INNOVATION AND THE STATE IN AFRICA

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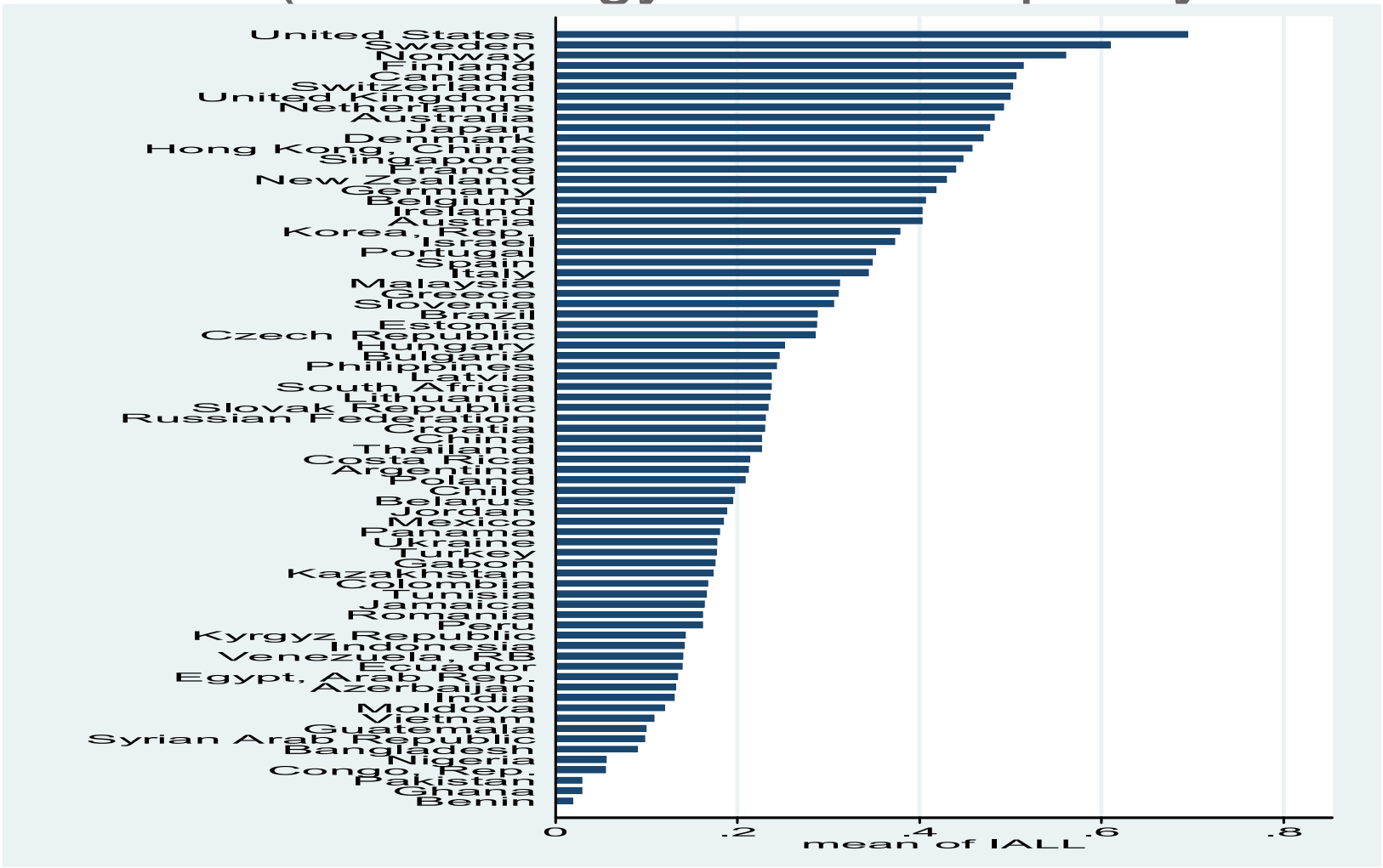
Where does Africa stand in the Ladder of Development?

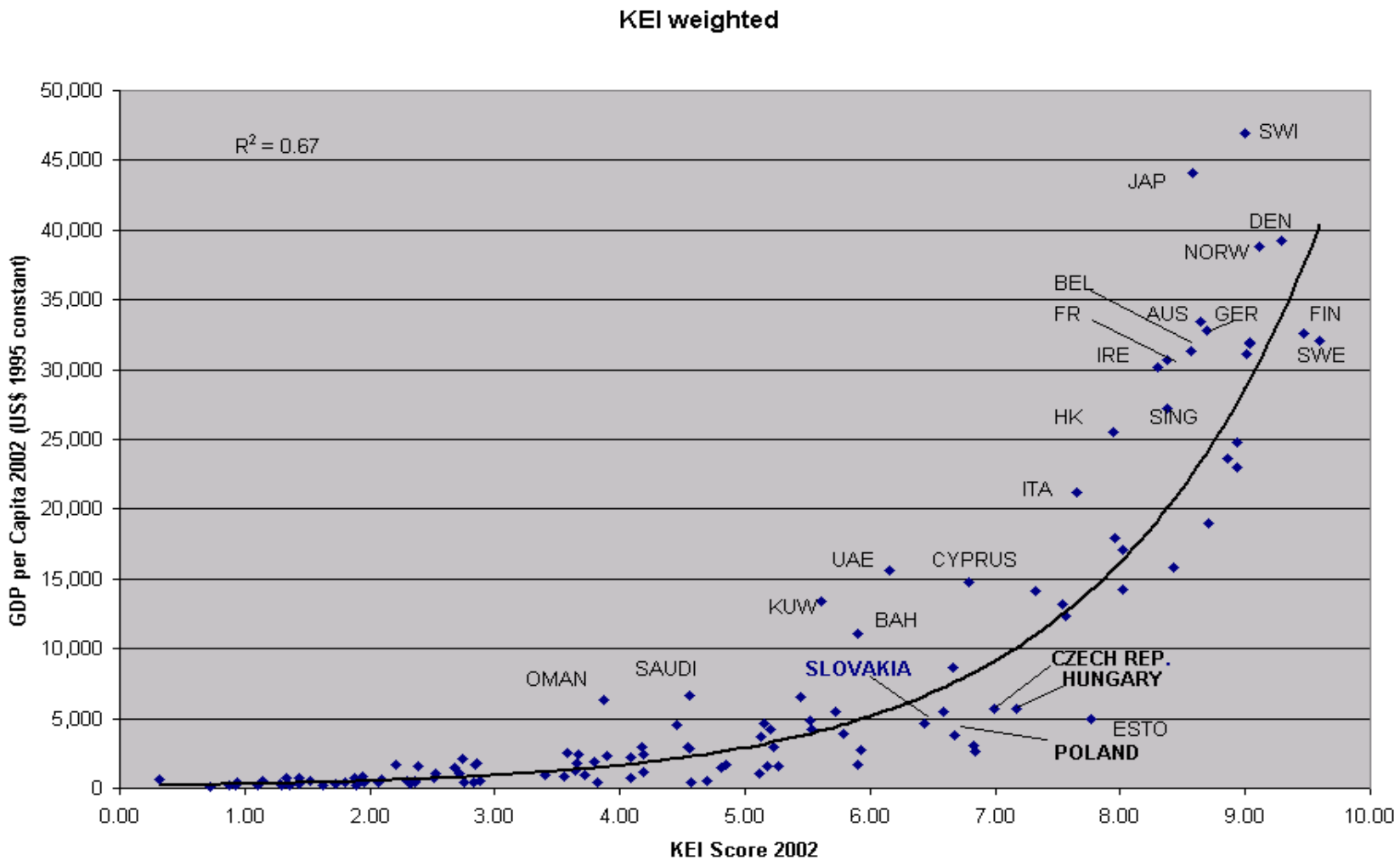
Table 3: Group Description of STI Capacity Index

Group I **Frontier Countries**	*Group II* **Fast Followers**	*Group III* **Late Followers**	*Group IV* **Lagging Followers**
1. United States	20. China	36. Ukraine	61. Kazakhstan
2. Japan	21. India	37. Croatia	62. Moldova
3. Sweden	22. Portugal	38. Pakistan	63. Kyrgyz Republic
4. Germany	23. Ireland	39. Malaysia	64. Guatemala
5. Switzerland	24. Poland	40. South Africa	65. Peru
6. France	25. Hungary	41. Bangladesh	**66. Nigeria**
7. United Kingdom	26. Slovenia	42. New Zealand	67. Panama
8. Canada	27. Turkey	43. Belarus	68. Azerbaijan
9. Italy	28. Australia	44. Thailand	69. Syrian Arab Republic
10. Finland	29. Czech Republic	45. Estonia	70. Ecuador
11. Israel	30. Mexico	46. Tunisia	71. Gabon
12. Korea, Republic of	31. Slovak Republic	47. Philippines	72. Benin
13. Austria	32. Greece	48. Russian Federation	73. Congo Republic
14. Hong Kong, China	33. Romania	49. Lithuania	
15. Belgium	34. Brazil	50. Latvia	
16. Spain	35. Bulgaria	51. Jamaica	
17. Netherlands		52. Jordan	
18. Denmark		53. Argentina	
19. Norway		54. Egypt, Arab Republic.	
		55. Indonesia	

LSI = (Technology & Infra Capacity Index)



Strong Correlation between GDP/Capita & KEI



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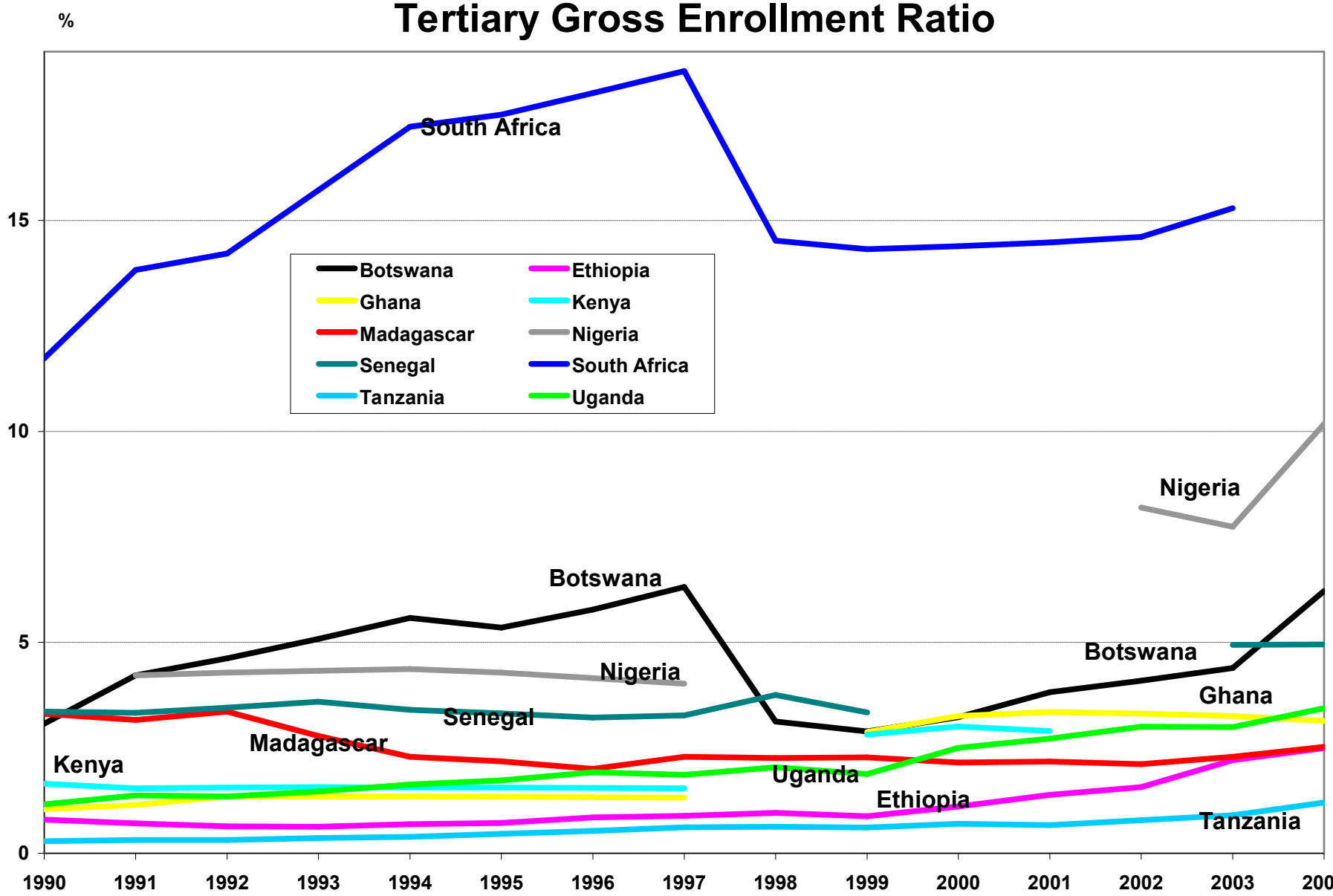
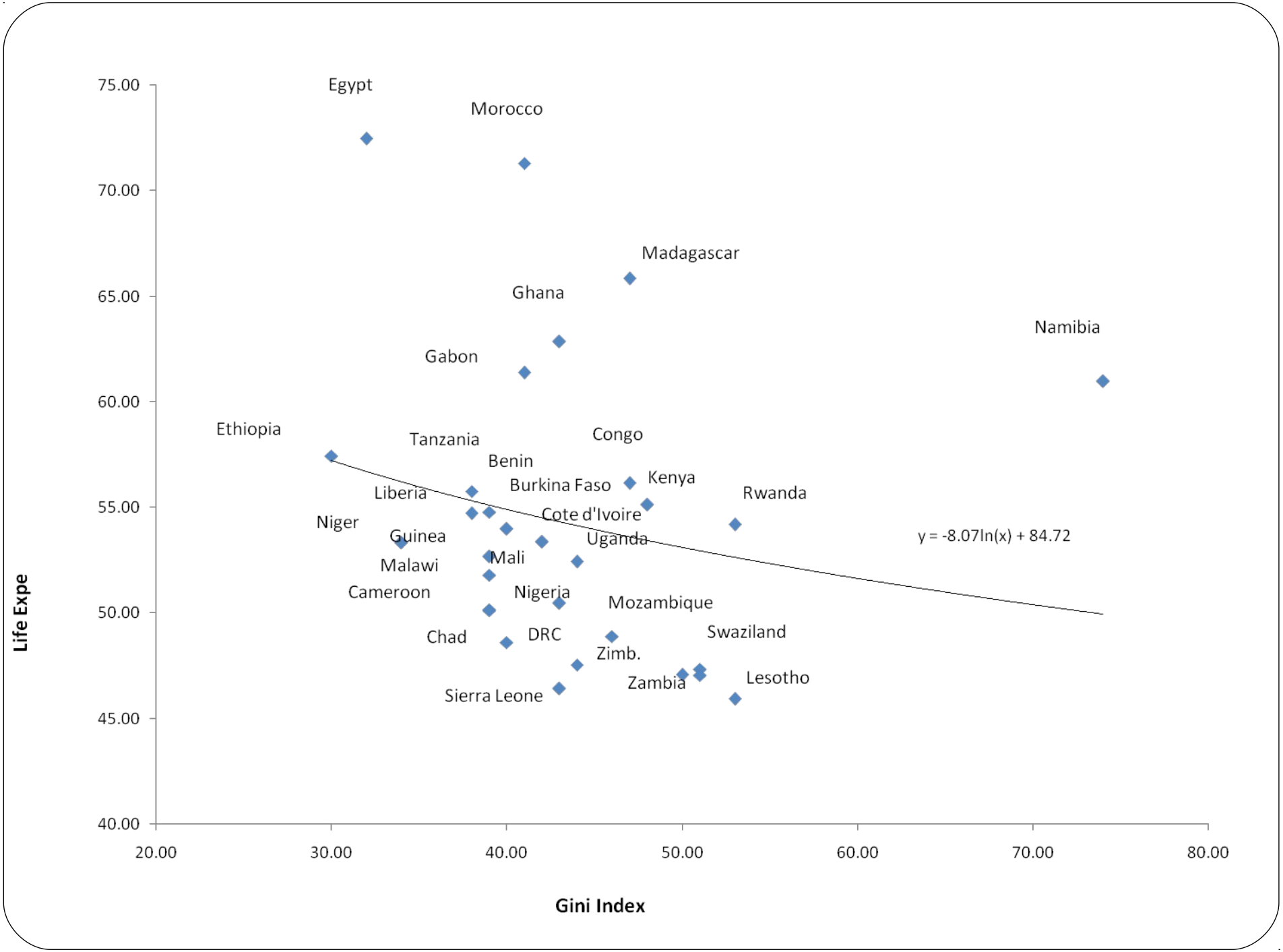
What Makes a sector and a Nation Different?

- The depth of STI activities (assembling, manufacture, design, systems integration);
- The sophistication of physical and high-tech infrastructure;
- **Quality of human capital** required for manufacturing, design and new products; and
- Human capital makes the difference in Global integration into the production value chains

Tertiary Gross Enrollment Ratio



Source: World Bank internal databases (DDP and Edstats)


Egypt
Morocco
Madagascar
Ghana
Namibia
Gabon
Ethiopia
Tanzania
Congo
Benin
Kenya
Burkina Faso
Liberia
Rwanda
Cote d'Ivoire
Niger
Guinea
Uganda
y = -8.07ln(x) + 84.72
Mali
Malawi
Cameroon
Nigeria
Mozambique
Chad
DRC
Swaziland
Zimb.
Zambia
Lesotho
Sierra Leone
75.00
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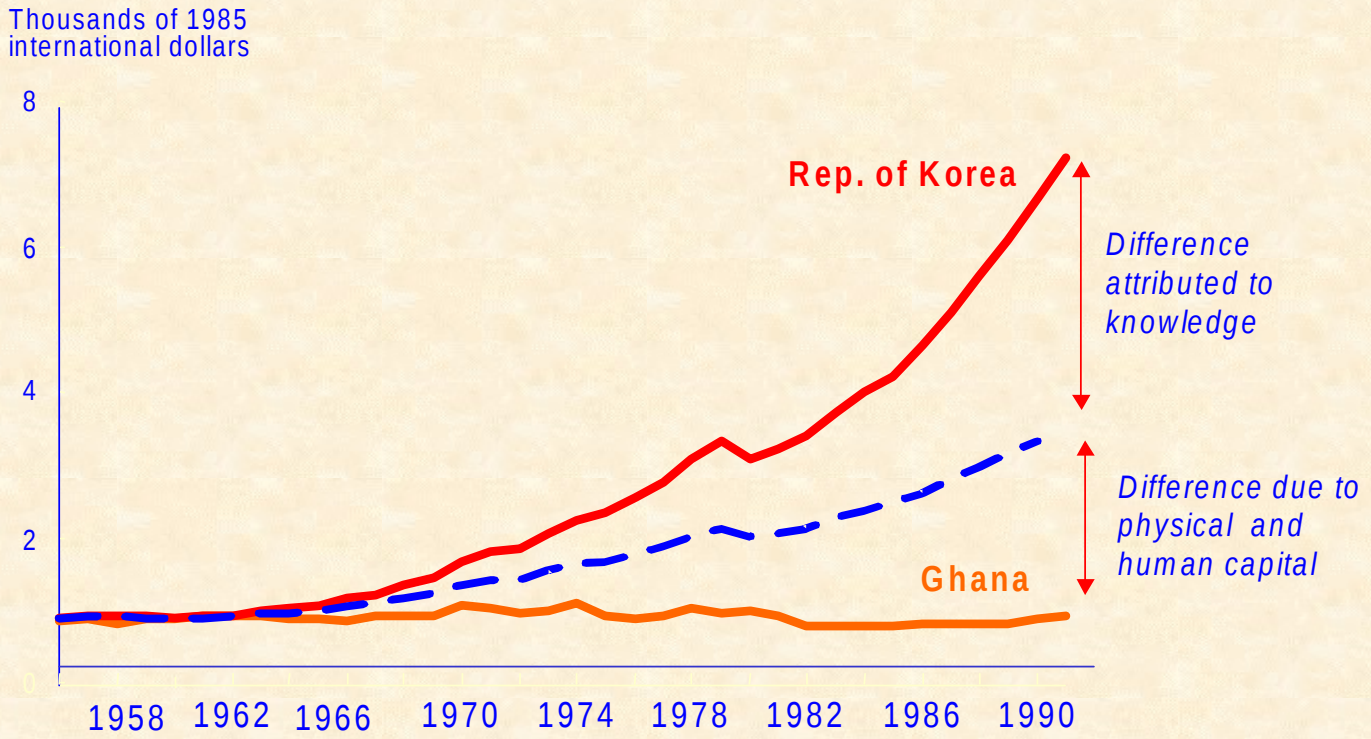
Life Expe
Gini Index

The KBE Advantage at work: 50 year perspective

Korea
vs. Ghana



Why Regions and Nations Differ

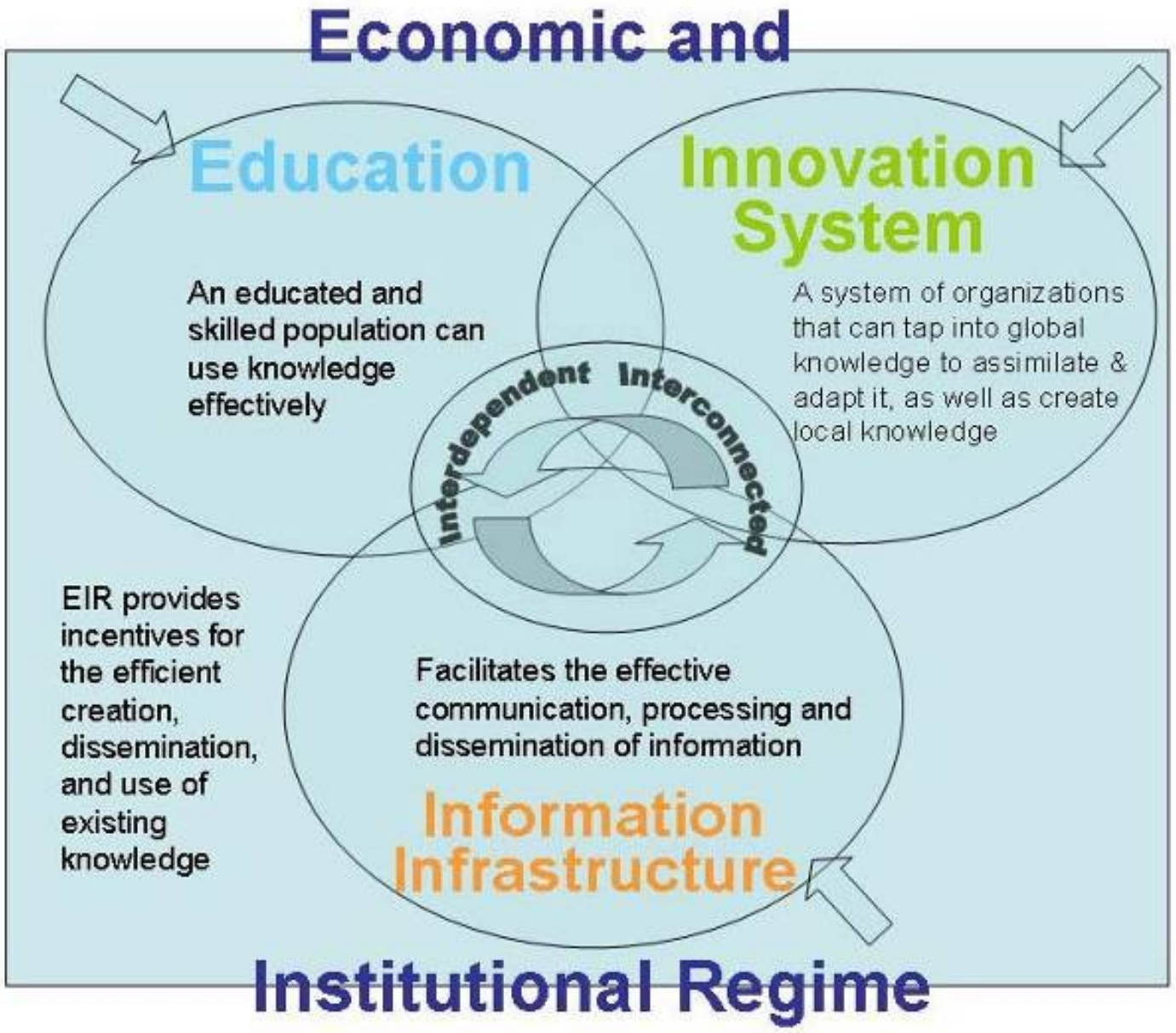
- The efficiency with which knowledge is created and diffused among different organizations depends on the variety of institutions promoting production and innovation;
- Designing the right social institutions to absorb, retain, advance, and sustain knowledge has turned out to be much more challenging.
- The failures to reap the promises of science and technology are often due to failed institutions and to our assumptions that institutions are neutral

Why Regions and Countries Differ?

- Very limited commitments to developing the knowledge-centered capabilities for building strong STI systems;
- For Africa the scale of resources and capabilities for exploiting technology and generating innovation lags far behind that of dynamic economies;
- More specifically, the scale of STI investment in the public and private sectors lags far behind the levels observed elsewhere to support competitiveness in similar firms and industries in other regions.
- This is why we are importers of manufactured goods and why Taiwan and China & others export

Four Pillars of a Dynamic Economy (WBI)

- A sound *economic incentive and institutional regime*
- An *educated and creative* population
- A dynamic knowledge *infrastructure*
- An efficient *innovation system which include STI manpower*


Economic and
Education
An educated and skilled population can use knowledge effectively
Innovation System
A system of organizations that can tap into global knowledge to assimilate & adapt it, as well as create local knowledge
Interdependent Interconnected
EIR provides incentives for the efficient creation, dissemination, and use of existing knowledge
Facilitates the effective communication, processing and dissemination of information
Information Infrastructure
Institutional Regime

What is Innovation?

- Innovation is often confused with research and measured in terms of scientific or technological outputs.
- Innovation is neither research nor science and technology, but rather the **application of knowledge in production.**
- This knowledge might be acquired through learning, research or experience, but until it is applied in the production of goods or services it cannot be considered innovation.

What innovation is

- Much of Innovation in a developing context includes continuous improvement in product design and quality.
- Changes in organization and management routines, creativity in marketing and modifications to production processes that bring costs down.
- Increase efficiency and environmental sustainability.
- The ability to manage a portfolio of partnerships, to form linkages and to learn through them.

Innovation

- As opposed to the focus on novelty that is central to the concept of invention and a key criterion for patenting, innovation is a broader concept.
- In the mind of policy makers, this distinction is often difficult to make;
- The focus of Innovation Policy is on the interaction between these actors and their embeddedness in an institutional and policy context that influences their innovative behaviour and performance.
- Coordinating these different actors e.g. agencies of government is difficult, complex and undermined by vested interests.

Innovation Policy

- Whether tacit or explicit, policies play a role in setting the parameters within which actors make decisions about learning and innovation. Innovation processes are not the outcome of a single policy but a set of policies that collectively shape the behaviour of actors.
- How to quantify and measure the process and outcome begs the question.

Innovation System

- In broader systems terms demand may be intermediated by policies.
- **Conventional S&T policy in Africa has only come to terms with this reality.**

Features of African Innovation System

Historical path-dependence: agriculture policy focus since pre-colonial times

- Half the amount of research institutes are dedicated to agricultural research
- Extensive work on drought resistant, high yielding varieties of cereals, legumes and tubers
- Focus on single commodities

Features of African IS

Potential of the agricultural system not realized:

- Weak linkages between university and PRI researchers and farmers - duplication of research and misallocation of funds
- Lack of technological facilities to translate research into innovations
- Limited linkages with agro-industries
- Lack of farm-level inputs
- Lack of policy initiatives to support farmers and educate them about new technologies and to help oganize and market their products.

Features

- Lack of systemic coordination reflected in:
  - Delinked R&D capacity from the private sector: little or no tech upgrading
  - RDIs affected by lack of funds.
  - Institutional framework for the development of S&T affected by lack of coordination and learning between organizations

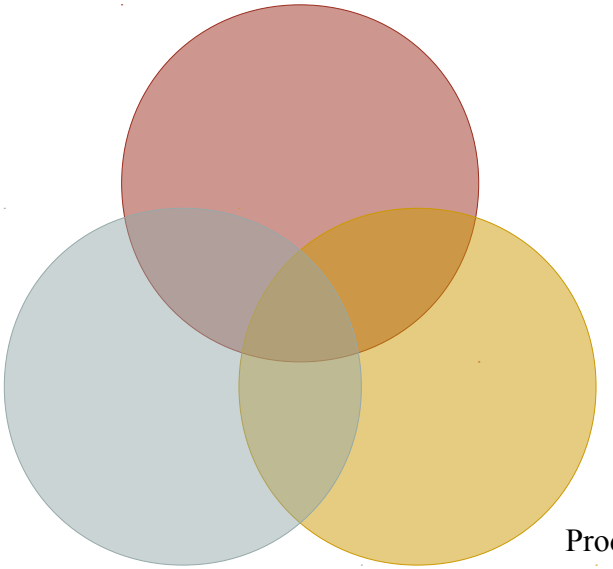
- Lack of qualified personnel and physical infrastructure to support innovation
  - Too few engineers, scientists and other researchers
  - Lack of specialized infrastructure for R&D and product development. E.g., tissue culture for teak, coconut, etc.

Features (Manufacturing and Design)

- Poor systems linkage reflect in missing components concerned with design, engineering, and management.
- In manufacturing these activities play important linkage roles in the innovation systems; much of which is missing in Africa.

Systems Linkage

Final Market for goods



Design and Engineering

Production of Goods and services

STI Institutions

- S & T policy institutions remain distant from top-level decision and planning machinery of governments because S&T policy was interpreted to mean R&D policy.
- What should have been a systems-wide cross-sectoral policy for industrialization was conceptually frozen into “councils” and ministries of S&T.
- The policies, unknowingly, encouraged the isolation of RDIs from the mainstream productive sector and it is on these agencies that much of the money budgeted for S & T in Sub-Saharan Africa (SSA) is expended.

FIRMS ARE CRITICAL

Firms: repositories of capabilities and

The firm is the most important locus of production between state and society;

T**he firm and its capability** reflects the relation of state – society governance;

dynamic SI help to creates new firms

State – society relations are reflected in institutions of enterprises

INTEGRATE AFRICAN FIRMS & OTHER ACTORS

- African firms should rely less on outsiders for innovations; make autonomous efforts to innovate;
- Governments need to provide incentives to business firms;
- African Firms are not sufficiently specialized to compete globally and they need to build capabilities to occupy specific niche markets;
- The concept of SI limited to R&D is too narrow and not very useful in analyzing development.

THREE LIMITATIONS OF AFRICAN FIRMS

1st Firms operating with High Transaction Costs

2nd Size and Types of Markets: small & fragmented

3rd Lack of Effective State Support ; they require

→ *Institutional Compensations*

Innovation Policies and Development

Quality of life

- Human development and Poverty
- Indices

Wealth Creation

- Technology based growth

Technical progress (Improvement and Innovation)

- Patents
- Business R&D intensity
- ICT uptake indicators

Business performance

- Technology/ trade mix
- Key sector performance
- New sectors (e.g. biotech)

Technological Capability

- Researchers in workforce
- SET workforce
- Manufactured Exports

Imported know-how

- Technology balance of payments

Knowledge Infrastructure

- Share of publications
- R&D intensity (investment)

S&T post-graduate degrees
University Exemptions in Maths and Science

Physical Infrastructure

- Electrical Power
- Telephone and Internet density
- University Exemptions in Maths and Science

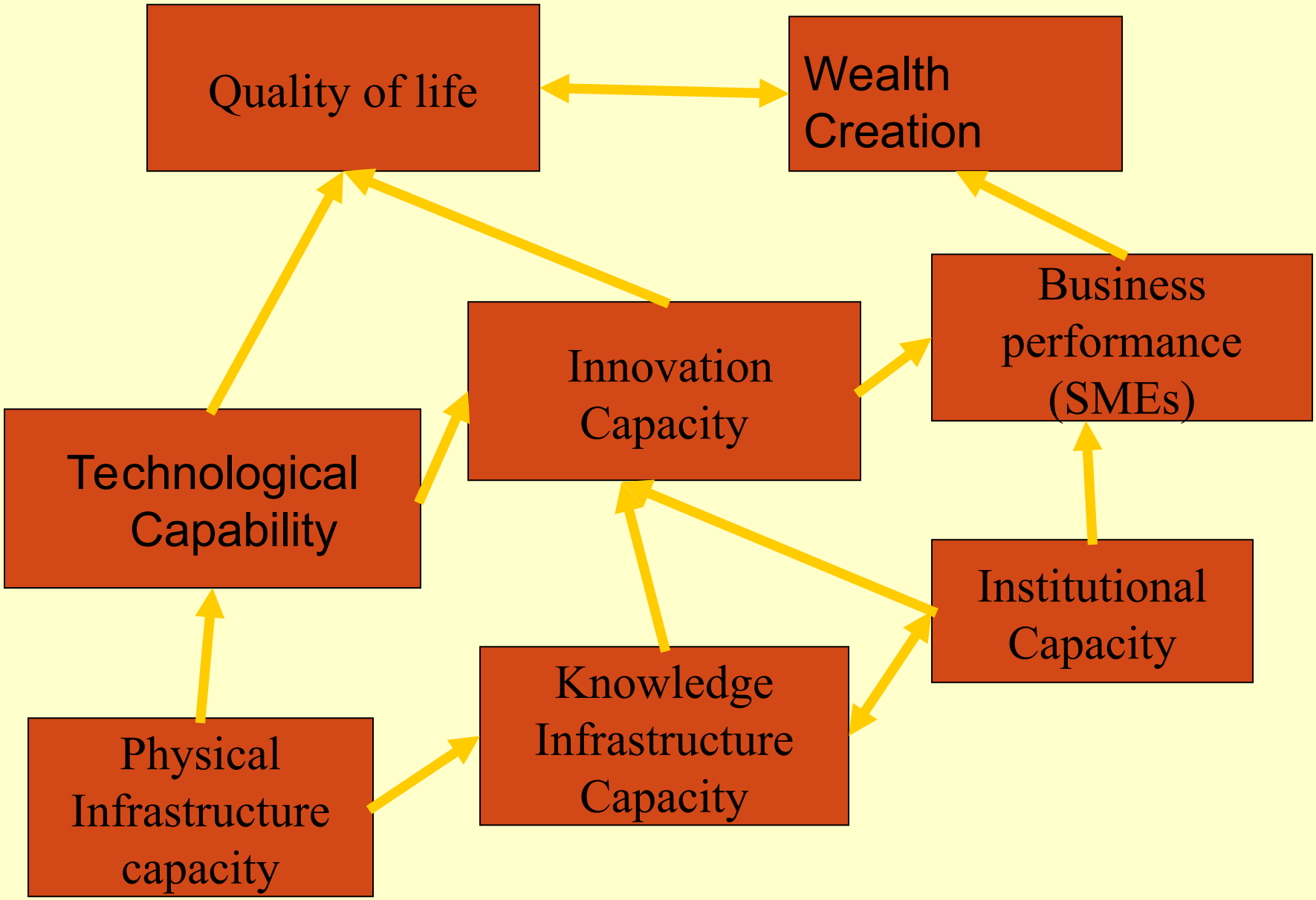
Indicators

1.IC buildsTechnological Capabilities

Countries are differentiated by a set of TC factors:

1. Capabilities for effective use of knowledge in production, investment and innovation

- 2.Bcos Skills and knowledge are part of the organizational memory of firms and nations;
- 3. Capabilities are path-dependent (time)
- 4. Require explicit state & private investment



Framework Innovation Capacity

THE ROLE OF GOVERNMENTS AND STATES

- WHAT SHOULD BE THE ROLE OF STATES?

Five Roles for the State

- **States need to formulate a long-term vision and goal for development through technology and innovation and pursue it;**

- **States should provide coordination in order to bring harmony and efficiency to the action of multiple actors acting in a** system;

Five Roles of the State

- ***States have to put in place institutions where they are missing and strengthen those that are weak***;

Institutions include those that foster interactive learning through systemic coordination.

Incentive systems develop from fundamental institutional roots such as labour laws and even national constitution.

Terms of employment and work environments, both tangible (research and teaching facilities) and intangible (possibilities for institutional collaboration,

Quality of networks and colleagues) play a pivotal role in retaining skilled professionals.

4th Role of the State

- *States act as guarantors of risks and provide innovation "insurance".*

Entrepreneurs are slow to uptake innovation prospects coming out of the activities in a sector/ economy due to risk and uncertainty,

Especially in sectors and technologies that are new to the local contexts.

In such cases, successful state action has involved the creation of several mechanisms, including newer systems of property rights that insure rents for having taken up the risks of engaging in innovation.

Role of State No 5

- ***States have to manage conflict and resolve problems of asymmetric power relations***

Conflicts arise when powerful actors in an economy with vested interested stand to lose influence, profits and markets as a result of emerging new sectors and industries.

Some actors might potentially gain while others potentially lose;

The uncertainty of the extent of gains and loses raises the prospects for conflict.

END

- THANKS