South African Aluminium industry Roadmap

2017
An industry-wide conjunctural roadmap...

A conjuncture is the period during which the different social, political, economic and ideological contradictions that are at work in society come together to give it a specific and distinctive shape.

Considering the dynamics of the South African socio-economic, political, environmental, labour, cultural and technological needs, this is a complex environment. This complexity is in particular brought about by changing economic paradigms, driven by structural reform. South Africa has a mix of economies and has to deal with models of capitalism shaped by participation of industry, labour and government.
A Typical Roadmap... not sufficient

“Most roadmap models apply to technology or product futures inside the enterprise and are not adequate for application to an entire industry.”

“Can an industry roadmap model be developed, supported by a future thinking process that addresses conjunctural challenges of the industry?”
Towards an industry roadmap model

The aluminium value chain

Bauxite mining

Alumina production

Primary aluminium production

Semi-fabrication

Recycling

Use phase

Product manufacturing

Industry roadmap model = \( \sum \) Enterprise business models projected on the industry value chain
Industry Roadmap Influences

- The Future landscape
- Market Information
- Product Information
- Process Information
- Value Chain Information
- Industry Model Information

Future Thinking
Market Analysis Reports
Per market sector
Production processes
Mining to recycling
Integrated business models

Roadmap Boundaries
- Strategic/Policy Interventions
- Sustainable livelihoods & settlements
- Social development
- Human well-being

Roadmap Creation
- Regional development
- Environmental constraints
- Industry growth needs

Industry Vision

Value addition projected onto the value chain
### Additional units of analysis

<table>
<thead>
<tr>
<th>Unit of analysis</th>
<th>Meaning</th>
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<tbody>
<tr>
<td>Complements</td>
<td>Two assets are said to be complements when investment in one asset increases the marginal return on the other, e.g. manufacturing capabilities, marketing channels, brand name, technology platforms, etc.</td>
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<tr>
<td>Dynamic capabilities</td>
<td>Ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments</td>
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<tr>
<td>Platforms</td>
<td>Layers of infrastructure that impose standards on a system in which many separate entities can operate, allowing to easily connect and build products and services on top of the platforms and co-create value</td>
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<tr>
<td>Ecosystems</td>
<td>The context and position of the industry within the larger economy, and entities that it co-exists with</td>
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The Future Landscape

- Competitive supplier of primary and secondary material
- Grow capacity in the industry
- Significant job creation, socio-economic upliftment and resultant well-being for communities
- Unique own finished products
- Optimisation of resources
- Energy-efficient, sustainable and environmentally friendly
- Include regional and global markets
- Grow to net exporter through import replacement and localisation

Vision

- Our Future
- The Future
- Back-casting
- Mind-time Travel
- Edge of Disruption

Strategy

The Present

The Past
Aluminium in Various Markets

- Construction
- Transportation
- Packaging
- Machinery and Equipment
- Energy
- Consumer Goods
Processes to be in place ...

- Knowledge required
- Complementary efforts
- Capabilities to be dynamically managed
- Platforms to support the industry
- Integrating with other ecosystems
Arriving at an industry roadmap

2016

- Road freight
- Marine
- Automotive

2020

- Electric Vehicles
- Drones/UAVs
- Buses

- Autonomous electrical
- Additive manufacturing
- Engine block casting
- Al wire (electrical)
- Heavy haul trailers
- Locomotives
- Rail coaches
- Armoured vehicles
- Bus bodies
- AHRLAC
- 7-series Al alloys

2030

- Autonomous Vehicles
- Regional air travel
- Engine block casting
- Al wire (electrical)
- Heavy haul trailers
- Locomotives
- Rail coaches
- Armoured vehicles
- Bus bodies
- AHRLAC
- 7-series Al alloys

- Heat shields
- Boats
- Passenger wagons
- Trailer chassis
- Body panels
- Truck bodies
- Gearbox
- Transfer case
- 6-series Al alloys

Automotive drive trains
Ships
SARA
Helicopter
Metal matrix braking system
Space launch vehicles

Mass transport
Automotive uptake

- Wheels
- Number plates
- Tankers
- Trailers
- Flat bed chassis
- Boat railings
- Engine castings
- Suspension parts

Science & Technology
Department: Science and Technology
REPUBLIC OF SOUTH AFRICA
The company

Investment

Social stability

Market leadership

Employment

The country

The people

The industry

Profit

Growth

Well-being

Global Competitiveness

Conjunctural priorities

Roadmap outcome

Roadmap impact
Conclusion

- New industry roadmap model – design and tested
- Application possible to a wider industry base
- Large potential for further academic research and improvement
- Complex relationships that exist within an industry can be included
- Opportunity for software, visualisation, automating inputs, real time updating
- Needs understanding taking traditionally conservative industries into the future
- Suitable to build relationships, allow competition and discourage collusion
- Recognise challenge to keep the roadmap alive and dynamic
- Role of a champion paramount
- Industry roadmap model supported by future thinking and visioning can address conjunctural challenges
- Contributes to the R&D management knowledge base on roadmapping and future thinking at industry level