

RISC and ICT: A cluster approach

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Introduction

India's economic growth and development is predicated to a large extent upon the development of its 700-million strong rural population. Currently, the majority of India's population lives in about 600,000 small villages and is engaged primarily in agriculture and related activities.³ For economic growth, that rural population needs access to income-generating services. But the provision of user services necessitates the availability of infrastructure services that are missing in rural areas.

A model called Rural Infrastructure & Services Commons (RISC)⁴ attempts to focus the supply of services by physically co-locating a variety of firms at specific locations which are accessible from a large set of villages, thus aggregating their demand to a level that is more efficiently met by the market. Many of these income-enhancing services that matter to rural populations are information related.

In this paper, we will introduce RISC. Then we will focus on services that are specifically ICT oriented. We will argue that there are specific requirements that the use of ICT imposes which are best met in a cluster approach. One such requirement is the efficient provision and use of ICT requires a "deep back-end" which poses severe challenges in rural areas.

We will argue in conclusion that the use of ICT is mandated by the general need for providing income enhancing services to rural populations, and that the clustering of services in something like a RISC hub is a logical step towards rural economic development.

Services and Infrastructure

People need access to a wide range of services such as market access, educational, health, financial, entertainment, transportation, and communications. The efficient provision of user services requires affordable infrastructure. However, infrastructure investment is 'lumpy' because infrastructure exhibits economies of scale. This suggests that the most efficient mechanism for providing the needed infrastructure in rural areas is to aggregate the supply in specific locations, a cluster approach. Scale and scope economies will drive aggregated demand to the chosen locations. The argument is that this will reduce average costs and therefore prices.

Even if the full set of infrastructure were provided at every village, it would not be commercially sustainable as the aggregate derived demand for the infrastructure will be

³ The future distribution has to be a much smaller number of much larger aggregations of people – if the desired future is one where the agriculture sector's share of GDP is to be significantly smaller relative to manufacturing and services sectors, and if the majority of the labor has to be engaged in non-agricultural activities.

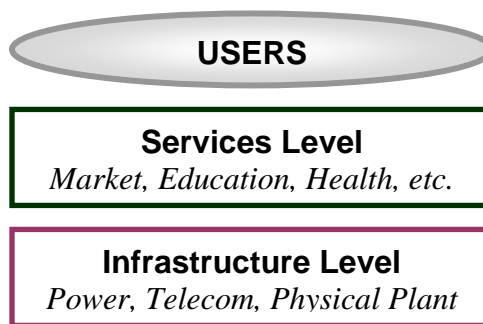
⁴ RISC – Rural Infrastructure & Services Commons: "A model for a Bicycle Commute Economy". Full concept paper available at Vinod Khosla's website at <http://www.kpcb.com/files/RISCNov.2003.doc>

insufficient. Clearly, subsidy of infrastructure for 600,000 villages is not an option considering resource constraints.

The RISC idea is to bring to the rural population the full set of services that are essential and enhance incomes. It works within the constraints of limited resources by focusing attention to and concentrating investments at specific locations to obtain economies of scale, scope, and agglomeration.

RISC Structure

RISC follows the logical trend of moving away from vertically integrated institutions to one of horizontal segmentation and specialization. Thus, conceptually and operationally, a RISC has two levels: the lower one is the infrastructure level (I-level) which provides a reliable, standardized, competitively-priced infrastructure platform consisting of power, broadband telecommunications, and the physical plant (building, water, air-conditioning, sanitation, security). The I-level is achieved by the coordinated and cooperative investment of firms that specialize in the component activities.



The user services level (S-level) is above the I-level. Co-located at the S-level are firms that provide user services such as market making, financial intermediation, education, health, social services, governmental services, entertainment, logistics, etc. The presence of the I-level reduces the cost of the services and therefore the prices that the users face. Economies of scope and agglomeration are obtained by the presence of the variety of different service providers.

Given that rural populations are very poor, it is reasonable to expect that the aggregate demand of a single village for any single service will be very low. However, the aggregate demand for, say, a 100 villages for a single service could be significant. Aggregating the demand for many different kinds of services of the same 100 villages would translate into lot of services. These services would require infrastructural inputs which can be commercially and sustainably supplied.

RISC provides a signal to coordinate the activities of a host of entities: commercial, governmental, NGO's. It synchronizes investment decisions so as to reduce risk. It essentially acts as a catalyst that starts off a virtuous cycle of introducing efficient modern technology to improve productivity that increases incomes and thus the ability of

users to pay for the services, and so on. It creates a mechanism that reduces transaction costs and therefore improves the functions of markets.

Operationalizing RISC

The total rural population of India can be covered by about 6,000 RISCs each servicing the needs of approximately 100,000 people. Further external economies of scale can be obtained by implementing a few thousand RISC locations across the rural landscape. Access to a RISC for any rural person would be only a 'bicycle commute' away.

The distinction between the I-level and the S-level becomes apparent at the operational level. The I-level is provided by a small number of firms that specialize in the provision of infrastructure. The essential requirement is that the investments from these various firms are coordinated. This resolves the 'coordination failure' generally associated with investments that are large, lumpy, which have large lead times in implementation, and have long payback periods. These can be either private sector or public sector firms.

There is an element of planning in the creation of the I-level. But it is not a top-down, bureaucratic, government-imposed centralized planning. It is coordinated investment in various components of the infrastructure so that they all make each other mutually viable. The role of the government is highest at this level.

The government has to facilitate the process of the creation of the I-level first through light-handed regulation. Second, it has to give required tax incentives to the firms. Third, the government may be required to facilitate investment through loan guarantees. Finally, it has to facilitate the acquisition of land required for the projects. The model does not require the government to directly fund any of the infrastructure elements.

Naturally, the firms providing infrastructure will base their investment decisions on adequate return on investment. The infrastructure will be used by, and paid for, by the firms which are at the S-level and which provide services that users demand. The composition of firms at the S-level will be almost entirely market-driven. There will be two basic categories of services. First, services which the users are willing and able to pay for. This means that the benefits to the users of the services will be greater than the costs. These are the 'income-enhancing services' such as greater market access. Second, services which are not fully priced such as government services and those provided by NGO and charitable entities.

RISC and ICT

RISC serves as a focal point for the bi-directional flow of information and materials within the rural areas by clustering economic activities in specific rural locations. It integrates the rural economy with the national and the global economy.

In abstract terms, RISC embodies a marketplace which is sufficiently large, efficient, and varied. For efficient functioning of markets, the information requirements are stringent:

information has to be timely, cheap, accurate, sufficient, accessible, and reliable. The widely celebrated advances in information and communications technology (ICT) have provided the tools for this to be possible.

There is a problem, though. These technology tools impose a degree of sophistication on their users for their effective installation, maintenance, and use. High technology has a “deep back-end” which is generally hidden from the users. To keep complex systems up and running requires highly trained people. While in urban areas, the depth and availability of human resources required for these high technology tools can be generally taken for granted, rural areas are starved of trained people.

Very small installations of computers and telecommunications such as found in “internet kiosks” in villages scattered across the rural landscape suffer from all kinds of problems. First, power is poor quality and unreliable. Second, in case of any software or hardware failure, the time to repair is high because trained manpower and spares have to be “imported” from cities. Finally, even though the capital expenditure for a small internet kiosk is small, the range of uses and the capacity utilization is so small that they are not commercially viable.⁵ The long run average cost of the services provided by kiosks exceed the average benefits to the rural users.

RISC addresses the entire range of concerns that are associated with the use of ICT in rural areas. First, it provides reliable, high quality power. The idea is that a RISC would be a sufficiently large user of power that it would be economically viable to have its own captive power generating unit such as a diesel generating set or even some alternate renewable power source such as biomass, wind, or solar unit.

Second, it serves a very large number of users with a wide variety of services, all of which require ICT. Therefore, the scale of the ICT implementation is bigger than just a few PCs with a dial-up connection. Indeed, even a moderately sized RISC would have a few servers, scores of PCs and terminals, and broadband internet connectivity. The capital expenditure can therefore be shared over a greater volume of services and therefore the average cost will be low. That is, the capacity utilization will be much higher than in the case of isolated internet kiosks.

Third, reliability and availability of the ICT platform will be higher since trained manpower can be resident on site given the scale of the operations at a RISC.

Example ICT Services

There are a wide range of services required in rural areas that are ICT-oriented. A short list would include the following:

⁵ For a review of various internet kiosk models such as n-Logue, Drishtee, and ITC e-Choupal, see “Information Technology and Rural Development in India” by Nirvikar Singh. http://econ.ucsc.edu/faculty/boxjenk/wp/Singh_IT_IDF.pdf

- Market making: Bi-directional flow of market information for prices of inputs and outputs from agricultural and non-agricultural related activities.
- Medical: Access to information on medical practices and tele-medicine video conferencing.
- Educational: Information through access to the internet and the world wide web, such as tele-courses for general and vocational education.
- Financial intermediation: Banking and insurance related information services.

For the above and many more services dictated by local conditions, the required hardware, software, and the physical infrastructure can be provided at the RISC. All the available resources can be shared and thus lead to higher capacity utilization and thus to lower average costs.

For example, the same video conferencing facilities and conference room can be used by medical services, educational services and entertainment. The broadband connection, similarly, can be shared by all the services requiring broadband access.

Many rural users are not sufficiently educated to use the power of ICT tools. This problem can be circumvented by providing intermediation at the RISC. For example, if a farmer needs market information, he can request the information in his own words and the request could be served by a person who knows both the local language and is also trained to search and interact on the internet. Another example would be that of artisans and craftsmen in the local area. Their need to access the non-local market can be met by trained intermediaries who understand how to use the web most effectively.

Conclusion

RISC aggregates a wide variety of user services and service providers, the full set of infrastructure and infrastructure service providers, and thus provides a focal point for investors to coordinate their investment decisions. The use of ICT is extensive for the provision of services.

The location of a RISC and the services that it provides will be dictated by market demand. Specifically, a RISC would be located to serve the populations of a district or its subdivisions, depending on the expected aggregate demand for its services. The availability of services – and intermediation – will draw from the surrounding villages those who are most able to make use of the facilities. In a sense, users will self-select among themselves those who are the most entrepreneurial and thus increase economic activity in the area. The powerful tools are available today and RISC actually makes it accessible and transforms potential users to actual users of ICT.