

E-commerce as a techno-managerial innovation ecosystem: Policy implications

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Policy Letter

Innovation can be viewed as a adoption and dissemination of something new in a given context. E-commerce is thus an innovation when it is introduced to a new environment in an emerging market or when adopted by a new class of user industries. As a techno-managerial innovation, it requires business adaption, organizational learning, and supportive environment that could lead to wide diffusion and transformational impact. Several global forces drive the adoption of e-commerce such as global competition, trade liberalization, and increasingly, ICT advances and Internet diffusion. National factors, such as governance, education, and infrastructure, then shape and differentiate the speed of adoption across enterprises within a country, the breadth and depth of use within an enterprise, and ultimately the impact on the firm and the nation. Understanding the national environment, the policy, technological and infrastructural contexts, and the common drivers and barriers to adoption and effective use within firms should provide a guide to promoting e-commerce as a techno-managerial innovation, and realizing its full potential for the nation.

1 Potential for e-commerce

E-commerce is transforming trade. In the US, total online transactions grew from \$3trillion (2006) to \$5.4 trillion (in 2012), equivalent to a third of US GDP, with 88 percent of value of these transactions are business-to-business (B2B)¹. Globally, business-to-customer (B2C) transactions alone are expected to grow from \$1.5 trillion (2014) to \$2.4 trillion in 2017. E-commerce is growing four times faster than world economy. A sizeable share of e-commerce is cross-border, estimated to average 16 percent among the six main markets—US, UK, Germany, Brazil, China, and Australia. The growth of cross border e-commerce will be specially fast in Asia Pacific, growing 3.7 times between 2011 and 2017, with the largest growth is in

¹ US Census Bureau E-Stats Report, 2012

China, where cross-border transactions are estimated at \$160 billion in 2018. Worldwide, the cumulative Average Gross Rate (CAGR) of the cross-border e-commerce is 25 percent (Souminen, 2014).

Consumers also benefit from e-commerce, sometimes at the expense of firms, as e-commerce enables consumers to search for lower prices online and improves their bargaining position, and reduces the information advantage previously enjoyed by dealers and middlemen.

E-commerce is a huge export and growth opportunity for small and medium enterprises (SMEs), in particular. It increases export participation and broad-based trade from SMEs. When trade transactions are cross-border, e-commerce increases export diversification and expands the gains from trade. It gives consumers a wider variety of goods and services at lower cost. It gives online exporters a more staying power than offline exporters.

Since the commercial use of the Internet is less than two decades old, and SMEs tend to lag in adoption of new technologies, we may be seeing just the beginning of transformations that will be apparent in coming years with the diffusion and mastery of this innovation. While only large enterprises companies had the capital, global networks, and scale economies to enter and compete in world markets, e-commerce enables small businesses to leapfrog and gain visibility at low cost among global buyers and most distant markets.

2 Drivers and barriers to e-commerce

Many factors shape the adoption, pace of diffusion, and ultimate impact of new and versatile techno-managerial tools and practices such as e-commerce. Taking an ecosystem view can help in identifying these factors and dealing with the key stakeholders who influence adoption and diffusion. Stakeholders at the national and local levels would include relevant public agencies, the adopting enterprises, the customers, and various potential intermediary institutions such as business development associations, consulting firms, small business development services, research centers, and universities. This ecosystem can be quite complex, more than is often assumed by the designers of e-commerce diffusion programs. It spans public policy, public platforms for e-commerce and electronic payments, enterprise learning and capability development, and consumer education.

The key global drivers of e-commerce are: global competition, cross-border trade liberalization, global production and distribution networks, the practices and strategies of MNCs, telecom deregulation, mobile and Internet diffusion, and the emergence of online marketplaces and e-commerce movement. International policies and institutions (WTO, ITU, World Bank) can also facilitate e-commerce via open rules and effective regulations for trade, investment, intellectual property, and telecommunications. Integration of countries into global production networks involves the adoption of e-commerce as a condition of participation. MNCs try to standardize their internal practices worldwide and push their suppliers and partners to align their processes and practices, including e-commerce, with those of the MNC. They rely on ICT, and particularly B2B e-commerce to improve coordination, cut

inventory, shorten time-to-market, reduce errors, and become demand-driven.

The impact of these global forces is mediated by national contexts at the macro level: the economic, political, social, and technological context and the policy environment of the country. Also, it is influenced by firm and industrial sector organization and capabilities at the micro and meso levels. Understanding drivers and barriers at these levels is critical to devising policies and programs to diffuse e-commerce practices and to augment their transformational impact for business adopters.

At the national level, e-commerce drivers are economic factors, while barriers are more institutional, legal, and capability factors. National policy context influencing e-commerce comprises: openness to trade and investment, telecom and Internet regulation, security and ease of online payments, consumer protection, legal environment and enforcement of rule of law, online privacy and data security, intellectual property protection, customs and trade compliance costs (particularly for cross-border traders), and data protectionism, among others. National infrastructures and financial institutions also play a key role in the diffusion of e-commerce: access and quality (reliability, speed, cost) of Internet and communication infrastructure, transport and distribution systems, postal system, and financial services (eg, credit cards) and financial regulation.

Most visible in developed economies, the use of ICT for business is contributing to growing intensity of competition and environmental complexity, and in turn, greater complexity arising from globalization is leading to increased adoption of e-commerce.

Country economic structure and socio-economic institutions also matter for the use of e-commerce. Countries that are heavily dependent on international trade like China (with more than half of its GDP based on trade), Singapore and Taiwan (almost totally dependent on foreign trade) are likely to be open to external influences such as e-commerce practices, and might also learn faster from foreign MNCs. Meantime, Brazil and Mexico's large income inequality is likely to factor in retarding the use of e-commerce (Kraemer, 2006). A substantial proportion of firms in the developed countries have integrated their processes with suppliers and business partners, indicating substantial use of e-commerce for supply chain coordination. Singapore proactively promoted e-commerce and business process integration to act as a production platform for foreign MNCs. The small scale of local markets in many developing economies may give global factors a more leading role as drivers of adoption than in large, inward-oriented countries, like Brazil.

Industry structure and sectoral differences also matter. Financial institutions were among the first to go global and to drive e-commerce practices via B2B, BPO, call centers, etc. Emerging patterns of e-commerce diffusion suggest that global networks drive B2B e-commerce, as in manufacturing, while local competition drives B2C e-commerce, as in wholesale/retail distribution. Put differently, B2B e-commerce supports upstream activities and tends to be more global; B2C supports downstream activities and to be more localized. Firms that operate more globally realize more benefits than firms that operate locally, as they are able to achieve economies of scale from their e-commerce investments, and their broader experience with ICT enables

them to utilize e-commerce more effectively.

The overall diffusion and impact of e-commerce is likely to be a gradual and learning process, as in ICT use in business transformation in general. It must adapt to national institutional conditions. In China, for example, heavy investments in IT infrastructure and the Internet has been counterbalanced by relatively rigid institutional infrastructures and business processes. Hence, the gradual diffusion of e-commerce in China has been focused on the internationally oriented coastal regions and cities, where complementary organizational factors have been faster to emerge.

Government can also provide digital platforms and induce business use of e-commerce via e-government procurement systems, online government to business applications, trade-net, and other e-commerce promotion initiatives that create network effects and a critical mass of users. Government policy may require the use of Internet for government procurements, offering incentives for to help small enterprises go online. A national e-commerce movement can be fostered by business media, industry associations, venture capitalists, in collaboration with governments. It can be primed, transformed, or made more inclusive by developing local online marketplaces, such as the Ethiopia Commodity Exchange for agricultural markets, an ICT-based marketplace that serves the entire value chain: farmers, traders, processors, exporters, and consumers (UNCTAD, 2011). The evolutionary character of e-commerce points to the need for continual monitoring and evaluation of the use and impact of e-commerce over time, and to identify and overcome the barriers to its diffusion and effective use, especially for SMEs.

3 Challenges to adoption, diffusion, and impact for SMEs.

Surveys suggest the strongest drivers of e-commerce use are the desire to expand markets, to improve coordination with customers and suppliers, and to enter new markets (Kremer, et al, 2006). Linkages to MNCs can be both a driver and enabler for SMEs. Other factors include demand by local consumers, and the cost and quality of access to the Internet and online marketplaces. The biggest barriers to adoption are concerns over privacy and security of data (highest in the financial sector) and inadequate legal protection for Internet purchases.

The impact of e-commerce on firms and economies is significantly dependent on their managerial and technical capabilities. It is a function of the spread and intensity of use of ICT within the enterprise, and within its entire value chain, from suppliers to business partners, to customers. E-commerce is not just about sales (as in contrast to Amazon and eBay), and online selling requires other activities as complements, if not prerequisites. Firms with a higher and more strategic technology use tend to realize greater value from e-commerce investments.

Managers play important roles in promoting greater depth and breadth in ICT use across the value chain: marketing, sales, customer services, procurement, production, information sharing, and value chain coordination. Technical and managerial competencies for effective use of ICT innovations are mainly acquired through learning by doing. As ICT applications become a strategic necessity, such

competencies become a major differentiator of e-commerce adopters at the firm, sector, and national levels.

4 Mobile for e-Commerce

Mobile phones, being the main communication tools for small entrepreneurs in developing countries, have great potential for e-business applications. Mobile telephony is also likely to be the primary tool for connecting the vast majority of low-income population to business and information society, at least in short to medium term. For example, SMEs that export agricultural products may be alerted to business opportunities and receive timely price information for their products. Mobile commerce, mobile banking and payments and mobile content are spreading in most developing countries. The potential is great, provided there is an enabling regulatory environment. In many countries, prepaid mobile services are used to provide mobile public payphones, and this improves accessibility in rural areas. As mobile handsets grow in sophistication and add new functionalities, such as digital photography and multimedia messaging and other utilities, they will provide a gateway to digital literacy.

The Philippines presents an interesting example of leveraging mobile phones for e-commerce by farmers. With very low penetration of Internet, the government tapped into the culture of SMS to provide two mobile applications, one, for farmers to post prices of their products, and the other, for mobile users to compare price of the top most traded products in a province. The program works with cooperatives to provide a level playing field and by giving players access to a common source of reliable and on-line market prices, are helping farmers maximize their selling prices.

For developed countries, the impact of broadband on business has been fairly documented in terms of reducing costs, increasing revenues, and expanding markets—but the evidence of broadband impact on business is still fairly thin among developing countries, even at the firm level. The experience of developed countries is therefore critical to guide broadband and e-business diffusion and impact in developing countries. A study of broadband deployment in business in several Latin American countries showed that deployment was associated with considerable improvements in business organization, including knowledge diffusion within organizations, and speed of business reengineering and network integration (Momentum Research Group, 2005). Broadband may also help firms in specializing in core activities and outsource the rest. Broadband may also help in building distinctive capabilities by allocating activities more efficiently between workers tackling complex and creative tasks and more transactional workers (Johnson, Manyika and Yee, 2005).

The highest productivity gains appear in firms that commit to integrate broadband, and IT in general, with reengineered business processes. Organizations that align their investments in network infrastructure, network-based applications, business processes and organizational behavior experience greater increases in business outcomes than organizations that disproportionately focus on one or more of these elements.

5 Conclusion

E-commerce holds the potential of becoming a major techno-economic innovation and an entry towards broader export, innovation and business transformation. It can lead to innovation in business models. It can provide a platform for innovations in business processes, relationships, products, and services. Some countries have therefore initiated e-commerce diffusion programs to help early adopters and SMEs, and increase the scale and impact of this innovation in selected sectors or economy-wide.

National policies to promote the adoption of e-commerce as a techno-managerial innovation should include: effective logistics and delivery infrastructure, trade facilitation system, digital infrastructure and platform development, affordable and reliable access to this infrastructure, secure payment solutions for online purchases, and enforcement of e-commerce laws and regulations. These policies should be complemented by developing e-commerce skills among small businesses, promoting digital entrepreneurship and innovation management, developing government e-procurement and e-trade networks to incentivize enterprises to adopt online transactions, and raising digital literacy and general awareness of all stakeholders about e-commerce.

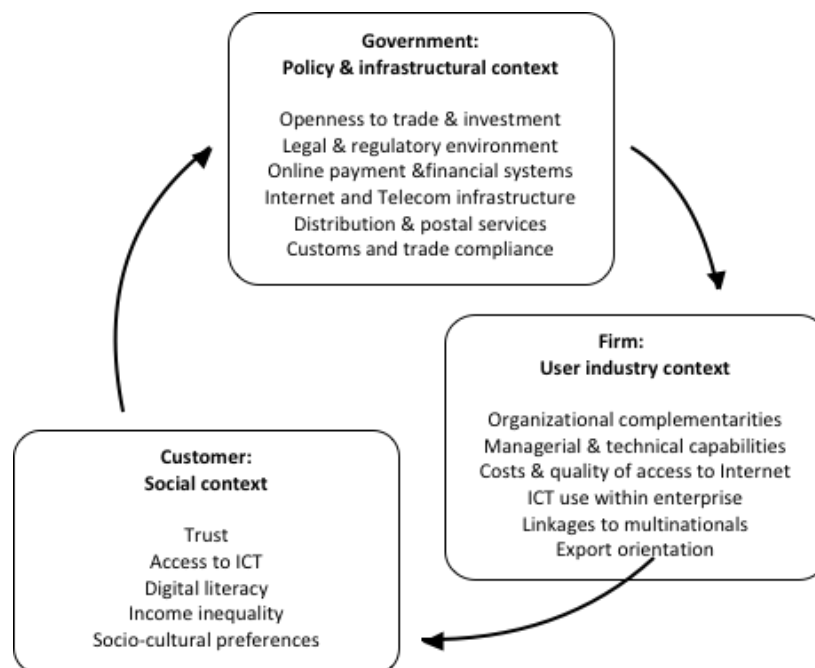


Fig 1. Factors influencing the e-commerce ecosystem

Some promising lessons are emerging. An ecosystem approach can be helpful in designing these diffusion programs and in mobilizing the relevant stakeholders to

fund and sustain them. E-commerce diffusion programs should focus on actual usage and payoffs from e-commerce, rather than focusing solely on ICT investment. They should be tailored to country context, to address policy and institutional factors, such as payment systems, privacy and data security, legal protection for online transactions, customs and trade compliance procedures, and Internet governance. They should address issues of access to Internet and broadband, and the diverse forms of digital divide. They may also address those infrastructural issues (eg, postal, transport, logistics, electricity) that impact SMEs' e-commerce most adversely. And perhaps most important to SMEs, diffusion programs should promote capability development and advisory services to SMEs to leverage and integrate e-commerce adoption into their business strategies and practices. Such programs may be sponsored by central government (ministry of industry, trade, small business), cities and local governments, trade and business associations, universities, or combined sources via partnerships.

Figure 1 sums up the various factors that influence the adoption and use of e-commerce, and overall e-commerce ecosystem of a country; this ecosystem view should guide the design of e-commerce diffusion programs.