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# Community e-Development Index

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An International self-Assessment Tool for  
Community ICT based development in  
the 21<sup>st</sup> Century

**Presented to the Smart Community International Network  
Workshop, Malaysia, 3-4 March, 2003**

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## Table of Contents

e-Development <i>Index</i> .....	3
<a href="#">What's it all about...?</a> .....	3
The Basis for establishing e-Development <i>Index</i> .....	5
Smart City Definitions .....	5
An overview of smart city definitions used worldwide .....	5
Smart Community definition adopted for e-Development <i>Index</i> .....	6
An Exchange focused approach to assessment of Smart Communities.....	7
Why do communities need to use an assessment tool like e-Development <i>Index</i> ?.....	8
The Characteristics of e-Development <i>Index</i> .....	9
Selecting Indicators.....	11
The analysis in developing the e-Development <i>Index</i> .....	11
An Innovative Economy .....	12
Why is ICT important for an Innovative economy? .....	12
The framework for sustained innovation, productivity, and ICT integration: Knowledge Capital.....	13
Benchmarking & Comparisons using e_Development <i>Index</i> .....	16
Leading communities.....	16
The Community performance chart.....	18
A draft of Table of Content for an e-Development <i>Index</i> .....	19
Appendix I – Proposed Assessment Dimensions and Indicators.....	21

## List of Tables

Table :Community benchmarking table for the knowledge Capital indicators. ....	17
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## List of Figures

Figure 1: Smart community as facilitator of exchanges .....	7
Figure 2: The structure of e-development <i>Index</i> .....	10
Figure :The knowledge Capital Dynamics of the innovative economy in the 21st Century .....	14
Figure 4:Example of the Level of Performance on the e-Development <i>Index</i> indicator for Advanced technology jobs in Ottawa .....	15
Figure 5:Community Performance gap analysis chart.....	18

## Introduction

This working document provides introductory information on the development of an e-DevelopmentIndex. It is intended to inform interested readers on the background and work done so far to develop the e-DevelopmentIndex by Nova Community of Hilversum in the Netherlands and the Centre on Governance at the University of Ottawa in partnership with OCRI-SmartCapital in Ottawa, Canada.

The document is organized to provide information on the need and the thinking behind developing e-DevelopmentIndex. It also presents the structure of e-DevelopmentIndex needed to conduct a useful self-assessment and comparative analysis of the community efforts. The underlying theme of the analysis is how to help communities guide themselves towards enhancing and creating the conditions to be a Smart Community in the 21<sup>st</sup> century.

The document has three sections. The first section describes and defines the purposes of the e-DevelopmentIndex. The second section provides an example of the type and depth of analysis that was required to construct the six dimensions of the e-DevelopmentIndex. The Third section provides an idea of how to use the results of the e-DevelopmentIndex to guide the community development process or make benchmarking comparisons with other communities to determine the relative position of the community with respect to the leading communities or other communities of similar aspirations or socio-economic conditions.

## Section I

### e-DevelopmentIndex, what's it all about...?

There are many communities worldwide, that consider themselves 'smart', without making clear (to themselves as well as others) what is meant by 'smart'. Is being 'smart' the opposite from being 'dumb'? Or do they use the term 'smart' to illustrate the fact that information and communication technology (or short ICT) is used in a smart way by citizens, schools, hospitals and institutions within their community? We think the last definition comes close to what a lot of 'smart' cities or projects aim for.

This variety in definitions of what 'smart community' really is, as well as the wish to be able to compare various smart communities worldwide, formed the basis for the development of the e-DevelopmentIndex, a self-assessment tool for 21<sup>st</sup> century smart communities worldwide.

The e-DevelopmentIndex, as we envision it, is a tool that:

1. helps communities to answer a number of questions that will help them to determine in what stage of development their smart community really is.
2. helps communities define the next steps in the development
3. provides guidance from 'best practices' in other smart communities that already are ahead on the development journey.
4. helps smart communities compare their projects in an objective way to other similar projects worldwide. As such, it enables the stakeholders(as well as

others) to objectively make comparisons between different smart community type projects. Such smart projects have proven to be difficult to compare because each project claims to be unique and won't be easily compared to other projects.

5. uses International standards to help policy makers and stakeholders to in their efforts to gain transparency in their smart communities .
6. would be helpful in producing International standards for the practice of developing smart communities based on the accumulative experience of smart community initiatives worldwide that went through the self-assessment process.
7. helps support practitioners and policy makers with the know-how when planning for the building the foundations of Information Society at regional and national levels.

The e-DevelopmentIndex consists of a number of assessment questions, grouped into six categories. The questions, both qualitative as well as quantitative, address key issues in the development of smart community from 'vision' of its future to it's efforts in furthering users' acceptance of ICT. e-DevelopmentIndex uses examples of Best practice from other smart communities to help the community reach answers for the assessment questions applicable in its case. e-DevelopmentIndex coalesces the narrative with graphical presentations to communicate the outcomes of the assessment to the interested parties. . Using e-DevelopmentIndex tool on a regular basis helps in monitoring the development of an individual or multiple projects. By extension, e-DevelopmentIndex will help in easily compare different communities and projects. The graphical presentations of the self-assessment results, in particular, will help interested parties identify similarities and differences 'in one single glance'. The Published results based on e-DevelopmentIndex will help communities learn from each and about each other in many different ways. First communities would easily identify other communities and projects that may help them in their own efforts based on the similarities and performance differences. The comparison would identify which areas the community need to put more efforts into. Other communities might find it useful to use their own self-assessment results as marketing tools. On the other hand, communities might join efforts to work together on similar smart community projects For the more advanced communities; the published results might provide invitations to consulting work opportunities from other communities just starting.

e-DevelopmentIndex will be used in assessing key smart community projects from the four founding members of SCIN (Smart Community International Network, Ottawa, Stockholm, Multimedia Super Corridor Malaysia and Kenniswijk, Eindhoven the Netherlands) for both validation and referencing purposes. The goal is determine the range of variations for each of the tool's componets based on practical experieces, i.e., defining realistic reference points for using e-DevelopmentIndex.

It is expected by demonstrating and consulting with the delegates at SCIN launch event would be helpful in taking the e-DevelopmentIndex to the next stage and build credibility for e-DevelopmentIndex. The development team will be using the delegates' feedback and input at discussion following their presentation at SCIN launch conference workshop to enhance the design, relevance, analysis capabilities data requirements and, and the possible ways to focus the interpretation and presentations of outcomes from using the self-assessment tool.

## The Basis for establishing e-Development/Index

### **Smart City Definitions**

#### **An overview of smart city definitions used worldwide**

A Smart Community is:

- A community that has made a continuous effort to use information technology to transform life and work within the region in significant and fundamental rather than incremental ways (John Eger, Ten Steps in Becoming a Smart Community);
- A Community in which members of local government, business, education, healthcare institutions and the general public understand the potential of information technology and form successful alliances to work together to use technology to transform their community in significant and positive ways (Implementation Guide for Smart Communities, Smart Communities Organization)
- The Intelligent Community views communications bandwidth as the new essential utility, as vital to economic growth and public welfare as clean water and dependable electricity. Intelligent Communities work to position their citizens, businesses and public sector to prosper in the Digital Age. Rather than trying to prop up dying industries, they eagerly embrace the growth industries of tomorrow. They work to create the advanced information and telecommunications (IT&T) infrastructure needed to gain a competitive edge in attracting and growing the leading-edge industries that create jobs in the economy of the 21st Century. They train their citizens to take advantage of those jobs and work to deliver government services in electronic form more cost-effectively and efficiently than ever before. Intelligent communities may be large or small, and appear in both the developed and developing world. (The Intelligent Community Forum)
- 'Smart Cities' are safe, secure and efficient because their systems – for power delivery, water supply, transportation, business, and housing – are designed, constructed, and maintained making use of advanced, integrated materials, sensors, electronics and networks which interface with information technologies and are optimized by decision-making algorithms. A city that monitors and integrates conditions of all of its critical infrastructures, including roads, bridges, tunnels, rail/subways, airports, seaports, communications, water, power, even major buildings can better optimize resources, plan its preventive maintenance activities, and monitor security aspects while maximizing services to its citizens. Management of emergency response to both natural as well as man-made challenges to the system can be focused and rapid. With advanced monitoring systems and built in smart sensors, data can be collected and evaluated in real time, enhancing city management's decision making. For example, resources can be committed prior to a water main break, salt spreading crews dispatched only when a specific bridge has icing conditions, and use of inspectors reduced by knowing condition of life of all structures.(Brookhaven National Laboratory)
- A Smart City is defined as having:
  - a highly skilled workforce

- a community where continuing education is part of the culture
- a large, research intensive university
- close partnerships between education, business, and government sectors
- a cluster of high technology companies
- an advanced telecommunications infrastructure
- a strong pro-business environment
- effective regional and international transportation links
- reasonable taxes and low cost to live and do business
- an exceptional arts and entertainment scene
- plenty of recreational opportunities

(Edmonton Smart City Awards 2002)

- Smart communities are where leaders and stakeholders have formed alliances and partnerships to develop innovative ways to extract new economic and social value from electronic networks and the public Internet. Typically, the focus of smart community strategies is to change the dynamics of growth in the community, so as to make it an attractive and competitive location in which to live, invest, and carry on business. This is accomplished by using information and communications technologies as tools to build the community, solve its problems, and transform the way individuals and organizations live, work, learn, shop, and manage their affairs. (Industry Canada)
- It could be defined as a geographical area ranging in size from a neighborhood, a town, to a multi-county /multi-province region whose residents, organizations, and governing institutions are using information and communication technologies to transform their region and enhanced the standards of living in significant ways. Cooperation among government, industry, educators, and the citizenry, instead of individual groups acting in isolation, is preferred. The technological enhancements undertaken as part of this effort should result in leap-frog rather than incremental, change. (Smart Community Conference, 1997)

### **Smart Community definition adopted for e-DevelopmentIndex**

In developing the e-DevelopmentIndex we took a more critical and wholesome approach to come to agreement on a useful definition for assessment purposes of what could be called a 'smart' community or better a 21<sup>st</sup> century e-community:

we think 'smart' communities, inclusive of the different aspects in the above definitions, are fundamentally about communities. That is, they are about the relationships among people and the exchanges that are made between them. Those relationships can exist due to geographic proximity or to interest affinity. The exchanges that take place may be tangible (products, services or money) or intangible (knowledge, satisfaction or reputation) and the processes of exchange can be direct (face-to-face) or indirect (mail, telephone or electronic). The frequency and quality of these exchanges define a number of features of a community – its dynamism, its coherence, its adaptiveness, its collective decision-making and ultimately its sustainability.

A 'smart' community therefore implies, not only a use of technology in these exchanges but also a "best use scenario" that maximizes the benefits for both persons in terms of both tangible and intangible returns. Exchanges that amount to zero sum interactions between people, where one wins and the other loses, fail the test of smartness because there is no overall benefit, no increase in value, to the community resulting from those exchanges. In a 'smart' exchange, however, there may be only a one-way exchange of tangibles but accompanying intangibles must increase overall.

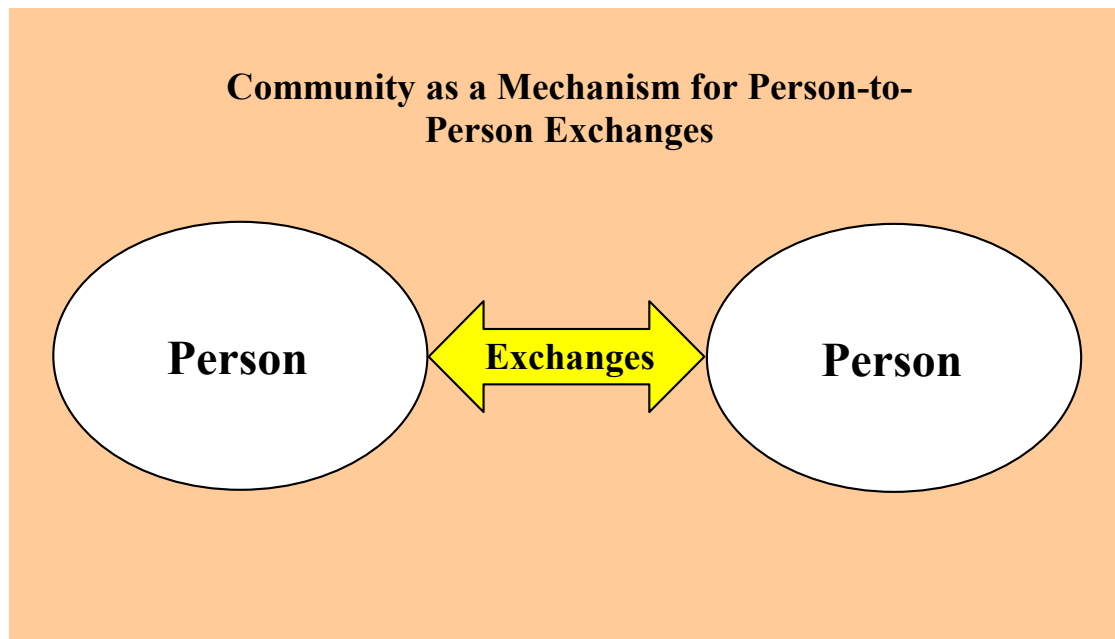


Figure 1: Smart community as facilitator of exchanges

### **An Exchange focused approach to assessment of Smart Communities**

The assessment of smart communities therefore needs to look at the nature, frequency and quality of the exchanges that take place within a defined community as well as the benefits that accrue, both tangible and intangible, from those exchanges.

First, in terms of the nature of exchanges, are they face-to-face or online and, if online, do the online exchanges increase or decrease the degree of face-to-face exchanges (there is growing evidence that entirely virtual exchanges have challenges that limit trust building and learning, two essential elements of community development)?

Second, what are the frequency and quality of these exchanges? This speaks to the nature of the technological infrastructure, its level of penetration in the community and the uses put to it. Are those uses purely informational or do they involve some economic, learning, community and governance related purposes, all of which imply a degree of interactivity? What are the applications that the community's technological infrastructure is used for?

If economic uses for ICT mediated exchanges exist in the community then how does the use of ICT help generate prosperity, for whom and to what degree? Does the use of ICT increase average incomes? Does this apply equally across all income groups? Does ICT aid in attracting and retaining employers and employees? Does it aid in workforce transitions?

If there are learning uses for ICT exchanges, how are they used to create and disseminate knowledge? Are there indications of increased innovativeness? Is it used in education and skill development? Does ICT help foster networking and other informal learning exchanges, as well as more formal ones? Can the infrastructure support self-referral in the community, ie. can the community know what it knows, what skills it has, what learning is needed and what training is available?

If there are community development uses made of the ICT infrastructure, does it help bring people together? Does it increase awareness and tolerance of sub-groups within the community? Does it add to the cultural and social vitality of the community? Does it add to the community's quality of life? Does the community encourage access to the ICT infrastructure and provide alternative means for delivering the same information and services?

Finally, is the ICT infrastructure helpful in bringing different community perspectives to the fore, in encouraging dialogue and in fostering community consensus? Good governance is about effective coordination when power, knowledge and authority are distributed. Does the ICT infrastructure foster good governance or does it encourage balkanization? Does it encourage citizen participation in the community or discourage it?

In summary then, it is our opinion that a smart community index, or what to become to be e-DevelopmentIndex should be composed of smaller indices to show progress on – infrastructure, opportunities in the knowledge- based economy, learning, community development and governance. It is expected that any community will favour one or more of these smart community indices reflecting its own unique values and growth strategies. Not all smart communities will be alike and a comparison of smart communities without accounting for natural differences in emphasis will be misleading. An aggregation of the five indices might be interesting so long as it is accompanied by more revealing component indices.

### **Why do communities need to use an assessment tool like e-DevelopmentIndex?**

The Index is based upon the premise that ICT is a critical factor in achieving better quality of life for citizens, can fuel the growth of the community's into competitive player in the global economy, and is the key to accumulate and create new knowledge. This premise derives from the fact that ICT delivers revolutionary tools to facilitate the diffusion of knowledge among people as it engages them in fast exchanges of information over a variety of media, ranging from one-to-one to many-to-many channels.

There are basically four good reasons for communities to assess whether they take full advantage of the ICT and knowledge revolution.



1. it is a matter of creating opportunities for growth in the global knowledge-based economy; i.e. creating an innovative economy.
2. it is a matter of self-accountability to ensure prudent allocation of resources to protect, save, and continue to improve the well-being of citizens.
3. it is a matter of using the best organizational and technological means to achieve equitable social and economic opportunities to current members of a community and new generations. it is a matter of responsibility on the part the community leadership to make the best collective investment decisions in order to get the best results possible from applied ICT.

### **The Characteristics of e-DevelopmentIndex**

The e-DevelopmentIndex is a self-assessment tool for reflecting on a community wide enterprise in terms of direction and position on a normative evolutionary scale, empirically developed to distinguish what can be described as 21<sup>st</sup> Century community.

The e-DevelopmentIndex addresses the evolution of the community's development efforts in a holistic and sustainable fashion with emphasis on the role of the New Information and Telecommunications technologies in shaping this evolution.

The e-DevelopmentIndex is not an organizational behavioural assessment tool focusing on local activities nor is it bounded by existing institutional and organizational limits. Rather, it is an **exploratory** tool to assess the role of ICT in enhancing community relationships, in terms of changing the prospects of the community development process. These prospects are determined not only by the technology but more by the soft issues in the process such as organizational coordination and civic entrepreneurial capacities.

The focus of the assessment is on community aggregated activities, outputs, and outcomes, short, medium, and long term. Appropriate weights and scales are assigned to community progress towards local goals and objectives along seven fundamental dimensions: local vision, governance, infrastructure development, public access, online services development, e-inclusion, and knowledge capital growth. The assessment of the community development uses an array of macro-level socio-economic community profile data as a contextual snapshot for the self-assessment tool. Figure 2 shows the structure of the e-DevelopmentIndex. In a stepwise fashion, it starts with identifying the main issues and related questions for the six categories. Then for each question it operationalize the assessment criteria that could be supported by quantitative and qualitative data to mark the level of performance.

The design of the assessment framework is largely drawn from the experiences in implementing community development projects, rhetorically dubbed Smart communities or Intelligent cities, in the four founding countries of Smart Communities International Network (SCIN), Canada, Holland, Malaysia, and Sweden. The projects signify publicly supported region-wide initiatives that employ the new ICT technology in community development in those four countries. In addition, knowledge from published multi-disciplinary academic research work and reports from relevant consulting practices will be used to further validate and consolidate the experience of SCIN members.

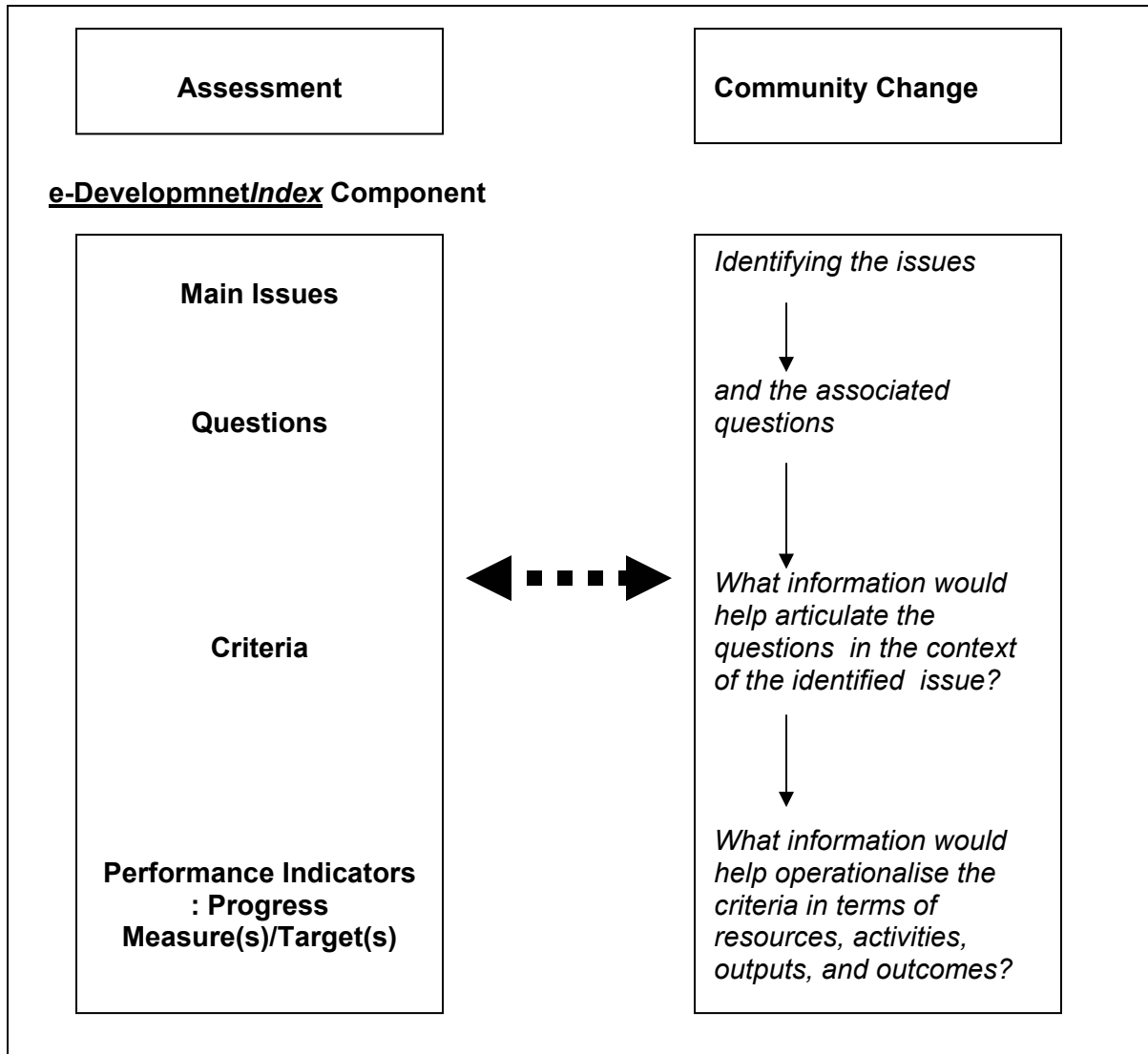


Figure 2: The structure of e-development/Index

The assessment focuses on building on and using existing and available data and information to develop indicators, which are consequential to technology-based community development. It will also attempt to make use of and integrate existing community assessment tools to help building the e-Development/Index efficiently.

The normative scale of the assessment tool focuses on characterizing the successful integration of the response to community needs, technology, place, time, and human ingenuity to meet the goals of the stakeholders and community vision.

The application of the e-Development/Index will be tailored to the characteristics of the community. The tool is adaptable to assess the development of community in urbanized and rural settings.

The e-Development/Index is not meant to determine competitive advantages of one community over others in its league (e.g. similar in population size, and socio-economic). However, post-analyses based on the results of the community self-assessment, using the right design and research methodologies, could serve that purpose. The number of indicators will be kept to the minimum possible to validate the relevant assessment questions meaningfully and correctly.

## Selecting Indicators

Indicators are quantitative measures that tell us how well we are doing: getting better, worse or staying the same. A rigorous set of criteria was applied to all potential indicators. All of the selected indicators:

- Are derived from objective and reliable data sources published in economic development reports.
- Have statistics measurable on an on-going basis
- Are leading indicators that reflect the fundamentals of economic vitality
- Can be understood and accepted by the community

Measure conditions in which there is an active public interest.

## Section II

### The analysis in developing the e-Development/Index

#### The example of developing the knowledge Capital dimension

The e-Development/Index is a report card on your community's progress toward effective participation in the global knowledge-based economy as you seek to achieve the best quality of life in your community. Like most indices, it uses statistics and graphs to illustrate how the community performs, and compares its performance to that of similar communities, your neighbours, and a set of reference community benchmarks. The benchmarks are ideal levels of best possible achievements over time, derived by from experts of Smart Communities. These ideal performance levels are based on the necessary requirements to lead in the in 21<sup>st</sup> century and to integrate information and communications technology (ICT) into the socio-economic fabric of the community. We will refer to these requirements as the "Leading e-Development Requirements (LDC), and they include: Vision, Governance, infrastructure development, on-line services, e-inclusion, and Knowledge Capital. The index is packaged as a self-assessment tool kit to be used by municipal governments, community leaders and organizations, interest groups and others interested in or responsible for community well being.

Unlike most economic or social studies, the Index is not intended to report on the entire socio-economic conditions of your community. For instance, the Index does not cover all industrial activity in your community, the available jobs or the status and conditions of community services. Instead, the Index focuses on six broad productive groups—or "clusters"—that are significant in the knowledge-based economy, the most important service sectors, and governance mechanisms. It offers about thirty statistical indicators and qualitative measures to capture the progress of your community.

## An Innovative Economy

The six productive clusters featured in this report represent sectors that are heavily knowledge based or affected by knowledge-based jobs or lack there of. The exchanges within these six clusters represent a high proportion of all the exchanges in a typical knowledge-based economy. Their strength and dominance within the community 's economy, compared to other exchanges within community's region, and in the national economy as a whole, is a reflection of the community competitiveness. The Index helps to assess how a community sustains productivity and innovation through the growth of these clusters, and to provide important insights into the role of ICT in the entire economy of the community.

### Why is ICT important for an Innovative economy?

New local economic activities not only create new products, they also create new industries, which in turn create new jobs in the community. Over the last decade, SMEs—especially in ICT-producing industries --were leading in wealth creation, followed by those in the industry clusters where ICT is integral to the final or intermediary products and processes or helped that business.

With communities and companies competing against each other globally, the ability to achieve lower costs, spearhead innovation- new ways of doing things better, cheaper, or faster - and productivity- increased economic output from each person working- in the community would be the most important factors in generating future economic growth.

The key to win competition in the 21<sup>st</sup> century is to achieve higher innovation and productivity levels in the leading wealth-creating sectors of the economy, whether in ICT products or other industries and sectors where ICT is a core production factor or facilitator.

The integration of ICT is a means to improve productivity; it creates a competitive edge for business firms. In fact, higher levels of ICT integration cut the costs of doing business: an important gain, especially for SMEs. Labor costs for the SMEs have been historically the main contributor to the costs of doing business. ICT-based automation replaces humans in the production process.

Economists now estimate that fifty percent or more of all the growth in the U.S. economy since World War II has been the result of new technology. Some economists estimate that as much as two-thirds of U.S. economic growth during the 1990s was due to the introduction of new technologies, particularly information technologies (IT).

Many tend to think that innovation and technology is the same thing, but businesses innovate all the time, with and without new technology. Boston's financial services industry has steadily grown for decades, thanks in part to the creation of the mutual fund—not a technology, but an innovative way of purchasing and holding stocks on behalf of investors.

Economists now speak of innovation as the result of a series of inter-related processes that range from basic scientific research to methods of finance and business strategy. Increasingly they speak of these processes as part of a national innovation system. According to the RAND Corporation, "the system . . . has emerged as one of our most important national assets, as important a source for growth today and in the future as have been . . . the nation's natural resources in the past."

*Excerpt from 2002 Index and the Massachusetts Innovation Economy*

On one hand, ICT helps SMEs to do more with fewer employees. On the hand, ICT can also create opportunities for higher wages, better working conditions, and other benefits for employees. Thus, ICT integration creates win-win situations for SMEs. It increases the productivity of a company as much as it improves the well being of employees. In a knowledge -based economy, and especially in ICT and knowledge-intense industries, products, processes, and human capital are all interchangeable as costs and assets for the businesses enterprise.

There are examples of business innovations without technological intervention. However, business innovation as well industrial innovation today is hardly imaginable without at least some element of ICT in the process. Of course ICT is always a main factor in creating new ICT products. However, for other innovations, ICT affects the innovation process as well, by changing the time, knowledge- resources, and people's abilities used in the process. The coupling of ICT and innovation is the hallmark of the knowledge-based economy in the 21<sup>st</sup> Century.

### **The framework for sustained innovation, productivity, and ICT integration: Knowledge Capital**

e-Development/Index measures the progress of three key components of an innovative Economy. It is based on a dynamic conceptual framework that links resources to economic results through the process of ICT integration and knowledge-based innovation. The framework measures a community's ability to leverage its resources through innovation and productivity, and to achieve higher levels of economic performance in the process. In a virtuous cycle, high economic performance supports ongoing investment in the key resources required to sustain the Innovation and productivity of the Economy.

In general, a modern economy has three interrelated and interactive components:

- Results: Outcomes for people and business in the community—job growth, rising average wages, and export sales
- Processes: Dynamic interactions and exchanges that transform resources into results—idea generation, commercialization, entrepreneurship, and business innovation
- Resources: Critical public and private inputs to the economy—human, technological and capital investment resources, and infrastructure.

The e-Development/Index first presents the economic results of an Innovative Economy and, subsequently, tracks the most visible public innovation processes influencing the economy. It concludes by documenting trends in a number of resources that fuel the Innovative Economy of the 21<sup>st</sup> Century communities. The process is illustrated in an innovation environment diagram developed by Nicos Komnions (Figure 3), which shows the exchanges in an innovative economy to turn knowledge into products. These exchanges form the knowledge Capital of communities and the source of wealth creation and economic strength in the 21<sup>st</sup> century.

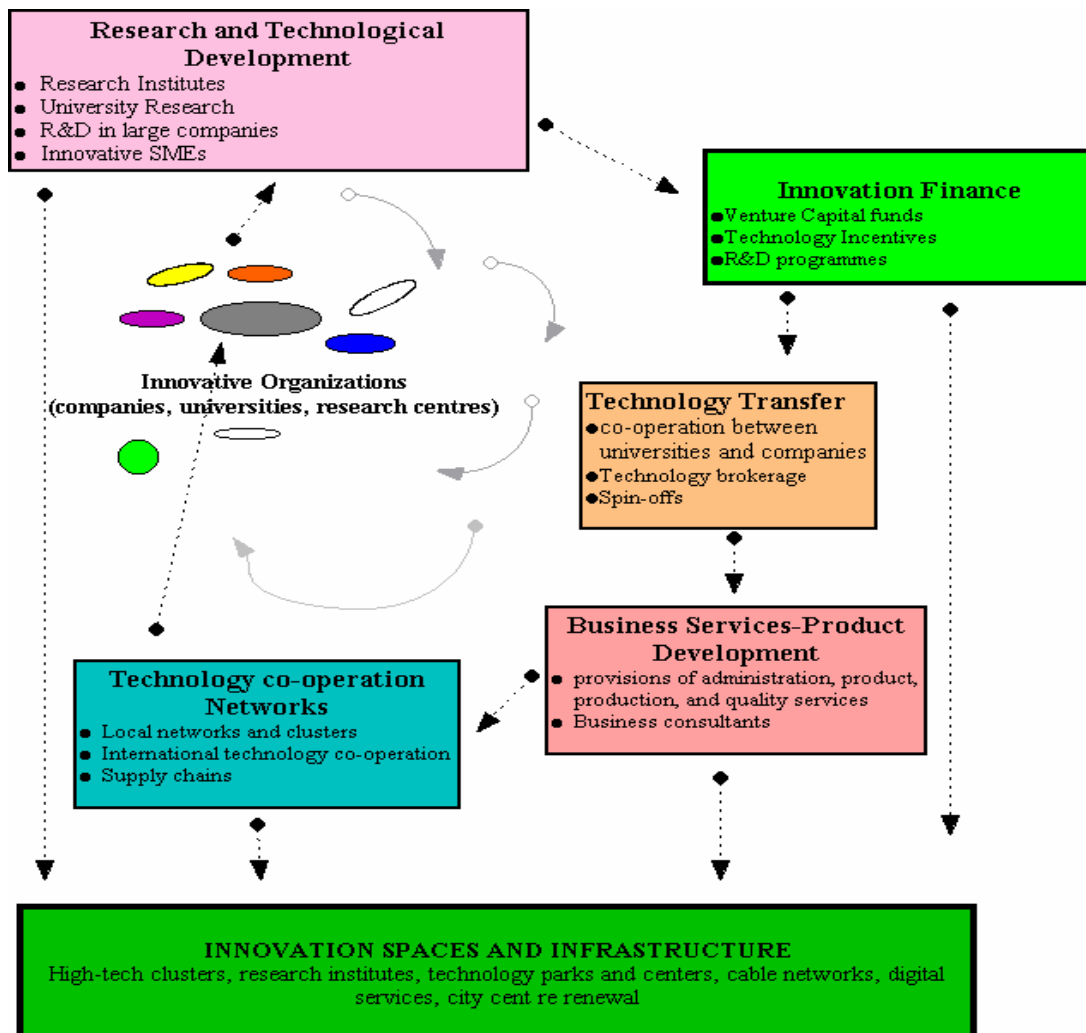


Figure 3: The knowledge Capital Dynamics of the innovative economy in the 21st Century

### Six Key Industry Clusters

From Komnions's diagram, we can see that it is important to monitor the impact of innovation in those key productive clusters that are critical to the community's economy in the 21<sup>st</sup> century. The Index identifies six such clusters. They include Postsecondary Education, Skill Development and Vocational Training, Research & Development, Computer & Communications Services (which includes telecommunications & software) and Professional Services (which includes engineering services and management consulting services).

An e-Development Index would help answer the following types of questions:

1. How much these six clusters contribute to total employment in the community.
2. What is the distribution of employment in these five key six clusters between public and private sectors. Public sector payroll encompasses all government employees, armed forces and civilian employees, including federal, provincial and local workers,

postal workers, and education workers at the state and local level. Private sector employment pertains both to for-profit and not-for-profit organisations.

3. How much is the average wage paid by the five key clusters compared to the rest of the economy.
4. How much is the total R&D expenditure and the Business R& D expenditure?

Appendix I provides the most important indicators for these the innovative economy clusters' performance (see the details of the Knowledge Capital). Examples of the performance levels on some of the identified indicators for the knowledge capital dimension is provided in Figure 4 below.

**Figure 4: Performance Levels of an e-DevelopmentIndex indicator for Advanced Technology jobs in Ottawa**

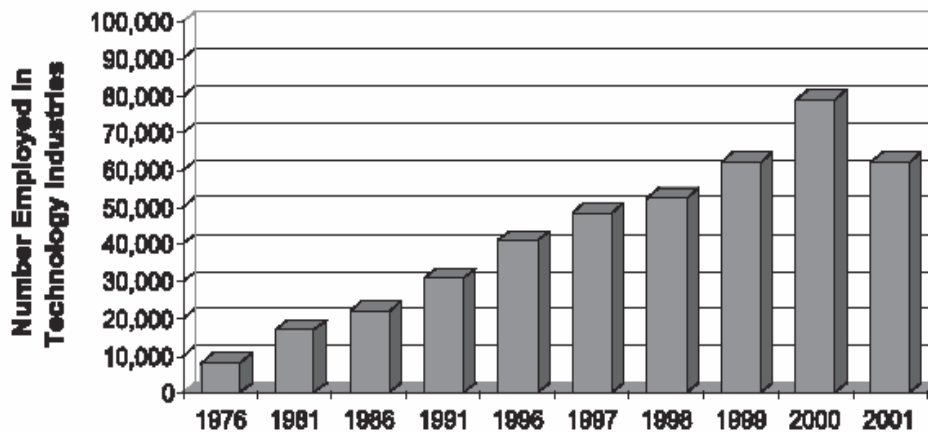
**Number of People Employed in Key NCR Industries (NAICs) by Occupation (SOC) in Thousands**

	Standard Occupation Codes										
	Total	Managerial	Business, Finance, & Admin	Natural & Applied Sciences	Health Service	Social Sciences & Education	Arts, Culture & Recreation	Sales & Service	Trade, Transport. & Equipment	Occ. Unique to Primary Sector	Occ. Unique to Process. & Manufacturing
Percentage of Ottawa Employment	100%	11%	20%	13%	5%	10%	5%	23%	10%	1%	2%
Total Employment	576.1	61.9	116.8	76.6	27.2	58.5	26.6	134.8	54.9	6.6	12.2
<b>North American Industry Codes</b>											
Public Administration	108.3	15.3	40.7	23.4	*	13.9	5.9	7.1	*	*	*
Business Services	81.0	7.2	32.8	7.1	*	5.6	4.4	19.2	3.4	1.7	*
Information & Communications Tech.	73.9	9.5	10.8	37.5	*	2.6	3.2	1.7	1.6	*	5.9
Health & Social Service	56.4	1.5	*	*	25.2	5.3	*	15.0	*	*	*
Tourism, Arts & Ent., Acc. & Food	51.5	5.5	*	1.5	*	*	8.5	30.5	*	*	*
Education	42.9	1.9	*	*	*	28.8	2.7	4.3	*	*	*
Construction	28.3	3.5	*	*	*	*	*	*	20.9	*	*
Transportation	14.8	*	*	*	*	*	*	1.5	9.7	*	*
Agri-food	6.6	*	*	*	*	*	*	*	*	3.7	*

\* Indicates more than zero but less than 1,500 persons that fall into a category.

Source: Statistics Canada, Labour Force Survey, 2001, by request February 2002

**Advanced Technology Employment in Ottawa**



Source: OCRI; published in the *Ottawa Business Journal*, January 2002

## **Section III**

### **Benchmarking & Comparisons using e-Development Index**

#### **Leading communities**

Communities should be able to track the Innovation Economy over time. Monitoring the Innovation Economy on a regular basis is crucial to assess its strength and resilience. At the same time, benchmark comparisons provide important clues as to how the community is doing in a relative sense. Some of the indicators compare community with a composite measure of four competitive Leading Development communities (LDC). The selection of the four LDCs chosen for comparison throughout the Index year is based on expert opinion.

#### **Neighbouring communities**

Here, a comparison is made either with the national average or with two neighbouring communities. It will show how well the community is doing relative to its neighbours and document global influences and regional competition.

#### **Similar communities**

Here, a comparison is made with two other communities of similar socio-economic characteristics. It will show how well the community is doing relative to others within the same league and to document the impact of global influences and competition.

The results of the comparisons can be listed in the aggregate performance-benchmarking table. The overall performance results would be determined based on a qualitative approach, recording the relative performance of the community with respect to each of the individual variables- ahead, level, or behind. Where performance variables conflict in aggregation, a qualitative weighting can be used. In those cases where a robust qualitative aggregation cannot be developed, a quantitative weighting scheme will be used. In both cases, weighting is assigned based on the experts' experiences.



<i>Indicator</i>	<i>Community Performance</i>	<i>Neighbouring Communities Performance</i>		<i>National Average Performance</i>	<i>Results</i>	<i>Comparable Communities</i>		<i>Results</i>	<i>Comments</i>
		<i>A</i>	<i>B</i>			<i>A</i>	<i>B</i>		
<i>Six clusters total employment</i>					<i>Ahead</i> <i>Level</i> <i>Behind</i>				
<i>Employment government</i>									
<i>Employment non-government</i>									
<i>Total R &amp; D expenditure</i>									
<i>Business R &amp; D expenditure</i>									
<b>Overall Qualitative weighted Aggregate Assessment</b>					<i>Ahead</i> <i>Level</i> <i>Behind</i>			<i>Ahead</i> <i>Level</i> <i>Behind</i>	

Table :Community benchmarking table for the knowledge Capital indicators.

### The Community performance chart

To assess the performance of the community over time a community chart is developed in spider graph format. The co-centred rings represent the five most important indicators for each assessment dimension is shown on the graph, which are distributed to form 6 sectors of the graph (or 6 pizza slices). Each sector is divided into four-performance levels (25%, 50%, 75%, and 100%) level satisfaction with the level of achievement. in that particular indicator. The whiteness in the spider graph represents the performance gaps. From year to year, these gaps should be closing.

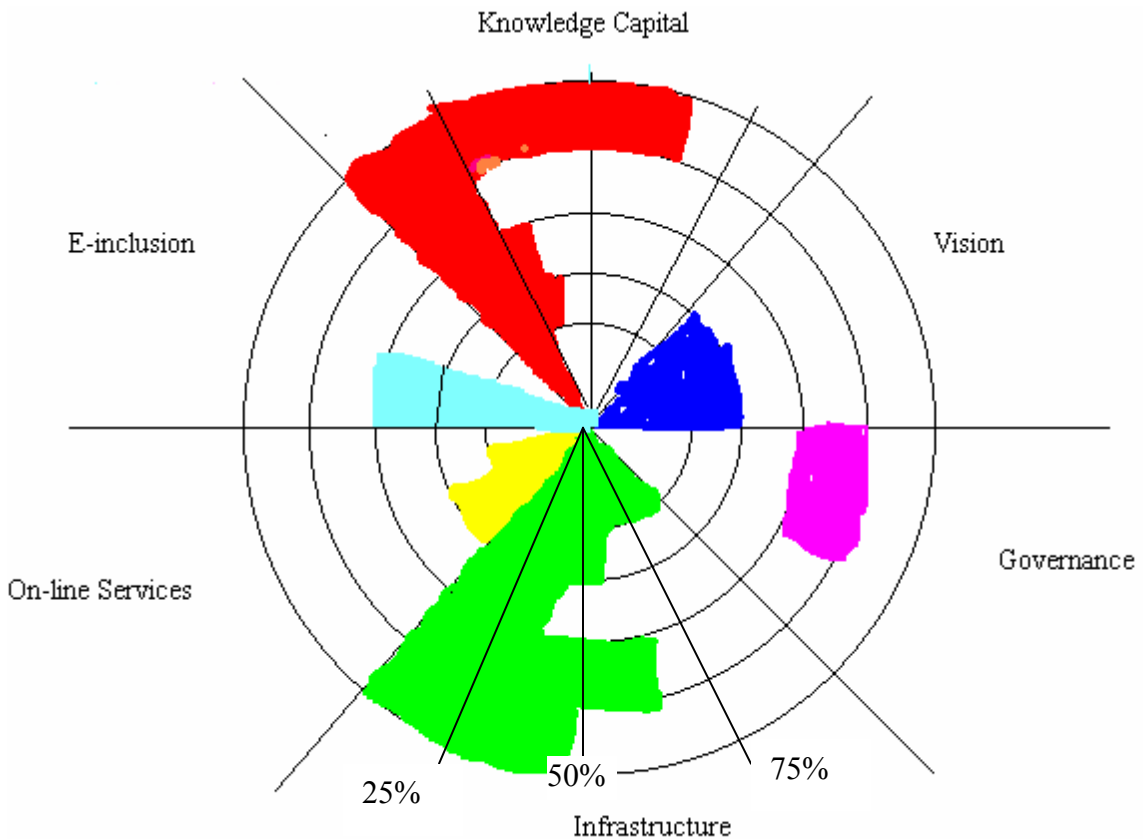


Figure 5: Community Performance Gap Analysis Chart

## **A draft Table of Content for the e-Development Index**

### **1. Introduction**

- 1.1. Challenges for communities in 21st Century
- 1.2. Community e-Development
- 1.3. Use of Self-Assessment Tools
- 1.4. The Propose of Community e-Development Index

### **2. Assessment Framework**

- 2.1. Index's Foundations
- 2.2. Index's Objectives
- 2.3. Index's adaptation and customisation

### **3. The self-Assessment Dimensions**

- 3.1. Community Big picture (The community Socio-economic profile)
- 3.2. Community Enterprise
  - 3.2.1. Local Vision
  - 3.2.2. Governance
- 3.3. Service Delivery Systems
  - 3.3.1. Infrastructure Development
  - 3.3.2. Online Services
- 3.4. Community Capacity Building
  - 3.4.1. ICT engagement & Adoption
  - 3.4.2. E-Inclusion
  - 3.4.3. Knowledge Capital Growth

### **4. Assessment Logical Model**

- 4.1. The Index as Multi-criteria decision making process
- 4.2. Dealing with Subjectivity in the assessment
- 4.3. Dealing with the information limitations

### **5. Assessment Methodology implementation**

- 5.1. Decision on the Objectives of Self-assessment
  - 5.1.1. Setting the time period for the data
  - 5.1.2. Stakeholders requirements
  - 5.1.3. Evaluators requirements
- 5.2. Decisions on Criteria
  - 5.2.1. Relevance of Criteria
  - 5.2.2. Setting priority weights for applicable criteria for each assessment dimension
- 5.3. Decisions on Indicators
  - 5.3.1. Setting uncertainties on applicability of Indicators to each criteria
  - 5.3.2. Indicator Validation
  - 5.3.3. Setting data collection Priority for Indicators

### **6. Trial Runs and setting standards for Benchmarking**

- 6.1. Constructing Normative Scale (Scoring System)
  - 6.1.1. SCIN Members
    - 6.1.1.1. Country profile
    - 6.1.1.2. Smart community project Profiles
  - 6.1.2. Criteria decision Table
  - 6.1.3. Measurements problems
- 6.2. Reporting Results

- 7. Bibliography Sources**
- 8. Definitions and terminology explained**
- 9. Appendix**

Appendix I -- Proposed Assessment Dimensions and Indicators

**The e-Development Index**

<b>Assessment 1 – Community Profile</b>			
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	
<b>Main Elements</b>	<b>Questions</b>	<b>Indicators</b>	<b>An example of performance levels</b>
1.1 Demographics	1.1.1 How many people live, work, play, in the community?  1.1.2. What are the main attractions for visitors?	1.1.1.1. Population 1.1.1.2. Size of Workforce 1.1.1.3. No of Annual Visitors 1.1.1.4. Mortality rate 1.1.1.7. Households composition  1.1.2.1. Natural Endowments & recreational activities 1.1.2.2. Architecture 1.1.2.3. Arts & Culture events 1.1.2.4. Business & Trade	Qualitative questions are answered on a five point rating scale (1-5), with 5 is the most favorable, the strongest agreement, highest level or satisfaction, and 1 is the least.
1.2 Geographical/Physical Characteristics	1.2.1. What is the level of urbanity?	1.2.1.1. Size of Geographical Area 1.2.1.2. Size of rural areas 1.2.1.3. Population distribution (downtown, suburban, rural) communities 1.2.1.4. Travel distances from major urban centers 1.2.1.5. Rate of increase in Housing stock	

Assessment 1 – Community Profile			
<i>e issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	
	Questions	Indicators	An example of performance levels
1.3 Economy	<p>1.3.1. What is the structure of the domestic economy?</p> <p>1.3.2. What is the level of local participation in the global economy?</p>	<p>1.3.1.1. Real GDP per Capita</p> <p>1.3.1.2. Average unemployment</p> <p>1.3.1.3. Cost of doing Business</p> <p>1.3.1.4. Number of new Business registrations</p> <p>1.3.1.5. Annual Business Bankruptcy rate</p> <p>1.3.1.6. Average Household income</p> <p>1.3.1.7. Volume of Venture Capital investment</p> <p>1.3.1.8. Local Government Revenues</p> <p>1.3.1.9. Taxation rates (property, Sales, Capital, receipts)</p> <p>1.3.1.10. Distribution of Employment by main sector</p> <p>1.3.1.11. Distribution of GDP on Goods and Services</p> <p>1.3.1.12. Level of R&amp;D expenditures by sector</p> <p>1.3.1.13. Private R&amp;D expenditures by sector</p> <p>1.3.1.14. Employment in Advanced Technology sector</p> <p>1.3.1.15. Taxation rates (property, Sales, Capital, receipts) for Advanced Technology Sector</p> <p>1.3.2.1. Ratio of Exports to the GDP</p> <p>1.3.2.2. Ratio of Employment in Major Export industries to the total Employment</p> <p>1.3.2.3. Volume of Direct Foreign investment</p> <p>1.3.2.4. Trade Balance</p> <p>1.3.2.5. Exports of Advanced Technology Sector</p> <p>1.3.2.6. Revenues of Tourism &amp; hospitality sector</p>	

<b>Assessment 1 – Community Profile</b>			
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	
<b>Main Elements</b>	<b>Questions</b>	<b>Indicators</b>	<b>An example of performance levels</b>
1.4 Socio-cultural and heritage diversity	1.4.1 What is the ethnic diversity of the community?  1.4.2 What is the immigration level in the community?  1.4.3 What is the level of population stability?  1.4.4. What is the social class structure in the community?	1.4.1.1 No of Languages spoken at home 1.4.1.2. No of Ethnic minorities  1.4.2.1. Level of Annual immigration  1.4.3.1. Level of Migration in and out of the community major cities 1.4.3.2. Family Size per household 1.4.3.3. Age distribution  1.4.4.1. No of Rental units 1.4.4.2. Average cost of rental units 1.4.4.2. Average income of low income households 1.4.4.3. No of Children in Household receive Arts Education 1.4.4.5. Expenditure on Vacation and holidays per household	

<b>Assessment 1 – Community Profile</b>			
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	
<b>Main Elements</b>	<b>Questions</b>	<b>Indicators</b>	<b>An example of performance levels</b>
1.5 Quality of life	<p>1.5.1. What is the level, distribution, and quality of education?</p> <p>1.5.2. What is the level, distribution, and quality of health care?</p> <p>1.5.3. What is the need for social services and social subsidies?</p> <p>1.5.4. What is the level of</p>	<p>1.5.1.1. Percentage of youth population at each education level</p> <p>1.5.1.2. Percentage of the youth in vocational and job training programs</p> <p>1.5.1.3. No of Universities, R&amp;D institutions, K-12 schools.</p> <p>1.5.1.4. Average Classroom Size in K-12 and post-secondary education</p> <p>1.5.1.5. Total Expenditure on Education sector</p> <p>1.5.1.6. Total Expenditure on vocational training programs</p> <p>1.5.2.1. Total Expenditure on Health Insurance (public + private)</p> <p>1.5.2.2. Total Number of Hospital beds per capita</p> <p>1.5.2.3. Total Expenditure on Health care sector</p> <p>1.5.2.4. Child low-birth weight</p> <p>1.5.2.5. Total Expenditure on home care for seniors</p> <p>1.5.2.6. No of Nurses</p> <p>1.5.3.1. Percentage of population receiving social subsidies</p> <p>1.5.3.2. Average Child care cost per year</p> <p>1.5.3.3. No of people with disability who receive assistance</p> <p>1.5.3.4. No. Of people in need for affordable housing</p> <p>1.5.3.5. No. Programs serving homeless people</p> <p>1.5.3.6. Average number of people receiving Employment Insurance per year</p> <p>1.5.4.1. No. of Violent crime per capita</p>	



Assessment 1 – Community Profile			
<i>e issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	
	Questions	Indicators	An example of performance levels
	<p>personal safety/security in the community?</p> <p>1.5.5. What are the conditions for providing a livable environment?</p>	<p>1.5.4.2. No. of youth crime per capita                      1.5.4.3. No. of Break and Enter crimes per year                      1.5.4.3. Size of police force                      1.5.4.5. Size of Fire and rescue services fleets                      1.5.4.6. No. of private security services companies.</p> <p>1.5.5.1 Average size of new Housing units                      1.5.5.2. Electricity consumption                      1.5.5.3. Contribution of renewable and alternative energy to total energy consumption                      1.5.5.4. Area of open green space                      1.5.5.5. Cost of using public transportation                      1.5.5.6. Carpooling level                      1.5.5.7. Public transportation ridership per Capita                      1.5.5.8. Water use level                      1.5.5.9. Share of recycled water                      1.5.5.10. Air Quality (Smog level, Particulate Matter level)</p>	

<b>Assessment 1 – Community Profile</b>			
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	
<b>Main Elements</b>	<b>Questions</b>	<b>Indicators</b>	<b>An example of performance levels</b>
1.6 Social Institutions	<p>1.6.1. What is status of democracy?</p> <p>1.6.2. What is the status of Government accountability?</p> <p>1.6.3. What is the status of the legal/ justice system?</p>	<p>1.6.1.1. What is the level of democracy in selecting the governing bodies?</p> <p>1.6.1.2. What is the level of freedom of speech the citizens entertain?</p> <p>1.6.1.3. What is the degree of government control on media?</p> <p>1.6.2.1 What is the level of adherence to accountability, transparency, and financial control in government and public sector organizations?</p> <p>1.6.2.2. What is the level of trust in government officials and politicians?</p> <p>1.6.2.3. What is the level of corruption witnessed among politicians and civil servants?</p> <p>1.6.2.4. What is the level citizen participation in political life?</p> <p>1.6.2.5. What is the level of citizen participation in community (volunteer/philanthropic) work?</p> <p>1.6.3.1. What is the degree of independence the legal/justice system has from government?</p> <p>1.6.3.2. What is the level of police brutality?</p> <p>1.6.3.3. What is the level of corruption witnessed in police force?</p>	

<b>Assessment 2 -- Community Vision</b>				
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?</i>	
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>

Assessment 2 -- Community Vision				
e	and the associated questions	What information would help articulate the questions in the context of the identified issue?	What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?	
s	Questions	Criteria	Performance Indicators: Progress Measure(s)/Target(s)	An example of performance levels
2.1. Intrinsic Strengths	2.1.1. How well founded is the community vision?	2.1.1.1. Strong sense of community identity  2.1.1.2. Comprehensive reach  2.1.1.3. Values Collaboration  2.1.1.4. Realistic	2.1.1.1.1 Does the vision reflect the community values? 2.1.1.1.2. Does the vision reflect the community inspirations?  2.1.1.2.1. Does the vision speaks on behalf of all community members? 2.1.1.2.2. Does the vision addressees the needs of all community members? 2.1.1.2.3. Does the community approve of the vision statement? 2.1.1.2.4. Is the community vision statement widely adopted?  2.1.1.3.1. Does the vision focus on community engagement? 2.1.1.3.2. Does the vision promise rewards for collaboration? 2.1.1.3.3. Does the vision statement identify the directions for collaboration? 2.1.1.3.4. Does the vision statement invite specific contributions?  2.1.1.4.1. Does the vision focus on community strengths? 2.1.1.4.2. Does the vision address community weaknesses? 2.1.1.4.3. Does the vision statement identify achievable goals? 2.1.1.4.4. Does the vision support the most probable strategic options for community prosperity?	Qualitative questions are answered on a five point rating scale (1-5), with 5 is the most favorable, the strongest agreement, or satisfaction, and 1 is the least.
<i>Smart Community International Network</i>		2.1.1.5. Creative	2.1.1.5.1. Does the vision statement catch attention? 2.1.1.5.2. Is the vision statement easy to remember?	

Assessment 2 -- Community Vision				
e	and the associated questions	What information would help articulate the questions in the context of the identified issue?	What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?	
s	Questions	Criteria	Performance Indicators: Progress Measure(s)/Target(s)	An example of performance levels
2.2. Change Drivers	2.2.1. Who usually brings about and guides change in the community life?	<p>2.2.1.1. Community Leadership ability to recognize Strengths, Weaknesses, Threats, and Opportunities</p> <p>2.2.1.2. Capacity of Collective bargaining</p> <p>2.2.1.3. Community Openness</p>	<p>2.2.1.1.1. What is the level of resistance to new ideas or call for change in the community life?</p> <p>2.2.1.1.2. What is the level of conforming to community norms?</p> <p>2.2.1.1.3. What is the level of accepting vested interests in the community?</p> <p>2.2.1.1.4. What is the level of historical ability to adjust to new conditions?</p> <p>2.2.1.2.1. What is the level of lobbying Government?</p> <p>2.2.1.2.2. What is the level of natural/ elected community leadership?</p> <p>2.2.1.2.3. No. of Labor Union strikes</p> <p>2.2.1.2.4. No. of protest activities organized by students</p> <p>2.2.1.2.5. No. of media campaigns organized by special interest &amp; professional organizations</p> <p>2.2.1.3.1. What is the level of influence of civic organizations?</p> <p>2.2.1.3.2. What is the level of respect for home grown champions/ heroes?</p> <p>2.2.1.3.3. No. of projects led by civic entrepreneurs</p>	

Assessment 2 -- Community Vision				
Identifying the issues	and the associated questions	What information would help articulate the questions in the context of the identified issue?	What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?	
Main Issues	Questions	Criteria	Performance Indicators: Progress Measure(s)/Target(s)	An example of performance levels
2.2. Change Drivers	<p>2.2.1. What usually brings about and guide change in the community life?</p> <p>2.2.2. Who usually steers/ guides change (change agents)?</p>	<p>2.2.1.4. External Market forces</p> <p>2.2.2.1. Public Sector Vitality</p> <p>2.2.2.2 Private sector participation</p> <p>2.2.2.3. Third sector</p>	<p>2.2.1.4.1. Level of circulation of foreign media products, and art forms.</p> <p>2.2.1.4.2. Time spent watching Satellite Channels</p> <p>2.2.1.4.3. Percentage of population with access to Internet</p> <p>2.2.1.4.1. Local currency exchange rate with major hard currencies</p> <p>2.2.1.4.2. Level of foreign direct investment</p> <p>2.2.1.4.3. No. Of foreign company Headquarters</p> <p>2.2.2.2.7. No. Government Bills defeated</p> <p>2.2.2.2.8. No. of amendments to adopted local official plans</p> <p>2.2.2.2.12. No. of editorials critical of local government in local media</p> <p>2.2.1.2.6. Level of government sponsorship and subsidies for local grass-root project</p> <p>2.2.2.1.1 No. of private foundations</p> <p>2.2.2.2.2. Level of private sector donations to community projects</p> <p>2.2.2.2.3. No. of editorials critical of local government in local media</p> <p>2.2.2.3.1. Relative amount of Third sector activity</p>	<p>Qualitative questions are answered on a five point rating scale (1-5), with 5 is the most favorable, the strongest agreement, or satisfaction, and 1 is the least.</p>

<b>Assessment 3 -- Governance</b>				
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?</i>	
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
3.1. Coordination	3.1.1. What is the level of Collaboration among stakeholders?  3.1.2. What is the degree of centrality in decision making?	3.1.1.1. Shift to Inter and intra-sector policy development and project planning.  3.1.1.2. Increase in the use Public-Private Partnerships for Funding programs.  3.1.2.1. Extensive use of Multi-disciplinary teams in development and service delivery projects.	3.1.1.1.1. No. Of active joint task forces between government agencies, private, and civic sectors 3.1.1.1.2. No. of Public consultation meetings on official plans  3.1.1.2.1. No. of Public-private partnerships in community projects 3.1.1.2.2. Total volume of Public-private partnerships  3.1.2.1.1. No. of cross department service delivery programs 3.1.2.1.2. No. of University-government public policy studies	
3.2. Leadership	3.2.2. How to produce Community Champions?	3.2.2.1. Encouraging the Sense of duty to community  3.2.2.2. Expansion of Civic entrepreneurship  3.2.2.3. Providing Incentives for personal commitment	3.2.2.1.1. No of public awareness programs 3.2.2.1.2. No of leadership development courses for youth  3.2.2.2.1. Size of membership in community organizations  3.2.2.3.1. No. of community awards programs	

<b>Assessment 3 -- Governance</b>				
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?</i>	
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
3.3. Government Transparency	3.3.1. How to create effective Accountability?	3.3.1.1. Gaining Public Trust  3.3.1.2. Use of Results based evaluation  3.3.1.3. Reward Success and achievements	3.3.1.1.1 No. of auditing reports published 3.3.1.1.2. No. of annual Town Hall informational meetings by government departments 3.3.1.1.3. No. of Internet forums for public discussion sponsored by government 3.3.1.1.4. No. of laws and regulations enforcing ethics in government  3.3.1.2.1. No. of Government policy papers published on use of evaluation 3.3.1.2.2. No. of government officials received training in program evaluation  3.3.1.3.1. No. of awards for excellence in public services 3.3.1.3.2. No. of government employees received recognition awards	



Assessment 4 -- Infrastructure Development				
	<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?</i>
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
4.1. Bandwidth	<p>4.1.1. What are the priorities to enhance Internet speed and capacity?</p> <p>4.1.2. What are the access paths to telecommunications Infrastructure?</p>	<p>4.1.1.1. Mapping Internet subscribers connectivity</p> <p>4.1.1.2. Internet Backbone capacity</p> <p>4.1.1.3. Solutions for Broadband Last mile in the near future</p> <p>4.1.2.1. Inventory of access paths to telecommunications infrastructure.</p>	<p>4.1.1.1.1 No. of lines per 100 inhabitants using (Analog Modem[up to 56Kbps], ISDN[64 Kbps to 128 Kbps], ADSL, DSL[128 Kbps to 1.5 Mbps +], Cable Modem [shared 5 Mbps], Satellite [400 Kbps (down)])</p> <p>4.1.1.1.2. No. of subscribers of 3rd generation Internet [10Mbps or greater]</p> <p>4.1.1.1.3. No. of ISP per 1000 inhabitants</p> <p>4.1.1.2.1. Size of Internet traffic of Metro networks</p> <p>4.1.1.2.2. Number of Fibre-optics lines (single mode, multi mode) in Metropolitan areas</p> <p>4.1.1.2.3. Size of video-on-demand traffic</p> <p>4.1.1.2.4. Size of V-o-IP traffic</p> <p>4.1.1.3.1. No. of fibre to the home connections</p> <p>4.1.1.3.2. No. of fibre using SONET (Synchronous Optical Network) connections for business</p> <p>4.1.1.3.3. No of High speed wireless service connections</p> <p>4.1.1.3.4. No of Free-Space Optics service connections</p> <p>4.1.2.1.1 No. of Cellular/mobiles subscribers per 100 inhabitants</p> <p>4.1.2.1.2. No. of fixed telephone lines per 100 inhabitants.</p>	

<b>Assessment 4 -- Infrastructure Development</b>				
	<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?</i>
<b>s</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
4.2. Policy Regulations	4.2.1. What are the conditions for telecommunications Market liberalization/ Deregulation?	4.2.1.1. Monopoly of Service provision  4.2.1.2. Foreign Investments/ownership  4.2.1.3. Radio Frequency Spectrum	4.2.1.1.1. Monopoly of Telecommunications Service 4.2.1.1.2. Foreign Investments/ownership 4.2.1.1.3. Radio Frequency Spectrum 4.2.1.1.4 No. of Long distance companies 4.2.1.1.5. Percentage of State ownership in TV and radio broadcasting  4.2.1.2.1. No. of foreign companies offering local telecommunications services 4.2.1.2.2. Average stock price of the largest telecommunications companies  4.2.1.3.1. Cost of Radio frequency allotment	
4.3. Business Case Development	4.3.1 How to encourage private investment in non-attractive telecommunications markets?	4.3.1.1. Cost restructuring.  4.3.1.2. Packaging content and Convergence of digital services by Suppliers.  4.3.1.3. Demand Aggregation	4.3.1.1.1. Case study of Service costs and prices in rural and remote areas  4.3.1.2.1 .No of Transport Suppliers offering services in non- metropolitan areas 4.3.1.2.2. No. of CLECs operating in non-metropolitan areas 4.3.1.2.3. No. of services integrators in non-metropolitan areas  4.3.1.3.1. No of public private partnership in Broadband projects 4.3.1.3.2. Government partnership and subsidies	

<b>Assessment 4 -- Infrastructure Development</b>				
	<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?</i>
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
4.4. Return on investment	4.4.1. What are the requirements to provide top quality network services?	4.4.1.1. Scalability 4.4.1.2. Interoperability 4.4.1.3. Accessibility 4.4.1.4. Quality of service 4.4.1.5. Speed 4.4.1.6. Affordable prices	Case study illustrations of quality of Network services (services distribution, customers satisfaction) in metropolitan and rural areas	

<b>Assessment 5 -- Online Services</b>				
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes ?</i>	
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
5.1. Pervasiveness of on-line services	5.1.1. What is the level of penetration of on-line services?	5.1.1.1. Use of On-line services?	5.1.1.1.1. No. of Internet hosts per 1000 inhabitants 5.1.1.1.2. Household access by type of service per month 5.1.1.1.3. No. of Individuals frequently using internet services per month e-business services 5.1.1.1.4. No. of secure web servers 5.1.1.1.5. Distribution of e-commerce by type of sales 5.1.1.1.6. Share of internet sales in domestic and international markets 5.1.1.1.7. No. of Business with Internet services 5.1.1.1.8. No. of SMEs without internet payment systems e-government services 5.1.1.1.9. No. of government on-line services by type 5.1.1.1.10. No. of individuals frequently using government on-line services 5.1.1.1.11. No. of government informational portals. 5.1.1.1.12. No. of visits to government informational portals 5.1.1.1.13. Frequency of Use of webcasting in public consultation and local Council meeting 5.1.1.1.14. Frequency of using public discussion forums e-health services 5.1.1.1.15. No. of e-health application by type 5.1.1.1.16. No. of doctors using e-health	Qualitative questions are answered on a five point rating scale (1-5), with 5 is the most favorable, the strongest agreement, or satisfaction, and 1 is the least.

<b>Assessment 5 -- Online Services</b>				
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes ?</i>	
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
		5.1.1.2. Rate of introducing new on-line services?	applications 5.1.1.1.17. Cost savings for patients by using e-health applications e-education services 5.1.1.1.18. Percentage of students taking e-learning courses 5.1.1.1.19 Distribution of e-learning application by type. 5.1.1.1.20. Ratio of students to available computers in K-12 schools  5.1.1.2.1. How effective is the Marketing and Promotion?	
5.2. Planning process	5.2.1. What are the requirements for offering good quality on-line services?	5.2.1.1. Robust 5.2.1.2. Affordable 5.2.1.3. Innovative 5.2.1.4. Sustainable	Case study of on-line service development process (Design Expertise, User Support for applications Public consultation)	

<b>Assessment 5 -- Online Services</b>				
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes ?</i>	
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
5.3. Applications development	5.2.1. What are the requirements for developing user applications?	5.2.1.1. User Centered Design 5.2.1.2. Portable 5.2.1.3. Secure 5.2.1.4. Robust 5.2.1.5. Integrative	5.2.1.1.1. What is the Level of Customization/ Personalization  5.2.1.1.2. What is the level of user input in the application development?  5.2.1.2.1. What is the level of Support International software Standards?  5.2.1.3.1. What is the level of security for using the application?	
5.4. Content		5.4.1. Relevant  5.4.2. Multiplicity of channel Delivery and Access.  5.4.3. Adherences to (enhanced) Legal/ ethical/privacy requirements.	5.4.1.1. Source contribution in content development by type  5.4.2.1. Distribution of request for service by Telephone, on-line, in person  5.4.3.1. No of complaints, 5.4.3.2 No. of court cases.	

<b>Assessment 5 -- Online Services</b>				
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes ?</i>	
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
5.5. Applications Support Services	5.5.1. What are the requirements for providing good quality user support?	5.5.1.1. 24/7 accessibility 5.5.1.2. User satisfaction 5.5.1.3. Staff Knowledge 5.5.1.4. Sustainability 5.5.1.5. Privacy	5.5.1.1.1 Hours of operation of Service Call Centers 5.5.1.2.1 No. of User complaints per week 5.5.1.3.1 Average time to close Service Call by support staff 5.5.1.4.1 Revenue from on-line services 5.5.1.5.1. User agreements	

<b>Assessment 6 -- E-Inclusion</b>				
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?</i>	
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
6.1. Provision of public Internet Access	6.1.1. What is the level and quality of public access to internet and electronic services?	6.1.1.1. Availability  6.1.1.2. Affordable  6.1.1.3. Service/Application Robustness  6.1.1.4. Sustainability of public access programs  6.1.1.5. Privacy  6.1.1.6. Extensions of Service Offering in public facilities	6.1.1.1. Percentage of population with computer use and internet Access 6.1.1.2. Percentage of population with Internet access (home, work, school) 6.1.1.3. No of Access points/ Institutions offering public access to Internet/electronic services 6.1.1.4. Access hours  6.1.2.1. Expenditure on Public access programs  6.1.3.1. No of hours of Failure and breakdowns of service  6.1.4.1. Private sector contributions (Monetary + In-kind)  6.1.5.1. Enforcement of public use policy  6.1.6.1. No. of subscribers to community Networks, Freenets	



<b>Assessment 6 -- E-Inclusion</b>				
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?</i>	
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
6.2. ICT literacy	6.2.1. What are the means to increasing ICT literacy rates among community members?	6.2.1.1. Overcome Institutional obstacles  6.2.1.2. Create sense of access to new users of Internet and on-line services  6.2.1.3. Offerings of ICT Basic Training programs  6.2.1.4. User-Support  6.2.1.5. Sustainability of ICT Basic Training programs	6.2.1.1.1. Percentage of population with computer use and internet Access 6.2.1.1.2. Percentage of population with Internet access (home, work, school) 6.2.1.1.3. No of Access points/ Institutions offering public access to Internet/electronic services 6.2.1.1.4. Access hours  6.2.1.2.1. Expenditure on Public access programs 6.2.1.2.2. No of hours of Failure and breakdowns of service  6.2.1.3.1 No. of free Internet training courses offered  6.2.1.4.1. Enforcement of public use policy  6.1.5.1. Private sector contributions (Monetary + In-kind) 6.2.1.5.2. No. of subscribers to community Networks, Freenets	

<b>Assessment 6 -- E-Inclusion</b>				
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?</i>	
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
6.3. ICT integration in everyday activities	6.3.1. How to establish public awareness of ICT benefits?  6.3.2. How to increase adoption and consumption rates of ICT based services?	6.3.1.1 Effective marketing and promotion of ICT-based programs and services  6.3.1.2. Create sense of Ownership for clients and customers  6.3.2.1. Foster end user collaboration	6.3.1.1.1. No of ads for training courses in locals media 6.3.1.1.2. Level of Sponsorship of public access programs by private sectors organizations  6.3.1.2.1. Rate of increase in PC ownership in low income households 6.3.1.2.2. Enrollment in End-User Skill development and application training programs  6.3.2.1.1. Rate of Use of email and chat services per session in public facilities 6.3.2.1.2. No. of peer learning groups in public access programs	

<b>Assessment 7-- Knowledge Capital</b>				
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?</i>	
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
7.1. The opportunities for knowledge and wealth creation	7.1.1. What are the measures undertaken to generate and foster innovation?	<p>7.1.1.1. Facilitation of knowledge transfer through formal organizational channels</p> <p>7.1.1.2. Facilitation of knowledge transfer through informal organizational channels</p> <p>7.1.1.3. Supporting Self interests, talent, and exposure</p> <p>7.1.1.4. Resourceful workplace</p> <p>7.1.1.5. Resourceful professional associations &amp; Communities of Practice</p>	<p>7.1.1.1.1. Average age of technology &amp; knowledge intensive Companies.</p> <p>7.1.1.1.2. Average lead-time from design to Market of high tech and knowledge intensive products.</p> <p>7.1.1.1.3. Average lead-time from design to Market for the major industries.</p> <p>7.1.1.2.1. No of high tech and knowledge intensive industry patents produced per year.</p> <p>7.1.1.2.2. No total patents for the major industries produced per year.</p> <p>7.1.1.2.3. Total amount of R&amp;D Tax credits</p> <p>7.1.1.2.4. Total expenditures on Science &amp; Technology programs</p> <p>7.1.1.3.1. Volume of Science and Technology journal/books/ media reports published</p> <p>7.1.1.3.2. Volume of multimedia educational production.</p> <p>7.1.1.4.1. Average number of conference/workshops per year for major public/private organizations</p> <p>7.1.1.4.2. No of participants in conferences/workshops per employee per organization for major public/private organizations.</p> <p>7.1.1.4.3. Average government annual spending on training.</p> <p>7.1.1.5.1. No of professional associations.</p> <p>7.1.1.5.2. Average number of events organized by professional organization per year.</p> <p>7.1.1.5.3. Level of membership of professional organizations.</p>	

<b>Assessment 7-- Knowledge Capital</b>				
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?</i>	
<b>Main Issues</b>	<b>Questions</b>	<b>Criteria</b>	<b>Performance Indicators: Progress Measure(s)/Target(s)</b>	<b>An example of performance levels</b>
		7.1.1.6. Market Dynamics  7.1.1.7. Creating Learning environments	7.1.1.6.1. No of corporate mergers/acquisitions. 7.1.1.6.2. No of coaching /mentoring programs per industry. 7.1.1.6.3. No of IPO.  7.1.1.7.1. No of events organized by non-government organizations 7.1.1.7.2. No of civic sector initiatives and projects. 7.1.1.7.3. No. of local/national/International events/ Fairs. 7.1.1.7.4. No of visitors to local/national/International events/ Fairs.	

Assessment 7-- Knowledge Capital				
Identifying the issues	and the associated questions	What information would help articulate the questions in the context of the identified issue?	What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?	
Main Issues	Questions	Criteria	Performance Indicators: Progress Measure(s)/Target(s)	An example of performance levels
7.2 Developing a skilled Workforce and attract talent	7.2.1 What are the development mechanisms and programs developed to sustain an innovative workforce and talent?	7.2.1.1. Training and skill development opportunities for current workforce  7.2.1.2. Quality of education in higher Education institutions  7.2.1.3. Quality of education in K-12 education institutions	7.2.1.1.1. No. Of courses offered by higher education institutions per capita 7.2.1.1.2. No. Of courses offered by other instructions per capita 7.2.1.1.3. No. Of e-learning courses per capita 7.2.1.1.4. No. Of Distance learning courses capita 7.2.1.1.5. No. Of learning institutions providing e-learning 7.2.1.1.6. No. Of teachers and trainers per capita 7.2.1.1.7. No. Of students in higher education institutions 7.2.1.1.8. No. Of trainees in private company/public sector organizations 7.2.1.1.9. No of Training programs for teachers and trainers in private company/public sector organizations  7.2.1.2.1. No. of new teachers and trainers in higher education per capita 7.2.1.2.2. Average no of entering degree students in higher education institutions per capita 7.2.1.2.3. Average no of graduating students in higher education institutions per capita 7.2.1.2.4. Average no of entering degree students in higher education institutions per capita 7.2.1.2.5. No. Of dropout students in higher education institutions per capita 7.2.1.2.6. No. of teachers and trainers leaving higher education per capita  7.2.1.3.1. No. of new teachers and trainers in K-12 education per capita 7.2.1.3.2. Average No. of entering degree students in K-12 education institutions per capita 7.2.1.3.3. Average No. of graduating students in higher education institutions per capita 7.2.1.3.4. Average No. of entering degree students in K-12 education institutions per capita 7.2.1.3.5. No. of dropout students in K-12 education institutions per capita 7.2.1.2.6. No. of teachers and trainers leaving K-12 education per capita	

Assessment 7-- Knowledge Capital				
<i>Identifying the issues</i>	<i>and the associated questions</i>	<i>What information would help articulate the questions in the context of the identified issue?</i>	<i>What information would help operationalise the criteria in terms of resources, activities, outputs, and outcomes?</i>	
Main Issues	Questions	Criteria	Performance Indicators: Progress Measure(s)/Target(s)	An example of performance levels
7.2 Developing a skilled Workforce and attract talent	7.2.2. How do we attract and retain talent and skilled workers?	7.2.2.1. Tapping new sources for skilled workers  7.2.2.2. Maintaining a supply of skilled workforce  7.2.2.3. Decreasing the gaps in Learning and skill development among working population  7.2.2.4. Incentives to relocate	Interviews with key informants and case study illustrations of the community capacity to attract and retain skilled workers  Annual employer surveys	
7.3. Life-long Learning	7.3.1. What are the measures for encouraging long-life learning (Youth, Adult, Seniors, Children )?	7.3.1.1. Activities in Libraries/ Community Centers.  7.3.1.2. Volunteering.	7.3.1.1.1. Percentage distribution of Local educational and learning events targeting (Youth, Adult, Seniors, Children) 7.3.1.1.2. No of public workshop events organized by government/private/civic organizations 7.3.1.1.3. No of volunteer based initiatives and projects  7.3.1.2.1. Volume of public library collections (books, multimedia) 7.3.1.2.2. Volume of public library collections of local content (public information)	