# BRIEFING PAPER

INTEGRATING ICT INTO VALUE CHAIN DEVELOPMENT

INTRODUCTION

Value chains encompass the full range of activities and services required to bring a product or service from its conception to sale in its final markets—whether local, national, regional or global. Value chains include input suppliers, producers, processors and buyers and are supported by a range of technical, business and financial service providers (see figure 1 below).

Figure 1: The Value Chain Framework
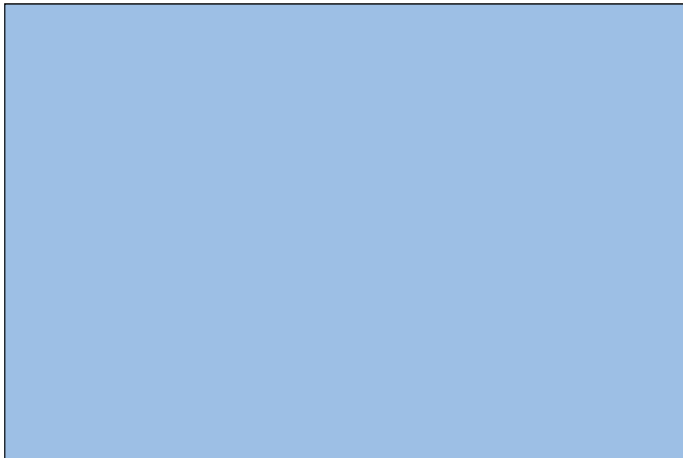
Information and communications technology (ICT) offers a growing number of ways to exploit opportunities and address constraints to value chain growth and competitiveness. Examples of ways in which ICT can increase competitiveness include the following:

- Bar coding can speed the delivery of products to markets, thereby reducing spoilage of shipments of perishable products such as tropical fruit.

- SMS text messaging can help farmers to negotiate with transport providers by supplying farmers with real-time information on market prices.

- Cell phones can strengthen horizontal links (between like firms) or vertical links (between buyers and sellers) by enabling reliable and rapid communication.

- The Internet can provide information about new production technologies and processes that help actors upgrade, leading to entry into new, higher-value markets.

This briefing paper describes some current trends in ICT, practical uses for ICT in value chain development, lessons learned from **the field, and** special considerations for conflict-affected environments.

TRENDS IN ICT

Understanding a few key trends related to ICT can be helpful in identifying if, when and how ICT can be used to improve value chain competitiveness—even for those who do not consider themselves to have an advanced understanding of technology. The trends described below can contribute to increased accessibility to ICT for poor and remote populations for whom such technologies were previously cost-prohibitive or simply unavailable.

First, mobile phone networks are expanding and improving dramatically, particularly in developing countries, and can now be used for *applications*, not just voice communication. This means that cell phone users can securely communicate with other cell phone users—sending text information, numerical data, photos, etc.—over mobile phone networks.

> ### ICT TOOLKIT
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> The term ICT is often used synonymously with the Internet. However, ICT encompasses a broad set of technologies that can be used alone or in combination. Below are a few examples:
> - Radios—satellite, digital, conventional terrestrial
> - Cell phones—including text messaging and data applications
> - Hand-held computers—personal digital assistants (PDAs) like the Blackberry™
> - Stand-alone computers
> - Televisions
> - Use of and presence on the Internet
> - Print media
> - Bar codes
> - Digital cameras

Second, Internet access is becoming easier and cheaper to extend to previously unserved areas using new technical approaches such as wireless connectivity, and business models geared toward individuals with low cash flows, such as pay-as-you-go applications. Pay-as-you-go applications allow users to access software for a fee over the Internet without having to purchase it, thus avoiding substantial up-front costs and the expense of maintaining the software and server.

Third, different forms of technology are evolving to perform similar tasks—a process called convergence. For example, one can use the Internet to make phone calls or see videos and use a mobile phone to browse the Internet and take pictures. Convergence offers more flexibility to consumers but can present unique challenges to regulators who have traditionally regulated these media separately.

Finally, devices themselves are becoming cheaper, sturdier and more energy-efficient. Part of the reason for this is that manufacturers are tuning in to the growing market demand in developing countries and are creating and targeting products specifically for those consumers.

INTEGRATING ICT INTO PROGRAM DESIGN

For development practitioners, the use of ICT can most effectively increase the competitiveness of value chains if considered before an intervention has begun, either during or—preferably—prior to project design (see figure 2 below).

Figure 2. Value Chain Project Cycle
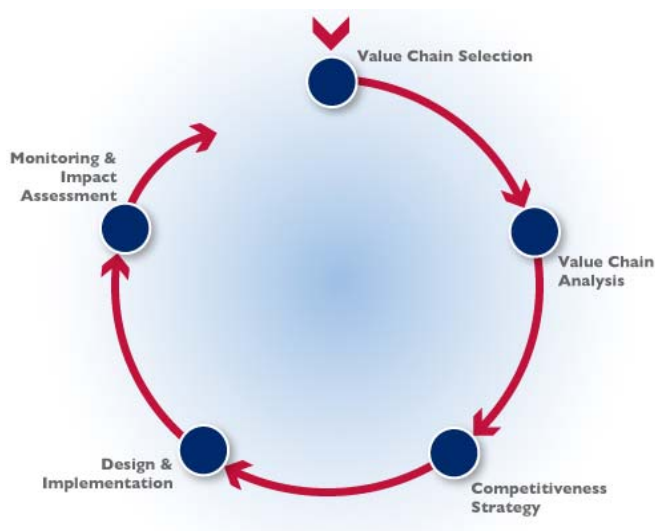
SMART PHONES AND FISH

In the Philippines, fishermen were trained and certified to use new environmentally and ethically sound methods to practice their profession—and were also equipped with smart phones. The smart phones used a picture-based technology, deployed for those who were not literate. Photos could trace the origin of fish, a system that allowed traders to receive immediate picture-based information and provide feedback to fishermen. Orders were conducted electronically with buyers to increase revenue in the value-chain with the side benefit of preventing over-fishing.

Reference: AED and Marine Aquarium Council

In value chain analysis, development practitioners should assess constraints to increased competitiveness—constraints in the enabling environment, in the end markets, weak or missing linkages between firms, inadequate support markets, etc.—and consider whether ICT-based solutions can help address these constraints. ICT should not be seen as an added bonus that can be purchased if project funds are available, but rather as a critical tool to address industry constraints to growth.

Considering these ICT-related questions during value chain analysis can provide important information for project design:

- **What types of ICT are value chain actors already using and how affordable is it?** Do they have cell phones or radios or Internet access? Do they share these or have their own? Where can the project take advantage of ICT already in use to achieve program objectives?

- **What are the sources of energy and how reliable and expensive is energy?** There are ways to charge ICT devices with solar power if power is intermittent. A community Internet center can earn extra revenue by using its generator to charge phones, increasing its sustainability.

- **Are there legal or regulatory barriers to ICT access and affordability?** Are these likely to change during the term of the project?

- **How are industry competitors using ICT?** Are there opportunities to utilize those ICTs for the value chain being assisted?

- **Is there competition between ICT providers that the project can leverage?** One provider may be willing to partner with the project to take advantage of the project's understanding of a new market or to increase its market share.[1]

- **Are other donor projects working in the same area that might share a need for ICT?** Donors or implementers should look for opportunities to pool the ICT demands of the value chain and the demand from local governments and schools, and seek a private provider to meet the aggregated demand.

LESSONS FROM THE FIELD

1. Facilitate the delivery of ICT services to maximize the potential for sustainability. As with any value chain development activity, ICT-based interventions should be *facilitated* rather than carried out directly by the donor-funded project team. This means selecting private (and ideally, local) ICT providers through a transparent tender process to provide any ICT-related services, and looking for opportunities for those already in the target value chain (e.g., input providers) to provide the services or help fund them. For example, in the agricultural inputs value chain in Zambia, an input firm provided advice and product information to farmers via SMS.

2. Resist the urge to use excessive technology; use the lowest-cost and simplest technology that can address the identified constraint. This will increase the likelihood of the ICT activity being sustainable and scalable. In the context of value chain development, ICT should be viewed as a means to an end—a tool that can be used to address a specific constraint in the value chain. Unfortunately, new and innovative technologies are often viewed as an end in themselves. An example of using the minimum technology needed comes from coffee cooperative farmers in Rwanda who had difficulty navigating new relationships with international buyers. The buyers were accustomed to direct email communication with suppliers related to orders, shipments and visits, and expected quick response times. The introduction of simple email communication provided through mobile phone networks was enough to solve this major con-

straint, strengthening the buyer-cooperative relationship and enabling producers to better meet buyers' needs.

3. Look for opportunities to build on ICT already in use. Before introducing new technology, find out what products and services are already available and/or in use that could be employed or adapted to resolve the value chain constraint. The rice value chain in Mali faced many constraints to competitiveness: i) farmers did not know what prices were being paid for their crop in regional markets; ii) farmers did not have access to warnings about weather conditions that could damage their crops; and iii) farm extension workers could not reach all the farmers to train them in production techniques due to poor roads and high vehicle and fuel costs. Mali has a community radio system that was already in use. By expanding the use of radio to convey price information, weather alerts and extension information, these constraints were addressed.

4. Encourage sharing of application development and operations across users to reduce costs. To reach a niche market in Italy and effectively compete with China, Macedonia's small apparel firms needed to use very high-tech and expensive design and manufacturing software and equipment. To address this limitation, one USAID project supported the entry of a third-party service provider. By paying for use of this ICT-enabled service to the service provider, many firms were able to afford collectively what they could not on their own.

USING ICT TO EXPLOIT NEW MARKET OPPORTUNITIES

In Cambodia, an entrepreneur learned of the demand for digitizing old business records in developed countries. He set up a company to provide this service, taking advantage of Internet access to receive the documents in PDF formats and deliver the finished product to his clients (eliminating the cost and delays of shipping documents); and using the large local supply of low-skill, low-cost labor to convert the documents to searchable electronic form.

Reference: www.digitaldividedata.org

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[1] In such a case, to reduce market distortions, practitioners should select the provider(s) using a tender process across competitors even if a provider offers discounts or donations of equipment or services.

5. Consider the telecommunications legal and regulatory environment. If access to and the price of ICT are constraints to its use by firms in a value chain, consider working with the telecommunications enabling environment itself. Helping to improve the legal and regulatory environment for telecommunications to increase predictability of service, transparency and support for competition and innovation can have dramatic results in terms of lowering costs and increasing accessibility for consumers. In Montenegro, changes in the telecommunications law and related regulations dramatically reduced the price of access to the Internet by allowing more competition and reducing license fees.

6. Plan an exit strategy upfront when using grants, subsidies and pilot projects. ICT grants and subsidies have a danger of not being scalable or sustainable if equipment or services that are introduced are too expensive for others to purchase or maintain. Therefore, to ensure maximum effectiveness, sustainability and scalability, practitioners should implement interventions with a realistic scale-up plan and an upfront exit strategy. In the first phase of implementation, allow flexibility to make adjustments to the project based on beneficiary needs and responses. One proven approach to improve the chances of sustainability and scalability is to build in financial incentives for the service provider so that the more successfully the service expands to serve a greater proportion of the target population, the more the provider earns. In India, USAID partnered with a private-sector IT firm to develop ICT-enabled applications on handheld devices that allow extension agents and farmers to communicate valuable information across the entire fruit and vegetable supply chain. This IT firm is now entering into commercial relationships with supermarket chains to further develop and apply the applications.

SPECIAL CONSIDERATIONS FOR CONFLICT-AFFECTED ENVIRONMENTS

When there is violent conflict, telecommunications infrastructure is often the first to shut down since its wires and towers are easily destroyed. However, it is also one of the first sectors to rebound—particularly when wireless connectivity enables quick start-up—as fierce competition pushes mobile operators across borders and into post-conflict areas quickly.

In conflict-affected areas, mobile networks and radio can sometimes be integrated into other infrastructure projects. Ideally, fiber wire will be laid during road or railroad construction or in tandem with an energy project, as is currently happening in Afghanistan.

All donors want Internet access or cell phone coverage, creating the potential for collaboration with other donor- or government-funded projects to consolidate demand and create a market for telecommunications service providers.

Global positioning systems (GPS) can be very powerful tools because they allow for the determination of exact locations based on satellite coverage, which is helpful for coordinating services and distribution networks. In conflict situations, military units often make an investment in good GPS coverage, producing maps that can be obtained and used for ICT network purposes.

With a favorable regulatory environment, the private telecommunications sector will make most major investments, minimizing donor investment requirements in infrastructure. There may be a lack of political will on the part of the government to make changes in the regulatory environment or break the monopoly of an incumbent provider, but efforts must be made to increase competition since this will reduce prices and extend access as providers seek broader markets.

RESOURCES

AED
http://itac.aed.org/projects/economic_growth.shtml
Maritime Aquarium Council
http://www.aquariumcouncil.org/conservation.html
The GSM Association
http://www.gsmworld.com/our-work/programmes-and-initiatives/index.htm
Mobileactive.org http://mobileactive.org/
*info*Dev http://www.infodev.org/
The Development Gateway
http://ict.developmentgateway.org/
The International Telecommunications Union
http://www.itu.int/net/ITU-D/index.aspx
ACDI/VOCA
http://www.acdivoca.org/acdivoca/PortalHub.nsf/ID/indiaIGP