Innovation in Bangalore to innovation from Bangalore

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The technological basis for networks

- **The ICT industry characterized by gradual voice data convergence over the last 30 years (since the development of internet protocols and the shift from circuit to packet switching).**

- **This technological change (or changes to the technical division of labor) has led to changes in the organizational structure of the industry and the kinds of skill its demands (changes to the social division of labor).**

The changing structure of the ICT industry

Application layer

Presentation layer

Session layer

Transport layer

Network layer

Data link layer

Physical layer r

The Open Systems Interconnection Model

Questions for the ICT industry

- Previously distinct computing and communications firms increasingly resemble one another in technological terms.

- Historically, changes in the technical and social division of labor have led to industries seeking regions which can provide them the right combination of inputs – skills, infrastructure and others – and the institutions to generate those inputs.

- This leads us to three questions:
  (i) what are the institutions and inputs that are needed by the new ICT industry?;
  (ii) which are the regions that can provide these institutions/inputs?
  (iii) what does it mean to talk of a region for these new set of requirements?

The inputs – skills in Bangalore

- As the cost and functionality of data communication equipment are increasingly determined by software, the ability to find skilled labor to develop software is critical.

  - reinforced by the presence of 2/3rds of nation's engineering **graduates within a 600 kilometer radius**

  - Bangalore's historical role in public sector led industrialization in sectors such as telecommunications and aerospace provided an initial pool of skilled labor

  - over a period of time, the presence of other firms led to a deepening of the local labor market by

  - Indians who returned home after years of experience either on their own initiative or when transferred within MNCs to India

The inputs - infrastructure

- **A driving force behind agglomeration economies are data communications infrastructure to physically and commercially tie regions to global networks**

  - in 1990, Bangalore became home to India's first Software Technology Park (STP) which is essentially an export zone tailored to the needs of the software industry by providing high bandwidth and also financial incentives

The inputs – access to markets

- **Firms occupying different layers of the ICT industry come together to offer technological platforms on which to offer applications to end customers**

  - these include firms working in the formal sector such as telecommunication service providers

  - it also increasingly involves NGOs who provide access to user or consumers in poorer/informal markets

The idea of a region

- **How do we think of a region for ICTs in the GINs?**

  - the region is not a static entity

  - the size of the region also varies depends on the nature of the inputs

  - thus, in Bangalore, the labor market for experienced engineers is much more restricted to the metropolitan area; similarly, the location of firms to is restricted by access to data infrastructure (30 kilometers)

  - the market for fresh engineers extends across many states, just as ties to organizations that provide access to markets