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JAMK UNIVERSITY OF APPLIED SCIENCES

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Tiivistelmä

Opinnäytetyön tavoitteena oli selvittää, kuinka Eun Digitaaliagenda tulee vaikuttamaan Suomeen ja kuinka alan yritykset ovat varautuneet sen vaikutuksiin strategioissaan. Työ pyrkii myös tunnistamaan mahdollisia tulevia ongelmia alalla ja löytämään Digitaaliagendan tarjoamia mahdollisuuksia.

EU2020-strategian lippulaivahanke Digitaaliagenda voi aiheuttaa suuria muutoksia koko EUn alueella. Digitaaliagenda tähtää esimerkiksi nopeampiin internet-yhteyksiin koko EUn alueella, luo digitaalisen yhteismarkkinan ja lisää järjestelmien yhteentoimivuutta. Nämä tavoitteet tuodaan tarkemmin esiin opinnäytetyössä.

Työssä käytettiin Porterin Viiden kilpailuvoiman (Five Forces) mallia Digitaaliagendan yleisten vaikutusten esittelemiseen. Tässä osassa työtä käydään läpi tämänhetkistä tilannetta ja pyritään luomaan tulevaisuuden skenaario alalle, sikäli kun se on näin laajalla kentällä mahdollista.

Tuodakseni työn käytännönläheisemmälle ja yksityiskohtaisemmalle tasolle käytin sitten Tulevaisuuspyörää (Futures Wheel) analysoidakseni Digitaaliagendan vaikutusta viiteen erilaiseen ja eri kokoiseen ICT-alan yritykseen. Tässä kohdassa haastatellut yritykset ovat Nokia, Microsoft, Sonera, Graphisoft Finland ja Tieto.

Tämän tutkimuksen tulokset ovat suoraan sidonnaiset tutkittuun toimialaan. Digitaaliagendan vaikutukset riippuvat myös yrityksen koosta. Tutkimuksen tuloksista on nähtävissä, että Digitaaliagendalla tulee olemaan suuri vaikutus tavallisten kuluttajien elämään. Digitaaliagenda tuo tavalliselle kuluttajalle lisää vaihtoehtoja ja paremmat verkkoyhteydet. Tämä voi johtaa hintojen alenemiseen. ICT-alalla Digitaaliagenda lisääntyvä kilpailu tulee muuttamaan toimintaympäristöä. Uusi toimintaympäristö tulee vaatimaan yrityksiltä lisää tehokkuutta ja luovuutta.

Avainsanat (asiasanat)
Euroopan Unioni, Digitaaliagenda, Digitaalinen Agenda, ICT, Porter, Futures Wheel, Nokia, Microsoft, Sonera, Tieto, Graphisoft

Muut tiedot

# The effect of the EU Digital Agenda on the ICT sector in Finland

Laura Mäkinen

Bachelor's Thesis
April 2011

Degree Programme in International Business
Social Sciences, Business and Administration

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Abstract
The goal of this thesis is to find out how the Digital Agenda of the European Union will effect Finland and provide information on how it is taken into consideration by ICT companies operating in Finland. The work also aims both at recognizing possible future problems for the industry and at pointing out the opportunities Digital Agenda provides.

The EU2020-strategy's flagship initiative can cause changes throughout the European Union. The Digital Agenda sets goals for example for faster Internet connections throughout the EU, creates a digital single market and increased interoperability. All of these goals are discussed in the thesis.

To find the general impacts on the ICT sector I conducted an analysis of Porter's Five Forces. This Case Study of the Finnish ICT sector recognizes the current situation as well as creates a future scenario to the extent it is possible for a sector as broad as the ICT.

To provide more practical and in-depth information I then used the Futures Wheel-method to analyze the impact of Digital Agenda for 5 ICT companies of different sizes and industries. These include Nokia, Microsoft, Sonera, Graphisoft Finland and Tieto.

The findings of this research are industry specific and strongly depend on the size of the company. The findings show that the Digital Agenda is extremely likely to have a clear impact on the lives of the the regular consumers by providing them with more choices and better network connections. For a regular consumer this can mean for example more choice and thus lower prices. Within the ICT field the increased competition will change the operating environment. In the new even more hyper-competitive environment companies need to be extremely efficient and creative. This may initially mean lay-offs. However in the long run it is rather more likely that there will be a shortage of competent employees in the ICT field in the future.

Keywords
Futures Wheel, M.E. Porter, Five Forces, Digital Agenda, European Union, EU2020-strategy, Flagship Initiative, Innovation, Future Studies, ICT

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# 1. Introduction

EU2020-strategy states where the Union is supposed to be in the year 2020 and the means to reach the goals. Digital Agenda is one of the flagship initiatives of the strategy.

For example Tekes' point-of-view of the month in February 2011 (http://www.tekes.fi/fi/community/Kuukauden_n%C3%A4k%C3%B6kulmat/474/Kuukauden_n%C3%A4k%C3%B6kulma/1323?name=Ohjelmistoala+on+Suomen+vahvuus) mentions software business as one of Finland's most crucial strengths. The article stresses the importance of the industry for Finland, as the Finnish economy is strongly dependant in exports. Unlike many other businesses, the software industry grew even through 2009, the worst year of the recent economic recession.

As the ICT - sector is important for the Finnish economy and the Digital Agenda will bring changes with it I wanted to research the impact of the Agenda on the Finnish ICT - sector for my thesis. I have used Porter's Five Forces-framework to outline the industry. Later I interviewed five ICT - companies that operate in Finland. I used Futures Wheel-method to analyse their answers and show how the Digital Agenda will affect these companies. I chose different sized companies operating on different parts of the ICT – sector to get a thorough idea of the Digital Agenda's impact on the sector as a whole.

The Digital Agenda may also have indirect implications on the Finnish national economy. It may increase competition, effect price level and ease entrepreneurship in rural areas.

# 2. The Digital Agenda

## 2.1 The Europe 2020 - strategy

The Europe 2020 (Europe 2020 – A European strategy for smart, sustainable and inclusive growth, COM(2010)2020) strategy aims at increasing the competitiveness of EU. It involves general outlines defined by the European Commission. Measurable goals for all the member countries are also included in this. This strategy also requires that the member countries commit to national strategies to reach the goals set by the commission.

"All of these goals are designed to improve the competitiveness of the EU after the crisis. The EU2020-strategy is built on three pillars – smart, sustainable and inclusive growth ."

(EU2020 strategy, COM(2010)2020, p. 7)

*Europe 2020 puts forward three mutually reinforcing priorities:*

- *Smart growth: developing an economy based on knowledge and innovation.*
- *Sustainable growth: promoting a more resource efficient, greener and more competitive economy.*
- *Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.*

(EU2020 strategy, COM(2010)2020, p.7)

The goals set by the commission are mostly set for the year 2020. As these targets are rather ambitious for many member countries, achieving them means that the work must start now. These are the EU- targets for year 2020 according to the Europe 2020 – communication (EU2020 strategy, COM(2010)2020, p.11-12) of the commission:

– 75 % of the population aged 20-64 should be employed.

– 3% of the EU's GDP should be invested in R&D.

– The "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right).

– The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree.

– 20 million less people should be at risk of poverty.

These goals are also supported by seven flagship initiatives. These are put in place by the commission to support and speed up the positive development in each member country. The digital agenda we will concentrate on later in this work is one of these flagship initiatives.

The flagship initiatives most closely connected to the digital agenda are "Innovation union" and "An industrial policy for the globalisation era".

"Innovation union" (Europe 2020 Flagship initiative Innovation Union, COM(2010)546 final) aims at supporting innovation so that good ideas could be put into products. This is closely related to the digital agenda, as the digital agenda strongly emphasizes the need for increase in the research and development funds. The Innovation union- initiative (Europe 2020 Flagship initiative Innovation Union,COM(2010)546 final) is linked to the Digital Agenda, as they both emphasize the significance of R&D – investments for the future of European growth.

"An industrial policy for the globalisation era" (An industrial Policy for the Globalization Era Putting Competitiveness and Sustainability at Centre Stage, COM(2010)614) is aimed at improving the business environment of SME's. It wishes to create a sustainable industrial base that is able to compete globally. This is related to the Digital Agenda, because it aims at improving the competitiveness of Europe in the digital environment. The industrial policy for the globalization era (An industrial Policy for the Globalization Era Putting Competitiveness and Sustainability at Centre Stage, COM(2010)614) also aims at developing the single market from it's own point-of-view (An industrial Policy for the Globalization Era Putting Competitiveness and Sustainability at Centre Stage, COM(2010)614, p. 9). The significance of harmonized intellectual property law legislation within the EU also emphasized there. The negative effect the current 27 differing legislations have on the European

competitiveness is also recognized in this document (An industrial Policy for the Globalization Era Putting Competitiveness and Sustainability at Centre Stage, COM(2010)614, p. 9).

## 2.2 The Digital Agenda

As mentioned earlier, the Digital Agenda (A Digital Agenda for Europe, COM(2010)245) is one of the flagship initiatives of the Europe 2020 - strategy.

It outlines ways to take advantage of the opportunities provided for us by the modern communications technology.

The virtuous cycle of the digital economy demonstrates, what the commission wishes to achieve with the programme.

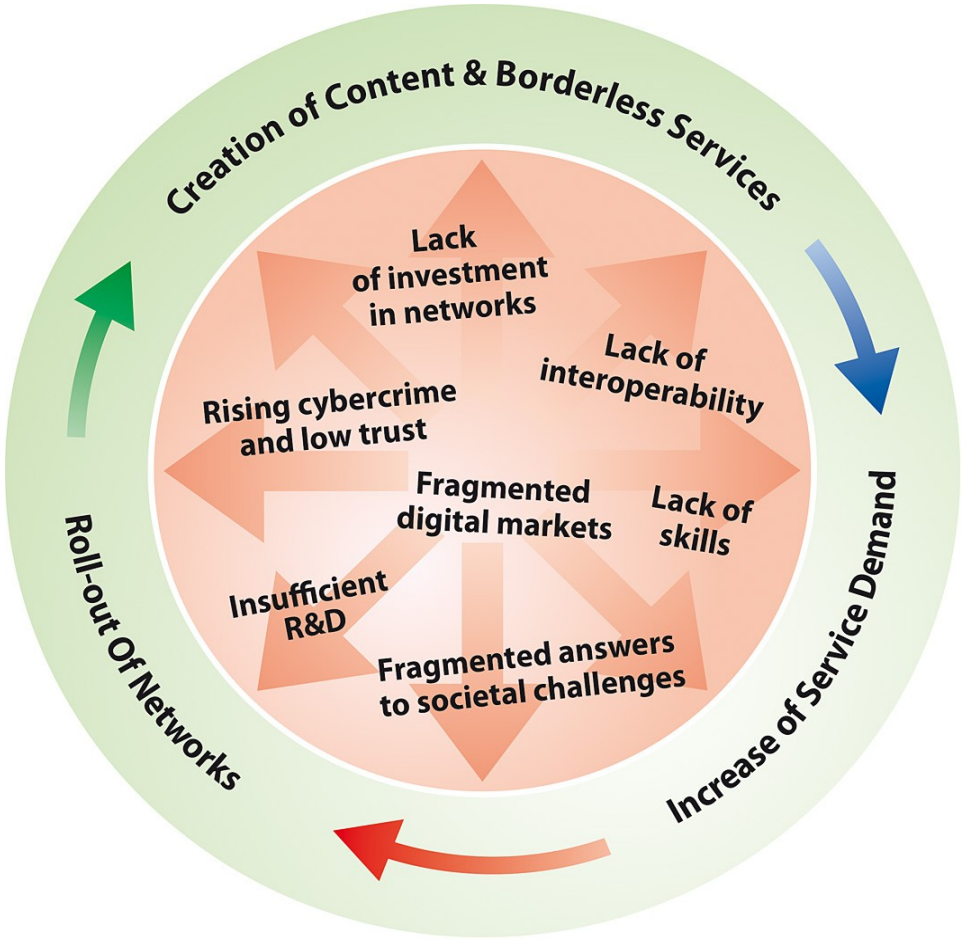



*Figure 1: The virtuous cycle of the digital economy*

(Source: European Commission, Brussels, COM(2010)245, p.5)

This figure demonstrates the virtuous cycle. It can become self reinforcing. In the center it shows all the major obstacles to taking advantage of modern communications technology. The outer circle then demonstrates the potential solutions to these problems and how, once we get it started, these solutions will be self reinforcing and the situation will start to correct itself.

To take an example, we could examine how organizing IT courses for those who lack in skills affects the bigger picture. If courses are organized new skills are developed. Thus there may also be more demand for networks, which would encourage investment in them. Also, if the demand for better consumer protection is required by more online shoppers, its development becomes more crucial. Thus, service demand will increase resulting in the roll-out of networks and thus content and borderless services will develop.

According to the rapporteur of Committee of Regions Markku Markkula, the successful implementation of the digital agenda requires a change in attitude in Europe. He feels that changes need to happen in the willingness to work in a horizontal and multidisciplinary manner. Once these changes have taken place new innovations can be born. Overcoming of national boundaries will also help to achieve this goal.

The Committee of Regions (CoR) rapporteur reminds us that in a digital society consumers are also producers. In his opinion, Finland could be a trailblazer for the creative industries in Europe. In his opinion This would require boldness and vision that are transformed into economic activity.

Markkula also highlights the new possibilities opened by the Digital Agenda as it enables building a low-carbon, high employment economic model for the rest of the world. This enables us to build a Europe based on knowledge.

The European Commission mentions seven major obstacles (A Digital Agenda for Europe, COM(2010)245, p. 6) that are introduced in the following chapter. Emphasis is put on their significance to the Finnish operating environment.

## 2.3 Fragmented digital markets

The online markets in the European Union (EU) have remained strongly national. Thus, the European citizens cannot, at the moment, enjoy the single market in the digital environment. This of course cripples the single market, as a lot of products and services are bought online nowadays. The commission insists that commercial and cultural contents should be able to flow freely across the borders. To achieve this, more trust from the consumers is required.

According to an article of The Parliament (Digital Single Market could increase the EU GDP (Gross Domestic Product)), the European Policy Center (EPC, an independent think tank) has predicted that a fuctioning digital single market could add "at least" 4,1 percent to the European GDP. The EPC also states in the article that launching the digital single market is crucial for productivity and competitiveness. This prediction highlights the significance of the digital market for the Union's recovery from the current crisis.

Especially the Finnish ICT sector sees the EU-level programmes like eGovernment and the digital single market as a huge opportunity (Miltä näyttää Suomen ICT klusterin tulevaisuus? The results of FuturICT Finland -project, research manager Hannu Hernesniemi's presentation). The FuturICT –project's major recommendation for all the ICT companies of Finland is to internationalize.

It becomes evident from Hernesniemi's presentation that there will be an increasing demand of competent work force in the ICT field in the coming years especially if the digital single market is properly launched. Within the ICT cluster, the number of personnel nearly doubled from 1993 to 2007. During the same time period the revenues almost tripled, while the amount of places of business remained roughly the same. On the basis of these statistics we can assume that the companies have grown.

In his presentation Hernesniemi lists the potential future strengths of the Finnish ICT cluster. Within those, the opportunities provided by EU (like eGovernment) are clearly acknowledged. He also states that the digital single market will create a significant improvement on the competitiveness of the above mentioned companies.

According to Hernesniemi, Nokia has taken a positive attitude to the digital single market. The digital single market would enable Nokia to develop products and solutions to the entire Europe. At the moment they need to develop them to every single country separately, which makes every market small. This obviously means that the product development and marketing expenses per consumer are significantly more expensive than in a situation where there would be a functional single market.

Hernesniemi also pointed out that many companies manufacturing health care software would like Europe to remain fragmented. This division into monopoly regions protects the companies from competition.

## 2.4 Lack of interoperability

In a nutshell, interoperability measures how well european digital systems work together. At the moment there is room for improvement. The digital services and equipment used by Europeans and the governments of member countries' do not work together, interoperate, to the desired extent. This is crucial for the digital agenda, as it can only work properly if all the different parts of it are interoperable. Open source software has a large significance in this.

According to Hannu Hernesniemi, added interoperability would, for example, enable the exchange of patient records over state borders within the EU. This is related to the issue of digital single markets. As there will be more national and EU-level regulations, the systems will be forced to be more unified.

This will naturally change the field of health care software, as current monopolies will face increased competition due to added interoperability.

## 2.5 Rising cybercrime and low trust

Trust is a crucial element in the use of the Internet. As crime online increases, Europe must rise to the challenge. As the Internet is a relevant part of the life of citizens, all the IT systems and networks must be made safe and reliable.

In the year 2009, payment, privacy and trust concerns were among the major disincentives to shop online. The following picture shows, that the only the lack of need to shop online or the preference to shop in person, were more common.

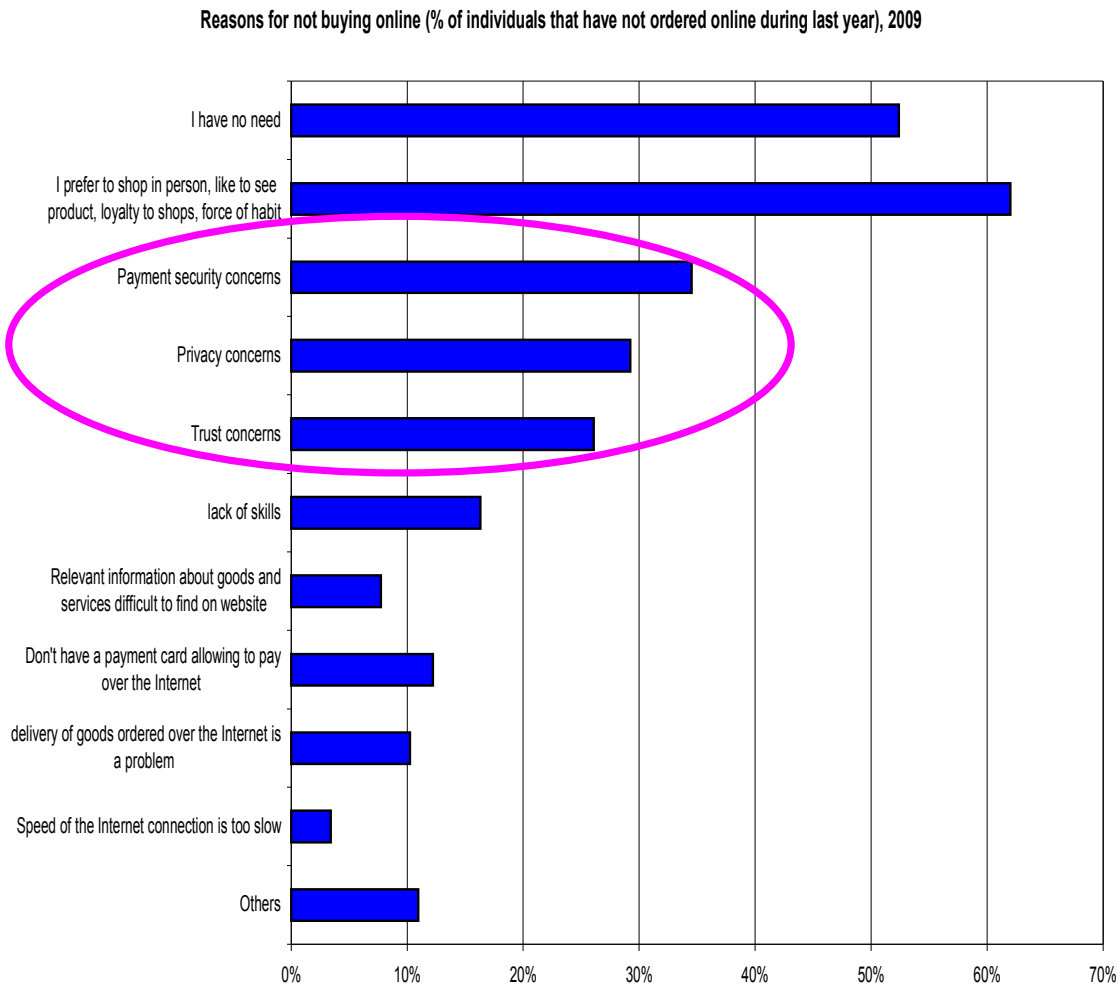



*Figure 2: Reasons for not buying online*

(Source: The Digital Agenda for Europe, COM(2010)245, p.13)

There has been work done to prevent cybercrime. For example Eurojust has held five operational meetings on the subject. Eurojust is an EU body focused on fighting organized crime. In it's annual report of the year 2009 Eurojust states that tackling Internet white collar crime requires coordinated investigation and proceeding actions. This kind of international cooperation is increasingly important as the Europol review of the year 2009 states, that during the year in question, cybercrime was on the grow.

In 2009 the implementation of the Europol Cyber Crime Platform (ECCP) began. It is part of a long term strategy that aims to cope more effectively with crimes committed by means of electronic networks (http://www.eubusiness.com/news-eu/action-plan-cybercrime/) The ECCP includes, for example, The Internet Crime Reporting Online system that connects member states and Europol to get information on the offences on the Internet. Also, ECCP targets Internet and ICT - driven organized crime in order to identify and dismantle cybercrime groups. The project also aims at the police sharing their best practices and training.

## 2.6 Lack of investment in networks

Broadband is needed by all the citizens. This means that the EU must take more action to offer everyone broadband connections of higher speeds using both wireless and wired technology. According to the Digital Agenda (COM(2010)245, p. 20), investing in the creation of ultra-fast Internet connections must be supported. To simplify, the EU wants to find a way to support private investments and avoid the birth of monopolies in the sector.

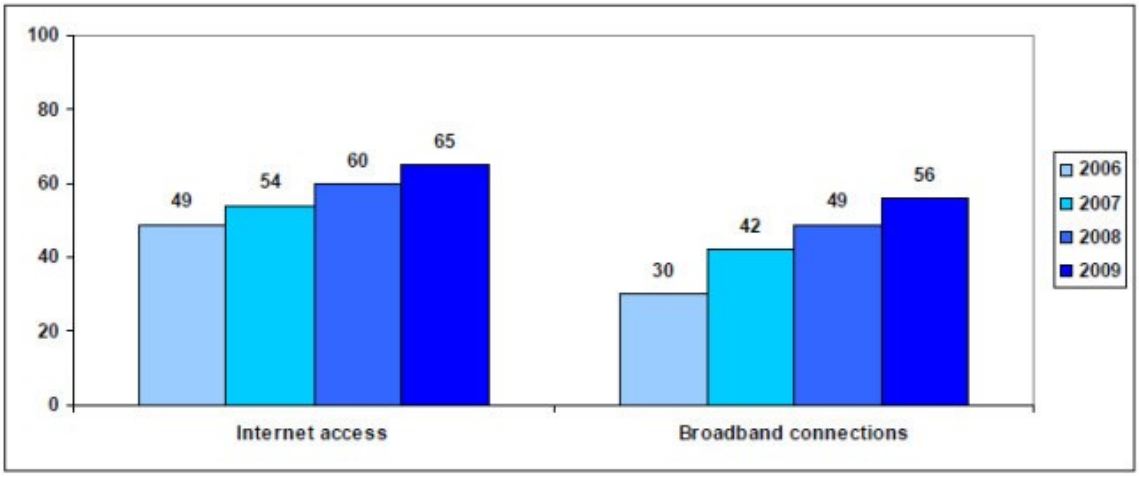



*Figure 3: Internet access and broadband internet connections by households*

(Eurostat, Data in focus 46/2009, Internet usage in 2009 – Households and individuals, p.1)

As we can see from the figure above, the amount of Internet connections has grown significantly since 2006. Also, the proportion of faster broadband connections has risen significantly. Even though this development is positive, there are certain things one should take into consideration. Europe has made large investments in aging broadband technology reliant on copper wiring. The new optic fibre technology that would enable faster Internet connections has seen very limited proliferation in the EU.

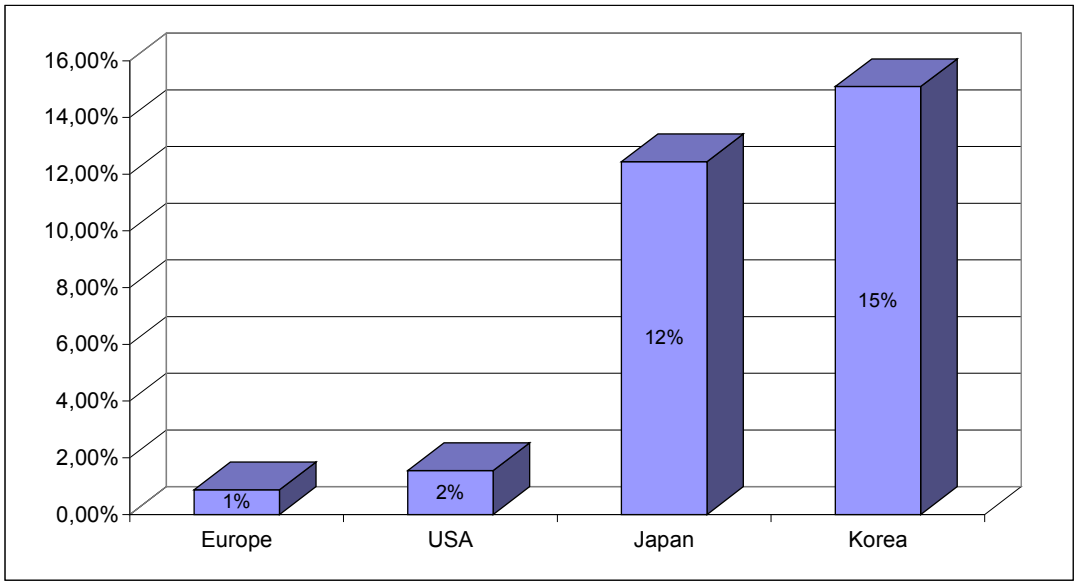



*Figure 4: Optic fibre connections*
Percentage of homes with optic fibre Internet connections

Figure 4 demonstrates how the proportion of Internet connections using the latest technology is small in the EU.

Updating the technology to support faster Internet connections will be very expensive. In the Europe 2020 - strategy it is suggested that EU's structural funds could be utilized in building these networks. Also, cooperation with private companies is strongly encouraged. It is further emphasized in the Digital Agenda (The Digital Agenda for Europe, COM(2010)245, p.21) that no telecommunications operator should be given a monopoly power in the market.

In Finland the availability of Internet connections has already been made a priority. In fact, Finnish law has demanded universal access to Internet connections of at least one Mbps since July 2010. The law demands that an Internet connection be available to all citizens, despite where they live. This

right is supervised by the Finnish Communications Regulations Authority (FICORA). If need be, FICORA has the authority to assign companies responsibilities for bringing Internet connections to certain areas at a reasonable price.

Ajankohtaista Kuluttajaoikeudesta is the magazine of the Finnish consumer agency. In its October 2010 issue some concerns are raised about the consumer protection of Internet users in rural areas. The article highlights the fact that actual consumer costs prices seldom equal the list prices. Instead, competitive edge on the sector is seeked by sales campaigns. These prices are significantly more inexpensive than the list prices. Thus the prices tend to be lower in the regions where the competition of service providers is fierce. This puts consumers in significantly inequal positions, depending on where they reside.

The Finnish consumer agency is concerned that the competitive low prices in the densely populated areas are paid for by the people living in rural areas who often have little, if any, choice regarding their service provider. In the article it is emphasized that the prices cannot be set unreasonably high. According to the article the reasonability of prices need to be estimated from the point-of-view of those with low incomes, like for example elderly people living on small pensions.

This problem is linked to the other aims of the Digital Agenda, like lack of skills and missed opportunities in addressing societal challenges. in the author's opinion, this is obvious. If one cannot afford an Internet connection, one will not shop online, learn to use a computer very well and most certainly will not use the eGovernment services that are further presented later on in the text.

According to Petri Lahesmaa (senior consultant, TAT-group) many Internet operators throughout Europe see the required investments as a problem due to the difficult economic situation. The next generation networks require huge investments, and it is now wondered if profit can be expected from these investments. So, in short - do consumers really need ultra fast Internet connections and are they willing to pay for them?

The lack of fast Internet connections, however, slows down the growth of e-commerce. In a 2009 Eurostat study it was found that approximately 5 % of EU-citizens said slow Internet connections was their main reason not to shop online. However, this is most likely not a large problem in Finland. According to the European Competitiveness Report 2010 Finland's eCommerce is better developed than in other member countries, as 54 percent of the population are ordering goods and services online.

## 2.7 Insufficient research and innovation efforts

Due to the current lack of R&D investments, the creativity of the SMEs is underused. EU wants to create a new "ecosystem" of innovation, where demand for new products can be created. This would mean for example acquiring more private investments, improving coordination and speeding the ability of the SME's of the digital field to get funding from the research funds of the EU.

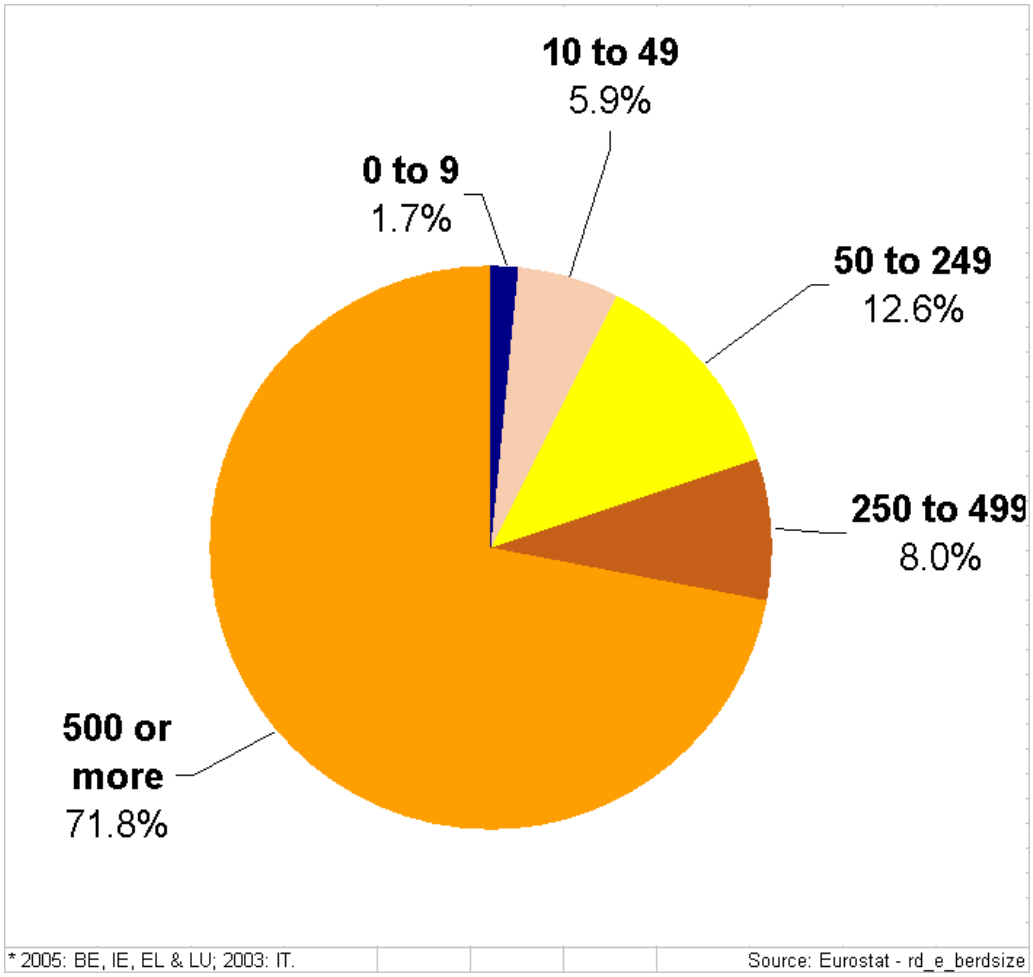



*Figure 5: Research and development investments in the EU*

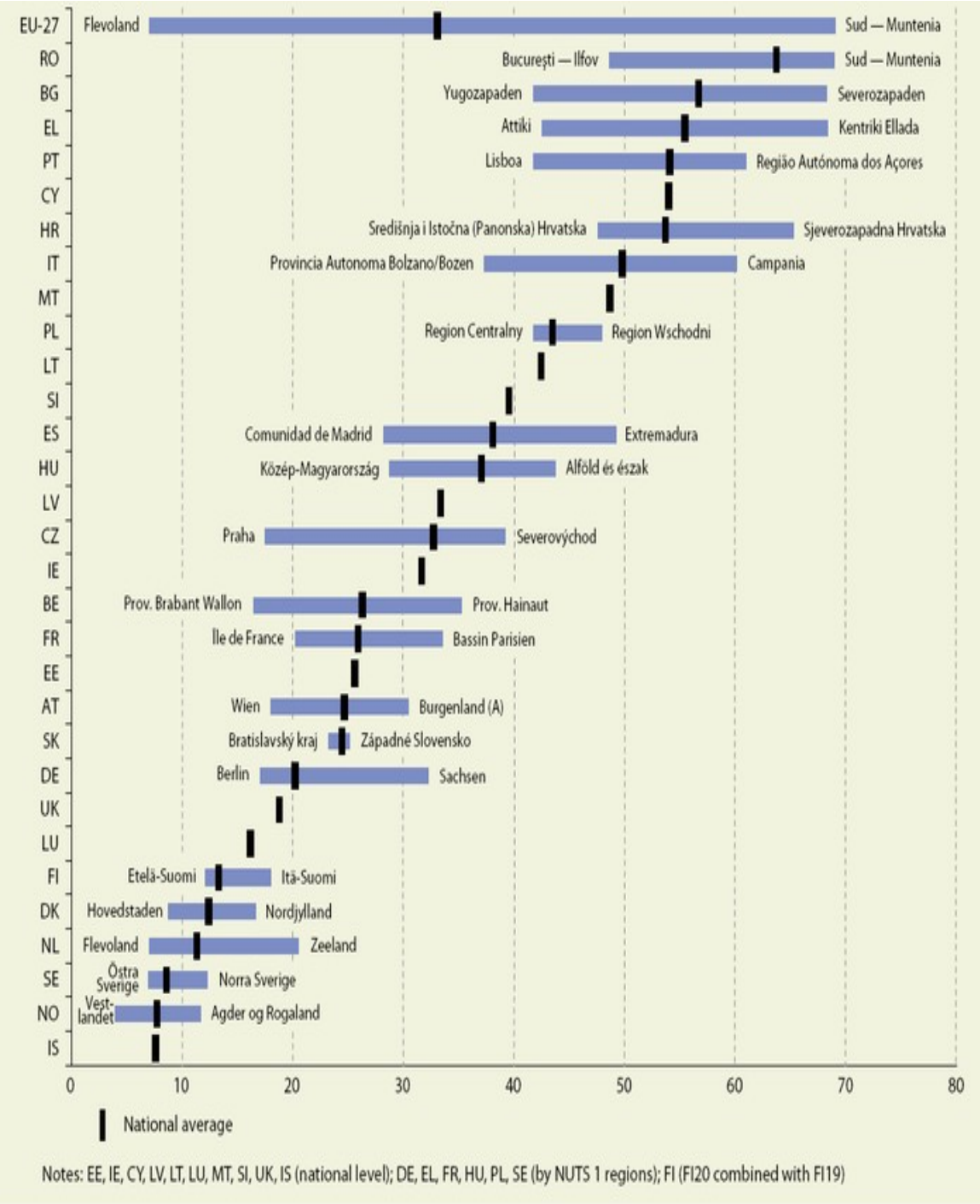
(http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/R_%26_D_expenditure_in_business_enterprises)

Figure five shows the amount of research and development investments in relation to the size class of the company. From the picture we can tell that SME's are resposible for a very small portion of the investments. The digital agenda aims at them having more chances to get funding for their innovations.

According to the Director of the Nokia's EU representative James Waterworth, the situation of research and development in Sweden and Finland is in general good. In his view Finland's main problem is the poor record with new businesses. After all, many of them fail during their first year and would need support during that time. Thus – spending on them correlates with their success. As he sees taxes and subsidies as such as obstacles for creativity, he believes that a suitable solution could be in tax arrangements. If tax reliefs were given to those who make risk investments or invest venture capital, this form of investment could become more attractive. This would allow more financing for new businesses without creating an elaborate system of government subsidies to increase the amount of R&D-investment.

## 2.8 Lack of skills

Lack of skills excludes many of the citizens from the digital society and economy. The situation requires taking coordinated action led by member states and other stakeholders. There are still a lot of regional differences in using the Internet. Figure six presents the percentage of non-users of the Internet.




(http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Information_society_statistics_at_regional_level)

Even though there can be multiple reasons for such regional differences, the lack of skills as well as the lack of proper networks can contribute to this. This may also lead to inequality if these differences are caused by the varied skill levels, as the services will shift toward being online in the future.

Finland's short- and long term goals in ICT were launched in 2009. They include increasing ICT and media training in schools. This prevents lack of skills in the future, as the use of ICT is integrated in the education from early on.

The lack of skills can also affect the development of the digital single market. According to Eurostat studies mentioned in the digital agenda (The Digital Agenda for Europe, COM(2010)245, p.13) in 2009 the lack of skills was a reason not to shop online for over 15 % of the EU – citizens who had not ordered anything during the previous year.

## 2.9 Missed opportunities in addressing societal challenges

The challenges Europe is currently facing could be better met with a more efficient use of IT. This would for example enable Europe to develop more efficient public services, which will be crucial in the coming years as our age structure is changing.

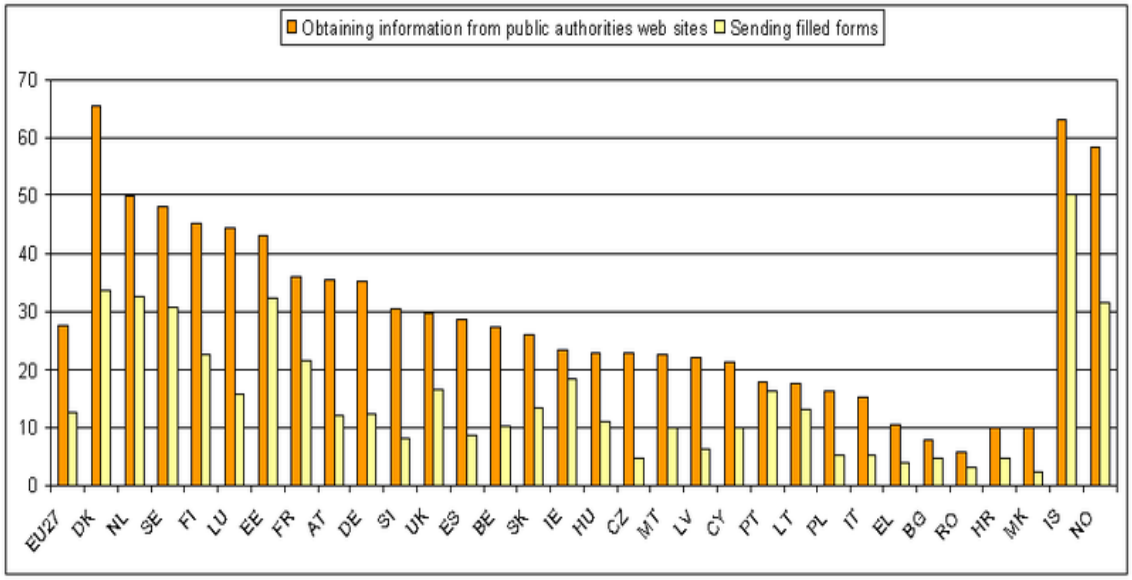



*Figure 6: Use of public services online*

(http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=File:Online_Interaction_of_individuals_with_public_authorities_by_country_2009.png&filetimestamp=20100608112925)

As we shown by figure six, the differences between member states are noticeable. While over 20 percent of Finns have sent filled forms online (the yellow bar), only less than 10 percent of Romanians have done the same. Also ways to search information vary. As we can see from the orange bar, there are huge differences between EU countries on whether information was found from the web sites of public authorities.

It can safely be said that if citizens of some member countries do not even find information on the websites of authorities, they will not use the services of those authorities online. This can possibly result from lack of skills or connections, or lack of trust of the information found online. in the author's opinion it is most likely that the reason is a combination of all of the above. This would most likely depend on the region in question.

The use of the Internet to find information about public authorities or to interact with them can prove extremely important in the future as the European population ages, as public services need to be cut in the future along with a lot of other government expenditure. This challenge is also linked to the skill level of citizens, as well as the availability of fast and reliable Internet connections throughout the Union. This crucial information needs to be available to all even in the future.

In an interview with Kuntalehti (issue 4/2010), the Finnish minister of social affairs and health Juha Rehula commented on the state of Finnish healthcare especially in rural areas. He said that everyone, no matter where they live should feel that health care services are available. In his opinion, the feeling of security coming from the availability of services is extremely important. Even though he does not mention the possibility to move some of the services online in the interview, this could definitely be an option.

In the author's opinion there is a clear demand for digital innovations on the health and social care sectors. Thus raises the problem of different skill levels and the availability of Internet connections in the rural area.

These issues naturally need to be addressed, and other non-digital options provided for those who cannot utilize digital services. Even so large savings could be achieved, especially if the goals are set on longer term so people get time to adjust to and get comfortable with the new technology.

### 2.9.1 eGovernment

The eGovernment aims at using ICT tools and systems to provide better public services to citizens and businesses (http://ec.europa.eu/information_society/activities/egovernment/index_en.htm). Ideally this leads to a more effective use and production of public services. In the present economic situation many Euro countries are facing at the moment it is extremely important that savings on the public sector can be achieved without sacrificing the quality of services.

The main reason to avoid eGovernment services was (for 35 %) the wish for personal contact. This is a basic need that would be hard to replace with any computer developments. Even so, the second largest reason was the need for data protection and security. One in five (20%) of those who abstained from using online services felt that their personal information would be threatened. This is a similar reason why people avoid e-commerce. Therefore fixing the problems and the image of online services could help both the public and the private sector.

In Finland eGovernment has been more popular than in many other member countries of the EU. In the European Competitiveness Report 2010 it is said that Finland is a leader in eGovernment usage and user friendliness. It also describes Finland's vision of eGovernment as "truly citizen-centric".

As rapporteur of Committee of the Regions (CoR) Markku Markkula has pointed out that online government services have so far mainly meant changing the paper-based bureaucracy to an online option. This means that the eGovernment has not been used to its full potential. A more innovative approach could produce new opportunities.

# 3. Case Study : The ICT sector of Finland

To bring the digital agenda and it's effects on Finland to a more practical level, I will go through its effects on the Finnish ICT sector. I will use Porter's Five Forces Framework.

## 3.1 The basics of the Finnish ICT sector

First we need to go through the fundamentals of the Finnish ICT sector. As my primary source I will use a publication of Teknologiateollisuus, called Digitaalinen Suomi 2020 - Älykäs tie menestykseen, as the publication sums up a great deal of the current situation and problems.

In Finland the ICT sector's portion of employment and production is among the highest in the world. However, there have been significant changes within the personnel structure of the industry in the last 10 years (Digitaalinen Suomi 2020 – Älykäs tie menestykseen p. 9).

During the past 10 years the portion of the ICT sector of the Finnish economy has decreased (Digitaalinen Suomi 2020, p. 47). However, this does not mean that the sector is shrinking. New companies have been started especially in the software field and the more established companies in the field have started to internationalize (Digitaalinen Suomi 2020, p. 47).

In more traditional sector of ICT business, the manufacturing of goods has moved away from Finland (Digitaalinen Suomi 2020, p. 47). At the moment there is more exportation of services than of machines (Digitaalinen Suomi 2020, p. 47). However the manufacturing of electro-technical products as well as optic devices and instruments has remained stable and the exports continue to grow.

In a nutshell, Finland's recovery from the depression of the early 1990's was much speeded up by the ICT sector. This is most likely one of the causes that have led to the Finnish economy being extremely specialized in the ICT. Also, the income level has risen. When the income of households increases, the demand for all ICT products increases.

## 3.2 Porter's Five Forces

Michael Porter's Five Forces framework goes through all the forces affecting a certain industry. These five forces include supplier power, barriers to entry, threat of substitutes, degree of rivalry and buyer power.

The framework was first published in the Harvard business review in 1979. Porter revisited the model in the Harvard Business Review of January 2008. In my thesis I will use the model that was published in 2008.

### 3.2.1 Rivalry Among Existing Competitors

One very crucial point to consider, when discussing rivalry among existing competitors, is patenting. Finnish companies are active in protecting their innovations by patenting them. This naturally creates a competitive edge both to Finnish companies in general (compared to those abroad) and also against the companies that operate in the same field within Finland.

As the Digital Agenda (A Digital Agenda for Europe, COM(2010)245) calls for more interoperability, the companies operating especially in the software business are required to create standards. This will probably add competition in the field, as it makes it easier for the consumer to change the service provider without having to change all the other systems, too. As already mentioned earlier, this will create huge changes for the companies that create health care software (Research Director, Etlatieto Ltd, Hannu Hernesniemi).

Currently the larger companies on the ICT sector have often gone international. In the international operating environment the export of services has increased. This development will most likely continue even more with the digital single market, increased interoperability and the added input to research and development. Digital single market will obviously make it easier for these companies to internationalize even further. Increased interoperability will open up the competition environment (Deputy Director-General Antti Peltomäki). It also makes it easier to create new products. The added funding of research and development can lead to interesting new innovations that can create more competitive edge to Finnish companies on the international market (CoR Rapporteur Markku Markkula).

There is also a large amount of SMEs on the field. A lot of these new companies are in the software field. There are a lot of new, smaller companies started in the field all the time. The software production and information technology service production have increased during the past years (Digitaalinen Suomi 2020, älykäs tie muutokseen (A Digital Finland 2020, an intelligent road to change), Hannu Hernesniemi (editor)).

### 3.2.2 Threat of Substitute Products or Services

The threat of substitute products or services is nearly non-existent. It is rather hard to imagine mobile phones being replaced by something else. There are also no substitute products for computer programmes in the sense – all of the competition comes from new innovations within the field.

However, if there are new innovations, new technologies are adopted easily. This creates a lot of competition within the industry. Obviously, as happened for example with iPhone and Apple, finding new technologies can be priceless (Deputy Director-General Antti Peltomäki). The digital single market might aid in creating new innovations in this field, because it enables more creative use of resources. This results from the fact that the digital single market enables mobile phone companies to develop programs and solutions to the entire European market area. Especially Nokia has embraced this development, as mentioned earlier (Director of Nokia's EU representative, James Waterworth).

One industry, where there is some threat of substitute products is the mobile phone operator - branch. Even this is only to some extent. A lot of the calls made abroad have and will move online due to programmes like Skype that allow to make phone calls for free. However, I do not consider it at all likely that Skype could actually replace regular phone use. I assume that Skype mostly leads to long phone conversations and the calls made abroad moving online. This will of course cut into the business of the operators.

Also the Internet broadband connections have a threat of substitute products. This threat is however within the industry, and mainly concerns replacing the mainly used technology.

There is a lot of new technology in the broadband- field. There are the optic fibres as well as the mobile technology. The new moving technology that operates in the 3G-network will most likely prove to be important in Finland. The Digital Agenda (A Digital Agenda for Europe, COM(2010)245) requires faster Internet connections to all the member states. In Finland that is a rather large and scarcely populated country it would become extremely expensive to build fixed networks throughout the whole country. In the Digital Agenda it is clearly stated that any form of technology can be used to bring the Internet connections to the citizens.

With the 3G-technology there is the issue of reliability. This technology can not at the moment be considered very reliable. However, the technology can be improved. Once it is made more reliable and faster it can prove extremely important in implementing the goals of digital agenda in Finland especially in the rural areas.(Deputy Director-General Antti Peltomäki)

### 3.2.3 Threat of New Entrants

It is rather easy for new companies to enter the industry. New start ups tend to be common especially in the software industry. Often the new companies are small and thus require only small initial investments. (Research Director, Etlatieto Ltd, Hannu Hernesniemi)

The entry barrier depends strongly on which part of the ICT cluster is discussed. Obviously entering this field requires a rather high level of education or significant work experience. As higher education is well available and common in Finland, this is not necessarily an obstacle here.

The threat of new entrants can be expected to grow in the future. The Europe2020- strategy's Innovation Union's education goals will be a contributing factor to this. It intends to ensure that there will be a sufficient amount of those who have completed a degree in natural sciences, mathematics or engineering. The Innovation Union also wishes to focus the

curriculums of schools on creativity, innovation and entrepreneurship. Needless to say - if this succeeds we will see a lot of new start ups in the ICT field in the coming years.

### 3.2.4 Bargaining Power of Buyers

Because of the generally very low switching costs in this field, the buyers have high bargaining power. There are also many service providers in the field, which further increases the power of the buyers.

The digital single market will further increase the power of buyers in this field significantly, as it provides them with more choices. This will of course require the faster Internet connections and the increase of trust in the networks to facilitate eCommerce and provide consumers with more options. If the digital agenda will be successful the consumers will have more choices. This will increase their bargaining power.

A good example of the transformation the digital single market may bring to the traditional industries by increasing the bargaining power of buyers can be found from clothing industry. The traditional store chains don't compete with each other only in malls any more, but also online. In addition to their competition spreading to include online stores, they now also compete with various brands abroad that may only be available in the Internet. This means that a clothing chain operating in the Finnish market does not only compete with other physical stores but also online. This means that in order to hold on to their market share they need to pay even closer attention to both the quality and the design of their clothes in order to keep them interesting and the prices down in the more competitive market.

Also, the increased interoperability will increase the power of the buyers. This will mostly effect the purchasing decisions of companies and governmental organizations as the software interoperability is a more crucial question to them than to the regular consumer at home. The required interoperability will

help governments throughout EU to share information. This can have an impact on the safety of EU citizens, as it can help for example the police and the hospitals share information faster and easier when it is needed.

### 3.2.5 Bargaining Power of Suppliers

The manufacturing of mobile phones grew during the 1990's. During that time there were a lot of suppliers in Finland. However, during the 2000's the manufacturing has moved abroad, mainly to Asia. Obviously, this meant the end for many of the suppliers in Finland (Digitaalinen Suomi 2020 (editor Hannu Hernesniemi, p.48).

Within the ICT cluster a lot of the production has been moved to countries with lower labour costs. Only the processes that require highly skilled workers have stayed in Finland. This has resulted in dramatic changes in the personnel structure of the industry. (Digitaalinen Suomi 2020, p. 47)

As there is so little production in Finland, suppliers play a minimal role in the development of the industry. However, as the supplier network and the production have both decreased, the suppliers most likely do not have very high bargaining power due to the limited amount of business opportunities in a highly specialized industry. One could also speculate that due to the nature of the industry long-term partnerships with suppliers would be rather common.

# 4. The Goals of Digital Agenda

In this chapter I will bring up the goals of Digital Agenda most relevant to the Finnish companies will be discussed.

## 4.1 Making eCommerce European

One of the main goals is to create a joint digital market. There are still many boundaries in e-commerce both in Europe and globally. From the point of view of the companies a lot of them are related to copyright issues. However, from the point-of-view of consumers, statistics show that people only shop online if they feel like they have clear rights and that these rights are protected.

According to the Digital Agenda (COM(2010)245), a lot of the uncertainties consumers have are related to the security of paying. One solution to this problem could be creating a joint consumer protection system in the EU. This would guarantee the consumer the same rights no matter which EU state they are from. The commission expresses in the Digital Agenda that a directive regarding these matters should be accepted as soon as possible.

At the moment, downloading music (legally) online is four times more common in the US than in Europe (COM(2010)245 p.6). This is mainly due to legal issues. If someone wanted to start a European online - music store, they would have to negotiate with all the 27 copyright organizations in the Union. For example for an iTunes users this means that an Italian iTunes user might be able to download some songs that e.g. a Swedish user cannot download (in reference to discussion with Deputy Director-General of the Directorate-General for the Information Society and Media (DG INFSO) Antti Peltomäki).

Solving this situation now requires an innovative business model to create a balance between supply and demand on this online market. If contracts are reached, new legislation is not necessarily needed to enable these kinds of businesses.

Also member states can get involved in encouraging legal downloads over the illegal ones. France is a good example of this. An article published in the Helsingin Sanomat - website on 15.10.2010 reveals that the state will start paying half of the music downloads of young people. The launched project is called "Carte musique jeune". It means that the French state will pay half of all the legal music downloads made by 15-24-year-olds during one year up to the sum of 50 Euros. The project will support legal downloads of music for two years, and it is believed that over a million youngsters will use the opportunity each year.

It has been discussed in the EU whether the “Carte musique” is an acceptable form of state support. The commission decided that it is acceptable as long as it is for the general good and does not distort the competition. Once the results of the French project start coming in, we will see if other member states will follow the example.

According to the director of Nokia's EU Representative Office James Waterworth, projects like the “Carte Musique” will not be enough to increase the amount of legally downloaded music as such. In his opinion the uncoordinated copyright legislation is largely to blame. As all the member countries have their own collecting societies (like Teosto in Finland) that have a monopoly, little room for innovation remains.

One product of Nokia required especially effective lobbying. The Nokia Comes With Music was a phone that allowed the users to download an infinite amount of songs from the Nokia store to their phones. According to James Waterworth the Nokia Comes With Music required a big and innovative company. However, even after all the lobbying the lists of available music differ from one country to another and the phone is not even available everywhere.

## 4.2 Faster Internet connections

Another central theme of the Digital Agenda (COM(2010)245) is the fast Internet connections. In the Europe 2020 - strategy the significance of broadband as a means to create competitiveness is strongly emphasized. In the strategy a goal is stated - a regular broadband should be available to all the citizens of the EU by 2013(COM(2010)245, p. 20). Also, by 2020 much faster Internet connections (30 Mbps or more) should be available to everyone in the EU and at least 50 percent of the European homes should have an Internet connection with a speed of over 100 Mbps(COM(2010)245, p. 20). One does not need a lot of imagination to see what this goal could mean together with creating a stronger digital single market.

Finland in particular has set it's goals very high. By 2015 There should be a 99 % coverage of 100 Mbps connections, as getting the connection will become a legal right (http://yle.fi/uutiset/news/2009/10/1mb_broadband_access_becomes_legal_right_1080940.html)

Creating these new, faster Internet connections, especially building the optic fibre based ones that can provide the ultra-fast connections requires a lot of investments. Some of this funding can most likely be reached from private enterprises, as better networks can also provide them competitive advantage. The investments are needed in a very fast schedule in order to reach the set goals. This will also require some public funding. Commission feels that more partnerships between public and private sector should be created. In addition, money to be invested could be gotten from the EU structural funds (COM(2010)245, p. 22).

Also, building the new and improved networks provides business opportunities for companies in the field in all the member countries. The situation requires strong, strategic decisions from them, as the companies need to decide whether to see the situation as an opportunity or as a threat.

According to Petri Lahesmaa (senior consultant to TAT-group) Finnish and European business life has in general been excited about digital agenda. This is mainly because the focus has shifted from the mechanics to the contents of electronic communications. The main stage of the Digital Agenda (COM(2010)245) is taken by copyrights, contents of the Internet that users find interesting, advancing e-commerce and security of managing things online.

Naturally, if more citizens have better Internet connections, Internet is used more. This means that more businesses need to be online, as the Internet becomes an even more important way to search information. This creates more business opportunities for companies that design websites. As the digital single market is improved, this eases going international for even smaller companies throughout the EU. Also, if there will be joint consumer protection in the EU, the business opportunities are further improved. After all, if there are more consumers shopping online, there will be more market opportunities.

## 4.3 What does this mean for Finnish businesses?

This enables even smaller companies to find their niche in the European marketplace. Another impact is on the competition, both in the view of consumers and companies. The consumers would have more choice on where to shop. This would create more competition. This might mean, for example for Finland, where the prices have traditionally been rather high in part due to low competition that the general price level could decrease. This does not necessarily imply that only the countries where production is inexpensive would be able to compete. A true digital single market would enable at least some companies to have a larger choice of suppliers, depending on the nature of the industry of course. This would help in decreasing the production costs, thus bringing down the general price level and increasing buying power in the area.

At the moment 26 percent of Finnish companies are purchasing online (European Competitiveness report 2010). This is slightly above the EU 27 average of 24 percent. 15 percent of the companies are also selling online. The average for this on EU - level is 12 percent. This means that many companies are passing on their chance to directly profit from eCommerce.

# 5. The Futures Wheel Method

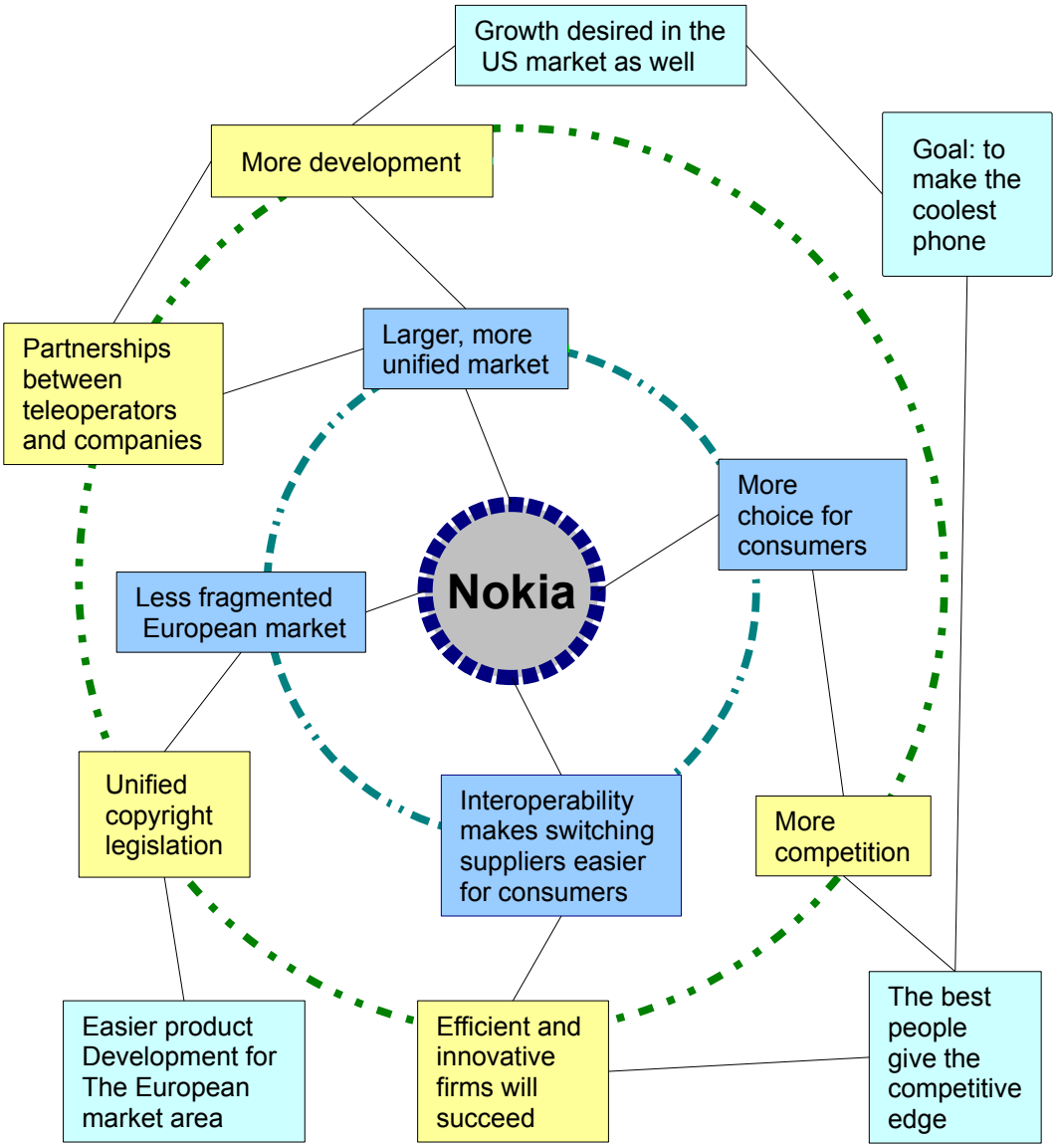
To get a more practical idea of what the Digital Agenda (COM(2010)245) means for the operating environment of ICT companies in Finland the representatives of Microsoft, Nokia, Sonera and Graphisoft Finland were interviewed. These companies were chosen because they have a significant presence in the Finnish market, even though they operate internationally, which makes Digital Agenda relevant to their operations.

As the changes brought by digital agenda in the future will only take place in the future, the Future Wheel Method (AC/UNU Millennium Project, Futures Research Methodology – V2.0) seemed appropriate. As a method the Futures Wheel aims at recognizing and visualizing the consequences of trends and events. It has been used as a method for policy analysis and forecasting since the 1970s. There are three different variations of the wheel. I decided to use the original, as the consequences of Digital Agenda cannot be clearly distinguished into different kinds of impacts, as using version two effectively would require. Also, as version three emphasizes the effect history has into future, it would not be suitable to use in this context.

The original Futures Wheel's (AC/UNU Millennium Project, Futures Research Methodology – V2.0) advantages, in this case, are the ability to distinguish secondary and tertiary impacts clearly from each other, and that it also aids in structuring the future scenario by bringing the details together into a bigger picture. Many of the impacts shown in the Futures Wheels are interlinked and using the Future Wheels Method (AC/UNU Millennium Project, Futures Research Methodology – V2.0) helped in displaying these relationships.

On the first circle one can see the primary implications Digital Agenda will have on the company in question. Then, moving outward the secondary and tertiary implications are shown These are further discussed on the text below the actual Futures Wheel.

## 5.1 Nokia




Nokia is one of the leading companies producing and designing wireless technology in the world. The Nokia mobile phones made the company famous and are still the main focus of the company, but today other mobile technology is also produced. (www.nokia.fi) The author focused on the production of phones as they are the main product of Nokia.

I interviewed the Director of Nokia's EU Representative James Waterworth to gain information on the implications Digital Agenda has on Nokia. The key implication will be intensified competition on an already hyper-competitive field. Many of the changes brought on by the Digital Agenda will improve the position of the consumer as well as give innovative and efficient companies a

better chance of success, as the bureaucracy involved with operating internationally is decreased.

One of the key elements increasing the competition will be the increased interoperability. The increased interoperability will make changing one's mobile phone supplier easier. According to James Waterworth this is an opportunity for an innovative and effective company like Nokia to succeed.

Lately, Nokia's willingness to stay in Finland has been widely questioned due to personnel cuts. Nevertheless, James Waterworth pointed out that in the increasingly competitive environment the best people provide a unique competitive edge. At the moment, the Finnish educational system provides competent professionals, giving Nokia an indisputable competitive advantage.

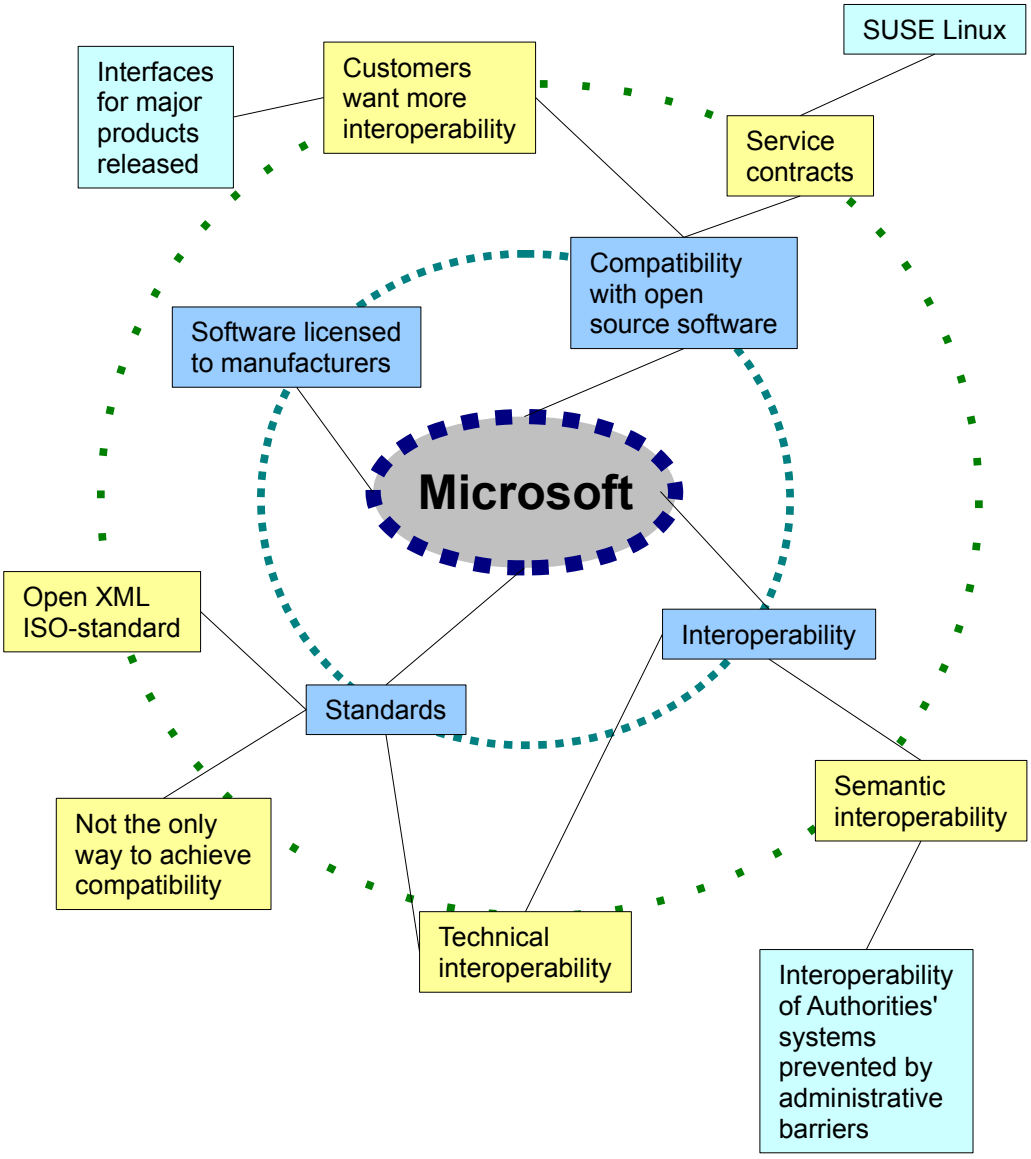
The Digital Single Market makes the European market less fragmented. The larger, more unified market will give more room for development within the market. An example of potential development may be an increased number of partnerships between operators and companies.

More development also gives an opportunity for more growth. The key to this growth is also a goal for Nokia – making not just the technically the best phone but the coolest one as well. This may also aid in gaining market share in the US market, especially through the alliance with Microsoft.

The less fragmented market also eases product development for the European market. In addition the joint copyright legislation would give more room for innovation in creating new products for the European market.

In general, Nokia views the Digital Agenda's impacts as opportunities opening more doors for innovation and thus growth. Being able to design good products may also lead to global growth, especially in the smart phone sector.

## 5.2 Microsoft




The Senior Manager of information society relations of Microsoft Max Mickelsson answered my questions.

Microsoft is a large, global software company with a dominant market position.

Microsoft has been widely criticized for not supporting interoperability. However, Max Mickelsson pointed out that from Microsoft's point-of-view they actually started interoperability. When Microsoft first started licensing software for manufacturers was a revolutionary idea.

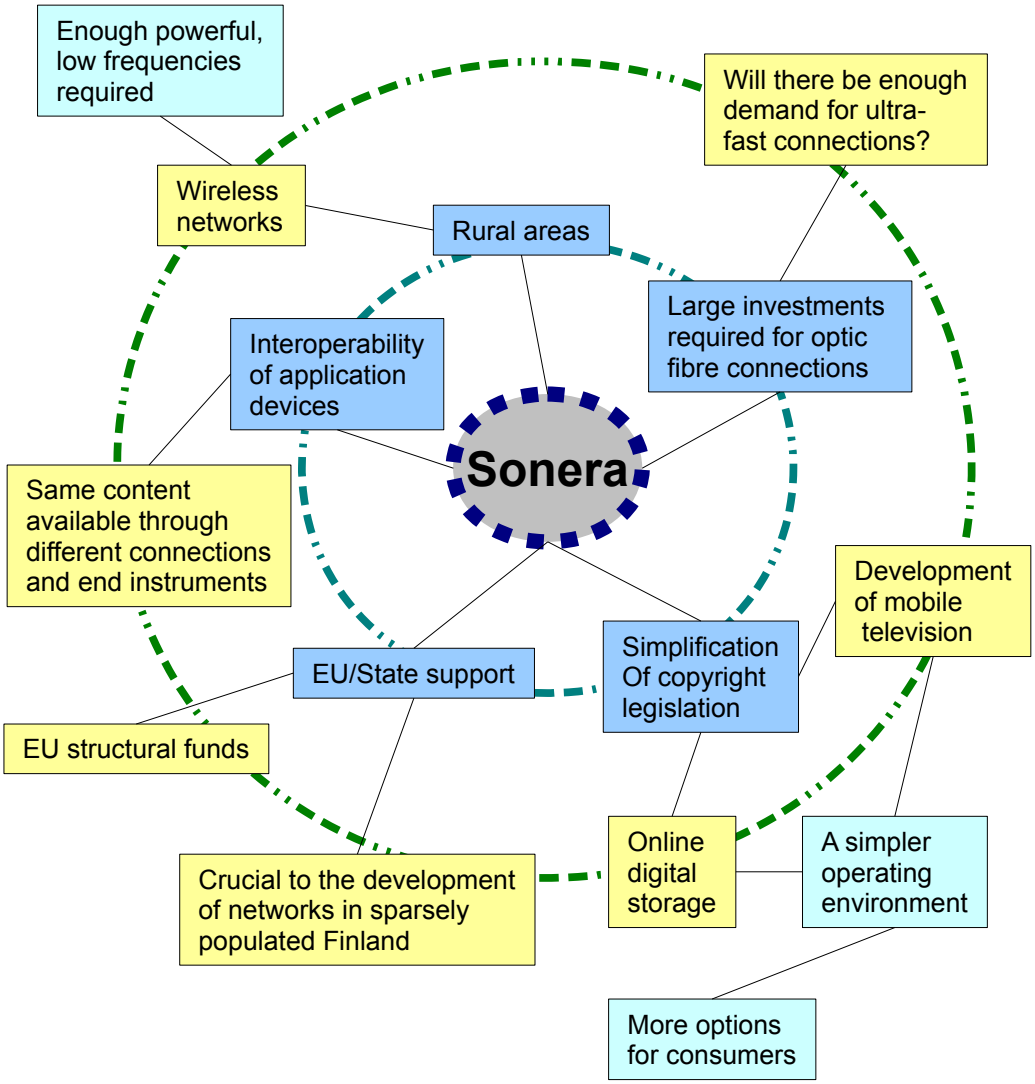
Despite the criticism, Microsoft has co-operated with the increasingly popular open source software. A natural reason for this is that more interoperability is required by the customers. This has lead to the publishing of the interfaces of major products. Thus the development of open source products operable with Microsoft products.

Microsoft has also made service contracts. An example of these would be the one made with Linux SUSE. Basically, this aimed at increasing the interoperability between Microsoft, Linux SUSE and thus the Novell platform. This for example lead to tighter co-operation with Renault in 2008.

Max Mickelsson also pointed out that the interoperability problems on the official level are due to administrative boundaries, not due to actual technical problems. Even though standards are an important factor in interoperability they can not solve the problems alone.

The digital single market will most likely not have a large effect on Microsoft because their software is designed to manufacturers, not to specific market areas as such. In a sense the software of Microsoft is available in a similar form throughout the world.

## 5.3 Sonera




Sonera is a registered brand of the Nordic company TeliaSonera. Sonera is used in Finland. TeliaSonera provides network access and telecommunication services.

Sonera is one of the companies operating in Finland that are most directly affected by the goals of the Digital Agenda. Sonera both provides services affected by the digital single market and the increased interoperability but is also an Internet provider, and thus in it's part responsible for providing the ultra-fast Internet connections mentioned in both the Digital Agenda (A Digital Agenda for Europe, COM(2010)245) and the report for the parliament of Finland conducted by the Council of State (Tuottava ja Uudistuva Suomi – Digitaalinen agenda vuosille 2011-2020 / A Productive and Renewing Finland – a Digital Agenda for years 2011-2020).

Tapio Haapanen from the Law department of Sonera stated that to get the networks of Finland to the required level on the given timetable financial support from the EU or the state is extremely necessary.

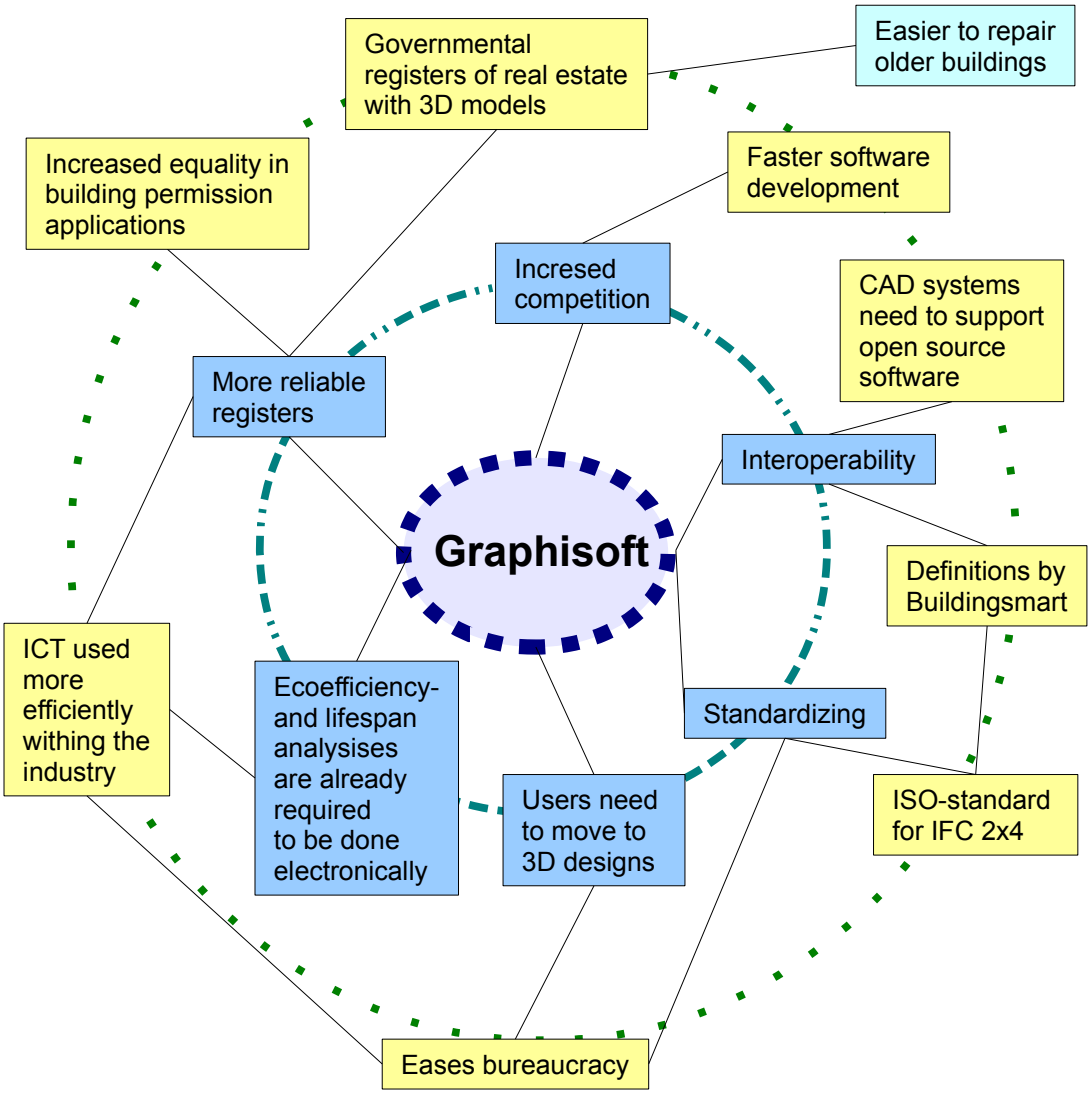
In order to get the ultra fast Internet connections even to the cities large investments are required as the old copper wire networks need to be replaced with optic fibre. The structural funds of the EU are available for this use. However, there still remains the question of demand, as Sonera remains sceptical if enough people actually want the 100 Mbps broadband – and whether they are willing to pay for it.

As Finland is sparsely populated, the rural areas tend to be problematic when for example new networks are built. At the moment some areas only get the 1 Mbps Internet legally guaranteed to them. Still, it is stated in the Digital Agenda that all the EU citizens should have a 30 Mbps broadband available to them by the year 2020 ( COM(2010)245, p. 20). In rural areas the wireless broadband could be an appropriate solution. Tapio Haapanen emphasized that developing those solutions requires a sufficient amount of available low frequencies. EU level decision making can also facilitate in developing this technology by reserving certain frequencies for wireless broadband traffic.

The simplification of copyright legislation will give Sonera an opportunity for product development. According to Tapio Haapanen examples of opportunities brought by the change in legislation are developing of mobile television and online digital content storage. Both of these potential developments can lead to simpler operating environment.

In all the implications the benefit of a regular consumer is clearly visible. Easier, more rapid product development provides them with more choices. In the future there will also be more choice in the speed of one's Internet connection, where ever one lives. Also, interoperability of application devices makes same contents available through differing connections and end instruments thus also adding to the power of the consumer.

## 5.4 Graphisoft Finland




Graphisoft Finland is an independent importer of German-owned Hungarian programming company called Graphisoft. Over 150 000 Graphisoft ArchiCAD licenses have been sold globally with approximately 2000 in Finland. The main target group of the software is architects. There are approximately 3000 of them in Finland. Graphisoft Finland gets the majority of it's sales from Finland, even though some of the sales come from abroad, both in and outside of the EU. I interviewed Ville Pietilä from Graphisoft Finland for insight on the effect the Digital Agenda has on them.

Interoperability will become an important factor for this industry in the future. At the moment the CAD-systems like the ArchiCAD do not support open source software. The interoperability will be executed by Graphisoft. The definitions for this work are done by BuildingSmart, an entity independent of software manufacturers. The open standard form already created is called IFC. The IFC 2x4 version is becoming the official ISO-standard that will surely fulfil the demand for interoperability.

Standardizing within the industry can bring large changes, even on a societal level. As IFC 3D-modelling will become more common in the future building permissions could be given based on these models. This would make the process significantly more efficient – with less use of paper.

3D-modelling can lead to more reliable registers. For example the process of gaining a building permission can become more equal. At the moment those applying for one may be in very unequal positions depending on where they are applying for the permission. This is mainly due to problems in interpreting the construction plans. However, a 3D model can be thoroughly researched with automatic checking programmes. Thus, these programmes would prove extremely important in the use of officials.

Also, government registers of real estate could benefit from 3D-modelling. At the moment the real estate registers are based on paper plans. The figures are then measured from them and moved to spreadsheet by hand. 3D-modelling can increase productivity significantly.

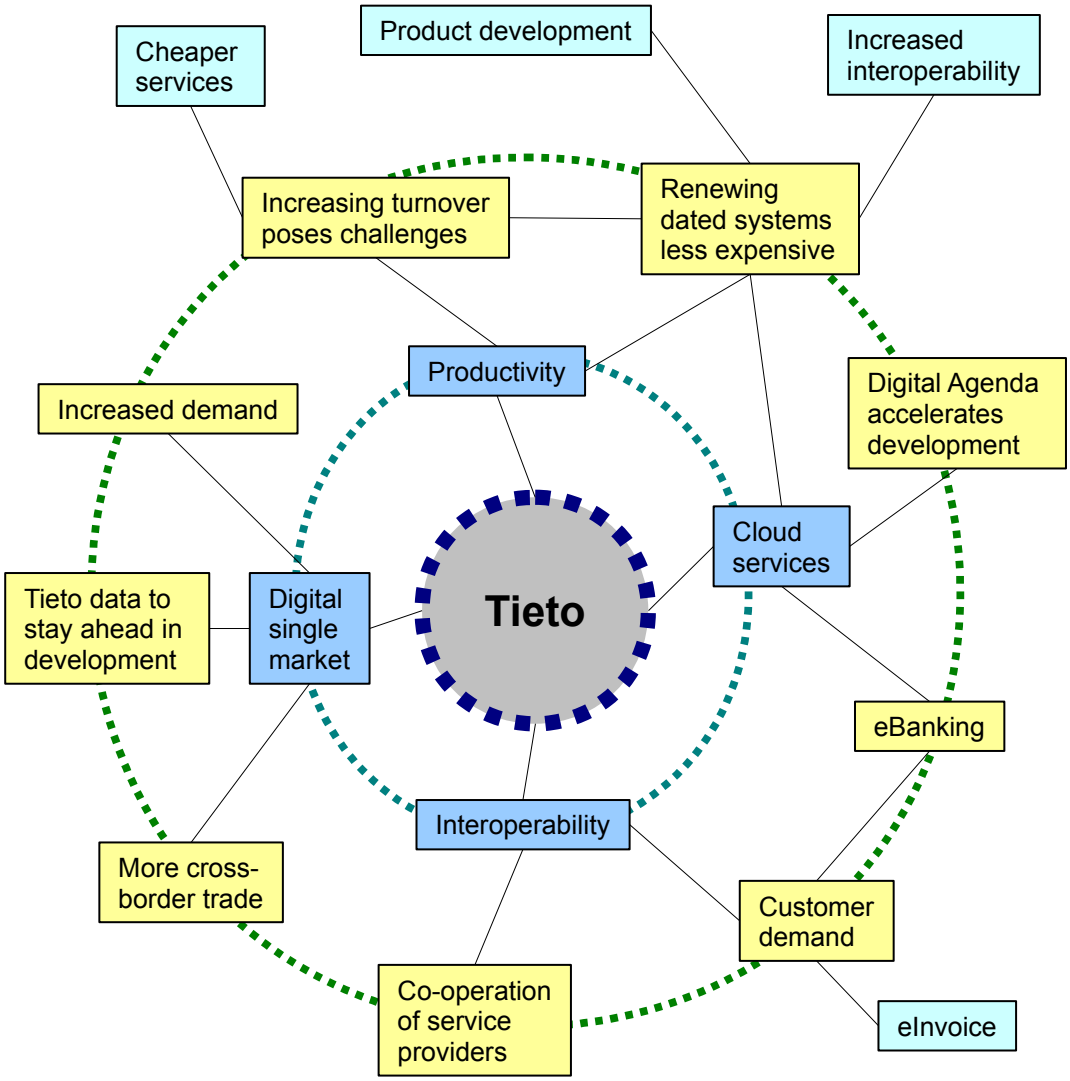
A practical future scenario could involve fixing an old building. At the moment it is usually modelled based on defective construction plans. In the future the model could be ordered from the register of the appropriate official.

Many of these potential changes relate well to government programmes related to the Digital Agenda throughout the EU. An example would be eGovernment. The 3D-modelling and easier access to this information can facilitate the restoration of old buildings or even home renovations in the future.

Once 3D-models would become more crucial the whole industry would have to develop throughout the field. Some designers still use the software to make 2D-drawings. Naturally they would then need to evolve.

Also, some of the competitors of Graphisoft are still selling 2D-software. The Digital Agenda will lead to increased competition over the same customers. Thus the development of these design programmes will become faster. Increased competition may also lead to other changes within the industry in terms of price or other services related to the product.

## 5.5 Tieto




Tieto provides IT and product engineering services. The company's aim is becoming a leading service integrator with a strong focus on customer services. Tieto provides it's services to various sectors, from the automobile industry to the public sector (http://www.tieto.com/about-us/tieto-in-2-minutes). From Tieto I interviewed the Head of Executive Advisors, Bo Harald.

Tieto has focused on Cloud Services. This means that the customer is able to access data or services online. This eliminates the need to own hardware or software as such (http://www.tieto.com/cloud/services.aspx ).

An example of a cloud service is online banking, which essentially means that customers log on to the bank's Internet banking system where they can for example pay their bills or move money to their savings account. Thus, the customer is able to get their banking services from the server where the online bank is located.

These Cloud Services are becoming increasingly common. They have developed a lot and the Digital Agenda will further accelerate the development. Also the demand for Cloud Services will increase in the future, as the demand for, for example, eInvoices increases.

Bo Harald pointed out that Cloud services will increase interoperability also at an administrative level. It is very common that for example health care services have extremely outdated operating systems. Cloud Services enable them to be updated without creating whole new systems, keeping the expenses at a level affordable to the public sector. This can also increase the EU-wide interoperability of the public sector when necessary.

Producing Cloud Services for customers is relatively inexpensive. In the future it will be a challenge for companies like Tieto to maintain or increase their turnover. This is due to the fact that volumes would have to increase significantly as the production of services is less expensive.

Also the Digital Single Market will bring changes. Cross-border trade has already increased and the same development is expected to continue. Also the demand is continuously increasing. The Digital Single Market enables Tieto to stay ahead in the development of the field.

In general Bo Harald would like to point out that Digital Agenda could bring on more changes. However, this would require that everyone would understand that the point of Digital Agenda isn't the technology but the needs of the customer instead.

# 6. Discussion

## 6.1 Expected future changes for Finnish ICT industry

The Digital Agenda and its success will play a large role in the future economic growth of the EU.

The digital single market will provide consumers with more choices. This may result in lower prices as the competition increases. Increasing competition came up in all the interviews conducted for the Futures Wheels. One should, however, take into consideration the attitudes consumers now have against shopping online. The concern over security of eCommerce should be addressed on a European as well as on a national level in order to create a truly functional digital single market.

There seems to be a general understanding within the ICT sector that increased interoperability makes changing suppliers easier. Thus, as consumers have more choice competition increases. This can result in lower prices, which as we saw before can act as an incentive to shop online, even across borders. This makes the excisting competition even more harsh.

The tightening competition forces companies to make strategic choices. They can focus on decreasing their price level. However, at the same time the market for unique designs or ethical production that might have been too small in Finland to make the production profitable can become possible with the Digital Agenda.

The ICT sector is currently going through a change. The changes brought by Digital Agenda favour efficient companies. Making production more efficient is often associated with cutbacks. However, there will be many state run ventures like eHealth, eGovernment and ePrescriptions. Naturally the software and

web design needed for these will bring growth to the ICT sector in Finland, thus bringing in more jobs. Hence, even though production needs to be streamlined to become more efficient no jobs are necessarily lost. It is even possible that the shortage of software professionals will increase even further in the future.

## 6.2 Suggestions for Finnish ICT companies

As many of the ICT related industries are already hyper-competitive the increased competition brought on by the digital single market will be a challenge for them. As James Waterworth from Nokia said – they need to be both extremely innovative and efficient to succeed in this new operating environment. Naturally, this goal for efficiency may result in losing jobs temporarily in some fields.

However, as the developing digital single market evolves it also creates jobs in the long run. The faster connections require better infrastructure that needs to be designed and built, the faster connections need to be sold to consumers for the investments to pay themselves back, someone needs to design end execute the desired eGovernment services and so on. The new jobs will mostly be created on the technical and economical fields. This should be taken into consideration when making national strategies for education. The Finnish ICT companies should aim at keeping the future (and current) demand for workforce a 'hot topic' in for example the media in order to ensure that the future demand will be met with competent employers.

## 6.3 Suggestions for other stakeholders

Both keeping up and improving the Finnish skill level in ICT is crucial for our national competitiveness. It is important for keeping high-tech companies here (see the Futures Wheel for Nokia) as well as for getting new start ups. The Finnish national strategy (A Productive and Renewing Finland – a Digital Agenda for years 2011-2020) outlines means to achieve this. It involves for

example increasing the significance of IT know-how during the training of teachers.

The goal is for all the teachers to gain the readiness to use ICT – technology as an educational tool. These abilities should also be maintained during their teaching career. This would enable using ICT technology in teaching from early on. It would also make possible the use of electronic study material. At the moment basically all the study material used in schools is in paper form. If students start to embrace ICT technology as a part of everyday life already in elementary schools it naturally makes using and understanding it easier later on. Even though the economic situation requires cutbacks it is crucial that too much is not cut from this field of education.

The Finnish National broadband strategy (http://www.lvm.fi/fileserver/50_2003.pdf) acknowledged already in 2003 that wireless broadband solutions are most likely the most cost effective way to bring broadband to the rural areas. Even though Sonera finds wireless Internet connections a solution for bringing Internet to rural areas within the 3G-areas, the state aims at bringing optic fibre connections to all the Finns (Tuottava ja Uudistuva Suomi – Digitaalinen agenda vuosille 2011-2020 / A Productive and Renewing Finland – a Digital Agenda for years 2011-2020). The goals Finland has set for itself are approaching fast and as little has been done so far to get to them reaching them can be doubted. Even though many of the documents considering the practical reinforcing of the Digital Agenda are not made public, one can be sceptical of the ability of Finland to reach the set goals.

The increased competition may result in lower prices. However, price is not the only relevant factor when making consumer decisions. This development may lead to us getting more ethically produced products of better quality for a relatively lower price. This is a matter of corporate strategy – the companies need to find good qualities to put their emphasis on. Whether those factors are design or price the choices need to be made to remain competitive. For this research no marketing research for regular consumers was conducted. This could be the next logical step to help the companies make the strategic choices needed to maintain and increase their market share. It should be

recognized that this market research should be conducted within a broad region, not only in the domestic country of the company and it's neighbouring countries.

To get all the positive effects of Digital Agenda many changes are required. A lot needs to happen in Finland. Even though more services move online we need to make sure that everyone still has access to them. Phone support and ensuring the availability of services face-to-face when necessary ensures this. Also training should be provided to all age groups to improve the skill level in Finland. Close attention needs to be paid in building the faster Internet connections, too, but they will not be as beneficial to the society as they could be unless training in communications is provided for all who feel they need it.

Also the demand of software professionals needs to be taken into consideration in the future. There has been a lot of discussion in the Finnish media throughout Spring 2011 about the starting places in different institutions of higher education. The aggressively growing Rovio is already training it's own employees to the field of game programming (www.rovioacademy.com). It is crucial that the starting places in different educational fields are designed in more co-operation with the working life in the future. After all, not all companies will be willing to train their own professionals in Finland at their own expense. If the scarcity of skilled workers will not be fixed on a societal level it might decrease the motivation of high-tech companies like Rovio to stay in the country.

## 6.4 Suggestions for European officials

The general awareness of eCommerce needs to be taken into consideration. 48 percent of those who had not shopped online during the past year did not do so because they felt they had no need (SEC(2009) 283 final). Due to the age deviation between those who had and those who had not shopped online during the past year one can speculate that one of the reasons not to see a need to shop online can have to do with the lack of general awareness of

eCommerce (SEC(2009) 283 final). General awareness programmes could help in improving the situation.

On the other hand, many of the consumers seem to be concerned over the security of eCommerce. Also, many feel they lack the adequate skill level to do shopping online. However, in Commission staff working document, Report on cross-border e-commerce in EU (SEC(2009) 283 final) (p. 10) it is said that lower prices would encourage a third of EU citizens to cross-border online purchases. The same report still states that 44 percent of EU citizens would not consider making cross-border purchases online. Thus, it could be stated that if the problems with sufficient skill level and security of eCommerce could be solved, the potential to create a large, competitive and growing joint European digital single market is there. One of the keys to this is creating a joint European consumer protection legislation .

EU level regulations need to be made as soon as possible. The unification of intellectual property law regulations throughout the EU is becoming increasingly important to improve and maintain the competitiveness of the EU. In addition, it would probably aid in creating new innovations, as for example James Waterworth stated. The need for new high-tech innovations is widely discussed throughout the Europe2020 strategy and in many of its flagship initiatives. It now remains to be seen if the Union is willing to follow through with the new legislation. This new legislation has been resisted by the copyright organizations of the member countries. The harmonization of copyright legislation will bring on a lot of changes. These changes were addressed only to a limited extent in this work, as I tried to focus more on the business side. The copyright issues will nevertheless be extremely important for the future of Digital agenda and more research on them is needed.

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