

Perspectives on Global Internet Diffusion

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INTRODUCTION

There is a strong link between the adoption of the Internet and economic growth opportunities for individuals as well as economies. In spite of this potential payoff, the percent of individuals adopting the Internet remains low in many countries. According to the International Telecommunications Union (ITU), in 2013, only 16.3 percent of the Africans used the Internet, whereas the average Internet adoption rate in Europe is nearly 75%. Further, in many countries the Internet penetration rates still remain below 10% (ITU, 2013). So, the factors that promote or hamper the adoption of the Internet are worth studying. An understanding of these factors is crucial to forming policies and strategies that enhance the Internet adoption rate and subsequently contributes to the economic development. Insights gleaned from this can assist policy makers, economic developmental agencies, and political leaderships of countries in formulating appropriate strategies and implementing policies.

BACKGROUND

The Internet is playing an increasingly vital role in the economic development of nations. The adoption of the Internet and related business applications such as e-business, voice over IP (VoIP), mobile commerce, and integrated supply chains have become the primary drivers of the growth of economic activities in many countries (Albirini, 2008; Dedrick, Gurbaxani, & Kraemer, 2003; Kenny, 2003, Koh & Chong, 2002). Also, the Internet provides revenue-generating and skill-enhancing opportunities to individuals. For individuals, it includes the opportunities to sell things online, collaborate with people at far-flung places, learn

new skills online, access data/information quickly, and faster communication (Chavula, 2013; James, 2008; Larson & Murray, 2008; Laguerre, 2013). An increased adoption of the Internet and information and communication technologies has been shown to increase globalization and trade and lead to higher GDP (Albirini, 2008; Kuppusamy, M. & Santhapparaj, A.S., 2005; Lawrence, 2002; Raheel, Karim, Saleem & Bharwani, 2012). In fact, the recently published *Global Information Technology Report 2013* estimates that in 2011, digital technologies boosted global economic output by nearly \$200 billion and created six million jobs. It also reports that a 10% increase in a country's digitization score (a measure of the pervasiveness of information and communication technologies) increased GDP by $\frac{3}{4}$ of a percentage point and pushed down unemployment rate by slightly more than a full percentage point. More specifically, for mobile phones, the report states that a doubling of mobile data usage was found to increase GDP per capita by $\frac{1}{2}$ a percent point. Accelerated economic growth of India and China in the last decade is also a prime example of how ICT in concert with appropriate economic, intellectual property protection, and infrastructure improvement policies promote rapid economic development.

GLOBAL INTERNET ADOPTION FACTORS

There are many factors that determine the adoption rates of the Internet in various countries. These factors include the availability of reasonably-priced technology/telecommunications infrastructure, access to personal computers, educational and training opportunities for individuals, income levels, innovative capability, culture, and competition in the information technol-

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ogy industry, (Beilock & Dimitrova, 2003; Birba & Diagne, 2012; Chinn & Fairlie, 2007; Dewan, Ganley & Kraemer, 2010; Dholakia, Dholakia & Kshetri, 2003; Huang & Chen, 2010; Kiiski & Pohjola, 2002; McCoy, Cha & Durcikova, 2012; Meijers, 2006; Murthy, 2004; Nath & Murthy, 2003, 2004; Oyelaran-Oyeyinka & Lal, 2005; Wunnava & Leiter, 2009). Also, the rule of law (e.g., property rights, strong legal system) governing the country's trading system, government regulations and market liberalization policies, and credible payment systems (e.g., credit cards, digital wallet and cash) are necessary for expanding into mobile and digital commerce.

Human Capital Development Factors

It is virtually impossible to fully reap the benefits of the Internet if people are not able to read or write or have a basic understanding of computers, Internet and their applications. Therefore, a person needs to have a minimum level of computer/technology and language literacy to use the Internet and use it for beneficial purposes. At the national/regional level, one way to measure this is to consider indicators such as:

1. Adult literacy rate
2. Percent of school age children enrolled in schools
3. Per capita spending on education

Many studies including those by Balamoune-Lutz (2002), McCoy, Cha and Durcikova (2012), Nath and Murthy (2003), Noce and McKeown (2008), and Wunnava and Leiter (2009) have concluded that literacy and tertiary enrollment rates have a strong positive influence on Internet adoption. Also, literate citizens are more accepting of information and communication technology (ICT) innovations. And this results in higher acceptability and utilization of the Internet and its applications in commerce, personal productivity tools, education, health, and social networking.

Technological Factors

As one would expect, a reliable and cost effective network infrastructure is a prerequisite for people to use the Internet. This includes the bandwidth, the number

of Internet hosts, the reliability of electric power, and the percent of the population of a nation that have access the Internet. In addition, people who are familiar and comfortable with using other technologies such as a phone, a mobile phone and a personal computer are more likely to adopt and use the Internet. Specific variables that one may consider here are:

1. Number of personal computers per 100 inhabitants.
2. Telephone lines per 100 inhabitants.
3. Cell phone subscribers per 100 inhabitants
4. Number bandwidth (bits) per capita
5. Reliability of electrical power

One key aspect of the new economy is the availability of cost-effective information and communication technologies (ICT) and the above listed items represent leading indicators of ICT (Balamoune-Lutz, 2003). Several studies have established that countries with higher availability rates of personal computers, tablets, telephones, and mobile phones, sufficient bandwidth and reliable supply of electricity that powers most ICT devices, also have more Internet users (Nath & Murthy, 2003, 2004; Wunnava & Leiter, 2009).

Economic Factors

How expensive is it to get online? If this cost is prohibitively high relative to the income, then the Internet penetration rate is bound to be low. The two variables that are relevant here are:

1. Real Gross domestic product per capita (in US purchasing parity \$)
2. Average monthly cost of 20 hours of Internet access.

Kiiski and Pohjola (2002), and McCoy, Cha and Durcikova (2012), found that, across countries, GDP per capita and Internet access costs were good predictors of the growth of the Internet. Further, Nath and Murthy (2004) using data from 62 countries, demonstrated that higher "average monthly cost of 20 hours of Internet access" had a significant negative impact on the Internet adoption rates.

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