TELECOMMUNICATIONS NETWORKS AND SERVICES IN ESTONIA LESSONS TO OTHER EUROPEAN COUNTRIES

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ABSTRACT

Estonia has shown somewhat remarkable developments in the telecommunications – or more precisely, building up an efficient network of modern information and telecommunications technologies (ICTs) for the Information Society. This paper takes a look at the development of telecommunications infrastructure networks and services in Estonia. The study also evaluates what other countries could learn from Estonia. More specifically, by this study we attempt at answering whether Estonia is as successful as data suggests, what the factors behind this success are, and whether there are lessons to be learned for the entire European territory. The paper introduces to the development of the telecommunications infrastructure and services in Estonia, by presenting facts and figures, and comparing the progress of the country with that of other European countries. It also discusses the measures that have helped Estonia on the road to Information Society. The results show that in summary the success of Estonia seems to have been a result of three things: Proximity of Finland and Sweden, active regulation and relative early liberalization, and a competition and entrant friendly market environment. The paper is an outgrowth of the ESPON (European Spatial Planning Observation Network) project 1.2.2 "Telecommunications Services and Networks: Territorial Trends and Basic Supply of Infrastructure for Territorial Cohesion" (see: http://www.espon.lu).

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1   INTRODUCTION

Equal opportunities to access information and communications technologies (ICTs) have been a concern of policies around the world for a long time. The inclusiveness of the information society (IS) has been regarded as vital to a sustainable social and economic development. However, the diversity in definition of "access", as well as of the "digital divide" results in different approaches to the problem.

 "Digital divide" is a term that is used to describe a gap between the "information haves" and the "information have-nots", i.e. between people who have access to ICTs and those who do not. Access, however can refer to 1) the (physical-infrastructural) availability, 2) the affordability of, as well as 3) the educational and skillswise preparedness, and 4) the content and service driven motivation to use these technologies. Consequently, the digital divide may be regarded merely as a technological gap, and thus treated with infrastructure-oriented policies and market regulation, or can be understood as a more complex and socially deeper rooted phenomenon and approached in a broader, more comprehensive way.

The most recent tendency in Europe has been a gradual realisation of the risk that already existing social and regional divides in living standards, competitiveness and development potentials can be reconsolidated by the digital gap. Also, it has been increasingly understood that the third and fourth levels of access are at least as important to focus on in policies as the physical and financial bases of ICT connectivity: Several debates exist concerning the importance and roles of broadband, market liberation, state subsidies, education, and content provision. Although the European Union has set the guidelines for its old and new members to promote both the supply and demand components of "access", the combination, composition and ordering of the IS policy packages and priorities vary considerably across the continent. This paper focuses on Estonia, which is an example of a country where a remarkably thorough approach has been taken. It has resulted not only in a fast catch-up of Western European countries, but also in overtaking them in several respects of the informational development.

While history binds the Baltic States, and to some degree, all Central and Eastern European countries (CEEC) together, there have also been divergent processes in the region. The comparatively faster progress of the northernmost Baltic country, Estonia had become obvious

already by the early nineties. Recently Latvia and Lithuania had the lowest, and Estonia the fourth lowest GDP per capita of the new ten EU member countries in 2003. Estonia has generally been considered as the most successful in reconstructing its political and economic systems among the three Baltic States. It has also even exceeded other so-called ´transition countries' in the CEE region in several areas. Estonia's cornerstones in building a market economy have been a stable currency, a balanced state budget, a liberal trade policy, and rapid privatisation (EC – DG Enterprises, 2000).

Estonia has shown somewhat remarkable developments in the telecommunications – or more precisely, building up an efficient network of modern information and telecommunications technologies (ICTs) for the Information Society:

> I am truly amazed with how far Estonia has gone in its efforts to develop the Information Society. Such success gives me hope that the entire Baltic region, including my home country -- Latvia, will one day once again become a land of developed as opposed to developing countries. (Snetkov, 2001)

This paper takes a look at the development of telecommunications infrastructure networks and services in Estonia. The study also evaluates what other countries could learn from this country. More specifically, by this study we attempt at answering the following questions:

- o Is Estonia really as successful as data suggests and if so, have these achievements been realised across and benefiting the whole territory of the country?
- o What have been the factors behind Estonia's success? Is it only the geographical – and cultural – proximity of Finland, or the Nordic countries in general, to which this rapid development can be attributed?
- o What are the lessons to learn, especially for the ten new member states and the "peripheral" countries?

The paper starts with an introduction to the development of the telecommunications infrastructure and services in Estonia, presenting facts and figures, comparing the progress of the country with that of other selected European countries. This is followed by a section on measures that have helped Estonia on the road to Information Society. The final part provides the conclusions of this paper, and some lessons from the telecom and the broader information society developments in Estonia.

2 TELECOMMUNICATIONS IN ESTONIA: FACTS AND FIGURES

Estonia is one of the smallest of the EU countries: its area is only 45.266 km^2 and population some 1.4 million (July 2003, estimate). The population consists of several different ethnic groups: besides Estonians (65.1%), there are Russian (28.1%), Ukrainian (2.5%), Byelorussian (1.5%), and Finnish (1%) people (CIA Fact Book, www.cia.gov).

Estonia inherited a poorly developed telecommunications infrastructure from the Soviet Era. In 1992, all calls from the country were still routed through Moscow and a rotary-dial phone was a distinguished possession. In the next year Eesti Telefon was founded, and it received the copper-pair network and a queue of almost 150 thousand people waiting for a phone hook-up (Eesti Telefon / Elion, 2002).

The development in this sector has been remarkably rapid since: the telecommunications market in Estonia has become comparable with many of the EU15 countries. The incumbent Eesti Telefon (Elion, since 2003) invested 5.4 billion kroons (€345 million at 12.2002 exchange rate) over ten years in the network, and as a consequence digitalisation reached 77% and queuing had ceased by 2002 (see Figure 1). Already in the beginning of 1995, there were 97 registered telecommunications enterprises, most of them privately owned. The telecommunications sector had been completely liberalised by January 2001, when the monopoly of the Elion ended. At this time, the market was also opened to foreign investments.
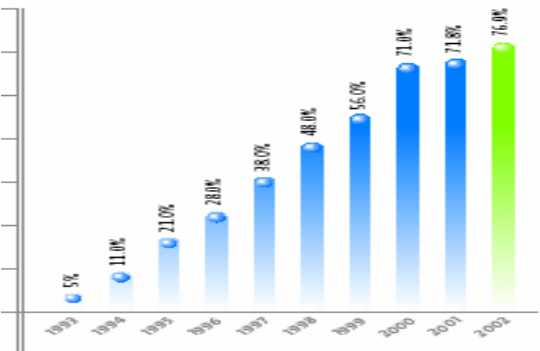

Figure 1. Network digitalisation in Estonia. (Source: Eesti Telefon / Elion, 2002)

Estonia is presently one of the best connected countries in Europe, and also in terms of 'tele-density', this country is among the top 20 worldwide. In basic telecommunications, Estonia ranks among the selected European countries as presented in Figures 2 and 3.
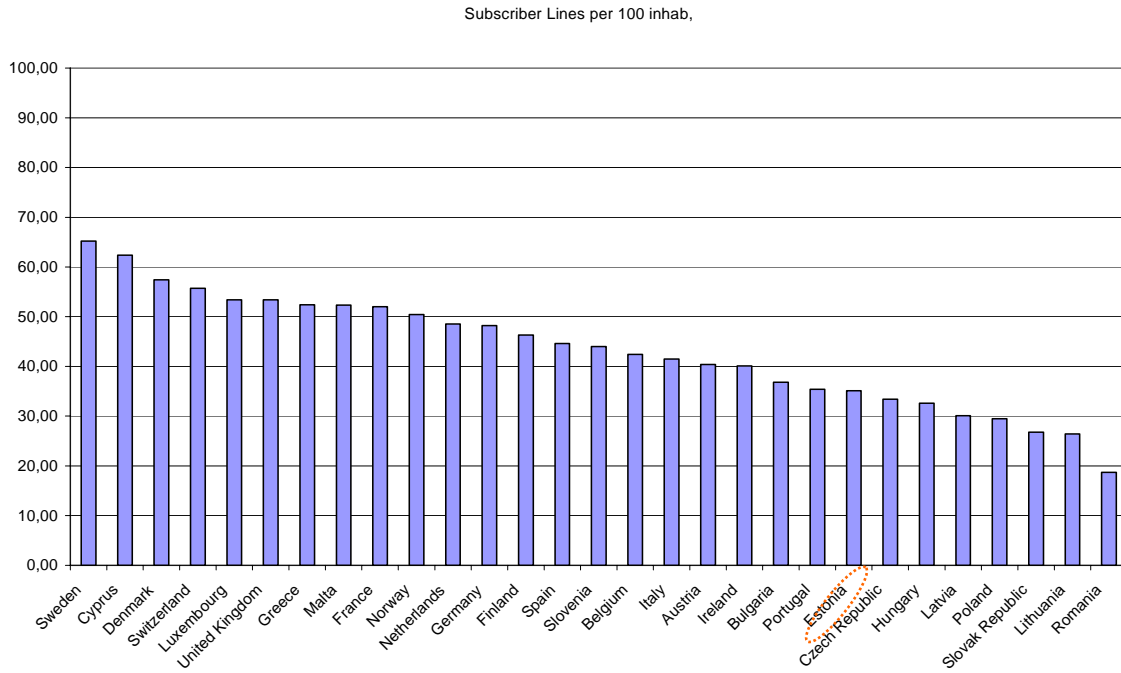
Subscriber Lines per 100 inhab,

Figure 2. Subscriber lines per 100 inhabitants, 2002 (Source: ITU, 2003)

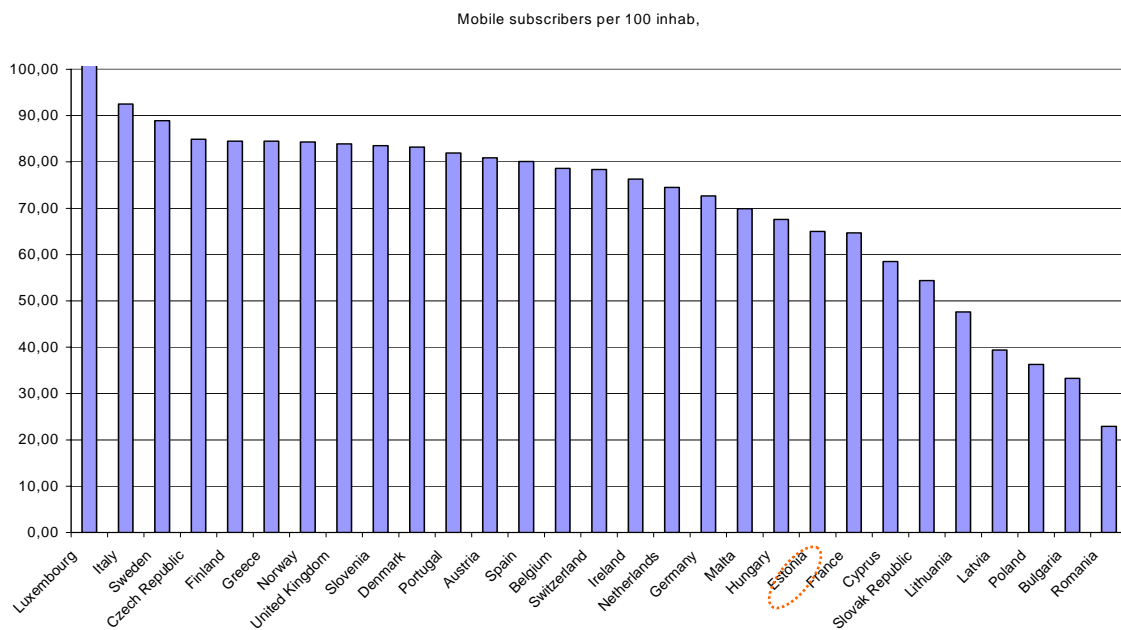Mobile subscribers per 100 inhab,

Figure 3. Mobile subscribers per 100 inhabitants, 2002 (Source: ITU, 2003)

As can be seen from Figures 2 and 3, the success of Estonia does not show in the penetration of fixed telephone line subscriptions: the country was ranked no. 22 among the selected European countries in 2002, with only 35% penetration of fixed subscription lines. However, this is easily understandable in the case of CEE countries in general, where basic telecommunications infrastructure started to be upgraded only in the early 1990s, and wireless applications

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took over very soon after: the number of fixed phone lines started decreasing as many consumers switched from fixed phones to mobile phones, and this happened at an earlier stage in the penetration of fixed lines. However, in the diffusion of mobile subscriptions, Estonia's position was #21 (see Figures 2 & 3), yet with 65%, which was close to the West European average, and considerably higher than the figures in the other two Baltic States. In this respect Estonia outperforms, for example, France. Recent estimates of March 2004 show a penetration of over 80% (MOFA). The ranks of the selected European countries in more advanced telecommunications, broadband and Internet use, are presented in Figures 4 and 5.
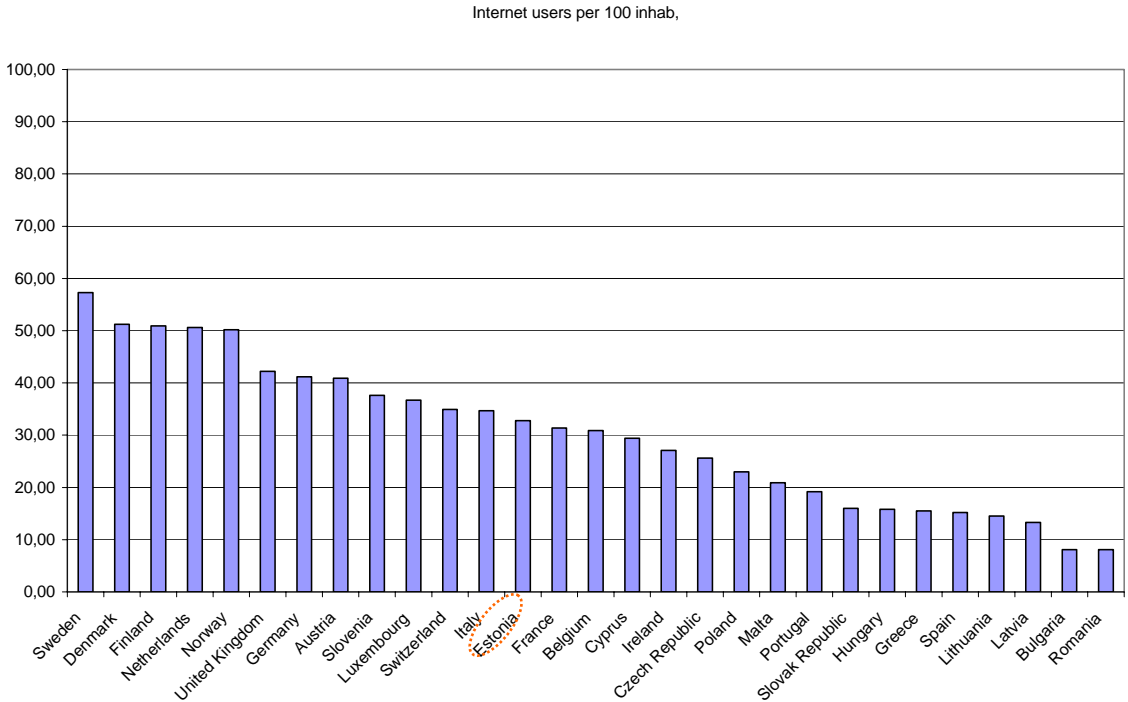
Internet users per 100 inhab,

Figure 4. Internet users per 100 inhabitants, 2002 (Source: ITU, 2003)
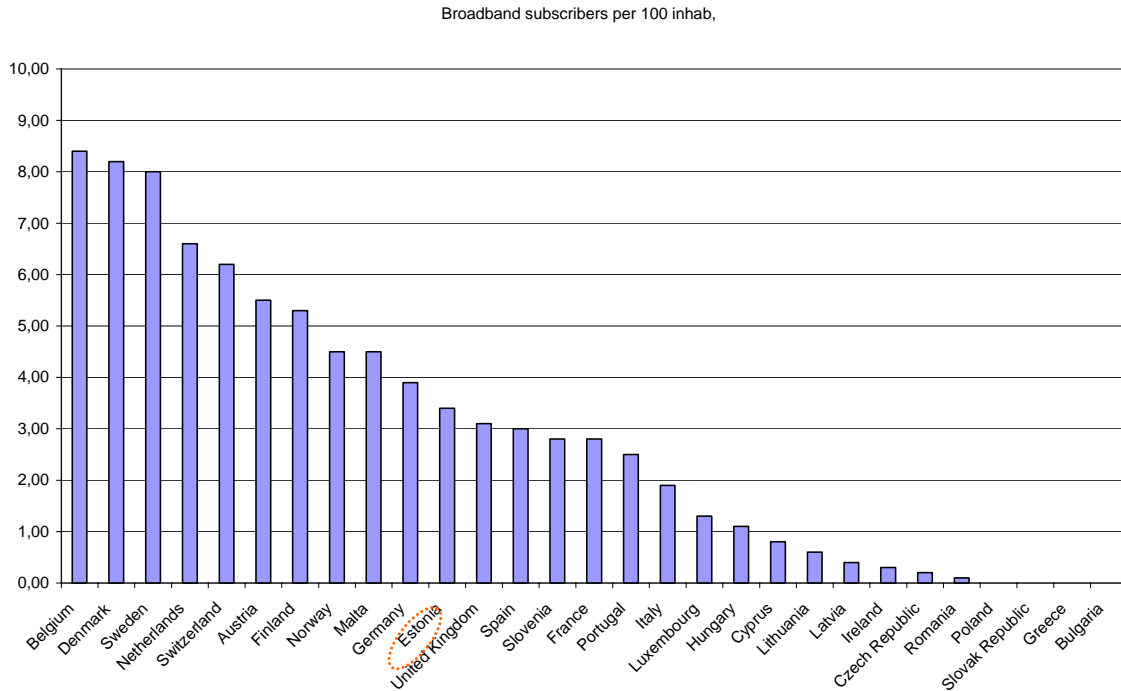
Broadband subscribers per 100 inhab,

Figure 5. Broadband subscribers per 100 inhabitants, 2002 (Source: ITU, 2003)

As the Figures 4 and 5 show, Estonia did strikingly better in the penetration of more advanced ICTs: In Internet usage it ranked #13 and broadband penetration #11 in 2002. Estonia ranks also well in world telecommunications statistics: with 3.5 % it had the 16th highest DSL penetration in June 2003 (Telecommunications in the Baltics, 2004), and it was ranked 12th in terms of ADSL lines per regular phone lines (Point Topic, 2003; MOFA, 2003). A survey accomplished in Autumn 2003 by TNS EMOR showed that 47%r cent of the Estonian population aged 15-74 regarded themselves as active Internet users (MOFA, 2003). ITU has combined Digital Access Index (see Figure 6), which can be regarded as an IS index since it includes education and affordability as well. ITU has found these two factors to be equally important with infrastructure access. By this index, Estonia ranks #18 among the selected European countries and outperforms other CEE countries except Slovenia.
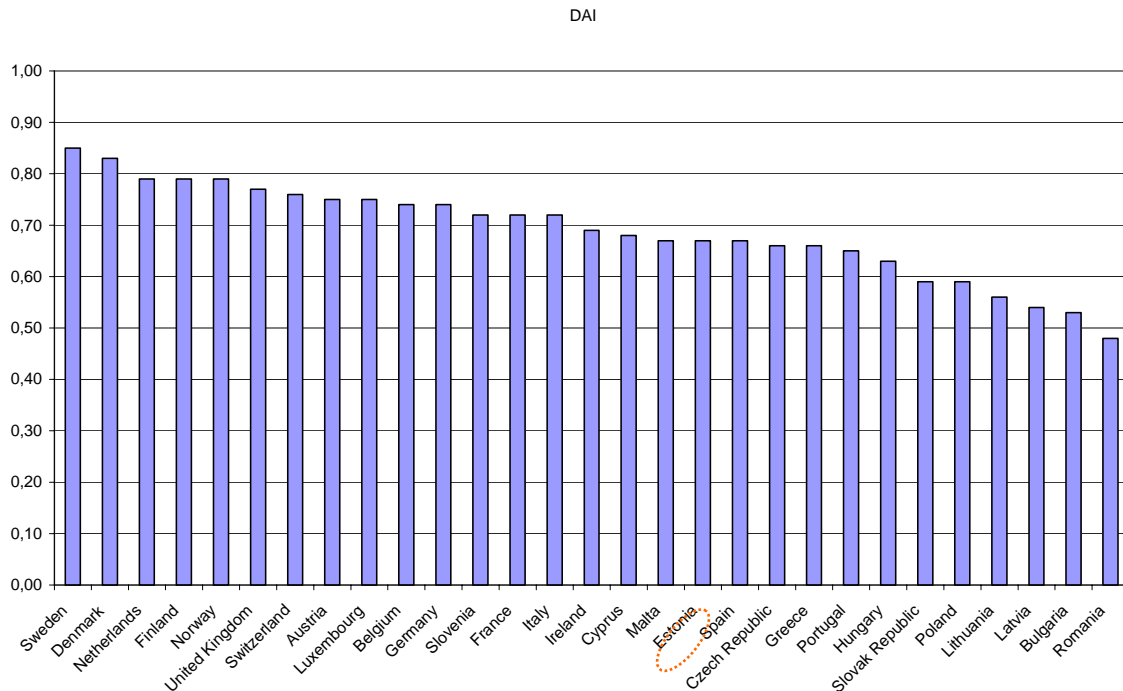
Figure 6. Digital Access Index, 2002 (Source: ITU, 2003)

3 DEVELOPMENT OF TELECOM NETWORKS AND SERVICES IN ESTONIA

The good rankings of Estonia displayed above are the result of a number of factors. This section highlights some key factors in the development of Estonian telecommunications markets. The section is divided into two parts, the first part concentrates on the development of infrastructure access, the provision of telecommunications networks, and the second part on the key measures aimed to increase the demand of telecommunications.

3.1 Infrastructure Access: Nordic Presence, Improving the Fixed Network and Technology Leapfrogging

Foreign investments – and especially Nordic ones – are often seen as the major reason for the rapid development of telecommunications in Estonia:

> "Estonia is benefiting from its geographical position and close links with Scandinavian countries to share some of their high take-up levels for new technologies such as broadband." (Point Topic, 2003)

In fact, several telecommunications operators from the Nordic countries have been actively investing in the Estonian (and also in the Latvian and Lithuanian) telecommunications sector: Currently, TeliaSonera (Swedish-Finnish) dominates the market with major shares in the Estonian fixed-line incumbent, and the mobile market leader. Tele2 (Swedish) is also in the fixed-line, mobile and cable-TV businesses of Estonia. A great innovator in wireless communications in Estonia is Radiolinja Eesti, the subsidiary of the Finnish operator Elisa. (Telecommunications in the Baltics, 2004). These investments must have had hastened the usage of new technology, but also to have reinforced Estonia's ICT industry in low value added activities (Kalkun and Kalvet, 2002).

However, it seems not only to be Nordic presence which is behind the rapid infrastructure development. Estonia was also active in regulating its telecommunications. It first formed an incumbent operator in the early 1990s, which had a very important role in building the basic telecommunications infrastructure. Probably one of the most important measures was the concession agreement between the government and the incumbent Elion (former Eesti Telecom), which guaranteed it a monopoly position for at least 8 years in basic telecommunications, starting from 1992 (Concession Agreement, 1992). It was aimed to rapidly modernize the existing telecommunications network and to ensure connectivity in rural and scarcely populated – and hence unattractive for ICT investments – areas in return for profitable urban contracts. This concession agreement enabled the incumbent to finance these unprofitable investments by cross-subsidies from profitable businesses. The deregulation of the monopoly took place in 2001, and has been rapid, since Estonia was also the only EU applicant country to have fully unbundled the local loop by January 2003. New operators entered into these markets immediately after the end of monopoly, and they have succeeded in taking relatively high market shares by introducing lower tariffs.

In mobile communications, the strategy seems to have been quite different than in fixed lines telecommunications: Estonia seems to have had a liberalized mobile telecommunications right from the start. In mobile telecommunications, it seems that competition between operators has ensured access to mobile networks for the whole country. Mobile telecommunications in Estonia also provides a prime example technology leapfrogging – to which the presence of Nordic operators probably has had a great effect on. Technology leapfrogging becomes an attractive option in a country with a bad or non-existent fixed telecom infrastructure, as more flexible mobile alternatives are set up and provide connectivity more rapidly. So, instead of first

waiting that the fixed telecommunications network would have been finished, the mobile networks were built simultaneously. Estonian operators were relatively early in the GSM markets, among the first in introducing WAP services, and more recently, positioning services. (Information Technology Landscape, 2001). Currently, Estonia is actively building a wifi network (WLAN); the first wifi hotspots were launched in the spring of 2001. Estonia had 107 wifi hotspot areas in 5/2003, and 293 in 5/2004 – wifi is now present in all Estonia's territories, however with more hotspots in more populated areas (see Figure 7). Indeed, 6.8 % of all wireless Internet areas in Europe were located in Estonia in 2003. (Telecommunications in the Baltics 2004; www.wifi.ee).
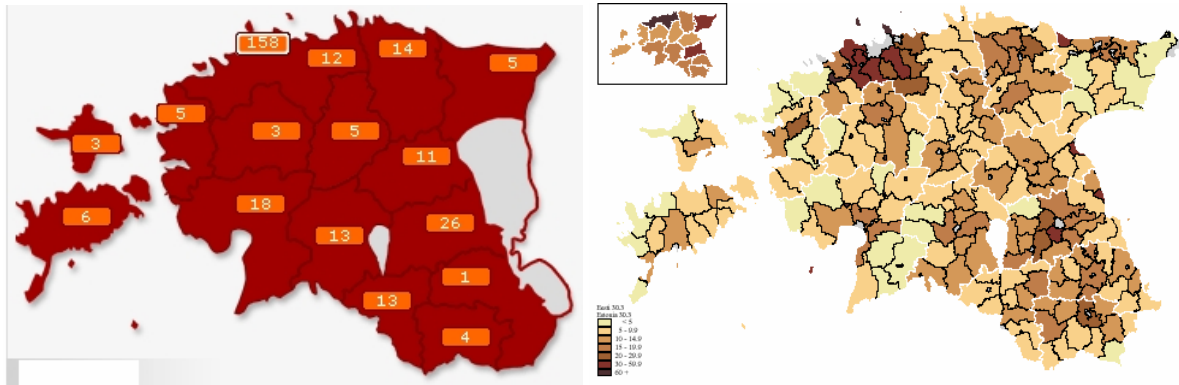

Figure 7. Wifi hotspots in Estonia and population density. (Source: wifi.ee; www.stat.vil.ee)

Currently, it seems that the Estonian telecommunications markets are restructuring again, as the mobile telecommunications has become to provide a worthwhile alternative for fixed telephony:

> "In the Baltic countries, we further developed the mobile business and initiated a restructuring of the fixed network operations. The mobile operators showed positive growth and a good earnings trend and we strengthened our market positions. The fixed network operations are facing stiff competition from the mobile sector. Restructuring efforts were initiated on these operations in order to reduce cost levels and fortify the Internet and data communications businesses where we see good growth opportunities. " (TeliaSonera, 2003)

3.2 Increasing Telecom Demand: Provision of Public Access and Education

More or less after building the basic telecommunications infrastructure, the countries' policies in general seem to have shifted from focussing on the supply side to the demand side, or to the whole market - 'Information society'. All three Baltic States had adjusted their telecom-

munications regulation to meet the EU requirements by May 2004. Also, all of the states have ambitious Information Society plans. However, relevant legislation is seen to be more deliberate in Estonia than in the case of Latvia and Lithuania (Telecommunications in the Baltics, 2004). The IS policy of Estonia was approved by Parliament in May 1998, and the Action Plan was accepted by the government in April 1998 and May 1999. The Strategy (1999) included a broad set of topics from market regulation to education programmes.

Although almost all public employees have computerized workplaces in Estonia, and 38 % of the population have computers, of which 71 % are connected to (usually high-speed) Internet (MOFA, 2003), there exists a socio-economic and geographical digital divide. To diminish this divide, and to promote Internet usage, Estonia has provided a Public Internet Access Points (PIAPs). These have proved to be successful in making people familiar with the Internet. The PIAP project was funded by an aid project of the UN Development Programme. The first PIAP was opened in 1997, and currently there are over 700 PIAPs throughout Estonia, meaning 51 PIAPs per 100 000 people (autumn 2003) - the highest ratio in Europe (MOFA, 2003). Most of the PIAPs are located in libraries and other municipal buildings. The territorial distribution of PIAP's compared to population density is shown in Figure 8.
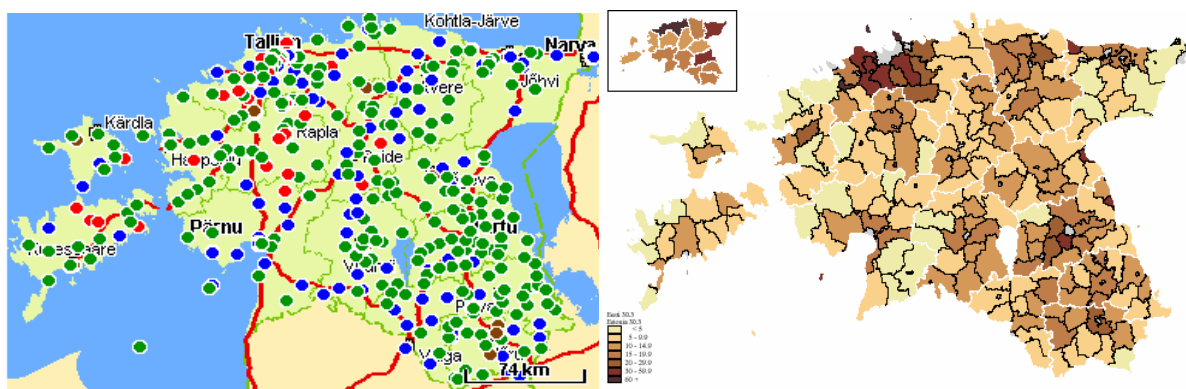

Figure 8. Public Internet Access Points (PIAP) and population density (Sources: www.regio.delfi.ee/ipunktid; www.stat.vil.ee)

The significance of the promotion of ICT skills in education was recognised relatively early: First, all Estonian schools were connected to the Internet, by the state-run "Tiger Leap" programme (1997-1999) (Tiger Leap, 2004). Even the three-student school on the isolated Ruhnu Island (about 40 inhabitants) has an Internet connection. As a result of this programme, school children are above-average users of the Internet, and the Estonians now in school will be

100% computer literate (MOFA, 2003). Teachers are enthusiastically reporting that students are highly motivated to learn computing, out of personal interest, and also because they know it will help them to find better jobs (Accenture et al., 2001). There has been also an emphasis on ensuring that the university prepares students with relevant and practical ICT skills. The high level of Internet usage in Estonia is thus largely correlated to the early adoption of Internet in research and higher education.

More recently, the government has been active and introduced smart cards to facilitate applications in, for example, public administration, hospitals and public transport. The Internet is also being used extensively to deploy e-government and e-banking functions: over 280 public services were available on-line, and 80% of commercial banking transactions were conducted via the Internet already in 2000. An interesting curiosity is that farmers from the remote island of Hiiumaa are offering their products through Internet auctions. (Accenture et al., 2001).

4   CONCLUSIONS AND LESSONS FOR OTHER EUROPEAN COUNTRIES

The aim of this paper was to evaluate Estonia's success in telecommunications networks and services, and the key factors behind the possible success. From the analysis in the second section it is obvious that Estonia is doing well in terms of telecommunications, by some of the indicators its situation is comparable to the EU15 countries, especially in broadband and Internet use.

Although the Nordic operators have been eager in investing and developing Estonia's telecommunications markets, they have not been the only factor behind rapid development. Estonia's active policy actions which ensured the modernization of the fixed network, made possible competition of foreign operators in the mobile network, and improved computer and Internet skills of citizens, have been important steps in the development. The mix of fixed and wireless technologies, and regulated and liberal markets have probably also been the key to a good rural connectivity. However, Northeast Estonia does not seem to be that well covered (see Figures 7 and 8) which would suggest that there is a social digital divide not separate from the ethnic or language dimension of Estonians and Russians.

There might also be other reasons behind the high broadband penetration rate in Estonia, related to closeness of the Nordic countries:

> Clearly broadband Internet appeals to customers in Northern countries with long winters, where indoor hobbies will be popular. Canada's high penetration of DSL supports this analysis and the relatively high penetration in Estonia has already been mentioned. (Point Topic, 2003)

But, besides measures aiming to cool climates in order to get longer winters, what are the lessons which other countries may learn from Estonia to get high penetrations in telecommunications services? The key lessons can be summarized as follows:

o Provide the fixed telecom operator with enough investment possibilities in order to have the fixed telecommunications network modernized. These investments can be financed, for example, through cross-subsidies, if the operator runs a national monopoly.

o Make international presence and investments possible in the development of new telecommunications networks. Early liberalization makes the market attractive for foreign operators: With limited resources, international operators are needed to provide the investments for new telecommunications networks and, more importantly, to generate competition in the provision of networks. Competition seems to lead to a relatively early and good territorial coverage, and to lower prices in a small country such as Estonia with relatively densely populated rural areas.

o Do not only concentrate on improving access to telecommunications networks, but also be sure to improve general computer knowledge and citizens' computer skills. This can be done, for example, through provision of public access points and education programmes. We easily overestimate the role of top-down government policy, and forget the impact of grassroots activities (and national culture in general) on the overall development.

o Be sure that relevant content is provided over the telecommunications networks. Without content potential users of telecommunications networks remain non-adopters, as they do not see the point of adopting. The public sector should at least consider providing of some of its own services through telecommunications networks. Subscription to telecommunications might even be made more attractive through encouraging private content provision, for example, by means of subsidies.

In the end, it seems that the technology-mix of telecommunications may well vary in countries with different historical and institutional developments and territorial structures, and this implies different policy packages. But when Estonia is compared to other Baltic states, what has been the key strength of Estonia to attract investments inflows in the region? To summarize and in general, the success in this sense may have been a result of three things: Proximity of Finland and Sweden, active regulation and relative early liberalization, and a competition and entrant friendly market environment.

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