1. Introduction

- **Mining sector important** in shaping the economic trajectories of Botswana, Zambia, and Zimbabwe.
- SA is the hub of a regional value chain for goods and services, dominant player but losing ground.
- **Room for regional cooperation** around specific programmes.
- All countries have mining linkage development strategies – some more defined and effective than others.
- Very little is known about developments in the rest of the region on mining-related NSIs; and in relation to South Africa.

2. Rationale & Qs

- **Research on RSI lagging behind.**
- **Resource-based industrialisation** requires substantial domestic knowledge intensification efforts.
- **National System of Innovation (NSI) literature** emphasizes the systemic and dynamic components of domestic innovation ecosystems.

**QUESTIONS**

- What is the role of mining-related NSIs in Botswana, Zambia and Zimbabwe?
- Assessing NSIs in isolation risks missing important dynamics related to skills development and competence building across borders.
- What is the role of South Africa in relation to these three NSI?

3. Findings

**ENGINEERING AND TECHNICAL SKILLS**

- **Decline of mining-related skills** development in Zambia (1990s), Zimbabwe (2000s) and most recently Botswana.
- Variations in support from mining companies (Bots vs. Zambia) through different funding and placement opportunities.

**Regional dimension**

<table>
<thead>
<tr>
<th>Country</th>
<th>Students studying abroad Total</th>
<th>Outbound mobility rate %</th>
<th>Top five destinations for outbound mobile students</th>
<th>Number of incoming foreign students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botswana</td>
<td>9 471</td>
<td>71.6</td>
<td>South Africa (7,012), Australia (792), UK 700</td>
<td>SA (488), Malaysia (152)</td>
</tr>
<tr>
<td>South Africa</td>
<td>5 619</td>
<td>0.8</td>
<td>USA (1,971), UK (1408), Australia (643)</td>
<td>49 979</td>
</tr>
<tr>
<td>Zambia</td>
<td>3 610</td>
<td>14.7</td>
<td>South Africa (1,363), USA (855), UK (543)</td>
<td>Australia (33), Namibia (228)</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>16 669</td>
<td>29.9</td>
<td>South Africa (10,568), UK (2,741), USA</td>
<td>(1,999), Australia (892), Namibia (71)</td>
</tr>
</tbody>
</table>

- **Skills development taking place in SA.**
- **Institutional frameworks lag behind:** 2000 SADC Regional Qualification Framework.
- **SA qualification to circumvent limited recognition of regional qualifications.**
- **Weak cooperation:** Only University of Botswana and University of Zambia cooperation with Stellenbosch/UCT – most relationships are informal: University of Zambia – University of Zimbabwe.

4. Conclusions

**A Regional System of Innovation?**

- **Large-scale mining investment pulled demand for** capital goods, technical skills, engineering services, mining-related technological solutions, and infrastructure = opportunities to build NSIs.
- **Regional System of Innovation:** ‘hub and spokes’ structure = South Africa as a hub.
- **Skills development and engineering consultancy have a strong regional footprint.**
- **YET:** SADC institutional frameworks lag behind.
- **But bilateral cooperation also ineffective (SA leadership?).**
- **SA NSI not geared to the region yet market for innovation would be large.**
- **Significant engineering skills development for the region is taking place in SA, but these skills tend to remain in SA.**
- **SA taps into the flows of regional skills to address its own skills deficit in engineering consultancy and R&D.**
- **Little impact on knowledge intensification outside SA.**