowance; 3) lower interest rates; and 4) funding for working capital (IPAP 2013/14-2016/17)

A disaggregated analysis of the current budget for industrial development support in South Africa illustrates the significance of this factor input policy interventions further. Table 9 summarizes how the main expenditures contributed to the overall industrial policy budget over the last years. It is evident that the major manufacturing incentives that involve direct grants to firms (MCEP, APDP, EMIA, CPFP) as well as the 12I tax incentive managed by the Incentives Development and Administration Division (IDAD) today amount to R 3.4 billion of the available annual budget in the dti. This is almost three times the amount recorded in 2010, which means that 36% of the available budget is currently captured by these incentives. The significant growth (+36% p.a. between 2010 and 2013) was largely triggered by the introduction of the MCEP which was initiated as a reaction to the financial crisis (Treasury 2014).

Table 9: Analysis of the Industrial Policy budget according to main expenditures between 2010-2016

	Audited expenditure outcome		Latest revised estimate		*Annual growth of expenditure*	Medium-term expenditure estimates		*Estimated annual growth of expenditure*
National expenditures for main Economic Services in R million	2010/11	*% of Trade & Industry budget 2010/11*	2013/14	*% Trade & Industry budget 2013/14*	*2010-2013*	2016/17	*% of Trade & Industry budget 2016/17*	*2013-2016*
Total budget: Trade and Industry (incl. Administration, etc.)	5.797		9.443		*18%*	11.984		*8%*
1) Incentive Development and Administration Division (IDAD)	2.793	*48%*	5.393	*57%*	*25%*	7.051	59%	*9%*
1.1) Manufacturing Incentives within IDAD (incl. MCEP, 12I, APDP, CPFP, EMIA, etc.)	1.337	*23%*	3.357	*36%*	*36%*	4.027	34%	*6%*
1.2) Infrastructure Development Support within IDAD (incl. SEZs)	1.021	*18%*	1.042	*11%*	*1%*	1.940	16%	*23%*
2) Customised Sector Programmes within IDD (incl. CTCP)	638	*11%*	1.056	*11%*	*18%*	1.404	12%	*10%*

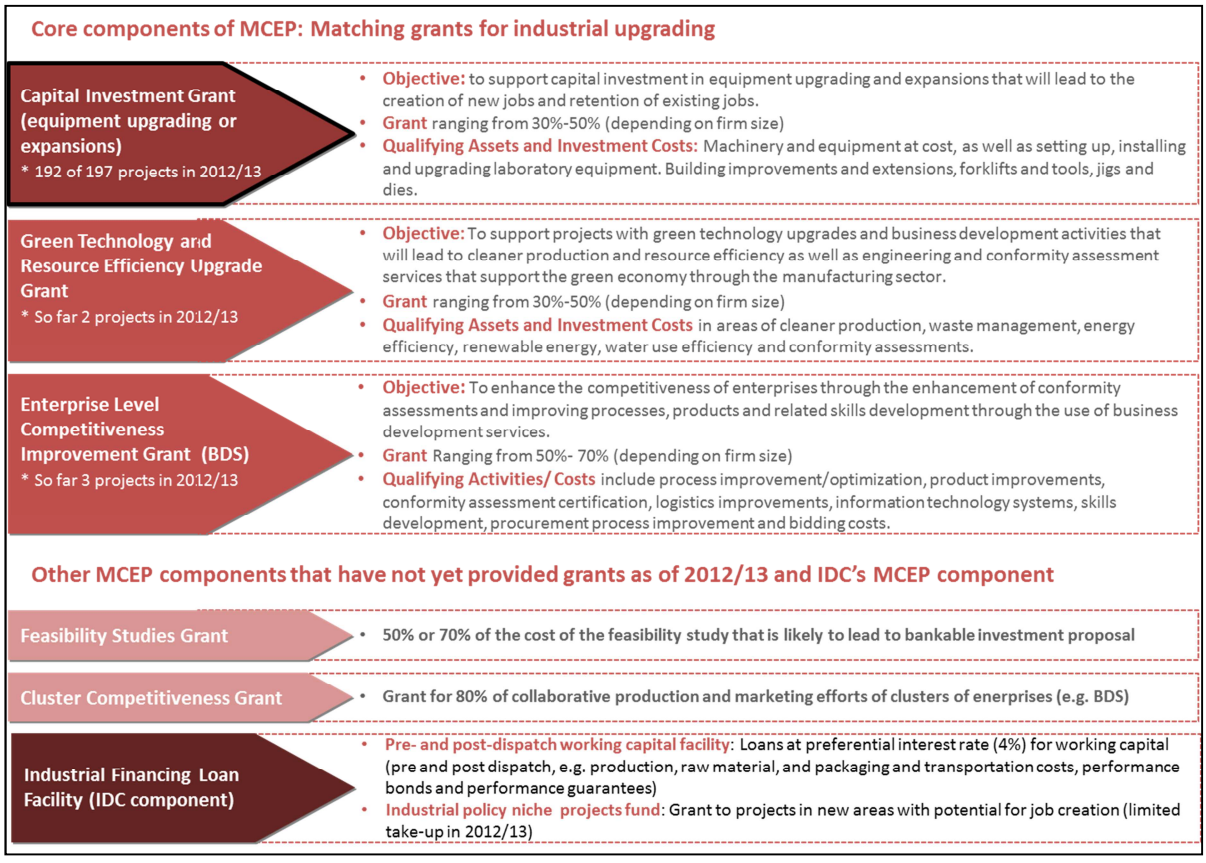
Source: Treasury 2014, National expenditure estimate

In addition, other major sector-specific grant based incentives are managed by the dti's Industrial Development Division (IDD) and amount to a total annual budget of R 1.1 billion in 2013/14, up from R 0.6 billion in 2010/11. This represents an additional 11% of the available budget for Trade & Industry. This intervention package also shows a strong increase, in particular between 2010-2012 when the CTCP for Clothing/Textiles support was introduced (Treasury 2014; DTI 2012: CTCP).

Looking ahead, these sorts of support measures, which largely consist of matching grants for individual firms, are expected to remain the principle industrial policy expenditure in South Africa. While IDAD's manufacturing incentives are projected to amount to R 4 billion per year in 2016/17, IDD's customised sector programmes could reach R 1.4 billion per annum according to the most recent medium-term national budget estimate (Treasury 2014).

Currently, the Manufacturing Competitiveness Enhancement Programme (MCEP) is the main key action programme under the Industrial Financing pillar of IPAP and it aims at increased industrial competitiveness through better access to financial capital. The programme provides grant finance to manufacturing firms to invest in competitiveness enhancement by upgrading production facilities, processes, products and people and it seeks to maximise employment and value-added potential in strategic sectors set out in the IPAP (IPAP 2012-15). The scheme is summarized in the figure 10 and consists of 7 sub-components, 5 of which are managed by the dti and 2 by the IDC.

Figure 10: Components, objectives and features of MCEP



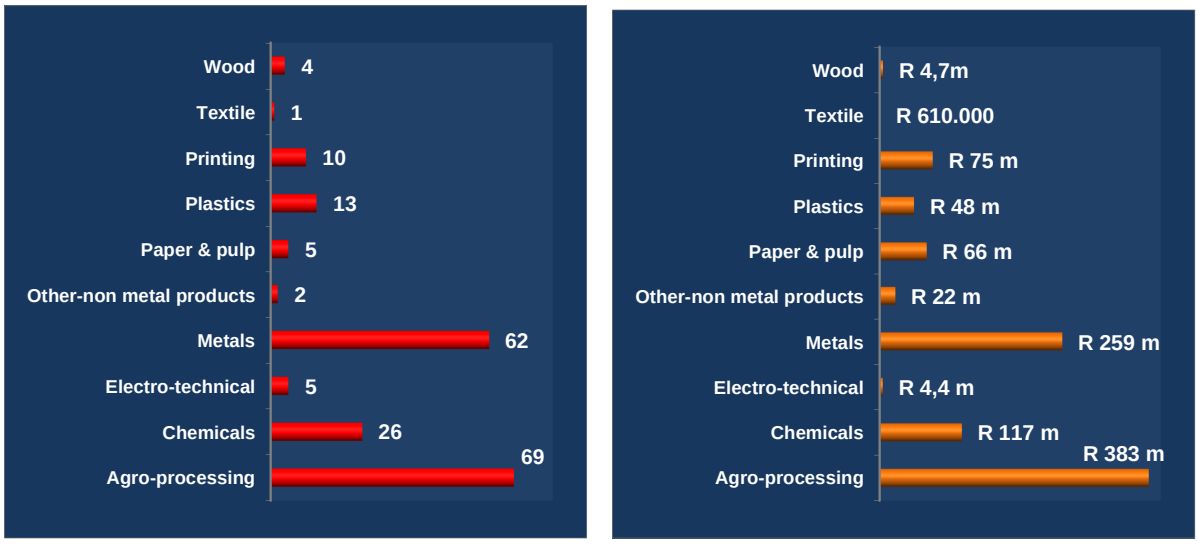
Source: Authors on the basis of IPAP, MCEP guidelines and dti incentives performance report

Within MCEP, applicants can apply for one or a combination of the above-mentioned sub-programmes at company-level based on their needs. Within the dti components of MCEP, firms can apply for a matching grant and qualifying investment activities include capital equipment for upgrading and expansions; green technology upgrades for cleaner production and resource efficiency activities; enterprise-level competitiveness improvement activities for new or increased market access, product and process improvement; related skills development; and conducting feasibility studies. One component allows for clusters of firms to apply for a grant for their collective efforts. The IDC components are a pre- and post-dispatch working capital loan facility and the Industrial Policy Niche Projects Fund (DTI 2012; http://www.investmentincentives.co.za/mcep).

The programme has a significant size of R 5.8 billion and is scheduled to run over 5 years (2012-2017). During the 2012/13 financial year, 197 projects to assist manufacturing enterprises with matching grants with the total value of R983 million were approved and a total investment of approximately R4.2 billion was projected on this basis. Of the 197 approved projects, the Capital Investment component had the most number of approvals (192), while the other components recorded only limited take-up (IDAD 2013).

In terms of sectoral distribution, the scheme is introduced as a horizontal intervention and in general allows most manufacturing firms to apply, although sectors which are covered by similar sector-specific grant schemes (e.g. Automotive and Textiles) are usually not eligible. However, the actual approvals in figure 11 display a strong sectoral focus on the Agro-processing (36 grants worth R383 million), Metals (62 grants worth R259 million) and Chemicals (26 grants worth R117 million) sectors in 2012/13. The three sectors jointly accounted for 77% of the volume of all grants in this period (IDAD 2013).

Figure 11: Number and value of approved MCEP applications across sectors 2012/13



Source: IDAD 2013

While the dti regularly engages in the implementation of financing schemes for manufacturing firms such as MCEP itself, e.g. for the provision of capital expenditure grants, South Africa also has three dedicated industrial financing institutions[3]:

1. the Industrial Development Corporation (IDC) which was set up in 1940 to promote economic growth and industrial development and is owned by the South African government under the supervision of the Economic Development department. It provides loan and equity funding to private industrial firms with total funding approvals of R 13 billion in FY 2012/13.
2. the Export Credit Insurance Corporation (ECIC) which was established in 2001 and facilitates South African export trade by underwriting export credit loans and investments outside the country and is a state-owned agency under the dti with a total portfolio of R 18 billion in the FY 2012/13.
3. the Development Bank of Southern Africa (DBSA) which provides various financial instruments with a focus on economic infrastructure development finance in South Africa as well as other Southern African countries. Its mandate does however not cover the manufacturing sector.

Emphasizing the strategic importance of these institutions, the IPAP argues that: *"Given the scale of competitor banks such as the China Development Bank and the Brazilian BNDES, these institutions should secure agreement on a collaborative approach to identify and unlock opportunities for support to South African and African manufacturers"* (IPAP 2014/15-2016/17).

In particular the IDC is a key implementing agency of industrial policy in the country and works closely with the dti, for instance in the implementation of the MCEP and CTCP programmes. Within MCEP, the IDC manages a Woking Capital Fund of R 765 million as well as an Industrial Policy Niche Fund of R 200 million. In the FY 2012/13 it approved more than R 200 million MCEP funds as loans mostly to the Metal/transport/machinery sector (IDC 2013).

However, an analysis of IDC's current portfolio (table 10) illustrates that the MCEP funds only make up a minor share of IDC's overall loan portfolio to manufacturing enterprises. In 2012/13 alone it disbursed almost R 4 billion to manufacturing firms, which equals around 30% of its total approvals during that year. On the other hand, the MCEP funds amount to only 2% of total IDC approvals in 2012/13.

[3] Sources: http://www.idc.co.za/; http://www.ecic.co.za/; http://www.dbsa.org.

Table 10: IDC loan approvals to manufacturing sub-sectors from own resources and MCEP funds in 2012/13

IDC Strategic Business Units in Manufacturing	Financing approved in FY2012/13 in R million	of which MCEP
Metal, transport and machinery	1.721	207
Textiles	426	-
Forestry and wood	397	-
Chemicals and allied industries	671	15
Agro-industries	738	2
Total of above SBUs	**3.953**	**224**
Share of total IDC approvals in FY 2012/13	30%	2%

Source: Authors, based on IDC Annual Report 2013

It can be summarized that the current financial support measures in South Africa's Industrial Policy are significant in scale and consist of two main legs: 1) grant schemes administered by the dti and 2) the provision of (working capital) loans by the IDC. This two-pronged approach follows a certain logic: The grant schemes were put into place to mitigate the major constraint of access to finance quickly, by injecting capital directly into manufacturing firms. However, as one has to acknowledge that this approach will only temporarily relieve the financial constraint facing the manufacturing sector, this needs to be complemented with actions to increase access to finance in the longer-term. The IDC and other industrial financing institutions could eventually assume this role. However, their current focus is on (shorter-term) working capital loans rather than supporting capital expenditure projects, which leaves a question mark on the effectiveness of the current set-up.

In a similar vein, Minister Davies highlights the need to strengthen and focus the industrial finance aspect of industrial policy in the country in his foreword for the IPAP 2014/15-2016/17:

> "*Mobilising industrial finance is crucial. We must make further and more rapid progress towards ensuring that SA's industrial financing, across all DFIs, is better designed, more coherently aligned and more competitive in relation to our peer middle-income countries, with an optimal mix of public and private sector financing. State and private capital co-operation must increasingly complement one another if we are to achieve the levels of investment in the production sectors that is required.*"

On this basis, IPAP suggests that immediate attention needs to be given to 1) strengthening of conditionality of industrial financing instruments; and 2) improving the coherence of the industrial financing system particularly between dti incentives and funding flows from the IDC and the Export Credit Insurance Corporation (ECIC). (IPAP 2014/15-2016/17)

Signalling the serious efforts in this regard, the latest iteration of IPAP even includes a key action programme on the "*re-calibration of existing dti incentives*" with the ultimate aim to arrive at a more targeted approach for financial incentives. It is acknowledged that this would need to be based on a dialogue with manufacturing industry stakeholders and a better understanding of the characteristics of recipient and non-recipient manufacturing firms and their competitive performance (IPAP 2014/15-2016/17).

While a more selective approach to industrial financing is supposed to lead to larger impacts and better value for money, this does not necessarily imply a smaller scale of intervention in the future. In fact, the dti is in the process of developing proposals for expanding the suite of existing support mechanisms, including fine-tuning the MCEP and designing a specialised incentive to support BEE in the manufacturing sector. Hence, the notion of providing investment capital for the enhancement of production capacities is likely to remain a core feature of Industrial Policy in South Africa in the foreseeable future.

3.4.2 Public procurement: demand side measure to enhance production capacity

Besides fulfilling the government's demand for goods and services, public procurement regularly addresses a wide range of objectives. It has been used by governments to achieve socio-economic objectives such as stimulating economic activity; protecting national industries from foreign competition; improving the competitiveness of certain industrial sectors; and remedying national disparities (Uyarra & Flanagan 2009; Ambe & Badenhorst-Weiss 2012). In fact, evidence on the positive effects of public procurement as an industrial/innovation policy tool was already provided by Rothwell and Zegveld (1981) as well as Geroski (1990), which shows that there has long been interest in the use of procurement in the industrial policy mix.

Using public procurement for developmental goals is seen in the literature as a demand-side policy measure through which governments can generate new markets for companies in order to develop new technological capabilities and solutions (Edler & Georghiou 2007). More specifically, Yuelek and Taylor (2012) highlight that apart from simply aiming at price discounts, governments can choose between four types of strategic procurement policies: 1) *preferential vendor and/or industry purchasing arrangements* (e.g. preference to specific types of domestic firms); 2) *domestic preference* (i.e. "buy domestic terms"); 3) *local content* and 4) *countertrade and offsets*. On this basis, they argue that public procurement is a platform from which a set of policies can be crafted in support of an overarching economic development strategy

In this vein, the South African IPAP 2012/13-2014/15 explicitly highlighted the role of public procurement as a strategic policy tool to leverage on demand to support production development in different sectors. The IPAP 2013/14-2016/17 re-emphasises that public procurement is one of the key strategic levers for the country's' industrial development objectives. It represents huge amounts of public expenditure and accordingly the Government possesses the necessary purchasing power to leverage procurement in support of broader economic development goals on a large scale.

In terms of implementation, South Africa has amended its Preferential Procurement Policy Framework Act (PPPFA) in December 2011 by integrating mechanisms to promote strategic procurements. The revised PPPFA regulations empower the dti to designate industries, sectors and sub-sectors for local production at a specified level of local content. On this basis, the dti has

designated ten sectors which are summarized in table 11. While the first 8 items were already designated in 2012, the last two (i.e. power cables and solar water heaters) were added in the latest iteration of IPAP (IPAP 2013/14-2016/17; IPAP 2014/15-2016/7).

In terms of the taxonomy proposed by Yuelek and Taylor, most of the items suggest that the dti's policy focuses on "local content", while the three items with 100% local content de-facto equal a "domestic preference". However, the whole procurement scheme also features B-BBEE criteria and hence qualifies as a "preferential vendor and/or industry purchasing arrangement" policy. This implies that the South African procurement policy has some elements of a production subsidy as it alters the allocation of resources, prices, and welfare in the economy. Yuelek and Taylor (2012) suggest that this sort of policy should be adopted only after a careful analysis of costs and benefits as more complete price and quality competition commonly leads to increased welfare in the purchasing government's economy.

Table 11: List of designated products for local procurement under IPAP 2014

Industry/sector/sub-sector	Minimum threshold for local content
Buses (bus body)	80%
Textile, clothing, leather and footwear	100%
Power pylons	100%
Canned / processed vegetables	80%
Rolling stock	65%
Pharmaceutical products (oral solid dosage tender)	(73% of the tender volume)
Set-top boxes for TV digital migration	30%
Furniture • Office Furniture • School Furniture • Base and Mattress	 85% 100% 90%
Power and telecom cables	90%
Solar Water Heaters (collectors and storage tanks/geysers)	70%

Source: IPAP 2014/15-2016/17

Leaving cost-benefit considerations aside, in particular the buses, rolling stock and energy infrastructure (power pylons and cables) offer significant domestic demand and hence could contribute substantially to an increase in industrial production capacity. So far, contracts were awarded for the supply of 3600 coaches and pharmaceuticals worth R 1 billion and a tender for more than 1000 locomotives was issued. In addition, with regard to the strategic orientation of public procurement, the IPAP 2014/15-2016/17 highlights that further sub-sectors will be designated in the future and that the performance of designated sectors will be monitored and the

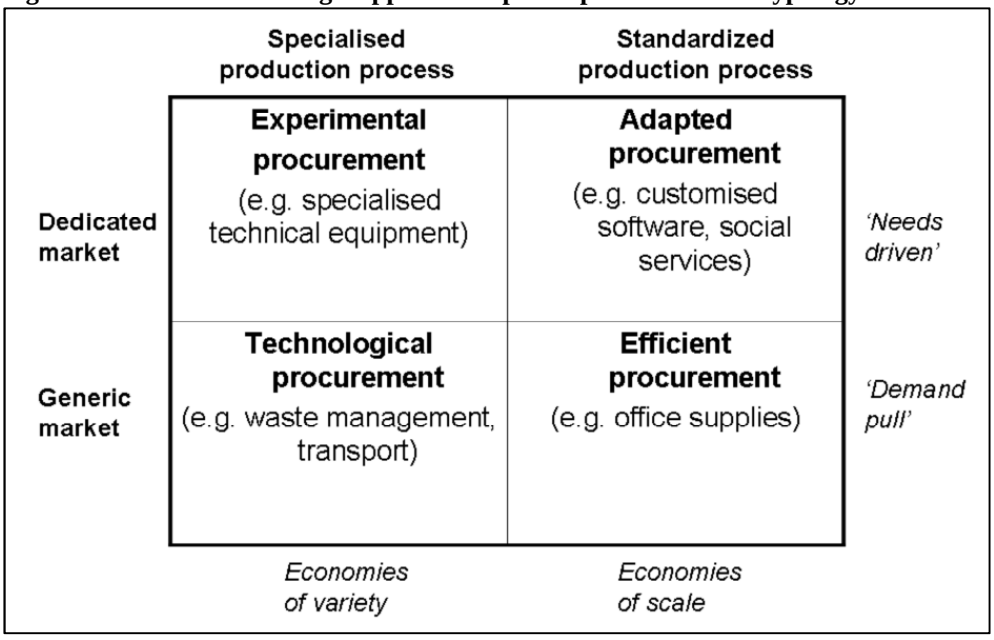
impact of the policy will be evaluated. Acknowledging the relevance of the institutional side of industrial policy, the dti is also planning to harmonise strategic approaches to local procurement with other departments and to strengthen the coordination among them.

This analysis illustrates that South Africa is forcefully pursuing public procurement in its industrial policy mix and has taken a number of important steps to increase the effectiveness recently. However, the task to prioritize strategic products and define suitable policy approaches for public procurement will continue to be of critical relevance for achieving significant impacts on industrial development. While a significant amount of products has been designated for public procurement already, a specific strategic diagnosis of the products that could offer the most attractive potentials has not yet taken place. Such analysis should in particular consider the respective characteristics of different product groups and the resulting applicability for different procurement strategies.

In this regard, Uyarra & Flanangan (2009) suggest four distinct areas for public procurement which differ in terms of their strategic potentials and prerequisites from an innovation perspective (figure 11):

1) procurement of standardised products serving a generic market (efficient procurement);
2) addressing specific demand niches but employing known production methods and practices (adapted procurement);
3) encouraging new technical solutions to meet a generic need (technological procurement); and
4) adapted technical solutions (experimental procurement).

Figure 11: Towards a strategic approach to public procurement: a typology



Source: Uyarra & Flanagan 2009

On this basis, the authors suggest that the role of the public sector is more significant for technological and experimental procurement which are characterized by more specialized production processes. While the government can become a large and sophisticated customer through *technological procurement*, it can become the lead user at a smaller scale within *experimental procurement*. Hence, both areas offer significant potential to contribute to the structural transformation and upgrading of the industrial sector. In addition, the government could also become a niche user for products that are specifically customized for local demand through *adapted procurement*. However, within *efficient procurement*, the government is expected to be mostly cost-driven when procuring undifferentiated items in large quantity, and hence this area is suggested to be of less relevance from an industrial policy and innovation perspective (Uyarra & Flanagan 2009).

Without conducting an in-depth assessment on the situation in South Africa, it is evident that among the currently designated sectors/products (cf. figure 11 above) most products seem to qualify as *efficient procurement* items (e.g. canned vegetables, furniture, textiles, and cables). The products that could possibly be considered as *technological procurement* are rolling stock, pharmaceuticals, set-top boxes as well as solar water heaters. At the very least, this suggests that there is still some room to define several additional technology-intensive products/sectors for designation that could deliver larger and more dynamic learning and upgrading effects on industrial competitiveness.

However, policy effectiveness ultimately depends on the capacities of the responsible technocrats. It is acknowledged widely that strategic public procurement requires significant industrial policy management capabilities. One reason is that public administrators have many goals to follow in modern public procurement, including cost savings, value-for-money, transparency and last but not least sectoral policy priorities (e.g. industrial, environmental, energy, etc.) – which sometimes contradict each other. Hence, developing countries need to enhance their institutional capabilities significantly not only to increase efficiency but also to allow policy learning in the management of public procurement (Kattel and Lamber, 2010).

In the South African case, several observers conclude that the shortcomings in institutional capacities for public procurement on the different levels of government are a key constraint (Ambe & Badenhorst-Weiss 2012; Haines 2012; Sheoraj 2007). Towards this end, the National Treasury (NT) has recently started the Procurement Transformation Initiative (PTI) which will be implemented over the next 5-7 years. This includes 1) the design of an overall Supply Chain Management (SCM) architecture; 2) the creation of capability at NT to design, implement and monitor SCM; 3) the reduction of complexity in the current system through standardisation, aggregation and data alignment; 4) the enforcement of compliance through strong administrative actions and; 5) the creation of SCM capability in specific functions at all institutions (Treasury 2013).

With regard to the last point, it deserves to be mentioned that the core actors in the industrial policy process would benefit from the strategic enhancement of procurement management capabilities. The revised Preferential Procurement Policy Framework Act (PPPFA) regulations empower the Department of Trade and Industry (the dti) to designate industries, sectors and sub-sectors for local production at a specified level of local content. In particular this designation of attractive and feasible products for procurement requires detailed technical competence which goes beyond the principles of the supply chain management process. This strategic issue hence deserves to feature prominently in the capacity building plan.

In this context, it deserves to be highlighted that during 2014/15, the newly created office of the Chief Procurement Officer in the Treasury plans to develop a national supplier database, identify and list the top 40 commodities that government spends money on, review and amend the Preferential Procurement Policy Framework Act (2000), and provide operational support to government entities (Treasury 2014). This process could provide the foundation for a more strategic definition of public procurement opportunities from an industrial policy perspective. In addition to the planned ranking of the 40 product groups with the largest leverage (procurement volume), it could be beneficial to also consider a mapping of the potential of these product groups on the basis of the above typology of procurement areas.

3.4.3 SEZs: re-emphasizing the infrastructure for manufacturing export success and regional industrial development

Special economic zones (SEZs) are spatially delimited areas within an economy that function with administrative, regulatory, and often fiscal regimes that are different than those of the domestic economy. The creation of SEZs is an industrial policy tool which is widely applied globally with the objective of triggering growth in national and foreign direct investment (FDI), exports, and employment, as well as a more balanced regional economic development. However, with few exceptions, the SEZs that were introduced in several African countries since the 1990s have largely underperformed compared to more successful experiences in Asia and Latin America (Farole 2011).

Also South Africa established an Industrial Development Zone (IDZ) Programme in 2000 with the aim of attracting FDI and promoting the export of value-added commodities. IDZs were established close to international ports and airports in Coega, East London, Richards Bay and OR Tambo and were meant to provide an investor-friendly environment characterised by good infrastructure and minimal red tape. However, over the last years, a large number of commentators concurred that IDZs have not delivered on the government's expectations (cf. CED 2012, Woolfrey 2013).

One of the main reasons that are commonly cited for the limited success of IDZs is the lack of dedicated incentives to firms that locate in the zones which accordingly operated under very similar conditions and regulatory frameworks as firms outside the zones. Table 12 summarizes these main shortcomings of South African IDZs compared to leading international SEZs (CED 2012, Woolfrey 2013). These shortcomings are also acknowledged by the Government in the SEZ Bill (GoSA 2013).

On this basis, the Government of South Africa started revisiting their support for SEZs in 2007 with an evaluation of the limitations of this first attempt as well as an examination of global success cases and good practices (cf. CDE 2012). As a next step, the IPAP 2012/13-2014/15 marked a turning point in the strategizing for SEZs in two ways: 1) the development of a dedicated legislative framework and regulation including the drafting of an SEZ policy and accompanying SEZ bill was initiated; and 2) SEZs are now explicitly framed as a regional development tool for underdeveloped regions[4].

[4] While the IDZs were located around the major ports and airport, the following quote illustrates the shift in strategy: "The new SEZ programme will be specifically used to promote the creation of a regionally diversified industrial economy by establishing new industrial hubs in underdeveloped regions of the country". (IPAP 2012-2014)

In the next iterations of IPAP, these plans were further detailed, the legislative process was pursued and the roll-out of the SEZ programme was initiated with the designation of additional zones and the execution of pre-feasibility studies for ten concept proposals. In addition, the government designed a specific capacity development programme to recruit and train 30 additional staff for the effective planning, development and management of SEZs (IPAP 2013/14-2016/17).

Table 12: South Africa's IDZs compared with leading international SEZs

Leading SEZs worldwide	South African IDZs
Corporate tax exemptions and discount rates over specific time frames	Full corporate tax for enterprises in customs-controlled area (CCA) of the IDZ
Discounted personal tax for zone enterprise employees	Full personal tax for IDZs and CCA enterprises employees
Conditional exemptions from import duties	Conditional exemptions from import duties
Zero rated value added tax	Zero rated value added tax
Consistent dedicated investment incentives for capital goods, HRD, imported capital goods, R&D, and other needs	Inconsistent investment incentives and no zone-specific incentives
Automatic qualification and speedy incentive approvals, lending certainty and investor confidence	Stringent admission criteria and requirements. Up to 6 months turnaround time reduces certainty and investor confidence
Discounted and competitive land and property prices, as well as rental rates	Market-related property prices and rental rates
Customs control delegated to zone operator by internal revenue authorities. Zone operator allowed autonomy.	Authority reserved and controlled by SARS
Liberal interpretation of customs control regime. Zone operator allowed autonomy	Cumbersome customs procedures compounded by excessive monitoring and reporting requirements

Source: Richards Bay Industrial Development Zone Annual Report, 2009

Source of table: CDE 2012

In terms of implementation, the first major milestone was achieved in 2013 when the Special Economic Zones Bill was passed (which allows the IDZs to graduate into SEZs) and the new Saldanha IDZ was designated. The Bill also includes the establishment of an SEZ Advisory Board and institutional coordination mechanism. It is evident that the government takes a serious attempt this time, as the SEZ support accounts for almost R 1 billion or roughly 11% of the available budget for Trade & Industry in 2013/14, while the medium-term estimate suggests a significant increase by

23% p.a. until 2016/17 to reach R 1.9 billion per annum (cf. table 12 above). The newly allocated budget will mostly be invested for conducting pre-feasibility and feasibility studies for the proposed special economic zones in all nine provinces, infrastructure projects in the existing industrial development zones, and newly designated special economic zones (Treasury 2014).

In addition to the dedicated legislative framework, the Government has also approved a range of tax incentives that clearly differ from the former IDZ approach. Investors in SEZs now qualify for a corporate tax incentive of 15% (instead of 28%), a building tax allowance, an accelerated 12i tax allowance, an employment tax incentive as well as VAT exemption and duty free rules. This constitutes a significant enhancement of the incentive system compared to the exclusive focus on provision of infrastructure in the past (DTI 2013).

In terms of the sectoral and regional distribution of SEZs, table 13 on the existing IDZs and table 14 on the new SEZ proposals reveal a significant strategic shift. In terms of sectoral characteristics, the recent attempts display a much stronger element of sectoral choice. While the old IDZs covered a large number of sectors (e.g. in Coega: agro-processing, BPS, energy, automotive and petrochemicals), the new Saldanha Bay IDZ has a strong focus on the oil and gas industry and the new proposed SEZs all have a specific sectoral focus (e.g. Platinum Group Metals in Limpopo and Solar Energy in the Northern Cape).

In terms of regional distribution, the recently designated Saldanha IDZ and the new SEZ proposals could contribute to balancing the current concentration of zones. While the old IDZs are all located at the major ports on the East coast (as well as OR Tambo airport), Saldanha is located on the West coast and the new proposals come from all 9 provinces, including two from Limpopo, the poorest region in the country.

As a bottom line, we can say that the South African Government's SEZ strategy is a good example of modern industrial policy experimentation and learning practice. After a critical evaluation of the shortcomings of the IDZ programme, the country currently witnesses a re-introduction of the idea of SEZs as a key element of the industrial policy mix. A dedicated legislative framework, a significant budgetary allocation, a set of SEZ specific incentives and a clearer selection of focus sectors will presumably attract a larger number of national and international investors that could significantly enhance the productive and export capacity of South African industry. Whether the decision to introduce a regional development angle in the scheme can contribute to a more inclusive industrial development process in the country or might overburden the initiative can only be determined with the support of a thorough M&E framework.

Table 13: Sectoral focus and achievements in South Africa's IDZs

Industrial Development Zone	Inception	Sectoral focus	Budget transferred (until March 2013)	Operational investors	New investments 2012/13	Direct and indirect jobs
Coega IDZ	2001	agro-processing, general manufacturing, business process services, energy, automotive and petrochemicals	R 4.3 billion	20 investors (R 1.1 billion)	8 investors (R 1.7 billion)	40,900
East London IDZ	2001	automotive, marine aquaculture, agro-processing (bio-fuels, food and timber), pharmaceuticals, ICT and electronics, business process services	R 1.3 billion	21 investors (R 1.1 billion)	5 investors(R 0.3 billion)	7,500
Richards Bay IDZ	2002 (construction start 2010)	aluminium clustering, wood, chemicals and mineral beneficiation	R 0.3 billion	1 investor (R 0.8 billion)	-	180
OR Tambo International Airport IDZ	2002 (permit 2010)	Plan: strategic industries linked to air transport, including precious mineral beneficiation and high-technology industries	n.a.	0		
Saldanha Bay IDZ	2013	Plan: manufacturing of components for the oil and gas industry & marine repair cluster	n.a.	0	six lease agreements with international oil and gas companies signed	12,000 (forecasted)

Source: Authors on basis of information provided in Treasury 2014

Table 14: Progress on 10 new SEZ proposals in South Africa (status Oct 2013)

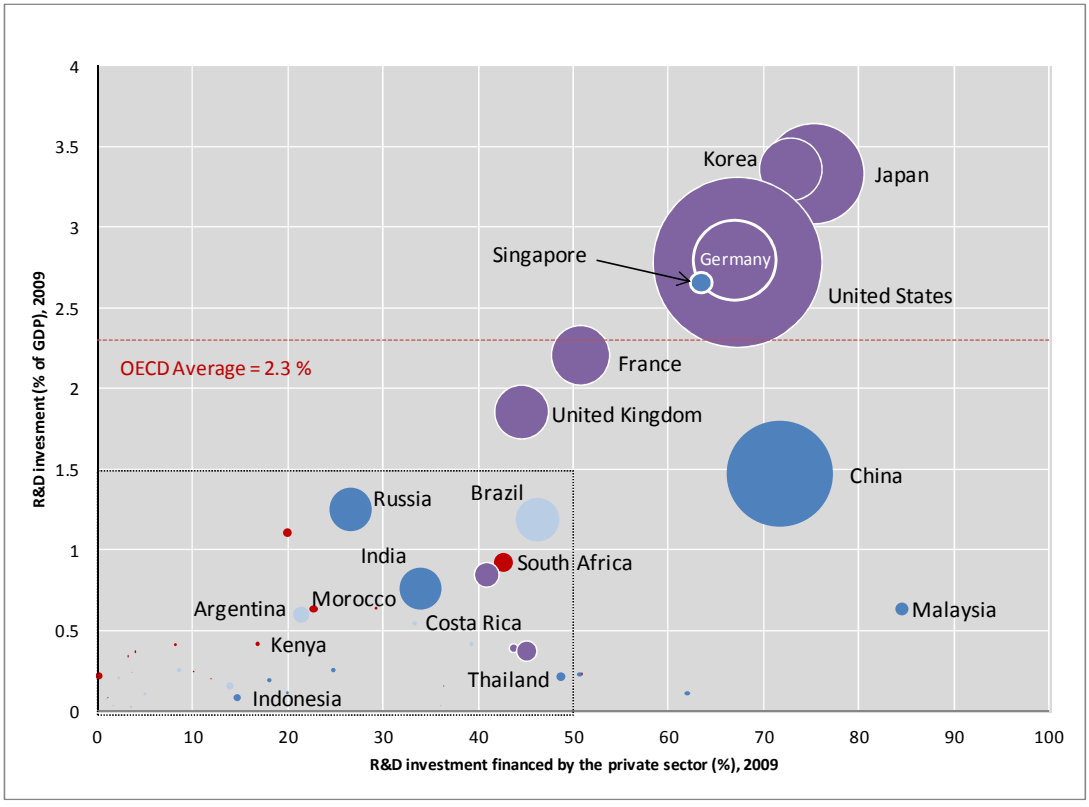
Province	Region	Focus	Status
Eastern Cape	Mthata	Agro-processing	RFPs out
Free State	Harrismith	Agro-processing	RFPs out
Gauteng	JHB	ICT Hub	Feasibility stage
KZN	KSIA	Agro-processing, Aviation, Electronics	RFPs out
Limpopo	Tubatse/Steelpoort Valley	PGMs	Pre-feasibility stage
	Musina	Agro-processing, mineral processing, trade hub	RFPs out
Mpumalanga	Nkomati	Agro-processing	RFPs out
Northern Cape	Upington	Solar Corridor	Pre-feasibility stage
North West	Rustenburg	PGMs	RFPs out
Western Cape	Atlantis	Renewable Energy	RFPs out

Source: DTI 2013

3.4.4 Technological infrastructure for innovation and manufacturing upgrading

Several emerging economies have significantly increased their investment in R&D over the last decades, but wealthier economies invest higher shares of their GDP on R&D. China more than doubled expenditures on R&D over the last decade and it now invests 1.5% of its GDP on R&D, but its spending remains low compared to an OECD average of 2.3%. Emerging economies are becoming interesting locations for R&D. They host a rising number of R&D centres, thanks both to public policy support and to new business strategies of transnational corporations. Several companies have opened research labs in emerging markets, such China, Brazil and India, and in growing economies such as Costa Rica, Malaysia and Singapore.

Figure 12: R&D investment in selected OECD and non OECD countries, 2009



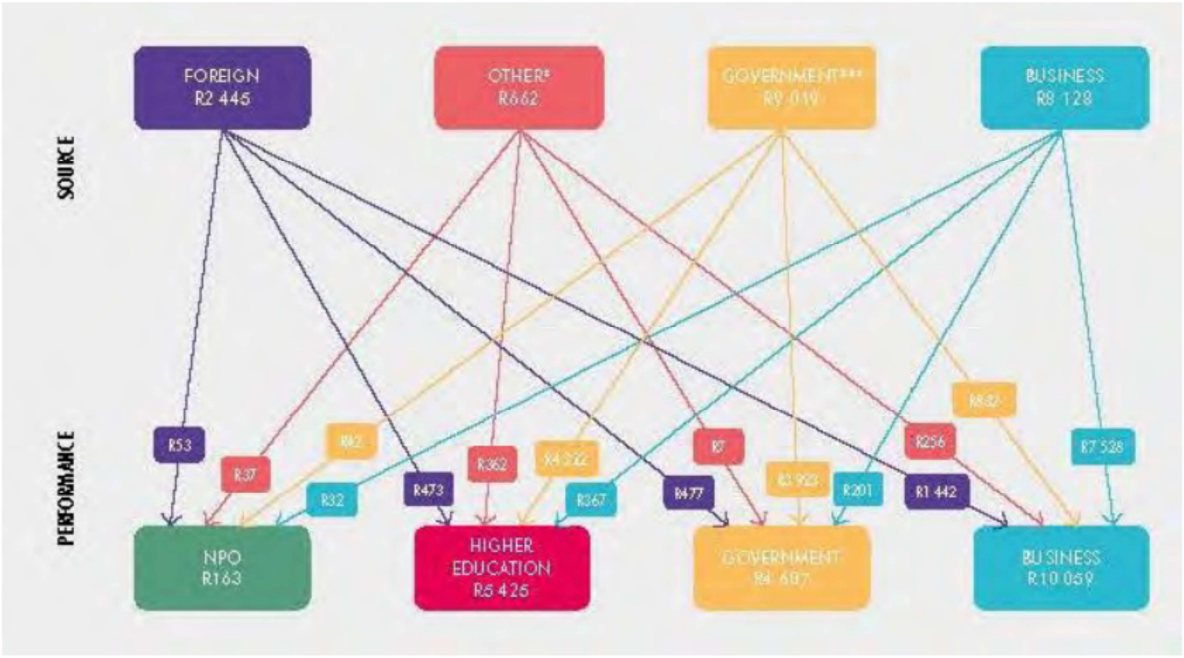
Source: OECD countries: OECD MSTI Database, Latin America/ Caribbean: RICYT, other countries: UNESCO.
Note: 2009 or latest available year.

As shown in figure 12, South Africa is behind China, but also Brazil in terms of R&D investment. However other catching up economies like India, Thailand and Indonesia are behind South Africa in terms of R&D investments as a percent of GDP; while in the comparison with Russia, although

the R&D investments as a percent of GDP is lower in South Africa we still have a relatively bigger involvement of the private sector (almost 45%).

According to the IPAP 2014/15 – 2016/17 (see figure 13), in 2010 the major R&D investment sources are the government (R9019), closely followed by the business sector (R8128) and, finally, by foreign investors (R2445).

Figure 13: Major R&D funding flows (million), 2010/11



Source: IPAP2014/15 – 2016/17 , p. 57

Due to the public goods nature of knowledge, the market tends to under-invest in providing all those elements constituting a country's *technological infrastructure*. This justifies public intervention – either direct state provision through intermediate institutions or subsidization of companies' investments in innovative technologies development. At the centre of a given country's technological infrastructure there is an array of intermediate institutions. They can help the manufacturing sector in:

- The identification, adaptation and development of innovative technologies through feasibility studies and market opportunity scouting, experimental testing, demonstration projects, lab testing, quality certification and product/process control;

- The diffusion and transfer of these technologies through technical assistance, demonstration projects, quality certification and product/process control, extension services, piloting innovative companies in partnership with private companies.

- The nurturing focal technological linkages across sectors, especially with manufacturing as many of the agro-technological innovations come from manufacturing industries.

Increasing costs of producing and disseminating knowledge and technological innovation have made public involvement even more necessary, because many of these activities are moving beyond the reach of individual companies. Therefore, public intervention in providing research, extension, education and information has become more important (Andreoni and Chang, 2013).

In the IPAP 2013/2014 the South Africa government has set a target of increasing and sustaining research and development expenditures to at least 1% of GDP. In recognition of the increasing global technological race, these investments are aimed at building the innovation and technological competences and capabilities of South Africa across the entire 'innovation value chain', that is, from research to scaling up and commercialisation. While the DST's National Research and Development Strategy focuses on the research end of the spectrum, the dti operates on the opposite end (i.e. scaling up and commercialisation) with mainly three programmes:

- the MCEP to upgrade existing plants and machinery;
- the SPII to provide financial support in the technological development phase;
- the THRIP to promote research collaborations.

The IPAP 2013/2014 recognised the existence of intervention gaps and misalignments along the innovation value chain and the need to review and restructure existing SPII and THRIP programmes. Moreover, sector-specific technology platforms combined with enabling cross-cutting technologies (i.e. advanced materials, nanotechnologies and micro/nano electronics) were prioritised. However, with the exclusion of business incubators attached to universities or science councils, the majority of these policy interventions rely upon sectoral funds and finance instruments. Less emphasis seems to be given to the development of intermediate institutions and other infrastructure for systemic technological upgrading.

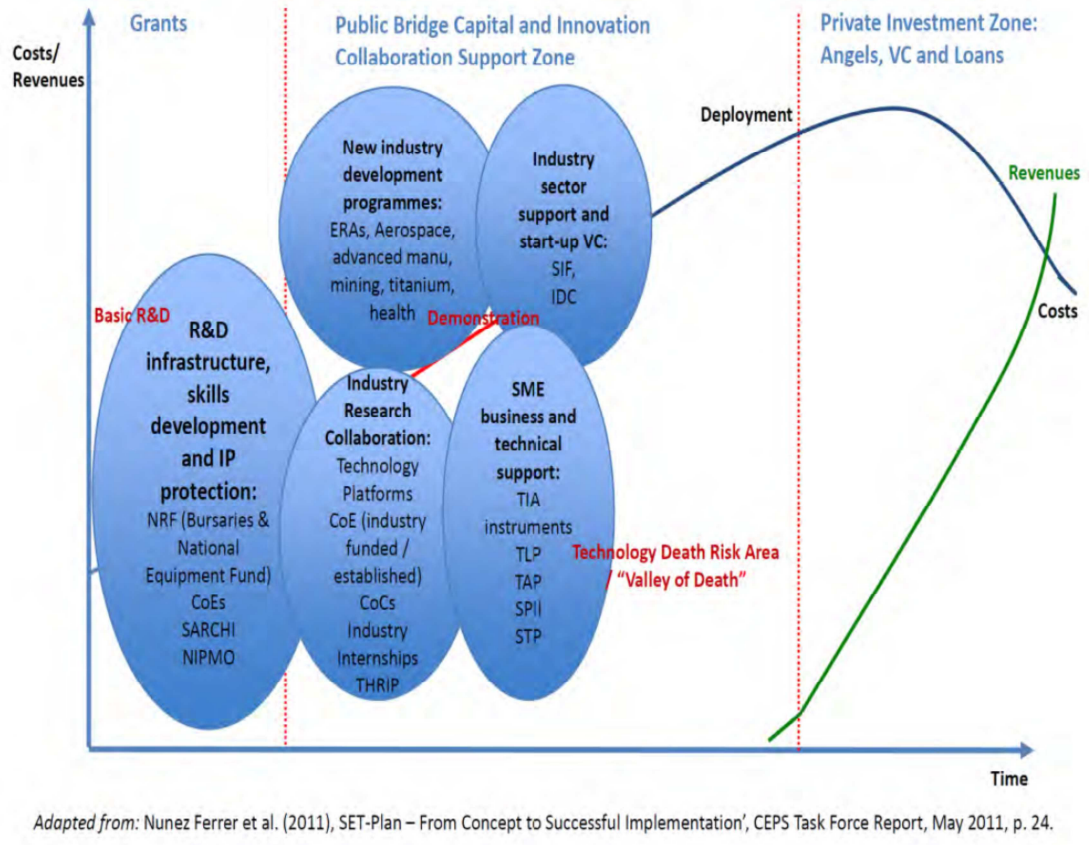
The most recent IPAP 2014/15 – 2016/17 presents a more articulated discussion about the current innovation and technology challenges of South Africa. A number of specific areas of policy intervention are identified that aim at:

1. supporting large research and development programmes (cross-cutting, innovative and sustainable) in knowledge intensive areas within the Emerging Industries Action Plan (EIAP);
2. supporting both existing and new technology-based SMEs to access the technological infrastructure (such as incubation services) and innovation support programmes;
3. addressing industrial scalability and commercialisation challenges within a comprehensive technology commercialisation strategy.

The possibility of addressing these latter challenges effectively resides on the harmonisation and alignment of the different incentives and support programmes along the innovation journey. The IPAP 2014/15 – 2016/17 builds on the internationally emerging 'valley of death' concept to address

the coordination problems related to the industrial scalability and commercialisation challenges. This emphasis on 'greater coherence in the use of R&D' within the South Africa technological infrastructure is well captured by the mapping exercise presented in the most recent IPAP document (see figure 14).

Figure 14: Snapshot of South African Innovation Funding and Support Instruments along the Technology Cycle



Source: IPAP2014/15 – 2016/17 , p. 62

By mapping funding schemes and supporting programmes, the government is aiming at addressing in a selective way those specific funding gaps, but also dysfunctional overlaps and duplications which result in bottlenecks or efforts waste along the innovation journey. Indeed this mapping exercise constitutes a fundamental step in redesigning the technological infrastructure of South Africa in order to improve its effectiveness in supporting industrial and technological upgrading. While expanding the production capacity of the country is critical in order to reach efficiency scale and high volume production, the application of innovative technologies in production and product systems and sub-components development are critical to allow South Africa capturing increasing value from international trade.

4. Matching industrial systems and policies: challenges for implementation and ways forward

Taking stock of the detailed analysis developed in section 3, this section assesses the policy mix and its alignment/disalignment given the stated policy goals as well as the major challenges arising from the industrial policy analysis. Specifically, in the specific context of South Africa, the analysis reveals the importance of focusing on three main challenges: (i) focusing on policy coordination and selectivity; (ii) exploiting the opportunities offered by 'developmental linkages' to address manufacturing as well as employment objectives; finally, (iii) improving the policy process and inter-institutional coordination within a policy learning approach to monitoring and evaluation. Particular emphasis is assigned to the discussion of the tensions arising from a welfarist (job creation) approach with a more techno-industrial transformation perspective in discussing priorities and policy measures. The importance of rethinking policies' selectivity, coordination and the cross-sectorial effects (which unfold as a result of developmental linkages) constitute fundamental intersections and opportunities to go beyond current policy trade-offs. This section also sketches a series of feasible 'ways forward' for improving the industrial development strategy taking into account both the diagnostics at the global and national level, and the policy mix and the institutional capacities in South Africa.

4.1 Policy selectivity and coordination

4.1.1 Challenges

The issue of 'selectivity' has probably been the factor which has contributed most to the polarisation of the industrial policy debate. The extent to which policy measures should (or should not) favour particular sectors or even particular companies (the so called 'picking winners argument') has been extremely controversial.

Those who believe that industrial policy should be *general* (also called 'functional' or 'horizontal') argue that the state should not distort resource allocation resulting from the price system. Instead the state should facilitate the functioning of the market by enriching the environment in which it operates with investment in infrastructure, general education and basic research. This enhancement of the general endowment of the economy is not expected to have any discriminatory effect between companies or between sectors. Thus "stressing that industrial policy fosters productivity competitiveness or creates favourable general conditions for firms lays the foundation for a *horizontal approach*" (Aiginger and Sieber 2006: 582).

In contrast, those supporting *selective* (also called 'sectoral' or 'vertical') policy measures tend to stress how the very definition of industrial policy implies an element of selectivity. They argue that industrial policy always involves making choices about the specific manufacturing development trajectory that the country (or region) should follow. This can be done by selecting specific *policy targets* such as picking 'high value added' industries or channelling financial resources in specific activities, for example in basic research or specific engineering education programmes. All the following definition of industrial policy contains an element of selectivity:

'a policy that deliberately favours particular industries over others, against market signals, usually (but not necessarily) to enhance efficiency and promote productivity growth' (Chang, 2009; see also Chang 1994:58)

'I will use the term [industrial policy] to apply to restructuring policies in favour of more dynamic activities generally, regardless of whether those are located within industry or manufacturing per se' (Rodrik 2004:3)

'comprises policies affecting 'infant industry' support of various kinds, but also trade policies, science and technology policies, public procurement, policies affecting FDI, IPRs and the allocation of financial resources' (Cimoli, Dosi and Stiglitz, 2009:2)

Interestingly even the lack of industrial policy is an implicit form of selective intervention. A country that refuses to adopt any industrial policy is implicitly accepting the current structural configuration of its economic system, the pervasive presence of market failures, the current distributions of learning opportunities across sectors, regional dualisms etc. .

Those embracing a selective approach also stress how the distinction between general and selective measures is actually a fictitious one, since even supposedly 'general' measures imply some trade-offs. This point has been highlighted by Landesmann (1992:245 italics added) when he argues:

"Industrial policies are targeted towards increasing national wealth and they thus open up positive sum options from which everybody could gain. In actual practice, however, industrial policy are designed to be specific, i.e. directed towards particular industries, firms, regions, groups in the labour market, etc., rather than general. *Even in those cases in which they are general (such as general tax allowances), they have a differential impact upon different parts of, and actors in, an economy.* Implicit in industrial policy formulation and execution are … trade-offs between different groups, regions, industries, etc."

From a dynamic point of view, the fact that structural economic dynamics and institutional changes require different time frames to work themselves out introduces misalignments and trade-offs among policy objectives, thus, the need for a form of *dynamic coordination* among industrial policy measures. The problem of alignment over time of structural dynamics and institutional changes is well illustrated by the case of technological (also called structural) unemployment. Achieving full utilisation of available labour is particularly difficult as the economic system enters an accelerating process of structural change and is thus based on manufacturing industries characterised by extremely dynamic technological and organisational changes. This is because a certain amount of labour (i.e. producers' capabilities) will become obsolete and, thus, redundant with economic development. The need for coordinating education policies, technology policies and sectoral policies is also critical at initial or catching up stages of manufacturing industries development.

The existence of misalignments over time is a strong rationale in favour of industrial policy and policy coordination. Their consideration leads also to the consideration of two problems that policymakers have to address:

(i) given a plurality of policy targets, picking the right *policy mix*, that is a 'package of interactive measures' (Stiglitz 1996);
(ii) given a plurality of structural change patterns, picking the right *time horizon* in policy implementation and being able to *align policies over time*.

Coordinating and aligning industrial policy measures over time is not trivial as policymakers have to consider a plurality of policy targets and relative trade-offs among them over time. As Landesmann's (1992:242) analysis of Scandinavia countries has shown, these countries ended

adopting an 'interesting mix of both defensive and constructive policies' in order to tackle structural tensions, institutional bottlenecks and the unavoidable emergence of dualisms. Similarly Chang (2009:29) stresses how, "in East Asia, free trade, export promotion (which is, of course, not free trade), and infant industry protection were organically integrated, both in cross-section terms (so there always will be some industries subject to each category of policy, sometimes more than one at the same time) and over time (so, the same industry may be subject to more than one of the three over time)' (see also Johnson 1982; Dore 1986; Amsden 1989; Wade 1990; Chang 1994; Stiglitz 1996). The extent to which a certain policy mix is effective depends upon policymakers' capacity to design and implement measures operating upon different factor inputs and at different levels of aggregation of production activities (these are the two main axes of the policy matrix discussed above, see section 3).

4.1.2 Selectivity and coordination challenges in South Africa

While the sectoral focus areas of IPAP introduced above indicate a high degree of selectivity in the South African industrial policy mix at first glance, one may argue that the large number of priorities has indeed reduced the overall level of selective choice over time significantly.

In fact, table 15 below provides a brief analysis of the current sectoral priorities in cluster 1 of IPAP and indicates that they jointly account for almost ¾ of total manufacturing employment. As this does not yet include the additional priorities in clusters 2 and 3 (and neither the BPS and Creative Industries), it is safe to say that almost all existing (and newly emerging) manufacturing activities in the country are eligible for targeted sectoral support in one way or another.

Table 15: Contribution of IPAP priority sectors in manufacturing (cluster 1 without BPS and Creative Industries) to South African manufacturing employment

IPAP Priority sub-sectors (cluster 1 without BPS and Creative Industries only)	Employment 2011	Share of SA manufacturing employment 2011
Clothing, textile, leather, footwear	101,511	8.8%
Automotive	97,000	8.4%
Metal, metal fabrication, capital equipment and rail transport	343,457	29.74%
Agro-processing	205,097	17.8%
Plastics, Pharma, Chemicals	60,000	5.2%
Cosmetics	50,000	4.3%
Forestry, timber, paper, pulp, furniture	?	?
Sum of focus sectors	**857,065**	**74%**
Total manufacturing	**1,153,534** (based on Agro-processing above)	**100%**

Source: Authors, based on IPAP 2013-2016 information.

Note: Values in red are calculated on the basis of absolute value being stated.

One reason for this lack of selectivity is the relatively aggregated definition of priority manufacturing sectors that qualify for support (e.g. the metal, metal fabrication, capital equipment and rail transport sub-sector alone accounts for almost 30% of manufacturing employment). One

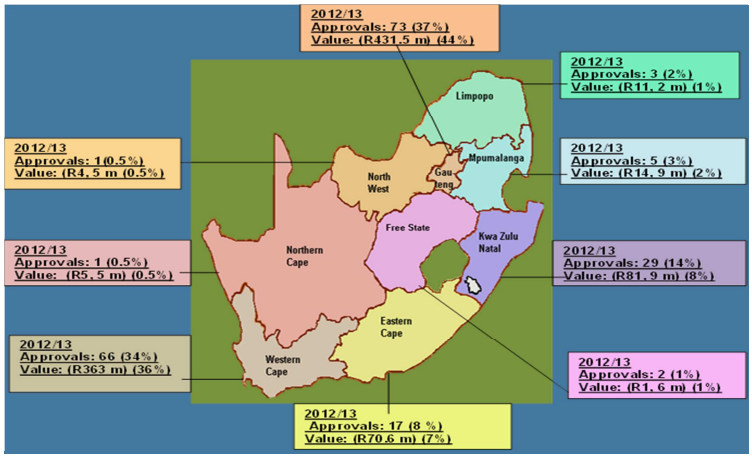
can only speculate that it was a pragmatic decision to define these priorities rather loosely as private sector lobby groups and other stakeholders wanted to ensure that a larger number of firms can benefit from government support. A more disaggregated distinction between specific activities within the sectors could be one option to establish clearer priorities.

The fact that the level of support for some sectors (e.g. automotive and textiles) is larger than for others and that the key action programmes consist of more specific activities that partially target only smaller parts of the sub-sector puts this overall assessment into perspective. In addition, as outlined in section 3 above, some of the transversal interventions do include sectoral aspects. Nevertheless, compared to other industrial policy packages in emerging economies, the South African IPAP overall does not stand out as a highly selective approach but is rather characterized by a significant scope of sectoral activities.

A more obvious challenge for selective industrial policy in South Africa relates to the implicit and (arguably) unintentional selectivity that some of the transversal interventions display. While most schemes are open to a wide range of manufacturing firms, they commonly exhibit strong sectoral and/or regional concentrations. In particular, they tend to re-enforce current structural configurations instead of triggering structural change dynamics.

As a case in point, despite its horizontal nature, MCEP has so far provided grants largely to the agro-processing and metals sectors which not only make up the lion's share of South Africa's manufacturing capacity but also account for more than 65% of all MCEP grants awarded in 2012/13 (cf. section 3.4.1 above). In terms of regional spread, the grants concentrate in the two strongest regions Gauteng and Western Cape that account for 80% of the grant values so far (figure 15). Hence, the MCEP scheme has most likely contributed to a prolongation of the sectoral and regional patterns of industrial production in the country instead of altering them.

Figure 15: MCEP applications approved from June 2012 to March 2013 by province



Source: IDAD 2013

While nothing is wrong with this situation per se, it is at least questionable whether the strategy behind MCEP considered or even anticipated these outcomes. However, even when assuming that this was not the case, the government cannot be made responsible for the unbalanced take-up of incentive schemes by the private sector on the one hand. On the other hand, it may opt to adapt its interventions on the basis of their take-up in a continuous policy experimentation process. In fact, the current plan of the dti to re-calibrate MCEP and other financing incentives and to strengthen

conditionality signals the relevance of this discussion. Hence, the remainder of this sub-section presents some options in this regard.

4.1.3 Ways forward

Acknowledging that the selectivity of the industrial incentive schemes in South Africa will continue to be of relevance for policy effectiveness, the recalibration of policy interventions could consider the following issues:

1. *Maximizing the additionality of incentives*

Whilst specific factor inputs (e.g. finance) may be a constraint for the manufacturing sector (or the whole economy) in general, they will naturally hinder some firms more than others. In order to maximize the impact of limited resources available for incentive schemes, it is worth considering how one can ensure that funds are prompting firms to make more innovative decisions rather than subsidizing investments that would have occurred even in the absence of an incentive.

With regard to the access to finance, for instance, one may argue that larger and more profitable firms with sizable capital reserves are generally more knowledgeable about how to access the necessary resources for growth. The fact that several of the South African incentives are comprised of matching grants increases the risk of lower additionality as there is an implicit bias towards firms with a higher income who can afford to share the cost of the investment. It is important to recognize this trade-off between securing the buy-in from firms through cost-sharing and (implicitly) excluding poorer firms who may be in greater need of the resources.

One guiding principle for selective interventions could hence be the “additional” benefit of the promoted activity to the economy. For this decision, it would be necessary to provide greater clarity on *where* markets are failing to provide factor inputs (e.g. industrial financing) more severely. The result could be a more targeted incentive package that strategically distinguishes between particular sectors, regions, or types of firms on the basis of actual needs.

2. *Targeting structural change objectives with incentives*

The selection of beneficiaries can go beyond additionality considerations. Governments can consider several alternative strategies for the targeting of their incentive schemes. In particular, a selectivity strategy could consider how firm level benefits can lead to broader sectoral/economic benefits. Bearing in mind that enhanced manufacturing competitiveness is the key objective of several industrial policy measures in South Africa, some options may be more appropriate than others.

While most existing incentive schemes in South Africa do not try to reach all manufacturing firms they also don’t make their selectivity strategy explicit. However, by the very fact that applications go through an adjudication process, there is selectivity occurring. Also, since a large number of firms will not receive funds from incentive schemes, it is important to keep the entire sector in mind when determining recipient’s as the spillover/competition effects can be either positive or negative (e.g. an unintended consolidation of the sector).

Instead of spreading incentives thinly, the government could provide a large amount of money to strategic sub-sectors and/or firms with the objective of changing the industrial structure of the economy. This approach would be riskier, but if priorities are chosen strategically there would be a higher chance of seeing a marked change in the long-term competitiveness of particular manufacturing activities which are best suited to drive the competitiveness of the whole manufacturing sector.

Unfortunately, international experiences with selective industrial policies do not provide a "one-size-fits-all" selectivity strategy for industrial upgrading. The "best" firms to target entirely depend upon the primary industrial policy objectives and the specific economic context. At least four (not mutually exclusive) alternatives could be considered:

(i) Focus on high technology sectors:
One potential selectivity strategy would be to focus on cutting-edge technology for companies in high-value-added, knowledge intensive and innovation-based sectors. This strategy is based on the assumption that technology intensive sectors are a key driver of industrial competitiveness in particular for middle-income countries and that introducing more sophisticated production processes will prompt sectoral upgrading which will ultimately enhance the nation's industrial performance.

(ii) *Established vs. emerging sectors*:
Based on the current set-up of several incentive schemes, the majority of funds are channeled to the main contributors to industrial output in the country (e.g. Metals and Agro-Processing in MCEP). While there is nothing wrong with supporting and upgrading your strongest sectors to make them more globally competitive, the strategy should be made explicit and trade-offs should be discussed. An alternative would be to focus on more dynamic, emerging sectors that offer higher growth prospects in the domestic, regional or world markets. This latter option, although riskier, has the potential for a high pay-off as these new sectors are likely to be high generators of value-addition and export if they succeed.

(iii) Maximize spillover effects:
Whenever there is selectivity in an industrial policy measure, the hope is that the beneficiary firms prompt a type of "catalytic effect", whereby the whole sector is positively influenced because of the targeted firms' changed behavior. When one firm increases its productivity, there can be a replication effect amongst their immediate competitors if they also have access to the necessary resources. This means that the introduction of new, cutting-edge technology or management system in one enterprise could diffuse to other enterprises in the same industry. However, in order to ensure these interactions, incentive schemes need to have mechanisms which encourage technology transfers and knowledge sharing that can lead to widely spread spillover effects. One possibility is to focus on upgrading "lead firms" who coordinate a large number of local suppliers and sub-contractors. Many large firms will already have mechanisms in place to upgrade the firms within their supply chain. Therefore, an upgrade in these lead firms could facilitate a "pulling up" effect, whereby the change in behavior in the lead firm leads to an upgrading all along the chain. Obviously, this strategy could partially conflict with the discussion on additionality.

(iv) Regional selectivity:
At present, the majority of industrial policy funds are concentrated in the two leading industrial regions (Gauteng & Western Cape). A regional selectivity strategy could potentially follow two contradicting visions. The first would be to target firms in the most industrially competitive regions because that is where the most innovation, replication and spill-overs occur (and therefore the most likely site for enhanced economic competitiveness). Alternatively, an agenda focused on increasing economic equality, employment generation and poverty alleviation in struggling areas of the country might prompt a government to focus on less competitive regions so as to increase enterprise activity across the country and support the development of new industrial hubs (cf. the discussion on new SEZs in section 3). Whilst this latter strategy is likely to maximize additionality, it is more of a strategy for the domestic economy and has certain limitations in terms of enhancing global industrial competitiveness.

This discussion highlights that industrial policy is fundamentally about making difficult strategic choices. The next section adds additional complexity to this question by considering the multi-dimensional target system.

4.2 Manufacturing and employment policies: the role of developmental linkages

4.2.1 Challenges

Albert Hirschman famously characterised the development process in the following terms: *" […] development is essentially the record of how one thing leads to another"* (Hirschman, 1981, p. 75). Manufacturing is linked to the other productive sectors through a bundle of different relationships:

- *Technological*: triggered by the distinctive capacity of manufacturing to 'transfer' technological change across sectors (in particular industrialisation of agriculture and resource-based industrialisation);

- *Demand/Consumption*: quantitative interdependencies across more or less complementary sectors (intermediate demand) and along vertically disintegrated sectors in global production networks (increasing complexity);

- *Fiscal*: related to the use of rents generated in the resource sector to develop industries which are either unrelated to the resource sector or only marginally related to it;

- *Employment*: related to direct, indirect and induced effects that different sectors may or may not have on the others and the rest of the economy as a whole.

These linkages are the main drivers of the processes of qualitative transformation and quantitative expansion of the productive structure of a country. A useful way to visualise developmental linkages is to think of a *matrix of intersectoral interdepencies*, that is a matrix defined by both supply side and demand side linkages among different sectors. Inside the matrix, production activities within the manufacturing sector are characterised by a comparatively higher density of inter-industry and inter-sectoral forward and backward linkages, albeit to different degrees. Now these intersectoral linkages are destined to change and "vary according to the particular phase of the

development process and as structural conditions and international circumstances change" (Kay, 2009, p. 116).

Despite these sectoral specificities which change in historical time, all sectoral activities persistently affect the rest of the economy through both direct and indirect linkages which accumulate in successive rounds of intersectoral expansion of the productive matrix. The existence of a 'symbiotic' evolution of intersectoral relationships between agriculture and manufacturing has found empirical support in various studies. For example, in the context of Malaysia, it has been shown how an expansion of manufacturing output (associated with a contraction of agricultural output in the short run) is also correlated with a process of agricultural expansion over the long run (Gemmell et al., 2000). Furthermore, the experience of highly industrialised countries such as Japan and U.S. (in which a comparatively higher multiplier effect for the agricultural sector is registered) demonstrates how agro-based industries can effectively emerge from the increasing exploitation of intersectoral synergies and complementarities (Andreoni, 2011). In sum, these studies confirm the idea that structural change does not simply imply a process of *sectoral transition* but also one of *sectoral deepening* (that is, a technological transformation of production processes performed in each sector) and *intersectoral deepening* (that is, an unfolding of increasingly denser linkages between related production activities and sectors).

While at initial stages of development linkages between resources and agriculture on one side and manufacturing on the other are central, throughout their transformation path, countries tend to experience an increasing intensification of manufacturing-services linkages. The bundle of interactions that connects manufacturing and services becomes increasingly dense, given the *outsourcing* of services activities from manufacturing firms to services providers but also the changing *technological linkages* between manufacturing and services (in particular production-related services).

From the perspective of the original employer, through outsourcing the employment relationship 'is replaced by a commercial relationship with a service provider' (Tregenna, 2010b, p. 1431). This phenomenon may be driven by companies' need to concentrate on a limited number of core competencies. However, the possibility of establishing a commercial relationship also allows firms to increase their flexibility, to manage the risks associated with employment and, sometimes, to circumvent labour legislation. In developing countries, the reallocation of employment from manufacturing to services may also impact the degree of informalisation of the economy. In fact, as observed by Tregenna (2010, p.1454): 'Service-providing firms, to which activities previously located in manufacturing have been outsourced, are likely to be disproportionately located in the informal sectors'.

The existence of strong technological linkages and interdependencies between manufacturing and services is something that was originally revealed by input-output analysis performed by Park and Chan (1989). Park and Chan's empirical analysis conducted on 26 countries selected in the UNIDO database confirmed Hirschman's intuition that the manufacturing sector has larger multiplier effects than do services. Specifically, it tends to generate a two to three- fold greater output impact on the economy because of the denser backward and forward linkages formed within and around it. Reflecting the clear driving role of manufacturing industries, the results highlighted how "the evolution of the intersectoral relationship between services and manufacturing in the course of development is symbiotic, in the sense that the growth of the service sector depends not only on that of the manufacturing sector, but also structural change of the former is bound to affect that of the

latter" (Park and Chan, 1989, p. 212). Precisely these results have been recently confirmed by Guerrieri and Meliciani (2005). Their analysis has shown that a country's capacity to develop its services sector depends on the specific structural/technological composition of its manufacturing sector. This is because different manufacturing industries require different producer services and tend to use them with different degrees of intensity. Their analysis also highlights how the cumulative expansion of services can follow both inter- and intra- sectoral patterns as the same service producers are also intensive users of these producer services.

Park and Chan found also evidence of the 'catalytic role' that industry could play in fostering employment opportunities in the services sector (the *indirect employment effect*) and of the fact that "as the industrial base broadens and becomes more integrated, both horizontally and vertically, the employment impact of industrial activities should also increase substantially" (Park & Chan, 1989, p. 201). Empirical studies in regional income and employment multiplier analysis (Stewart & Streeten, 1971) had previously shown using input-output techniques that the "the *direct* employment effect of industrial investment is small relative to its *indirect* effects resulting from the interindustry purchases of inputs and income induced effects of private consumption".

These input-output analyses have provided evidence of the fact that not only does labour-intensity vary widely across sectors (*direct labour absorbing capacity*), but also that employment in a given sector is linked to other sectors of the economy which may or may not be labour-intensive (*indirect labour absorbing capacity*). This implies that while a certain sector (say medium-high tech manufacturing), given its structural and technological characteristics might show a relatively low direct labour absorbing capacity, it might indirectly absorb labour by buying from other sectors with high labour absorbing capacity. While the direct employment absorption of sectors is generally captured by labour intensity ratios such as labour-capital ratio or labour-value added ratio, employment multipliers are broader measures of labour intensity which allow factoring in indirect employment absorption dynamics.

4.2.2 The challenge of employment creation through industrial policy in South Africa

The earlier sections of this paper highlighted the strong emphasize that South African economic policy in general and industrial policy in particular put on employment creation. This issue obviously also features in the main incentive schemes. For example, the language surrounding the MCEP and other financial incentives places the objective of enhanced manufacturing competitiveness as complementary with employment retention/creation. The SEZ programme and the public procurement initiative also explicitly refer to employment effects. However, while the IPAP prioritized sub-sectors on the basis of their employment multipliers (cf. section 3 above), the individual policy interventions are largely concerned with direct employment effects (i.e. headcounts in recipient firms).

While industrial competitiveness and employment usually go hand in hand on the *macro-level* in the *long-term*, it is important to recognize that different types of innovation or upgrading will have different employment effects on the *firm level* in the *short-term*. For example, in the short-term, enhanced firm level competitiveness in many cases requires reduced levels of employment, especially if firms are focusing on process upgrading (e.g. increasing efficiency by introducing new technology or production systems that require less manual labour for the same level of output).

Some of South Africa's current financial incentive schemes that focus on capital expenditure to increase manufacturing capacity almost by definition increase the capital-intensity of production and hence are likely to reduce the labour-value added ratio (direct employment effect). However, if industrial competitiveness is increased in a sustainable way as a result of the intervention, employment multipliers are likely to remain positive because of indirect employment effects. The difficult question is how the implementation of incentive schemes can be aligned to these dynamics.

To illustrate this difficulty, the current MCEP requires that beneficiaries maintain their employment levels and measures employment effects on the recipient firm level during the duration of MCEP. Now, for instance, equipment upgrading may lead to a decline in employment in the short run due to productivity improvements at the firm level or consolidation processes at the industry level. However, these may be necessary developments for the firm (or sector) to increase production and sales in the medium-term and subsequently employ additional staff in the long-term. This may also strengthen linkages with other sectors that come with additional indirect employment effects. However, a reduction of direct employment of grant recipients is currently not allowed in the MCEP.

4.2.3 Ways forward

While most proponents of industrial policy would argue that an intervention which increases competitiveness will also lead to sustained employment eventually, it is not straightforward to prove this point. Arguably, one way to escape this challenge is through a more precise definition and subsequent measurement of the anticipated employment effects of industrial policy interventions. First of all, it should be made explicit whether there is an employment retention target or an employment creation target. Second of all, targets may differ significantly in terms of their scope and time horizon which should be reflected in the underlying measurement approach. Building on the example of financial incentives for capital expenditure introduced above, several options to define and measure the anticipated employment effect could be considered:

(i) 'Recipients have not reduced employment level during the programme'
This option is compatible with the idea that recipient firms are not allowed to reduce their employment levels during the timeframe of an intervention and employment retention may hence be defined as the total number of baseline jobs of recipient firms (cf. IDAD 2013). It has to be acknowledged that this option does not consider the absolute employment effects of an intervention (beyond recipient firms) and neither the longer-term effects (beyond the duration of the programme) and hence delivers only a (partial) measurement of the direct employment impact of industrial policy measures.

(ii) 'Total number of jobs in manufacturing sector is retained during programme'
This option would require the measurement of the total number of jobs in the manufacturing sector (ideally by sub-sectors) beyond recipient firms. It would allow some judgment on the competition effects of an intervention as far as employment retention is concerned. If combined with a comparison group approach, it can also help to provide some insights into short-term causality ('*were the jobs really retained because of the intervention or because of other factors?*'). It does however not consider the longer-term effects beyond the duration of the intervention (e.g. '*was the termination of jobs prevented or 'only' postponed by the intervention?*')

(iii) '*The largest possible number of sustainable, competitive jobs in manufacturing is retained in the long-run'*

This objective is significantly more ambitious and is based on the belief that an industrial policy intervention can only safeguard employment in a sustainable way if it manages to lift the real constraints that inhibit firm persistence and growth (i.e. a lack of competitiveness). Interventions would hence primarily aim at ensuring that firms (and accordingly a large number of jobs within these firms) can continue to exist or pursue sustainable growth as a direct effect of the intervention. The '*number of sustainable jobs retained*' would only include jobs which would have been lost if the firm's competitiveness had remained insufficient or worsened without receiving support. Measurements would need to consider the change in employment numbers of recipients and non-recipients in a comparative way (ideally with a control group) over a period that is significantly longer than the intervention. In a nutshell, this option would allow measuring how many 'jobs at risk' were safeguarded by industrial policy in a lasting way.

(iv) 'Manufacturing has increased employment multiplier (through inter-sectoral linkages)'

In a nutshell, the employment multiplier measures the amount of direct, indirect and induced jobs created (or lost) in a sector. It was argued above that manufacturing mainly impacts employment through inter-sectoral linkages rather than the creation of large numbers of direct jobs within the manufacturing sector per se. In particular in middle income countries, the total number of manufacturing jobs is at best likely to stay more or less constant rather than to grow rapidly, while the *total number of indirect jobs* could potentially multiply with the help of a more competitive manufacturing sector. Hence, one may consider the alternative of accounting for the linkage effects of manufacturing firms more prominently rather than highlighting only the number of direct manufacturing jobs. On the one hand, the implementation of this option would require significant additional efforts for measurement. On the other hand, if implemented successfully it certainly increases transparency and hence offers significant opportunities for policy learning and effectiveness.

Depending on which option is considered as the employment objective of industrial policy, differences in sectoral dynamics can also be used to define selectivity strategies (and ultimately to introduce greater levels of conditionality) in incentive schemes in addition to the ideas outlined above in section 4.1. While the IPAP 2012/13 ventured into the direction of using relative employment multipliers to define priority sectors, specific interventions do not yet apply this methodology for making strategic choices on firms and/or sectors.

4.3 Policy process and inter-institutional coordination: effective implementation through policy learning

4.3.1 Challenges

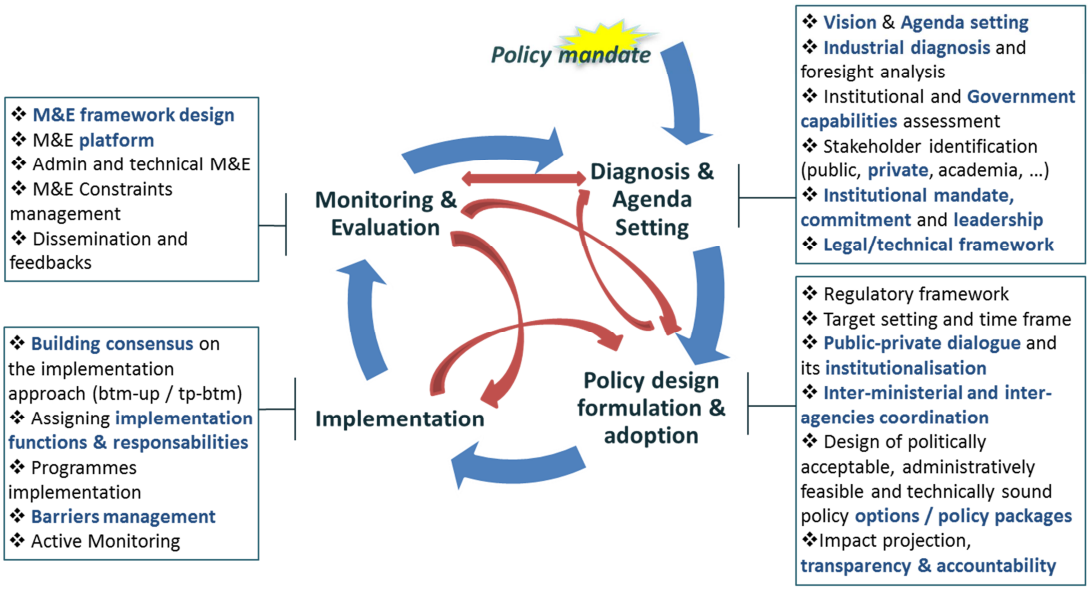
Industrial policy measures that are theoretically sound can also fail because of various types of 'government failure', owning to lack of political commitment, 'capture' by interest groups, lack of bureaucratic capabilities, and other reasons. Therefore, we need to understand why some attempts succeed and others fail and think of ways to maximise the chance of success and minimise the

chance of failure. The industrial policy literature since the 1980s has always highlighted the implementation issues, but these issues have been getting renewed attention and more refined discussions in the more recent literature (Chang, 2011; OECD, 2013; Andreoni, 2013c).

Firstly, it was stressed how "Success in industrial policy formulation depends not only on the proper choice of policy measures but also, more fundamentally, on policy procedure and organization from which good policies are produced and executed" (Ohno 2011). The policy-making process has been defined as a process through which governments translate their political vision into specific policy solutions, the latter being specific programmes and actions implemented through a set of coordinated procedures and operations (Birkland, 2005).

In developing countries, a policy idea/concept finds severe constraints and bottlenecks at each stage of the policy process and, as a result, may not get beyond mere discussions or general definitions. To overcome such limitations, scholars and policy makers have increasingly stressed the importance of designing the industrial policy making process within a *learning model framework* (see Figure 16). This more practice-based model stresses the importance of multiple loops and feedbacks throughout the policy making process. Although this model represents a first step towards a more practice oriented approach in the analysis of industrial policy making, each stage presents unique context-specific challenges. The following figure shows these loops connecting the different stages of the policy process and, for each of them, a number of critical action/policy functions have been reported.

Figure 16: Policy making process: Learning model



Source: Andreoni, 2013c

Overall, the effectiveness of the industrial policy-making process, as well as its *ownership*, *quality* and *speed* critically depends on three sets of factors: government capabilities, inter-istitutional coordination and embeddedness.

(i) Government capabilities

The capabilities of the organisations implementing industrial policy matter. Not only the relevant government ministries and public agencies but also the private sector agencies needed in actually implementing some of the policy measures (e.g., employers' association, industry associations, trade unions) need to have adequate policy capabilities. This requires staffing these organisations with individuals with appropriate skills and experiences. Moreover, capabilities are not just those possessed by the individuals working in those organisations. Organisations themselves possess capabilities in the forms of particular command structure, institutional routines, and organisational 'memories' (e.g., past records). Of course, the difficulty is that it takes time and investments to build up these capabilities and coherences, although they are not as difficult to build up as many critics of industrial policy would like us to believe (see Chang, 2011).

(ii) Inter-ministerial and inter-agencies coordination

Not only the capabilities of but also the interactions between the organisations implementing industrial policy are important. The relevant bodies (public and private) need to have good working relationships with each other. They also need some mechanisms to coordinate their actions, whether through some intellectual exercises (e.g., indicative planning, foresight exercise) or through organisational structures that makes coordination easier (e.g., some coordinating super-ministry, such as France's Planning Commission or Korea's Economic Planning Board [EPB]).

(iii) Embeddedness: Institutionalisation of government-business interactions

The relationship between the government and the industrial capitalist class (or the professional managers who represent them) matters. Experiences show the importance of continuous dialogue and exchange of information between the two, if the policies are going to be well informed and relevant. However, it is also important that the government does not get beholden to particular industrial interests and thus avoid the danger of 'capture'. Peter Evans (1995), the eminent American sociologist, has captured this point beautifully in his notion of 'embedded autonomy', which means that the government needs to have roots in the society ('embeddedness') but also has to have its own will and power ('autonomy') in order to be effective in its intervention. Autonomy without embeddedness can create a state that imposes an 'inorganic' vision on the society through force, while embeddedness without autonomy means that the state is turned into Marx's executive committee of the bourgeoisie.

4.3.2 Challenges in the industrial policy process in South Africa

This paper has provided a number of insights into the advanced industrial policy approach that is evidently emerging in South Africa recently. In addition to the design and deployment of a large range of interventions, the government has also put a premium on following a modern industrial policy process with the aim of increasing the effectiveness of its efforts. The most recent iterations of IPAP provide interesting evidence on this. Compared to other countries in the region, the process involves a comparatively larger number of actors with more significant stakes in industrial development.

Industrial policy often remains the sole mandate of the Ministries of Industry in developing countries, which in many cases are not considered key players in the cabinet and more often than not fail to raise significant budgets to support industrial policy interventions. The analysis of this paper has shown that the situation is different in South Africa. The budget for Industry and Trade is significant and expanding further. Major interventions are financed fully and rolled out at large scale. The national development plans and other Ministries acknowledge the relevance of industrial policy as a key driver of the structural transformation agenda of the country and participate actively in the design and implementation of policy measures.

With regard to the design and implementation of specific incentive schemes, a number of key players are regularly involved. Table 16 provides a summary of their general expectations, contributions and coordination issues. It is evident that the expectations of the individual stakeholders diverge to some extent, given their level of involvement in the process as well as their specific contributions. However, one issue seems to largely align the stakeholders: the focus on results (or: the impact of interventions). The description of industrial policy interventions in the IPAP, in the budget estimate from National Treasury, in IDAD's incentive performance reports, in IDC's annual report as well as in private sector statements converge on the idea that policy effectiveness is crucial. This sends the signal that the remaining differences in expectations and coordination challenges could be overcome through a transparent process of evidence-based policy learning.

Table 16: Main stakeholders for industrial policy incentive schemes in South Africa

Stakeholder	Expectations from IP interventions	Possible Contributions	Possible actions for coordination
Key			
Treasury	- Good value for money - Visible improvement in competiveness of SA industry - Dispersal of funds - Impact assessment	- Funds - Guidance on budgeting	- Effective communication on results - Manage expectations
The dti Minister & DG	- Visible improvements in competitiveness of South Africa - Job retention in assisted firms	- Publicity campaigns - Political buy-in / support from high levels (cabinet, parliament, etc.)	- More effective / systematic upward communication of strategies and results
IDD (Industrial Policy Development Division)	- Visible improvements in competitiveness and jobs creation in South Africa (at the firm, aggregate and sector levels)	- Information and feedback on sectoral analytical work and strategic priorities	- Deliver results / lessons learned / evaluation results from implementation perspective
IDAD (Incentives Administration Division)	- Efficient implementation of incentive schemes - Visible improvements in competitiveness of SA - Job retention in assisted firms	- Responsibility for implementation - Guidance on feasibility of implementation of new strategies/policies	- Coordination of implementation guidelines - Provision of IT system for timely communication of implementation data
BBBEE	- Economic transformation through empowerment of black community	- Intelligence on economic transformation (e.g. BEE objectives & monitoring)	- Joint development of systematic way of implementing new codes in incentive schemes

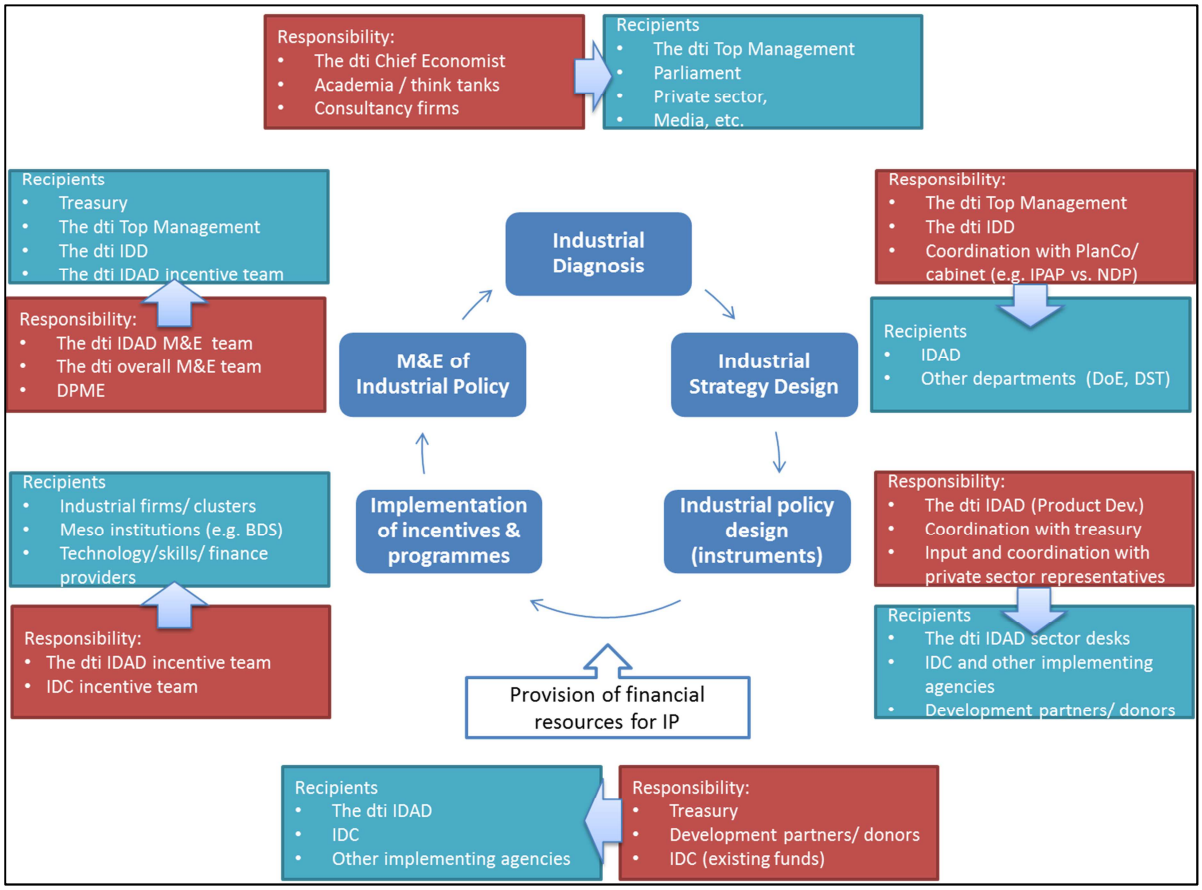
Stakeholder	Expectations from IP interventions	Possible Contributions	Possible actions for coordination
Beneficiary Companies	- Incentives, e.g. cost-sharing grants (mostly for capital expenditure) - Improved turn-around times - Business Development Services	- Feedback on incentive schemes (structure, relevance, effectiveness, etc.) - Provision of monitoring data, especially as regards capital expenditure, profits and employment	- Expectations management for firms
Primary			
Export Council & Manufacturing Circle, etc.	- Members benefit from incentives - Access to new markets	- Improve outreach - Expertise at design / adjudication phase - Media publicity - Access to own research findings on industry	- Discussions on effectiveness of incentive schemes - Management of expectations
IDC	- Reduced risk of investment projects through cost-sharing	- Use incentives (e.g. grants) to leverage on loans thus strengthening financial system	- Information sharing and coordination of trade-off between grants and loans
Private Banks	- Reduced risk of investment projects through cost-sharing	- Use grants to leverage on loans thus strengthening financial system - Factual finding report on clients financial situation	- Dialogue on how the role of banks could be enhanced in incentive schemes
BDS Consultants	- Reduced turnaround times for delivery of grants - Service fees charged for successful applications	- Outreach to fellow firms who may be eligible or otherwise appropriate for grants and increasing competitiveness	- Reconsider strong role of BDS Consultants in incentives publicity work
Other stakeholders include: **NCPC**, **SSA**, **DPME**, **Portfolio Committee for Trade and Industry, etc.**			

Source: Authors on the basis of expert discussions about the MCEP scheming

The organization of this experimentation and learning cycle matters significantly for policy effectiveness. In order to map the concrete strategy-setting and implementation structures for the industrial policy process in South Africa, one can apply the policy cycle sketched out above. Figure 17 summarizes the responsibilities and interactions among the main stakeholders at each stage of the policy cyle. It becomes evident, that several institutions have to work together closely in each stage of the process. This means that visions have to be aligned, synergies between the respective areas of expertise have to be generated and a practical division of labor has to be implemented.

One critical aspect of the cycle is the provision of financial resources, which one could describe as the propellant of industrial policy implementation and learning. At this stage it is critical to understand the role of the funding sources, including the National Treasury, development partners as well as the industrial financing institutions. Clearly, these institutions are not only responsible to provide the funding for IP, they are also recipients of feedback on the effectiveness of interventions which are being implemented. In this sense, the industrial policy M&E function plays a crucial role, as the generated evidence acts as a foundation for the design and roll-out of new (or re-calibrated) interventions in the next planning and funding cycle.

Figure 17: Responsibilities and stakeholder interactions in South Africa's Industrial Policy



Source: Authors

The current institutional set-up for M&E of industrial policy in South Africa is indeed fairly advanced and comprises of several layers. Monitoring and evaluation is done on the level of:

1) specific programmes or interventions (within IDAD);
2) the overall industrial policy mix of IPAP (within IDD) as well as;
3) the overarching national level for key incentive schemes (through DPME).

However, as far as the M&E approaches are concerned, some room for coordination and alignment still exists. This is particularly clear with the regard to the focus of M&E efforts, which in some cases focus more on measuring the effective provision of inputs, activities and outputs, rather than assessing concrete outcomes of interventions and industrial policy impacts. In addition, the target system for evaluations, in particular the indicators used for outcome and impact level objectives, are not fully aligned yet.

However, the South African government acknowledges that using M&E for evidence-based Industrial Policy experiments is important. In particular, a strategic approach to M&E can help to trace effects of policies; assess effectiveness of policies; identify critical factors for effectiveness; identify external factors (and their impact); identify unintended/side effects; provide feedback for adjustments;

Hence, ultimately, M&E can help to increase policy effectiveness. The following statement by Minister Davies in the IPAP 2013/14-2016/17 illustrates this approach well:

> "*…much has been achieved over the recent past, even as we reiterate that much more remains to be done. Our approach to the complex and demanding work that lies ahead is embodied in the principles of continuous improvement and learning-by-doing, which underpin the overall effort of the Department of Trade and Industry (the dti)*".

Further emphasizing its commitment to effective policy learning and adaptation, the government is currently also trying to advance its approach to industrial policy further in the area of impact-level monitoring and evaluation for its incentive schemes. In a joint project with UNIDO, the objective of the dti is to "*develop a monitoring, evaluation and impact assessment methodology for the MCEP, benchmarked against best practice in other comparable countries. It is hoped that this methodology will provide a useful basis from which other dti incentives can also be assessed.*" (DTI 2014).

These initiatives show that South Africa is on its way to enhance the effectiveness of its industrial policy process further. The remainder of this section will summarize some considerations that could guide this adaptation and learning process in the area of M&E.

4.3.3 Ways forward: Policy learning: towards a developmental M&E framework for South Africa

Monitoring and evaluation are government functions that are increasingly acquiring a central role in the industrial policy process. This is because they allow better understanding of industrial dynamics and related policy effects and, as a result, strengthen policy responsiveness and governments' capacity to align policies over time. Most evaluations of industrial policy measures that were executed either by the implementing parties, by evaluation departments or by the academic community have to be interpreted with great caution.

Firstly, in the majority of cases, the instruments were purposefully designed to affect a certain set of policy objectives. The specific targets of the interventions were sometimes more generic, e.g. economic growth and employment generation, and sometimes more specific, e.g. increased value addition, technological upgrading, diversification, enhanced exports or import substitution. In some cases, the desired outcomes were not only verbalized but also concretized in terms of clear target values for selected indicators. However, in the vast majority of cases, the ex-ante justification of the policy instruments was not complemented by an ex-post evaluation of the achieved results in terms of their impact on the targeted objectives. This lack of impact evaluations of implemented industrial policy measures is a key constraint for a comprehensive and comparative appraisal of their future potential for success, their applicability in certain countries or sectors as well as their effectiveness towards the achievement of industrial employment and/or growth objectives.

Secondly, many available evaluations were not performed in a sufficiently thorough way and hence an assessment of their internal validity suggests that in many evaluations, causal relationships between policy instruments and observable impacts are difficult to establish. In the ideal case, in order to obtain an unbiased estimate of a true causal effect of a policy measure, it is essential to execute a thorough design-based study[5] that considers confounding factors, includes a so-called control group and avoids selection biases as well as under- and overestimation of results.

Thirdly, the findings on the achievements and/or failures of industrial policy instruments that can be distilled from international experiences cannot that easily be generalized because of country heterogeneity. While it is the main concern of industrial policy makers in developing countries to be informed whether they could expect similar results when they emulate the same policy instrument which succeeded in the past in a different country, it is unfortunately not possible to provide a general answer to this question. In fact, judging whether a certain policy instrument is appropriate in a specific country context requires a careful case-by case assessment, making a deterministic approach to the selection of suitable industrial policy instruments neither feasible nor promising. In a nutshell, a comparison of industrial policy instruments cannot aim at the definition of a 'silver bullet' as no policy instrument is the dominant solution for all challenges in all countries at all times. Still, as a rule-of-thumb one can suggest that the more comparable the two countries under consideration (in terms of development stage, country specific factors, evident challenges, etc.), the more likely comparable results can be expected.

[5] We refer to impact evaluations that either use a randomized control trials (RCT) or a credible non-experimental design as *design-based studies*, which should be distinguished from so-called *observational studies.*

Fourthly, many evaluation exercises often underestimate critical design/implementation factors that strongly affect policy effectiveness. As a result, when those policies which have been positively evaluated are implemented in other contexts, governments tend to adopt policies blindly. This means that very often governments treat policy instruments as 'perfect substitute' and 'transferable'. Often this lack of knowledge about differences in the design, implementation and institutional settings supporting certain loan schemes (e.g. ZIM in Germany) or hybrid forms of public procurement (e.g. SBIR in US) may undermine their effectiveness in other contexts and, as a result, discourage other governments' industrial policy efforts.

Finally, single instrument discrete interventions can induce unexpected and unintended outcomes, especially when they interact with other policy instruments. As soon as a number of 'hidden policy treatments' are factored in the same idea that single instrument discrete interventions can be evaluated 'in isolation' becomes questionable. Evaluations of single instrument discrete interventions have been mainly focused on relatively simpler policies, such as R&D grants, R&D tax incentives, access to capitals for SMEs' innovation, etc. This 'evaluation bias' was determined by the fact that these policies can be more easily evaluated with rigorous state of the art quantitative techniques. However, this evaluation bias towards relatively simpler policies for which causational relationships and sequential causality are better understood, may induce 'policy biases'. Namely, governments may be induced to adopt only those single instrument discrete interventions for which evidence has been collected, while overlooking more 'difficult to evaluate' policies such as intermediate R&D institutions building and technology infrastructures development. Although the emerging emphasis that national and supranational governments are giving to system- level industrial policies, rigorous and systematic evaluations of industrial policy packages at the sectoral, cluster and system levels remain scattered and very problematic.

Essentially, impact evaluation is about generating evidence on which industrial policy measures work (and which do not) in a specific context. In that sense, probably the most important role of industrial policy monitoring and evaluation in developing countries is to provide feedback for making the next cycle of policy design and adaptation of existing instruments more innovative and effective. In that sense, industrial policy makers in developing countries would be well advised to gradually shift their attention from the investigation and imitation of international best practices to the identification and reproduction of national success stories.

In principle, this leads us to the recommendation that every industrial policy intervention should be evaluated ex post. Especially in contexts characterized by serious budget limitations and the resulting need for prioritization, it is essential to know whether the policy intervention was effective and whether the resulting benefits outweigh the associated public cost. However, while this approach is finding more and more support in the academic (and donor) community, policy practitioners encounter at least two political challenges:

1. Evaluations, in particular the more sophisticated ones that include design-based studies, do not come for free and hence reduce the available budgets for the implementation of the policy instruments. Hence, especially relatively small interventions do not seem to lend themselves to comprehensive M&E approaches.

2. Evaluations can reveal inherent flaws, limitations and even adverse consequences of industrial policy interventions. In almost all cases this implies a serious political cost. Hence, full-fledged evaluations are frequently perceived as a threat, in particular for larger interventions that usually coincide with ambitious political rhetoric and wide-ranging public interest.

However, both concerns above could possibly be resolved at least partially with the help of a more nuanced and pragmatic approach to industrial policy experimentation and evaluation. While full-fledged design-based studies and experimental designs are not always a feasible option, their distinctive logic can and should at least be incorporated in the industrial policy decision making process, even if a final evaluation cannot be incorporated. The point here is that there are possibilities to design policy instruments as if they were experiments, without actually executing them as such. In particular, policy interventions can and should come with a clearly formulated and realistic intervention logic or theory-of-change. At the very least, this would entail:

- A clear definition of a target system which concretizes the objectives (including trade-offs between different objectives) that the policy instrument is aiming to have an impact on in the longer-term (e.g. increased employment and/or economic growth, etc.).
- Realistic target corridors for judging success or failure with regard to each objective ideally based on real-world benchmarks (e.g. minimum and maximum expected increase in employment rate, based on prior achievements in the country or elsewhere).
- An explicit impact model with a comprehensive depiction of the short- and medium-term changes in the industrial sectors (on the firm as well as sectoral level) that are needed to reach these long-term targets (e.g. required average new investments of manufacturing firms and structural changes in the production activities of firms).
- A detailed description of the steps required for reaching each of these goals (impact paths), including a critical examination whether it is realistic to expect to reach the goal with the time and resources available.
- An account of possible unintended impacts and side-effects of the policy instrument (risk factors), for example based on consultations of experts, affected stakeholders, etc. before the implementation of the intervention.
- An honest description of the assumed counterfactual situation (i.e. the hypothetical situation in absence of any policy intervention). For instance, one has to answer a question of the following type: What would the employment rate have been if the government would have not subsidized wages in the manufacturing sector?
- The selection of concrete impact indicators which can be used to measure change both “on the way” (intermediate indicators) and with regard to the end-objective (final indicators).

Obviously, this process does not necessarily guarantee an ex-post scientific evidence of the causal effect of the policy instrument, which unquestionably is the main objective of an evaluation from the perspective of the academic and the donor community. However, it does at least ensure that interventions are discussed and designed in a reflexive way and that stakeholders are well aware of what is expected from them both in terms of actions and achievements. If this process is combined with less sophisticated and less costly (non-

experimental) monitoring and evaluation designs, e.g. reflexive comparisons and qualitative approaches[6], industrial policy interventions are likely to be a lot more evidence-based, consensual and transparent and hence eventually also more effective, without overburdening the (technical and budgetary) capacities of developing countries and without disrupting political imperatives.

5. Concluding remarks

To be completed

[6] Reflexive comparison is a non-experimental design, where the ex-ante baseline provides the comparison group, while qualitative approaches take the perceptions of the target population (e.g. firms) and/or other key informants with regard to the observed changes into account.

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