

Accelerating Development with a National Knowledge Exchange

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Economic growth requires people to have skills that enable them to fully exploit the resources available to them. Particularly in developing countries, there are neither enough people with the required skills nor people able to provide those skills. Nations cannot compete, or even participate, in the global economy without fully optimizing their use of information and communications technology (ICT) in all sectors of their economy. To take President Bill Clinton's phrase a bit further, it's not just "the economy, stupid"—we need to focus on the e-skills and infrastructure to support the economy.

Simply stated, *the use of ICT to support the timely and effective exchange of knowledge can accelerate economic development.*

In the public sector, the current economic climate is forcing governments to develop system and process improvements in all areas of service delivery, with the worthy goals of reducing costs, driving efficiency, and increasing public participation. Additionally, Cisco's Internet Business Solutions Group (IBSG) believes that public sector leaders must embrace e-skills development as a core activity that will underpin the success of any technology-based transformation.

There have been many small projects and programs to address the skills shortages in developing countries, but an ICT infrastructure is required to scale these efforts and enable new methods and modes of learning.

Cisco IBSG's perspective is that with the appropriate business models and architectures, the network can provide the platform for delivering e-skills, exchanging knowledge among citizens and communities (both local and global), and supporting economic development.

Trends and Challenges

The scale of the global challenge is huge. A recent report by the World Economic Forum showed that the Northern Hemisphere faces talent shortages in a wide range of occupational clusters largely because populations are aging rapidly and educational standards are insufficient. The United States, for example, will need to add more than 25 million workers to its talent base by 2030 to sustain economic growth, while Western Europe will need 45 million.¹ Southern Hemisphere countries have talent gaps due to lower skill levels. Because of the uneven quality of education systems, only 10 percent of Chinese engineers and 25 percent of Indian engineers boast the skills that multinational employers view as being on par with those of their Western counterparts.²

Analyses of other key professions show major skills shortages globally. For example, more than 10 million teachers need to be recruited worldwide to reach the internationally agreed target of universal primary education by 2015, and 45 countries in Sub-Saharan Africa need to increase the number of employed teachers by almost 50 percent, according to UNESCO.³ Additionally,

the World Health Organization (WHO) has documented a worldwide shortage of almost 4.3 million physicians, midwives, nurses, and support workers.⁴

There are, of course, important differences for the same sector among different countries. For example, considering the information technology and information technology-enabled services (IT/ITES) sector, Indonesia starts with almost 140,000 graduates each year, but only 20 percent of these are qualified to work in the IT/ITES sector because of issues with curriculum quality. Kenya, however, starts with a much smaller pool of 51,000 graduates every year, but 60 percent of these are suitable for work in the IT/ITES sector.⁵

In South Africa, a recent report by Adcorp⁶ calculated that as of May 2011, there were 829,800 unfilled positions for high-skilled workers across a wide range of occupations, including senior management, the professions (medicine, engineering, accounting, and the law), technical occupations (specialized technicians and artisans), and agriculture. The report noted, “Many existing economic activities are, given pervasive skills shortages, conducted inconsistently and, apparently, inexpertly, which is probably a more significant factor in South Africa’s low labour productivity by global standards than is widely thought.”

Another study of hospital managers in South Africa suggested that the lack of management capacity was such that “there needs to be a paradigm shift from predominantly formal approaches to management development to include more informal approaches.”⁷ The study found that managers are more likely to improve their skills and competencies through an experiential approach, which may include mentoring and coaching, networking with colleagues, and in-house programs; that is, a collaborative rather than didactic approach.

The Opportunity

Governments worldwide are seeking a new educational paradigm that can help meet these challenges. They need solutions that deliver locally appropriate training, content, and services across all sectors to all citizens, employees, and entrepreneurs. They must be high-quality, broadly accessible solutions that can be delivered at scale. ICT offers a powerful platform that governments can use to orchestrate the development and provision of skills. There are many different requirements, but they start with a baseline need for digital literacy. Figure 1 describes three broad categories of worker, along with the e-skills and capabilities that they need. While the content and focus of training for each type of worker are different, the overall architecture will be consistent, enabling collaboration, video learning, and interactivity.

Figure 1. While Different Types of Workers Require Different Skills and Training, They Can All Learn on a Similar Training Platform.

Descriptor	Skill Type	Ability Definition
Digitally Literate	ICT user skills	Use ICT to support and develop your own work, which is probably not in the ICT industry
Information Worker	ICT practitioner skills	Capable of designing, developing, installing, and supporting ICT products and solutions
21 st Century Professional	E-business transformation skills	Able to exploit the opportunities offered by ICT to enhance or start a business

Source: Cisco IBSG, 2011

Complication 1: Scale

How Can Governments Reach Enough Workers?

The problem of scaling services is enormous and ubiquitous. Across the developing world, most workers need training to improve effectiveness in their current role. But as implementation of e-government systems increases, there is also a need to provide workers with skill sets that enable them to embrace 21st-century work practices. It is clear that traditional face-to-face scenarios will not scale.

Complication 2: Quality

Where Will Expertise and Content Come from To Drive Quality?

If you are a police officer in Los Angeles or Sao Paulo dealing with knife crime in schools, the person with the experience you need may be an officer in the Metropolitan Police Force in London. If you are a midwife in rural Kenya, you may need to collaborate with a midwife in Nairobi because she knows all about a particular problem you're trying to solve. These workers can get the help they need by participating in "knowledge communities" that put them in touch with specific kinds of expertise. To be effective for countries with a lack of experts and skilled professions, these knowledge communities must be at least national in scope, but preferably global, and experts and content must be available easily, in an effective format. A virtual learning environment that delivers impactful knowledge services anywhere, at any time, on any device can no longer remain a pipe dream. It is probably the only affordable way to deliver quality knowledge and education at scale.

Solution

Cisco IBSG believes that skills development is a cornerstone of national development and global competitiveness, and that a prerequisite of skills development is the broad availability of knowledge. Knowledge, of course, is much more than information because it requires appropriate interpretation of information within particular contexts. The network can provide a platform on which “knowledge communities”—the foundation of successful 21st-century economies—can be built. In these new knowledge communities, participants can acquire knowledge effectively, and enhance, create, and share knowledge for common benefit—both within and among communities. Enabled by ICT, these communities will foster a culture of collaborative learning and problem solving that cultivates equitable prosperity.

Innovative teaching and learning processes will be essential to ensure both quality and scaling of knowledge transfer. IBSG believes that these processes will need to address at least three different knowledge-acquisition types, as illustrated by the following examples:

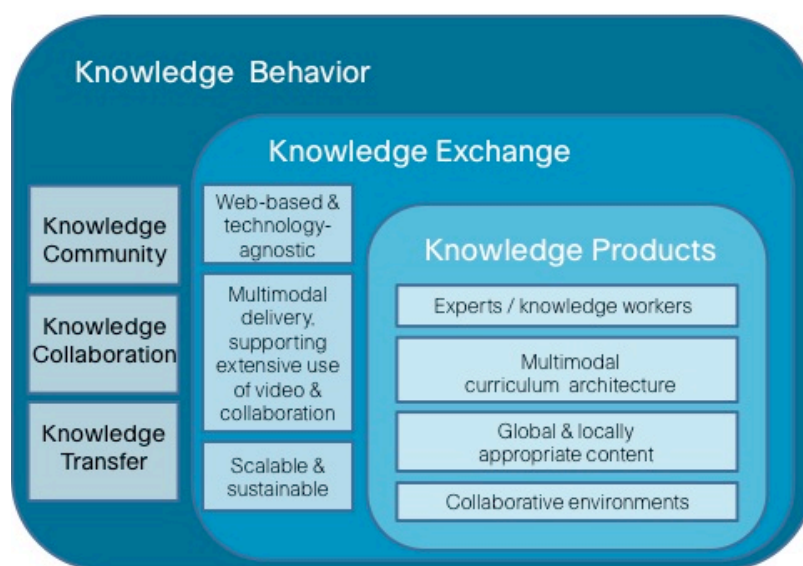
1. **Just in time.** A midwife in rural Kenya is attending an expectant woman who is diabetic. The midwife suspects the patient's hyperglycemia is due to a mismatch of diet and medication, so she texts her hospital's senior midwife for urgent guidance.
2. **Tactical.** As part of her training, Grace, a community “e-center” manager, has learned how to assess the public health information requirements of her community and has found indications of increasing levels of diabetes. Grace wants more information about diabetes and turns to a “knowledge hub,” which connects her with information and experts from the National Ministry of Health to support her. She is then able to share this with her e-center colleagues.
3. **Strategic.** The diabetes education program in Grace's community has fostered connections and attracted attention at the national and international levels. The WHO and African Union are seeking feedback on the rich-media diabetes information they have provided to the health workers and patients via the e-center. What they learn from the community's experiences (for example, via telepresence in the e-center) will help them refine their learning materials for diabetes-prevention programs elsewhere. In addition to these three knowledge-acquisition types, IBSG believes that optional modes of delivery will be required to offer flexibility in time, location, and end-user device, and to allow both teachers and learners to personalize learning.

As illustrated in Figure 2, the “knowledge exchange platform” is an ICT-enabled business and technology architecture that operates within a context designed to encourage the behaviors that create knowledge communities. The first step is the transfer of knowledge, but as collaboration within and among communities develops, a “knowledge community” evolves. It is the knowledge exchange that connects community members with one another. Web-based, technology-agnostic, and with rich media embedded, the knowledge exchange enables the delivery of customized bundles of curriculum, content, applications, and experts as knowledge products. It is access to these that enables scalable and sustainable solutions to be developed by those with the necessary e-skills.

Another innovation, multimodal curriculum architecture, is a methodology that allows curricula to be designed for multimodal delivery, with 21st-century skills “built in.” Typically, this methodology has clearly stated learning goals, and incorporates various video and collaboration technologies to facilitate learning and interaction. For example, members may participate in virtual classes

where the teacher facilitates a Cisco WebEx® session and students can interact and ask questions via the chat feature. Facilitators can incorporate video clips from experts, or even have experts online during the session. This approach offers a high degree of flexibility and personalization for users. Hence, multimodal curriculum architecture is critical for the effective creation of knowledge products for the knowledge exchange that will, we believe, result in better learning outcomes.

Figure 2. The Knowledge Exchange Provides Scalable Access to Locally Appropriate Knowledge Products, Helping Create Knowledge Communities in a Web-Based, Collaborative Environment.



Source: Cisco IBSG, 2011

Business architectures for the enterprises or government agencies that manage and provide the knowledge exchange services must also be highly innovative, reflecting the need for flexible services and the diverse requirements of the ecosystem of partners needed to build the knowledge exchange.

Thus, the knowledge communities that interact with the knowledge exchange could supply a workforce equipped with 21st-century communication and collaboration skills, deep expertise in their chosen subject, flexibility and adaptability, creativity, and community skills. Cisco IBSG believes that as these knowledge communities grow and evolve, the “human network effect” will ultimately give rise to global knowledge communities where collaboration and learning are not constrained by geography.

Case Example: e-Skills Initiative, Republic of South Africa

In 2009, the government of South Africa stated that “economic growth and development, including the creation of decent work on a large scale and investment in quality education and skills development,” are at the center of its Medium Term Strategic Framework (MTSF).⁸ To take this concept forward, the country’s Department of Communications established the e-Skills Institute (e-SI) to drive the national e-Skills agenda as a key component of the MTSF. The Department worked with Cisco IBSG to develop a strategy and policy that incorporate a

knowledge exchange platform as the central component for the National e-Skills Plan of Action.⁹ Three important assumptions drove development of the plan:

1. Technology would be an important requirement for implementation—providing broad access, ensuring consistent curriculum quality, enabling collaboration, and taking the program to scale.
2. Universities would be the engines of social and economic growth in the new knowledge society.
3. Establishing a multi-stakeholder partnership across government, business, education, and civil society would be critical for delivering a sustainable program.

Cisco has worked with the e-SI to ensure both quality and the ability to scale the program to a national level. Together, they have identified some key requirements:

- Physical “centers of excellence,” such as universities, research hubs, medical institutions, and incubation centers, must work together and contribute to a shared, virtual pool of knowledge.
- A broadband-based infrastructure is needed to implement new collaboration tools and video-based technologies, both of which enable innovation in learning and development.
- Digital and media exchange technologies must deliver content to any type of device, in any location, to capture full value from the content.
- Quality, content, and presentation standards must be agreed upon so that there is consistency and interoperability.

With such an infrastructure, knowledge communities will be able to transcend the constraints of distance and organizational boundaries by enabling participants to see and collaborate with peers, and to develop and share best practices. If the program delivers knowledge in ways that people find engaging, interactive, and easy to access, then citizens and communities will value the solutions—a necessary condition for digital inclusion.

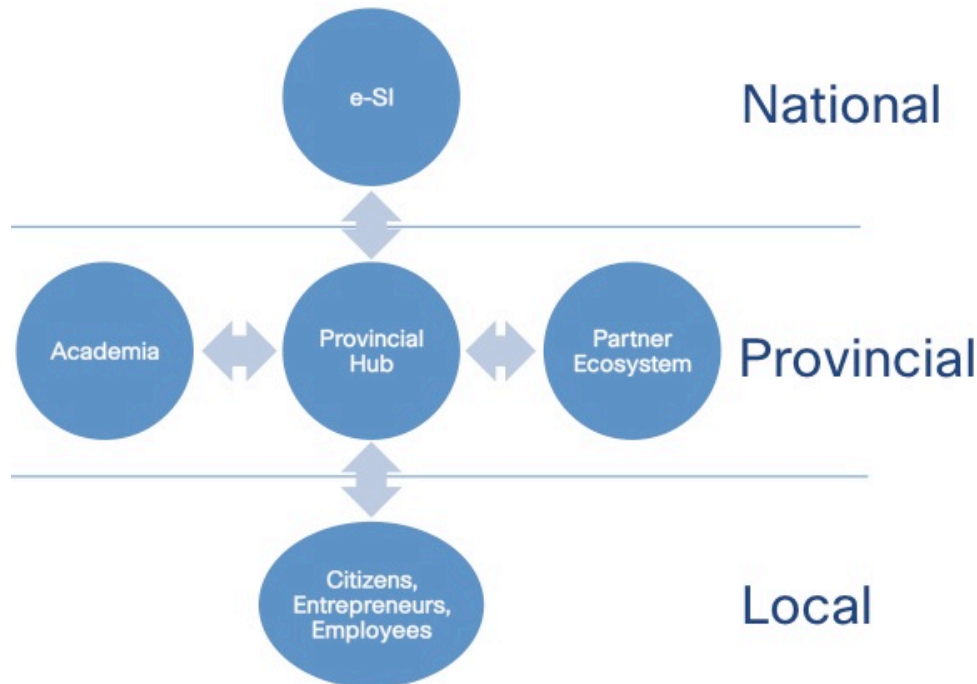
Governance Model

Figure 3 illustrates the basic e-Skills program governance model at the local, provincial, and national levels. Citizens, employees, and entrepreneurs use the collaboration and communications infrastructure to access the program locally. With support from the government, one university in each of nine provinces establishes a “hub” for knowledge creation and coordination of activities in that province. This includes the multi-stakeholder relationships among business, academia, global development partners, and provincial/municipal governments. All of these stakeholders have knowledge to contribute, and other partners are also needed to deliver the technical solutions.

These university-based provincial hubs function as a “faculty” of the e-SI. They share a common communications infrastructure to contribute to the national knowledge network under the guidance of the e-SI. The provincial hubs work together to champion knowledge verticals (such as e-Skills for health or e-Skills for educators, and so forth). They also collaborate around research, knowledge creation and delivery, assessment, and accreditation. The e-SI coordinates the program nationally and works for supportive policies and standards. The United Nations Development Program (UNDP) is supporting the e-SI at the international level. For example, it has established an internationally appointed advisory panel to gather and share

the best global experiences in policy, practice, and implementation for the ICT sector to use in South Africa.

Figure 3. Governance Model: The e-Skills Institute Provides National Coordination, and Supports e-Skills Development Activities at the Provincial and Local Levels.



Sources: e-Skills Institute, 2011; Cisco IBSG, 2011

Focus on Digital Inclusion

For the e-Skills program to have broad impact, there must be easy and affordable access to its resources for citizens, employees, and entrepreneurs across the country. Some may be able to access this knowledge from work, home, or on a mobile device. But for many, the only opportunity to be included in the digital world comes via an “e-center,” of which there are many types.

E-centers offer affordable access to computers, the Internet, and other technical resources, and may be run by private entrepreneurs, or located in post offices, libraries, or other public buildings. One of the e-Skills provincial hubs, at the University of the Western Cape, has focused on digital inclusion, and has adapted content from the Telecentre.org Foundation¹⁰ to build the skills of e-center managers. This e-center training material is localized for South Africa, available online, and uses a range of digital media. With support from Cisco, this material is being tested in e-centers of different types in urban, suburban, rural, and deep rural settings across the Province of the Western Cape. Peer collaboration, feedback, and further localization of the training material are being encouraged, using WebEx. The next phase will be to progressively enrich the sources of knowledge that e-center users can access.

Potential Impact

The crucial test of the impact of all this orchestration is that citizens, employees, and entrepreneurs are able to acquire the e-Skills required to access, collaborate, develop, and communicate digitally mediated content, training, and services—thereby improving their livelihoods and those of their communities' citizens. This impact is starting to be realized in South Africa. The major thrust of e-SI is aimed at securing equitable prosperity and global competitiveness within the mandate of the MTSF.

Formulated after a wide consultative process, the National e-Skills Plan of Action proposes that “by December 2014, all Provincial and Municipal libraries, schools, and community centres are resourced (and staff trained) to provide a national network of e-Skills local support centres.” South Africa has a widely spread web of about 1,200 public libraries¹¹ and 25,906 ordinary schools.¹² Additionally, it aims to have a “one-stop-shop” community center in each of 283 municipalities by 2014.¹³ If people are able to access e-Skills resources in all of these support centers, the benefits of e-Skills for individuals and communities will be large.

Because the program is fundamentally collaborative and interactive, successful implementation of the e-Skills framework will enable cultural changes at all levels that can help drive economic development. For example:

- **Individual citizens** will begin to embrace a culture of learning, self-reliance, and improvement.
- **E-center managers** will learn to collaborate and share content with peers, and learn to deal with the individual requirements of citizens.
- **Knowledge production and coordination hubs** will begin to serve the information needs of e-centers, peers, technologists, and the central government, as well as their academic peers (nationally and internationally).
- **Government** will begin fostering innovation and cultural change at all levels, working with service providers to find affordable solutions for digital inclusion and development.

Of the many initiatives that the government has to pursue, this is perhaps the best example of how collaboration and network technologies can be used as vehicles to promote sharing of knowledge and learning up, down, and across different organizational hierarchies. This will promote the cultural changes needed to build skills for driving development in South Africa.

An evaluation of the e-Skills program in South Africa has begun under the auspices of ReSNES, a national research network orchestrated by the participating universities and based at Walter Sisulu University.¹⁴ The initial work on e-Skills for e-center managers at the University of the Western Cape is now being evaluated. ReSNES will create a network of researchers across the higher education sector, the private sector, government, civil society, and other role players to provide research-based intelligence that will help inform the next iteration of the program.

Next Steps

Recognizing the scale of the challenge to provide equitable access to skills to develop society, the South African government's e-Skills plan of action is well under way. The next steps include:

- e-SI to be resourced to provide an orchestration role
- UNDP to develop a framework for global development partners to support the South African e-Skills initiative
- All nine hubs and their particular areas of interest to be confirmed
- Other government departments and agencies to be fully engaged
- Contributions of non-governmental organizations (NGOs) to be encouraged toward areas of greatest need
- Service providers to partner to deliver affordable, sustainable solutions
- Testing of progressively more extensive knowledge exchange services to be undertaken at e-centers on an ongoing basis
- Governance arrangements to be in place to enable the above
- Evaluation and impact analyses put in place by ReSNES to monitor the above

From the point of view of international partners such as Cisco, the next steps to support this e-Skills initiative will include proofs of concept of the underlying platform, as well as some of the collaboration, video, and data center services that will be needed to develop solutions to benefit South Africa. This work will also be used to explore the extent to which the approach used in South Africa—in terms of content, technology, and partnerships—can be adapted for use in other countries.

Conclusion: Connecting To Accelerate Economic Development

The South Africa e-Skills initiative demonstrates an innovative approach through which government works with universities and other stakeholders, using a business-driven architecture, to help create knowledge communities. The arrival of affordable, well-architected broadband-based services, content, and training now makes this feasible, and South Africa is well placed to demonstrate solutions that can stimulate locally relevant solutions in other countries. These sorts of efforts can be successful only if they are supported by government policy and investment as part of the national agenda for economic development.

E-skills are needed for citizens, communities, and nations to take full advantage ICT's benefits. Indeed, the acceleration of socioeconomic development will come only when people can use those skills to exchange and develop useful knowledge in a timely manner over any device, anywhere, anytime. The more people are connected, the more knowledge can be shared and created, enabling and accelerating economic growth. The costs of closing the "skills gap" will be more than offset by the benefits of increased productivity.

The role of governments in driving and investing in technical and organizational infrastructure is critical to fostering such e-skills. By developing a national knowledge exchange platform, governments will enable new styles of connection and learning. They will also pave the way for innovation and best-practice sharing, nurturing a workforce with the resilience that society needs to withstand the stresses of development in uncertain times. Governments need to consider how best to create and support a well-orchestrated ecosystem of partners—including NGOs, ICT companies, and e-centers. Governments that adapt to new ways of working with the

ICT sector can ensure affordable and sustainable provision of Internet-based services. The broadband-based economies of the future will enable communities to use collaboration tools, together with new modes of learning, to accelerate economic development.

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