

A TECHNOLOGICAL APPROACH TO DEVELOPMENT

-human development in the global era

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“Characterized by “shrinking space, shrinking time and disappearing borders”, globalization has swung open the door to opportunities.”

ABSTRACT

- Methodology:** By using two indexes, this thesis aims to prove and define the relationship between human and technological development. The first index uses variables of human development (Life expectancy, literacy rate, GDP/capita and HDI, along with levels of democracy and corruption) and the second displays technological data (phone mainlines, cellular phone- and internet-usage). By applying the indexes on two separate regions, the Baltic states and Central Asia, I have aimed to answer the following questions:
- Questions:**
- Is human development a prerequisite for technological development or vice versa?*
 - Does the use of high technology contribute equally to the development of nations?*
 - Which effects are already seen and can accordingly be expected for the future?*
- Empirical Data:** A brief background on the selected regions is given, along with a discussion regarding emerging global dialectics, before the two indexes are displayed and compared.
- Analysis:** Analysing the data, I have reached the conclusion that human development and technological development are mutually reinforcing prerequisites, which is illustrated through a clear correlation between the human and technological data. However, it is concluded that this correlation does not guarantee an equal development in states where high technology is implemented and used, due to different preconditions. Lastly it is discussed whether we can expect technological development to cause leapfrogging or trickle-down development, or whether we are facing greater divergence. Considering available data does not offer any reliable answers, I conclude that results will vary across the globe, but as we are getting more aware of the causes, we are also given the knowledge to change the effects.

ABBREVIATIONS

EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
HDI	Human Development Index
ICT	Information and Communication Technologies
ITU	International Telecommunication Union
LDC	Least Developed Countries
NATO	North Atlantic Trade Organisation
NII	National Information Infrastructure
OECD	Organization of Economic Cooperation and Development
SPSS	Statistical Package for the Social Sciences
UNDP	United Nations Development Program
UNESCO	United Nations Education Science and Cultural Organization
USSR	Union of Soviet Socialist Republics
WB	World Bank
WTO	World Trade Organization

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1 INTRODUCTION

“Information and communication technologies can be potent instruments for accelerating broad-based growth and sustainable development and for reducing poverty. Vast regions of the world are increasingly lagging behind in connectivity and access to global information flows and knowledge and are thus marginalized from the emerging knowledge-based economy. ...the Economic and Social Council expressed profound concern that the huge potential of ICT for advancing development, in particular of the developing countries, has not yet been fully explored.”¹

Electronic commerce has been identified as the engine behind the growth of wealth and social development. It is forecasted to remain a powerful factor, and in order to end the digital divide which is limiting some nations economic development, the effects of high technology on economic and social activity needs to be investigated. To benefit from technology, we need to know the prerequisites, and how these or the lack thereof will affect states.² The impact of technology on global development is immense, and I therefore wish to spend this thesis testing a technology-based approach to development. The purpose is to illustrate the implementation of technology as a development approach with global results. Global markets, global technology, global ideas and global solidarity can enrich the lives of people everywhere. The challenge is to ensure that the benefits are shared equitably and that this increasing interdependence take people into account instead of profit. Breakthroughs in communication technologies make advances for all of humankind possible, but this new era of globalization is also increasing human insecurity with the spread of global crime, disease and financial volatility.³ Technological development may provide a solution to some of the problems, and it may generate others. Only by recognizing its impact and given prerequisites can we use its tools appropriately.

1.1 Question and hypothesis

The worldwide information revolution has only just begun, and its networks are spreading wider every day. However, they are heavily concentrated to only a few countries. The ITU (International Telecommunication Union) stresses that communication and communication infrastructures are preconditions for economic and social development.⁴ The human development report from 2004 agrees with this reasoning, stating the importance of “...internet because of its tremendous potential for human development. Compared with most traditional tools for development, information and communications technologies can reach many more people, go geographically deeper, work faster and at lower cost.”⁵

¹ The Millennium Declaration, p. 161

² Poók & Pence, 2001, p. 415 ff.

³ Human Development Report, 1999, <http://hdr.undp.org/reports/global/1999/en/>

⁴ Poók & Pence, 2001, p. 415

However, the same report also speaks of the need for knowledge to implement and operate these technological systems. Since knowledge is a result of a certain level of social development, ITUs statement contains a weak link. Technology may be able to generate social progress, but a certain level of social development is necessary in order to implement technology. Establishing the connection between social and technological development is therefore very useful, and I chose to work according to the premis that there is a direct causality between economic and social development and information infrastructures and by implication, technology as well.

The power and importance of communications technology are clear. But some questions remain:

- *Is human development a prerequisite for technological development or vice versa?*
- *Does the use of high technology contribute equally to the development of nations?*
- *Which effects are already seen and what can be expected for the future?*

In order to answer these questions I wish to investigate the correlation between human and technological development through a comparative study between the Baltic states and Central Asia. Although the term social development is frequently used in related literature, I find it too narrow and have chosen to work with the wider and more inclusive concept of human development, to be defined in upcoming chapter.

1.2 Purpose

As stated in the initial excerpt from the Millennium Declaration, the issue of technology is often neglected as it is viewed as an integrated part of economic development. By stating the correlation between human and technological development, however, the possibilities to take appropriate action for further development increase. Knowing whether human development reinforces technological development, or if technology can actually generate social progress, more accurate strategies may be developed, directing FDI and development aid to the right areas in order to eliminate exclusion from the global society, and thus to reduce the digital divide.

2 METHODOLOGY

“...fuzzy norms do not yield useful analysis.”⁶

The basic method of all science is *simplification*, due to the fact that the political reality is too complex to perceive directly, and simplification becomes essential for understanding. Using the appropriate methodology thus enables us to seek a level of generalization and to identify the dynamic element within the general explanation.⁷

My chosen topic spans over several disciplines as political science, sociology and economy are interrelated, permeating every aspect of social change.⁸ The purpose of conducting such as study is not simply to understand, but to create an opportunity to change social conditions and explain social irregularities.⁹ However, I do not intend to separate the disciplines by treating them as different schools, but to *integrate* the diverse perspectives in my theoretical framework. This allows them to function not as isolated phenomena, but as a foundation for wider understanding.

Rather than merely establishing associations and correlations, the ultimate goal is to *explain*. A methodological discussion should therefore refer to data collection, processing and analysis, but also indicate the “criteria for admissible explanation that exist independent of these instrumentations and routines”.¹⁰ Such scientific explanations derive from theoretical statements relating specific events to generalized patterns, in a cyclical, dynamic procedure.

The procedure is circular, because an applied theory generates new observations which may be the foundation of new hypothesis and yet another research cycle.¹¹ I believe that this model is well applied on scientific research in general, and thus also well illustrates the work I wish to undertake.

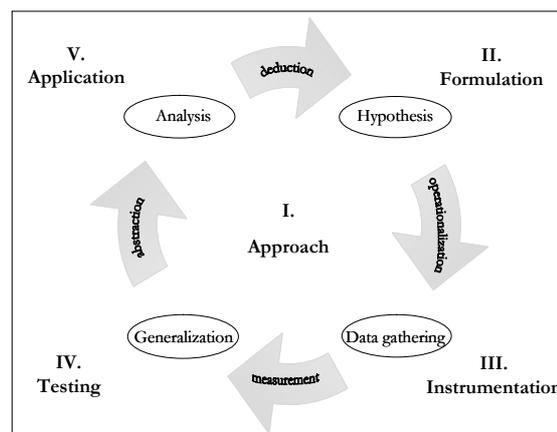


Figure 1 Model for the scientific research

⁶ Huntington 1991, s 9.

⁷ Garson, 1971, p. 4-5

⁸ Holme & Solvang, 1997, p. 29ff

⁹ Halvorsen, 1992, p. 15-16

¹⁰ Kegley, Gregory, Rood & Skinner, 1975, p. 40ff

¹¹ Ibid, p. 41

2.1 Scientific Approach

My work is based on *pre-studies*, where the topic and questions have been evolving throughout a year of studies in the field of sociology and globalization-studies. During this phase the problem was structured, along with the purpose of my thesis. This will be followed by *literature studies* on relevant background material, to gain an overall understanding of the area of research, and the theories related to it. These theories are to be connected to the *empirical study*, which is founded on extensive studies of material and reports from a wide range of public actors within the field of development along with statistics and trends. Based on the retrieved information, I will be able to draw certain conclusions regarding my questions. In this phase of my work, *problem solving* is made possible, establishing the cause and effect relation of the investigated data. This is also where theory, empirical data and analysis is combined and connected into a *conclusion*. My own thoughts on the results will be summarized and presented in a final paragraph of *reflections*.

Qualitative and quantitative approaches are often viewed as opposites, but as one does not exclude the other, studies may contain elements of both. I chose to work with a qualitative method, using primarily qualitative data, quantitatively explained and illustrated. This approach is well suited for researching specific phenomena, processes and characteristics.¹²

For the purpose of *validity*, selection is essential. Validity refers to the investigated phenomenon, and questions whether we are measuring what we intend to measure. *Reliability* is also important, as it indicates if we are measuring correctly with the most precise possible method.¹³ By carefully considering the purpose of the written material and by basing my empirical chapter on a considerable amount of different sources, I will be able to increase validity.

My work is of interpreting character, in which I do not strive to find any generally applicable truth, but am aware of the fact that my own values and background are reflected both in the process and the result. Although I aim to conduct a neutral study, unconditionality is never a part of the human factor. We can not strip ourselves of values, opinions, prejudice and expectations.¹⁴ It is important to be aware of this, and to eliminate the impact of our own prejudice on our work by clearly accounting for our prejudice as researchers.

¹² Starrin & Svensson, 1994, p. 21ff

¹³ <http://trochim.human.cornell.edu/tutorial/colosi/lcolosi2.htm>

¹⁴ Starrin och Svensson, 1994, p. 73ff

2.2 Areas of Study

In a study performed by Meso in 1999, the relationship between social development and geographic region as well as the importance of components of the NII (National Information Infrastructure) and social development among LCDs (Least Developed Countries) was investigated, concluding that geographic region is not a significant indicator of social development and that NII variables explain only about 50% of LDC social development.¹⁵ This is a significant study, but I wish to take it one step further in comparing not only LCDs, but comparing states of a similar background but with a thus far very uneven development. I do not find a regional perspective to be too narrow, as conclusions and estimates may be drawn from several indicators within each region. Such a study is thus of higher validity than one investigating a single state.

In order to perform a comparative quantitative study, I will use the SPSS (Statistical Package for the Social Sciences) cluster analysis. It identifies relatively homogenous groups of states based on a number of selected variables, identified to match the World Bank grouping of countries by income class. I intend to use two regions with a shared historical, social and political background, as members of the former Soviet Union, and investigate their development since their independence in 1990. By comparing social development indicators along with indicators of technological development between the regions and within the regions over time, I believe I will be given a good picture of the overall development. However, it must be noted that the selected areas possess a very diverse historical background before the Soviet era, which naturally will be reflected in the data. This is not an attempt to prove similarities between the Baltic states and Central Asia, but merely a selection of states sharing a recent past in terms of economic conditions and social dependency. These similarities, together with the diversities, will give my study interesting width.

The World Bank groups countries by income classes, arguing that countries in similar circumstances display similar social, economic and technical characteristics.¹⁶ The first group of states chosen for this study consists of the Baltic states Estonia, Latvia and Lithuania. These three states fall under the WB category of *high human development* states. The second group of states in this study is a selection of the Central Asian states, Turkmenistan, Uzbekistan and Kazakhstan, all falling under the lower end of *medium human development*. The three states from each region are samples of a geographical unit, and other states in respective region are on the same human development level.

¹⁵ Meso, 1999

¹⁶ The World Bank, www.worldbank.org

The chosen timeframe 1990 - 2002 is significant due to the fact that the investigated regions have undergone major political changes since the fall of the Soviet Union in 1990, a reflection of the global transformation taking place over the past decades. Experiencing an intensifying and more general expansion of global markets, these 12 years are well suitable as a frame of reference.

2.3 Index

To test these two clusters of states I will use two indexes, both based on the UN Human Development Report which is a gathering of data used to assess the level of development in different countries. My indexes are founded on theoretical assumptions of human development, introduced in upcoming chapter.

The first index is first and foremost represented through the UN Human Development Index ranking. This takes into consideration social measures, using literacy, primary education, infant survival, access to health care and safe water, life expectancy and per capita GDP, among others. HDI is a strong factor, which will be used as an independent variable in my study, but as I assume that some of its components may be very valuable in explaining development, I will also include a few given factors of each state:

- literacy rate
- GDP/capita.
- life expectancy

along with

- level of democracy
- corruption frequency

These are isolated factors, and I do not attempt to treat them individually, as they are naturally interdependent with health care access to housing and water etc. They are highlighted only for the purpose of this study, and in order to further illustrate my assumptions.

The human development factors will be measured against technological factors, in a **second index**, takes the following factors into consideration:

- internet users
- telephone mainlines
- cellular subscribers

2.4 Critique of Sources

There are naturally certain weaknesses with this type of data collection, from as scientific as well as a methodological point of view. Much of the written material consists of reports, composed by and for civil servants, politicians and other global actors, always with a certain purpose and a certain bias to the information, which is inevitable in every case where the human factor is involved. Without knowing the perspective and purpose of the author, and underlying reasons for his work, it is hard to determine level of validity. Furthermore there are most often political aspects involved, which is a reason for cautiousness.

Reports containing statistics on a certain area of development are often written with the purpose of illustrating progress or failure, and thus lack elements of critical evaluation. Such a report may be reflecting a wish or a need to highlight certain information, which makes its validity low. There is also reason to be cautious when evaluating material from interest organisations, as it may be based on a certain ideological standpoint affecting its approach. I will therefore carefully consider the purpose of the written material, to give me an idea of the level of validity that can be expected.

I will also attempt to eliminate low validity by investigating a considerable amount of information for my empirical chapter, as width makes room for a broader range of perspectives. Furthermore, there is a certain risk in using an interpreting approach, as the interpretation itself may create flaws and shortcomings.¹⁷ I will therefore be critical in judging my own evaluations, and try to eliminate conclusions with a weak theoretical and empirical foundation. Since I am using a qualitative approach, values and personal opinions are purposely but carefully being integrated in my work, however without extensive impact on the results. It must also be considered that the regions I have chosen to investigate are not equally transparent and that data may be misleading. This is especially the case regarding Turkmenistan: its economic statistics are state secrets, and GDP and other figures are subject to wide margins of error.¹⁸

¹⁷ Eriksson & Wiedersheim-Paul, 1997, p. 108ff

¹⁸ CIA World Fact Book

3 THEORY

“UNESCO was founded on the premise that information is not only a necessity to all human beings, but a human right.”¹⁹

The new global era poses a number of great challenges, not the least due to the multidimensional character of the ongoing transformation; technological, economic, social, cultural, political and geopolitical. Social development is today determined by the ability to establish a synergistic interaction between technological innovation and human values, leading to a new set of organizations and institutions to create positive loops between productivity, flexibility, solidarity, safety, accountability and participation, in a new model of sustainable social development.²⁰ Although the results generated by this model are positive, the very strategy to bring them about is ambiguous. There are obvious disagreements in policy approaches, and there is a common lack of understanding of the transformation that we are facing. Still it can not be disregarded that the information technology revolution and the process of globalization are very intimately linked, and that these two processes interact with other, in a very complex pattern of actions and reactions.

3.1 Definitions

For the purpose of investigation it is crucial to define the two key factors, which correlation I wish to establish:

Human Development is a multifaceted concept. The definition I have chosen to work from is gathered from the UN development index, where democratic freedom, economic and social status all play equal parts. The basic purpose of development is to enlarge human freedoms through increasing human capabilities by expanding their choices to live full and creative lives, a process that must benefit all individuals equitably, and build on participation. This approach to development is called human development, and has been advocated by the human development report since 1990.²¹ *Democracy* may in itself be an indicator of development, as may *economic growth*, but although these factors may occur independently they are strongly interrelated, and are often considered prerequisites for one another. The evident correlation is emphasized by Robert Dahl; “...it is pretty much beyond dispute that the higher the socioeconomic level of a country, the

¹⁹ Poók & Pence, 2001, p. 416 ff.

²⁰ Castells, 1998, <http://www.komm.ruc.dk/mcme/extdocs/castells.html>

²¹ <http://hdr.undp.org/statistics/>

more likely it would be a democracy.”²² Adam Przeworski has presented a number of prerequisites that should exist in a country in order for it to be democratic; “...democracy, affluence, growth with moderate inflation, declining inequality, a favourable international climate, and parliamentary institutions.”²³ Several of these prerequisites are economic rather than political, and it is this correlation between democracy and economic development that has provided a cornerstone within the science of democratization.²⁴ This is the reason for including the level of democracy as a variable in my first index, next to GDP, as neither economics nor politics may alone measure the level of human development. The democracy score represents an average of subcategory ratings for electoral process, civil society, independent media, governance, corruption and constitutional/legislative/judicial framework.²⁵

According to the modern approach to development theory stated in the Millennium Declaration, all social activity should be evaluated in terms of a human basic needs-concept. For the purpose of this study, I therefore wish to create specific terms of evaluation for development, human needs that constitute the foundation of my second index.

- *security*: freedom and a sense of safety in a socially stable environment
- *well-being*: physical well-being as a result of good health and safety for yourself and your family
- *self-determination*: autonomy, freedom from discrimination, and the right to participation in decisions affecting your situation
- *self-realization*: access to education and intellectual stimulation, the right to work and leisure.

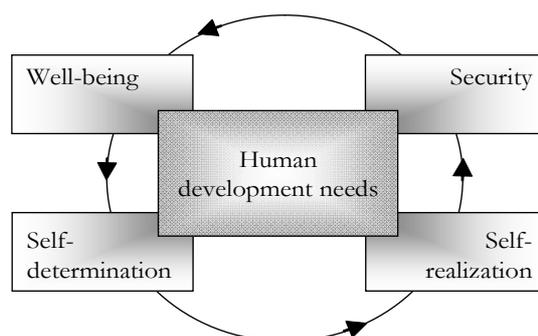


Figure 2 *Principles of evaluation for the first index*

By illustrating the principles of evaluation through a model, the interconnection of each factor becomes evident.

²² Sorensen 1998, s 25

²³ Przeworski, Alvarez, Cheibub & Limongi 1996, p. 39 ff.

²⁴ Sannerstedt 1994, s 56.

²⁵ Freedom House, www.freedomhouse.org

Technological development: It is a challenge to make the communication and information infrastructure serve people's primary needs, especially those of marginalized populations. The technology has become necessary for people to exercise their responsibilities and rights as citizens, using information and communication in order to carry out active citizenship. They also need the capacity to gather knowledge and information in order to improve the economic productivity, and to contribute to the creation of a new social order.²⁶ Internet-related activities including education, commerce and news dissemination are dependent on communications technology, which in turn is the merging of telecommunication, mass media, and information technology.²⁷ The fact that not all countries possess similar levels of these technologies to take advantage of the internet is an indicator of the intimate link between human development and technological development.

3.2 Evaluation Criteria

Human development may thus not be measured through economic growth alone, it is also dependent on how the resources are used and divided. Other human rights, such as participation, gender and minority rights are also independent from economic factors, but very important to consider. The Human Development Index reports an extensive set of indicators (nearly 200) on important human outcomes, such as life expectancy, literacy, access to clean water and on equity in participation. This rich array of indicators provides measures for evaluating progress in the many dimensions of human development, and a Human Development Index is published in each annual report.²⁸ The HDI focuses on 3 measurable dimensions of human development: Living a long healthy life, being educated, and having a decent standard of living. Although the concept of human development is so broad and complex, I believe that the HDI is a good starting point for my study, and a good indicator of the effects I wish to investigate.

Using two indexes based on the same source, no reconstruction to ensure compatibility becomes necessary. The human development index will be weighed against the technology development index, and the correlation will be established as demonstrated below. To test the correlation, I use the top 5 ranking countries of the world as reference, using a simplified set of variables:

²⁶ Patrik hunt, <http://www.tele-centros.org>

²⁷ Fergusson, 2000, p 323 ff.

²⁸ <http://hdr.undp.org/statistics/>

	Life Expectancy		HDI	
	197,5	2002	1990	2002
Norway	74,4	78,9	0,895	0,956 (rank 1)
Sweden	74,7	80,1	0,911	0,946 (rank 2)
Australia	71,7	79,2	0,892	0,946 (rank 3)
Canada	73,2	79,3	0,928	0,943 (rank 4)
Netherlands	74,0	78,3	0,907	0,942 (rank 5)

	Cellular subscribers		Internet users	
	1990	2002	1990	2002
Norway	43	844	7,1	502,6
Sweden	54	889	5,8	573,1
Australia	11	640	5,9	481,7
Canada	22	377	3,7	512,8
Netherlands	5	745	3,3	506,3

Figure 4²⁹ *Indicates number/1000 people*

This shows a stable human development over the past 12 years, where social and economic changes have been in line with global transformation, and the states have managed to keep their top ranking position. We also note a drastic increase in information and communication technology usage and availability, a prerequisite in order to maintain the level of human development, but also made possible by an already high level of human development. Therefore I am led to conclude that the criteria for evaluation are reliable, as the method tests positively on my sample chart. It shows a clear correlation between high Human development and technological development, but does not tell us if one is a result of the other or vice versa. This may only be investigated through additional analysis.

²⁹ Ibid.

4 EMPIRICAL DATA

*Technology may be globalizing communications, but globalization - and its new rules - is also shaping the path of new technologies.*³⁰

The ITU states direct causality between economic and social development and information infrastructure, and by implication technology as well.³¹ In an era of global information networking, the fusion of computing and communications has broken the bounds of cost, time and distance. The internet, mobile phones and satellite networks have shrunk space and time, technology has opened new markets and given rise to new actors. Communications have changed economic competition, empowerment and culture, and technologies are being shaped by globalization, at the same time as globalization is being shaped by technologies. As a result, knowledge has become the new asset: more than half of the GDP in the major OECD countries is now knowledge-based.³² This has a huge impact on human development.

In the early 1990s the internet shifted from a specialized tool of the scientific community to a more user-friendly network, transforming social interaction. The number of internet hosts rose from less than 100,000 in 1988 to more than 36 million in 1998. More than 143 million people were estimated to be Internet users in mid-1998—and by 2004 that number has exceeded 700 million. The internet is the fastest-growing tool of communication ever.³³

The social division is well illustrated by a comparison of technology. In Cambodia in 1996, there was less than 1 telephone for every 100 people. In Monaco, however, there were 99 telephones for every 100 people. A widely accepted measure of basic access to telecommunications is having 1 telephone for every 100 people—a teledensity of 1. Yet at the entry of the new millennium, a quarter of countries still had not achieved even this basic level. The differences are even more evident when comparing factors beyond basic landline connections; Thailand has more cellular phones than the whole of Africa and the United States has more computers than the rest of the world combined. Just 55 countries account for 99% of global spending on information technology.³⁴

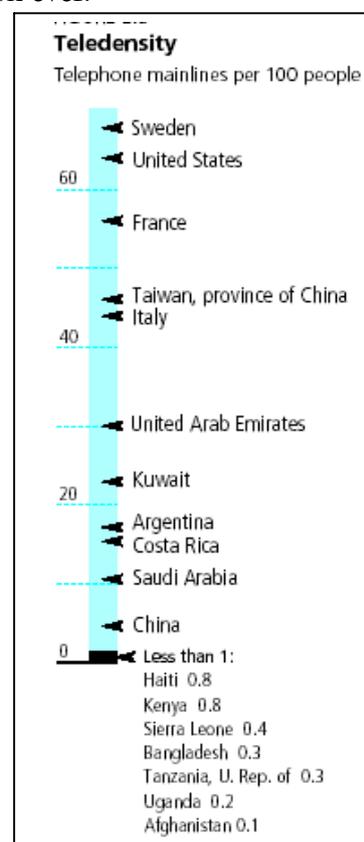


Figure 5

³⁰ Human Development Report 2004

³¹ Poók & Pence, 2001, p. 418

³² OECD Science, Technology and Industry, <http://www.oecd.org>

³³ ITU, <http://www.itu.int/home/>

³⁴ Human Development Report 1999, http://hdr.undp.org/docs/training/oxford/readings/HDR99_ch2.pdf

4.1 Global Dialectics

The emerging network society has resulted in complex and contradictory shifts:³⁵

Decentralization vs recentralization: Fast and cheap communications lets multinational corporations operate globally, yet still with the ability to coordinate and control their worldwide operations as a unit. As a result, old economic boundaries around nations have given way to new centres of power in the private sector. Consequently, the global arena is beyond the jurisdiction and accountability of any specific country.

Fragmentation vs integration The traditional national communities are to a certain extent replaced by on-line communities, drawn together by politics, ethnicity, interests, gender, work or social reasons. At the same time network communications can forge closer local communities, providing community information and making local government more transparent.

Homogenization vs diversity. The global entertainment and media industry spreading opinion, culture and politics, is dominated by a handful of major companies. They control both distribution networks and news sent by cable and satellite television into households across the world. At the same time the declining costs of technology have allowed a diversity of voices and cultures to be aired, and multilingual internet sites and radio programming in local languages reach out to minority groups.

The social changes, whether positive or negative, illustrate how information and communications technology have a tremendous impact on human development for all those connected. The dilemma is however, that on a global arena participation has become crucial, and when access to network technologies is lacking, there are also no possibilities to benefit from the technological development. **Exclusion vs inclusion** thus becomes a fourth social dialectic, where providing information, enabling empowerment and raising productivity are options only for those included in the global system of information and communication technologies.³⁶

Technology alone is not the solution, but whether a generator or a prerequisite for social change, the close interrelation between technological development and human development is illustrated through these social dialectics.

³⁵ Information technology and development I: Commercial and Industrial Dimensions, <http://www.unescap.org/itid/PAPER1.PDF>

³⁶ Castells, 1998, <http://www.komm.ruc.dk/mcme/extdocs/castells.html>

4.2 Regional Development

Countries progress by learning to duplicate, to adapt to their own needs and, finally, to innovate.³⁷ This requires a basic capacity to operate imported technology, illustrating the importance of knowledge at the forefront of global economic opportunity. If knowledge is regarded the result of high human development, according to this premise there will most likely not be any technological development without a certain level of human development. Studying the situation of the selected states will bring further insight.

4.2.1 The Baltic States³⁸

Latvia was annexed by the USSR in 1940 and reestablished its independence in 1991, following the breakup of the Soviet Union. The last Russian troops left in 1994, and Latvia officially joined the World Trade Organization in February 1999 along with both NATO and the EU in the spring of 2004. Latvia's transitional economy recovered from the 1998 Russian financial crisis, largely due to a gradual reorientation of exports toward EU countries, lessening Latvia's trade dependency on Russia. Telecommunications are still considered inadequate, but are being modernized in order to provide an international capability independent of the Moscow international switch.

Estonia was forcibly incorporated into the USSR in 1940, but has been free to promote economic and political ties with Western Europe since 1991. It joined both NATO and the EU in the spring of 2004. Estonia, as a new member of the World Trade Organization, is steadily moving toward a modern market economy. The economy benefits from strong electronics and telecommunications sectors and is greatly influenced by developments in the four major trading partners Finland, Sweden, Russia and Germany. Foreign investment in the form of joint business ventures has improved telephone services greatly; a wide range of high quality voice, data and internet services are available throughout the country.

Independent between the two World Wars, **Lithuania** was annexed by the USSR in 1940. On 11 March 1990 Lithuania became the first of the Soviet republics to declare its independence, but Moscow did not recognize this proclamation until September 1991. Lithuania subsequently restructured its economy for integration into Western European institutions; it joined NATO and the EU in the spring of 2004. Lithuania is the Baltic state that has conducted the most trade with Russia, and has recovered slowly from the Russian financial crisis.

Unemployment remains high, but growing domestic consumption and increased investment have advanced recovery. Foreign government and business support have helped in the transition

³⁷ Human Development Report, 1999; New technologies and the global race for knowledge, http://hdr.undp.org/docs/training/oxford/readings/HDR99_ch2.pdf

³⁸ CIA World Fact Book, <http://www.cia.gov/cia/publications/factbook/>

from the old command economy to a market economy. The communications system is still inadequate, but is being modernized to provide an improved international capability and better residential access.

4.2.2 Central Asia³⁹

Independent since 1991, **Uzbekistan** seeks to gradually lessen its dependence on agriculture while developing its mineral and petroleum reserves. In an attempt to boost the Soviet style command economy, the Uzbek government imposed subsidies and tight controls on production and prices, which has made the climate unattractive for investment. Since independence there has also been a sharp increase in the inequality of income distribution which has hurt the lower ranks of society. Terrorism by Islamic militants, economic stagnation, and the curtailment of human rights and democratization are major concerns in Uzbekistan. The communications system is antiquated and inadequate and in serious need of modernization, but the domestic telephone system is being expanded and technologically improved under contracts with prominent companies in industrialized countries, aiming to make Uzbekistan independent of Russian facilities for international communications.

Kazakhstan became a Soviet Republic in 1936. During the 1950s and 1960s agricultural program, Soviet citizens were encouraged to help cultivate Kazakhstan's northern pastures resulting in an influx of Russian immigrants. Independence in 1991 caused many of them to emigrate, leaving Kazakhstan without a cohesive national identity. Kazakhstan is the largest of the former Soviet republics in territory, excluding Russia, and possesses enormous fossil fuel reserves. It is also a large agricultural producer. In 1995-97, the government program of economic reform and privatization resulted in a substantial shifting of assets into the private sector. Thanks to its booming energy sector, but also to economic reform, good harvests, and foreign investment, Kazakhstan enjoyed solid growth in the beginning of the new millennium. However, communications service is still poor with antiquated equipment.

Turkmenistan became a Soviet republic in 1925. After achieving independence in 1991, President Niyazov retains absolute control over the country and opposition is not tolerated. Turkmenistan is a largely desert country with intensive agriculture in irrigated oases and large gas and oil resources. With an authoritarian ex-communist regime in power and a tribally based social structure, Turkmenistan has taken a cautious approach to economic reform, hoping to use gas and cotton sales to sustain its inefficient economy.

Widespread internal poverty, the burden of foreign debt and the unwillingness of the government to adopt market-oriented reforms make Turkmenistan's overall prospects in the near

³⁹ CIA World Fact Book, <http://www.cia.gov/cia/publications/factbook/>

future discouraging. However, Turkmenistan's cooperation with the international community in transporting humanitarian aid to Afghanistan may create a change in the atmosphere for foreign investment, aid, and technological support.

4.3 Human Development Index

	Life expectancy (years)		Literacy (%)		GDP/capita (US \$)		HDI (rank 1-177)	
	1970-75	2002	1990	2002	1990	2002	1990	2002
Estonia	70,5	71,6	99,8	99,8	7561	12260	0,814	0,853 (36)
Lithuania	71,3	72,5	99,3	99,6	5385	10320	0,819	0,842 (41)
Latvia	70,1	70,9	99,8	99,7	6911	9210	0,803	0,823 (50)

Figure 6⁴⁰

	Life expectancy (years)		Literacy (%)		GDP/capita (US \$)		HDI (rank 1-177)	
	1970-75	2002	1990	2002	1990	2002	1990	2002
Kazakhstan	64,4	66,2	98,8	99,4	4276	5870	0,781	0,709 (78)
Turkmenistan	60,7	66,9	-	98,8	3111	4300	-	0,752 (86)
Uzbekistan	64,2	69,5	98,7	99,3	2374	1670	0,728	0,766 (107)

Figure 7⁴¹

As shown there is a great spread between the states, with Estonia ranking HDI 36 among the world's nations, and Uzbekistan ranking 107. This reflects the severe differences between the regions, which is shown not only in the generally lower levels of existing development in Central Asia, but in the slower progress (i.e. regarding GDP) as well. It is also remarkable that Kazakhstan has fallen in ranks since the independence, displaying a lower level of human development today than 12 years ago.

Life expectancy is supposed to increase as medical care and general conditions improve. It is to be noted the great differences at the beginning of the 1990s, a clear indicator to the diverse standards of living between the states within the Soviet Union. In 2002 we note a slight increase in the Baltic states, and a more dramatic one in Central Asia, which can be interpreted as a social shift for the better. This is a positive reflection of general social status, access to health care, adequate sanitation and proper nutrition. However, the same kind of progress will naturally not occur in a state with an already high life expectancy, Lithuania is almost at the level of the top ranking states of the world, and as a result additional progress is limited.

⁴⁰ Human Development Report 2002, <http://hdr.undp.org/reports/global/2002/en/>

⁴¹ Ibid.

Literacy illustrates the right to self-realization, i.e. through education, and is thus a very important criteria for human development. It is an interesting factor, as the Soviet Union offered a very well developed general schoolsystem. The literacy rate has thus always been very high in both regions. Only a very slight increase is noted in Central Asia.

In Central Asia we also note a very modest change in *GDP/capita*, and Uzbekistan even displays negative figures. This contrasts deeply to the situation in the Baltic states, that have increased *GDP/capita* with about 50% over the past 12 years. The situation in the beginning of the 90's was more even, but the era of Soviet rule has left a great divide between the two regions. Central Asia's economic regression is serious, and becomes evident when compared to the progress of for example Estonia.

An important part of human development is the right to self-determination and participation. This can be traced through the *level of democracy* and the *corruption index*, where 10 illustrates a very high level of democracy, and a society less prone to corruption. Here we note an alarming division between the regions, with the Baltic states clearly at the upper end of the scale, illustrating that Estonia, Latvia and Lithuania have a high level of democracy, and are less prone to corruption. The authoritarian regime of Turkmeistan is placing it at the very bottom of the scale, along with the other Central Asian states.

	Democracy	Corruption
	Index 1-10	
Estonia	7,3	5,5
Lithuania	7,0	4,7
Latvia	6,9	3,8
Kazakstan	1,1	2,4
Turkmenistan	0,2	1,8
Uzbekistan	0,8	2,4

Figure 8

Index of democracy and corruption, where 10 is optimal value, illustrating a high level of democratic development and very low tendency to corruption.

Sources: Freedomhouse and Transparency International

4.4 Technological Development Index

	Telephone mainlines (per 1000)		Cellular subscribers (per 1000)		Internet users (per 1000)	
	1990	2002	1990	2002	1990	2002
Estonia	204	351	0	650	0	327,7
Lithuania	212	270	0	475	0	144,4
Latvia	234	301	0	349	0	133,1

Figure 8⁴²

	Telephone mainlines (per 1000)		Cellular subscribers (per 1000)		Internet users (per 1000)	
	1990	2002	1990	2002	1990	2002
Kazakhstan	80	130	0	64	0	15,7
Turkmenistan	60	77	0	2	0	1,7
Uzbekistan	69	66	0	7	0	10,9

Figure 9⁴³

The second index displays a stable increase since the 1990s, however with very assymetrical figures between the regions. The Baltic states show a slight increase in *phone mainlines*, and a drastic rise in *internet* and *cellular phone* usage. In Central Asia on the other hand we see an almost reverse process, where the telephone mainlines in Uzbekistan has decreased. Moreover there is a very modest increase in internet and cellular phones, figures so low that the progress is almost undetectable. Although these are very disturbing figures, they do correlate well with the more modest progress made according to the human development index of Central Asia.

The assymmetric data is not providing a coherent global development trend, but is displaying some remarkable results. Estonia with its solid human development has also succeeded on the technological arena. Along with economic reform, the country has made great efforts to promote access to the internet for its 1.4 million citizens. Public internet access points are provided throughout the country, even on remote islands in the Baltic Sea. In schools the “Tiger Leap Programme”, launched in 1996, provides information-based learning systems for all students, rapidly modernizing education and creating strong conditions for an open learning environment. Its scope has widened, aiming to create an open and democratic society by providing access to modern communications for all.⁴⁴

⁴² UN Human Development Report 2002, <http://hdr.undp.org/reports/global/2002/en/>

⁴³ Ibid.

⁴⁴ New technologies and the global race for knowledge, http://hdr.undp.org/reports/global/1999/en/pdf/hdr_1999_ch2.pdf

In Estonia we are therefore able to detect a strong correlation between human and technological development, there are steadily increasing figures in both indexes. The correlation may be traced in the other states as well, whether positive or negative. Uzbekistan having dropped in human development, most visible in the reduced GDP/capita, also display a decline in telephone mainlines usage.

Turkmeistan has the poorest record of technological development, which is disturbing, and to a certain extent confusing, as it displays a slightly higher increase in human development than Uzbekistan. It may seem as if the correlation is weak or even non-existent when viewing an increase in GDP that has given no response in technological development. GDP/capita as an isolated factor is however misleading, it does not take general distribution into consideration which may explain why there is certain economic progress, possibly concentrated in the hands of a few, without any technological development. Instead, the correlation becomes evident when viewing the democracy score, since a very low level of democratic development does not encourage any technological advancement that may lead to increased transparency. Thus the democracy index explains the figures of Uzbekistan and Turkmenistan, and also clearly illustrates that economic factors alone are not reliable. Furthermore, the figures of authoritarian states must be viewed critically, as the human development index is more vulnerable to manipulation than the technological index. (phonelines and internet connections are subject to more accurate international control than literacy and economic factors.)

5 ANALYSIS

“At a time of such dramatic breakthroughs in new technologies, it is indefensible that human poverty should persist.”⁴⁵

It is argued that the availability and use of information and communication technologies are a prerequisite for economic and social development in the new era. However, without the proper organizational environment, advanced technology cannot be a factor of development by itself. One is thus a prerequisite for the other, as I will illustrate in my upcoming chapter.

The past decade has proven the tremendous potential of global communications to provide information, enable empowerment and raise productivity. But it has also exposed the risks of dividing and polarizing societies, threatening greater marginalization of those left out and left behind. The UN has declared seven goals on the road to an information society:⁴⁶

- Connectivity: setting up telecommunications and computer networks.
- Community: focusing on group access, not individual ownership.
- Capacity: building human skills for the knowledge society.
- Content: putting local views, news, culture and commerce on the Web.
- Creativity: adapting technology to local needs and constraints.
- Collaboration: devising Internet governance for diverse needs around the world.
- Cash: finding innovative ways to fund the knowledge society.

When applied to my study it becomes clear that these are not only goals but prerequisites as well, they are a result of technological development, at the same time as they are necessary preconditions for the development to take place. It also becomes evident that there are territories that have lost value for the dominant interests in informational capitalism, because of their modest contribution as producers or consumers, or because of uneducation. Castells calls this the “fourth world”, where disconnected peoples and cultures are socially excluded, victims of the digital divide.⁴⁷ Performing this study, I believe that Central Asia must be considered a part of this fourth world.

⁴⁵ UN Human Development Report 1999, <http://hdr.undp.org/reports/global/1999/en/>

⁴⁶ Information Technology and Development II: Capacity-building, cooperation and social dimensions, <http://www.unescap.org/itid/PAPER2.PDF>

⁴⁷ Castells, 1998, <http://www.komm.ruc.dk/mcme/extdocs/castells.html>

5.1 Is human development a prerequisite for technological development or vice versa?

There are several factors determining human and technological development, and in this study there are four that have proven crucial.

Economy (cash), illustrated by GDP/capita, is vital for the access and implementation of technology. According to the data, general access to ICTs seems to be synonymous to general social development, and the low/negative economic development in Central Asia is thus accompanied by very modest figures on technological development. Since some nations, in the investigated regions as well as elsewhere, are much poorer than others, is it reasonable to argue that foreign developers are reluctant to invest in unprofitable regions and the indigenous populations cannot finance the high cost of technological development. There are countless examples; development agencies are supporting a pipeline development, a low technology project, rather than internet development, and are working to combat poverty rather than finance high technology projects in LDCs. This is not only a result of lack of knowledge toward the true effects of technological development on human development, but a symptom thereof. Such investments are both cause and effect, by financing low technology projects, states are not given the ability to catch up on technological development, keeping them behind socially as well. However, it might not be possible to finance high technology projects, due to a lack of local capacity and training to run them, in which case we would risk a neo-colonial type of FDI, where the investor runs the investment themselves, never giving the host an opportunity to reap the benefits in know how. It might also be true that the situation as such in the host country does not offer an opportunity to invest in technological development, since more pressing needs, such as poverty, health etc must be given priority. In this case, human development is a prerequisite for technological development.

Except for the immensely powerful factor of cash, there are other factors affecting both human development and technological development negatively, and that might explain the uneven figures of the chosen states.

Corruption (collaboration) is according to the World Bank the greatest obstacle to achieving economic and social development. Poor people are affected the hardest, since they are the most dependent on public service and have the least possibility to pay. Corruption thus poses a threat to the economy, the legal system and to democratization. Financial aid may be part of the problem instead of the solution. According to the corruption perception index, CPI, the investigated states are displaying very uneven and generally fairly low results. The Central Asian states are however more prone to corruption than the Baltic states, which may explain the lack of human development, and also be a cause thereof.

Education (capacity): Even if telecommunications systems are installed and accessible, people will have little access to the network society without literacy and basic computer skills. In 1995 adult literacy was less than 40% in 16 countries, and primary school enrolments less than 80% in 24 countries. With a large part of the population being illiterate, the possibilities of expanding access for internet users are heavily constrained. Even for the newest and most advanced technologies, the most basic and long-standing policy lies at the heart of the solution: investment in education.

Governance (community): Global governance of technology must respect and encompass diverse needs and cultures. Public investment—through new funding—is essential to develop products and systems for poor people and countries. Precaution is needed in exploring new applications, no matter how great their commercial promise. Only then will the rules of globalization allow technological breakthroughs to be steered to the needs of people, not just profits.

Conclusion: Technology and human development are mutually reinforcing prerequisites, one cannot exist without the other, but one may enforce and speed up the other once the foundation has been laid. This interrelation is very profitable, but requires an initial initiative in the areas of action identified above. Economic stability, good governance and education are necessary to implement and benefit from high technology, and these areas will moreover be reinforced with the continued use of high technology. Human development is also not possible without certain technological development, the transparency of the democratic process, the access to information etc are results of technology, and vital for human development.

5.2 Does the use of high technology contribute equally to the development of nations?

By using the internet as a learning tool instead of an entertainment centre, Estonia has indeed tiger-leaped ahead of other transition economies in integrating into the information society. More than one in ten Estonians are now on-line and Estonia ranks among the top 15 countries in Europe in computers per capita, ahead of France and Italy. This is a perfect example of the use of high technology for the purpose of increasing human development according to my conclusion on mutual reinforcement. However, as the data shows, this development is not equal or generally applicable. Different prerequisites offer different development patterns, and different government priorities will affect both the human and the technological development of a state. The best illustration of this dilemma is when technology is implemented through foreign aid or investment, but will not contribute to additional growth as long as there is a lack of local competence to operate the investment.

Therefore, an identical implementation of technology in a number of states will have very different outcomes. However, as Estonia has shown us, there is a receipt for success, which will most likely be adopted in surrounding states as well, once the timing and the conditions are right.

Conclusion: No, the use of high technology does not contribute to the equal development of states, due to different preconditions.

5.3 Which effects are noted and can accordingly be expected for the future?

We notice a highly uneven development over the regions, where the very vulnerable states of Central Asia still to a certain extent lacks the prerequisites for development, both human and technological. This explains the virtually nondetectable increase in the use of internet and cellular phones, although there are generally stable values in human development, along with a certain increase in GDP. However, without the proper training, government priority, the combat of civil unrest and corruption, technology as an isolated factor will not be able to generate growth. Keeping the emerging dialectics in mind, and investigating the uneven effects of technological development, we are led to speculate in future trends, where **leapfrogging** may be an option, as in the case of Estonia. Leapfrogging is a phenomenon where Initial development, both human and technological, reinforce each other in a positive spiral upwards. By implementing technology, or strongly reinforce any other specific area of development, the overall development would progress very rapidly, thus leap-frog forward and the state may advance from one development category to another in a short period of time. Although Estonia is a remarkable example of leapfrogging, the same scenario would most likely not occur when implementing the internet in Uzbekistan, since leapfrogging does require certain preconditions in order to succeed.

The **trickle-down** effect has been argued to apply for technological development as well as economic growth. This theory suggest that the success of one state will influence surrounding states to reach the same status by benefiting from stable trade and already existing technology. This may be a plausible scenario when observing the data, as we do see very similar trends within the two regions. The success of Estonia could have trickled down to Latvia as well, which would explain why the Baltic region appears to be heading down the same track.

One may also argue that neither leapfrogging nor the trickle-down effect are plausible options, and that we are facing a greater global **divergence**, with the already developed states advancing so fast that the less developed once will never be able to catch up and thus find themselves excluded from the global markets for good. This is a scenario where, regardless of

active implementation and favourable preconditions, catching up is not possible. There will always be some states ahead of others, in all areas.

I believe that what we are seeing, judging from my own research and from visible global trends, is a combination of the three theories. We can expect some trickle-down effect in certain areas, technology will flow over state borders, and using it will be profitable, indirectly as well as directly, promoting trade and invention along with education and social stability, which are factors that often affect entire regions. Also, there might be the occasional case of leap-frogging, like Estonia, where technology is implemented under the right circumstances, with the appropriate level of human development. Global divergence may persist, but it will hopefully not be static- states should be given the opportunity to develop and climb in ranks, and those who are ahead today may not necessarily be ahead tomorrow.

Conclusion: What to expect from the future is uncertain, but according to my own study, I believe a combination of theories to be possible, all depending on the specific situation of each state.

6 CONCLUDING REFLECTIONS

“From all perspectives- humanitarian, moral, ecological, economic and social- Information technology has the potential to elevate the quality of human life everywhere. It is imperative that we, the citizens of this Global Village, seize this historic opportunity.”⁴⁸

Information technology has become a potent force in transforming social, economic and political life globally. Without incorporation into the information age, there is little chance for countries to develop- but information technology may also present an opportunity to developing countries to break the cycle of dependence and poverty. In order to do this, however, we need to be aware of the social effects of information technology. The data presented in this thesis gives an indication of the development trends in the past decade. However, it does not provide any solutions or answers. Even when recognizing the mutually reinforcing interdependence between technological and human development, the problem remains unsolved. Where do we start? Would it be wiser to support education than the access to computers? Is it more important to combat poverty than to create political transparency through the access to information? There are no answers, since one would most likely lead to the other, and we must keep this in mind in order to provide optimal assistance. Each piece of information is useful when creating new development strategies, and we must be aware of the crucial cause and effect relationship between different social phenomena. Although we may not know what to expect from the future, we do have the tools to improve the odds.

⁴⁸ Information Technology for Developing countries in the Global Village, 1998

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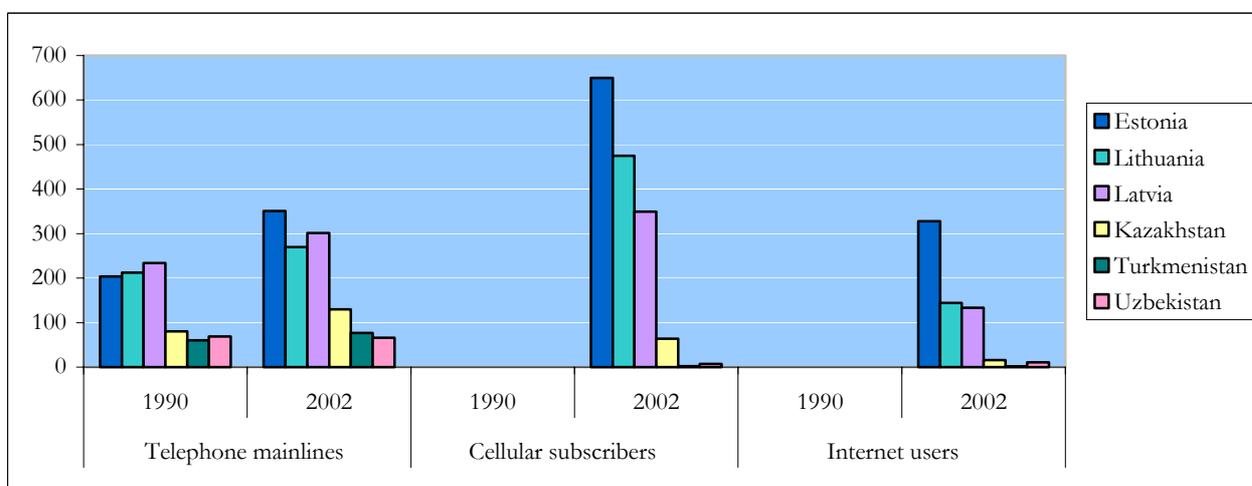
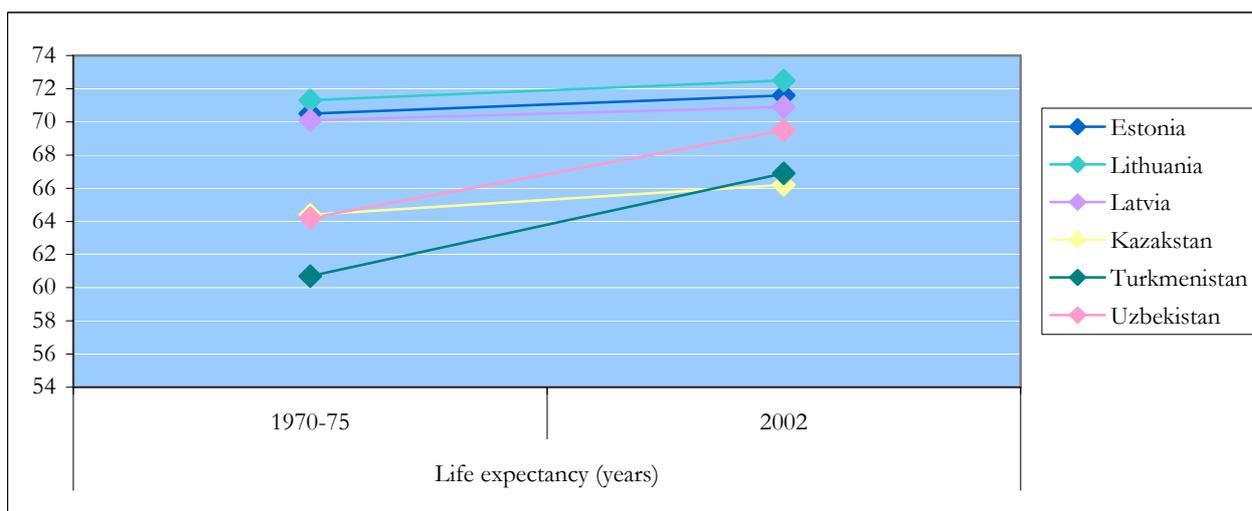
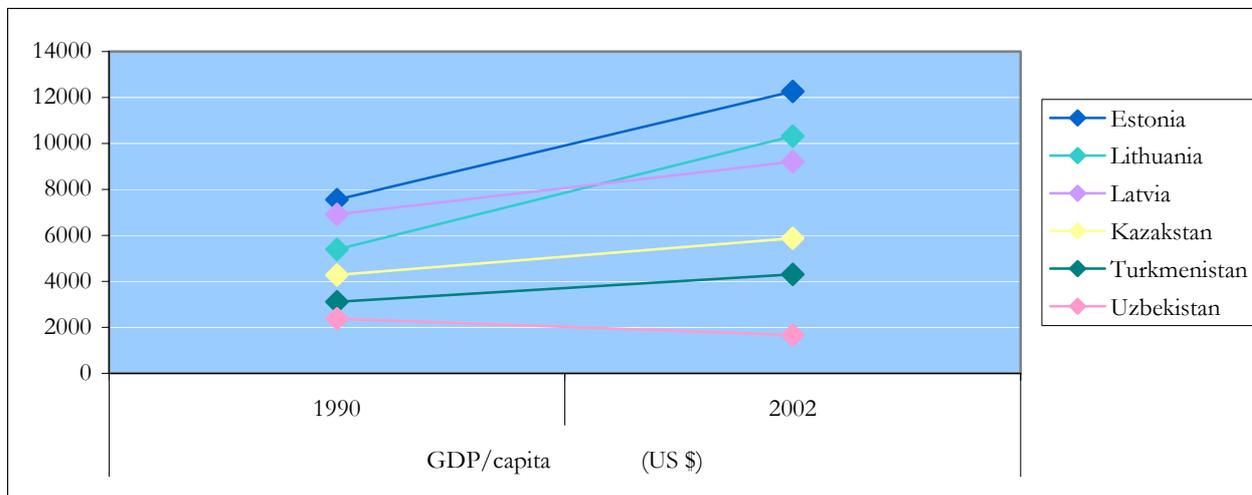
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8 APPENDIX

Index I and II: Differences between regions



Index II: Differences within regions (per 1000 people)

