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e-Services in Moldova: State of the Art

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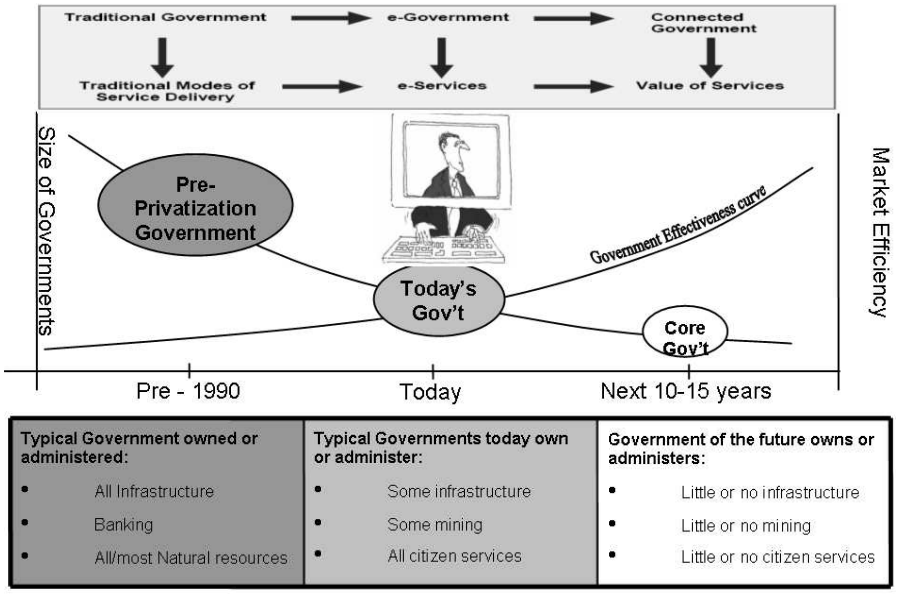
Abstract

The article provides an overview of the first steps in public e-services development in Moldova and a view of Moldova position from international perspective. The article identifies the constraints, weakness and strengths for e-services and ICT development in Moldova.

1 Introduction

In the modern era knowledge is recognized as an essential driver of development and information is seen as a valuable resource as much as other natural resources - metals, oil and others. Now information has become a critical resource that assists in ensuring the accountability of government, enables governments to manage their operations, and allows the public to participate in the governance of their country. As the result, the role and the size of the governments is changing. As it is mentioned in The *United Nations e-Government Survey 2008 "From e-Government to Connected Governance"* [1], if in the early 1990s governments had a full ownership of all infrastructure, banking and natural resources, now they become e-Governments, owning only a part of the infrastructure, some mining and all citizens services offered over the Internet. The traditional government models with traditional service today are replaced by *e-Governments* with e-government services. The government sizes are diminishing drastically. Future governments in the forthcoming 10-15 years are expected to own a bit of infrastructure, a little mining and few services for citizens and e-Governments will be transformed in *Connected Governments* with high value of services for citizens, increasing the effectiveness to the maximum possible



Sources: compiled from Andi Dervishi presentation by IFC. June 25, 2008. Some functions of today's Government, UN eGov Report 2008

Figure 1. The changing role of Governments

extent [2] (see Figure 1).

The connected government should keep and respect a key principle, namely, that: *the end-goal of all e-government and connected governance efforts must remain better public service* delivery. Improvements in the quality of governance and the responsiveness and effectiveness of government should still serve to empower the citizen. In that sense, citizens must be given the chance to play a role in influencing these e-government solutions [1].

An effective connected government is about a 'bigger and better' front-end with a 'smaller and smarter' back-end [3].

The National Strategy "e-Moldova" provides: "The Government of Moldova *will take* a leading role in developing appropriate conditions that favour emergence of a national information society fully integrated

into European Information Society." [4]

One of the important activities in this respect is the emerging project "Building e-Governance in Moldova" - a logical continuation of the UNDP-Government of Moldova project that started in 2003 and assisted national authorities to develop E-Moldova Strategy and Action Plan. The main objective of the project is to assist the Government to improve its new role in enhancing public service delivery, while improving the efficiency and productivity of government processes and systems, to develop and promote on-line electronic public services, to increase the level of ICT knowledge among public servants and to promote democratic values through application of ICTs.[5] The project developed e-Governance Concept, approved in 2006, e-Governance Portal Concept approved in 2007, and other important documents, establishing the key elements for building e-Governance. Figure 2 is explaining the interaction of different actors within e-Governance environment.

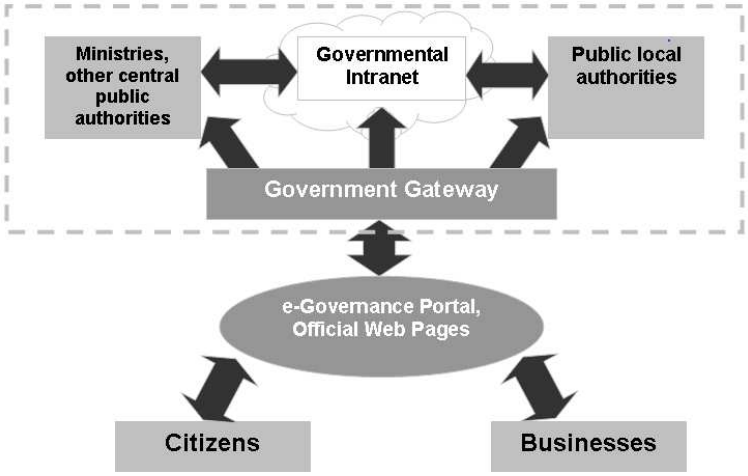


Figure 2. The interaction between different stakeholders
Source: E-Governance Concept.

E-Governance Concept [6] is not about making wrong processes more efficient through usage of technology, it is more about providing the solutions for abandoning inappropriate processes and rules being an important pillar for Public Administration Reform.
E-Governance concept enables government to deal with more challenging tasks in increasingly complex environments with less direct governing power and control.

2 E- Services in Moldova – view from inside

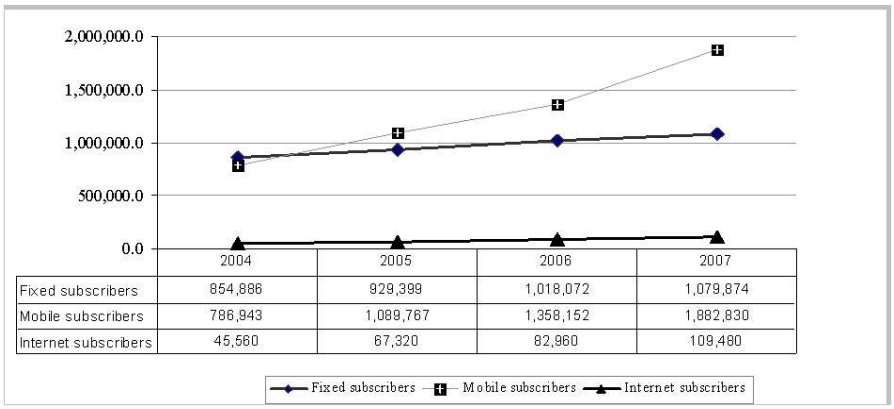
The e-Governance Concept provides recommendations for development of necessary elements for offering of 20 basic electronic services as they are defined by the e-Europe (12 for citizens and 8 for business). Based on approved e-Governance Concept some practical steps are being taken by the Government of Moldova supported by UNDP for their implementation.
Accessibility of services depends primarily on the level of public institutions preparedness to provide these services. It is widely recognised, that improving service delivery is not only about ICT, but mainly about cultural change, re-organisation, cooperation and interoperability between government bodies.

In the process of creating services there are some fundamental technical requirements for provision of services electronically. These conditions are related to the infrastructure of telecommunications, information resources, standards for interoperability, technology, security and data protection, the electronic identity of the person and company. For full functionality of e-services the digital signature mechanism also is necessary. The situation in Moldova with these components is shown in the Table 1.

The telecommunication infrastructure is a basic condition for access of citizen to e-services. In the last 4 years the access infrastructure growth was fast achieving the level of penetration (2007) in fixed telecommunications 32%, mobile telecommunications -61%, and Internet users 23.4%. The mobile telecommunications growth was faster than fixed telecommunications (Figure 3).

Table 1. The conditions for e-services

Necessary conditions	**Situation**	**Suggestions**
Telecommunication infrastructure	Fixed 32%, Mobile-61%, Internet 23,4%, Broadband-2.2%, Government Intranet	Needs improvement
Main information resources	4 main state information registers: *-population register* *-companies register* *-transport means register* *-drivers register*	Develop e-services based on existing resources
Interoperability standards	In progress of establishment	
Local content for services	Lack of local content	Needs
Technology	available	Further implementation
Security of data, confidentiality	Government Intranet	Expansion in rural areas
Privacy (personal data protection),	Law on Data protection, Data protection body not established yet Law on cyber crime drafted	To establish a Data Protection agency (provision of the law)
AND		
Electronic identity	Electronic identity- *implemented only in banking system.* It is expected soon the new identity card to be implemented	Implement the identity card with embedded digital signature
Interoperable electronic registration of companies	Interoperable electronic registration of companies- *partially implemented with limited access*	Implement full operable service
Interoperable digital signature	Interoperable digital signature- *incipient phase of implementation The access to wide use of digital signature is limited by: a) procedures, b) cost*	Expand PKI certification infrastructure Find cheaper and easier solution for citizens



	2004	2005	2006	2007
Fixed subscribers	854,886	929,399	1,018,072	1,079,874
Mobile subscribers	786,943	1,089,767	1,358,152	1,882,830
Internet subscribers	45,560	67,320	82,960	109,480

Figure 3. Dynamics of access infrastructure development
Source: ANRCETI

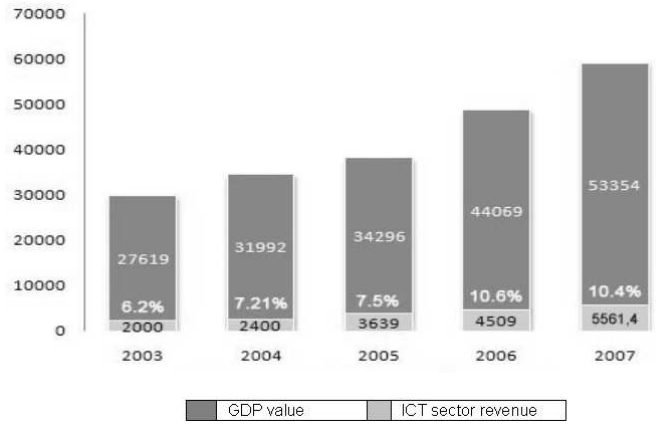


Figure 4. ICT sector value revenue share dynamics in GDP
Source: National Bureau of Statistics, Ministry of Information Development http://www.mdi.gov.md/stat105_md/

Due to the accelerated access infrastructure development, the ICT sector revenue was growing faster than GDP (Figure 4).

Moldova is taking the first steps in creation of e-services back office infrastructure. The following e-systems are in progress of implementation:

- E-Registration of companies (the personal signature and payment for service is necessary to pick up documents),
- E-Tax declarations system (is being implemented for businesses),
- E-statistics (The Concept of IT system is developed and being approved). UNDP is assisting in development of Statistics e-Reporting system,
- E-voting (The Concept approved by the Parliament, Register of Voters in the process of implementation),
- E-Procurement (incipient phase).

Based on e-Tax Declarations system development and implementation the following main Issues were met:

- The biggest problem – there are too many *"For the first time"*. For the first time for the country were developed, tested and implemented:
  - E-tax Declarations- first country-wide system of interaction of Government and society with the use of digital signature and user connection procedures,
  - *A* "time stamp" mechanism,
  - The dispute resolution procedure,
- Lack of experience in the society and in public authorities in use of digital signature
- Lack of public awareness in use of electronic services.

E-Services Offer-Demand Gap

A survey on e-services needs, undertaken in 2006 by e-Governance Project [8] to understand what citizens and companies of Moldova are expecting to have, showed, that the majority of the population is requiring services, related to health and to personal documents (Figure 5) and a substantial gap exists between the offer and the demand. For example, none of medical institutions were offering the on-line services. Only job search services are offered on-line by labour offices (as well as by private advertising companies).

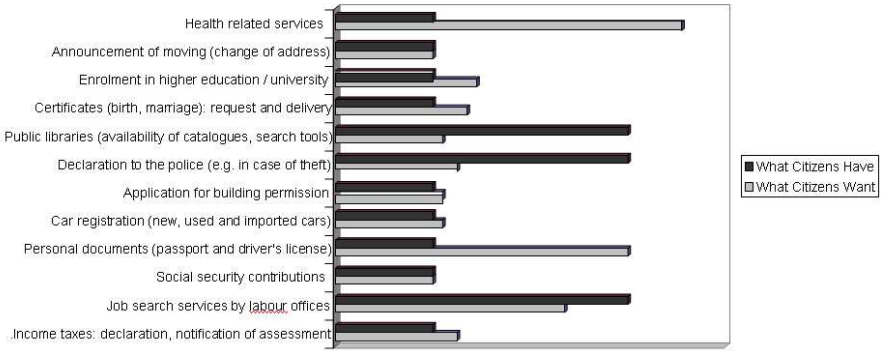


Figure 5. The e-services demand perception by citizen and the reality *Source: Report "Population priorities needs assessment in public services " Business Intelligent Service, for UNDP Moldova Project "Building e-Governance in Moldova", Chisinau, 2007, Author's estimation*

Almost the same is the situation with e-services for companies. Companies need the on-line services related to tax returns, public procurement, social contribution for employees and submission of data to Statistical offices. Currently only the e-Tax Declarations system has started offering online services (Figure 6) for companies.

Based on above mentioned data, Moldova should be positioned in e-services implementation at low level, having only one service fully on-line (Figure 7).

Conclusions:

- Moldova is mainly at the 2nd stage of e-Government services

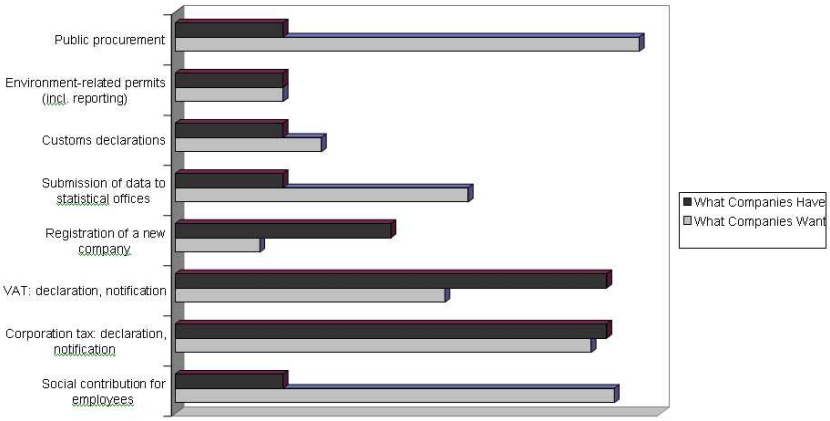


Figure 6. The e-services demand perception by companies and the reality

Source: Report "Population priorities needs assessment in public services " Business Intelligent Service, for UNDP Moldova Project "Building e-Governance in Moldova", Chisinau, 2007

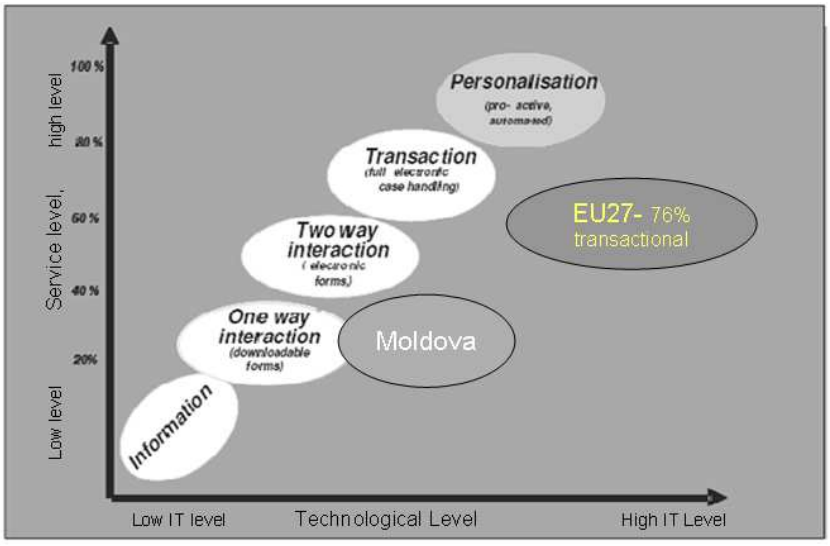


Figure 7. The level of e-services in Moldova and in EU27

Sources: Adapted from: 2007 European Commission Directorate General for Information Society and Media The User Challenge, Benchmarking the supply of online public services, 2007, author estimation.

implementation.

- Actions have to be taken to accelerate e-Services implementation.
- The implementation has to be prioritized according citizen and business expectations.

While substantial efforts are taken by the Government with donors assistance and the positive trends in development, there are at least three issues standing on the way of speeding up the implementation of electronic public services, namely: (a) the pace and the manner of implementing the Law on electronic documents and digital signature, (b) the weakness of IT departments within the ministries and other public authorities, caused by the level of wages of IT professionals, (c) lack of initiative and political will of public authorities to implement ICT in daily work. Probably, the last issue and strategic planning represent the most vulnerable weak point of the public institutions in general.

While the law on electronic document and digital signature was implemented technologically entirely, in terms of creating the necessary infrastructure for PKI protected transactions, the situation remains still unsatisfactory. Digital signature is used mainly for public servants (at quite limited extent) because of complicated procedures and the high cost. This may become an obstacle for the citizen in accessing the public electronic services. Strong political will is necessary to find a relevant solution to this problem, giving citizens the opportunity to benefit from on-line public services, using digital signature.

Practice of other countries shows that government electronic services offered to citizens should not require additional costs for accessing these services; in other words, citizens should not be forced to pay for digital signatures.

Some government institutions are technologically able to offer public services online, but the chain of procedures can not be finished without the physical presence of citizens because of digital signature and on-line payment procedure weakness.

For example, the registration of Companies through Internet (one of the 12 basic services for citizens), might be available 2 years ago

from the State Registration Chamber, but unfortunately, to complete the process, the presentation of the applicants to the desk is required for signing documents and for presentation of payment voucher.

The e-Tax Declaration system, which is being implementing started to be used only by companies. The high cost of digital signature (100 USD when average wage is 250 USD) and the procedure of its obtaining make unattractive (or impracticable) the use by citizen of on-line tax declaration services.

However, despite of barriers and constrains, one could conclude that the development of e-Services and ICT in Moldova is fast and the situation is encouraging, if do not take into consideration the position of Moldova in Figure 6. Moldova position in e-services stage suggests, that the situation should be evaluated in comparison with other countries, analysing how Moldova is seen in international context.

3 E-Services and ICT development in Moldova: view from outside. International context.

E-services and ICT development level is an indicator of the overall development of the country, depending on many factors. A range of international reports on ICT and/or knowledge based economy development were recently published, ranking the countries by different indicators internationally agreed. It is important to see the position of the country among others in this respect and to compare the development dynamics; to analyse the gaps in specific indicators for better understanding what kind of actions have to be taken to diminish the existing gap.

We will refer to the following indicators:

- The Networked Readiness Index
- The Knowledge Economy Index
- The Digital Opportunities Index
- The ICT Opportunities Index

- The Prosperity Index.

The Networked Readiness Index (NRI)
Moldova rank is 96 of 127 countries [10].
The NRI assesses:

- the presence of an ICT-friendly and conducive environment;
- the level of ICT readiness and preparation to use; and
- the actual use of ICT.

The NRI (Figure 8) is measured based on a mixture of hard data collected by International Telecommunication Union (ITU), the World Bank, and the United Nations, and survey data from the Executive Opinion Survey, conducted annually by the World Economic Forum in each of the economies included in The Global Information Technology Reports [10].

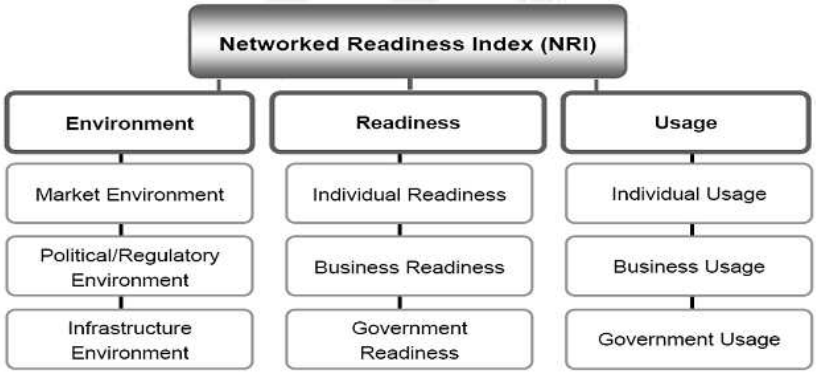


Figure 8. NRI Composition.
Source: Irene Miam. Senior Economist Global Competitiveness Network, World Economic Forum "Insights from the Global Information Technology Report 2005-2006"

The recently published Global Information Technology Report 2007-2008 is analysing 127 economies NRI. The level of NRI for

Moldova (3.21) is lower than the world average (3.96). Moreover, the growth of the NRI in 2006-2007 for Moldova by 0.08 is lower then world average (0.09) and is almost three times lower then NRI growth for Georgia -0.22 (Figure 9).

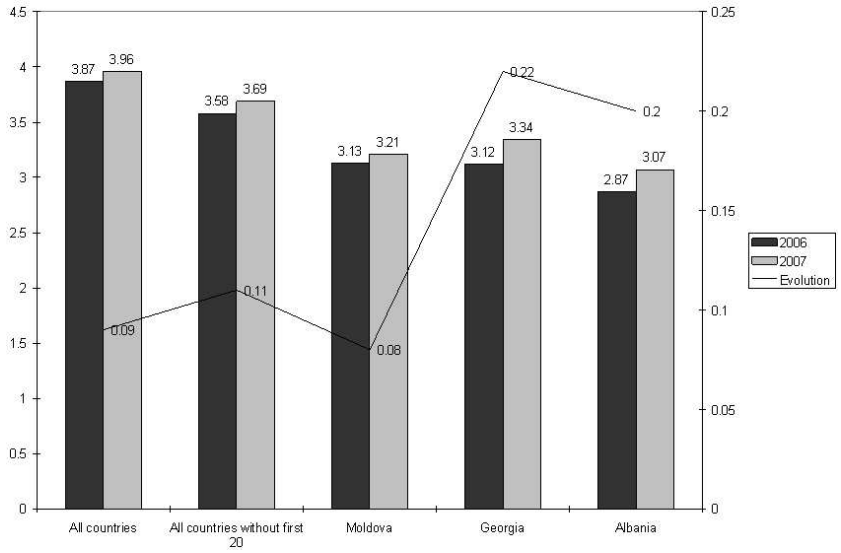


Figure 9. NRI dynamics 2006-2007.
Source: adapted from [10]

The government is the most important contributor to Moldova's overall well being and ICT promotion in particular. Looking at the value of and rank by components of NRI for Moldova one could ask, while government recognizes that ICT is an important factor for development it performs very poorly procuring first of all equipment without having information systems and does not invest enough in human capital to use it. It does not procure advanced technology (Table 2). Also, while the effectiveness of Law making bodies is satisfactory, implementation and judicial independence needs serious affirmative actions. The last period actions (Guillotine Law) cut the excessive regulations and special tax facilities for IT companies were introduced.

Conclusion: Keeping the existing conditions and pace of NRI dy-

Table 2. The strengths and weaknesses of Moldova based on NRI components

Strengths (Economy's 10 best ranks)		**Weaknesses (Economy's 10 worst ranks)**	
Variable Name	**Rank**	**Variable Name**	**Rank**
Number of procedures to enforce a contract	26	State of cluster development	126
Time to enforce a contract	26	Availability of latest technologies	125
Presence of ICT in government offices	47	Gov't procurement of advanced tech products	121
Time required to start a business	48	Prevalence of foreign technology licensing	120
Number of telephone lines	53	Extent of business Internet use	119
Tertiary enrollment	56	Cost of mobile telephone call	119
Number of procedures required to start a business	58	Freedom of the press	118
Total tax rate	59	Residential telephone connection charge	117
Quality of math and science education	59	Local supplier quantity	116
Education expenditure	60	Local supplier quality	116

Source: The Global Information Technology Report 2007-2008 © 2008 World Economic Forum

namics of the country could worse the situation and increases the gap with developed countries.

The Knowledge Economy Index (KEI)

Moldova rank is 74 of 140 countries [12]

The Knowledge Economy Index is calculated based on Knowledge Assessment Methodology (KAM) [10] with the unique strength of cross-sectoral approach, allowing the user to take a holistic view of a wide range of relevant factors rather than just focusing on one area. The variables serve as proxies for the 4 ***pillars of the Knowledge Econ-***

omy framework [12]:

- *An economic and institutional regime to provide incentives for the efficient use of existing and new knowledge and the flourishing of entrepreneurship (EIR);*

- *An educated and skilled population to create, share, and use knowledge well;*

- *An efficient innovation system of firms, research centers, universities, consultants and other organizations to tap into the growing stock of global knowledge, assimilate and adapt it to local needs, and create new technology;*

- *Information and communication technology to facilitate the effective creation, dissemination, and processing of information (ICT).*

Since 1995 to 2008, Moldova has improved its KEI ranking by 15 positions to 74. Moldova's EIR pillar increased by 23 positions to rank at 76 in 2008 due to significant reduction in trade barriers and strengthening in regulatory quality. Similarly, ICT also made significant improvements in computer and Internet penetration leading the pillar to jump by 15 positions to rank 81. However, in adult literacy rate, secondary and tertiary education enrolment rates decrease led to the education pillar decreasing 9 positions to be ranked at 52.

The position of Moldova (4.59) seems better than of Albania only (3.62) in this group of the countries and its KEI is lower than of the world average (6) and of the European and Central Asia group average (6.35). The dynamic of the Moldova KEI is positive (0.07), but is much lower than of European and Central Asia group (0.3) and of Czech Republic (0.37) for example (Figure 10).

Conclusion: The existing gap in KEI level between Moldova and developed countries is increasing!

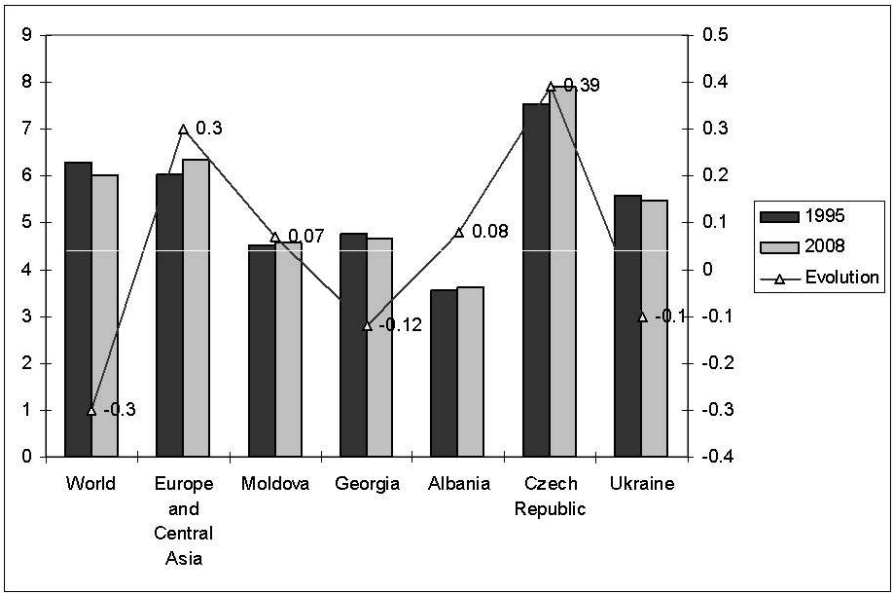


Figure 10. Knowledge Economy Index Dynamics 1995-2008.
Source: based on information from
http://info.worldbank.org/etools/kam2/KAM_page5.asp

The e-Government Readiness Index

Rank 93 of 191 countries [1]

The e-government readiness index is a composite index comprising the web measure index, the telecommunication infrastructure index and the human capital index.

The 5 stages of e-government readiness are identified:

Stage I - Emerging

Stage II – Enhance

Stage III – Interactive

Stage IV - Transactional

Stage V – Connected

The Web Measure Index

The web measure were based on a questionnaire, which allocated a

binary value to the indicator based on the presence/absence of specific electronic facilities/services available.

Telecommunication Infrastructure Index

The telecommunication infrastructure index 2008 is a composite index of five primary indices::

1. Internet Users /100 persons

2. PCs /100 persons

3. Main Telephones Lines /100 persons

4. Cellular telephones /100 persons

5. Broad banding /100 persons

Each index represents 20 per cent of the overall telecommunication infrastructure index. Source of data: International Telecommunication Union (ITU).

Human Capital Index

The human capital index is a composite of the adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratio, with two thirds weight given to the adult literacy rate and one third to the gross enrolment ratio. Sources of data: United Nations. Educational, Scientific and Cultural Organization (UNESCO), UNDP Human Development Report.

The 2008 Survey [1] represents an improvement from positions of 2005 on the e-government, when Moldova was the 37^{th} of 42 European countries and the 109^{th} – of 179 countries, and in 2008 gained 16 positions. While this shows some progress, Moldova having the higher growth of e-Government Index (0.1051) than the world average (0.0247) and the region one (0.0133), it remains on the last position in the region with the lowest e-Government Readiness level (0.451) among the countries of the Eastern Europe Region (Czech Republic, Hungary, Poland, Slovakia, Ukraine, Bulgaria, Romania, Belarus, and Russian Federation)-0.5689 (see Figure 11).

Conclusion: the pace of e-Governance development should be accelerated or at least kept at the same level for lowering the gap with developed countries in ensuring that its citizens are connected and have easy access to online government services.

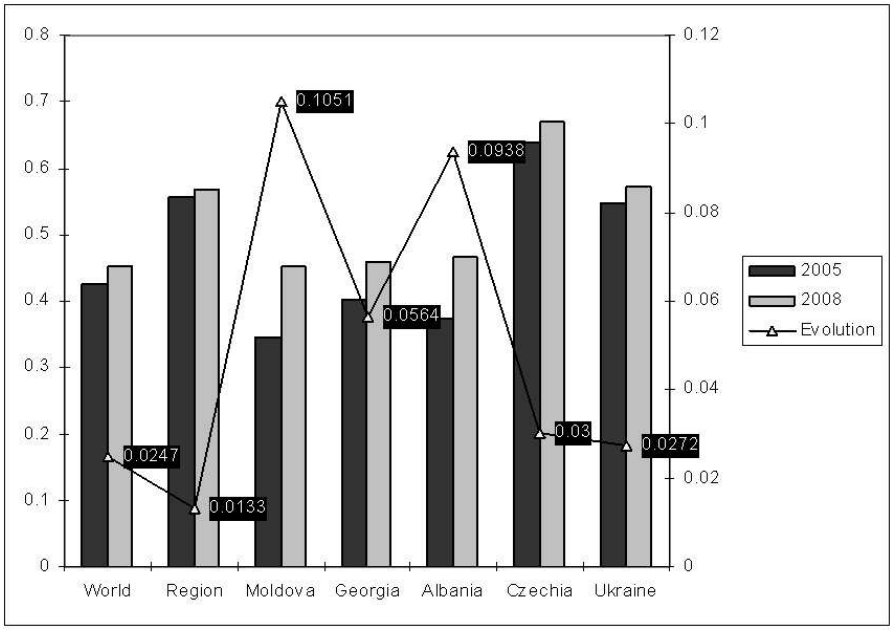


Figure 11. E-Government Readiness Dynamics 2005-2008
Source: based on United Nations e-Government Survey 2008 From e-Government to Connected Governance data

The Digital Opportunities Index (DOI)

Rank 111 of 181 countries [13]

The Digital Opportunity Index (DOI) is a composite index that *measures access to telecommunications and digital opportunity in 181 economies worldwide and considers the policy implications for the further evolution of the Information Society, and is one of the two indices endorsed in the WSIS Tunis Agenda.*

The Digital Opportunity Index is based on 11 ICT indicators, grouped in 3 clusters: opportunity, infrastructure and utilization (Figure 12).

According to the [13] Moldova DOI (0.35) was lower than the average DOI score worldwide in 2005/2006 (0.40), up from 0.37 a year

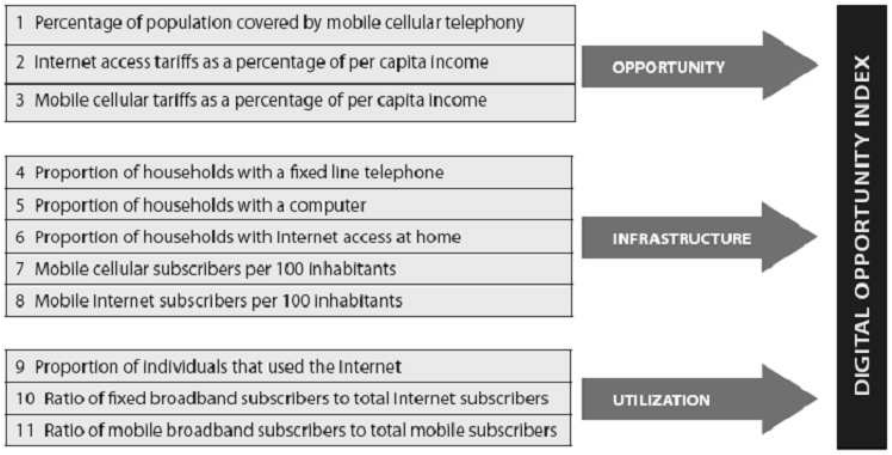


Figure 12. Composition of Digital Opportunities Index
Source: World Information Society Report 2007: Beyond WSIS, 2nd Edition, 2007 www.itu.int/wisr

earlier (an increase by 0.03). (Figure 13). This indicator is ranking Moldova among lower middle income countries (average DOI -0.38).

Conclusion: As soon as the speed of DOI growth of Moldova is the same as of the World and of Europe, the disparity with European Union countries will be preserved and Moldova will remain at the lowest level in Europe if additional actions will not be taken.

The ICT Opportunities Index (ICT-OI)

Rank 83 of 183 countries [13]

ICT Opportunity Index measures access to and usage of ICT by individuals and households in its inclusive sense interpreting the notion of ICT access and usage within the context of a global Information Society, thus recognizing ICT opportunities as an important part of social development [13]. See below Figures 14,15.

Moldova ICT-OI evolved from 59.59 in 2001 to 102.19 in 2005, by 42.6, achieving the reference country level of 2001 (Figure 16). In spite of the fact that Moldova had higher pace of development than other

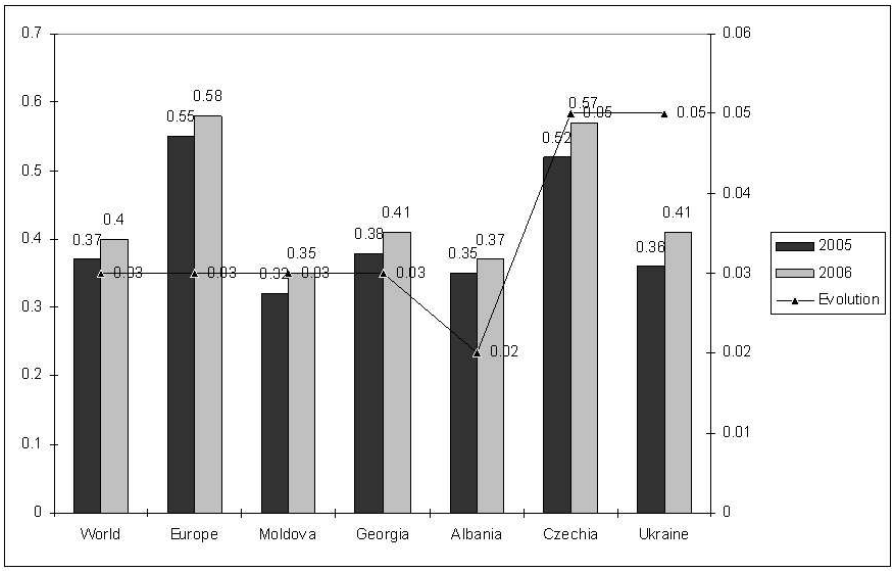


Figure 13. Digital Opportunities Index Dynamics
Source: World Information Society Report 2007

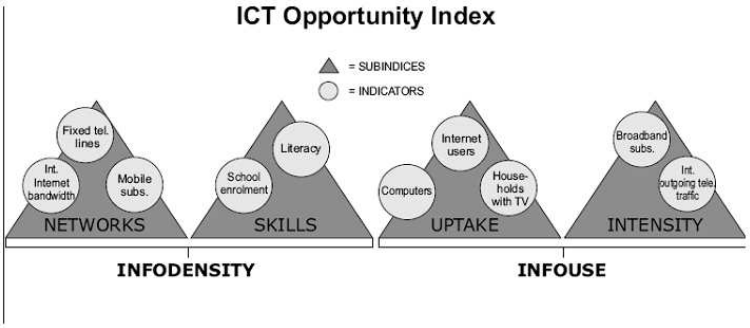


Figure 14. ICT Opportunities Index composition
Source: World Information Society Report 2007: Beyond WSIS, 2nd Edition, 2007 www.itu.int/wisr

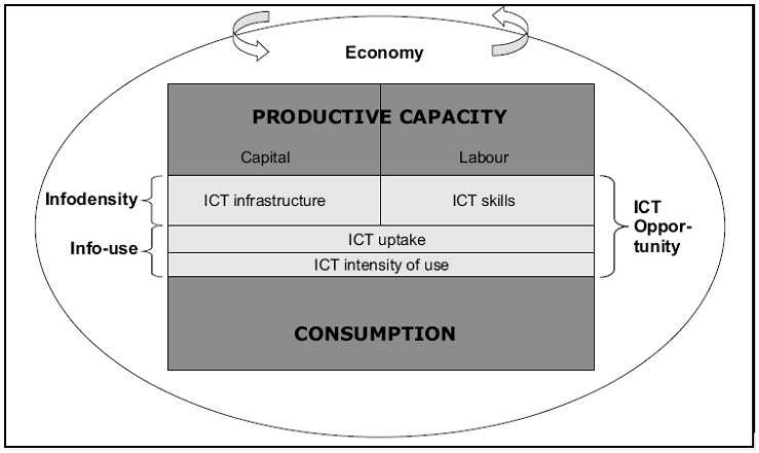


Figure 15. Conceptual ICT –OI framework
Source: World Information Society Report 2007: Beyond WSIS, 2nd Edition, 2007 www.itu.int/wisr

countries from the region as Georgia, Albania, and Ukraine, the average world growth of ICT-OI (the reference country ICT-OI 2005= 147.56) in 2001-2005 was higher than of Moldova.

For comparison, the EU countries, for example, Czech Republic ICT-OI growth (67.53) was substantially higher than of the Republic of Moldova (42.6).

Let us see were Moldova is lagging the most in the ICT-OI components. The networks, intensity , uptake and infouse indexes are the most lagging in comparison with the first ranked country- Sweden and the greatest gap with the reference country is in intensity index (Figure 17)

As mentioned above, the advanced infrastructure is a mandatory condition for the development of public e-services. Therefore, the stage of e-services implementation depends primarily on the ICT level of development, as well as on overall economic development, taking into consideration the high cost of necessary back office infrastructure.

As could be observed from Figure 18, the main ICT indicators of

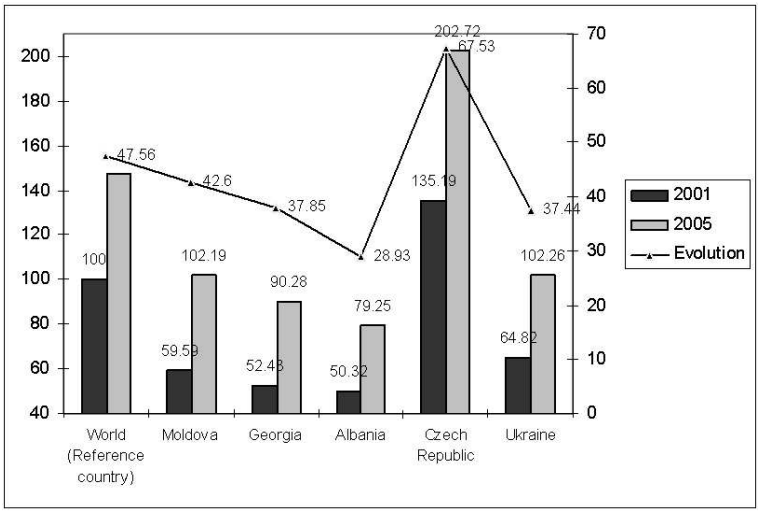


Figure 16. ICT-Opportunities Index Dynamics 2001-2005
Sources: The Global Information Technology Report 2007-2008, ITU & UNCTAD World Information Society Report 2007

Moldova even in 2007 are far behind the UE average level, excepting the ICT share in GDP.

Conclusion: Keeping the existing level of ICT-OI for Moldova the gap with developed countries will increase.

Annual sector revenues have reached close to 10 percent of GDP in 2007 and have averaged over 7 per cent over the past years. This is notably higher than other countries in the region, and significantly higher than the international average of about 3 to 4 per cent of GDP (5.3% in EU). According to [17] *"the overweight contribution of the sector to the economy might indicate either a weakness or an opportunity. The sector might be larger relative to the economy because the country is in transition and the official statistics might not reflect every economic activity. Alternatively, this could indicate that Moldavians are seeing the value of, and are using telecommunications services. The rapid expansion of the telecommunications sector relative to the national economy*

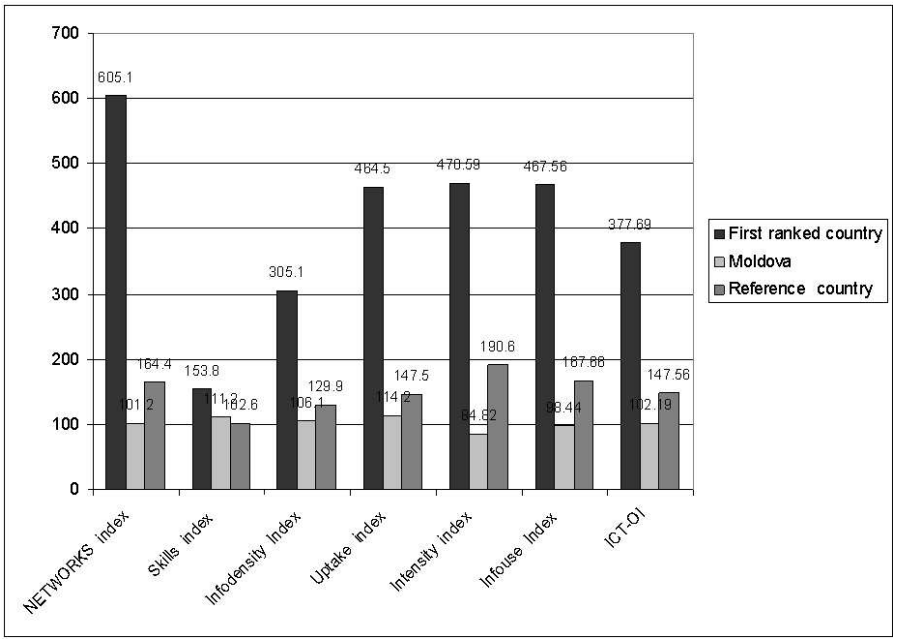


Figure 17. ICT-Opportunities Index components
Source: based on data from The Global Information Technology Report 2007-2008, ITU & UNCTAD World Information Society Report 2007

also supports such an interpretation".

The reality is somewere in the middle of such interpretation. It is rather a weakness of the country overall economic situation with $1299 per capita (2007)[1] and $1,218,230 (1/3 of GDP) of remittances [18,19] than an opportunity. According [24] Moldova is ranked 176 of 229 countries with $2300 per capita (PPP) in 2007.

It is important to understand why Moldova is ranked so low in these reports. As mentioned above, e-governance- a basement for e-services- is rather a matter of cultural change, re-organisation, cooperation and interoperability between government bodies than a matter

[1] 2300 (PPP) according https://www.cia.gov/library/publications/the-world-factbook/rankorder/2004rank.html

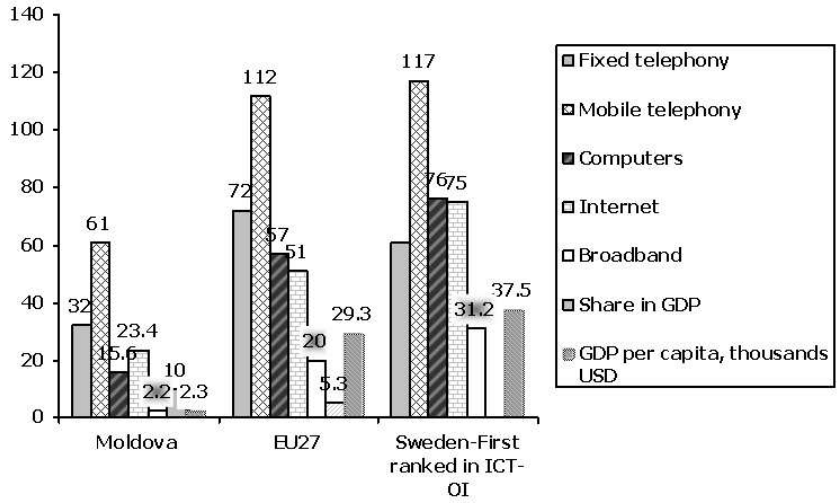


Figure 18. Main ICT indicators Moldova- EU average, Sweden, 2007
Sources: The Global Information Technology Report 2007-2008, ITU & UNCTAD World Information Society Report 2007,UN Global E-Government Survey 2008, ANRCETI Moldova, Eurobarometer nr.293, CIVIS 2007 Business & Houshold Survey for eGovernance Project, http://en.wikipedia.org/wiki/Economy_of_the_European_Union

of technology only. However as figure 15 shows there is a strong correlation between ICT indicators and GDP per capita value, especially for broadband.

While the electronic services for the citizens are seen for the one hand as a factor of good governance and for the other hand as a commodity, satisfaction of people, wellbeing and prosperity, let us see a newly indicator, analysed in another recent research -*The 2008 Legatum Prosperity Index results "An Inquiry into Global Wealth and Well-being"* [22].

The Prosperity Index (PI)
Rank 83 of 104 countries [20]

Again, the rank of Moldova is quite low. PI is the result of an

investigation into the various factors that drive prosperity in different countries [21]. Recent research advances have made it possible to compare not only the material wealth but also the life satisfaction of people in countries worldwide. Accordingly, the PI defined national prosperity as the well-rounded combination of both of these factors. The 2008 Prosperity Index combines more than 70 variables into 20 key indicators in order to rank countries, based on the degree to which the actions of their people and governments drive or restrain the creation of well-rounded prosperity.

The Prosperity Index:

Takes a holistic view of prosperity, encompassing both material wealth and life satisfaction.

Assesses the drivers and causes of prosperity, rather than measuring outcomes.

Includes factors that relate to government policy and to individual citizens.

The PI clearly indicates that both individuals and governments have a role to play. The 2008 Prosperity Index includes both factors driven by individual choice and factors driven by the choices of policymakers.

The results of the 2008 Prosperity Index research highlight a number of general principles relevant to the promotion of national prosperity.

- Freedom of choice is crucial.
- Holistic prosperity cannot be created or maintained without effective and accountable governance.
- For poorer countries, raising incomes is a top priority.
- For richer countries, wellbeing means more than just money. Entrepreneurship is a path to material wealth.
- Growth in invested capital is crucial to long-term economic growth.

- Economic openness can help poorer countries catch up faster.
- Climate and the environment impact happiness.
- Charitable giving is associated with wellbeing.
- Geography is no longer destiny.
- Governments and citizens each have a role in building the prosperity of nations.

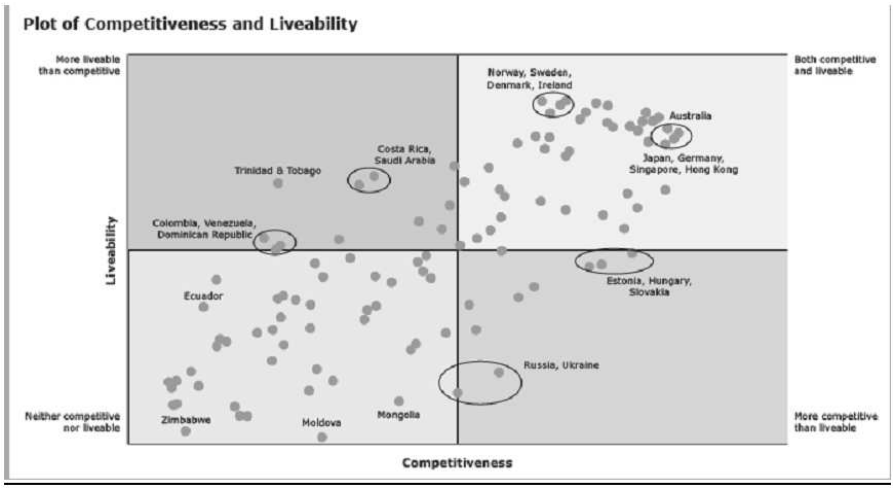


Figure 19. How Moldova is seen: Neither Competitive Nor liveable
Source: The 2008 Legatum Prosperity Index results "An Inquiry into Global Wealth and Wellbeing"

According to the [22] Moldova's Comparative Liveability indicators are as poor as its Economic Competitiveness indicators, including a low average income. Despite the existence of low unemployment (4.7%), citizens do not enjoy income levels that match their aspirations. This results in an outward migration rate of 34%, the highest in the region. Therefore Moldova is placed in the lower left quadrant of Figure 19

along with other countries which have a low rank owing especially poor liveability and poor competitiveness scores (like Zimbabwe).

The low rank of Moldova in this research demonstrates that neither government nor people make enough efforts in accelerating the development.

Below one could see that in competitiveness indicator all components (excepting secondary education) are below the world average. The most essential deviation is observed in Government Effectiveness (Figure 20).

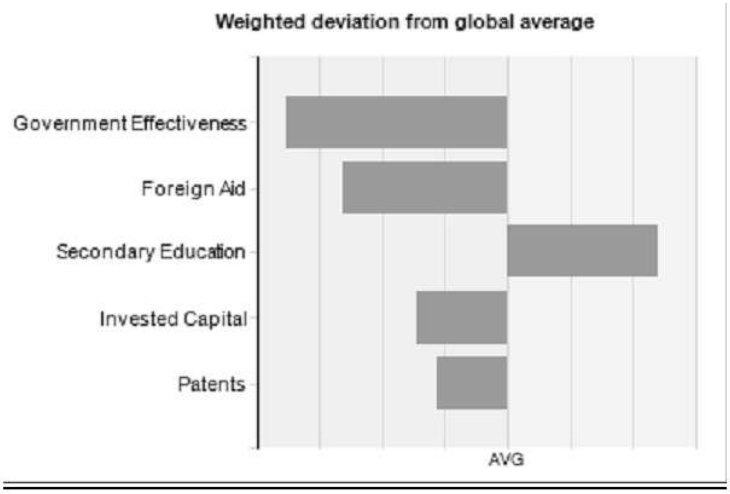


Figure 20. Moldova economic competitiveness indicators deviation from world average
Source: http://www.prosperity.com/country.aspx?id=MD

As Figure 21 shows, all the components of liveability are lower than world average. The major deviation is in the income per person.

4 Conclusions and recommendations

Moldova is ranked in all cited reports almost lower than the world average, excepting *e-government readiness index*. Moreover, the speed

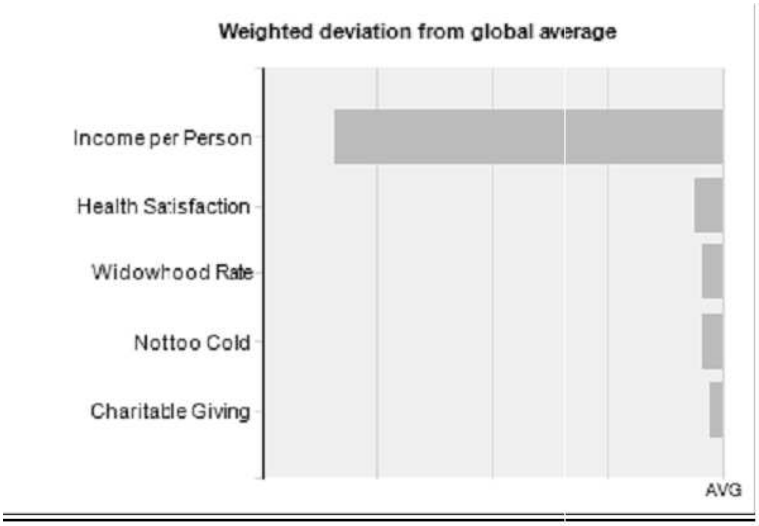


Figure 21. Moldova comparative liveability deviation from world average
Source: *http://www.prosperity.com/country.aspx?id=MD*

of development is lower than of many countries from the region, which should especially aware the responsible government bodies.

The weakest positions according to the Reports Moldova holds in:

- Income per person (very low)
- State of cluster development
- Availability of latest technologies
- Government's procurement of advanced technologies products
- Prevalence of foreign technology licensing
- Extent of business Internet use
- Cost of mobile telephone call

- Freedom of the press
- Residential telephone connection charge
- Local supplier quantity
- Insufficient competitiveness.

The following constraints for ICT and e-services development were identified by sector representatives within roundtables held by "e-Governance Project":

- The Centre for Electronic Governance is not yet created
- Private public keys Certification centres are not yet established
- Digital signature procedures applications are complicated and costly
- Lack of financial resources
- Lack of motivation of IT specialists to work in public institutions (low wages)
- Not yet mechanism for interoperability in place.
- Lack of law enforcement
- Lack of independence of Justice
- Lack of fair competition in fixed telecommunications market
- Protectionism from the government over incumbent operator
- Lack of access to the local loop and associated facilities for alternative operators
- Lack of funding and the high costs of investment in the creation and development of optical infrastructure FTTx / GPON that limits the broadband penetration

- High wages in developed countries create conditions for the exodus of qualified personnel
- Offer-Demand gap in ICT specialists' education
- Insufficient use by the Government outsourcing and expertise of local private IT companies
- Inconsistencies in the reforms and declared hostile business climate (according to the study "Doing business in Moldova" 2008 Moldova is ranked 92 of 172 economies);
- Insufficient use of OS/OSS limits local companies' development, and, creates the risk that the public authorities could lose access to their documents and archives.

The responsible bodies shall use the main strengths of the country for development mentioned in the Reports, such as:

- Acceptable number of procedures and time to enforce a contract
- Presence of ICT in government offices
- Number of procedures and time required to start a business
- Satisfactory number of telephone lines
- Tertiary enrolment, Education expenditure, quality of mathematic and science education
- Total tax rate

Use of existing strengths will create new opportunities to decrease the gap.

All the analysed in this paper World reports are showing that the level of ICT development in Moldova is below the world average. Moreover, the pace of development is lower than of majority of countries of the region. This low rate of development creates the risk of increasing the existing gap between Moldova and European Union countries. To

avoid such a scenario, Moldova needs not simply a fast development in the area of the Information Society but an accelerated development in the areas were new technologies will have the greatest impact to improve the situation in the next few years.
A Strategic Paper for ICT sector development 2009-2012 is being formulated by the Ministry of Information Development with UNDP assistance. All listed constrains have to be addressed in the paper and in the action plan to create relevant environment for the development.

However, creation of necessary conditions for the implementation of electronic services is a long term task for Moldova that needs political will, favourable legal and regulatory environment, changed paradigm of public servants, financial resources, trained personal and time. The high ranked countries in all the reports could serve as a best practice to be followed.

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