A critical analysis of the Information and Communications Ecosystem in Luxembourg

100 years of Engineering Studies in Luxembourg
26 September 2016

Presentation: Dipl.Ing, MBA Nico Binsfeld

1978-1982	Ingénieur-Technicien en Electrotechnique Institut Supérieur de Technologie
1982-1987	Studium Elektrotechnik RWTH AACHEN
1994-1998	Master of Business Administration Open University UK
1987-2001	Verschiedene Managementpositionen bei RTL Group / BCE
2001-2005	Business Manager Carrier Siemens Luxemburg
2005-2010	Country Manager Nokia Siemens Networks Luxemburg
2010-2015	CEO Netcore / Post Telecom PSF
September 2015	CEO House of Training
Dezember 2015	Vice-President Luxembourg Institute for Digital Training
1998-2005	Associate Lecturer Open University – Management Basics, Strategy, Management Projects, Vacataire Université de Luxembourg
Seit 2010	Chargé de Cours et Président des Commissions d'Examens Chambre des Métiers (Elektriker, Informationselektroniker)
Seit 2012	University of Strathclyde & Northumbria University UK, Doctor of Business Adminstration Student Forschungsschwerpunkt: ICT Ecosystem in Luxembourg
September 2015 Fertigung &	Dozent EUFOM Luxembourg - Dienstleistungsmanagement, Beschaffung, Marketing, Buchführung
September 2016	Dozent Institut Supérieur de l'Economie (www.isec.lu) - Management Basics,Marketing (MBA)

Agenda

- The ICT ecosystem in the context of Luxembourg’s economy
- Strengths and Weaknesses
- A liberalized market – really?
- Competing through e-skills
- What can we do possibly do?
- Questions and Discussion

LSC, IFBL and ATTF have joined their forces in 2015

HOUSE OF TRAINING

Luxembourg School for Commerce	Institut de Formation Bancaire, Luxembourg	Agence de Transfert de Technologie Financière

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www.houseoftraining.lu

Some figures

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30 Quality circles

800 Training modules

30 Permanent staff

3 Consultative Commissions

+/- 500 External trainers

7.5 Mio turnover planned in 2016

+ 22,500 Registrations in 2015

Our partners / sectorial training offer

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Commerce

ICT

Construction

Real Estate

Transport & Logistics

Industry

Horeca

Banks & Finance, Fund Industry , Insurance

Our partners / transversal training offer

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To understand the dynamic nature of the ICT ecosystem of small countries based on the case of Luxembourg by:

- **Analysing the role of the state in the changes that occurred over the period at stake.**
- **Analysing the size and the structure of the ICT ecosystem in Luxembourg**
- **Identifying the current strengths and weaknesses of the ICT Ecosystem**
- **Identifying needs for changes and improvements focussing on ICT jobs and e-skills**

Strengths and Weaknesses of the ICT Ecosystem

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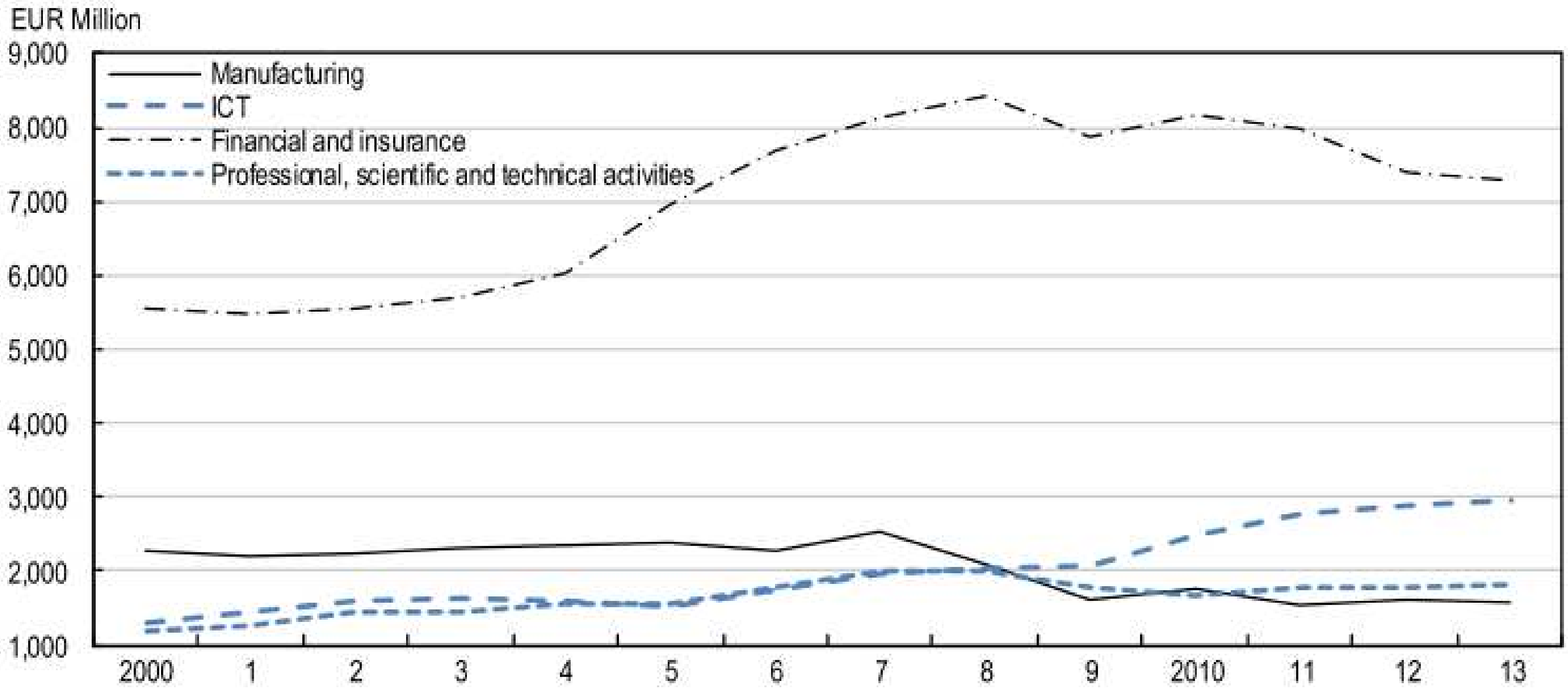
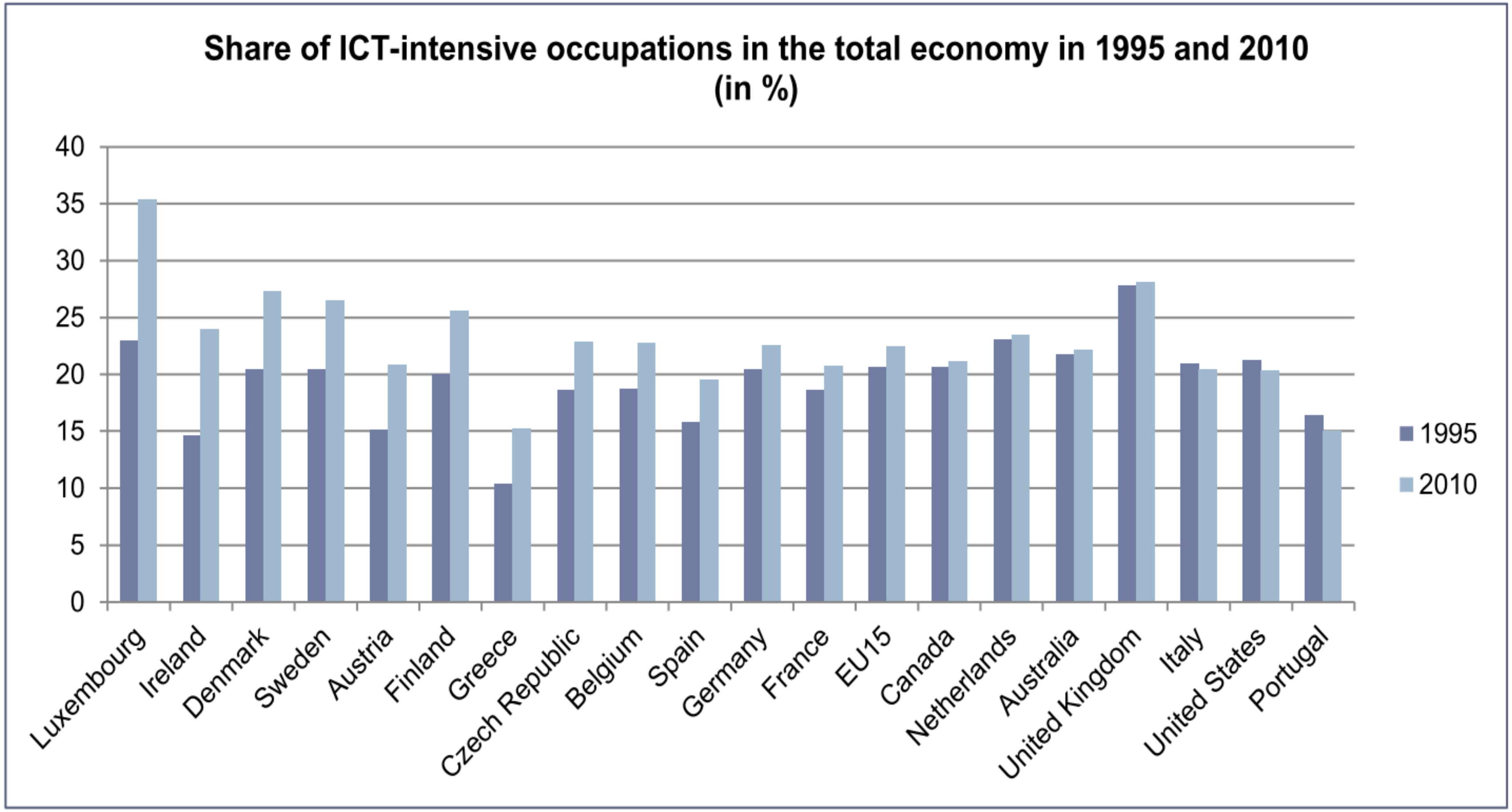
Information and Communication Technologies are of growing importance for Luxembourg's economy and have been resilient to the crisis



Source: OECD (2015), based on STATEC: http://dx.doi.org/10.1787/888933197937

A Growing share of ICT occupations



Source : OECD information Technology Outlook (2011)

ICTs are well developed and widely used

Table 1: Households with PC and Internet access (%)

Year	2005	2006	2007	2008	2009	2010	2011	2012
Households with PC	75	77	80	83	88	90	92	92
Households with Internet access	65	70	75	80	87	90	91	93
Broadband (DSL, fibre, CATV)	52	63	77	76	82[1]	78	75	73
Analogue/ISDN dial-up	51	36	26	24	20	30	27	22
DSL line	49	59	76	74	79	70	63	61

Note

1. The regulator adopted its approach to counting CATV customers to ‘active users only’. This change explains the decrease in the penetration of broadband access.

Source: Statec, ILR

Table 2 - Size of the ICT Ecosystem - main indicators

Main indicators	2001[40]	2008	2009	2010	2011	2012	2013
Companies	1797	1517	1594	1680	1750	1825	1920
Employment	11308	13626	13651	14269	14760	15200	16000
Share of total employment		3,9%	3,8%	3,5%	3,7%	4,0%	4,2%
Turnover (in million Euro)	5785	6537	6745	8771	N/A	9500	N/A
Added value (in million Euro)	1846	2264	2196	2600	N/A	2840	N/A
Added value (% of GDP)		6,87%	N/A	7,3%	N/A	6,6%[41]	N/A

Sources: Eurostat, EU, Statec, authors’ calculations, paperjam

A well "connected" country…

Source: Service des Médias et Communications

★ = CARRIERS HAVING IRU CROSS BORDER FIBRES ROUTES INTO LUXEMBOURG

10 carriers have got a total of 24 I.R.U. Individual cross border fibre routes

30 carriers providing wholesale services to Luxembourg based companies

8 Tier 1 networks

at&t, cogent communications Optical Internet ★, gtt, Level(3) ★, Telefónica, NTT Communications ★, TeliaSonera ★, verizon ★

22 International carriers

bce broadcasting center europe, bics a belgacom company, BT, Cable & Wireless, CEGECOM ★, colt ★, DATACENTER LUXEMBOURG Empowering Businesses Online, eutelsat, HIBERNIA ATLANTIC, INEXIO CONNECTING YOUR BUSINESS, interoute from the ground to the cloud, IPTRANSIT, KAIA GLOBAL NETWORKS, kpn, LuxConnect ★, NLix netherlands internet exchange, Post Telecom Luxembourg ★, root, SES, telindus telecom, TELECOM LUXEMBOURG PRIVATE OPERATOR ★, telenet

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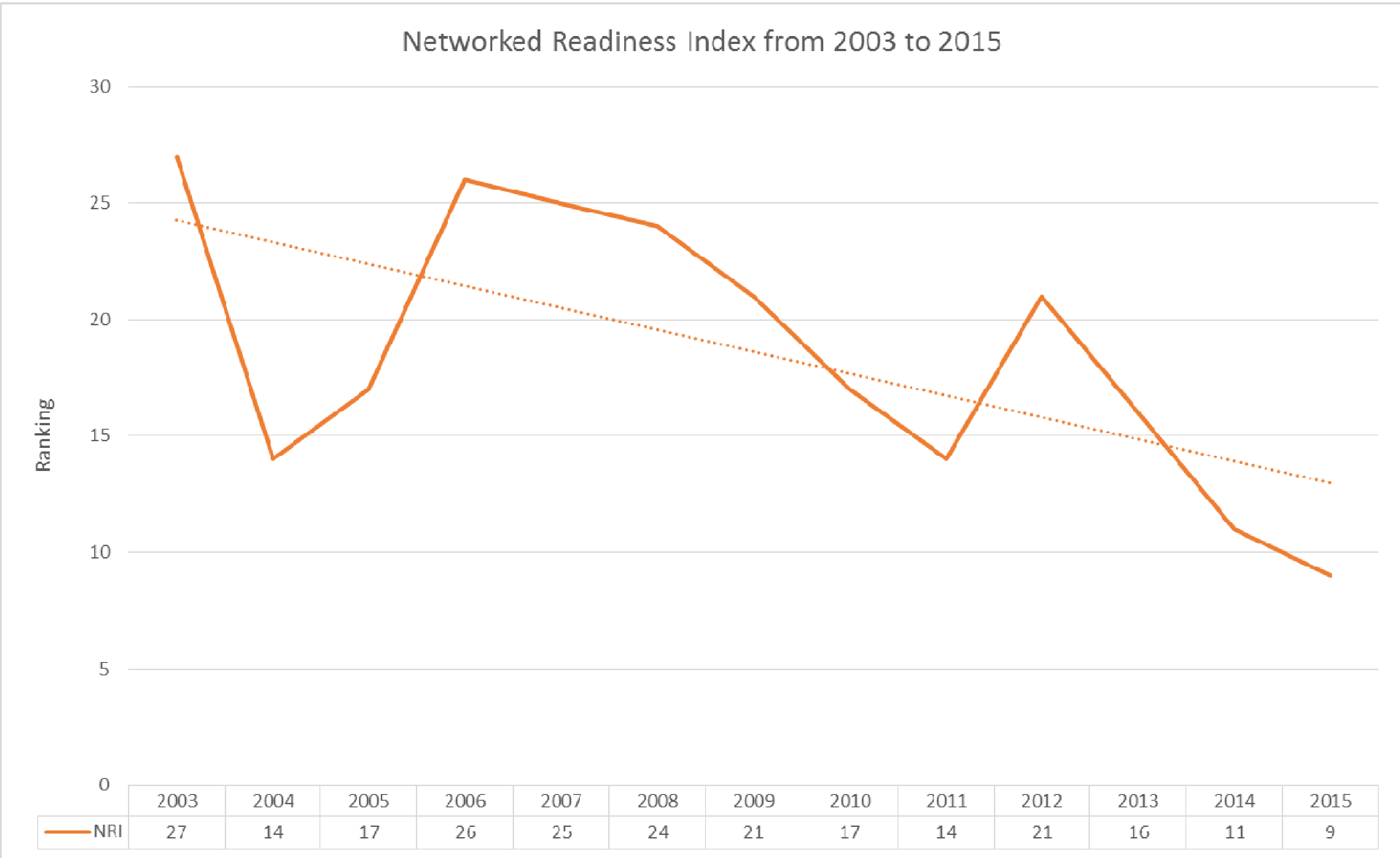
..with many datacentres

bce broadcasting center europe
BT
CEGECOM
CETREL a SIX Group company
clearstream DEUTSCHE BÖRSE GROUP
CONOSTIX
CSC
DATACENTER LUXEMBOURG Empowering Businesses Online
ebrc TRUSTED DATACENTRE, CLOUD & MANAGED SERVICES
European Data Hub www.europeandatacenter.eu
IBM
Labgroup
IRIS Document to Knowledge
LuxConnect
NETCORE GLOBAL NETWORK SOLUTIONS
orange Business Services
DATA4
SOLIDO HOSTING
steria
systemat A PASSION FOR IT SOLUTIONS
Tech-IT PSF
TELECOM LUXEMBOURG PRIVATE OPERATOR
telindus telecom
SES
SUNGARD Availability Services
verizon
VISUAL ONLINE INTERNET SERVICE PROVIDER

FRANCE
19 Visual Online

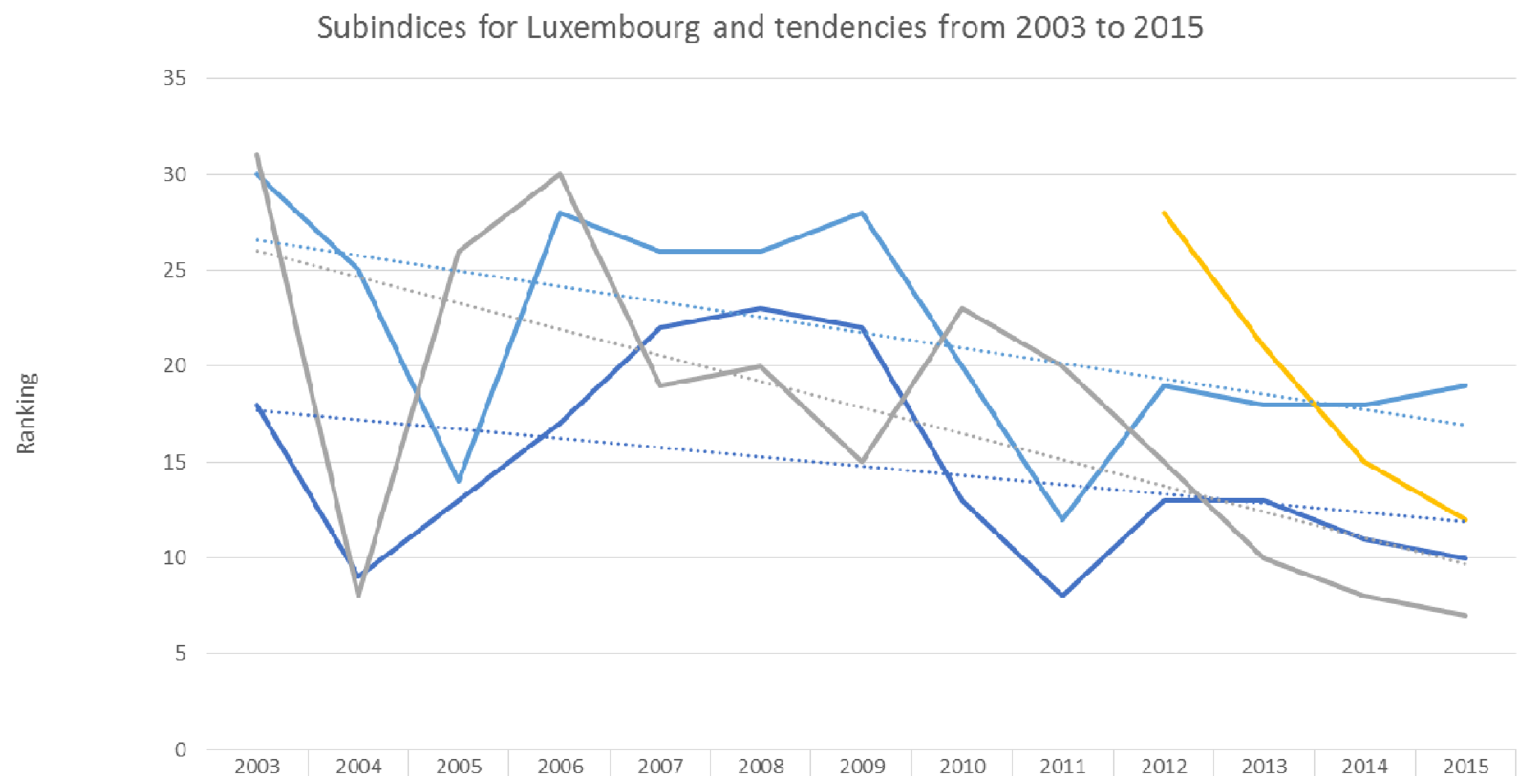
Source: Luxembourg for Business

Luxembourg successfully developed its ICT sector
e.g. Networked Readiness Index



Source: World Economic Forum

Luxembourg successfully developed its ICT sector e.g. Networked Readiness Sub-indices



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Readiness	30	25	14	28	26	26	28	20	12	19	18	18	19
Environment	18	9	13	17	22	23	22	13	8	13	13	11	10
Usage	31	8	26	30	19	20	15	23	20	15	10	8	7
Impact										28	21	15	12

Source: World Economic Forum

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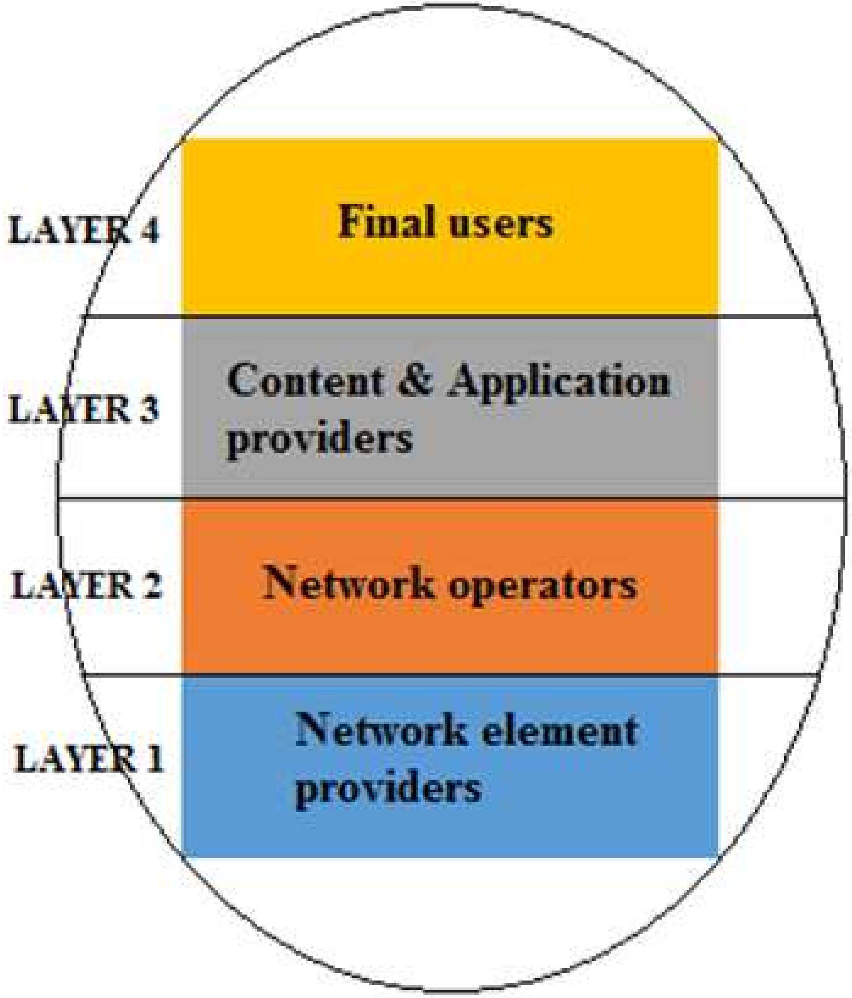
A strong presence of international actors (End of 2014)

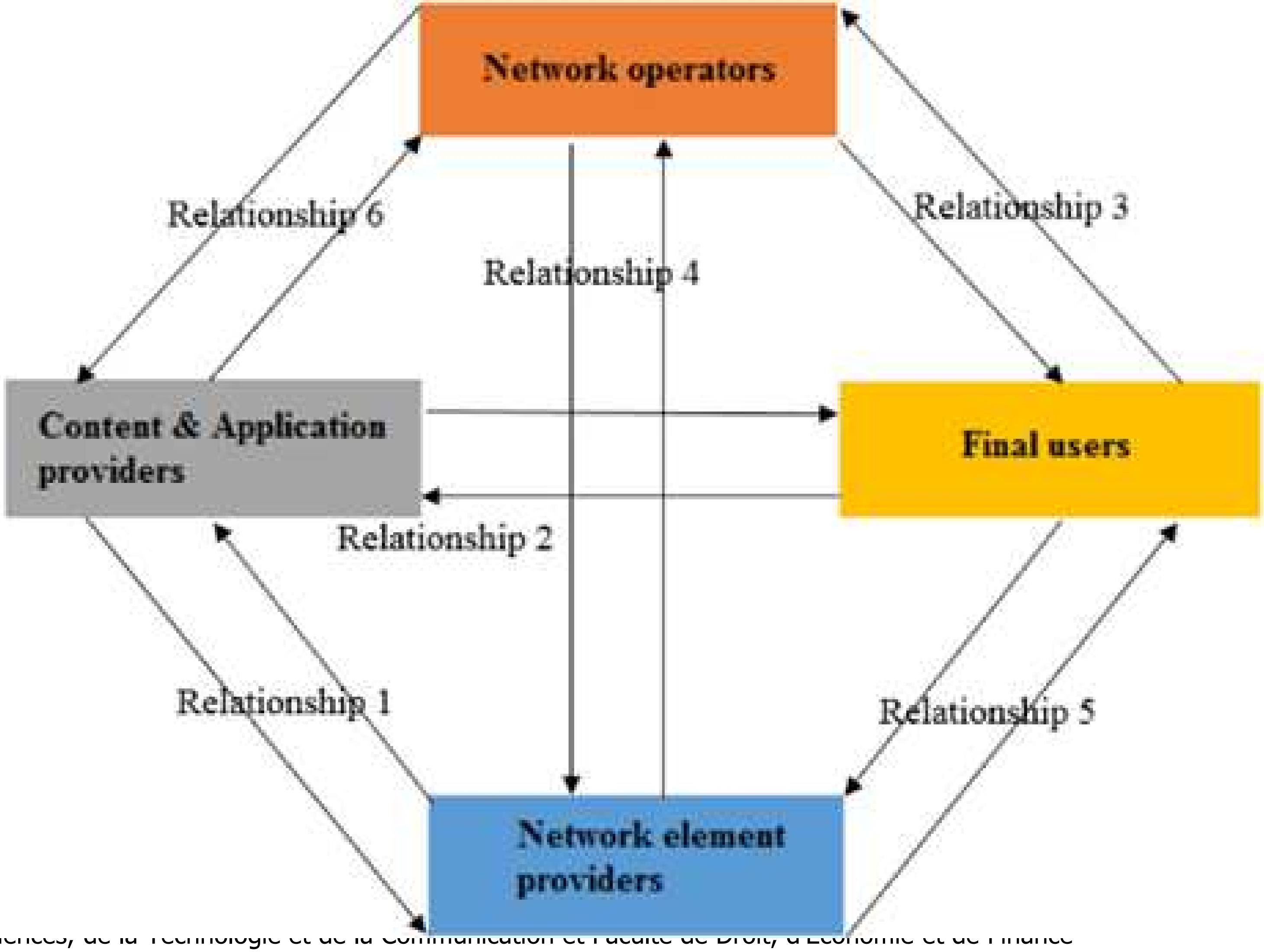
Source: Service des Médias et Communications

The ICT Ecosystem according to Martin Fransman

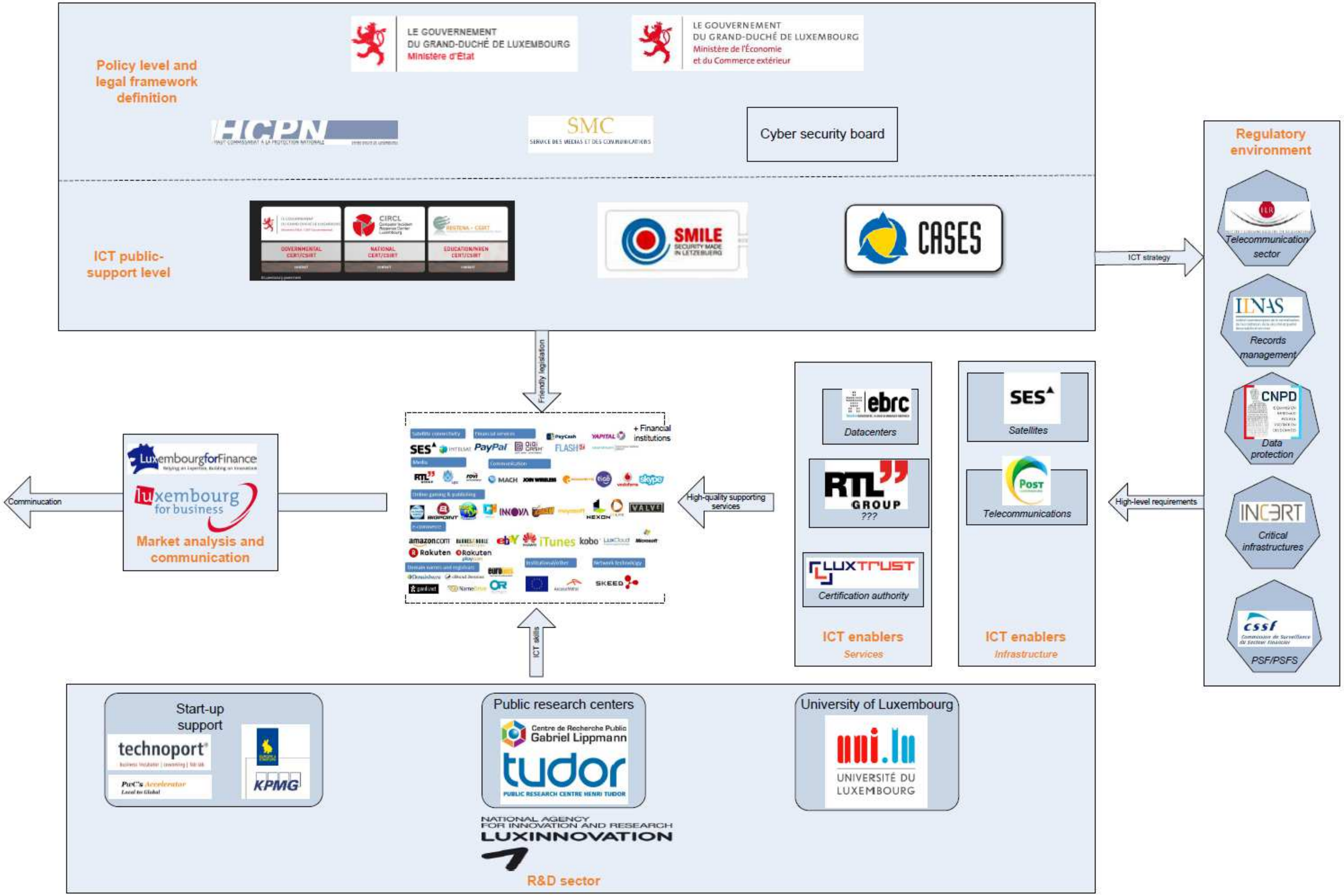


Fransman, M. (2010). The New ICT Ecosystem. In The New ICT Ecosystem: Implications for Policy and Relation.

Symbiotic relationships in « post – internet » ecosystems



Adapted and applied to Luxembourg



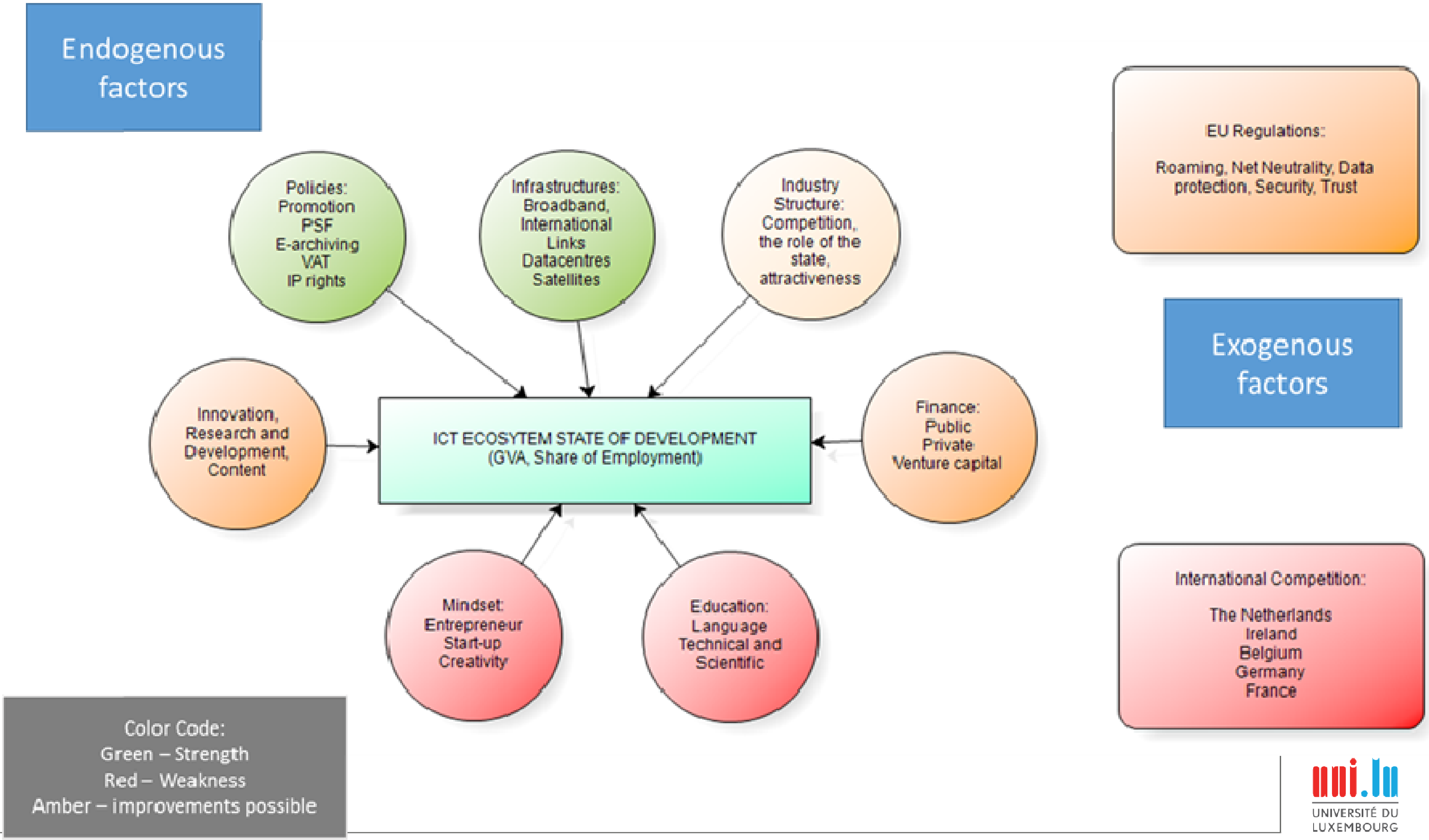
Over 50 C-Level Executives interviewed

Fransman's Layers	Interviewed Organisations and Institutions	Individuals
I – network element providers	Alcatel-Lucent, Cisco, HP, Unify	4
II – converged communication and content distribution providers	Broadcasting Center Europe, British Telecom, Cegecom/Artelis (2), Eltrona,(2) Fédération des Opérateurs Alternatifs Luxembourg, HotCity, Join Wireless, Post (2), Société Européenne des Satellites,Telecom Luxembourg,	13
III – platforms, content and applications	Association des professionels du secteur financier, Association des professionels du secteur de l'information, CTTL, Data4, Datacentre Luxembourg, Ebrc, Itrust, Luxconnect (3), Luxcloud, Netcore, Systemat, Telindus (2),	15
IV – consumers	Appolo Strategies, Association des Banques et Banquiers, Exxus (2), Gartner , Ikano, Fédération des Artisants,,Luxembourg Business Federation, ProNewTech, PwC	10
Outside influencers – finance, regulation, standardisation	Interdisciplinary Centre for Security Networking and Trust (2), Institut Luxembourgeois de Regulation, Luxinnovation, Luxembourg Institute of Technology, Ministère de l'Economie, Moskito, Service des Médias et des Communications	8

Methodology

- Conceptual Model of the ecosystem – focus group
- Initial SWOT analysis – focus group (10 participants)
- 51 Exploratory interviews, each about one hour
- Actors from different layers and external stakeholders
- Use of NVIVO software for data handling, analysis and presentation
- All interviews recorded in participants offices
- Translated (if needed) and transcribed
- Coding directly in audio files
- Additional material from press review over 2013 and 2014 and presentations at conferences, public speeches etc
- Template analysis based on initial SWOT analysis
- Links to existing literature

Strengths, Weaknesses and external influences



Mind-set - main messages

We are not ambitious enough - on an international scale we can do more. we have Luxembourg trade and investment offices in many places but we are not making best use of them. There is a lot of bright people but we are not using them. We are not clear what markets/customers to target? Where can we deliver an added value? **CEO Network Equipement provider**

"Risk taking culture and mind-set is literally in-existant " **CEO Alternative Telcom**

"We are not really helping start-ups e.g. if you go bankrupt you can not start again" **Head of Sales Network Equipment provider**

"We are focussing too much on ourselves and we believe to be better than we actually are. We should question ourselves more because otherwise after a while it might be too late"
"In Luxembourg unions are very strong and have major influence on political decisions" **CIO IT Service provider for IKEA**

"We want to stay what we are"
Unknown – Luxembourgish saying

"Luxembourgish people prefer a job as civil servant" **CEO Satellite Operator**

"if a start-up fails everybody looks down on it and it is very difficult to get another chance" **Prime Minister**

"Luxembourg can only overcome its internal inertia with the help of foreigners but Government meetings tend to be closed to non-Luxembourgers because of language issues" **Head of MVNE Alternative Mobile Operator**

"We need to become more creative and do more with less" **Luxinnovation**

"Major projects are driven by civil servants that do not want to make any mistakes rather than by managers that see the business value for Luxembourg" **Member of management board of bankers association**

E-skills - main messages

"To develop the "digital business" we need first and foremost energy and cooling but in addition we have to be able to attract young talents full of ideas and competencies. The difficulty of Luxembourg is that it lacks attractiveness for these people, they want to work hard and play hard, they want fun – we need to be able to attract them" **CEO Docler Holding**

"Parents are oriented their children into non-technical jobs" **Head of Sales Luxconnect**

" Our education system is expensive but not efficient, languages are still an advantage but there is an issue with English" **CEO Data Center provider**

"We are not hiring any local people anymore" **COO Media Services Provider**

"The is no cooperation between the educational system and industry" **CEO ICT Integrator**

"We need to promote the fact that there are 6 universities around us and that we have our own. But there is little companies that are created by these universities (seed-fund), there is no process, the professors are not motivated to act in such a way" **CEO Data Center provider**

"To find the right people – quickly, this is the main issue" **CTO ICT Integrator**

"our schools are not producing the right profiles" **CTO ICT Integrator**

"English language should be more developed - rather than being multi-lingual we should be more international - we tend to become regional focussing on French, German and Luxembourgish, Public school in English would increase attractiveness tremendously"
"We have a problem recruiting Non-EU staff, sometimes the process can take over six months" **University of Luxembourg**

Main Findings

- Government is well aware of the importance of the Ecosystem for Luxembourg's economy
- Many policies have been put in place to successfully develop the Ecosystem
- ICT Infrastructures are amongst the best in the world
- Smallness leads to flexibility which can be a major advantage
- Luxembourg's main weaknesses – **E-skills and Mind-set**
- International competition between countries is increasing
- Because of its small size, EU rules and regulation can have a particularly strong effect on Luxembourg's ICT Ecosystem e.g. roaming discussion

A liberalised Telecommunications Market?

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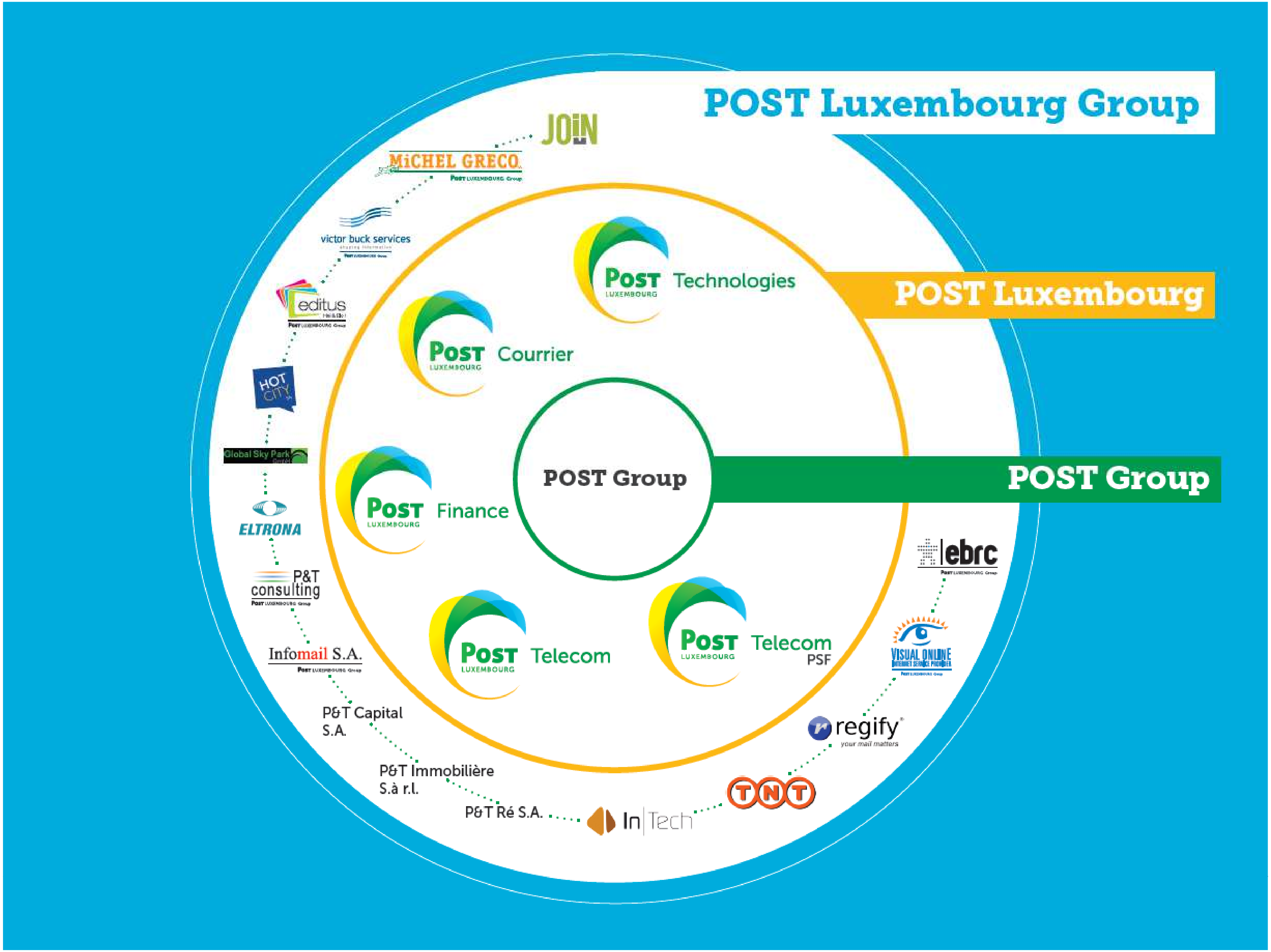
Government initiatives to develop the market…

- E-Luxembourg – first attempt to develop ICT amongst general public and administrations in 2001
- E-commerce – first country in Europe to exploit specific EU rules on e-commerce, attracted e.g. Itunes, Ebay, Paypal, Amazon and others
- Law on intellectual property and support for R&D
- E-Archiving – legal framework in place
- Cloud legislation – protects Cloud customer and guarantees access to data in case of default of service provude
- Broadband Strategy – aggressive roll-out plan financed by revenues from the incumbent
- Support of CATV operators (interconnection, broadband access)
- Agency to develop financial and ICT sector (Luxembourg for ICT)

The incumbent – Post Luxembourg (EPT)

- POST Luxembourg was founded in 1842 as a public service and has been a wholly state-owned company since 1992.
- Provider of postal, financial and telecommunications services with a total services turnover of 726,80 Mio € in the financial year 2013. It is the country's 3rd largest employer, with nearly 4,000 staff working for the company and its subsidiaries.
- Offers fixed and mobile to internet and television, as well as many specially designed services for businesses (e.g. M2M) and broadband connectivity solutions in Luxembourg and abroad, including Satellite up- and downlink services. Its TERALINK broadband network connects several European cities.
- Cloud and ICT services comprise IaaS, SaaS and PaaS (Infrastructure, Software, Platform as a Service) Services for the business market; same infrastructures are reused for internal platforms. Data centre hosting and services are offered by its subsidiary EBRC


POST Luxembourg Group
POST Luxembourg
POST Group
POST Group
POST Technologies
POST Courrier
POST Finance
POST Telecom
POST Telecom PSF
JOIN
MICHEL GRECO
victor buck services
editus
HOT CITY
Global Sky Park
ELTRONA
P&T consulting
Infomail S.A.
P&T Capital S.A.
P&T Immobilière S.à r.l.
P&T Ré S.A.
In|Tech
TNT
regify
your mail matters
VISUAL ONLINE
ebrc

Luxconnect a second state-owned operator

◈The Government decided in 2005 to set up a second 100% state owned operator. This new company would:

- Build a national dark fibre network. This would be made available to telecommunications operators so that they can build and enhance their own footprint in Luxembourg.
- Operate a network that connects Luxembourg to the Internet exchanges in Amsterdam, Brussels, Frankfurt and Paris. Distances would be minimised while route and fibre diversity maximised (is about to sold in 2014)
- Support the national ICT, media and e-business sectors by providing carrier neutral, state-of-the-art data centre facilities.

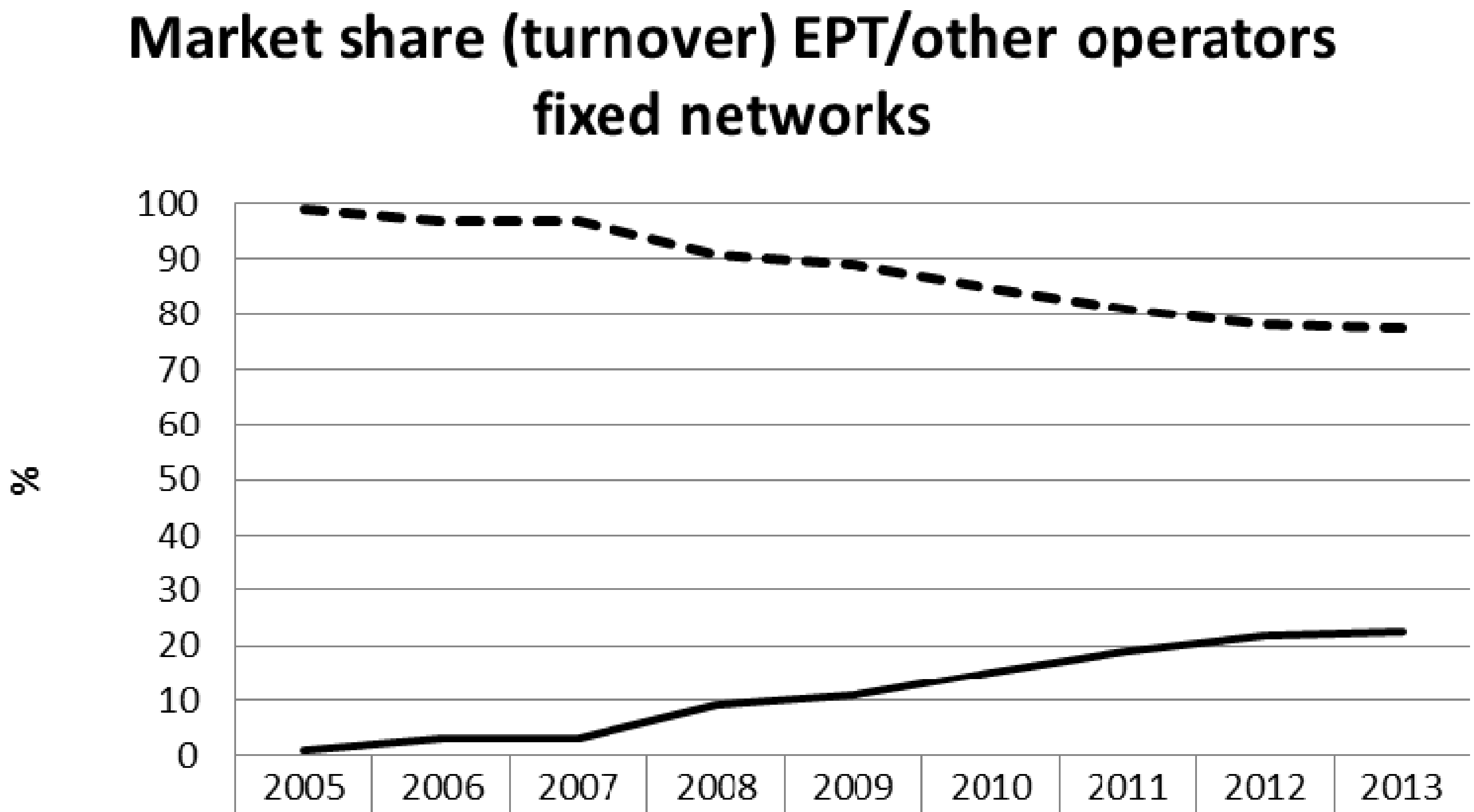
◈The project was allocated an initial budget of €30 million. By the end of 2012, LuxConnect employed 23 staff, had capital of €75 million and had invested over €92 million developing its business.

The national ultra-high broadband plan

	EU targets	Luxembourg government targets:
Since 2013	Basic broadband for all	➔ 1 Gbps download and 500 Mbps upload (min 25 % coverage) ➔ 100 Mbps download and 50 Mbps upload (min 80 % coverage)
End of 2020	High-speed broadband with at least 30 Mbps download	1 Gbps download and 500 Mbps upload (100 % coverage)

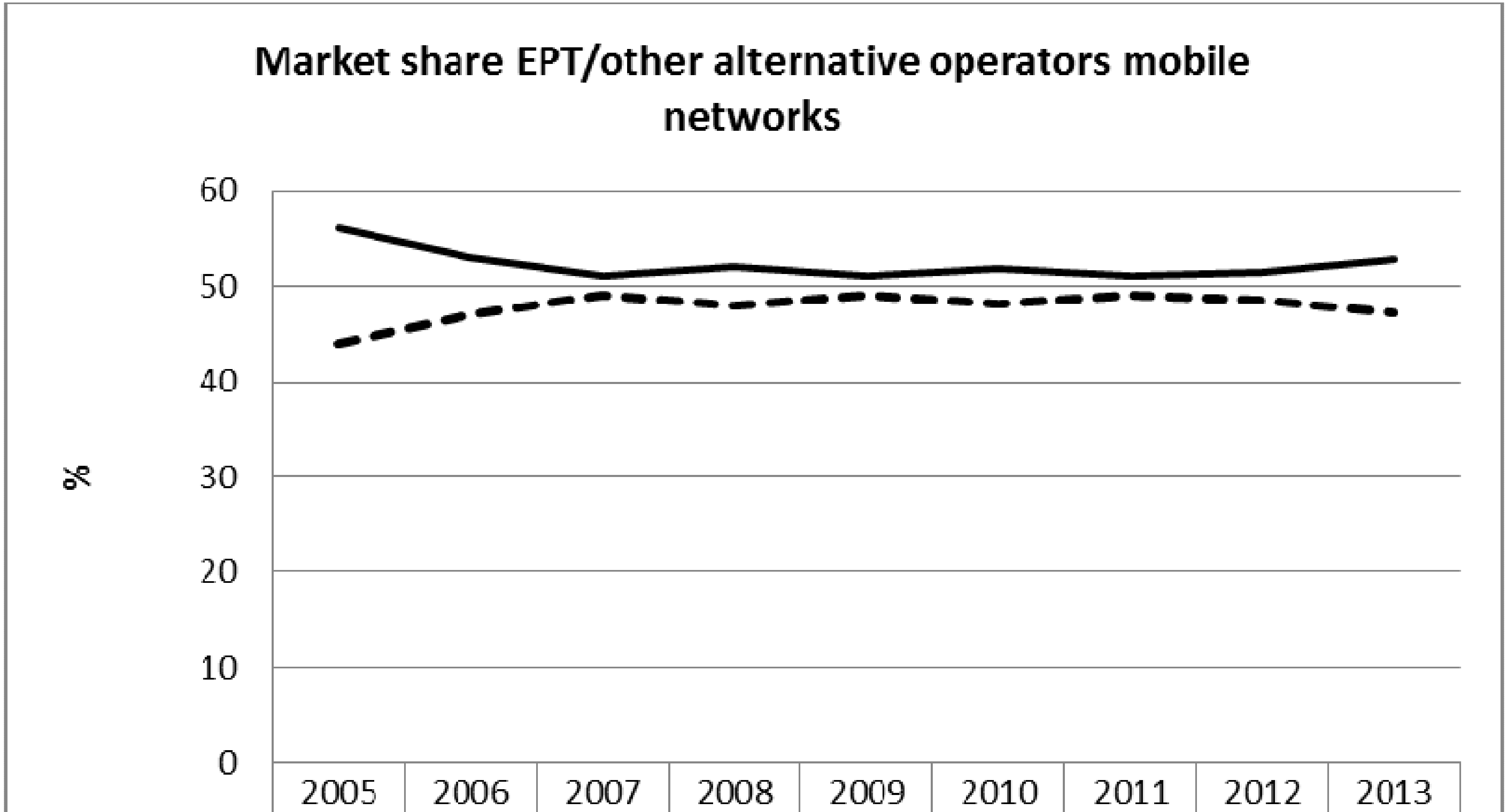
The incumbent as been instructed by the government to build the underlying FTTH networks and has been granted the necessary financing

How competitive is the Fixed Market?



	2005	2006	2007	2008	2009	2010	2011	2012	2013
EPT	99	97	97	91	89	85	81	78	77,4
OAO	1	3	3	9	11	15	19	22	22,6

How competitive is the Mobile Market

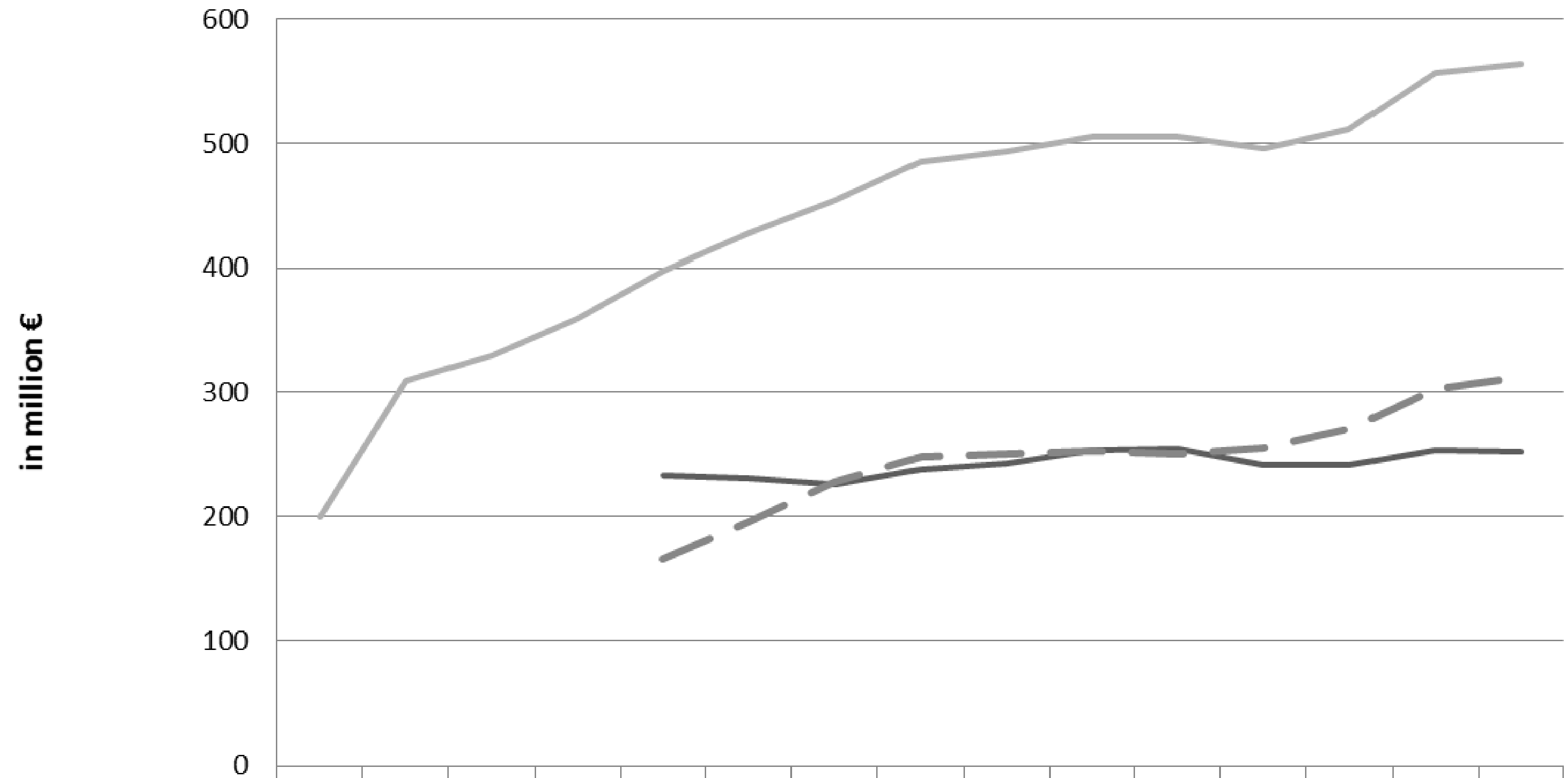


	2005	2006	2007	2008	2009	2010	2011	2012	2013
EPT	56	53	51	52	51	51,8	51	51,5	52,8
OAO	44	47	49	48	49	48,2	49	48,5	47,2

What about privatization?
The State is (still) heavily involved in the industry

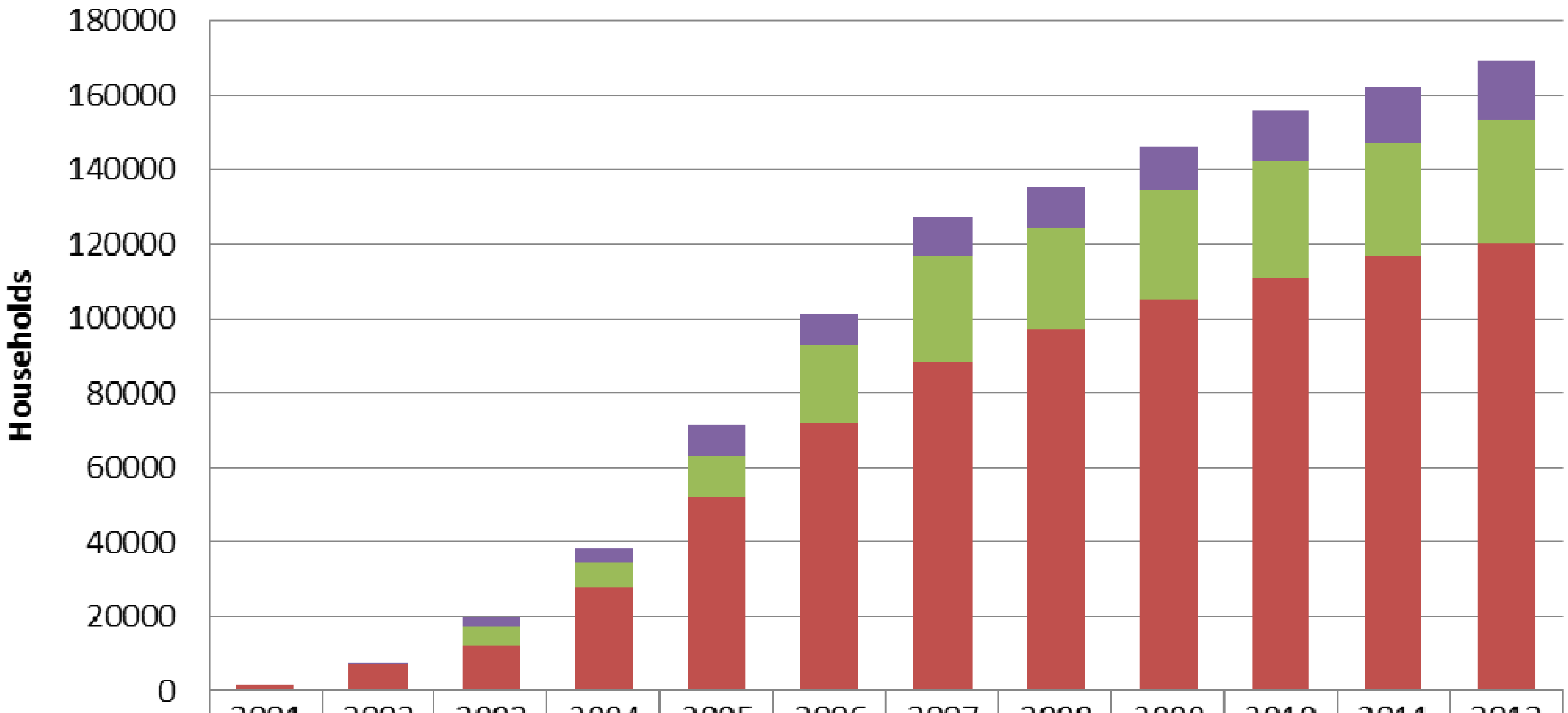
Operators in which Governement has a stake	Major Private and International Operators
• Entreprise des Postes et Télécommunications (incumbent) • Post Telecom (incumbent mobile operator) • Ebrc – datacentre and resilience provider • Luxconnect (Alternative infrastructure and datacentre provider) • Join Wireless (4th mobile operator, International MVNO) • Teralink (international fibre back-bone) • Hotcity (municipal wireless lan) • Visual Online (internet service provider) • Eltrona (largest CATV operator) • Artelis (telco operator, part of Energy Provider) • Societé Européenne des Satellites (Satellite telecommuncations)	• Tango (2nd mobile operator – Belgacom) • Orange (3rd mobile operator – France Télécom) • Telindus Telecom (B2B alternative carrier) • Numéricable (Altice Group) • Luxembourg Online • Telecom Luxembourg Private Operator (B2B alternative carrier)

Has state intervention been successful: the market size has increased substantially…



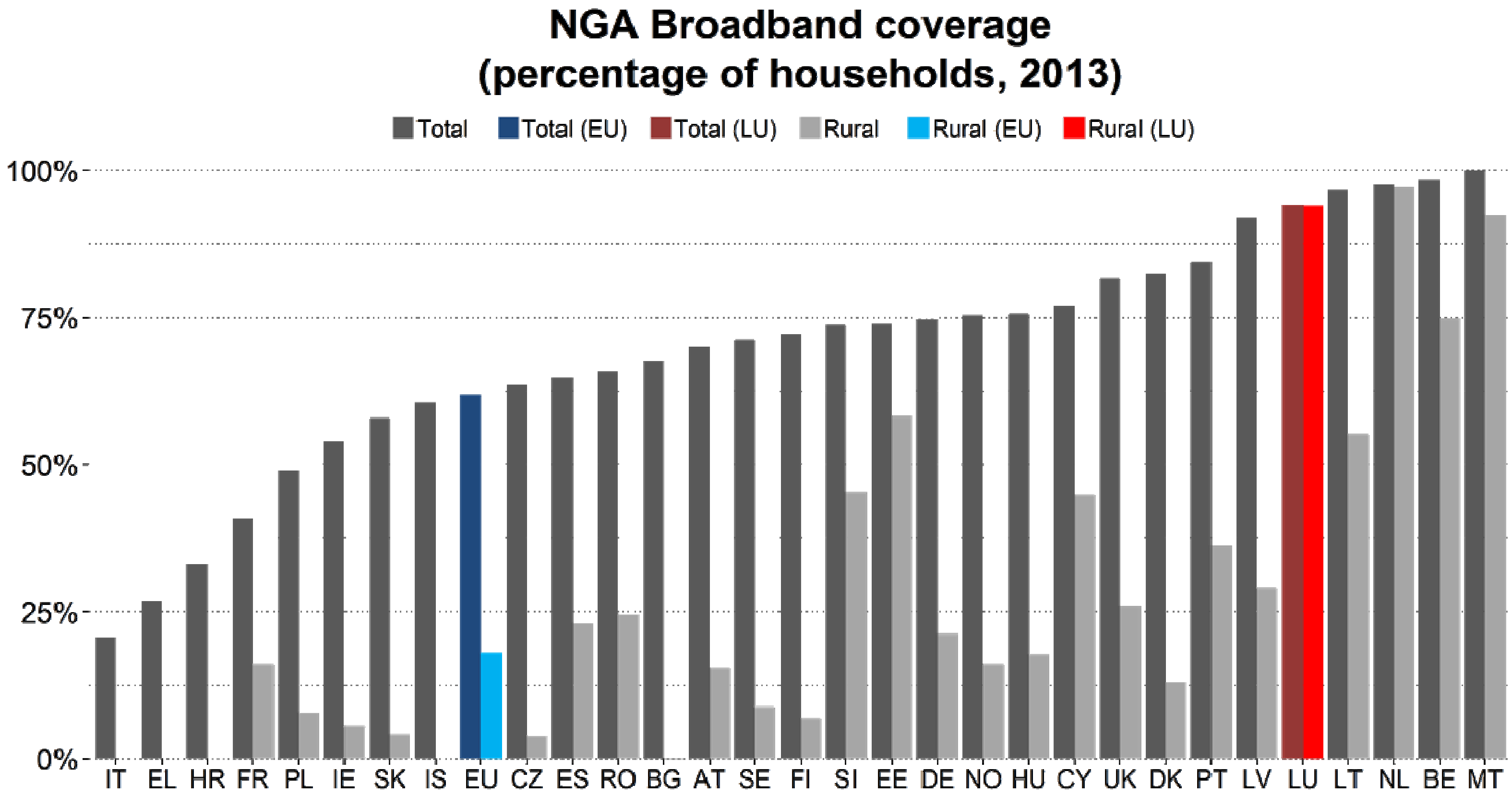
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Market Size	200	310	330	360	398	427	454	485	493	506	506	496	511	557	564
Fixed					233	231	226	238	242	253	255	242	241	254	252,2
Mobile					165	196	228	248	251	252	251	255	270	303	311,9

...and Broadband connectivity has grown



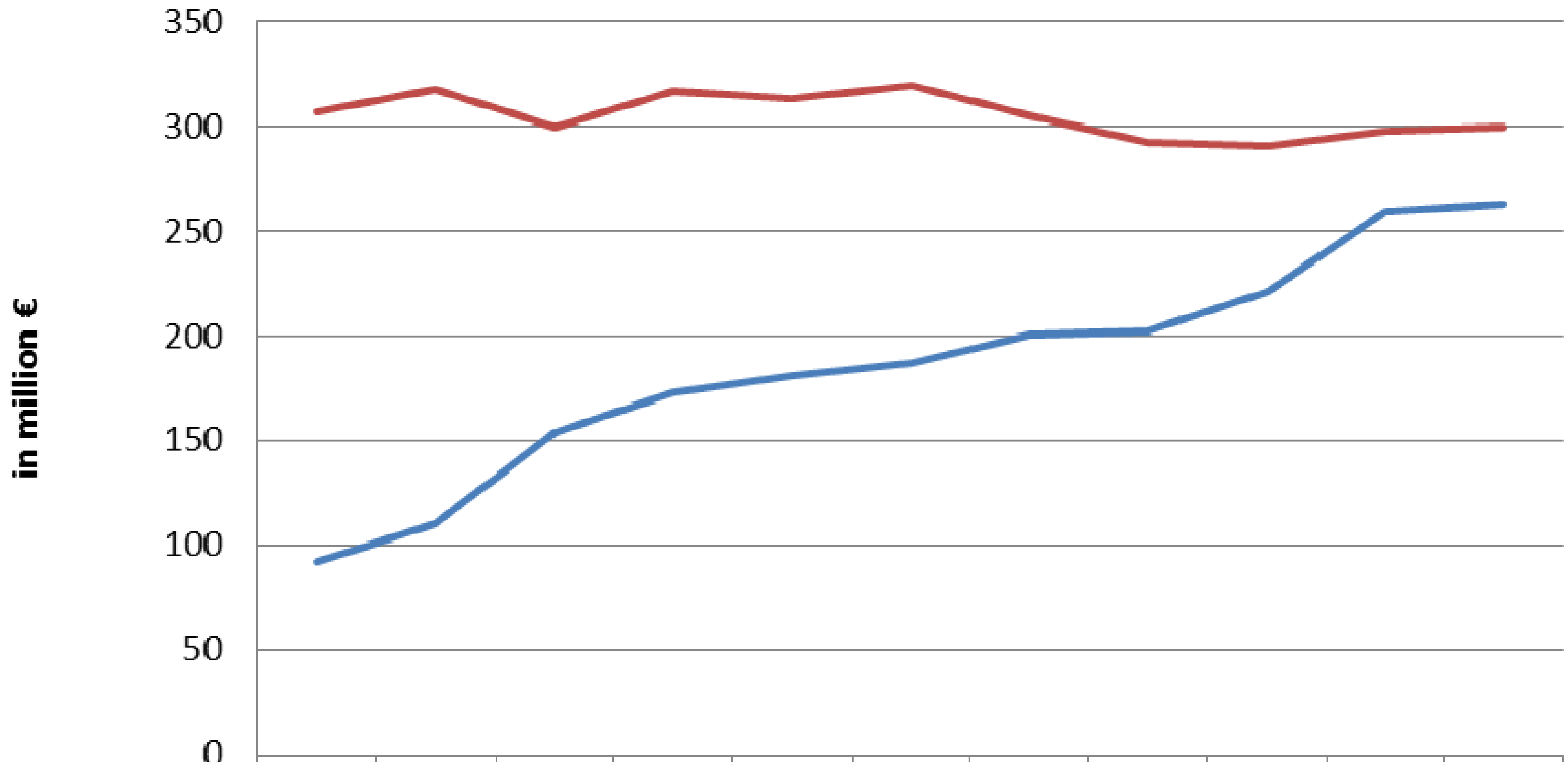
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
CATV	0	400	2500	4081	7956	8710	10000	11000	12000	13900	15200	16500
DSL Other	0	0	5000	6336	11065	20614	28747	26920	29244	31346	30000	32700
DSL EPT	1700	7000	12281	27906	52402	72170	88235	97326	105069	110999	117000	120400

NGA Broadband is widely available



Source: Digital Agenda scoreboard 2014

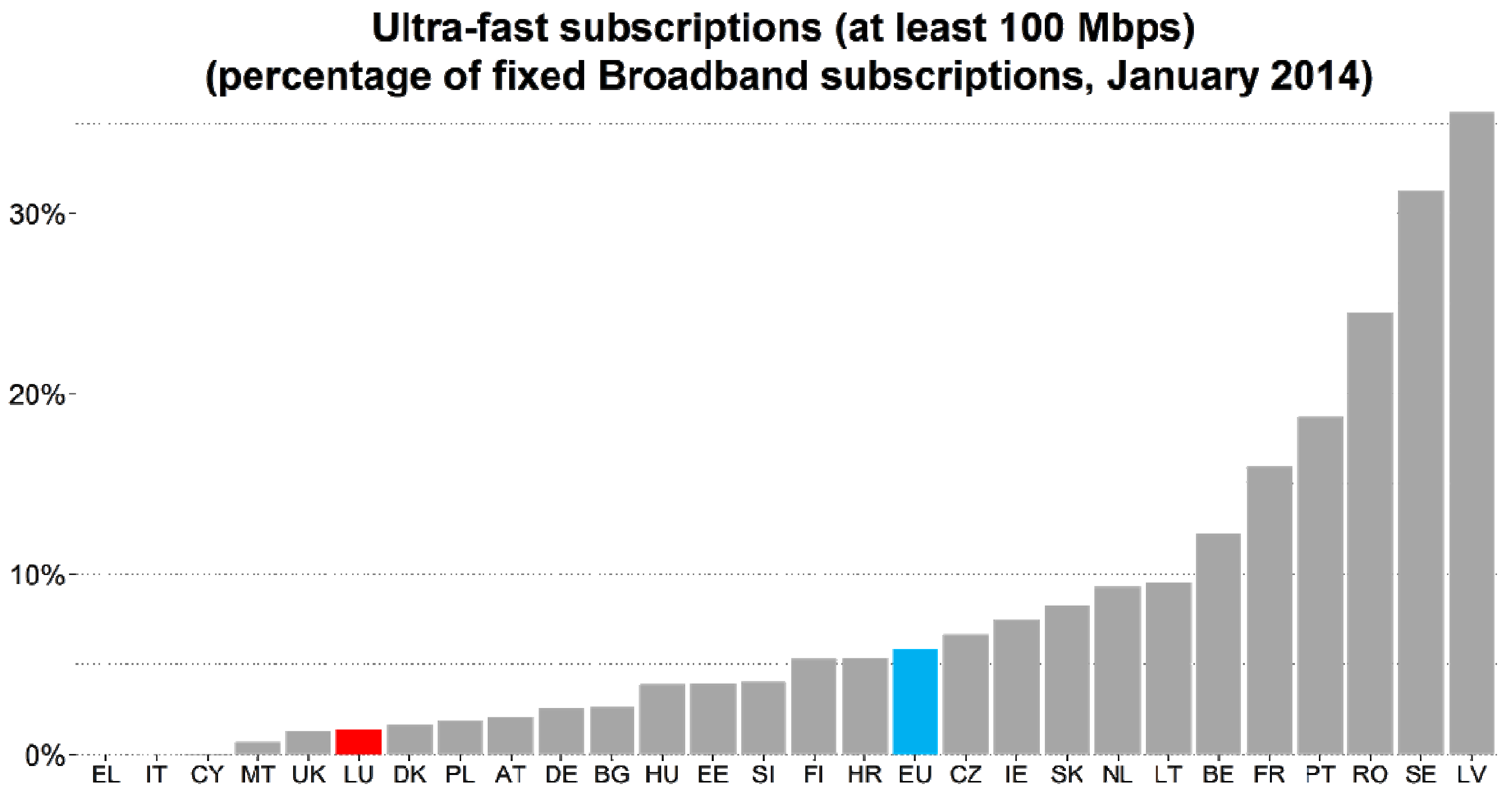
But the incumbent still dominates the market…



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
EPT	306	318	300	317	313	319	305	292	291	298	300
Alt. Ops.	92	110	153	173	180	187	201	202	221	259	263

Source: ILR Statistical report 2013, includes TV revenues

…and take up of UHB (>100 Mbit/s) is very low

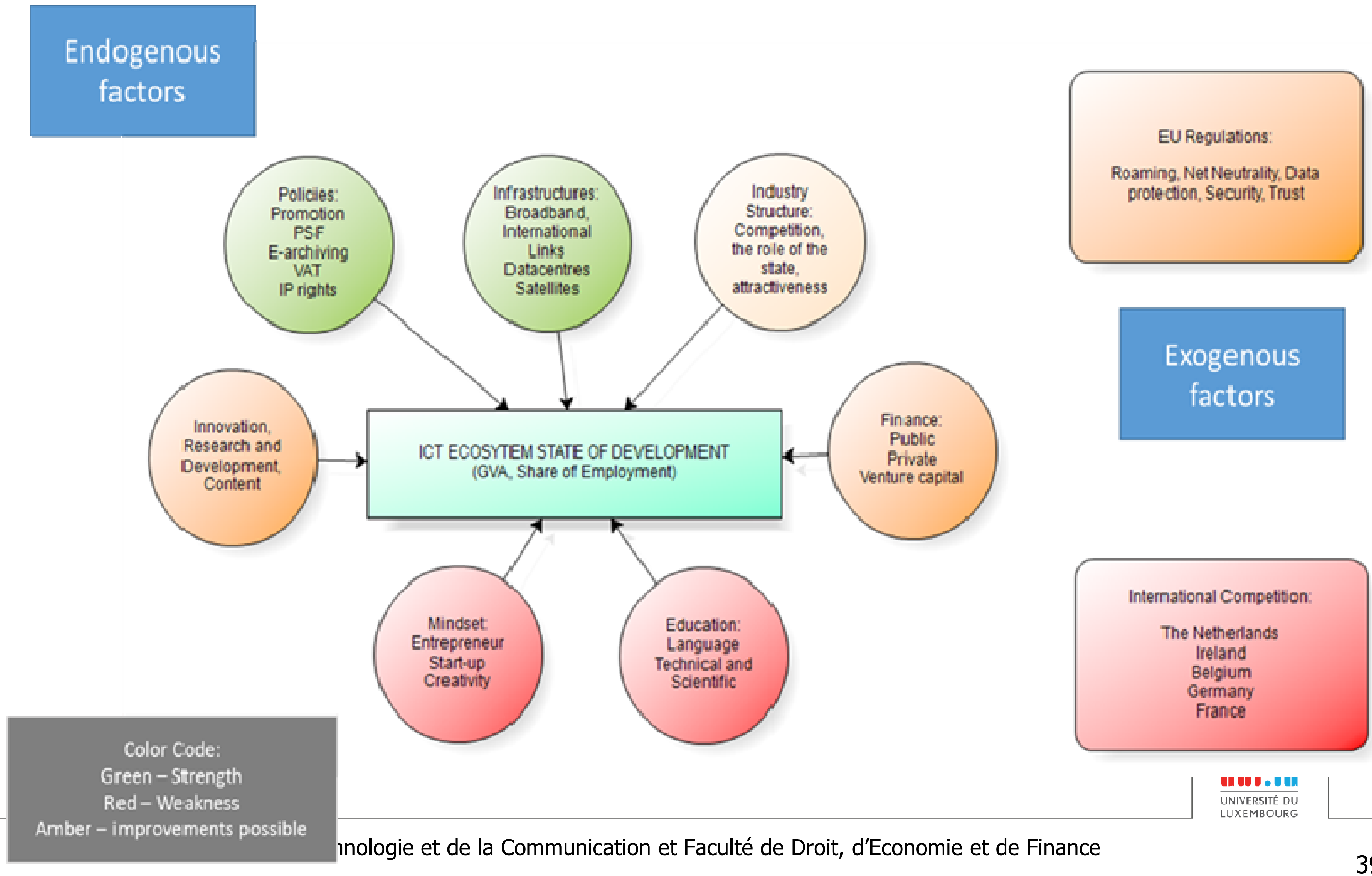


Source: Digital Agenda scoreboard 2014

Conclusions

- The incumbent still dominates fixed, mobile and broadband markets at least in the regulated (residential) sector
- Some competition in B2B segment for example through Artelis and Telindus Telecom
- Government heavily involved in infrastructures (networks & datacentres) as well as in services – functional separation is being discussed
- Limited foreign investment except for Belgacom and France Télécom – is it sustainable?
- International success less and less dependent on infrastructures and existing USP (tax advantage) is disappearing
- State budget under pressure – limited funds for further major investments

Strengths and Weaknesses of Luxembourg's ICT ecosystem



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Competing through e-skills – Luxembourg and its second level digital divide

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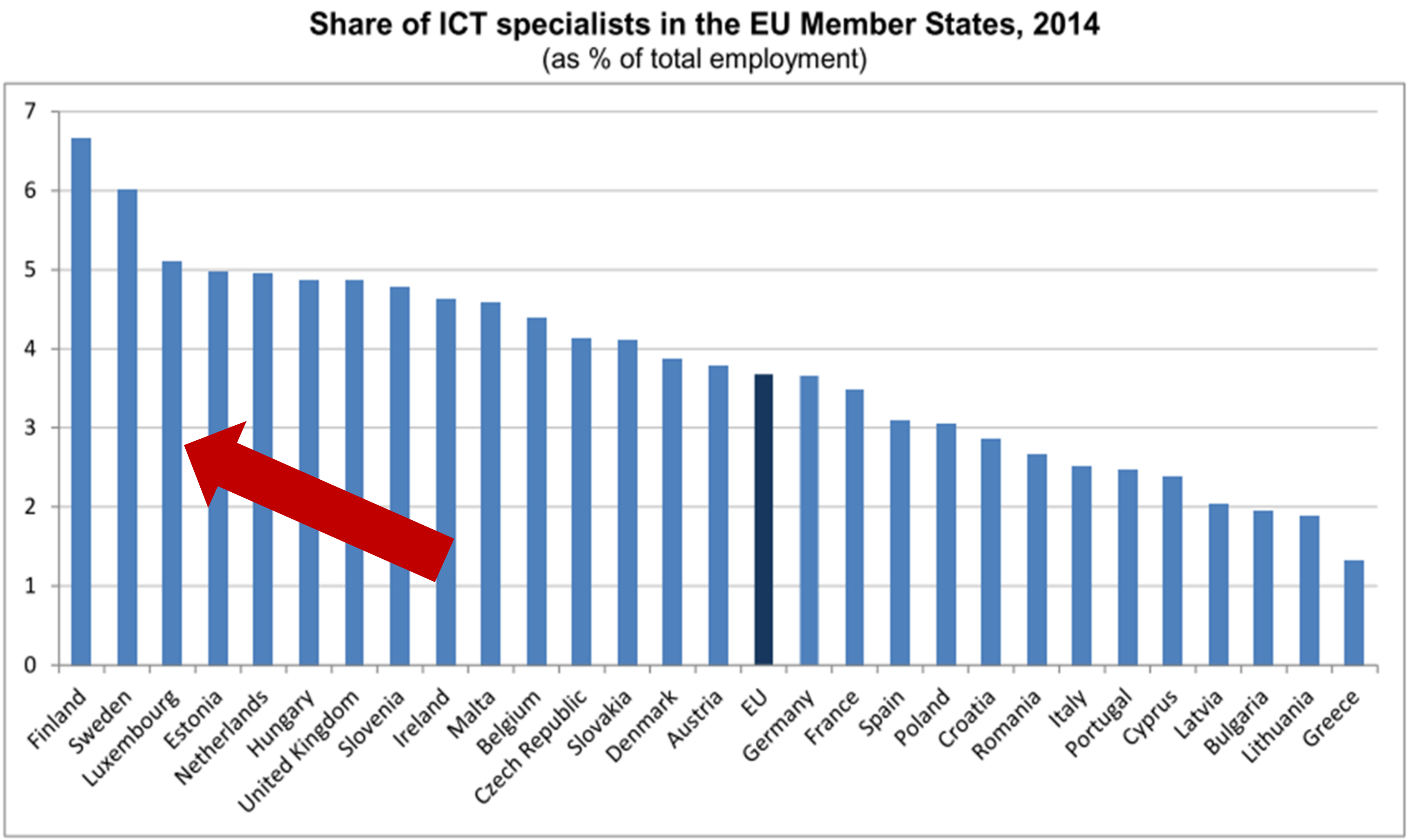
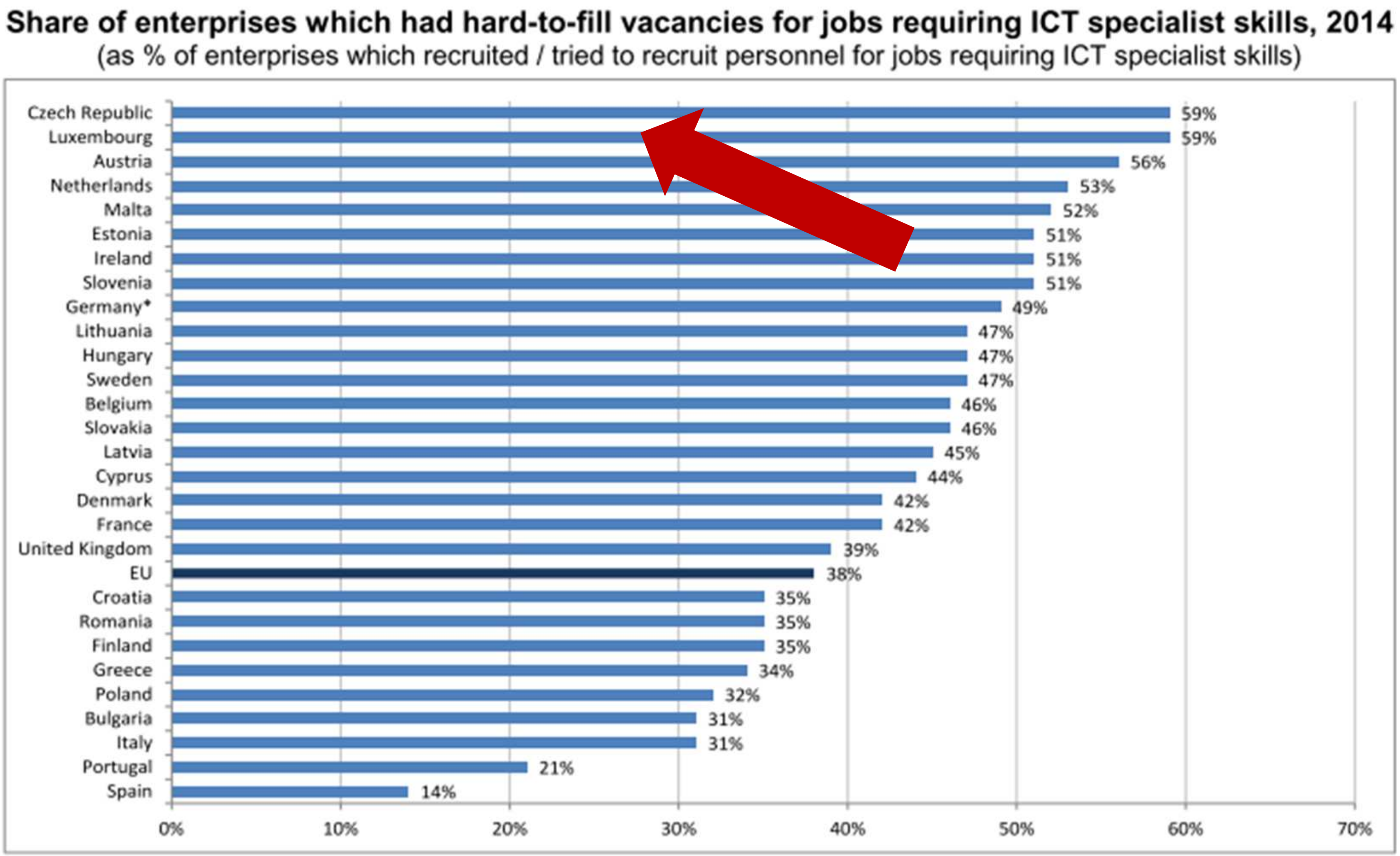
A high share of ICT occupations



Source: EU Commission

Difficulties in recruiting ICT specialists



Source: Eurostat

E-skills – a high level view

"To develop the "digital business" we need first and foremost energy and cooling but in addition we have to be able to attract young talents full of ideas and competencies. The difficulty of Luxembourg is that it lacks attractiveness for these people, they want to work hard and play hard, they want fun – we need to be able to attract them" **CEO Docler Holding**

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The high demand of E-skills is not matched by the “supply”

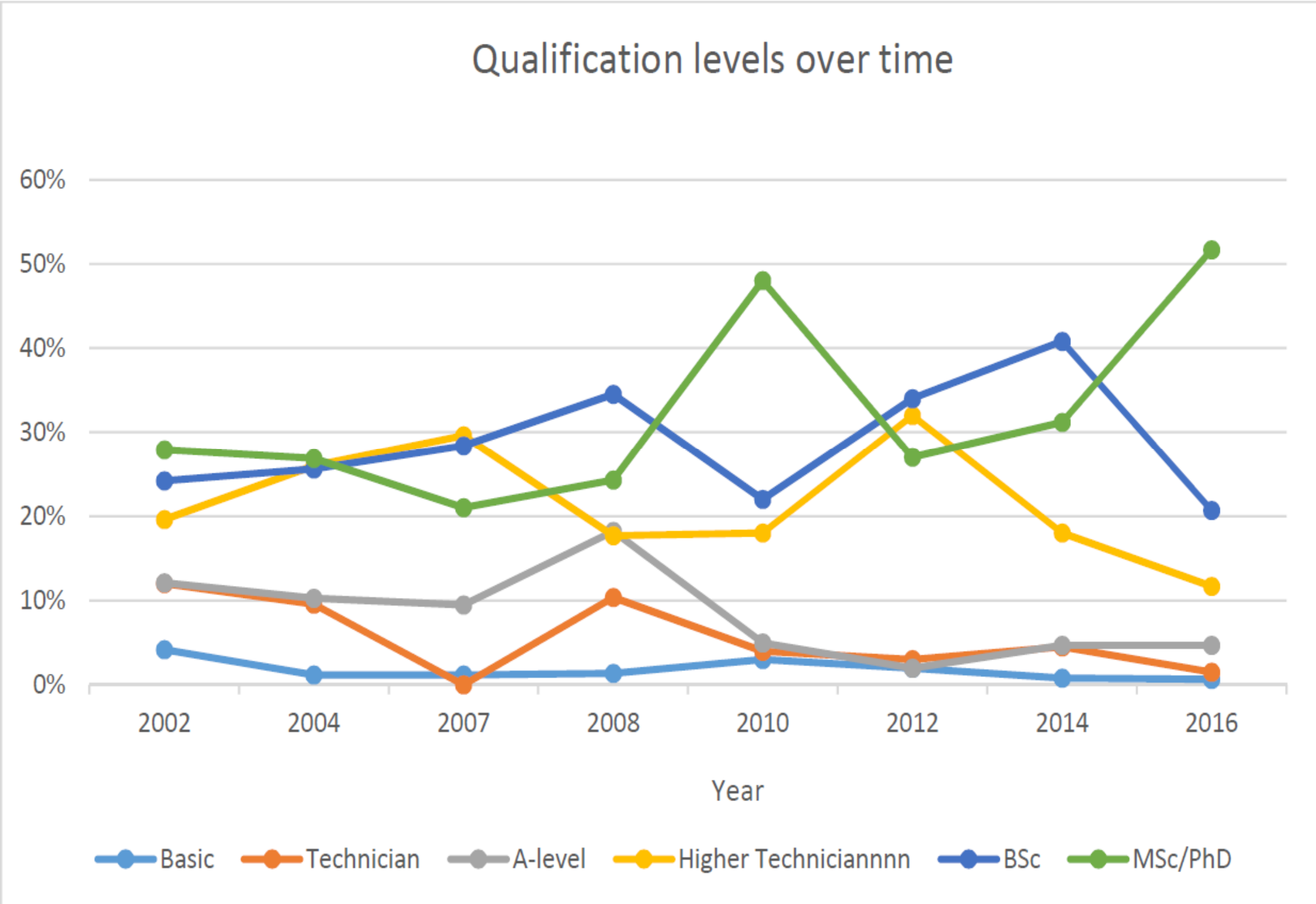
Basic ICT skills to a large extend available but growing signs “Second level digital divide” with a lot of ICT specialists employed and even more needed

Very low interest in **S**cience, **T**echnology, **E**ngineering and **M**athematics studies

	Luxembourg				EU
	DESI 2016		DESI 2015		DESI 2016
	Value	Rank	Value	rank	Value
2a1 Internet Users % individuals (aged 16-74)	97% ↑ (2015)	1	93% (2014)	1	76% (2015)
2a2 Basic Digital Skills % individuals (aged 16-74)	86% (2015)	1	n.a.	-	55% (2015)
2b1 ICT Specialists % employed individuals	5.1% ↑ (2014)	3	4.9% (2013)	4	3.7% (2014)
2b2 STEM Graduates Graduates in STEM per 1000 individuals (aged 20 to 29)	3.6 ↑ (2013)	28	2.8 (2012)	28	18

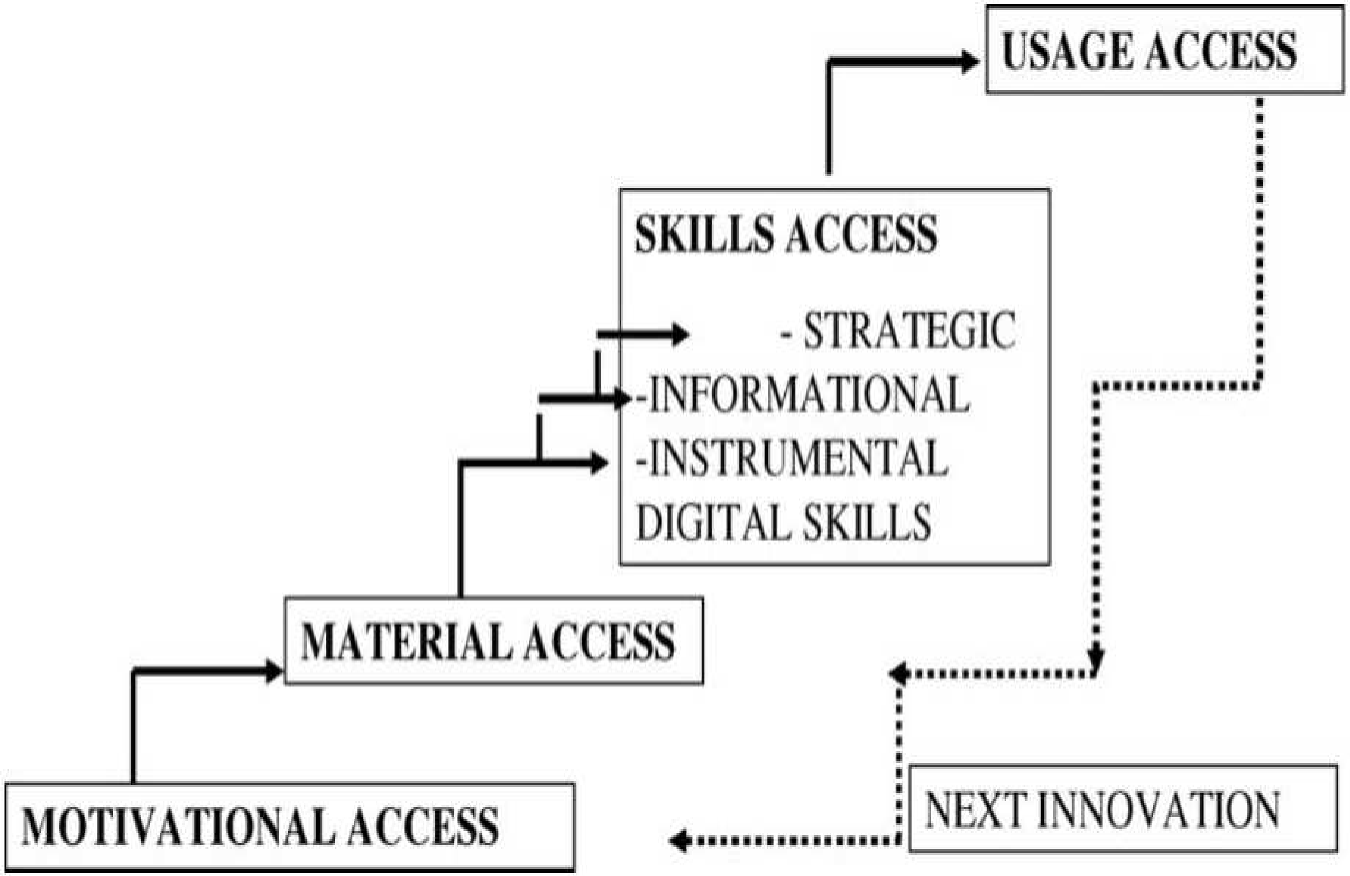
Source: EU Commission

An increased demand for higher qualification levels



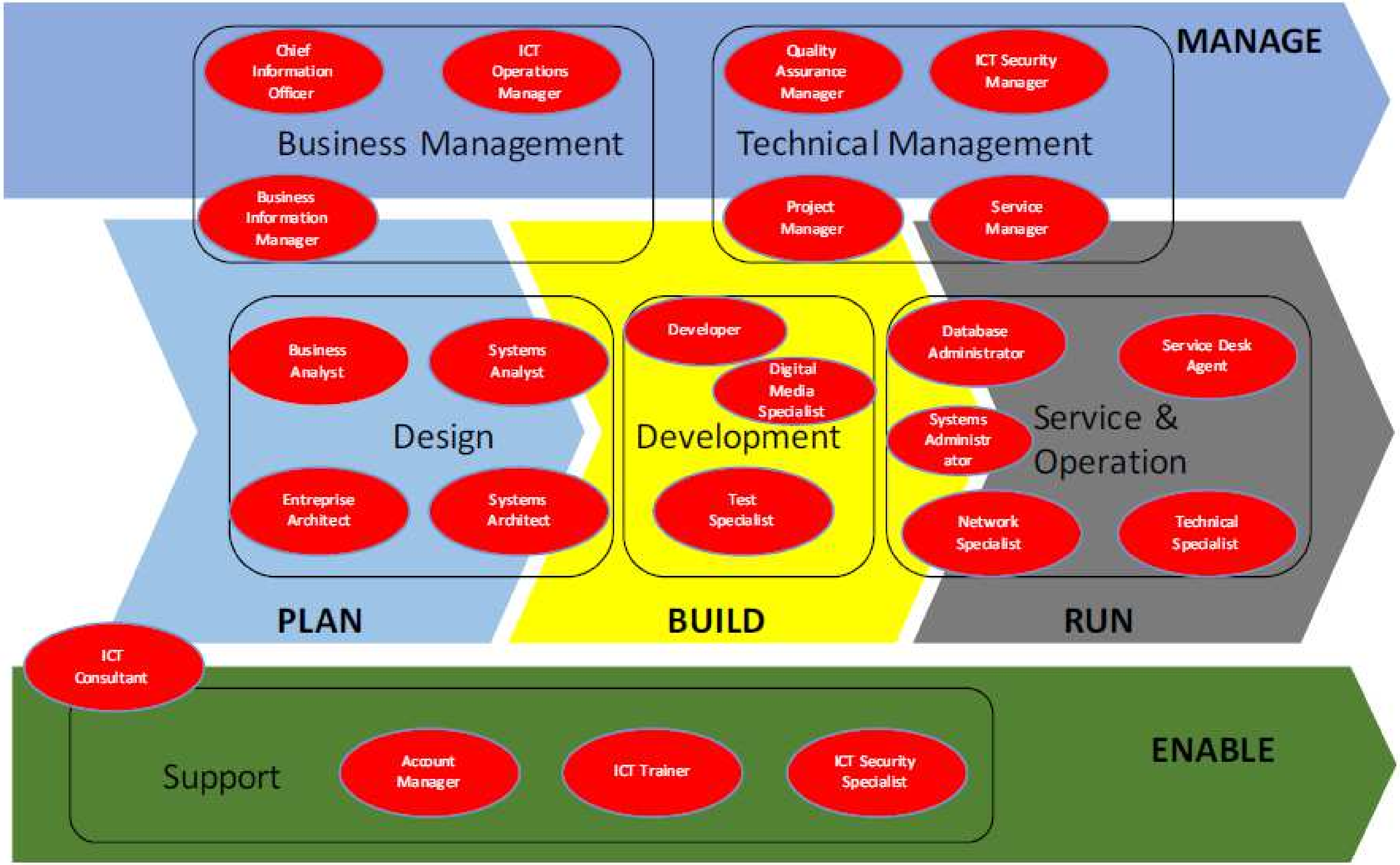
Source: FEDIL

The digital divide – a multi-layer issue



A cumulative and recursive model of successive kinds of access to digital technologies. Source: van Dijk (2005).

European E-competences framework and digital jobs



source: CEN

6 Families of e-Jobs identified

Compa	Employees in Luxembou	Main activity	Marketing, Communication and Business Intelligen	IT Management, quality, testing and security	Infrastructures and network	IT Governance and Project Manageme	User Assistance and Support	Software development and maintenance
1	1500	E-commerce	X	X	X			X
2	200	Research and Development	X					
3	30	Web and Online Marketing	X					X
4	30	SAP integrator	X		X		X	
5	5	Cybersecurity		X	X	X	X	
6	5	Web design			X			X
7	5	Cybersecurity		X			X	
8	5	Digital Marketing	X					X
9	5	Software Development		X				X
10	15	IT maintenance services	X		X		X	
11	15	IT infrastructure and cloud services		X	X	X	X	X
12	3000	Telecom incumbent	X	X	X			
13	50	IT Consulting	X		X	X	X	X
14	500	International media company	X		X	X		X
15	500	Satellite operator		X	X		X	
16	30	IT Project Management		X			X	
17	300	Software Development	X	X	X	X	X	X
18	30	IT Consulting		X	X	X	X	X
19	300	ICT Integrator		X	X		X	

Job profiles and preceived priorities

Less critical jobs profiles – low recruitment needs – low training needs	**Business dependent job profiles – high recruitment needs – lower training needs**
Project Manager, E-journalist, Graphical Expert, Telecommunications Engineer, IT Manager, CIO, Data Security Engineer, Online Marketer, Web Designer	Social Media Administrator, Social Media Consultant, Social Media Operator, 3D Designer, Programmer (C, C++), Maintenance Engineer, Maintenance Technician, Software Developer, Helpdesk Technician, IT Technician, IT Administrator, Network Administrator
Technological jobs profiles – high training needs	**Critical job profiles – high recruitment needs – high training needs**
Bioinformatics, Security researcher, ERP consultant, IT trainer/consultant, SaaS consultant, Strategic coordinator, Change and Innovation manager, E-services managers, IT Engineer, Network Engineer, Systems Engineer, Penetration Tester, Internet of Things Specialist, Transition Manager, Video Specialist	Cloud Architect, Cloud Engineer, Cloud Orchestrator, Cloud Technical Product Manager, Cloud Consultant, Cloud Administrator, Security Engineer, Security Consultant, Business Intelligence Analyst, Data Analyst, Data scientist, Legal Experts, Systems Architects, Technical Sales People, Virtualisation Consultants, Application Designer, Application Developer

Different levels of competences wanted

Key Competences
Good written and oral communications skills Innovative and creative mind-set Generate and understanding strategic visions Identify and understand stakeholders needs Being able to work autonomously Being flexible, multi-disciplinary Knowing about norms and standards Good language skills (at least 2 different one) Emotional intelligence Being able to take decisions Problem solving capabilities
Important Competences
Being able to sense and understand the main technological trends and evolutions Working in teams Negotiating capabilities Understanding budgets and financial issues Having an analytical mind Being able to manage and drive change Application development skills Project management skills Safety, security and risk management competences Self-marketing skills
Complementary Competences
Basic understanding of legal aspects Leadership skills Basic understanding of digital marketing techniques Being productive

What countries are they recruiting (forced to) from ?

"We have no limitations or preferences but candidates are coming mainly from Germany, US, France and the UK. Not many Luxembourgish candidates as we are not really known locally" **International E-commerce provider**

"A majority comes from France and lives there, we have only one Luxembourgish person and some French that chose to live in Luxembourg " **SAP consultant and service provider**

"France (80%), Belgium (5%), Germany (1%), Luxembourg (1%), other European (13%)" **Public research centre**

" We recruit from all over the world, but most candidates come from the greater region. All nationalities are welcome but English is working language" **Satellite operator**

France (33%), Belgium (33%), Germany and Luxembourg (33%) " **ICT integrator**

"France (50%), Belgium (20%), Germany (10%), Luxembourg (20%)" **Publicly owned telecom incumbent operator**

"As our radio and TV programmes are in Luxembourgish language we look for Luxembourgish e-journalists and web designers" **Local Radio and TV station**

"a majority comes from France, some from Belgium, a few from Luxembourg, none from Germany as French is our working language" **Large international software development company**

"a majority from France, some from Belgium and Luxembourg, no Germans" **Local IT services company**

"only French and Belgium people, impossible to find Luxembourgish resources " **local branch of large international communications equipment manufacturer**

"50% French, 50% Belgium, some however live in Luxembourg, but most commute every day over the border" **small local software development company**

How important is work experience and vocational training?

"Work experience is important for us but we also recruit directly from University – in particular Master or MBA levels. We go directly to major universities to promote our company. However, we also have a whole range of internal trainings" **International E-commerce provider**

"University level qualifications of any kinds are needed but most important for us if the kind of personality and the candidates' motivation" **SAP consultant and service provider**

"Vocational training and specific ad-hoc development of competences is important. Work experiences in similar jobs are definitely seen as an advance " **Public research centre**

"Vocational training is extremely important for us. We recruit young people and train them. Previous working experiences in a similar sector would be an advantage. As technology evolves quick life-long learning is the basis for our competitiveness" **Satellite operator**

"Previous work experience is important but even more so continuous vocational training and education" **Publicly owned telecom incumbent operator**

"For many technical profiles there simply is no appropriate initial education. Many current job profiles did not exist 10 years ago. Technological space makes ongoing training indispensable" **ICT integrator**

"Previous working experience is not necessarily required. We provide a lot of training in-house with the help of specialised training providers" **Local Radio and TV station**

"Vocational training is highly valued in our company. We also run internal master classes" **Large international software development company**

"Previous experiences can be an advantage. We spend about 20% of our time in trainings in particular in cybersecurity" **Local IT services company**

"vocational training is very important and we run our own international training offer " **local branch of large international communications equipment manufacturer**

"Work experience is important. Basic programming skills are developed at school but understanding customers and their demands comes with experience. It generally takes 6 months to learn a new programming language" **small local software development company**

What are the main reasons for missing competences?

"Our company is not well known. Luxembourgish candidates don't find us and they generally do not possess necessary competences and even less so relevant experiences" **International E-commerce provider**

"The local training offer (formal, informal, vocational) is not appropriate, in particular for SAP specialists, cloud services and new technologies but also in terms of personal development topics" **SAP consultant and service provider**

"The local university is too young and not offering yet the "right" trainings, skills and competences for the local economy. There is an important lack of language skills as well – in particular in terms of English" **Public research centre**

"We don't know and care about the underlying reasons. We just live with the situation and take matters on hand ourselves" **Satellite operator**

"lack of creativity, trainings in creativity, basic economics and team working skills" **Large international software development company**

"The curriculum at university is not completely in line with our current requirements. There is too much focus on technology. Social and human skills need to be more developed, just as the capacity to work in teams. It is also important to promote ICT related jobs amongst young people and their parents" **Publicly owned telecom incumbent operator**

"Schools have difficulties to follow the technological pace of change but sometimes even the basics are missing. There is too much focus on some proprietary solutions." **local branch of large international communications equipment manufacturer**

"Previous experiences can be an advantage. We spend about 20% of our time in trainings in particular in cybersecurity" **Local IT services company**

"University curriculum is not in-line with the demands of the local economy. There is too much focus on technical skills, More project work is needed rather then formal teaching. Social skills such as team working and project management are also required" **small local software development company**

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What are the most difficult to find profiles?

"For us it is supply chain managers and generally people interested in e-commerce, fluent in English and willing to move to Luxembourg with their families"
International E-commerce provider

"SAP consultants are most difficult to find even if you offer very attractive packages"
SAP consultant and service provider

"Project managers with both technical and management skills at an academic level, PhD candidates and Post-Docs" **Public research centre**

" We are in an international competition in our specific industry and we have to compete locally with the public sector. We do experience difficulties to attract people to Luxembourg"
Satellite operator

"Online and digital marketing specialists, SEO specialists, social media experts and web project manager. We have to use freelancers" **Digital Marketing consultant**

"Cloud Architects, engineers and administrators, Help desk operators. There is an intense competition between employers to attract and keep talents"
Publicly owned telecom incumbent operator

"For us it is e-journalists which are most difficult to find and in particular if they have to speak Luxembourgish in addition. The local educational system does not provide any education in that respect" **Local Radio and TV station**

"Content management, Business intelligence, IT transformation. We have no problem with employment conditions as we offer attractive packages" **Large international software development company**

"IT consultants, it is nearly impossible to find the right profiles in the local market and even in the greater region. Our recent hires come from Marseille and Lyon"
local branch of large international communications equipment manufacturer

"Security consultants, IT developers, Security Engineers, Senior researchers" **Local IT services company**

"PEN testers, network engineers – we offer "too good" employment conditions
Local IT services company

Main Findings

- 6 categories of job profiles most wanted
- A mix of technical and « soft » competences required
- Relying on « external » workforces mainly from France and Belgium
- French as the major working language
- Difficulties to find experienced profiles
- Strong competition between employers
- Limited local involvement of international ICT HW&SW providers
- University not yet offering required curricula

Conclusions

- Evidence of « second level digital divide »
- E-skills are not high on political agenda
- Develop local training and education offer(s)
- Promote importance of Science, Technology, Engineering and Mathematics at all levels
- Improve communication, coordination and cooperation between different actors (public vs private, education providers, learners, employers)

Building talents for the digital transformation

In the EU and in Luxembourg

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Major technological trends

mobility and mobile apps: technologies that enable voice and data connections between people, and increasingly between objects, while on the move.

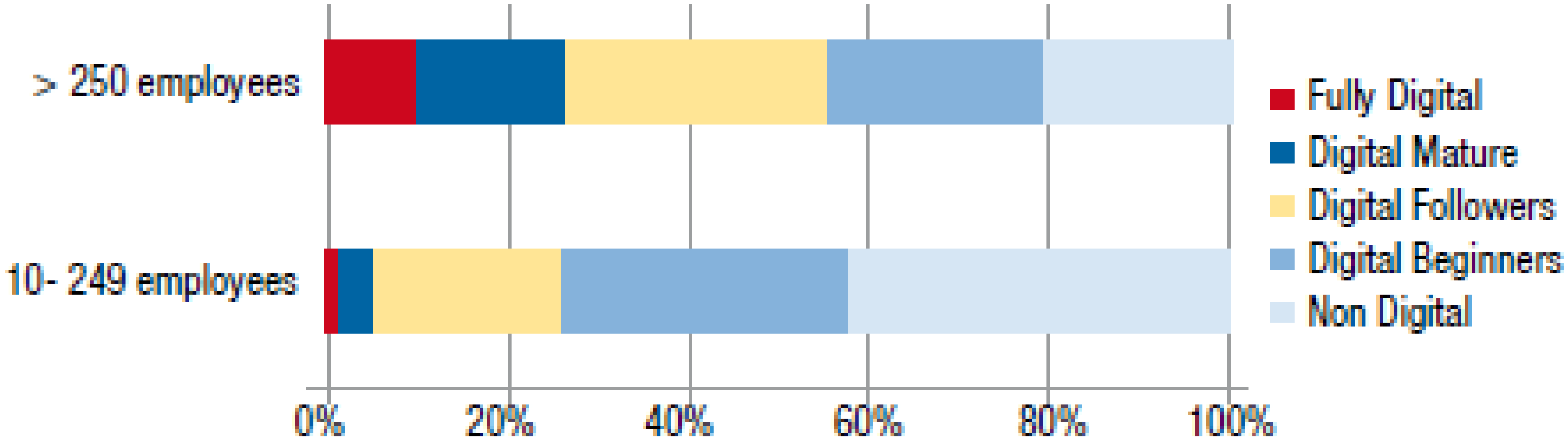
social media: enterprise social media describes companies' use of social media tools for business purposes.

cloud: cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provided and released with minimal management effort or service provider interaction;

big data analytics: the process of collecting, organising and analysing large sets of data ('big data') from a variety of different sources to discover and derive value from patterns and other useful information;

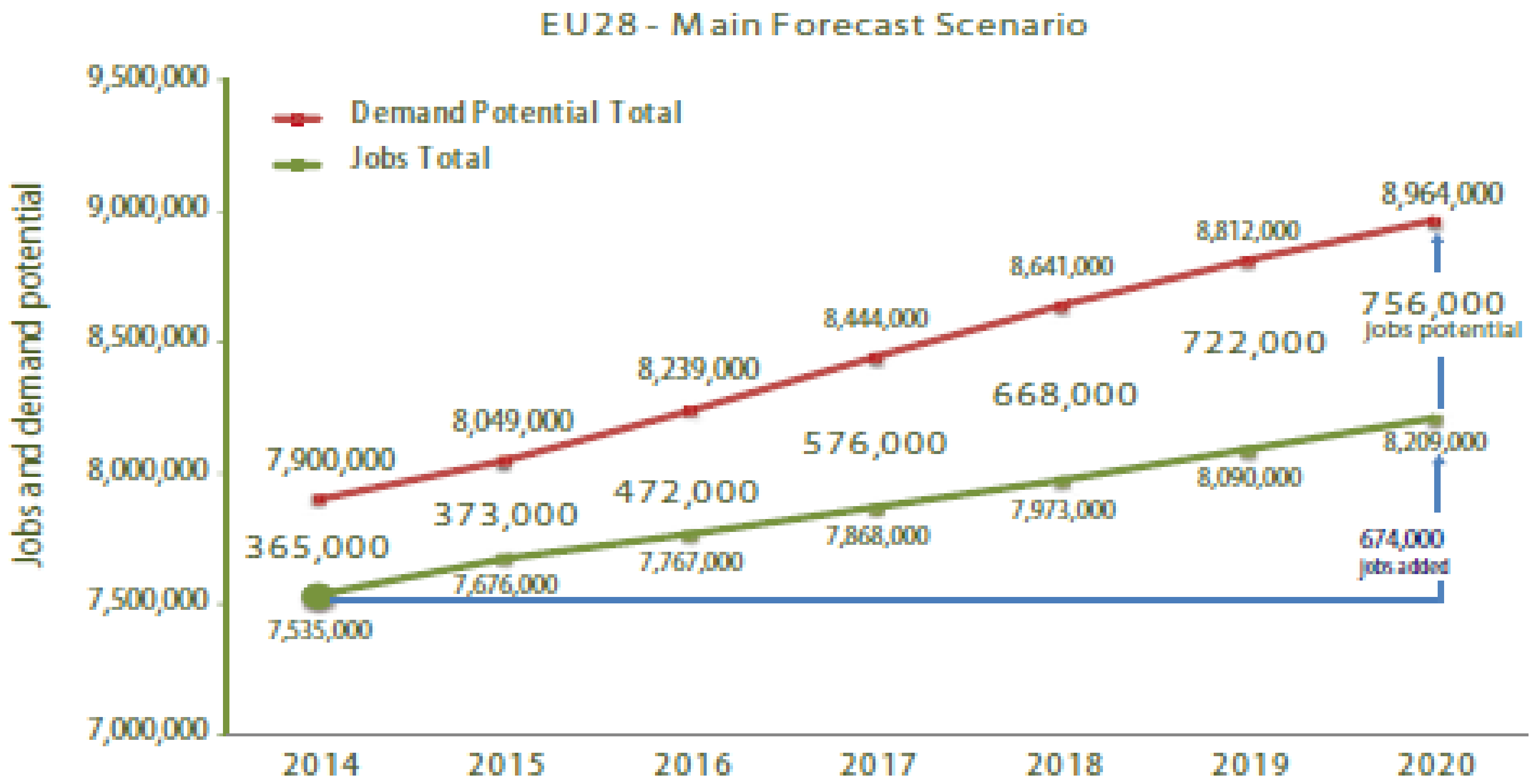
the Internet of things (IoT): describes the network of physical objects that feature an IP address for internet connectivity, and the communication that occurs between these objects and other internet-enabled devices and systems.

Digital transformation is a challenge for European SMEs



Source: IDC European vertical markets survey 2012

A growing gap



Source: Empirica

Europe needs to:

- **re-focus funds and programmes to support digital transformation better**
- **promote the importance of digital leadership**
- **make digital transformation part of the educational mainstream**
- **increase the supply of new, highly specialised skills**

European Schoolnet. (2015). *THE e-SKILLS Manifesto* (2015th ed.). Brussels: European Schoolnet.

EU initiatives so far (an extract)

- **ICT for Work – Digital Skills in the Workplace**, launched in 2014, and ICT in Schools study, 2012, of which an update will be launched in 2015.
- **Grand Coalition for digital jobs**, a multi-stakeholder partnership that endeavors to facilitate collaboration among business and education providers, public and private actors to take action attracting young people into ICT education, and to retrain unemployed people.
- **Opening up Education**, an action plan to facilitate schools and universities to deliver high quality education through ICT and digital content, as well as the digital skills.
- **Eskills Campaign**, an initiative based on the Communication "e-Skills for the 21st Century: fostering competitiveness, growth and jobs", 2007.
- **European Coding Initiative** led by ICT-companies and European Schoolnet to bring coding skills to teachers, kids and adults.

New policy initiatives proposed as part of the digital single market

- Address digital skills at the highest political level
- Boost the Grand coalition
- Grow and strengthen National Coalitions for Digital Jobs
- Encourage a better use of the European funding toward digital skills development
- Improve the analysis and the forecast of skills needs
- Modernize education by for example:
  - increasing trainings in digital skills for workforce and for consumers in the short term.
  - making sure that everybody acquires horizontal digital skills (e.g. coding and digital media skills)
  - harnessing digital technologies for learning (eg platforms of learning ressources, MOOCs, connected classrooms etc.).
  - promoting and facilitating mobility for learners and improving

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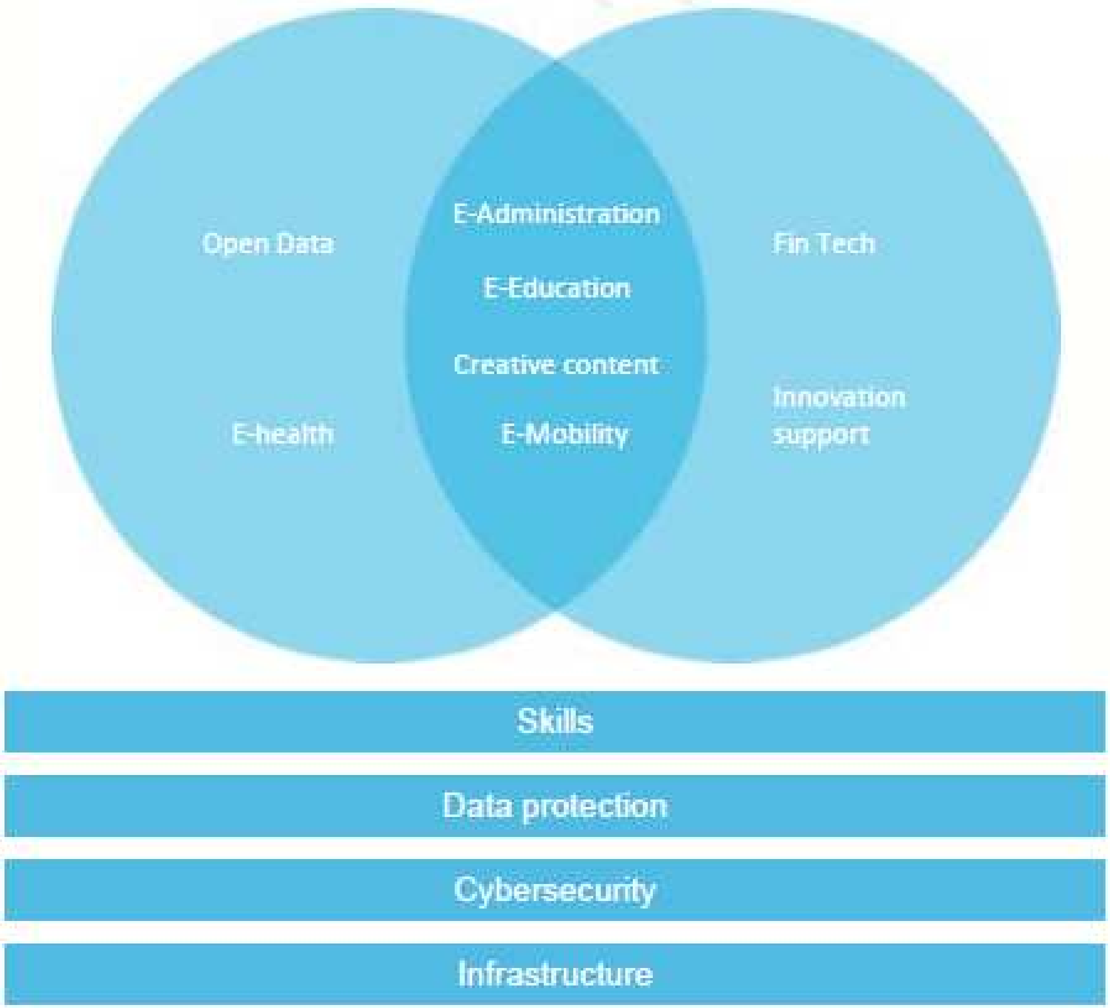

Digital Lëtzebuerg

http://www.digital-luxembourg.public.lu/fr/index.html

uni.lu UNIVERSITÉ DU LUXEMBOURG

E-skills group

➔ Digital 4 Education

- Civic dimension
  - Increased awareness of the importance of digital in daily life, privately and at the workplace
- Ethical & social dimension: digital peer
  - BEE SECURE
- Digital Learning dimension
  - EDUSPHERE
  - mathemaTIC
- Digital Worker dimension
  - Office 365 for Education (digital classrooms)
  - Mobile and portable learning (Tablets, Lap-tops in classrooms)
  - BEE CREATIVE (digital entrepreneur)

➔ Improved monitoring of recruitment needs and offer

- Making better and more coordinated use of statistical databases and combining different sources e.g. ADEM, STATEC and e-job classifications e.g. ROME, Cigref

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E-skills group

HOUSE OF TRAINING

➔ Promote Luxembourg to attract international ICT talents

- organise and participate in "job days" or recruitment fairs
- Presentations at international universities
- Improve legal framework to make Luxembourg even more attractive for international talents (including non-EU countries) -> blue card
- Facilitate intra-group mobility on an international level
- Fast-track working permits
- Facilitate "re-grouping" of immigrant's families
- Reduce "brain-drain"
- Implement new EU directive on students and researchers mobility

➔ Promote e-jobs amongst students and their parents

- Foire des étudiants
- Develop ICT part of « berufer.anelo.lu »
- «girls only» coding classes
- Several international e-skills conferences during EU presidency
- improve legal and economical context for work placements and internships in ICT

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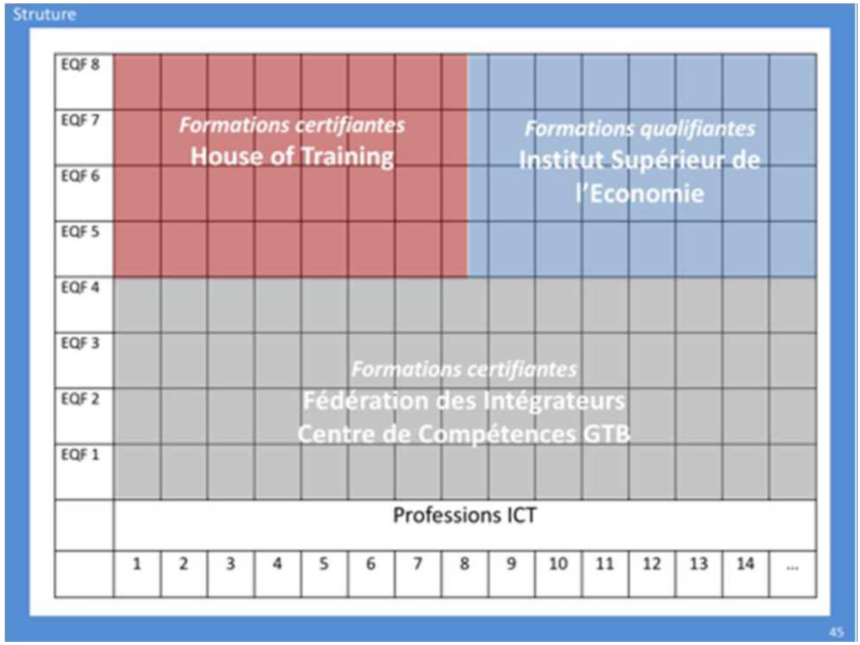
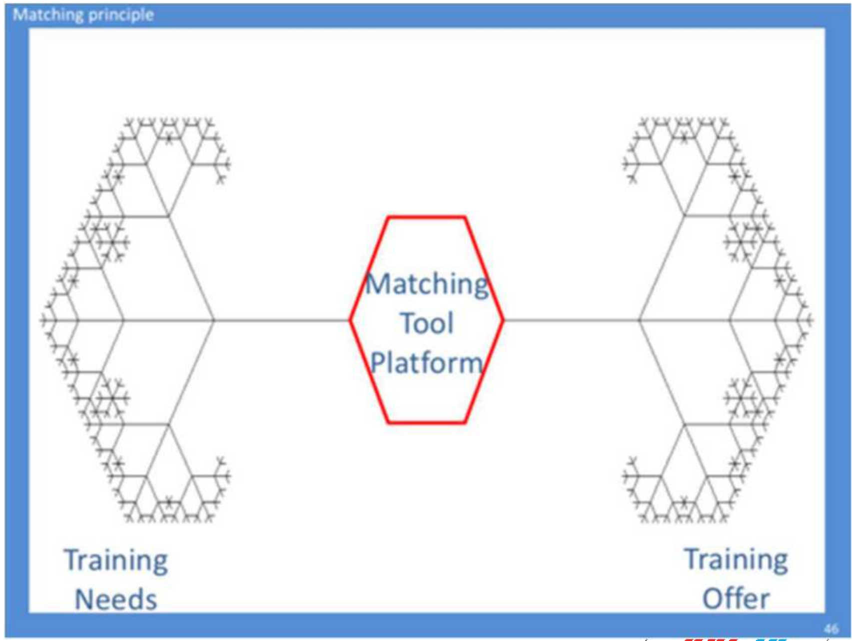
E-skills group

HOUSE OF TRAINING

➔ Life- long learning – the ICT Centre of Competence

- A joint-venture of « Centre de compétences du génie technique du batîment, House of Training and Institut Supérieur de l'Economie, supported by professional Chambres and Organisations, ICTLuxembourg represented by Fédération des Intégrateurs and Digital Lëtzebuerg





Other examples of public – private partnerships

HOUSE OF TRAINING

- **Fit4Coding project** by ADEM and Webforce3
- **Coding workshops** supported by Garantie Jeunesse (16-25 ans)
- **« Atelier Digital »** a conference and a series of F2F and online trainings – cooperation between Digital Lëtzebuerg, House of Training and Google to promote the use of the web and e-commerce to SMEs

National Coalition for digital jobs - objectives

HOUSE OF TRAINING

➔ Training and matching for digital jobs

- Promote Europe-wide student placement programmes with ICT and ICT-using businesses
- Work with existing ICT training providers to broaden and scale their offering to students

➔ Mobility

- Match people to ICT and digital jobs across borders
- Offer mobility assistance services to ensure successful recruitment and a smoother transition

➔ Certification

- Stimulate take-up of a European certification scheme for digital skills of ICT professionals, based on the European e-Competence Framework (e-CF)
- Promote ICT professionalism and further develop the European e-CF

National Coalition for digital jobs - objectives

HOUSE OF TRAINING

➔ Awareness raising

- Organise awareness raising campaigns to attract young people to ICT education, jobs and careers
- Involve young people in "real" ICT projects to help them discover fascinating domains and ultimately choose a career in ICT
- Organise promotional events that target kids, students, teachers, and adults to promote the importance and relevance of digital skills and ICT professional skills

➔ Innovative learning and teaching

- Boost the supply of ICT practitioners and a digitally skilled labour force through structural changes inside educational systems
- Promote dialogue between industry and education providers to develop new curricula that are better aligned with labour market needs

National Coalition for digital jobs

HOUSE OF TRAINING

- **Digital Lëtzebuerg, ICT Luxembourg, Centre de Compétences ICT, CIOnet and Fédération des Intégrateurs** are inviting all interested stakeholders to a round – table discussion on the 24th of March 2016.
- The following have already expressed interest: Digital4Education, Digital Champion, FDI, Luxinnovation, ICTCluster, MENJE, Script, SNJ, ABBL, APSI, CSL-LLLC, Uni.lu, ISEC, House of Training, EU commission, Webforce3, …

- **Everybody is welcome**
- **Objective** to officially launch a National Coalition beginning of 2017

Discussion:

What else can we do together to improve the situation?

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Challenges/opportunities to be explored further

- How to attract start-ups?
- How to create an entrepreneurial mind-set?
- How to stifle innovation and R&D?
- What will be the future of the PSF status?
- What about intellectual property?
- What about the PSDC status?
- Risks and opportunities of a single EU market (international expansion, roaming revenues)
- How to deal with technological changes and new business models eg. cloud Big data, All IP networks, Over the top competition

Some further information

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Thank you very much for your attention

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