II. BULGARIAN E-READINESS ASSESSMENT MODEL AND METHODOLOGY FOR QUANTITATIVE ASSESSMENT

The **definition** of e-readiness is mostly based on the notions promoted by the Center for International Development at Harvard University. It defines the 'e-ready' society as

> *one that has the necessary physical infrastructure (high bandwidth, reliability, and affordable prices), has integrated current ICTs throughout businesses (e-commerce, local ICT sector), communities (local content, organizations online, ICTs used in everyday life, ICTs taught in schools), and the government (e-government).*

The structure of the Bulgarian Assessment focuses on four categories of e-readiness: **access**, **society**, **education** and **economy** (incl. government). A detailed qualitative assessment in each category is followed by quantitative measures (e-readiness indices).

Similarities to the CID matrix, could be summarized in two main objectives:

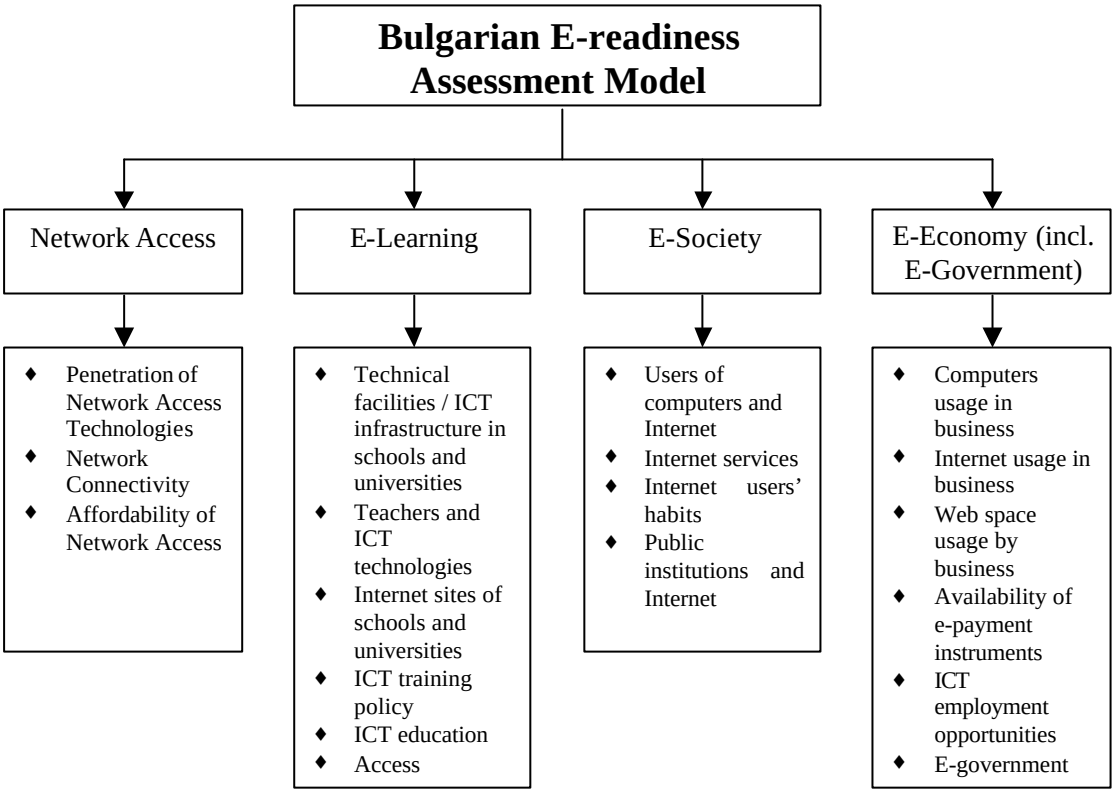
> **First**, both E-readiness Bulgarian Assessment Model (BEAM) and Network readiness Index NRI divide the total e-readiness measurement in subdirectories corresponding to different aspects of ICT proliferation. They make a distinction between factors that determine the usability of the Network (the Enabling Factors as called in NRI) and variables that reflect the extent of Network Use or Network Access in BEAM.
>
> **Second**, both indexes are constructed using overlapping indicators, which provides an overall complexity of these measurements and also allows a partial comparison between Micro-Indexes.

The Bulgarian E-readiness Assessment Model contains a series of indexes that summarize the most important indicators affecting the level of development of ICT (e-readiness) in different sectors of society. The model measures four main categories:

1. Network access
2. E-learning
3. E-society
4. E-economy (incl. E-government)

An extensive overview of Bulgarian E-readiness Assessment model is presented in Figure 2.1.

FIGURE 2.1. STRUCTURE OF THE BULGARIAN E-READINESS ASSESSMENT MODEL



The method for computation of Bulgarian Assessment indexes is elaborated below. The methodology is unique of its kind. It is still being tested and may require further development and refinement.

Network access

The goal is to assess the existing ICT and information infrastructure in Bulgaria, based on such indicators as telephone penetration, size of telecom market, market for personal computers, etc. Important sub-categories include:

- Penetration of Network Access Technologies
- Network Connectivity
- Affordability of Network Access

E-education

The goal is to assess the ICT infrastructure in Bulgarian schools and universities, the penetration of PCs and availability of internet access, the presence of ICT in the school curricula, different initiatives (private and public) aimed at bringing ICT to schools and universities, and others. The information is structured in the following sub-categories:

- Technical facilities / ICT infrastructure in schools and universities
- Teachers and ICT technologies
- Internet sites of schools and universities
- ICT training policy
- ICT education

E-society

The goal is to assess the diffusion of ICT and Internet in particular in Bulgarian society, the quality of Internet services, the number of Internet users and their "habits", the use of Internet by public institutions, etc. The information covers the following sub-categories:

- Users of computers and Internet
- Internet services
- Internet users' habits
- Public institutions and Internet

E-economy

The goal is to assess the use of Internet and ICTs by Bulgarian businesses (and government), the existing infrastructure and quality of Internet/IT services, the limitations in using/adopting new technologies, the access to services, various government initiatives encouraging business enterprise in the field of ICT, and others. Sub-categories include:

- Computers usage in business
- Internet usage in business
- Web space usage by business
- Availability of e-payment instruments
- ICT employment opportunities
- E-government

The full list of e-readiness indicators for each category and sub-category is presented in Appendix 1.

Method of Computation of E-readiness Indices

The e-readiness indices are a system of synthetic indicators. The main objective in constructing these indices is to reduce the multiple dimensions of the Information Society to a limited set of synthetic measures. The advantages of such an approach are at least the following:

- the employment of synthetic indicators is a prerequisite for establishing time series and respectively for analyzing and assessing change;
- synthetic indicators facilitate the public presentation of the results of the assessment, thus making analysis easier to perceive.

The method used to construct the e-readiness indices involves a number of steps:

First, the value of each indicator is measured on a 4- or 5-point scale (see Appendix 1)[4]

Second, A rank is assigned to each indicator value using the following procedure:

A. With 5-point scales: a rank of 1 is assigned to the first value, a rank of 3 – to the second value; a rank of 5 – to the third value, a rank of 7 to the fourth value and a rank of 10 to the fifth value.
B. With 4-point scales: a rank of 1 is assigned to the first value, a rank of 4 to the second, a rank of 7 to the third and a rank of 10 to the fourth value.

The purpose of these ranks is to ensure compatibility between different scales and present the indicator values in the range 1-10.

Third, different variables are divided in two groups depending on their importance to Bulgaria's e-readiness assessment. The level of importance is measured on a 2-point scale ("medium" and "high") based on expert assessment. High-importance variables are weighted by 2 in the computation of the indices.

Fourth, the respective ranks (depending on the real value of a given variable) is multiplied by the importance coefficient of the variable (the weighted coefficients are as follows: "medium importance" w=1 and "high importance" w=2).

Fifth, the values are aggregated in synthetic indicators in several categories. The value of each index is computed as a sum of the weighted ranks of the respective variables included in a given category / sub-category. Each index summarizes the values of several variables and is presented in a statistically normalized form: from 0 to 10. Values closer to 0 indicate a "low level" of e-readiness in the respective category / sub-category, and those closer to 10 – a "high" state of e-readiness.

The Table 2.1. provides an example on the calculation of the sub-category "Access to PCs" in the E-society index, resulting to the value of 1.5.

The same procedure is used in calculating the values of synthetic indices in each category and sub-category. The aggregate E-readiness index is computed as an average value of the indices for different categories.

[4]The scales were created with the following approach in mind: the most developed countries were studied and their approximate level was taken as the highest possible; then, the interval was split into five thus giving a linear scale. Most commonly two types of scales are used: one with top level of 100 percent (for long-time available service such as PSTN) and one with top level of 40 percent (for newer services such as mobile phones). In some occasions custom scales were used, mainly for high-tech issues.

TABLE 2.2. COMPUTATION PROCEDURES FOR ASSESSMENT OF "ACCESS TO PCS" – SUB-CATEGORY IN "E-SOCIETY" INDEX

Number of Variable	Rank	Weight	Rank multiplied by Weight (B*C)	Result : SD/ SC
A	***B***	***C***	***D***	***E***
1	3	2	6	
2	1	2	2	
3	1	1	1	
4	1	2	2	
5	1	1	1	
		S = **8**	S = **12**	***I = 1.5***

Sources of Information

The following sources of data and information have been used in performing Bulgaria's e-readiness assessment:

Institutional sources:

- National Statistical Institute
- Ministry of Transport and Communication
- Ministry of Economy
- Ministry of Education
- Internet Service Providers (ISPs)

Documents:

- Annual Report of Bulgarian Telecommunications Company (BTC)
- Annual Report of Mobikom (mobile telephone operator)
- Annual Report of Mobiltel (national GSM operator)
- Quantitative surveys of research agencies – Vitosha Research, BBSS, Alfa Research, Gfk, etc.
- IDG Bulgaria
- Bulgarian Association of Information Technologies (BAIT)
- European Survey of Information Society
- IT analytical reports of Bulgarian and international organizations
- Expert assessments of members of project task force group
- Quantitative and qualitative surveys of Vitosha Research agency