

Information Technology, Transactions Costs and Patterns Of Globalization in Developing Countries

Jeffrey James
Tilburg University, The Netherlands
M.J.James@Kub.NL

Abstract Though there are a number of mechanisms through which information technology promotes globalization, what is common to these mechanisms is that they can all be interpreted as a reduction in transactions costs between the trading partners. Thus interpreted, we show that developing countries differ in the extent to which, via reductions in transactions costs, they gain from increased trade and foreign investment as ratios to total output.

Keywords: Information technology, Transactions costs and globalization

INTRODUCTION

There is widespread agreement that information technology (defined to include telecommunications, computer hardware and software and access to the Internet) serves to promote globalization and that this influence is transmitted through a wide variety of different mechanisms, some of which lie on the demand side, while others have more to do with supply, some of which affect trade between stand-alone firms while others affect intra-firm trade within multinational corporations. Our goal in this paper is not, however, to describe the full range of these mechanisms. Our intention, rather is two-fold. On the one hand, we wish to show that many such mechanisms can be interpreted in one sense or another as a reduction in transactions costs between agents in different countries.¹ On the other hand, our goal is to show that these benefits tend to accrue in different

¹ This paper is based partly on James (2002), though it has been thoroughly revised in many areas.

degrees among developing countries, mainly because the capacity to absorb these benefits differs markedly from one country to another.

THE CONCEPT OF TRANSACTIONS COSTS

According to the *New Palgrave Dictionary of Economics*,

Transaction costs, like production costs, are a catch-all term for a heterogeneous assortment of inputs. The parties to a contract have to find each other, they have to communicate and to exchange information. The goods must be described, inspected, weighed and measured. Contracts are drawn up, lawyers may be consulted, title is transferred and records have to be kept

(1988: 676).

Thus defined,

Transactions costs, by and large, *reduce the volume of transactions*. In general equilibrium without transactions costs, the network of exchanges is indeterminate, there is no constraint on the gross trading volume. With increasingly costly transactions, individuals have an ever stronger incentive to economize transactions
(Ibid. 677, emphasis added).

In the economics profession, Oliver Williamson (1995) and Douglas North (1990) have done the most to emphasize the role of transactions costs as determinants of economic efficiency. Indeed, the latter goes so far as to suggest that “the costs of transacting are the key to the performance of economies” (1987: 419–420).

In developing countries, where information flows are impeded by poor telecommunications, property rights are ill-defined and contracts are difficult to enforce, the costs of transactions are likely to be especially high. What needs to be addressed, therefore, is the manner and degree to which information technology is able to reduce these and other types of transactions costs that so pervade these countries. The more are the mechanisms through which this can occur and the greater the effectiveness of information technology in reducing the transaction costs associated with each such mechanism, the more will developing countries be able to insert themselves into the global economy by means of international trade and foreign investment (two of the main components that define the concept of globalization). Note in this regard that these issues are rarely posed in international trade theory or other theories that assume perfect markets, which assume that transaction costs are negligible or zero (it is striking, for example, that most textbooks on micro-economics and international trade entirely exclude the subject). It is also worth emphasizing that we are *not* concerned with the related but separate concept of transport costs, which only arise once the transactions between buyers and sellers have actually been

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realized. We do not intend to deny the salience of these costs to increased globalization or that they have also been heavily influenced by technical change. Indeed, a series of innovations broadly referred to as “containerisation” has

had huge consequences for world trade. The most obvious was that the costs of shipping fell precipitously, as ships could be loaded by a few dozen longshoremen rather than hundreds, and as pilferage was much reduced. The need to build wooden crates to protect individual items was eliminated, making it feasible to ship consumer goods such as toys and stereo systems halfway around the world. International shipping capacity soared . . . driven by large increases in the volume of goods shipped

(The Economist 1997: 13).

Whether induced by falling transactions or transport costs, however, we are explicitly making the conventional argument, based on comparative advantage, that increased international trade benefits all countries concerned, although, of course not all countries or groups, within each country will necessarily share in the gains (as would occur, for example, if consumers of a traded commodity gain at the expense of producers of the same commodity who face competition from imports). Note, though, that the conventional gains from trade to which we have just referred, constitute only a part of the economic gains that may accrue to ‘latecomer’ countries that in principle can ‘borrow’ from the range of technologies already developed in the more advanced parts of the global economy. In fact, these advantages of being a borrower country were recognized by Veblen as early as 1915 in his *Imperial Germany and the Industrial Revolution* (Veblen 1915).

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Thus defined, transactions costs have to do with the various costs entailed in the conclusion of contracts between buyers and sellers. In this section, we will show how such costs can be reduced by the application of information technology and more specifically, we shall show that there are numerous mechanisms through which this can occur. And since telecommunications form the basis on which most other applications of information technology crucially depend, it is only logical to begin with the role that this particular type of technology plays (or can play) in the reduction of transaction costs.

Telecommunications, information technology and transactions costs

As noted above, an adequate telecommunications infrastructure is in general most acutely lacking in developing countries and to this extent so too therefore tend to be the costs of undertaking transactions in and with those countries.

As Norton (1992: 177) has put it,

First, in many less developed economies there is a lack of readily available information, which is costly. Decisions are not made or are made slowly because agents do not know the alternatives. In short, the information markets are relatively inefficient compared to those in the developed world. Second, in addition to their effect in information markets, telecommunications are extremely important to the functioning of product and factor markets. A telecommunications infrastructure reduces transactions costs in numerous markets and leads in turn to higher aggregate output. In terms of Edmund Phelps's famous "island economy" metaphor, telecommunications in effect reduce the distance between the islands by facilitating the flow of information. Thus, when a telecommunications infrastructure exists equilibrium-idle resources are lower, or markets are more efficient, than when one does not.

There are a variety of ways in which information technology has helped or is likely to help reduce the transactions costs cited by Norton (1992), though we shall provide here only a few examples, the first of which concerns the transition from digital, as opposed to electromechanical switching equipment. This transition is so important because switching equipment may be described as the "nerve center" of the telecommunications network and digital switching allows for cheaper, faster and more efficient service than its predecessor (partly because digital signals are switched without conversion to or from analogue signals). This new technology afforded developing countries not just the opportunity to improve the chance of improving their inadequate (and in some cases grossly inadequate) telecommunications systems, but also the chance to leap directly to the new technology without the encumbrance of the older electromechanical switching which at the time so pervaded the developed countries.

Indeed, in at least one group of developing countries, namely the East Asian NICs (newly industrializing countries) "have adopted digital, electronics-based systems faster than advanced countries have. Less comonitted to older technologies and suppliers, they leaped to advanced electronic electronics" (Hanna *et al.* 1996: 190). Consider, for example, the case of Malaysia, where in 1977, electronic switching accounted for only 7.4 percent of the total switching capacity, but which, by 1987, had reached over 64 percent, a higher level at the time than at least two developed countries. Consider also the case of India, where the indigenous design of small-scale rural exchanges is especially important from the point of view of transactions costs since in that country (as elsewhere in the Third World), these costs tend to be most pronounced in isolated small rural communities. In yet another part of the developing world, Botswana stands out because of the fact that its "physical network is comprised of nearly 100% digital switching and transmission systems" (UNDP 1999).

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Our second example of how an improved telecommunications can reduce transactions costs in developing countries, concerns the tendency for certain types of satellites to fall not only in terms of price and cost but also in terms of development time. More specifically,

Small satellites tend to use off-the-shelf parts and standardised platforms (much as car companies do) and are built on a cheap and simple assembly line . . .

And because the overall cost—and therefore the insurance premium to cover the risk of failure in launch or in orbit—is lower for a small satellite, customers are less likely to insist strictly on the use of the highest-quality parts made of materials that have been tracked for quality assurance purposes from the day they left the mine.

This approach frees small-satellite specialists . . . from the ten-year development programmes that tend to hobble the makers of big commercial satellites. With their vastly shorter production cycles, makers of small satellites can thus take advantage of component improvements and price reductions as they become available. It is this kind of “Fordism” that has . . . created the tantalising promise of satellites that may cost less than \$ 1 m in the near future . . . Small satellites are also lowering the cost of being able to own and use space systems. When prices come down to a few million dollars, they become affordable, for say, the agriculture ministry of a developing country. Equipped with remote sensing gear, they could be used to report on everything from deforestation and pollution to urbanisation. Using a handful of small satellites in a low-orbit array, agencies can do more active monitoring—such as keeping an eye on crops, forest fires and regional disasters. Surrey Satellite Technology has sold the technology to build small satellites to a dozen countries, including China, Pakistan, South Africa, Portugal, Turkey and Chile

(The Economist Technology Quarterly Sept. 22, 2001).

For the rural poor in developing countries, what this innovation means, is, among other things, a sharp reduction in the transactions costs of communicating with the relevant authorities in times of crisis (such as crop failures, disaster relief and so on). For, in most such areas, the alternative means of communications (such as walking to the nearest village or pay phone) are usually extremely high or indeed entirely non-existent, precisely when they are needed the most.

Mobile phones, information technology and transactions costs

In spite of the reductions in transactions costs that the above innovations in telecommunications may have effected, there are still sizeable parts of the Third World, especially, but not only in sub-Saharan Africa, lacking any form of communications based on information technology (in the broad sense of the term). In some such countries, mobile phones are increasingly coming to act as

a substitute for these missing lines of communications, in part, it would seem, because

cellular operators . . . have some inherent advantages over fixed-line companies when it comes to venturing into poor and isolated areas. Their costs are much lower, because they do not have to dig holes in the ground and lay expensive copper wire to get to their customers. . . . They can break even with a much smaller number of subscribers. They can also install new phone services much faster than landline companies. Lucent Technologies, for example, installed 800 base stations in some of the remotest bits of Argentina—enough to bring a telephone service to half a million previously isolated people—in just five months.

That some developing countries are experiencing a dramatic rise in mobile phone use is perhaps best illustrated by China, which, based on current growth rates will surpass the United States as the largest cellular market sometime in 2001. In other developing countries, such as Cambodia, no less than 60 percent of all telephone subscribers were using mobile cellular by the late 1970s as against 25 percent for fixed lines and fixed wireless for the remainder. More generally, Figure 1 lists all the countries where, by 2000, mobile phones had overtaken fixed lines.

On the basis of these data, and in particular, the relatively large number of developing countries which fell into that category, it seems fair to conclude that mobile phones have brought “many people into the world economy who have hitherto been excluded from it, and who would probably remain excluded if they

1993	1998	1999	2000	
Cambodia	Finland	Austria	Bahrain	Philippines
		Côte d’Ivoire	Belgium	Rwanda
		Hong Kong	Botswana	Senegal
		Israel	Chile	Seychelles
		Korea (Rep. Of)	El Salvador	Singapore
		Paraguay	Greece	Slovenia
		Portugal	Iceland	South Africa
		Uganda	Ireland	Taiwan-China
		Venezuala	Luxembourg	Tanzania
			Mexico	United Arab
			Morocco	Emirates
			Netherlands	United Kingdom

Source: ITU (2001).

Note: Economies where mobile phones have overtaken fixed ones.

Figure 1: More mobile economies

had to rely on fixed line phones” (Wooldridge 1999: 21). And in as much that these previously excluded members of society are induced by the resulting reduction in transaction costs between countries, global integration will tend to intensify and the gains between buyers and sellers will tend to increase.

The Internet and transactions costs

There are so many ways in which the Internet reduces transactions costs between economic agents (in commerce no less than in non-commercial activities) that our discussion of the possibilities has of necessity to be illustrative rather than exhaustive. To this extent, therefore, the following examples tend to understate rather than overstate the potential impact of the Internet on trade in goods and services via reductions in transaction costs. On the other hand, we also need to consider the fact that increased access to the Internet is just one precondition for successful participation in, say, electronic commerce. For, it is surely true that ‘Many developing countries, particularly the poorest ones, lack the human capital and complementary services required to make effective use of the latest technologies’ (Analysis 2000: 6). More generally, as Abramovitz (1989) has rightly emphasized, it is one thing to be afforded the advantages of being a latecomer to the information technology revolution (or technical opportunities in general) but quite another to assume that such potential will actually be realized in practice. Whether the potential benefits will exceed the benefits thus constrained (i.e. whether ‘catch-up’ actually occurs) is not, as yet, a question that can easily be answered and in all likelihood will vary from one developing country to another. It is plausible to imagine, however, that the potential benefits have more chance of being realized in the more developed countries of the Third World, where the capacity to absorb new technologies tends to be higher.

a) Simplification of the procurement process and reductions in transactions costs

A recent document prepared by the US Department of Commerce explores how the complexity of and hence the transactions costs associated with, the procurement process in a large US corporation were simplified by a shift in purchases away from one based on a manual system to one using the Internet (US Department of Commerce 2000). Under the former system, for example,

For each requisition, the accompanying blueprints had to be requested from storage, retrieved from the vault, transported on site, photocopied, folded, attached to paper requisition forms with quote sheets, stuffed into envelopes and mailed out . . . Now,

the sourcing department receives the requisitions electronically from its internal customers and can send off a bid package to suppliers around the world via the Internet.

Even for a relatively small company in a poor country, moreover, the Internet can yield sizeable gains during the procurement process, as the following example from Tanzania clearly shows. In particular, as described by Jensen (1998):

Tanzania Regent Clearing and Forwarding (TRCF), a small import-export company, now uses \$20 international faxes and telexes to place orders for products in North America and Europe. As a result, the company has seen its telecommunications bill fall from \$ 500 to \$ 45 per month. Meanwhile, stationery costs for fax and telex paper have been eliminated, along with time-wasting, expensive and error-prone typing of documents. With cheap and almost immediate access to many of its suppliers, TRCF now is able to place a series of orders each day as they come in, instead of having to wait to consolidate orders in one fax or telex.

b) Transactions costs and new opportunities for trade in existing goods

Trade, as already noted, is often hindered by the difficulties confronted by buyers and sellers in actually making contact with one another, a problem of transactions costs that is usually most keenly felt in developing countries. It is in those same countries, accordingly, that the gains from trade in existing goods may potentially be the most telling. For instance,

As in most other developing regions, the Internet in Africa has held special attraction for those engaged in trade and trade promotion. The potentially low cost of access to the Internet and its rapidly growing penetration (especially in the developed countries, which have the largest markets) offers new opportunities for poorly financed suppliers to reach buyers at any distance. As many potential products do not have well-established distribution channels, new relationships between buyers and sellers are being built through the Internet

(Jensen 1998).

Indeed, there is some evidence that companies using the Internet to sell products generate additional customers. According to one report, for example, eighty percent of purchases from Dell's Website had never purchased from that firm before, while one out of four said that without the Web site they would not have made the purchase at all (US Department of Commerce 2000: 21). In the case of another large US corporation, W. W. Grainger, the new trade opportunities that presented themselves after the introduction of the Internet, were directly related to the ensuing reduction in the costs of transacting with the corporation. More specifically, "Because the virtual store is open seven days a week, 24 hours a day, customers who wouldn't otherwise be able to order from a

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Grainger store are now able to do so" (Ibid.: 21). Similar and perhaps even greater gains may be expected to accrue to firms in developing countries that engage in e-commerce.

c) Transactions costs and trade in services between countries

Apart thus from promoting trade in existing goods, information technology also helps, one should note, to bring what were formerly untraded services into the realm of tradeability and that this additional contribution to the expansion of additional trade can also be explained in terms of a reduction in transactions costs. The essential role of information technology in this regard is that in some instances it avoids the need for physical contact between buyers and sellers of services and thus eliminates, or at least reduces, the transaction costs involved in bringing the two parties together. In the development context, for example, "Telemedicine is cited as a good example of how the Internet can assist with remote diagnoses, dissemination of medical knowledge and tracking of epidemics" (Analysys 2000). Moreover, in the area of telelearning, "The prospects for delivering educational support through the use of the Internet in schools, to extension and technical training programmes, and even to individuals are beginning to show exciting possibilities. . . . More than 6,000 correspondence course students all over Africa now can obtain advice and reading materials from their tutors at the University of South Africa (UNISA) via e-mail and the Web" (Jensen 1998).

d) Shortening the duration of transactions

One, admittedly imperfect way, to estimate the reduction in transactions costs, to which information technology gives rise, is to compare the time taken to perform a given task with and without the use of the Internet. Consider, for example, the need to find a high-rate certificate of deposit, an activity which might take some 25 minutes to complete on the telephone would take only a minute on the Internet and some specialized software. Sizeable gains in time would also manifest themselves in activities such as reordering an inventory item or updating an equity portfolio (Cairncross 1997). In the specific development context "Independent newspapers and magazines now are published daily on the Web in a growing number of other African countries, allowing users in remote areas to obtain the latest news and independent analysis without waiting days or weeks for local postal deliveries" (Jensen 1998). It is difficult to overestimate the gains to such countries from gaining instant access to information, as opposed to lagging behind other countries that enjoy the benefits of the Internet.

Information technology, transactions costs and foreign investment

To this point we have focused on the relationships between information technology, transactions costs and international trade. What also need to be considered are the relationships between the first two variables and foreign investment (that is, intra-firm trade). Here too we feel that the outcome of these inter-relationships is to facilitate trade within the multinational corporation and hence to raise the ratio of foreign investment to global output (and hence what is often referred to as an intensification of globalization). As Dunning and Narula have expressed the point for example,

new technologies have led to improved coordination of cross-border activities. . . . ICT information and communications technology has reduced both the costs of acquiring and disseminating information and the transaction and coordination costs associated with cross-border activity. . . . MNEs are better able to integrate the activities of their various affiliates through the use of these technologies and to more quickly respond to changing conditions in the countries in which they operate. Taken together, these transaction cost-reducing processes have enabled MNE activity to be much more efficiently organised across borders. They have also facilitated a shift towards more rationalised and strategic asset-seeking MNE activity, and away from the more multi-domestic approach which was more prevalent prior to the 1970s

(Narula and Dunning 2000: 153).

In one of the most striking manifestations of this particular line of argument, some of the most prominent multinational corporations now undertake R&D in developing countries that are geographically distant from corporate headquarters. Texas Instruments, for example,

has been able to perform geographically dispersed, but globally integrated, R&D activities because of information and communication technologies that allow the exchange of detailed integrated chip designs and scientific simulations across the world without a time delay. Texas Instruments (India) has the latest HP and Sun workstations and a variety of computers that are interconnected by a Local Area Network, which in turn is connected to Texas Instruments's worldwide data communications network. Texas Instruments (India) is connected to it on a 'real-time' basis through a dedicated 128 KB link, enabling the company to send and receive the latest support information, design technology and applications information for its products and services

(UNCTAD 1995: 153).

At the opposite end of the spectrum of technological complexity, multinational corporations are now also able to make use of information technology to locate routine data-processing activities in remote parts of the Third World,

rather than, as before, being confined by the non-tradeability of this service. American Airlines, for example,

assembles accounting material and ticket coupons in Dallas, Texas, for transport on its scheduled flights to Barbados for processing by its offshore subsidiary. . . . In Barbados, details of 800,000 American Airline tickets are entered daily on a computer screen and the data are returned by satellite to its data center in the United States
(UNCTAD 1996: 107).

With regard to each such type of foreign investment, however, there seems to be no clear view of the welfare effects on the recipient developing country. Consider, first, for example, the dispersal of R&D among certain developing countries as in the quotation cited above regarding Texas Instruments in India. On the one hand, it could be argued that such R&D investment in developing countries promotes economic growth,

by providing technology and managerial skills which in turn create indirect positive effects for the host country at a lower cost. These positive effects include technical support to local suppliers and customers, contract jobs from foreign R&D units to local R&D organizations, etc. . .

(Reddy 1997: 1833).

On the other hand, it could also be argued that, far from imparting skills and knowledge to the host country, multinationals tend instead to absorb scarce R&D resources and divert them for purposes with little or no benefit to that country (as would be the case, for example, if the diverted resources were devoted to the development of "global" products rather than to products designed for solving specific local problems). According to this view, therefore, it matters little whether R&D personnel are employed by multinationals in developing countries or in the host countries of these firms, which, in the latter case, amounts effectively to just another form of the 'brain drain' which so severely afflicts many parts of the Third World (Reddy 1997).

As regards the second type of foreign investment, which uses information technology to reduce the transactions costs of locating routine data-processing activities in remote parts of the Third World, the welfare effects again seem to be mixed. On the one hand, for example, such activities may provide employment to female workers who would otherwise be unemployed and at least in one developing country, Jamaica, wages for offshore data processing compared favorably with other local employment, such as that in the manufacturing sector. On the other hand, in that same country, employment contracts tend to be precarious and workers can readily be laid off without pay (Pearson and Mitter 1993).

CONCLUSIONS

The main purpose of this paper has been to denote the diverse mechanisms through which information technology promotes globalization (defined here as the ratios of international trade and foreign investment to total output) predominantly, but not entirely in developing countries. As we see it, what is common to these various mechanisms is that they all involve, in one way or another, a reduction in transactions costs between economic agents, be they consumers, firms or governments. Some such reductions to which information technology gives rise, simplify the process by which buyers and sellers find each other (as, for example, in electronic commerce), others are due to more accurate information about the product to be traded, while yet others have to do with bringing previously untraded services into the realm of tradeability (a phenomenon that has, among other things, important implications for the locational behaviour of multinational corporations in developing countries). At different parts of the paper, however, we have emphasized that the potential gains afforded to developing countries by the combination of information technology and reduced transactions costs may in actuality be limited by their capacity to absorb the changes, so that the net welfare gain in some cases may not be very clear.

In any event, the current wave of globalization and its implications for developing countries, needs to be distinguished conceptually in various ways from the similar degree of global integration that occurred in the nineteenth century. Phillips, for example, has made an interesting comparison of the roles played, respectively, by the Internet and the telegraph during these two periods.² Like the latter, he argues that

the Internet began with the help of government resources, but its use by business has taken longer to achieve. Business quickly embraced the telegraph but it has much more slowly embraced the Internet. This is despite the fact that many of the concerns are the same; i.e., security and reliability. A crucial difference is that the Internet places more power in the hands of consumers

(Phillips 2000: 282).

On the other hand, "Just as with the telegraph, monopoly arises. Microsoft had a monopoly on operating systems and attempted to use this monopoly to gain a monopoly on the Internet through its Internet Explorer browser" (Phillips 2000, 282).

² See also Melody (1987).

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