Varieties of Industrial Policy: Models, Packages and Institutions

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Background.1 : Industrial Policy

• There is actually no universally agreed definition of the term.

• The most literal interpretation includes any policy that affects industry (usually interpreted as the manufacturing industry), in the same way in which we would define fiscal policy as policy that affects government revenue and spending, and monetary policy as policy that affects monetary variables.

• We define industrial policy to mean ‘selective’ industrial policy, ‘sectoral industrial policy’ or ‘targeting’ – namely, a policy that deliberately favours particular industries/sectors (or even firms) over others, against market signals, usually (but not necessarily) to enhance efficiency and promote productivity growth, for the whole economy as well as for the targeted industries themselves (Chang and Andreoni).
Selective industrial policy

Many people believe that industrial policy should be of:

• general (or functional or horizontal) kind, rather than of selective (or sectoral or vertical) kind = should focus on ‘public goods’ that benefit all industries equally but are likely to be under-provided by the market

e.g., education, research and development (R&D), and infrastructure – and not involve ‘picking winners’.

• In a world with scarce resources, every policy choice you make, however general the policy involved may look, has discriminatory effects that amount to implicit targeting.
Background.2: Industrial policy variety

...and complexity

- Governance models
- Levels of interventions (firms, sectors, manufacturing systems, macro)
- Mix of instruments supporting different policy domains (both S – D)
- Multiple social, economic and environmental goals (and potential trade-offs among them)
- Multiple institutional solutions for policy implementation and enforcement
Background.3 : Industrial Policy Learning

Learning how to navigate this variety and complexity to

• expand the **policy imagination** (**opportunities for transfer and imitation**)  

• realise how policy ‘effectiveness is **context specific** – structural, institutional and political settlement (**need for adaptation and improvement**)  

• Realise how ‘**effectiveness is in the details**’ (**attention for institutional and policy design, but also implementation and governance models**)  

• improve the **effectiveness** of industrial policy packages **by improving their coherence** (**need for prioritisation, trade-offs management and policy alignment**)
Outline
Varieties of Industrial Policy: Models, Packages and Institutions

1. Recognising and **understanding the variety** of industrial policy experiences and its origins

2. Mapping industrial **policy models and packages** and their cyclical changes, beyond discreet policy intervention analyses
   - Policy **governance coordination**
   - Policy **measures alignment** (and synchronisation)
   - **Institutional solutions** for policy implementation (and enforcement)

3. Focusing on **emerging focal policy domains** and benchmarking the South Africa experience against international comparators

1. Recognising and **understanding the variety** of industrial policy experiences and its origins

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Recognising and understanding the variety of industrial policy experiences and its origins

Four interdependent factors are responsible for countries’ industrial policy variety

1. **Structural transformations** *across* and *within* national manufacturing systems posing new industrial challenges and constraints but also value creation and capture opportunities

2. **Institutional settings and policy models** allowing for different policy design, implementation and enforcement mechanisms (policy quality and coherence)

3. **Political settlements and political economy issues** within and across countries

4. **The industrial policy discourse** (policy rationales and policy space) within academia and governments
Recognising and understanding the variety of industrial policy experiences and its origins

**Structural transformations**

- Processes of value creation and national value capture are changing
  
  1. Value is **nested** in specific production tasks, across and beyond sectors
  2. Value is **created** through the combination/recombination of increasingly complex technology systems and platforms (also production technologies & competencies)
  3. Value is **captured** by major companies (ecosystem drivers) commanding critical stages of sectoral value chains

- Technological Innovation dynamics are also changing
  
  1. Platform technologies
  2. Enabling Technologies
  3. Scaling-up manufacturing competences
  4. Cross-sectoral technology innovations …
Recognising and understanding the variety of industrial policy experiences and its origins

Institutional settings and policy models

Institutional settings vary significantly and co-evolve with changes in countries’ industrial structures: different combinations of various public, semi-public and private institutions (e.g. government agencies and departments, development banks, intermediate R&D institutions, industry associations and chambers of commerce).

- Each of these institutions can take different forms and perform a plurality of functions affecting industries.

The policy model – i.e. the way in which industrial policy measures or initiatives are designed, implemented and enforced may vary:

- Top-down / centralised
- Bottom-up / decentralised
- Mixed / multi-layered system
Recognising and understanding the variety of industrial policy experiences and its origins

Political settlement (Khan, 2001)

Political settlements – the distribution of power and interests among productive (and non-productive) organisations in the economy

- Determining firms capacity to capture rents (subsidies and other forms of financial support, but also access to markets and public procurement)

- Distribution of interests and power across sectors (finance vs industry) but also within sectors (different industries) and within different firms in the same value chain (rents chains)
Recognising and understanding the variety of industrial policy experiences and its origins

**Industrial policy discourse: changes in rationales**

- **Market failures** (Horizontal policies)
  - Incomplete information
  - Imperfect markets
  - Asymmetric information
  - Agglomeration/localised externalities
  - Externalities in learning & discovery

- **Capital market imperfections**
  - Information externalities
  - Public goods (infrastructures)
  - Knowledge gap & transfer failures
  - Industrial commons (collective capabilities)

- **Structural coordination problems** (Selective policies)
  - Interdependences between competing activities
  - Capabilities development (infant industry/conditionality)
  - Transition problems
  - Lock-in problems
  - Interdependences among complementary activities
  - Quasi-public good technologies
  - F/Inf Rules & incentives (lack of congruence)
  - Institutional system failures

- **Learning and System failures** (Smart policies)
  - Imperfect information
  - Imperfect risk markets
  - Agglomeration/localised externalities
  - Externalities in learning & discovery
  - Industrial commons (collective capabilities)
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Industrial policy as a “package of interactive measures” (Stiglitz, 1996)

“...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).” (Chang, 2009)
Industrial policy package matrix

Policy measures targeting different policy areas
## Industrial policy package matrix

<table>
<thead>
<tr>
<th>Policy linkage</th>
<th>Regional/State</th>
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<tbody>
<tr>
<td></td>
<td>Manufacturing sectors</td>
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<td>Manufacturing system</td>
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<td>Industrial system</td>
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<td>National/Federal</td>
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<td>Manufacturing sectors</td>
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<td>Manufacturing system</td>
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<td>Industrial system</td>
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<td>Macroeconomic framework</td>
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### INDUSTRIAL POLICY PACKAGES

<table>
<thead>
<tr>
<th></th>
<th>Supply side</th>
<th>Demand side</th>
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</thead>
<tbody>
<tr>
<td>Innovation and Technology infrastructure</td>
<td>Higher education and workers training</td>
<td>Production capacity and advanced mfg operations</td>
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### POLICY MODEL & LEVELS OF POLICY ACTIONS

<table>
<thead>
<tr>
<th>Active Policy measure</th>
<th>Non active Policy measure</th>
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<tbody>
<tr>
<td>Regional/State</td>
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<td>Manufacturing sectors</td>
<td>Manufacturing sectors</td>
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<td>Manufacturing system</td>
<td>Manufacturing system</td>
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<tr>
<td>Industrial system</td>
<td>Industrial system</td>
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### Policy Linkage

1. Manufacturing sectors to Manufacturing sectors
2. Manufacturing sectors to Manufacturing system
3. Manufacturing system to Industrial system
4. Manufacturing sectors to Manufacturing system
5. Manufacturing sectors to Industrial system
6. Manufacturing sectors to Manufacturing sectors
7. Manufacturing sectors to Manufacturing sectors
8. Manufacturing sectors to Manufacturing sectors
Industrial policy package matrix
Insights: 1. policy governance coordination

<table>
<thead>
<tr>
<th>INDUSTRIAL GOVERNANCE MODEL</th>
<th>POLICY TARGETS</th>
<th>Supply side</th>
<th>Demand side</th>
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<tbody>
<tr>
<td>National/Federal</td>
<td>Manufacturing system</td>
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<tr>
<td>Regional/State</td>
<td>Manufacturing firms and sectors</td>
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<td>Industrial system</td>
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<td></td>
<td>Macroeconomic framework</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>POLICY LEVELS</th>
<th>Innovation and Technology infrastructure</th>
<th>Higher education and workers training</th>
<th>Production capacity and operations advancement</th>
<th>Long term financial capital</th>
<th>Resources access</th>
<th>Infrastructure and networks</th>
<th>Internal demand &amp; public procurement</th>
<th>External demand and Intl Market development</th>
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<td>7</td>
<td>9</td>
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</table>

Policy measures alignment
Policy governance coordination
Policy synchronisation along transformation cycles
Industrial policy package matrix
Insights: policy effectiveness and alignment

The effectiveness of a single policy measure depends on the alignment among the different policy measures in place (acting upon the same companies, sectors and specific institutions)

E.g. technology and sectoral policies, skills policy and technology policy, public procurement and competition, policies, exchange rate policy and sectoral policies…

- Policy effectiveness might be increased by changing or introducing other complementary measures
- Policy composition effect: the combined effect of different policies tends to be different from the one that the government can achieve by the independent implementation in time of the same policy measures
Mapping the variety of industrial policy models and packages: Operationalisation

Countries’ difficulties in aligning policies over time within each transformation cycle as well as transitioning from one transformation cycle to another (thus from one policy package to another), help explain discontinuities in their industrialisation paths.
Mapping the variety of industrial policy models and packages: Operationalisation
Mapping the variety of industrial policy models and packages: Operationalisation
Institutional solutions.1
Policy governance model

US, Germany and Japan:

Multi-layered industrial policy model combining top-down and bottom-up approaches offers more flexibility in the composition of the policy package and adoption of measures.

However, 'multi-layered' policy regime runs the risk of incoherence and different levels undermining each other (Germany and Japan have better integrated policy packages – Germany Industry 4.0 Policy Governance).

Amongst major industrialising economies, China is the only one adopting a multi-layered model also used to introduce competitive dynamics among regions (e.g. sectoral and regional clusters policies)

The lack of well structured and integrated regional institutions and agencies impedes Brazil and South Africa to adopt a multi-layered model (an exception being the Embrapa network in Brazil), despite a number of successful regional initiatives
Institutional solutions.2
Targeting sectors or industrial systems?

Sectoral policies in Germany, Japan and the US
• have been increasingly substituted by/combined with system level policies aimed at picking cross-cutting sectoral challenges and technologies (e.g. ARPA-E energy policy initiative in the US; the Innovation Network Corporation of Japan INCJ)

In the case of Japan,
• sectoral policies have been implemented to increase the country’s industrial resilience: from a mono-pole (automotive-electronics) to a multi-poles industrial structure (5 new ‘strategic industrial fields’).
• industrial system level policies have been promoted to encourage organisational change and SMEs direct global expansion/value capture (extended guaranty insurances on overseas expansion, technical advisory services, and the establishment of overseas business expansion support centres)

China and Brazil
• have been increasingly adopting manufacturing system policies alongside sectoral policies (especially for the development of new high-tech sectors and markets). For example Brazil launched two ‘super-sectoral programmes’ managed by BNDES, namely Strong Industry and Innovate Brazil
Institutional solutions.3
Technology policy and intermediaries

Germany, the US and Japan whose public and private technology infrastructure developed over the last century have managed to build a strong comparative advantage in high-tech activities.

The Fraunhofer in Germany, the Kohsetsushi Centres in Japan and, more recently, the NNMI institutes in US specialise in applied industrial and manufacturing research, scaling-up production and risk-reduction, especially for emerging technologies.

These ‘diffused’ technological infrastructures are also complemented with ‘punctual’ mission-oriented initiatives aimed at anticipating current and emerging challenges (e.g. environmental, health and mobility issues).

In particular Germany has implemented two High Tech Strategies since 2006 while more recently the US has launched the Robotics Centre, Additive Manufacturing and Material Genome Initiatives.
Institutional solutions.3
Technology policy and intermediaries

• Emerging industrial countries like China have intensified their support for a diffused system of industrial intermediate institutions, beyond the firms.

Increasing Chinese efforts to develop ‘external economies’, supply chains and knowledge-intensive industrial ecosystems around major national and foreign companies (MIT-PIE Report). Amongst others, China has pursued, refocused and re-financed its regional and clusters development plans started with the Torch Programme and 863 Plan in the 1980s alongside the support of special economic zones SEZs.

• Brazil has successfully developed its agro-technological infrastructure and is currently attempting to replicate the Embrapa model to support manufacturing upgrading.

• South Africa, is relying mainly on financial support (e.g MCEP – matching grant scheme), while less emphasis has been given to intermediate institutes supporting innovation and industrial development.
Institutional solutions.4
Financial support schemes

Financial support schemes including loans, long-term financing, matching grants, and financial guarantee schemes (e.g. SBIR in US, InnoFund in China, FNDCT in Brazil, MCEP in South Africa).

However, the effectiveness of these schemes depends on:

- the degree of selectivity of the financial support provided (i.e. the investment conditionality and technological requirements attached to it).
- the existence of a financial infrastructure able to implement, manage and enforce these financial support schemes.

Germany (KfW) and Japan (JDB), but also China and Brazil, found in their development banks important ‘operational arms’ for implementing public financial schemes as well as orienting, coordinating and supporting companies’ long term strategies.
Increasing global competition has pushed all countries to support their ‘internal demand’ with more strategically-focused public procurement policies and their ‘external demand’ with selective support to export-oriented companies. The latter has been provided through tax benefit/relief or financial support of specialised banks (e.g. US, Japan and China).

Also, various forms of hybrid industrial finance, public procurement and pre-competitive procurement have been integrated within these programmes and public financial agencies/institutions.
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## Industrial Policy: waves and emerging focal policy domains

<table>
<thead>
<tr>
<th>Main features</th>
<th>First wave 40s to mid-70s</th>
<th>Second wave Mid-70s to 90s</th>
<th>Third wave 2000s</th>
<th>Emerging themes 2010s</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development as/through</strong></td>
<td>Industrialisation and structural change</td>
<td>Stabilisation, liberalisation, and poverty reduction</td>
<td>Global knowledge economy</td>
<td>Learning economy and Innovation in production</td>
</tr>
<tr>
<td><strong>Policy target/s</strong></td>
<td>Creating markets Structural change and diversification</td>
<td>Specialisation and modernisation (Market-led)</td>
<td>Innovation Increasing productivity Diversification and specialisation</td>
<td>Industrial ecosystem development</td>
</tr>
<tr>
<td><strong>Policy framework</strong></td>
<td>Import Substitution/Export oriented Selective industrial policies Sectors development Gradual opening to competition</td>
<td>The best industrial policy is “no industrial policy”. Horizontal policies Exposure to competition FDI attraction</td>
<td>Targeted strategies in open economies Increasing national competitiveness Enabling business environment Strategic management of FDI</td>
<td>Smart (new selective) policies Value creation in global systems Value capture in production networks Competences/capabilities</td>
</tr>
<tr>
<td><strong>Policy model</strong></td>
<td>Top-down Centralised system National agencies/councils Developmental institutions</td>
<td>Minimal state (Weakening and/or dismantling of national institutions)</td>
<td>Multi-layered (Top-down/Bottom-up) Public-private identification of priorities, Science institutions</td>
<td>Multi-layered Institutions for public-private coordination Multi-level implementation Regional/cities clusters development</td>
</tr>
<tr>
<td><strong>Policy package/s</strong></td>
<td>Capital movement management Production-oriented finance National champions development Infant industry protection Hard infrastructure development Public funded research Compensation policies for lagging areas.</td>
<td>Innovation policies ICT diffusion Competitiveness programmes Human capital SMEs support (regional level)</td>
<td>Credits and grants for production development and innovation Public procurement Promotion of entrepreneurship (venture capital, angel investors and support to business capabilities) Hard and soft infrastructure Technical competences and skills development</td>
<td>Technology infrastructure &amp; intermediate R&amp;D&amp;M institutions Manufacturing research Scaling up Strategic public procurement General purpose technologies Key enabling technologies Risk reduction Manufacturability challenges</td>
</tr>
<tr>
<td><strong>Policy rationales</strong></td>
<td>Market failures Structural coordination Government failures &gt; Market failures</td>
<td>Market failures System failures</td>
<td>Market failures System failures</td>
<td>Learning and System failures</td>
</tr>
<tr>
<td><strong>Policy space</strong></td>
<td>High room of manoeuvre and high political legitimacy of national development strategies</td>
<td>Reduction in the room of manoeuvre (WTO, TRIPS commitments, etc.) and low political legitimacy of national development strategies.</td>
<td>Moderate room of manoeuvre in traditional fields; regain of legitimacy of national development strategies</td>
<td>High room of manoeuvre in emerging fields</td>
</tr>
</tbody>
</table>
Emerging focal policy domains

- **Technology infrastructure**: various types of public technology intermediaries to support manufacturing industries scaling-up, quality, innovation and competitiveness (also local industrial ecosystems)

- **Financial infrastructure and schemes**: various types of institutions (e.g. development banks, but also sector/export specific banks) to meet the specific production-related financial needs of companies

- **Strategic public procurement and hybrid instruments**: various approaches to support infant industries and emerging technologies
South Africa: progresses and challenges
The new wave of IPAPs

The post-apartheid industrial policies in South Africa focused on widespread trade-liberalization which led to

- **decrease in average industrial tariffs from 28% in 1990 to 8% by 2006.**
- support of a relatively narrow set of manufacturing sectors such as **automotive, steel, chemicals, aluminium and paper and pulp.**

**Evidence:** it did not lead to a substantial deepening of the industrial base, it did not promote significant industrial diversification away from mining and minerals (also as a result of the challenges posed by a relatively overvalued exchange rate and other institutional weaknesses)


- Extensive consultation
- More evidence based sectoral targeting (priority of high employment multipliers and backward linkages)

However,

- Challenges in policy alignment and coherence remain
- Internal tensions between policy goals, that is, industrial transformation and employment creation, are also critical
South Africa: progresses and challenges
Manufacturing development and Employment

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: from a direct to an indirect generator of employment.

- The NDP acknowledges that the country’s strength is mainly in capital-intensive manufacturing (mineral processing, metals, chemicals)
- Focus on the promotion of inter-sectoral linkages to construction, energy, waste reutilisation and mining (inputs and downstream) as well as services.
- Still need for domestic production capacity expansion in manufacturing (the consumption driven sectors are growing twice as fast as the productive sectors)
South Africa: progresses and challenges

Significant financial efforts

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

Andreoni & Neuerburg, 2013, Source: National Treasury 2014 Estimates
South Africa: progresses and challenges
Validated principles

The interventions rested on sound economic research and analysis, identifying market failures and designing the most appropriate measures required to address these.

Programmes and specific interventions have been the subject of significant stakeholder engagement and benefit from a critical mass of support from stakeholders.

Appropriate funding and human resources existed to take the interventions forward.

The programmes and interventions had the necessary intra-governmental co-ordination and co-operation critical to their success.

Source: IPAP 2013/14-2015/16
### South Africa: progresses and challenges and better policy articulation (transversal / sectoral)

<table>
<thead>
<tr>
<th>Transversal</th>
<th>Key Programmes</th>
<th>Significance and Achievements</th>
<th>Rationale</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financing</td>
<td>MELI (Machinery, Equipment, and Logistics) Incentive</td>
<td>Intended to provide $5.5 billion to manufacturing firms</td>
<td>Increase competitiveness and efficiency of manufacturing</td>
<td>Promotes the development of new or improved products and processes in targeted sectors</td>
</tr>
<tr>
<td></td>
<td>SDI (Small and Medium Enterprises)</td>
<td>Dominantly supported</td>
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<tr>
<td>Innovation/Technology</td>
<td>STIP (Science, Technology, and Innovation Program)</td>
<td>Establishes new or improved technology</td>
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<tr>
<td>Skills</td>
<td>Industry Skills and Industrial Centres (ISIC)</td>
<td>Aligns skills and training with industry needs</td>
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<tr>
<td>Public Procurement</td>
<td>Procurement Policy</td>
<td>Promotes local content and competitiveness</td>
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<tr>
<td>Competition Policy</td>
<td>Strengthen implementation of competition policy</td>
<td>Various large cases settled by competition commission in various sectors (fuel, steel, cement, telecom, food, etc.)</td>
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<tr>
<td>Trade Policy</td>
<td>Developmental Tariffs</td>
<td>Ongoing review and tariff setting for priority sectors (agriculture, manufacturing)</td>
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<tr>
<td>Regional Integration</td>
<td>Industrial Work Programme for SMMEs (Small and Medium Enterprises)</td>
<td>Development of Regional IP for SMMEs and SECs and Industrial Roadmap</td>
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<tr>
<td>SEZs</td>
<td>Designation of SEZs</td>
<td>Ongoing process of designation of SEZs, feasibility studies and legislative processes</td>
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</table>

<table>
<thead>
<tr>
<th>Sectoral</th>
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</thead>
<tbody>
<tr>
<td>Textile</td>
<td>CTPP (Clothing and Textiles Products Programme)</td>
<td>Intended to generate $1.2 trillion in new investment</td>
<td></td>
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<tr>
<td>Automotive</td>
<td>APHD (Automotive Production and Development Programme)</td>
<td>Intended to generate $1.2 trillion in new investment</td>
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<tr>
<td>Agro-processing</td>
<td>ACPS (Agro-processing Competitiveness Fund)</td>
<td>Intended to generate $1.2 trillion in new investment</td>
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<tr>
<td>Metal Fabrication and Capital Equipment</td>
<td>Support through public procurement</td>
<td>Intended to generate $1.2 trillion in new investment</td>
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<tr>
<td>Pharma</td>
<td>Intended to generate $1.2 trillion in new investment</td>
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South Africa: challenges persist

- Effective implementation and policy enforcement

- Building integrated industrial systems (favouring technology infrastructures more than firm-level grants, e.g. MCEP)

- Defining clear policy goals and managing trade-offs (e.g. technological change and employment creation)

- Improving policy governance

- Industrial policy package coherence

- Improving systems for policy learning, M&E
Thanks for your attention

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