Daniel Buhr, Rolf Frankenberger and Annalisa Ludewig

On the Way to Welfare 4.0 – Digitalisation in Estonia
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1. ABSTRACT

- Estonia is a pioneer in digitalisation. Since 2000, internet access has been a fundamental right of all citizens. Furthermore, Estonia has committed itself to consistent and regular renewal of its IT infrastructure, which has resulted in an extensive broadband infrastructure. However, while Estonia is a leader with regard to digital public services, e-government and private use of the internet, there is room for improvement with regard to the integration of digital technologies in the economy.
- Estonia is a forerunner of digitalisation in health care policy. The E-Estonian E-Health Foundation successfully coordinates digitalisation of the health care system. In 2008 Estonia was the first country in the world to implement a uniform nationwide system of electronic patient records, storing the medical history of every resident (Electronic Health Record or EHR).
- Estonian labour market policy has taken the path of deregulation. Since the outbreak of the financial and economic crisis in Europe Estonian labour market policy has been closely oriented towards the “flexicurity” model, along Danish and Dutch lines. The influence of the social partners is correspondingly low.
- Considerable resources have been put into improving the population’s digital skills. Furthermore, various programmes are targeted towards better serving the needs of business in future, taking account of digitalisation.
- Estonian innovation policy is based on digitalisation and especially the promotion of entrepreneurship. For example, the Estonian economy is based on a large number of SMEs and has an above-average founder ratio.
- In its Digital Agenda 2020 the Estonian government has bundled a range of measures aimed at improving the ICT infrastructure as a driver of Estonian competitiveness.

2. A BRIEF OVERVIEW OF THE POLITICAL AND ECONOMIC SYSTEM

The Republic of Estonia became independent from the Soviet Union on 20 August 1991; the current constitution came into force in July 1992, after a referendum. The constitution contains the basic principles of democracy and asserts that “the supreme power of state is vested in the people”. While the protection of living space and the environment are anchored in §53 of the constitution, it contains no fundamental social rights, so that the welfare state has little formal basis. The most northerly Baltic state acceded to the EU in May 2004 and adopted the euro as its currency in 2011. Estonia is also a full member of the OECD. After independence Estonia implemented comprehensive political and economic reforms. In this context the transition from a planned to a market economy was conducted consistently and successfully. Estonia’s economic development was interrupted in the crisis year 2009 and output fell by 14 per cent. Since 2011, however, Estonia has once more been on a growth path. Key economic branches include manufacturing industry, transport, telecommunications, tourism and trade. High growth rates have been achieved in the service sector. In 2015 real GDP grew by 1.4 per cent. Although in 2016 economic output and nominal labour productivity are below the EU average, the unemployment rate is also below average, at 6.8 per cent. Investment in research and development, at 1.44 per cent of GDP, as well as the number of people with a tertiary education (13.2 out of 1,000) in the so-called MINT subjects are also below the EU average (see Table 1).

The economic reforms were accompanied by reforms of the welfare state. With a very low proportion of social spending in GDP of 14.8 per cent, above-average income inequality, a very low trade union density and weak institutionalisation of industrial relations the Estonian welfare state has markedly “liberal” (Esping-Andersen) characteristics. A particular social challenge is the integration of the Russian minority and the continuing shrinkage of the population due to emigration. Among other things, digitalisation represents a great development opportunity. Despite the country’s comparatively low urbanisation – only 68 per cent of the population live in
Table 1
Overview of Estonia

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Estonia</th>
<th>EU28</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form of state</td>
<td>Democratic republic</td>
<td></td>
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<tr>
<td>State organisation</td>
<td>Unitary</td>
<td></td>
</tr>
<tr>
<td>Party system</td>
<td>Multi-party system</td>
<td></td>
</tr>
<tr>
<td>Electoral system</td>
<td>Proportional representation</td>
<td></td>
</tr>
<tr>
<td>EU member since</td>
<td>1 May 2004</td>
<td></td>
</tr>
<tr>
<td>Inhabitants/km²</td>
<td>30.3</td>
<td>116.7</td>
</tr>
<tr>
<td>Urbanisation (% of population)</td>
<td>68</td>
<td>74</td>
</tr>
<tr>
<td>Welfare state regime</td>
<td>Liberal / post-soviet</td>
<td></td>
</tr>
<tr>
<td>Income inequality (distribution quintile)</td>
<td>6.2</td>
<td>5.2</td>
</tr>
<tr>
<td>Social expenditure (% of GDP)</td>
<td>14.8</td>
<td>28.6</td>
</tr>
<tr>
<td>GDP per capita (PPS, Index: EU=100)</td>
<td>74</td>
<td>100</td>
</tr>
<tr>
<td>Growth rate (real GDP in comparison with previous year)</td>
<td>1.4</td>
<td>2.2</td>
</tr>
<tr>
<td>Budget deficit/surplus (% of GDP)</td>
<td>0.4</td>
<td>–2.4</td>
</tr>
<tr>
<td>Labour market productivity nominal per employee (Index: EU=100)</td>
<td>69.7</td>
<td>100</td>
</tr>
<tr>
<td>Harmonised unemployment rate</td>
<td>6.8</td>
<td>8.6</td>
</tr>
<tr>
<td>Trade union density (0–100)</td>
<td>5.65</td>
<td></td>
</tr>
<tr>
<td>R&amp;D total spending (% of GDP)</td>
<td>1.44</td>
<td>2.03</td>
</tr>
<tr>
<td>Proportion of people 20–24 years of age with at least upper secondary education (%)</td>
<td>83.4</td>
<td>82.7</td>
</tr>
<tr>
<td>Tertiary education in MINT subjects (per 1,000 graduates)</td>
<td>13.2</td>
<td>17.1</td>
</tr>
<tr>
<td>DESI (0–1; 1=digitalised society)</td>
<td>0.59</td>
<td>0.52</td>
</tr>
<tr>
<td>Proportion of regular internet users (16–74 years of age) in %</td>
<td>86</td>
<td>76</td>
</tr>
<tr>
<td>Internet penetration (% of households)</td>
<td>88</td>
<td>83</td>
</tr>
<tr>
<td>Proportion of households with broadband connection (%)</td>
<td>87</td>
<td>80</td>
</tr>
<tr>
<td>Proportion of companies with broadband connection (%)</td>
<td>97</td>
<td>95</td>
</tr>
</tbody>
</table>

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towns – Estonia has many features of a digitalised society. The proportion of regular internet users and the proportion of private households and companies with broadband connections are well over the EU average.

### 3. STATE OF DIGITALISATION

Estonia is thus rightly described as a digitalisation pioneer. For example, as early as 2000 the Estonian parliament introduced a fundamental right to internet access for all citizens. Parliament also decided that the IT infrastructure should be renewed every seven years in order to ensure technological progress. This commitment is reflected, for example, in the early and extensive implementation of broadband infrastructure, even though this has stalled somewhat for a few years and applies mainly to urban areas. More than 12 per cent of the Estonian population are still waiting for fast internet connections, well above the EU average (3 per cent) (Digital Economy and Society Index 2016). With regard to mobile broadband connections, however, Estonia is third in the EU, also due to the substantial drops in prizes for mobile telephone and internet use and the wide availability of WLAN networks.

If one looks at, besides purely technical parameters, other indicators, Estonia ranks sevenths in the DESI 2016 with regard to the development of the digital economy, right alongside Germany, Austria and the Netherlands.

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**DESI is an index composed of five dimensions, which surveys the development of EU member states towards a digital society. Developed by the European Commission (DG CNECT) the index encompasses connectivity, human capital, internet usage, integration of digital technologies in the economy and digital public services (e-government). The Index varies between 1 and 0, with 1 representing the highest value.**

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**Figure 1**

Development of a digital society in Estonia by comparison with Germany and the EU28

Source: Digital Economy and Society Index 2016.

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Estonia is above the EU average in all sub-indices and is characterised in particular by high growth rates. While the country is a leader in digital public services and the private use of the internet, it lacks behind with regard to the integration of digital technologies in the economy, lying a lowly twenty-second in the EU (DESI 2016).

Estonia took an early lead in Europe in the area of digital administration. The basis of the early digitalisation of broad swathes of the administration was the decentralised online platform “X-Road” introduced in 2001, which now links around 1,000 institutions offering numerous digital services. A plethora of e-services have been established: for example, almost every Estonian has an e-ID card, which has been available on a mobile basis since 2007 (e-Estonia 2016). In addition, for many years Estonians have been able to complete their tax declarations online, since 2002 to pay by mobile telephone and since 2005 to vote online (initially in municipal elections). In the European elections in 2014 one out of every nine votes were cast electronically and in the parliamentary elections on 1 March 2015 one voter in five voted through the internet.

### 4. HEALTH CARE POLICY

Estonia has the lowest social spending in the European Union, at 16.4 per cent of GDP (OECD 2016). Accordingly, state expenditure on the welfare state and on redistribution within the system are rather low. Social inequality is thus high (World Bank 2016). Although Estonia bears many similarities to the so-called “liberal” variety in various areas of the welfare state, in the health care system there are also features of a conservative or even social democratic system. On the one hand, decommodification – for example, with regard to daily sickness benefits with a replacement rate of around 70 per
Social Affairs, which is responsible for this policy area, en-
force the EHIF and 20 per cent for pension insurance.)

Towards recentralization. These tendencies are even stronger
since competences were concentrated within the Ministry of
Social Affairs, which is responsible for this policy area, en-
compassing not just health care, but also employment, social
security, children and the family, and even gender equality.
In Estonia all citizens and residents who pay the “social tax”
(Sotsiaalmaks) are subject to compulsory health insurance.
Health insurance is funded by employers, who pay 13 per
cent of monthly gross wages into the Estonian Health Insurance
Fund (EHIF – Eesti Haigekassa). (In total, 33 per cent of income
are deducted in the form of social contributions: 13 per cent
for the EHIF and 20 per cent for pension insurance.)

Although state spending on health care rose continuously
from 2000 to 2015, it remained comparatively low at around
4.2 per cent. It is also striking that relatively few people are
employed in the health care system (OECD 2016) and, in-
deed, many nurses and doctors emigrate. Thus medical provi-
sion is strained, especially in rural areas, because the number
of both hospitals and medical specialists has been falling for
years. On the other hand, the number of care places has risen
enormously in recent years.

But the health care system also provides considerable
evidence of Estonia’s status as digitalisation pioneer. Since 2005
the Estonian E-Health Foundation has successfully provided
a forum for coordinating the digitalisation of the health care
system. For example, in 2008 Estonia was the first country in
the world to implement a nationwide uniform system of elec-
tronic patient records to store the medical history of all resi-
dents (Electronic Health Record – EHR). Doctors and patients
have equal access to these records, although the latter can
also restrict access. More than 70 per cent of Estonians make
use of the EHR (e-Estonia 2016), although particularly older
people – especially in rural areas – have difficulties with it,
both in terms of technical access and the necessary digital skills.
Thus as early as 2002 the Estonian government launched
an initiative intended to facilitate internet use for all social
groups. The EHR, after all, also offers citizens the opportu-
nity to make doctor’s appointments and to receive reminders
about them, as well as to conduct teleconsultations with
the doctors treating them. Another important function is the
issuing of prescriptions: 98 per cent of all prescriptions are
now done online via the X-Road system.

5. LABOUR MARKET POLICY

The Estonian labour market is split: On the one hand, there is
a large number of highly skilled people especially in the urban
areas; on the other hand there are large numbers of under-
qualified people. Long term unemployment figures show that
these are especially elder cohorts, people from rural areas
and non-Estonians.

Estonian labour market policy has long pursued a (neo)
liberal course. The influence of the social partners is correspond-
ingly low. The employers are represented by four central
organisations. The most influential of these, besides the Esto-
nian Chamber of Industry and Trade (EKT), is the Central
Union of Estonian Employers and Industrialists (ETTK), repre-
senting around 1,500 companies, employing more than
one-third of all private sector employees. Another important
interest representative is the SME Association of Estonia
(EVEA) (EWS 2013). But only around one in ten employees are
trade union members. Among the trade unions, the Estonian
Trade Union Confederation (EAKL) and the Estonian Em-
ployees’ Unions’ Confederation [sic] (TALO) exercise the most
influence. However, institutionalisation of industrial relations
in Estonia is reactively weak. For example, at local level and
among broad swathes of SMEs there is almost no trade uni-
ion representation.

Since the outbreak of the European financial and eco-
nomic crisis Estonian labour market policy has been strongly
oriented towards the so-called “flexicurity” model, as it was
introduced for example in Danmark or the Netherlands. A
key actor in this regard, besides the Ministry of Social Affairs,
is the Estonian Unemployment Fund (Eesti Töötukassa), which
is responsible for both passive and active unemployment as-
sistance. In 2009 it took on the tasks of the Employment
Office and has local representation in each district (European
Economic and Social Committee 2013).

Unemployment insurance is funded by employer and
employee contributions (0.8 per cent of the gross wage for
employers and 1.65 per cent for employees – BMAS 2016).
Unemployment benefit is state-funded and, at a mere 4 euros
a day, very low. Resources for both active and passive labour
market measures are extremely tight, both relatively and in
absolute terms, with almost half of the Budget coming from
the European Social Fund. Among these measures the Estoni-
an government has in recent years increasingly focused on
activation, education and acquisition of qualifications, also
with regard to digitalisation.

For example, considerable resources have been put into
boosting digital skills. Within the framework of the nation-
wide gaming project “Bit by Bit”, for example, pupils between
the ages of seven and eleven years of age study program-
ing. Besides school education, the same approach is being
tried in further training, for example, with qualification sche-
mes such as “Tech Entrepreneurship” and “IT Innovation”.
Such schemes as the Lifelong Learning Strategy 2014–2020,
adopted by the Estonian parliament in 2014, the Adult Edu-
cation Act and the Professionals Act of 2015 are aimed at
better meeting labour market needs with regard to digitalisa-
tion. In this context the Ministry of Social Affairs will cooperate
more intensively in future with the Ministry of Education and
“Foundation Innove”.

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6. INNOVATION POLICY

Responsibilities with regard to Estonian innovation policy are distributed across various ministries, although they lie principally with the Ministry for Education and Research (Haridus- ja Teadusministeeriumi) and the Ministry for the Economy and Telecommunications (Majandus- ja Kommunikatsiooniministeeriumi). However, spending on innovation policy is below average by international comparison. This is also evident in relation to general expenditure on research and development for the economy as a whole. It is striking that in Estonia this has been falling for years – from 2.31 per cent of GDP in 2011 to 1.44 per cent in 2014 – while in the EU28 as a whole it has risen above 2 per cent during the same period.

Estonian innovation policy prioritises, both, digitalisation and the promotion of entrepreneurship. For example, the Estonian economy is based on a multitude of SMEs and has an above-average founder ratio. The Global Entrepreneurship Monitor (GEM 2016) acknowledges Estonia’s dynamic development, high innovativeness and continuously rising propensity to establish start-ups. Estonia also offers the opportunity of a so-called “e-residency”, which is available to foreign citizens, both to improve start-up conditions for foreigners wishing to establish companies, and to attract workers. Estonia is also catching up in relation to the provision of funding. In 2010 the Estonian development fund set up an affiliate company, “SmartCap”, to provide comprehensive growth funding, aimed at bringing together start-ups with capital and “business angels”. In addition, the Estonian state has set up the development fund Arengufond to promote information technology and digitalisation in application sectors. For example, around a quarter of the total industrial research budget flows into the IT sector.

This is bundled into various clusters – the Estonian ICT cluster, the Industry 4.0 cluster and the Connected Health cluster – with good links to the Estonian research system. In proportion to the size of the country, Estonia has an internationally renowned research sector, especially in the area of information technology. Besides the three state-run universities in Tartu and Tallinn there are two competence centres (ELIKO, STACC), a private research institute (Cybernetica) and a state research centre (KFB). The government has bundled its measures for improving the ICT infrastructure in its Digital Agenda 2020 as a driver of Estonian competitiveness. In detail, it plans, among other things, to expand the broadband network and to boost transfer speeds, as well as to put digital signatures on a sounder footing. Activities in the area of Estonian innovation policy since 2014 have pursued two medium-term policy strategies (2014–2020); the Estonian Research and Development and Innovation Strategy and the Estonian Entrepreneurship Growth Strategy. One aim is to increase research and development spending by 2020 to 3 per cent of GDP (Lisbon target), with two-thirds being funded by business. Given the constant decline of this indicator over the past five years, however, this target seems ambitious to say the least. However, in boosting its research and development Estonia is relying on the European Structural Funds. For example, the current Operational Programme for Estonia makes available 4.4 billion Euros during the funding period, 3.53 billion of which come from the European Cohesion Fund, with a particular focus on the innovativeness of the Estonian economy.

7. SUMMARY

Estonia, given its pioneering role (for example, in e-government), its size and its economic structure, is well prepared to benefit from the increasing digitalisation both economically and socially. In recent years, for example, it has been shown that the digitalisation of the health care system (for example, electronic patient records) can do a good job of making up for some of the weaknesses in medical provision (for example, poor hospital network, few doctors). However, this only goes part of the way to tackling the structural polarisation in Estonian society. There are still cleavages separating rich and poor, young and old, rural and urban, but also Estonian and non-Estonian. This has also manifested itself in certain aspects on the road towards the information society: winners here (for example, young, well qualified employees in Tallinn’s high tech clusters), losers there (for example, public sector employees or agricultural workers, pensioners and non-Estonians in the north-east of the country). Estonia will still have to invest substantially in the expansion of the welfare system in order to reduce social inequality and to avoid serious social tensions.

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