

Comparison of E-Readiness Assessment Models

Final draft, v. 2.13, 14 March 2001

Prepared by bridges.org as an 'open content' document
for further distribution and use.*

CONTACT: Teresa Peters
Executive Director, bridges.org
South Africa: PO Box 4163, Durbanville 7551
Tel: +27 21 970 1302 Fax: +27 21 970 1315
United States: 1424 16 Street, NW, Suite 502, Washington DC 20036
Tel: +1 202 299 0120 Fax: +1 202 628 6051

* Copyright 2001 bridges.org. Bridges.org strongly believes in building collaborative partnerships within the development and policy community and creating resources that are available for free use by the general public. Therefore, this document is made available for further distribution and use under an 'open content' license (per www.opencontent.org's Open Publication License version 0.9 or later). In other words, you are free to use this material and redistribute it as long as bridges.org is given credit for the original work. We hope that you also choose to make any derivative works available as 'open content' to expand the resources available for everyone.

This report benefited from a diverse range of opinions and input from experts working in this field - see the "Contributions" section for information.

I.	INTRODUCTION	3
II.	E-READINESS ASSESSMENT TOOLS	4
A.	READY-TO-USE TOOLS - QUESTIONNAIRES	4
a)	CSPP's Readiness Guide for Living in the Networked World	4
b)	CID's Readiness for the Networked World: A Guide for Developing Countries	5
c)	APEC's E-Commerce Readiness Assessment	6
B.	THIRD PARTY SURVEYS & REPORTS	7
a)	McConnell International's Risk E-Business: Seizing the Opportunity of Global E-Readiness.....	7
b)	Mosaic's Global Diffusion of the Internet Project.....	8
c)	WITSA's International Survey of E-Commerce	9
d)	Crenshaw & Robinson's Cyber-Space and Post-Industrial Transformations: A Cross-National Analysis of Internet Development.....	10
e)	CIDCM's Negotiating the Net Model	11
C.	OTHER E-READINESS ASSESSMENT MODELS	12
a)	Digital Divide Reports	12
b)	Position Papers	14
III.	COMPARISON	15
A.	TOPICS COVERED AND LEVEL OF DETAIL	15
B.	E-ECONOMY VERSUS E-SOCIETY	15
C.	ASSESSMENT METHODOLOGY	16
D.	RESULT OF ASSESSMENT	16
IV.	ANALYSIS.....	17
V.	CONCLUSION: TOWARDS A MORE COMPREHENSIVE TOOL.....	20
VI.	RESOURCES	21
VII.	CONTRIBUTIONS AND ATTRIBUTION	22
VIII.	APPENDIX: COMPARISON CHARTS.....	23

I. INTRODUCTION

Over the last three years, a number of ‘e-readiness’ assessment tools have been developed. On the surface, each tool gauges how ready a society or economy is to benefit from information technology and electronic commerce. On closer examination, the range of tools use widely varying definitions for e-readiness and different methods for measurement. For example, Harvard University’s¹ model looks at how information and communications technologies (ICTs) are currently used in a society, while APEC’s² method focuses on government policies for e-commerce. This report describes the various tools that are available and what they measure, to foster informed decisions about approaches to e-readiness assessment, as national governments consider their information technology policies and undertake development initiatives.

For each assessment tool, this report answers the following questions: What is the goal of the tool? What is measured? What standard is used, or how is ‘e-readiness’ defined? How is the assessment carried out? What result is produced? Are there existing reports that have used this assessment tool? Who authored the tool and where can more information about the tool be found? The range of available tools is broken down into different categories to clarify how each be used. For example, two major categories are used which offer different underlying goals: those that seek to measure ‘e-economy’ metrics, and those that look at ‘e-society’ indicators. E-economy assessment tools look at the ability of ICTs to impact the economy, while e-society assessment tools look at the potential impact of ICTs on the wider society. After these comparisons, the report considers how well each tool fits its goals. Finally, the report offers suggestions about how policymakers might use these tools to meet their specific assessment needs and how a more comprehensive e-readiness assessment tool could be developed.

The number of tools that are ready-to-use to assess a nation's e-readiness is limited, as relatively few organizations have presented their assessment methods for use by others. However, there is a wide range of reports and other resources that can be re-worked into ‘assessment tools,’ including position papers and survey results. This report starts with those methods formally presented as assessment tools, and then goes on to look at assessment methods which can be garnered from other resources. Throughout this report, the term ‘assessment tool’ is used in the wider sense to mean both ready-to-use questionnaires as well as other resources that can be adapted into assessment methods. Only a sample of the available tools could be covered in this report, so those included are either the most widely known and used, or they provide a unique perspective or method. A more detailed resource list is included in the appendix to this report, for further information on those assessment methods that are not described herein.

¹ *Readiness for the Networked World: A Guide for Developing Countries*, Center for International Development, Harvard University, 2000.

² *E-Commerce Readiness Guide*, Electronic Commerce Steering Group, Asian Pacific Economic Cooperation (APEC), 2000.

II. E-READINESS ASSESSMENT TOOLS

A. Ready-to-Use Tools - Questionnaires

a) CSPP's Readiness Guide for Living in the Networked World

Who created the tool?

The Computer Systems Policy Project (CSPP) developed this guide. It was published in 1998, and is available at www.cspp.org. CSPP is a "public policy advocacy group...comprised of the Chairman and Chief Executive Officers" of US information technology companies.

What is the tool's goal?

This self-assessment tool is designed to help individuals and communities determine how prepared they are to participate in the "Networked World."

What does it measure?

The guide measures the prevalence and integration of ICTs in homes, schools, businesses, health care facilities, and government offices, with additional focus on competition among access providers, speed of access, and government policy. Measurements are divided into five categories:

1. infrastructure
2. access
3. applications and services
4. economy; and
5. "enablers" (policy, privacy, security, ubiquity).

How does it define 'e-readiness'?

An 'e-ready' community has high-speed access in a competitive market; with constant access and application of ICTs in schools, government offices, businesses, healthcare facilities and homes; user privacy and online security; and government policies which are "favorable to promoting connectedness and use of the Network."

How is the assessment carried out?

The CSPP Readiness Guide provides a series of 23 questions, for community members to ask about the community itself. For each question, the users choose from a set of answers, which represent four progressive "stages" of development. The 23 questions are divided into the five categories listed above. For example, "chose...the level of access to network services provided in homes in your community. a) 25 % of homes have a computer / access device..."

What result does it produce?

The assessment produces a rating that indicates which of four progressive stages of development the community is at for each of the five categories listed above. "An overall 'score' for the community can be estimated by simply averaging the scores across the criteria."

Are there existing reports that have used this assessment tool?

Yes. See <http://206.183.2.91/projects/readiness/assessments.htm>

b) **CID's Readiness for the Networked World: A Guide for Developing Countries**

Who created the tool?

The Center for International Development at Harvard University developed this guide. It was published in 2000, and is available at www.readinessguide.org. It draws from the earlier CSPP guide, described above.

What is the tool's goal?

"The guide...systematically organizes the assessment of numerous factors that determine the Networked Readiness of a community in the developing world." This assessment is meant to serve as a basis for further analysis and planning.

What does it measure?

This guide measures 19 different categories, covering the availability, speed, and quality of network access, use of ICTs in schools, workplace, economy, government, and everyday life, ICT policy (telecommunications and trade), ICT training programs, and diversity of organizations and relevant content online.

How does it define 'e-readiness'?

An 'e-ready' society is one that has the necessary physical infrastructure (high bandwidth, reliability, and affordable prices); integrated current ICTs throughout businesses (e-commerce, local ICT sector), communities (local content, many organizations online, ICTs used in everyday life, ICTs taught in schools), and the government (e-government); strong telecommunications competition; independent regulation with a commitment to universal access; and no limits on trade or foreign investment.

How is the assessment carried out?

The guide provides a grid with descriptions of four stages of advancement in each of 19 categories (placed into five groups). Communities estimate their current stage of development in each category. No prescription is given on how that estimate should be made.

What result does it produce?

The guide rates the 'stage' a community is in for each of the 19 categories, and descriptions are given of what is required to be in a particular stage. "The Guide does not offer prescriptions for improved Readiness."

Are there existing reports that have used this assessment tool?

Yes, many. See <http://www.readinessguide.org/examples.html>.

Other Notes:

A new, more comprehensive, version of the guide is in development and is expected soon. The guide is currently available in six languages. Detailed descriptions of each category and their place on the grid are given.

c) **APEC's E-Commerce Readiness Assessment**

Who created the tool?

The Asian Pacific Economic Cooperation (APEC) Electronic Commerce Steering Group developed this guide. It was published in 2000, and is available at <http://www.ecommerce.gov/apec/>, and http://www.ecommerce.gov/apec/docs/readiness_guide_files/readiness_guide_5.pdf. More detail on the measurements can be found at: http://www.ecommerce.gov/apec/docs/readiness_background.html.

What is the tool's goal?

"To help governments develop their own focussed policies, adapted to their specific environment, for the healthy development of e-commerce."

What does it measure?

Six categories are measured for "readiness for e-commerce:"

1. basic infrastructure and technology (speed, pricing, access, market competition, industry standards, foreign investment),
2. access to network services (bandwidth, industry diversity, export controls, credit card regulation),
3. use of the Internet (use in business, government, homes),
4. promotion and facilitation (industry led standards),
5. skills and human resources (ICT education, workforce), and
6. positioning for the digital economy (taxes and tariffs, industry self-regulation, government regulations, consumer trust).

How does it define 'e-readiness'?

A country that is 'ready' for e-commerce has free trade, industry self-regulation, ease of exports, and compliance with international standards and trade agreements.

How is the assessment carried out?

Participants are asked 100 multiple-choice questions grouped into the six categories listed above. The possible answers indicate progressive levels of e-readiness for a country. No overall scoring occurs.

What result does it produce?

The product of the assessment is the answers to the 100 questions. Countries are supposed to work on areas with less than optimal answers, since they are "impediments...to the deployment of e-commerce."

Are there existing reports that have used this assessment tool?

Yes, but there appears to be no central listing of the reports. The report for Hong Kong is available at: http://www.info.gov.hk/digital21/eng/ecommerce/ec_assessment.html.

B. Third Party Surveys & Reports

a) McConnell International's Risk E-Business: Seizing the Opportunity of Global E-Readiness

Who created the tool?

McConnell International prepared this report in collaboration with World Information Technology and Services Alliance (WITSA), and it was released in August 2000. See <http://www.mcconnellinternational.com/ereadiness/default.cfm>.

What is the tool's goal?

To assess a national economy's e-readiness, or "capacity to participate in the global digital economy."

What does it measure?

The report measures five areas:

1. connectivity (infrastructure, access and pricing),
2. e-leadership (government policies and regulations),
3. information security (intellectual property, privacy, electronic signatures),
4. human capital (ICT education, available skilled workforce), and
5. e-business climate (competition, political and financial stability, foreign investment, financial infrastructure).

How does it define 'e-readiness'?

An 'e-ready' country has extensive usage of computers in schools, businesses, government, and homes; affordable reliable access in a competitive market; free trade; skilled workforces and training in schools; a culture of creativity; government-business partnerships; transparency and stability in government and an evenly enforced legal system; secure networks and personal privacy; and regulations allowing digital signatures and encryption.

How is the assessment carried out?

For each country and each category, the report performs a "dynamic evaluation of the relevance and accuracy of available quantitative data with an understanding of myriad cultural, institutional, and historical factors." These general ratings and their narratives can then be used as a starting point for further planning.

What result does it produce?

Countries are rated in the five categories listed above on a scale of one to three ('blue,' 'amber,' 'red'), and extensive analysis and recommendations are given.

Are there existing reports that have used this assessment tool?

The report rates 42 countries, and analyzes the results by region of the world. Overall, the report describes a complex picture of e-readiness: most countries are reasonably 'ready' in some categories, but not in others.

McConnell International creates similar country specific reports as part of its private practice.

b) Mosaic's Global Diffusion of the Internet Project

Who created the tool?

The Mosaic Group created this framework. Mosaic's framework has evolved over time, and there are a number of variants. For clarity, this report will examine one use of the framework: a case study of Turkey and Pakistan, available at http://mosaic.unomaha.edu/TurkPak_2000.pdf. For more information on the Mosaic Group, and other versions of its framework, see <http://mosaic.unomaha.edu/gdi.html> and <http://som.csudh.edu/fac/lpress/gdiff/>. A questionnaire version is available at <http://som.csudh.edu/fac/lpress/gdiff/question.htm>.

What is the tool's goal?

"To measure and analyze the growth of the Internet throughout the world."

What does it measure?

"The research ... [captures] the state of the Internet within a country at a particular point in time," by measuring six dimensions:

1. pervasiveness (per capita usage),
2. geographic dispersion,
3. sectoral absorption (usage within major sectors of the economy),
4. connectivity infrastructure,
5. organizational infrastructure (the state of the Internet service market), and
6. sophistication of use.

A country's movement along these dimensions is shaped by a set of determining factors that includes such metrics as teledensity, PC density, per capita GDP, foreign and domestic investment, geography, educational system, and government policy. The analyses focus on major social, economic, and political events, and the legal and regulatory environments as they affect the countries' Internet.

How does it define 'e-readiness'?

The framework does not describe an 'e-ready' society *per se*, but the reasons behind and readiness for growth of Internet infrastructure and usage (which are, by most accounts, requirements of an e-ready society). Unique interactions among the government and businesses, aided by market competition, help cause the growth and distribution of the Internet.

How is the assessment carried out?

The report uses a combination of statistics, narrative description and comparison to explain the growth of the countries' Internet, focusing on the six Internet statistics described above. The two countries (in this case, Turkey and Pakistan) are compared and contrasted for each variable to provide a deeper understanding of their Internet growth. The report also gives detailed descriptions of the political and economic factors that have affected Internet growth and usage, and forecasts future Internet developments.

Note: other Mosaic reports may conduct their assessments differently. Some include a questionnaire, and others focus more heavily on charting change over time. All reports use the same basic assessment of six Internet statistics and a range of factors that influence them.

What result does it produce?

The framework is used to describe, in depth, the relative growth of the Internet in the given countries. If the questionnaire is used, it also indicates the 'stages' of the country's Internet growth and usage.

Are there existing reports that have used this assessment tool?

The framework has been applied to over thirty countries. See mosaic.unomaha.edu/gdi.html.

c) **WITSA's International Survey of E-Commerce**

Who created the tool?

The World Information Technology and Services Alliance (WITSA) conducted this survey in 2000. The assessment survey and the resulting recommendations are available at <http://www.witsa.org/papers/EComSurv.pdf>.

What is the tool's goal?

To gather "the results of an international survey of the views of information technology industry associations...on the best ways to encourage the growth of electronic commerce. The aim of the research was to find out how aware businesses and consumers are of electronic e-commerce and to identify potential action areas."

What does it measure?

The survey focused on the direct experiences of companies with e-commerce and their subjective views of what is needed to promote e-commerce. The questions cover a range of issues, including: barriers to technology industry, role of consumer trust, problems with e-commerce technology, internal business practices that support e-commerce, workforce problems, taxes, public policy issues, and resistance from consumers.

How does it define 'e-readiness'?

The report of the survey states that an 'e-ready'

d) Crenshaw & Robinson's Cyber-Space and Post-Industrial Transformations: A Cross-National Analysis of Internet Development

Who created the tool?

This report was authored by Kristopher Klye Robinson and Edward M Crenshaw, Ohio State University Department of Sociology. It was published in December 1999 and is under review. Contact robinson.47@osu.edu, Crenshaw.4@osu.edu

e) **CIDCM's Negotiating the Net Model**

Who created the tool?

The Leland Initiative Telematics for Africa project at the Center for International Development and Conflict Management (CIDCM) at the University of Maryland has developed this tool over the past year and will publish case studies and a book on it in 2001. An outline of the forthcoming book and the draft framework can be found at www.bsos.umd.edu/cidcm/projects/neo.html.

What is the tool's goal?

To help advance the diffusion of ICTs in developing countries, especially Africa, by helping decision-makers improve the processes of negotiation through which ICTs are diffused by governments, NGOs and the private sector.

What does it measure?

The framework measures four categories of information for each country:

1. Background and history – structural context (economy, education levels, existing infrastructure), political structure and culture (type of government, policy making style), cultural norms (religion, etc).
2. Key players in Internet development – responsibilities and objectives of relevant players in government, local and foreign businesses, universities, NGOs, international financial institutions, research groups.
3. Internet development and ICT policy over time – access, regulation, competition.
4. Negotiations between players in developing the country's Internet - each aspect of Internet development and ICT policy is categorized into one of four stages (pre-commercial, commercial, competitive, and consolidated).

'Negotiation' between players is the focus of the framework – the rest is supporting information.

How does it define 'e-readiness'?

An 'e-ready' society has an ISP market that has passed through three phases of development: (1) pre-commercial (access limited to a pioneer community), (2) commercial (access is sold to consumers), and (3) competitive (the ISP market has multiple competing actors). The negotiations between actors should be transparent, conclusive, speedy and inclusive of the major players in public, private and NGO sectors.

How is the assessment carried out?

The assessment is conducted through interviews with key actors in the relevant institutions and draws upon a range of background statistics and information as outlined above.

What result does it produce?

A detailed narrative describing the processes and outcomes of negotiations between key players over the phases of development, identifying major contentious issues likely to remain problematic in the future.

Are there existing reports that have used this assessment tool?

Three in preparation: Senegal (available April 2001), Ghana (available May 2001), and Kenya (available June 2001). A similar method is being applied for China and Brazil.

C. Other E-Readiness Assessment Models

In addition to the formal tools and surveys described above, there is a range of other frameworks that can be similarly used for e-readiness assessment. This section describes how the ideas expressed in digital divide reports, position papers and other kinds of models can be used to evaluate a society's readiness to adopt and use ICTs. In most cases, these are not ready-to-go assessment tools nor completed surveys, but they could provide rich criteria for assessing e-readiness with some adaptation.³ Consideration of the various concepts outlined below and the standards they set add depth to this discussion, especially where they include elements that are missing in traditional assessment tools.

a) Digital Divide Reports

Another way of looking at e-readiness is through the lens of who is *not* benefiting from information technology, and which societies are *not* 'e-ready.' In the last year, numerous reports have come out that study the 'digital divide' and propose solutions. Many of these reports have the same components as the e-readiness tools described above: assessments of current technology and policy, and recommendations for making a society or community e-ready. Also like the tools described so far, digital divide reports use a range of methods and standards for evaluating e-readiness. Unlike e-assessment tools though, digital divide reports are more concerned with the distribution of the technology throughout society and its impact on the lives of people.⁴ Since there are many reports on the digital divide, and they are not directly usable as e-assessment tools, this paper only sketches out how these reports could be used.

There are four main perspectives and models of e-readiness described in these reports:

1. *e-readiness equals computers and access* – computer hardware and network access are required to be e-ready and bridge the digital divide, and government and private initiatives should supply them;
2. *e-readiness equals computers and access, but the problem will solve itself in time* – computer hardware and network access are required for e-readiness, but the market will solve this problem on its own;
3. *e-readiness equals computers, access, and effective usage of computers* – hardware and access are not enough for real e-readiness, there must be extensive training programs, locally relevant content, and a local ICT sector; and
4. *e-readiness requires basic literacy, poverty, health and other social issues to be addressed first* – computers are useful, but nothing will make a society e-ready and bridge the digital divide until basic literacy, poverty, and healthcare issues are addressed.

These four models are necessarily simplifications and exaggerate some of the differences for clarity and brevity. Using the outline employed on the other assessment tools, these digital divide models are described generically below (since many of the answers are the same for each of the models, only the first sketch includes the duplicative questions):

³ In most cases such an adaptation would merely involve writing a questionnaire asking “how well does this particular society fit our model of an 'e-ready society'”?

⁴ This report examines this in more depth under ‘e-economy’ versus ‘e-society.’ The distinction is not absolute, though – some e-readiness assessment tools such as the CID Guide focus on ICT's use in society.

1. E-Readiness equals Computers and Access

What is the tool's goal?

To assess the digital divide and advocate for increased equity and e-readiness in disadvantaged communities.

What does it measure?

Statistics of existing telecommunications and network infrastructure such as teledensity, availability of access with a focus on regional and socio-economic disparities.

How does it define 'e-readiness'?

A society with universal computers and access, supplied by a combination of the government and the market.

How is the assessment carried out?

The assessment involves heavy use of statistics of technology use.

What result does it produce?

It generates comparisons of network density and usage in different communities or socio-economic groups, with narrative descriptions of what actions should be taken for improvement.

2. E-Readiness equals Computers and Access, but the problem will solve itself in time

What is the tool's goal?

To demonstrate that the digital divide is a transitory problem, and that e-readiness improves through market forces.

What does it measure?

Varies.

How does it define 'e-readiness'?

An 'e-ready' society has affordable computers and access, diffused over time throughout society by market forces. In other words – given basic conditions, all societies will be e-ready in time.

How is the assessment carried out?

Varies.

What result does it produce?

Narrative and / or statistical analyses of computer usage and access, and forecasts of future growth.

3. E-Readiness equals Computers, Access, and Effective Usage of Computers

What is the tool's goal?

To demonstrate that the digital divide is a wider problem than simple physical access to computers and connections, and to advocate for continued vigilance to promote ICT integration in the broader social and economic context.

What does it measure?

Statistics of existing telecommunications and network infrastructure such as teledensity, availability of access, actual usage of computers, relative quantities of local language content, workforce and school training, job availability and pay distribution, government policies for each of these issues, ICT use in local communities for commercial and non-commercial purposes, strength of local ICT sector, e-government services; all with a focus on regional and socio-economic disparities.

How does it define 'e-readiness'?

An 'e-ready' society has reasonable equity in affordable access to ICTs, training, locally relevant content, and employment; a political environment that encourages ICT use through e-government and e-commerce services, and provides mechanisms for local input into (national and international) ICT policy-making; and an understanding at the community level of how ICT use can improve peoples' lives.

How is the assessment carried out?

Varies.

What result does it produce?

Comparisons of the large suite of factors listed above indexed by community or socio-economic groups.

4. E-Readiness Requires Basic Literacy, Poverty, Health and Other Social Issues to Be Addressed First**What is the tool's goal?**

To demonstrate that other issues – namely basic human needs – are more important than, and are prerequisites for, technology use.

What does it measure?

Basic human needs statistics such as poverty rates, malnutrition, infant mortality, and life expectancy.

How does it define 'e-readiness'?

An 'e-ready' society must have basic literacy, health, and workforce issues addressed sufficiently for people to have the time, energy, and money to use ICTs.

How is the assessment carried out?

Varies.

What result does it produce?

A call for increased effort and investment into basic human needs before technology.

b) Position Papers

There are a large number of position papers with recommendations for how a country can become 'e-ready' and effectively use and benefit from ICTs. These perspectives range from a focus on business and export-oriented growth with industry self-regulation, to strong government consumer protections and equitable access programs, to local content and cultural reception of

ICTs. These underlying models could easily be turned into assessment tools. In fact, many of the models have corresponding assessment surveys (for example, a business / export / self-regulation focus underpins APEC's survey). This report does not analyze them further, however, since there is such a range of position papers and they are not immediately usable as tools.

Two sample papers worth examining are:

- *The Networking Revolution: Opportunities and Challenges for Developing Countries* at <http://www.infodev.org/library/NetworkingRevolution.pdf>
- *G8's Okinawa Charter July 2000* at <http://www.g8kyushu-okinawa.go.jp/e/documents/it1.html>

A more detailed list can be found in the appendix to this report, and on the bridges.org website at <http://www.bridges.org/resources/>.

III. COMPARISON

A. Topics Covered and Level of Detail

Included in the appendix is a chart comparing the tools by the level of detail they provide on given topics. Each tool's coverage of a particular topic in their assessment, such as "locally relevant content," is rated on a scale of '0' to '3', where '0' is no coverage, and '3' is detailed coverage.

B. E-Economy versus E-Society

E-readiness assessment tools and models can be divided into two main categories: those that focus on basic infrastructure or a nation's readiness for business or economic growth, and those that focus on the ability of the overall society to benefit from ICTs. These two categories – which this report describes as 'e-economy' assessment tools and 'e-society' assessment tools – are not mutually exclusive. However, 'e-society' tools incorporate business growth and use of ICTs as part of their larger analysis, and consider business growth necessary for society's e-readiness. E-economy focused tools also include some factors of interest to the larger society, such as privacy and universal access. These rough categorizations are as follows:

E-Economy

- WITSA E-Commerce Survey
- APEC's E-Commerce Assessment
- McConnell International's E-Readiness Report
- Mosaic's Global Diffusion of the Internet Framework
- Crenshaw & Robinson's Cross-National Analysis of Internet Development

E-Society

- CID's E-Readiness Assessment Guide
- CSPP's E-Readiness Assessment Guide
- The various models for evaluating e-readiness from 'digital divide' reports
- CIDCM's Negotiating the Net Model

Another, similar, way to look at the e-readiness assessment models would be to consider them in terms of E-Society, E-Economy, and 'E-Systems,' where E-System models examine the underlying technology infrastructure that is a prerequisite for both E-Economy (including e-commerce, ICT sector jobs, etc), and E-Society (use by the general population, etc). For the purposes of this comparison however, that level of detail is unnecessary.

C. Assessment Methodology

The tools discussed here use four main methods to assess countries' e-readiness:

1. *Questionnaires* ask a set of direct questions about information technology and policy in a country, and the same set of questions is asked for any given country.
2. *Statistical methods* mathematically analyze prior data on the country to test for relationships between the individual factors, for example, by looking for a casual relationship between Internet access and political democracy.
3. *Best practices* use experience learned in other countries or direct comparison with other, similar, countries.
4. *Historical analyses* of the unique political, economic and social events in the country use these unique events to explain or forecast information technology in the country.

Tool	Questionnaire	Statistics	Best Practices	Historical Analysis
CSPP	Y	Y		
CID	Y	Y		
APEC	Y	Y		
WITSA	Y	Y		
McConnell		Y	Y	Y
Crenshaw & Robinson		Y		
CIDCM		Y	Y	Y
Mosaic	Y	Y	Y	Y
Digital Divide Reports	*	*	*	*
Position Papers	*	*	*	*

* Varies, depending on the report

D. Result of Assessment

The tools described here have three basic results: description, diagnosis, and proscriptio. *Descriptive* tools explain or describe what happened. *Diagnostic* tools identify problem areas, but do not indicate how to address the problems. *Proscriptive* tools urge action along a clearly defined path.

Tool	Description / Explanation	Diagnosis	Proscription
CSPP		Y	
CID		Y	

APEC		Y	Y
WITSA		Y	
McConnell	Y	Y	
Crenshaw & Robinson	Y		
CIDCM	Y		
Mosaic	Y		
Digital Divide Reports	Y	Y	Y
Position Papers	Y	Y	Y

IV. ANALYSIS

What is the most accurate definition of ‘e-readiness’?

The answer to this question is an ongoing debate and is beyond the scope of this report, but a few thoughts are outlined here to aid such a discussion. First and foremost, it should be noted that all assessment tools have an underlying standard of e-readiness. This standard will necessarily shape the results of the tool; i.e. there is no *objective* test of e-readiness. This standard may or may not fit the prospective user's personal views.

These tools appear to derive their definitions of e-readiness through four means⁵:

1. end user surveys,
2. statistical analysis,
3. best practices, and
4. the author's personal experience.

No standard definition for e-readiness is perfect. WITSA's method of asking participants for their subjective opinions, and generating a plan of action from them seems problematic to use for e-readiness recommendations. The other models simply state what factors are necessary for e-readiness, but do not provide a detailed rationale. It seems likely that the bias of these models came from their authors' individual experiences and knowledge of 'best practices' in their field. In sharp contrast, Crenshaw's model relies on a statistical analysis. The statistical analysis is a tempting method to get beyond subjective standards of e-readiness, but also has problems. A cross-national statistical analysis is invalid if the unique circumstances of individual countries are more important than generic measurements (as the considerable deviation in measurements would hint in Crenshaw's work). In that case, a country-specific tool such as Mosaic or McConnell, or case studies would be better suited.

What assessment tool is the best? The right tool depends on the user's goal

As the descriptions above have shown, e-readiness assessments are, in fact, very diverse in their goals, strategies and results. The right tool depends on the user's goal. The user should choose a tool that measures what they are looking for, and does it against a standard that fits their own view of an ‘e-ready’ society.

⁵ The tools do not always indicate how they developed their definition of e-readiness, but often the source can be reasonably guessed.

If the goal is to gauge the readiness of a particular company or group of companies to participate in e-commerce, the WITSA study would seem to be best suited. However, one possible critique is that the participants' answers on what they believe they need to work on to make their companies ready may not be accurate, because if they knew, they might not need the assessment tool.

If the goal is to assess a country's preparedness for e-commerce, APEC might have the best-suited tool. The survey is quite detailed with 100 questions, and straightforward to use. However, the digital divide reports suggest that wide-scale e-commerce is doomed if technology is not also spread throughout the society, a topic that the APEC survey gives only minimal coverage. Moreover, consumers would need locally relevant content and products, and training to use the computers to buy e-commerce products (in the business-to-consumer field). Also, unlike its stated goal, the APEC survey is *not* geared to specific environments. It measures specific environments against a single standard of how a country should be in order to promote e-commerce. This method implies that the same structure of e-commerce is needed for any country.

If the goal is to assess the current level of technology in a region as a basis to forecast future technology levels, there are a number of options. The Mosaic method provides a detailed and deep understanding along six different axes. There are also a number of sources of raw statistics (see the resource section) that the user could employ in this process. Questionnaires such as the CID and CSPP guides measure a slightly wider set of statistics, such as bandwidth, reliability, pricing, and usage in homes, schools, businesses, and government. However, these are very rough measurements – and the granularity is low for answers – since users choose from one of four multiple choice answers.

If the goal is for a quick but rough gauge of technology usage, then CSPP and CID are useful (with CID being the more detailed of the two).

If the goal is to understand the relative roles of political, economic, and social factors in technology's growth and usage, then Crenshaw's model seems to fit best. This statistical method would help *prioritize* what elements (and sets of elements) in a society are most important for e-readiness. This method could be combined with a detailed survey of the current state of these factors (such as with McConnell's method) to identify key areas to work on, and prioritize them. On the other hand, the Mosaic framework provides a detailed narrative analysis of these factors (though with less focus on the social factors), and conceptualizes the analysis with respect to another country.

If the goal is to understand the why particular countries progress differently, the case-study method used by Mosaic and CIDCM is appropriate.

If the goal is to assess the effects of the technology on the lives of real people, and consider how widely the technology is really being used, then it would be helpful to look to the digital divide reports – specifically to the group of digital divide reports that focus on education, local and relevant content, and effective use of technology throughout society.

What is the correct focus for assessment: e-economy or e-society? Again, it depends on the user's goal.

If the goal is to forecast business and economic growth, then e-economy assessment tools seem to be the only appropriate choice, similarly with e-society assessment tools and social benefits. However, the relationship between the e-economy and the e-society is complex and interdependent. The economy generates the ICTs and employment that spread technology's benefits through society. E-society assessment tools therefore incorporate business growth and use of ICTs as part of their larger analysis, and consider business growth necessary for society's e-readiness. However, one critique states that without economic equity, there can be no long-term stability. As Rodriguez and Wilson state in *Are Poor Countries Losing the Information Revolution?*⁶, "a continuation of existing trends in the ICT have/have-not gap may contribute to a number of social problems including....social and political conflict." In other words, e-economy assessments may be insufficient to assess *economic* readiness because they do not provide enough coverage of social issues. Some reports on the digital divide would indicate that the current focus on economic growth is causing increased inequity⁷.

On the other hand, some business groups reject technology distribution initiatives and regulations for universal access because they believe these interfere with economic growth. To quote Rodriguez and Wilson again, "there are great complementarities between ICT and economic and social progress, there are also some important trade-offs between equity, well-being and the unhindered development of ICTs. Simple claims about the links between ICTs and progress are not correct, and may in some cases be dangerously wrong."

What should a country be measured against?

The formal questionnaires and many of the informal assessment models measure all countries against one standard: the optimal state of e-readiness. Two problems can arise from this. First, many developing and emerging countries could be faced with an insurmountable task and not know where to start. These tools place developing countries in the 'early' stages of e-readiness, and indicate that they must undergo massive economic and political changes to become e-ready.

Second, it may be faulty to use a single standard of measurement at all. There is no single social, political, and economic model that has been the most successful at harnessing information technology. Some authors would argue that the unique cultural and historical environment of a region must be taken into account as part of a national ICT policy to truly gauge the country's e-readiness for the future. The Mosaic and CIDCM models work from this perspective.

A solution to both of these problems could be to base the primary assessment on countries within a particular region or social / economic / political group. The assessment tool could be adapted for the region, and recommendations could be made based on the experiences of similar countries. Additional data points and recommendations on how to become e-ready could be drawn, with caution, from the best practices and other examples seen in developed countries.

This method is far from perfect, though. It is considerably more complicated and costly. It provides detailed description of the state of ICTs, but a less detailed action plan for future work.

⁶ Francisco Rodríguez and Ernest J. Wilson, III, *Are Poor Countries Losing the Information Revolution?* University of Maryland at College Park, May, 2000. Available at <http://www.infodev.org/library/working.htm>

⁷ See "The Evolution of the Digital Divide: How Gaps in Internet Access May Impact Electronic Commerce" <http://www.ascusc.org/jcmc/vol5/issue3/hoffman.html>

In addition, data points from similar countries may be lacking. For example, what happens when no similar country exists that has been successful at harnessing ICTs?

V. CONCLUSION: Towards a More Comprehensive Tool

Two overarching lessons can be drawn from this comparison: First, the chosen e-readiness assessment tool must fit the user's goal. Each assessment tool or model has a different underlying goal and definition of e-readiness. The user should choose carefully and with a clear understanding of the kind of results that any particular tool is likely to lead them toward. This report aims at providing a foundation for that choice.

The second lesson is that there is a wide range of e-readiness assessment models available, but each has limitations. Every model evaluated would require re-designing to make it a comprehensive assessment tool. The tools that are ready-to-use are either limited in scope or lack detailed description on how to use the tool in practice. Of course, no tool will fit every user's needs. However, one could envision a tool that gave the user control over what was measured, and provided the resources to measure the various aspects of e-readiness.

What would a more comprehensive, flexible tool include? Drawing together the perspectives of the existing tools:

1. It should provide (optional) measurements for the range of factors that influence e-readiness. Such as:
 - a. existing technology infrastructure;
 - b. information technology policies (trade, encryption, digital signatures, privacy, etc.);
 - c. distribution, pricing, and usage of the technology in schools, business, government, and throughout society;
 - d. basic 'enablers' in society (basic literacy, quality of educational system, political stability, etc.);
 - e. social and cultural factors that influence technology's diffusion and use; and
 - f. market conditions (monopolies, regulation, etc.).
2. It should describe how these measurements could be used for:
 - a. economic growth;
 - b. wide social use of technology; and
 - c. economic growth in the context of social issues such as consumer protection, privacy, etc.
3. It should clearly describe how to use the tool:
 - a. when a policy assessment is needed;
 - b. how the information is to be gathered, and what standards are to be used;
 - c. who is needed to complete the assessment (diverse range of experts knowledgeable about issue, oversight of process to make sure accurate, etc);
 - d. how long it should take;
 - e. what the outcome should look like, including a narrative assessment of the policies, guided by or directly answering the survey questions, with recommendations on what to change;
 - f. how to recognize majority and minority opinions and leave room for dissent; and
 - g. what factors are usually under government control, and which are not.
4. It should indicate how to use the results, including identifying potential difficulties with implementation, such as balancing consumer rights, business and labor issues.

VI. RESOURCES

There are far more assessment tools and resources available than can be included in this brief report. In addition, new tools are currently being written, and many more that bridges.org is not currently aware of. To provide a more comprehensive and valuable resource than can be given here, bridges.org is hosting an 'e-assessment resource list' on our website, at <http://www.bridges.org/resources/>. We will update the list as we and other members of the community identify new items to be included.

Below is an initial version of the resource list. Please check the website for more up-to-date and comprehensive information.

1. Other assessment tools or resources which could be converted into assessment tools
 - a. Leland Initiative of USAID – Case Studies of African Countries
<http://www.usaid.gov/regions/afr/leland/enduser.htm>
 - b. Internet for Economic Development Initiative of USAID – basic case studies and statistics on 13 countries
http://www.usaid.gov/info_technology/ied/
 - c. InfoDev's Stories project – Various Case Studies
<http://www.iicd.org/stories/>
 - d. Metricnet's *Global New E-Economy Index*
<http://www.metricnet.com/specials/GNEImain.html>
 - e. The Internet Economy Indicators
<http://www.internetindicators.com/>
 - f. E-Commerce Across Australia, using the “Allen E-commerce Preparedness” indicator
http://www.noie.gov.au/projects/information_economy/e-commerce_analysis/eCommAust/
 - g. The Economist Intelligence Unit's E-Business Readiness Assessments
http://www.ebusinessforum.com/index.asp?layout=rich_story&doc_id=367&country_id=VN&channelid=6&categoryid=20&title=Introducing+the+EIU%27s+e%2Dbusiness%2Dreadiness+rankings+World
 - h. CISCO Systems' *Net Ready* – guide and 'scorecard' for businesses
<http://www.cisco.com/warp/public/779/ibs/netreadiness/>
 - i. The European Union's *European Survey of Information Society Projects and Actions*
<http://europa.eu.int/ISPO/esis/default.htm> and *Information Society Indicators in the Member States of the European Union* <http://europa.eu.int/ISPO/esis/default.htm>
 - j. E-Cities' *Internet Readiness Self-Assessment*
<http://www.ecities.org/docreadi.htm>
2. Digital Divide Reports:
 - a. United States Internet Council's *State of the Internet Report*:
<http://usic.wslogic.com/intro.html>
 - b. Cato Institute, Benton Foundation give two perspectives on the future of and solution to the digital divide <http://www.educause.edu/pub/er/erm00/erm006.html>
 - c. Center for Democracy and Technology's *Bridging the Digital Divide: Internet Access in Central & Eastern Europe* <http://www.cdt.org/international/ceeaccess/>
3. Proposed or In-progress Assessment Initiatives
 - a. InfoDev's E-Readiness Assessment Initiative
<http://www.infodev.org/ereadiness/>

- b. The Markle Foundation
<http://www.markle.org/news/Release.200007251223.1910.html>
 - a. PriceWaterhouseCoopers' *E-Business Readiness Survey* – coming soon
<http://www.ereadiness.pwcglobal.com/>
4. Statistics
- c. Access
 - i. NetSizer: <http://www.netsizer.com/>
 - ii. Nua: <http://www.nua.ie/>
 - iii. ISP World's ISP Statistics:
http://www.ispworld.com/src/ISP_Statistics.htm
ISP, Backbone, broadband statistics
 - iv. Broadband in the US – Study:
(<http://www.ntca.org/press/releases/broadbandstudy.pdf>)
 - d. Pricing
 - v. Access Costs in OECD Countries:
<http://www.oecd.org/dsti/sti/it/index.htm>
<http://www.oecd.org/dsti/sti/it/cm/prod/localaccess.htm>
 - e. Computer Usage Studies
 - vi. (News Item) Digital Divide Not Reflected In Online Behavior - Study
<http://www.newsbytes.com/pubNews/00/157011.html>
AA Americans and Online Behavior study from Pew
 - vii. Profile of a US Net User
<http://www.ecommercetimes.com/news/articles2000/001016-4.shtml>
<http://www.yankeegroup.com/>
 - viii. *Who's Not Online* by Pew Research Center
<http://www.pewinternet.org/reports/toc.asp?Report=21>
 - d. Lists of Sources for Statistics
 - i. *Efforts to Track Internet Diffusion*
<http://som.csudh.edu/fac/lpress/gdiff/gdiffprojects.htm>
5. Background papers on E-Assessment, Resources to use
- a. *Tracking the Global Diffusion of the Internet*
by Larry Press, November, 1997.
<http://som.csudh.edu/cis/lpress/articles/worldacm.htm>
6. Policy Surveys
- a. The APEC *Competition Policy & Law Database*
<http://www.apeccp.org.tw/>
 - b. *An Analysis of International Electronic and Digital Signature Implementation Initiatives (ILPF)*
http://www.ilpf.org/digsig/analysis_IEDSII.htm
 - c. EPIC and Privacy International's
Survey of 50 Countries' Privacy laws
<http://www.privacyinternational.org/survey/>
 - d. Security Law Project of McConnell International
<http://www.mcconnellinternational.com/services/securitylawproject.cfm>

VII. CONTRIBUTIONS AND ATTRIBUTION

This report benefited from a diverse range of opinions and input from experts working in this field. Bridges.org received many valuable comments and additions to the report, including from

the authors of the tools themselves. We would like to thank everyone who contributed, including: Joseph Alhadeff; Jennifer Bremer; John Daly; the Information Technologies Group of the Center for International Development at Harvard University; Philip Maggi (Center for Computer Systems Policy Project); Bruce McConnell (McConnell International); Larry Press and Peter Wolcott (Mosaic Group); and Ernest Wilson, Kelvin Wong and Anne Pitsch (Center for International Development and Conflict Management at the University of Maryland). Attribution is optional, to respect the desires of individual contributors; more information is available on our website. We also welcome future comments and additions to this work.

This report is available on the bridges.org website at www.bridges.org/ereadiness/. Bridges.org strongly believes in building collaborative partnerships within the development and policy community and creating resources that are available for free use by the general public. Therefore, even though this document is copyrighted by bridges.org, it is made available for further distribution and use under an ‘open content’ license (per www.opencontent.org's Open Publication License version 0.9 or later). In other words, you are free to use this material and redistribute it as long as bridges.org is given credit for the original work. We hope that you also choose to make any derivative works available as ‘open content’ to expand the resources available for everyone.

VIII. APPENDIX: COMPARISON CHARTS

Chart 1: Level of Detail for the Measurements Used

Assessment Tool's Level of Detail*		CSPP	CID	APEC	WITSA	McConnell	Crenshaw & Robinson	CIDCM	Mosaic**
Technology	Infrastructure – Network, Tele-density	2	3	3	1	2	2	2	3
	Pricing	0	2	3	1	2	0	1	1
	Speed and Quality	2	2	3	0	2	0	1	2
	Other Technology Issues	0	3	3	0	1	0	2	2
Economy	Use within Businesses	1	2	2	2	0	0	1	1
	E-Commerce	1	2	3	3	1	0	0	1
	Market Competition / Privatization	2	0	3	1	2	0	2	3
	Export Trade, Foreign Investment	0	0	3	0	2	2	2	2
Government	Other Economic or Business Factors	0	0	3	3	1	0	2	2
	Policy (Privacy, Trade, Intellectual Property, Electronic Signatures) Regulations	1	2	3	2	3	0	3	2
	E-Government	1	2	1	0	2	0	1	1
	Political Openness,	0	0	0	0	2	2	2	0

Education	Democracy								
	Use in Schools	1	2	2	0	2	0	1	1
	Tech Training in Schools	1	2	2	0	2	2	1	1
Social	Availability of Trained workforce	1	0	2	3	2	0	1	1
	Use of ICTs in Everyday life	1	2	2	0	2	2	1	2
	Utilization of Technology throughout Society (Inequality)	1	2	1	0	2	2	1	2
	Basic Literacy, Poverty, Other Social Factors	0	0	0	0	1	2	2	1
	Locally relevant Content	0	2	1		1	0	0	1
	Consumer Trust	1	1	0	3	0	0	1	1
	Unique Political, Business, Social History	0	0	0	0	2	2	3	3

* Each tool's coverage of a particular topic in their assessment, such as 'locally relevant content' is rated on a scale of '0' to '3,' where '0' is no coverage, and '3' is detailed coverage.

** Mosaic has more than one framework of analysis. Depending on the report, the focus of the study varies, and this column indicates the aggregate.

Chart 2: More About the Tools

Assessment Tool	Directions on How to Use	Questionnaire	Grid with Stages	Existing Reports?	Source of Data
CSPP	Yes	Yes	Yes	Yes	Questionnaire on Community's Statistics
CID	Yes	Yes	Yes	Yes	Questionnaire on Country's Statistics
APEC	Yes	Yes	No	Yes	Questionnaire on Country's Statistics
WITSA	No	Yes	No	Yes	Questionnaire for Industry Leaders
McConnell	No	Yes	No	Yes	Statistics, Qualitative Country Analysis
Crenshaw & Robinson	No	No	No	Yes	Statistics
CIDCM	Yes	No	Yes	Soon	Statistics, Case Study
Mosaic	No	Yes	Yes	Yes	Statistics, Case Study
Digital Divide Reports	Varies	Varies	Varies	Yes	Varies
Position Papers	Varies	Varies	Varies	Yes	Varies