Research Report

Information Technologies and International Development: Conceptual Clarity in the Search for Commonality and Diversity

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Abstract

Good public policy and good analysis (and even good journals) should begin with good clear definitions of their core concepts and terms, and if possible, the relationships among them. For the launch of Information Technologies and International Development, *terms such as* information technologies *and* international development *are no exception—we need to define each one carefully and to explore the relations among them.*

Introduction

This essay begins by defining the developing world and contrasts it with the developed world. It considers common features shared by developing nations and points to the internal diversity among them. Second, it analyzes some common experiences of information and communication technologies (ICTs) in developing countries, especially issues of capital investment and effective use, while pointing to the diversity of experiences that countries have had in deploying ICTs. Next, the essay links international development and ICT by considering evidence that investment in ICT and effective use do matter for the economic development of a country. It also shows diversity within the capacities of countries to create an environment in which information technologies can yield their greatest benefits. The essay concludes that it is critical that governments create a positive enabling environment of good institutions and good policies to link ICT and international development.

The vocabulary and study of development start with the concept of the developing world. Is there such a place? The short answer is yes: there are common features that distinguish developing countries from industrial countries along broad and narrow measures. Figure 1 shows various measures that are used often to distinguish between rich, industrial countries and poorer, developing countries. Two broad measures of development are income per person, which accounts for market-based indicators of economic activity, and the human development index, which also includes health and education metrics. Two measures of information and technology usage are the density of PCs in a country and the intensity of Internet use in a country (see the Appendix for data definitions).

The divide between haves and have-nots is real and obvious, whether measured by dollars or digital indicators. The drop in income per person from the average high-income country ($27,700) to the average middle-income country ($5,680) is tremendous. But even the high-income group enjoys only 80% of the income of the United States. Among regions, Latin America, the Caribbean, East Asia, and Pacific countries straddle the

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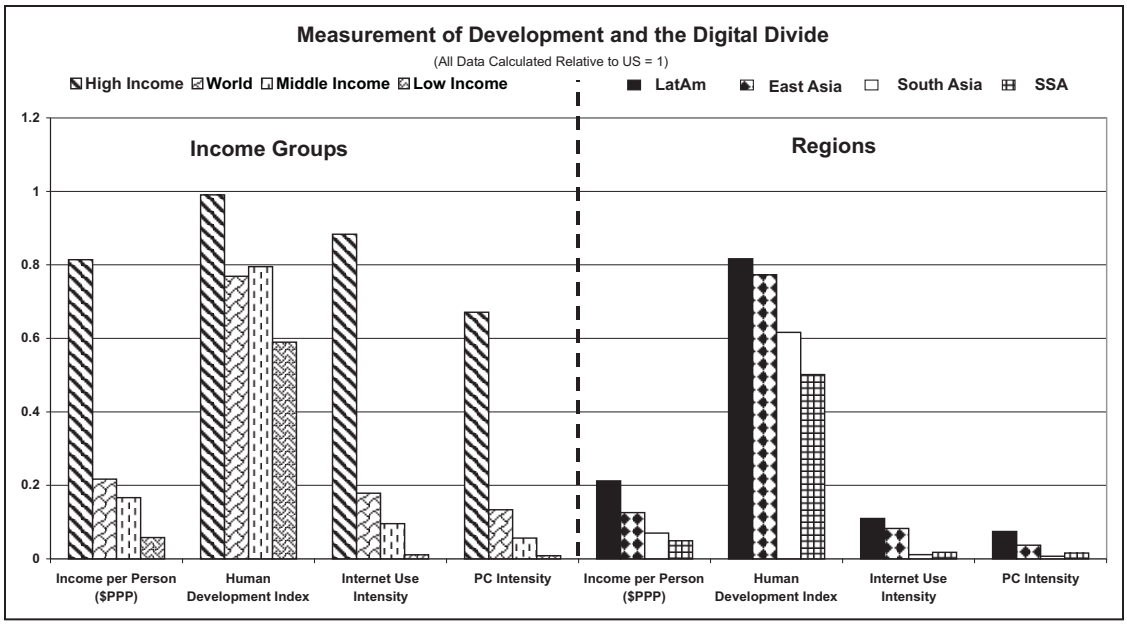

Figure 1. Measures of development and digital divide.

value for middle-income countries taken as a group. Income per person for countries in the regions of South Asia and sub-Saharan Africa straddle the low-income value of $1,980 per person per year. Even this low value masks the fact that about 650 million people exist on around a dollar a day (Bhalla 2002:61–63).

Differences in the human development index, which includes health and education outcomes, are not so extreme. The US lead over the other high-income countries in terms of human development is much less, reflecting somewhat lower life expectancy and relatively lower enrollment ratios in the United States. On the other hand, for developing countries, longer life expectancy, improved adult literacy, and rising educational enrollments have significantly improved their measures of human development. Still, this social progress has not yet translated into higher income per capita. Although not so apparent from these aggregated groups, taking all the economies around the world, there is a strong positive relationship between income per person and human development, particularly at lower levels of income. Thus, improvements in income and in development do go hand in hand.

Given the differences in income between different regions and groups of industrial and developing countries, there should be no surprise that various digital divides exist, as well. Higher income per person more easily finances PCs and intensive use of the Internet. Yet, there are some interesting caveats in comparing income and information gaps.

First, high-income countries have a smaller Internet-use gap than an income gap vis-à-vis the United States. That is, high-income countries as a group use the Internet more intensively than one would think based on the level of income per capita alone. Second, and of particular relevance for developing countries, is that the high-income group's PC gap with the United States is larger than the Internet-use gap. Considering the two gaps together implies that intensive Internet use does not require that a country have equally numerous PCs. No surprise to the denizens of Internet cafes: you do not have to own a PC to use one.

Looking at the groupings of developing countries, income gaps and technology gaps exist, but only to a point (Figure 2). First, television and telephones are types of ICTs in the sense that information can be transmitted and exchanged through these devices. These can be networked and the Internet can be accessed this way, as well. On this basis, the digital gap between the middle-income countries (including those in Latin America and East Asia) and the high-income countries is in fact smaller (televisions) or not much larger (telephones)

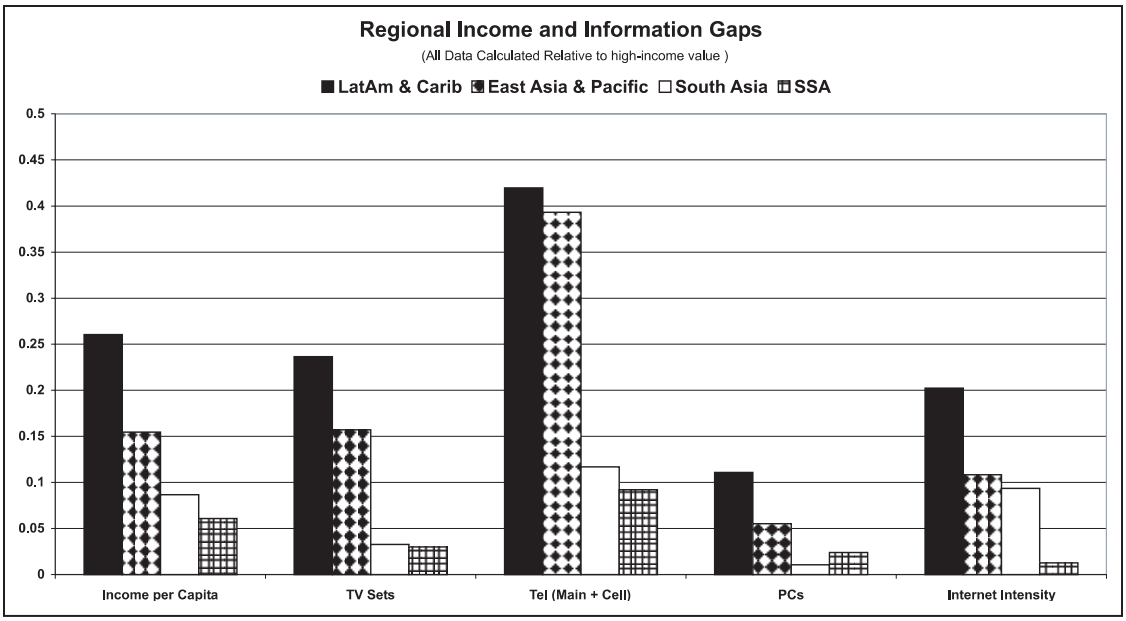

Figure 2. Income and information gaps.

than the income gap. In this respect the digital divide and the income gaps may be more reflective of the same fundamentals rather than some new force unique to IT.

What about the more common ways of measuring the digital divide, with PC density and Internet usage? If using IT means owning a PC, then for these groups of developing countries the digital gap is dramatically wider than the income gap. But, as noted earlier, when comparing the high-income countries with the United States, PC ownership may not be a good measure of how intensively a country is using IT. If Internet usage is the better measure, the digital divide and income gap between rich and poor look about the same for most developing country groups and regions. Even in the low-income group of South Asia, the technology gap as measured by Internet usage is no wider than the income gap, even though other indicators (PCs, telephones) are more pessimistic.

It is in the poorest countries, particularly in sub-Saharan Africa, where all indicators of technology access and technology use are extremely low. For these countries, only the television gap is smaller than the income gap. The telephone gap is much larger, with PC and Internet usage gaps equally large. For the poorest countries, these consistent and huge gaps suggest that, among other fundamental problems (such as war and disease), there might be a threshold of investment in technology and infrastructure that must be achieved before they can start to narrow the digital divide, as well as raise income per person.

Are the Income Gaps Closing?

The previous section argues that there are big gaps between rich and poor (although exactly how large depends on the measure). Section 5 presents evidence that effective use of IT does increase income. But before focusing on IT and growth it makes sense to ask, What do we know about the income gap over time? Is development around the world proceeding apace or not?

There is a huge and controversial literature on whether rich and poor countries are becoming more similar in terms of income per person. Assessing convergence is not so simple: Should it be measured on a country-by-country basis, in which case Pritchett's line is, "Divergence, big time" (Pritchett 1997). Or should it be measured on a global population basis, in which case Sala-I-Martin says, "Convergence, period" (Sala-I-Martin 2002). Pritchett's approach takes each country as an equal unit

regardless of size to judge whether income per capita has converged over time. The Sala-I-Martin method (similar to that of Bhalla 2002) takes individuals as the unit of measurement. So when a large country lifts the bulk of its population out of poverty, this would get a higher weight in the analysis than if a small country were as successful. Which metric to use (country, individual, or within country) and how to measure the income of the individual (via national income accounts or surveys, among other methods) matter a lot for the conclusion (Ravallion 2003) and are important when considering the possible spread of ICTs.

Each of the various approaches to measuring convergence can be right depending on the question. Which is the better way to measure convergence if we wish to consider the role for IT? On the one hand, IT is a global phenomenon, in theory equally available for all people, in which case the Sala-I-Martin (2002) approach to measuring convergence might be appropriate. On the other hand, if the domestic policy environment of a country is critical for the effective use of globally available IT in that country, the Pritchett (1997) approach to measuring convergence is better. This essay argues (and research supports) the latter, that domestic policies and business environment are crucial for a country and its people to benefit fully from IT. It is not enough for technology to be available; it needs to be used in a country by its citizens and businesses, and that depends on policies at the level of the country.

To exemplify this point, return to the human development index. This broad measure of the development gap is much smaller than any of the other gaps. This may suggest that with better health and skills in place, income growth will follow: convergence in income is just around the corner for the poor countries. Alternatively, this snapshot of human development for different income groups could imply that despite improvements in health and educational attainment, income growth remains elusive: the poor remain poor because other policies and institutions have failed.

A similar unease comes when the digital divide is the focus of attention. Various pronouncements imply that the digital gap deserves specific focus because of the particularly great potential of IT for growth (G8 2000; APEC 2000). By this reasoning, focusing on closing the digital divide will promote quicker convergence (or reverse the trend of divergence) in income per person. Although evidence is clear that ICTs contribute importantly to income growth (section 5), it is also clear that supportive policies, institutions, and human resources are really key to unleashing that potential. Therefore, IT cannot be a goal in itself. But might a focus on ICT help catalyze broad-based policy and institutional change? If so, income gaps could narrow and countries could be lifted from poverty. Through this perspective, Internet development is important for international development, not just on income and wealth dimensions.

Diversity in Policies and Outcomes in the Developing World

Examining successful diffusion through the lens of gross domestic product (GDP) per capita does not take us far enough to reveal the full relationship between growth and ICT, nor is it sufficient to look at policies and outcomes across broad categories of countries. It is also necessary to examine countries as individuals. Figures 1 and 2 mask considerable diversity among countries in each income group; Figures 3 to 5 show individual countries. Whereas developing countries on average had lower Internet use than the United States or other high-income countries, some individual developing countries have higher Internet use than do the high-income countries and even higher than the United States (Korea, Estonia). Among moderately well-to-do developing countries, some (Chile, Malaysia) have far higher Internet use than others (Mexico). Even among poor countries, some (Jamaica, China) have higher Internet penetration than other countries with similarly low incomes (India).

Telecommunication costs are a policy factor particularly important for differentiating between indicators of IT availability and Internet use. Considered over all countries, higher telecommunications costs inhibit Internet use, but cheap telecoms do not guarantee Internet use (Figure 4). Sadly, the relationship between costs and usage is most apparent in the poorest countries, where costs are exorbitant and usage rates are lowest. Among middle-income countries the experience differs. Some with relatively high cost have low usage (Argentina) and others with similar income and lower cost also have low

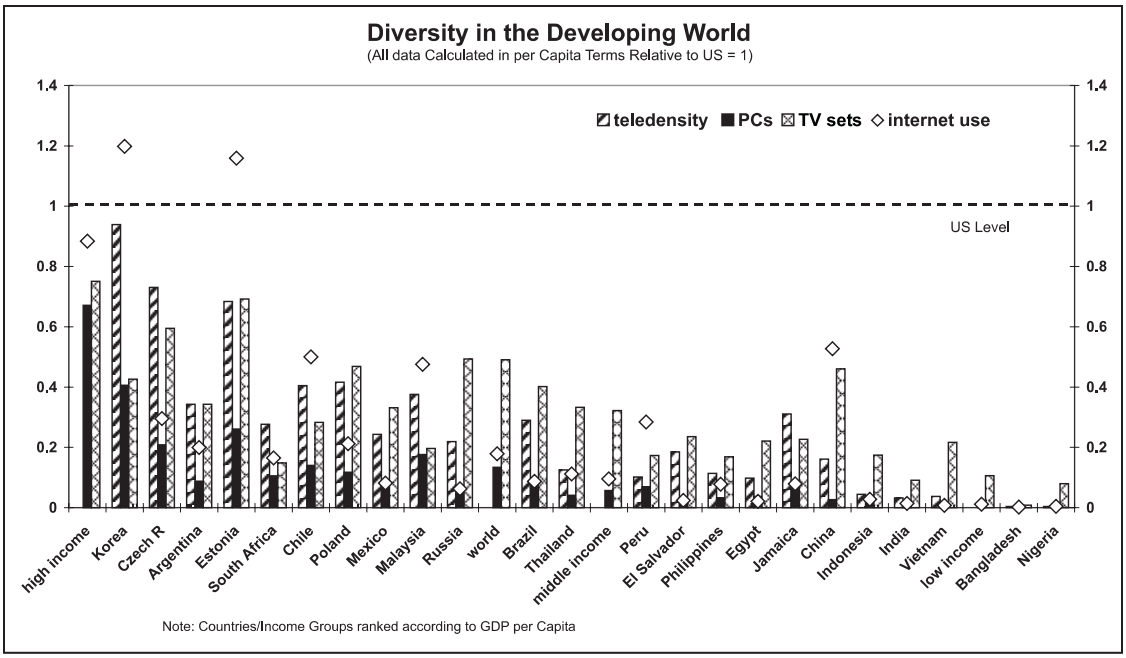

Figure 3. Diversity in the developing world.

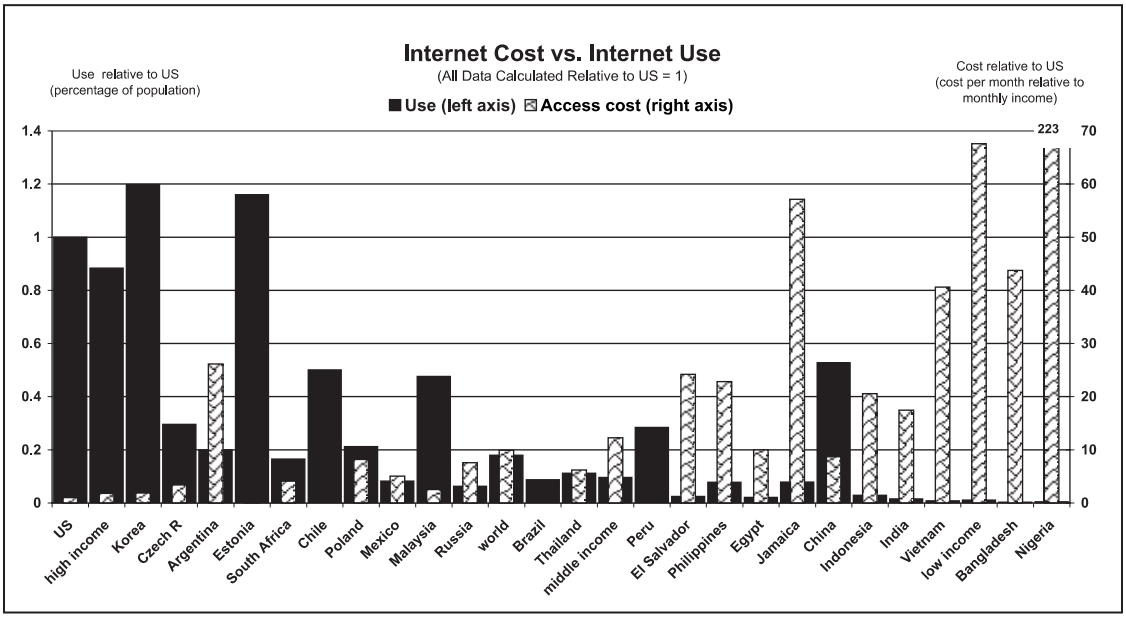

Figure 4. Internet cost versus Internet use.

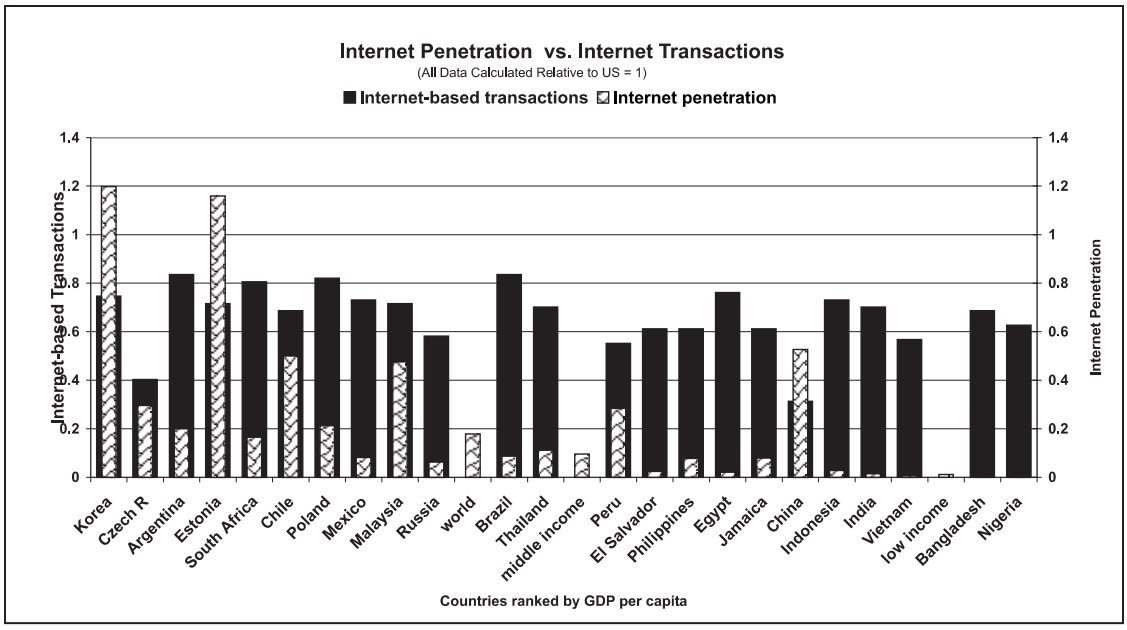

Figure 5. Internet penetration and Internet transactions.

usage (Czech Republic). Some countries appear to be using a cheap-access strategy to promote usage (Peru, Malaysia, Chile).

Drilling further into differences between policies and outcomes, Internet use is but one indicator of the extent to which networked ITs have taken hold throughout an economy. To affect income growth, it matters what people do on the Internet when connected. Do they read e-mail and play games or engage in business research and commercial transactions? Whereas e-mail and games are good entry points for familiarization with networked IT, changing the activities of business to increase efficiency of resource use requires the additional steps of commercial linkages and financial transactions (Mann et al. 2001:72–73; Litan and Rivlin 2001:65–100). Policies are an important foundation for these next steps.

For example, Korea and Estonia have higher Internet penetration than does the United States, but survey data indicate that Internet-based commercial transactions are much lower than in the United States (Figure 5). In Korea, for example, extensive broadband capability supported and financed by government intervention is used mostly for entertainment rather than for business activities (Mann and Soe 2003).

On the other hand, in Brazil and Poland, even though Internet penetration is relatively low, the survey data suggest a relatively more extensive use of the Internet for business and consumer transactions. In Brazil, government legislation requires that banks clear financial transactions in real time; this requirement has promoted Internet banking and financial system software (Botelho 2003).

China and India also stand out. In China, the Internet has taken hold, but its use for commercial transactions has not. China's policies toward limiting international financial transactions, as well as the poor condition of its banks, play a role. In India, Internet penetration is low, but its use for commercial transactions is relatively high. India's policies promote Internet-based and export-oriented IT-services businesses that build on the training and skills of its citizens. Can we say which of these two countries is ahead in integrating IT into the fabric of the country and economy? Probably not. On the one hand, China's more widespread use might put it on the cusp of commercial use, once other policies are fixed. On the other hand, India's commercial use might generate sufficient income to support use beyond the export-oriented IT campuses.

All told, policies relating to the telecommunications and financial systems, the degree of

integration with international markets, the overall business environment, and the education and skills of citizens are all relevant factors affecting whether the Internet is used for play or profit.

Is It Worth It? Can ITs Really Raise Economic Growth?

Good services infrastructure, extensive international trade linkages, a supportive business environment, and educated citizens are all long-standing development objectives.[1] Reforms to achieve these goals are comprehensive and go to the heart of how an economy works. They often present difficult political and institutional challenges. In comparison, buying computers is easy. Is comprehensive effort really worthwhile in the name of ICT? What do we know about the relationship between IT and growth?

Careful research on both industrial and developing countries shows that investment in IT and transformation of economic activities to take advantage of what IT can do deliver big income gains. But not all developing countries are alike. For the poorest countries, spillovers through ICT investment may be relatively more important. For middle-income countries, with more ICT in place, policies that promote effective use of ICT through the transformation of economic activities may matter relatively more to achieve higher income.

The strongest evidence that transforming the environment matters comes from industrial countries, where, in comparison to developing countries, there is plenty of capital in place. Researchers find that the benefits of technology capital for productivity growth are lower when rules restrict resource reallocations across firms and sectors in the economy (e.g., bankruptcy rules, closing plants, or changing product lines). Similarly, the gains to technology capital are also lower with rigid organizational relationships within firms (such as adversarial management-labor relations and restrictions on changing work rules or firing workers; Gust and Marquez 2002; Bassanini, Scarpetta, and Visco 2000; van Ark, Inklaar, and McGuckin 2002; Dunne, Foster, Haltiwanger, and Troske 2000; Brynjolfson and Hitt 2000; OECD 2003).

Comparing and contrasting the experience of the United States and Australia is particularly instructive (Table 1). In both economies labor productivity growth rose substantially during the 1990s. Productivity growth matters because it is the foundation for higher wages, faster sustainable GDP growth, and therefore, higher standards of living. In the United States and Australia, investment in IT capital accounted for about one-half of the increase in productivity growth. The other half of the acceleration came from increased multifactor productivity growth (MFP). MFP is a proxy for how the activities of workers and firms change when ICT is applied in an enabling environment.

This industrial country example has relevance for developing countries. First, and particularly pertinent for most developing countries (other than the ICT producer powerhouses in East Asia), is that Australia does not produce much IT. Rather, during the 1990s, Australia imported ICT products to raise its ICT investment. Of equal importance is that at the same time, Australia reduced tariffs and engaged in reforms that increased flexibility in labor markets and competition in product markets to raise MFP. Therefore, ICT did not just sit in the corner office; Australian businesses and government actually used it. The environment changed so that businesses could restructure their operations using their new ICT tools.

The unusual characteristic of rapidly falling prices for IT products clarifies why it is advantageous to buy ICT on the world market. The declining prices for ICT products mean that the terms of trade (export prices compared with imported products' prices) are moving against ICT producers (just as when coffee prices fall, the terms of trade turn against coffee producers) and in favor of ICT importers. Thus, the gains to the domestic economy that come from investing in imported ICT are enhanced by the falling prices.

Econometric research on the link between IT and productivity growth for developing economies is mixed. But careful consideration of the differences among developing countries suggests that that there may be a threshold effect for ICT investment to bear fruit, but that once in place, transformation is key to getting the full benefits.

1. See extended discussion of why old policy issues should precede a discussion of new technology issues in Mann, Rosen, and APEC (2001).

Table 1. IT and Productivity Growth in the US and Australia

IT and Productivity Growth[1]		
	US[2]	**Australia[3]**
Labor Productivity Growth	**0.5%**	**1.0%**
Capital Deepening	**0.2%**	**−0.1%**
ICT Capital	0.3%	0.4%
Hardware	0.3%	0.4%
Software	0.1%	0.0%
Other	0.0%	
Other Capital	−0.2%	−0.5%
MFP Contribution[4]	**0.3%**	**1.1%**

[1]Contributions to labor productivity accelerations in the 1990s cycle, percent per year, and percentage points.
[2]Growth in 1992–2000 less growth in 1986–92.
[3]Growth in 1993–94 to 1999–2000 less growth in 1988–89 to 1993–94.
[4]MFP = Multifactor productivity growth.
Source: Grettin, Gali, and Parham 2002, p. 9 (box 2.2), and author calculations on IT production as a share of economy-wide production.

Aggregating across large number of developing countries, Pohjola (2001) and Kraemer and Dedrick (2000) find little relationship between IT and productivity growth in developing economies. They surmise that there is too little ICT investment and that supporting infrastructure is poor. Lee and Wan (2001) divide a sample of 38 countries into industrial countries and two groups of developing countries (based on the increase in the share of ICT investment in GDP from 1992 to 1996). They find some important distinctions among the developing economies.

For the industrial countries and the developing country group with the larger increase in ICT-GDP ratio, the link between ICT investment and productivity growth appears. But there is an important distinction between the rich and the middle income. Consistent with the research on industrial countries only (cited earlier) is that openness (a proxy for the flexibility and competitiveness of markets) is more important for the industrial countries in this sample. Rather than suggesting that transformation is not important for growth of the middle-income countries, the results suggest that, with ICT in place, creating a business climate of flexibility and competition is necessary to get to the next higher level of income of the industrial countries.

For the poorer group of developing countries, with lower rates of ICT investment, there is no relationship between their own ICT investment and growth, consistent with the aggregate findings of other researchers. On the other hand, for this poorer group, externalities from ICT investment done around the world are important to increasing their productivity growth. In other words, even the poorest countries get some benefit of the global ICT network.

Does all this mean that developing countries should invest in the latest technology to increase ICT as a share of GDP or focus on high-tech links to the global network? Not necessarily. Because how information and technology are used also matters, as does the environment in which they are used, the most useful ICT for some people in a country may not be cutting edge.

Consider the case of farmers and telephones. Eggleston, Jensen, and Zeckhauser (2002) compare the income of farmers in villages with and without phones and find that income is higher and the dispersion of prices for farm products lower for farmers in a village with phones. In India, price information sent to village fax machines allows farmers to decide to which market to bring their produce, rather than simply going to the market where they always go. Farmer income increased from this more timely and complete information. Chinese and Indian farmers reap the gains from effective use of ICT, even though it is not cutting edge technology.

Moreover, ICT installed is not always easily embraced. For example, when Korean and British retail-

ers merged, consolidating IT systems took about 10 months because of a clash of management and personnel culture (see case study in Mann et al. 2001). In Morocco, computers sat in the storage closet of an elementary school because no one knew how to use them or how to integrate them into the learning program (author's field research).

All told, econometric research, data analysis, and case study reach several conclusions for developing countries. First, investment in ICT is key, and there appears to be a minimal threshold of a country's own ICT investment necessary to jump-start the benefits of growth, although even the poorest countries benefit from the global network. Second, with falling global prices, importing IT is a good approach, but the type of IT need not be cutting edge. Third, once in place, the policy and overall environment in which ICT is used is particularly important because transformation of economic activities is necessary to get full benefits. Fourth, ICT alone cannot force the changes to growth, policies, or activities.

Benchmarking a Policy Strategy: An Example for Six Middle-Income Countries

Policy choices shape the domestic environment in which ITs take hold and are used widely, or not. What should policy makers aim for to improve infrastructures and to enhance the chances that ICT will be used effectively (Mann, Eckert, and Knight 2000; Mann et al. 2001; Talero and Gaudetter 1996)?

First, we must acknowledge that applying IT is not a shortcut around basic reforms. Second, we know that conveying information is at the heart of why ICTs raise productivity; therefore, telecommunications systems matter more with ICT than ever. Third, because investment in ICTs and transformation of activities drive productivity growth, financial intermediaries must be able to sort out what are good and poor opportunities, whether those be in microenterprise or multinational. Finally, a competitive, flexible, and supportive business and social environment is one in which firms and workers can take advantage of opportunities and are encouraged to take the opportunities presented by technology to improve their own situation.

Suppose policy makers buy into this assessment. How should they decide on a strategy of reform to maximize the benefits of their ICT investments? First, a policy maker needs to consider which countries can be used to benchmark his or her own country's policies and outcomes. Whereas looking at the global best (e.g., highest PC penetration or best financial system) has some value, this is unattainable in the near term and may provoke backlash or a defeatist attitude and could even misdirect policy attention from what really matters. Rather, picking a set of countries of more similar income levels, technology attainment, and economic performance may make more sense.[2]

Moreover, finding comparator countries gives each country's policy makers an idea of the policy foundations and economic outcomes in countries "like them." Having a framework for analyzing policies and specific comparator countries helps start a dialogue among policy makers of various countries about what works and what does not work in countries of broadly similar situations.

Consider the following example of six middle-income countries. Based on measures of GDP per capita, technology assessment, macroeconomic performance, and export competitiveness, Mexico, Malaysia, Philippines, Poland, Slovak Republic, and Thailand are relatively similar.[3]

Figure 6 positions these six middle-income countries in the general context of global performance and practice using the policy and environment metrics as outlined previously: telecommunications, financial sector, overall business climate, and education and skills availability. What general points about this group of middle-income developing countries might we glean from these figures, and what areas for particular attention might emerge for specific countries?

2. Considering, as well, who are competitors in the export market is of immediate operational significance. That is, the global value chain of production demands increasingly intensive use of IT. If firms in the home countries cannot keep up with the demands of its business partners, they could lose their position on the value chain to competitors in another country who can keep pace (Mann 2002).

3. The methodology discussed here is related to that used in "Policy Reform Toolkit for E-Commerce & ICT Development" (Westby, Mann, and Owen 2003). For the example here, see the Appendix for details on the data used to construct the indexes.

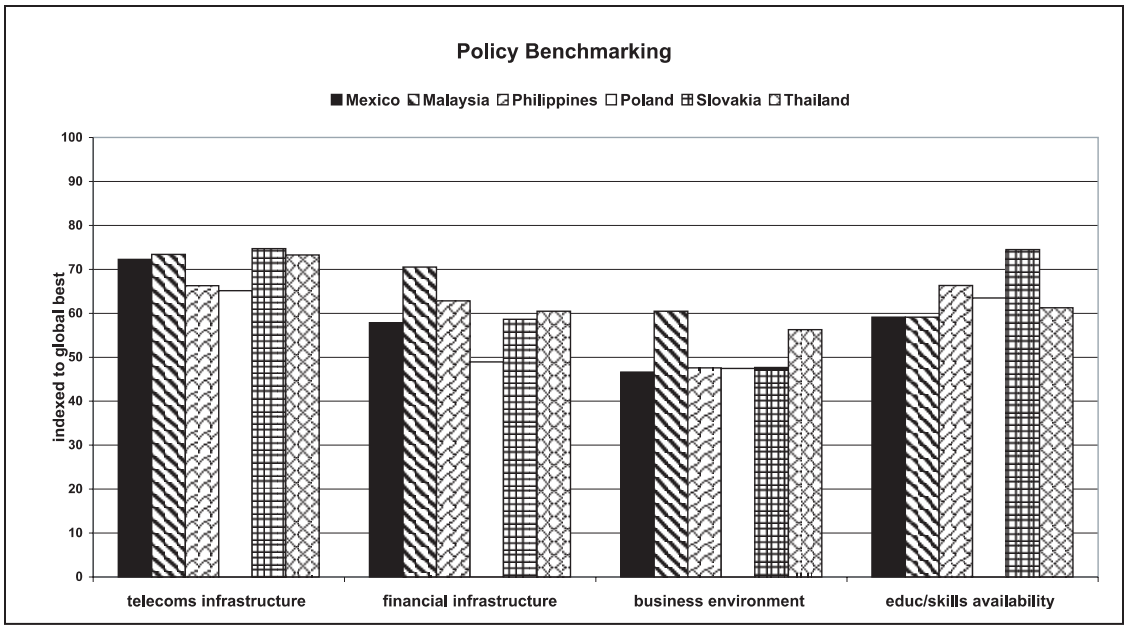

Figure 6. Policy benchmarking.

First, consider the set of countries with respect to the two key infrastructures of telecommunications and financial sector. The telecommunications infrastructures are moderately closer to global best than the other two key infrastructure areas, although the Philippines and Poland may have a bit more work to do than the others. In all of the economies, the financial sector is further away from global best, and in particular, Poland and Mexico might give priority attention in this area.

With respect to overall business environment, these countries are similar, but notably these indexes are further away from the global-best environment than are the specific infrastructures. There are many dimensions to the business environment index, including extent of regulatory burden, degree of competition, issues of transparency and corruption, and openness of the trade regime. For any country, examining these areas in more detail, as is shown in Figure 7, can give much greater insight into which areas might be targets for policy maker attention.

Finally, education and skills show quite a bit of disparity among these six middle-income countries. To the extent that a country has skilled people and gives them an environment in which they can excel, ICT is more likely to bear fruit.

Conclusion

I argue that it is valid and useful to consider developing nations as distinct from developed countries in terms of their economic status and the ICT conditions. Differences in income per capita define developing countries and distinguish them from high-income industrial countries, and as a general statement, the digital divide of ICTs exists just as does the income divide. Capturing the diversity and unity among the developing countries is also an essential component for understanding and improving the contributions ICT can make to international development, given the right policy and institutional environment.

Research and case study show that it is not just investment in IT that matters, although ICT investment is important. Rather, effective use of IT is the key ingredient to faster economic growth. Effective use of IT presumes an enabling domestic policy and business environment that allows individuals, businesses, communities, and governments to change their activities based on the new possibilities created by the tools of IT.

Common stumbling blocks of investing in and effectively using ICT face all developing economies.

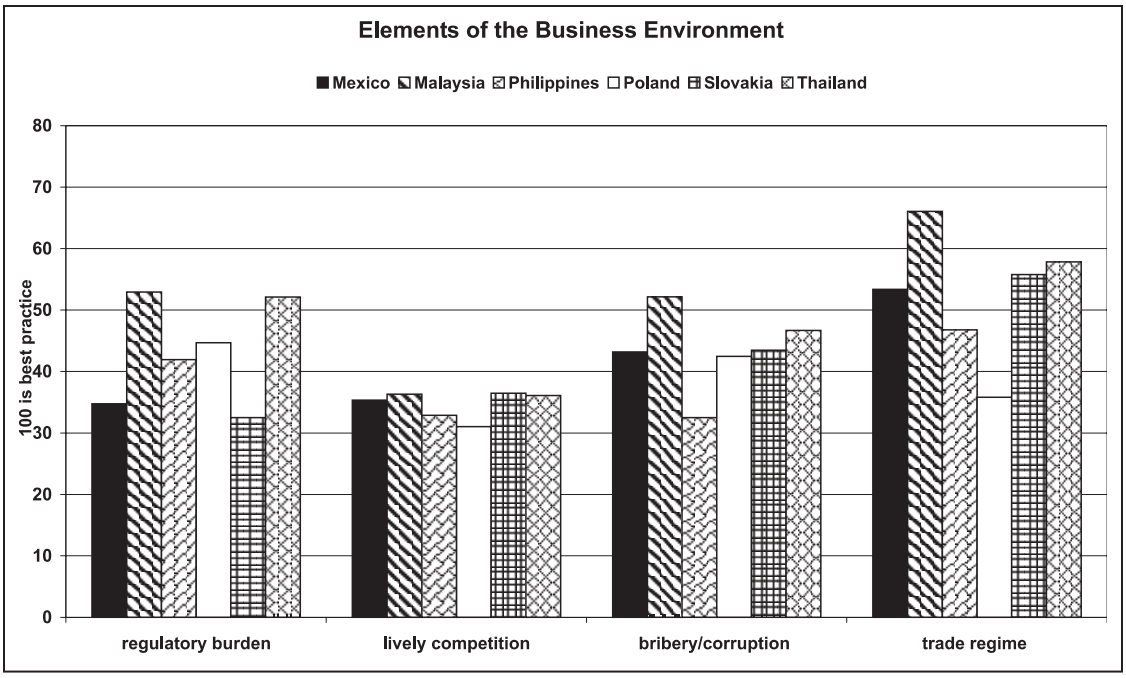

Figure 7. Policy benchmarking in the business environment.

But countries will find different solutions based on individual characteristics. Both appreciation of common factors and the sharing of diverse approaches will enable more developing countries to move faster to address both digital and developmental divides.

Appendix

Figures 1, 3, 4, 5: all data shown indexed to US = 1. Figure 2 data are indexed to high-income country value. All data are for 2000. PC density is PCs per 1,000 inhabitants. Internet use intensity is Internet users as a share of the population. TV sets is sets per 1,000 inhabitants. Tel (main + cell) is the sum of main lines and cellular subscribers (International Telecommunications Union [ITU]). Costs are calculated for 20 off-peak hours and include Internet service provider (ISP) and connect charges. Internet transactions from survey data on use of Internet by business and government for online transactions (Global Information Technology Report [GITR]; World Economic Forum 2002b). Sources: World Development Indicators, UN Development Programme (UNDP), ITU, GITR.

Figures 6 and 7 and related text: data used to determine comparator countries for Mexico include the human development index, real GDP per capita, the technology achievement index in the *Human Development Report*) (HDR; UNDP 2001), the survey question "extent to which technology and science human resources meet business needs" from the *World Competitiveness Yearbook* (WCY; IMD 2002), the technology index and innovation capacity index from the *Global Competitiveness Report 2001–2002* (GCR; World Economic Forum 2002a), the current competitiveness index and macroenvironment index from GCR, and domestic economic performance from WCY. In addition, export competition and leading sectors were obtained by examining the trade performance index in Cornelius, von Kirchbak, Mimouni, and Pasteels (2002). The top four sectors in which Mexico ranks in the global marketplace are: IT and consumer electronics (rank 16 of the 75 countries covered by the GCR), transport equipment (rank 25), clothing (rank 33), and electrical components (rank 34).

Telecommunications infrastructure: measured by Information Infrastructure Micro Sub-Index (GITR)

composed of hard data on teledensity; years to adopt cellular; waiting list for lines; telecom staff numbers; telephone faults; survey questions on availability of telephone line, perception of broadband access, price and quality of Internet connections, availability, and cost of mobile.

Financial infrastructure: constructed from survey information on central bank effect on economy (WCY), financial market sophistication (GCR), adequacy of legal regulations on financial transactions (WCY), confidentiality of financial transactions (WCY), and regulations and competitiveness of banking (WCY).

Education and skills availability: constructed from surveys on skilled labor availability (WCT), investment in employee development of IT skills (GITR), university or industry research collaboration (GCR), and quality of IT training and education (GITR).

Overall business environment: constructed from survey information on burden of regulation (GCR), bureaucratic impediments (WCY), ease of starting a new business (GITR), competition legislation and unfair competition (WCY), effectiveness of antitrust (GCR), entrepreneurship (WCY), cooperation in labor-employee relations (GCR), overall infrastructure (GCR), and bribery or corruption (WCY and GCR). These are aggregated into categories for Figures 6 and 7.

Trade regime: constructed from surveys on whether the exchange rate regimes support competitiveness (WCY), whether customs aids transit of goods (WCY), whether protectionism hurts business interests (WCY), as well as data on the share of high technology exports in manufactured exports in 1999 (HDR) and the ratio of trade to GDP (WCY). ■

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