Innovation systems for low income countries

Tanzania Workshop

Dar es-Salaam

March 21 2012

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My background – and a Warning

- I am expert on innovation – I have worked on related issues since the beginning of the 1970s (around 40 years). Both as scholar and as councillor on public policy.
- I am not an expert on least developed countries – I have tried to learn since 2000 and I expect to learn more the next couple of days.
- Up to this meeting I (re)read inspiring contributions by Wangwe, Banji, Bitrina, Astrid and others. My pre-sentation will end up with questions rather than answers.

Three questions with tentative answers

- Is it a good idea to apply an innovation system perspective on low income countries?
  - Answer is a conditional 'yes'
- How to study innovation systems of low-income countries?
  - A broad approach that includes both the informal and the formal institutions that shape innovation and learning is necessary. Analyse the quality of demand as well as of the supply of knowledge.
- What should be done in terms of policy?
  - Combination of supply and demand stimulation as well as capacity building and institutional design. Begin from where you are! Take ownership – with openness to ideas from abroad!

Structure of my presentation – NIS as a general framework sensitive to context

- Innovation systems in general
  - The innovation process
  - A general theory of innovation
  - Missing links and the role of advanced users
  - Defining the innovation system
- Innovation systems for low income countries
  - Building knowledge platforms with forward linkages
  - Building 'industrial complexes' with backward linkages
  - Engineering as intermediating between science and industry
  - Inclusive need-driven innovation and economic development

Defining the Innovation Process

”The innovation process stretches from new ideas or new issues to be investigated to the final spread and use of new products or processes”

”An important driver of innovation is competition – but competition needs to be modified to the firms’ capacity to transform”

”The innovation process is characterised by interactive learning among diverse agents”

”Not a linear process: Feed back mechanisms are crucial for outcome”

”The innovation process begins with a new combination of existing knowledge and ends with new knowledge”

Understanding knowledge and learning among all actors (followers as well as leaders – users as well as producers) is crucial for understanding innovation!

Innovation is an interactive process - Sappho 1978 (now presented as Open Innovation)

1. Innovative firms' interact with customers, suppliers, knowledge institutions.
2. Innovative firms are characterised by interaction across departments.
3. Innovative firms involve workers in the innovation process.

'Social capital' is crucial for the valorisation om intellectual capital!

Toward a general Theory of Innovation or ’Dynamizing Adam Smith’

- Adam Smith: Crucial for economic wealth is the scale of the market and the deepening of the division of labour.
- Innovation drives and shapes the division of labour
- Deepening the division of labour contributes to diversity and opens up new interfaces for (user-producer) interaction between and within organisations.
- Short social distance and low cultural barriers facilitate interactive learning and promote innovation.
- Technological and economic capabilities among users are as important for innovation as capabilities among producers.
- As long as capabilities are weak proximity between the two will at best promote incremental innovation (Bitrina).
- After take off: Virtuous circle - Innovation, Division of labour, Innovation. But how to get there?

Three different delimitations of innovation systems

- Extended R&D-systems – linking knowledge institutions to production (Nelson and Mowery).
- Extended production systems – focus on learning by doing, using and interaction (DUI) in the production system (Freeman and Aalborg-group).
- Extended production and competence building systems – + linking education and labour market systems to innovation (Lundvall 2002) – lics in globelics stands for learning, innovation and competence building systems!

A broad definition of national innovation systems

”The national innovation system is an open, evolving and complex system that encompasses institutions and economic structures. The quality of its elements and of the relationships between elements determine the rate and direction of innovation and competence building emanating from a combination of experience based and science based learning”

The narrow definition of innovation systems as science systems is problematic - Especially for low income countries!

Easy policy steps:

- Copying formal (R&D) institutions from the West
- Investment in science and academic training

Tempting for donor organisations since it is easy to document progress.

Difficult policy steps:

- Establish missing links
- Upgrade the capacity of users, including users of knowledge.

Require policy innovation and more complex indicators

Specifying the development challenge for low income countries

- Start from what you have got: Agriculture, Raw material, Tourism, Informal sector, Donor dependence, Increasing presence of China and India. And a lot of problems (=opportunities??). Weak infrastructure but a growing and young population with ambitions.
- Education and investment in science remain fundamental. But increasing the supply of knowledge without increase in demand does not promote development. Innovation increases the demand for knowledge (Nelson and Phelps, 1966).

Science and technology platforms in Africa

- To absorb scientific knowledge from other parts of the world requires a domestic research effort.
- Is there a potential in building upon national efforts and establïsh Africa-wide open knowledge platforms in fields such as ICT, Biotechnology, health, energy, transport?
- How can institutions and programs be designed at the national and regional level in such a way that they do not become White Elephants – without interaction with user sectors.
- By giving strong emphasis to engineering dimension? By requiring market orientation with decreasing rate of public support?
- Engineers as intermediators between science and industry. What us the role of engineers in economic development strategies?

Education/learning systems and economic development

- Problem based learning and shift between theory and practise in education
- Understanding and upgrading everyday learning in formal and informal sector
- Offering vocational training and apprenticeships to adult workers and farmers.
- Managing brain-drain and brain-gain – mobilising the diaspora.

STIMULATE THE DEMAND FOR SKILLED FARMERS, WORKERS AND PROFESSIONALS

From sectoral innovation systems to industrial complexes

- Analyse and upgrade the knowledge base of basic sectoral systems (Agriculture, Health, Energy, Raw materials and Tourism). Look for where to invest in capacity building and where to insert new linkages.
- Analyse how industry and services can be fostered as rooted in these basic sectoral systems. From sectoral systems to industrial complexes.
- Industrial complex concept indicates also the political forces that are organised around or may promote the emergence of new *intersectoral systems of innovation.*

The new world order and the role of China and India in Africa

- The increasing presence of China and India may be seen as a threat (neo-colonialism) or as an opportunity (linking up with and learning from the business models of emerging economies).
- Urgent to find ways to steer the presence of China and India toward constructive innovative solutions and toward knowledge sharing with mutual benefits.
- Export promotion and subcontracting to foreign firms as ways to link up with ’advanced users’.

Inclusive development and need driven innovation

- Innovation driven growth is never completely harmonious - innovation is creative destruction. Some will be better off but not everyone. Need for embryonic 'welfare state' that compensates the losers. A mistake only to promote innovations that include women and poor people.
- But innovation programs may respond to specific African needs for infrastructure, communication, health, environment etc. – combination of science, education, technology standards and creative public procurement.
- Such programs should aim at linking up the activities with market-driven industry and service enterprises.

Summing up five questions

- How to build knowledge platforms so that they become organic sources of innovation and development?
- How to grow or transform ’industrial complexes’ with roots in agriculture, raw material and tourism?
- How to use engineers as interpreneurs and engineering as bridge between science and business?
- How to make positive use of the presence of China and India, as a source of capacity building?
- How to combine social inclusion and sustainability with innovation driven development.

On the importance of entrepreneurship

- Being knowledgeable is not enough.
- A need for ’doers’ in all fields
- We need selection mechanisms finding activist doers and giving them incentives to do.
- Recognition of new initiative is fundamental also for social entrepreneurship.

BITRINA is an OUTSTANDING EXAMPLE OF A SOCIAL ENTREPRENEUR.

On the importance of infrastructure (Chapter 6 in Banji 2006)

- Support the building of communication infrastructure and facilitate access to markets domestically, regionally and outside the region.
- Weak systems for transport, electricity, water and telecommunication add to production and distribution costs.

Final remarks

- Innovation refers to processes where people do new things or do things in new ways and learn by doing new things.
- Innovation in this broad sense is at the very core of development in countries at all levels of income.
- Building formal and informal institutions that support interactive learning is a key challenge!
- The most challenging task in low income countries is to find effective ways to upgrade the capacity of users and to stimulate the demand for knowledge.

- Thank you for your attention!