Can National Information Infrastructures Enhance Social Development in the Least Developed Countries? An Empirical Investigation

PETER MESO, Kent State University, USA
NANCY DUNCAN, Kent State University, USA

The need for national information infrastructures (NII) in the world’s least developed countries (LDCs) tends to be overshadowed by the nation’s severe deficiencies in physical infrastructure. Consequently NII may be inadequately addressed by governments and supporting agencies in their plans for stimulating social growth. The example of Singapore’s TradeNet and other lesser-developed countries developing national, electronic information infrastructures, suggests that information technology infrastructure may enable an LDC to develop at a particularly advanced rate. This paper studies the relationship of information infrastructure and social development. It establishes a clear correlation between 1) levels of information infrastructure and social development, and 2) growth rates of information infrastructure and social development. The findings suggest that governments of LDCs may enhance their countries’ growth by developing strategic plans for NII development.

INTRODUCTION

The value of information technology infrastructure in business has been well documented over the past few years (e.g., Branchaeu et al. 1996; Broadbent et al. 1996; Duncan 1995). It is understood to affect the firm’s process efficiencies (Keen 1991; Weill 1994) and to have strategic potential for the firm’s comparative performance in its industry (Keen, 1991; Branchaeu et al., 1996; Duncan, 1995). It enables firms to economize on transactions through “virtual integration” (Clemons and Row, 1991; Miller et al., 1993) and to compete in markets that would otherwise be inaccessible.

The concept and perceived value of a national information infrastructure (NII) arises from similar needs within and across national boundaries. As information technology expands a nation’s interconnectivity and capacity for information integration, hitherto independent sectors such as education, health, social policy, commerce and trade, government, agriculture, communications, and science and technology can be integrated. An NII that allows members of the various sectors to share information and related resources may increase process efficiencies and intellectual activity that lead to economic productivity. Sharing resources reduces the cost of affected projects or services, which in turn increases feasibility of new endeavors. Consequently, the span and scope of its information infrastructure can affect a nation’s delivery of social services, national productivity, and may ultimately stimulate economic growth. This synchronous development of a vision for integrated national services makes evident the importance and value of an integrated national information infrastructure.

The value of greater information integration across independent sectors has been explored and exploited by nations with highly developed economies such as the U.S. In economically less developed countries, the need for NII is less obvious. It may be obscured by needs for more basic infrastructure (such as roads, electricity and water treatment networks), or it may simply not be in demand because the need for information occurring in service-based economies is not yet pressing (Odedra et al, 1993). Yet if the NII can offer strategic economic benefits to a developed country, it may likewise offer means for more efficient economic development in the least developed countries (LDCs). Indeed, it may
offer new and more efficient means to both social and economic growth.

Since the concept of an NII is very recent, hardly any empirical research has been conducted to study the correlation or causal relationships existing between the development of an NII and the economic and social development of particular countries, least of all the LDCs. LDCs face immense disadvantages in social and economic development. Their precarious position is exacerbated by the current global economic order centered on international open-market trade. However, it is generally accepted that the increasing disparity between the developed nations and the LDC’s is not beneficial for the sustainable growth of the international economy. Therefore sustainable growth of LDC economies is rapidly becoming an international concern.

This paper examines the potential relationship between national information infrastructure and social development in LDC’s. The next section of the paper examines the hypothesized role of information infrastructure in the social development of developing countries as well as in the international economy. It posits the unique capabilities of information infrastructure in providing access to markets and basic services unattainable without an adequately developed physical infrastructure. Such capabilities may offer an efficient alternative to physical infrastructure through which infrastructure-dependent services can be dispensed within LDCs. Part three presents the research design and method. Data collection and analysis are described, and the assumptions of the study elaborated. Part four documents the findings of the study and the inferences drawn therefrom. Our conclusions focus on the implications of this study for future research.

INFORMATION INFRASTRUCTURE AND SOCIAL DEVELOPMENT

Previous research establishes that the quality and levels of services provided by sectors including education, health, commerce, government, agriculture, communications, and science and technology impact positively the rate of economic and social development in LDCs (Sadowsky, 1996; Antle, 1983; Romero, 1995; Saunders, 1996; Leff, 1984; Stone, 1993; Wingrove, 1993). To the extent that service quality is dependent on quality and quantity of information, and to the extent that delivery of service depends on efficient access to and delivery of information, we may expect economic and social development to be affected by the breadth and capabilities of the NII. In this section, we discuss the research problem, describe the research model, and present the hypotheses of the study.

The Problem: Can NII Development Catalyze Social Development in LDCs?

Economic development data shows that developed countries exhibit higher information infrastructure indices — as measured by the proportions of the population having direct access to telephones, television sets, radio sets, cable television, newspapers and periodicals, postal services, and the Internet — than developing countries. They also exhibit more extensive communication networks — as measured by total length of telephone, television, Internet, and Electronic Data Interchange cable per geographical area — than do developing countries. Further, these countries have a larger total number of broadcasting stations, television channels, newspaper and periodical titles, libraries, and post offices per geographical area than do the developing countries.

A comparison of the developing countries to LDCs reveals the same type of relationships — developing countries have higher information infrastructure indices than the less developed countries (World Factbook, 1994; World Bank, 1994; Danowitz, 1995). This data suggests that as a given country achieves a higher level of economic development, it requires a more advanced information infrastructure to support the increased volume and complexity of the transactions taking place within its economy. Therefore the country’s national information infrastructure develops in the same direction as the overall economic development of that nation (Danowitz, 1995). These data suggest increased economic development pushes NII development. As a given country achieves a higher level of economic development, it will require a more advanced information infrastructure to support the increased volume and complexity of the transactions taking place within its economy. Therefore the country’s NII develops in the same direction as the overall economic development of that nation (Danowitz, 1995).

In order to bring about rapid and widespread economic development, LDCs might develop concurrently all infrastructure components to such levels as will capacitate citizens to exploit fully the production resources within these countries. However, these countries lack the capital to develop these infrastructures (Odedra, 1993). The costs involved in developing the infrastructure have proved to be prohibitively high for most LDC governments (Antle, 1983). A feasible and quicker solution may be to develop an NII that will deliver intangible services such as education, health care, commercial services, and technological know-how to a wider population of citizens, regardless of their physical location or economic status in the LDC. The knowledge acquired by these citizens may then capacitate them to derive their own solutions to the tangible infrastructure limitations such as poor transport networks and inadequate machinery.

With adequate information access, citizens may obtain information on where to source cheap and reliable machinery and how to obtain financing for such machinery. They may also obtain information on how to use locally available materials to develop or build cheap and reliable machinery, hence expanding their productive capacity. They may identify methods of collaboration with government and private organizations to develop transport networks, access to markets, access to energy, and access to material inputs. In so