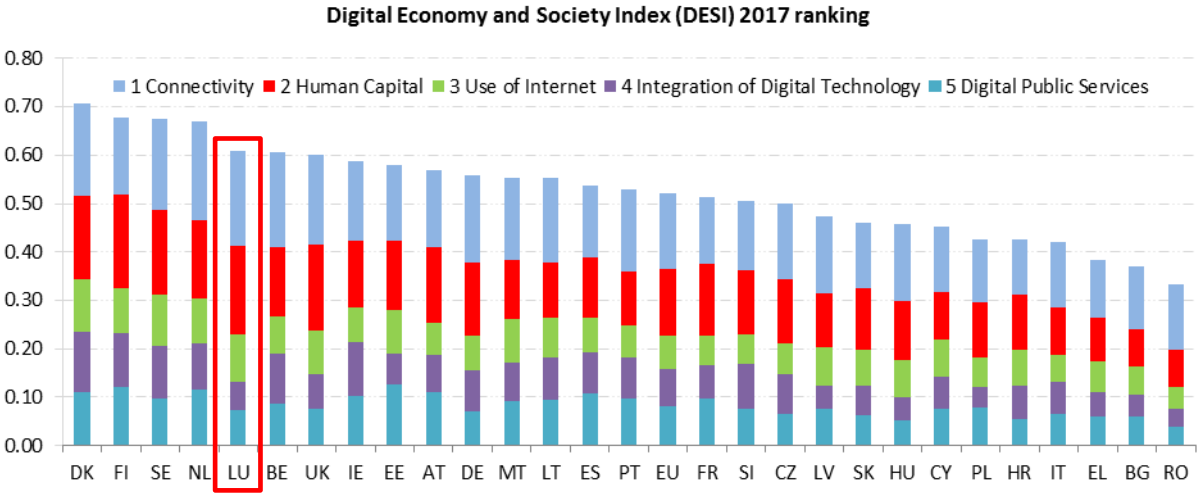
Europe's Digital Progress Report (EDPR) 2017 Country Profile Luxembourg

Europe's Digital Progress Report (EDPR) tracks the progress made by Member States in terms of their digitisation, combining quantitative evidence from the Digital Economy and Society Index (DESI)[1] with qualitative information on country-specific policies. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband, broadband speed and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and eCommerce
5 Digital Public Services	eGovernment



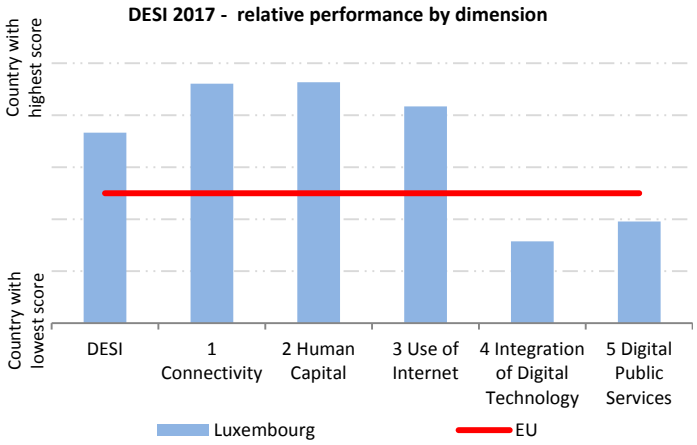
[1] https://ec.europa.eu/digital-single-market/en/desi

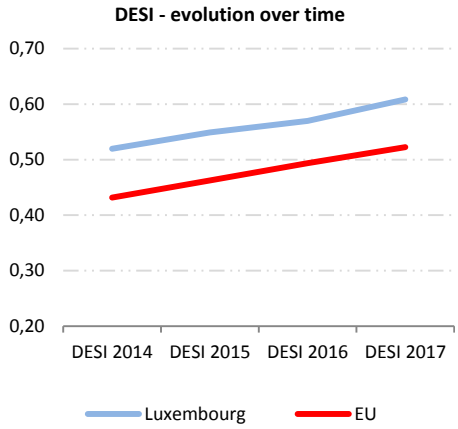
	Luxembourg		Cluster	EU
	rank	score	score	score
DESI 2017	**5**	**0.61**	**0.63**	**0.52**
DESI 2016[2]	7	0.57	0.60	0.49

Luxembourg ranks 5th out of the 28 EU Member States. Overall it has improved its performance slightly since last year. Luxembourg performs well in connectivity (2nd rank in 2016), both for coverage and subscription (take-up). It records excellent results (2nd rank in 2016) in terms of human capital, whether in use or in digital skills. It achieves very good results for the use of Internet (3rd rank in 2016). On the other hand, it is lagging behind in the integration of digital technologies by companies (22nd rank in 2016), whether for e-business or e-commerce. Similarly, it is lagging behind in digital public services (19th rank in 2016).

Luxembourg belongs to the high performing cluster of countries[3]. However, this good overall performance masks more diverse performance levels across the five dimensions.

Luxembourg has undertaken an ambitious economic diversification strategy in respect of the digital sector. This strategy is multidimensional, embracing education, economy, public services, and grouped under an umbrella initiative called *Digital Lëtzebuerg.*[4]





[2] The DESI 2017 was re-calculated for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.

[3] High performing countries are Denmark, Finland, Sweden, the Netherlands, Belgium, the UK, Ireland, Luxembourg and Estonia.

[4] http://www.digital-luxembourg.public.lu

1 Connectivity

1 Connectivity	Luxembourg		Cluster	EU
	rank	score	score	score
DESI 2017	**2**	**0.79**	**0.75**	**0.63**
DESI 2016	3	0.74	0.73	0.59

	Luxembourg					EU
	DESI 2017			DESI 2016		DESI 2017
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**99.98%** 2016	→	**4**	**99.98%** 2015	**4**	**98%** 2016
1a2 Fixed Broadband Take-up % households	**96%** 2016	↑	**1**	**94%** 2015	**1**	**74%** 2016
1b1 Mobile Broadband Take-up Subscriptions per 100 people	**116** June 2016	↑	**5**	**73** June 2015	**12**	**84** June 2016
1b2 4G coverage[5] % households (average of operators)	**95%** 2016		**5**	**NA**		**84%** 2016
1b3 Spectrum[6] % of the target	**50%** 2016	↓	**24**	**53%** 2015	**24**	**68%** 2016
1c1 NGA Coverage % households	**94%** 2016	→	**6**	**94%** 2015	**5**	**76%** 2016
1c2 Subscriptions to Fast Broadband % subscriptions >= 30Mbps	**49%** June 2016	↑	**12**	**40%** June 2015	**13**	**37%** June 2016
1d1 Fixed Broadband Price[7] % income	**NA** price 2016, income 2015			**NA** price 2015, income 2015		**1.2%** price 2016, income 2015

Luxembourg performs very well in comparison with other Member States and is making significant progress in the Connectivity dimension.

Luxembourg is fully covered by broadband services, including fixed, mobile and satellite networks. Fast broadband coverage is at 94 %. Furthermore, Luxembourg performs very well in the uptake of fixed and mobile broadband services (96 % uptake of fixed and 116 % uptake of mobile broadband services) compared with the EU average of 74 % for fixed broadband and 84 % for mobile broadband. The increase in the uptake of mobile broadband services has been particularly significant in 2016. Demand for fast broadband services is also increasing; 49 % of subscriptions are for fast broadband versus 40 % one year ago. On a less positive note, Luxembourg has assigned 50 % of the overall harmonised spectrum for broadband, mainly due to lack of demand from operators. The harmonised spectrum has however been made available and it can be assigned to operators once they express a need.

[5] This is a new DESI indicator measuring the average coverage of telecom operators' 4G networks.

[6] There is a decrease in most of the Member States due to the additional EU harmonisation of the 700 MHz band in April 2016.

[7] Due to a slight methodological change, historical data was re-calculated.

This has not prevented Luxembourg from achieving 4G coverage that is substantially better than the EU average (95 % versus 84 %).

As fibre roll-out continues, above 60 % FTTP coverage has been achieved. While Luxembourg sticks to its objective that by end 2020 everybody should be connected with 1Gbit/sec upload speed and 500Mbit/sec download speed, Luxembourg mainly relies on a market-driven broadband roll-out based on competition among the operators. Accordingly, it does not intend to use public funding. The parliament voted the law implementing the Cost Reduction Directive on 8 February 2017.

Luxembourg is well on track to achieve the broadband targets at EU level. It is not entirely clear whether the more ambitious targets defined by national policy will be achieved. Considerable efforts to this effect are made, currently based on a market-driven approach.

2 Human Capital

2 Human Capital	Luxembourg		Cluster	EU
	rank	score	score	score
DESI 2017	**2**	**0.73**	**0.68**	**0.55**
DESI 2016	2	0.75	0.66	0.53

	Luxembourg				EU
	DESI 2017		DESI 2016		DESI 2017
	value	rank	value	rank	value
2a1 Internet Users % individuals	**97%** → 2016	**1**	**97%** 2015	**1**	**79%** 2016
2a2 At Least Basic Digital Skills % individuals	**86%** → 2016	**1**	**86%** 2015	**1**	**56%** 2016
2b1 ICT Specialists[8] % employed individuals	**4.6%** ↓ 2015	**5**	**5.1%** 2014	**3**	**3.5%** 2015
2b2 STEM Graduates Per 1000 individuals (aged 20-29)	**NA** 2014		**NA** 2013		**19** 2014

In terms of human capital, Luxembourg holds a good position (2nd rank in 2016) and maintains this position. It takes the first rank in terms of proportion of individuals who are regular internet users (97 % in 2016) and proportion of individuals who have at least basic digital skills (86 % in 2016). It has a good record in terms of the proportion of individuals who are ICT specialists (5th rank in 2016) while at the same time it has a high proportion of companies reporting hard-to-fill vacancies for ICT specialists (62 % of enterprises which recruited/tried to recruit reporting hard-to-fill vacancies for jobs requiring ICT specialist skills in 2016; 3rd rank in Europe; EU average: 41 %).

In the STEM fields (Science, Technologies, Engineering and Mathematics), it is the case as with the other subjects, about 70 % of Luxembourg students (residents) study abroad and not at the University of Luxembourg, contributing to a diverse pool of specialists with academic backgrounds cultivated all over the world.

At the level of primary and secondary education, the Luxembourg government launched the Digital(4)Education[9] action in 2015. It comprises two components: digital education and digital for education, as well as a wide-ranging coordinated action to promote STEM. These initiatives include several flagship projects: BEE Secure (cybersecurity), MathemaTIC (digital learning tool for mathematics for basic education), Maker-Space (places of discovery, and also spaces of creation).

At the level of higher education, the strategy of the University of Luxembourg is to focus on the post-graduate segment. According to its 2014-2017 four-year plan[10], it has four Strategic

[8] Historical data have been revised by Eurostat.

[9] www.portal.education.lu/digital4education/

[10] http://wwwen.uni.lu/research/focus_areas

Research Priorities (one on computer science) and three interdisciplinary centres (one on cybersecurity).

At the level of vocational education and training (VET), Luxembourg recently created the House of Training, a central training platform that offers state-of-the-art IT courses[11].

Luxembourg is about to launch its national coalition for digital skills and jobs in May 2017. The Luxembourg coalition is part of the Digital Lëtzebuerg initiative and is coordinated through LIDIT (Luxembourg Institute for Digital Training), a non-profit organization created in November 2015. It brings together various public and private actors involved in promoting digital skills in Luxembourg, including the government, the education and training sector, professional chambers and federations, ICT companies and non-governmental organisations.

Addressing the shortage of ICT specialists remains crucial to support digital transformation of the country and is one of the priorities of the Luxembourg digital skills strategy.

[11] https://www.houseoftraining.lu/

3 Use of Internet

3 Use of Internet	Luxembourg		Cluster	EU
	rank	score	score	score
DESI 2017	**3**	**0.64**	**0.60**	**0.48**
DESI 2016	4	0.60	0.57	0.45

	Luxembourg					EU
	DESI 2017			DESI 2016		DESI 2017
	value		rank	value	rank	value
3a1 News % individuals who used Internet in the last 3 months	**89%** ↑ 2016		**4**	**85%** 2015	**9**	**70%** 2016
3a2 Music, Videos and Games[12] % individuals who used Internet in the last 3 months	**89%** 2016		**5**	**NA**		**78%** 2016
3a3 Video on Demand[13] % individuals who used Internet in the last 3 months	**29%** 2016		**6**	**NA**		**21%** 2016
3b1 Video Calls % individuals who used Internet in the last 3 months	**54%** ↑ 2016		**6**	**47%** 2015	**7**	**39%** 2016
3b2 Social Networks % individuals who used Internet in the last 3 months	**69%** ↓ 2016		**15**	**70%** 2015	**9**	**63%** 2016
3c1 Banking % individuals who used Internet in the last 3 months	**73%** ↑ 2016		**9**	**67%** 2015	**10**	**59%** 2016
3c2 Shopping % internet users (last year)	**80%** → 2016		**4**	**80%** 2015	**4**	**66%** 2016

In Luxembourg, Internet use by individuals is clearly above average (3rd place in 2016) and is progressing slightly (4th place in 2015). Among individuals who used Internet in the last 3 months (reference year 2016), 89 % read online news (EU average: 70 %), 89 % play or download games / music / videos (EU average: 78 %), 29 % subscribe to video on demand (EU average: 21 %), 54 % make a telephone or video call (EU average: 39 %). In terms of participation in social networks, individuals in Luxembourg exceed average practice (69 % compared with 63 % on average in the EU). Finally, individuals in Luxembourg often carry out online transactions: 73 % use online banking (average EU: 59 %) and 80 % shop online (average EU: 66 %).

[12] Break in series due to a change in the Eurostat survey.

[13] Break in series due to a change of data source. New source is Eurostat.

4 Integration of Digital Technology

4 Integration of Digital Technology	Luxembourg		Cluster	EU
	rank	score	score	score
DESI 2017	**22**	**0.30**	**0.44**	**0.37**
DESI 2016	22	0.27	0.41	0.35

	Luxembourg				EU
	DESI 2017		DESI 2016		DESI 2017
	value	rank	value	rank	value
4a1 Electronic Information Sharing % enterprises	**39%** 2015	**11**	**39%** 2015	**11**	**36%** 2015
4a2 RFID % enterprises	**4.9%** 2014	**10**	**4.9%** 2014	**10**	**3.9%** 2014
4a3 Social Media % enterprises	**19%** ↑ 2016	**12**	**15%** 2015	**15**	**20%** 2016
4a4 eInvoices % enterprises	**11%** 2016	**20**	**NA** 2015		**18%** 2016
4a5 Cloud % enterprises	**12%** 2016	**14**	**NA** 2015		**13%** 2016
4b1 SMEs Selling Online % SMEs	**9%** ↑ 2016	**24**	**6%** 2015	**26**	**17%** 2016
4b2 eCommerce Turnover % SME turnover	**NA** 2016		**2.6%** 2015	**27**	**9.4%** 2016
4b3 Selling Online Cross-border % SMEs	**6.3%** 2015	**18**	**6.3%** 2015	**18**	**7.5%** 2015

Regarding the integration of digital technologies by companies, Luxembourg is well below the European average (22nd rank in 2016) and stagnates in position. In terms of business digitisation, Luxembourg has a medium to above average position in terms of electronic information sharing (ERP software), radio frequency identification (RFID), use of social networks and cloud computing. However it is below the European average for companies sending electronic invoices (20th rank in 2016). In the same way, it recorded below-average results in terms of e-commerce for small and medium-sized enterprises (10-249 persons employed, excluding financial sector): only 9 % of SMEs sell online (EU average: 17 %) and 6.3 % of SMEs sell online cross-border (EU average: 7.5 %).

In order to reduce the dependence of Luxembourg on the financial sector, the government has embarked on an economic diversification strategy and identified five priority sectors, one of which is the Information and Communication Technologies (ICT) sector.

Luxinnovation (the Luxembourg agency for innovation and research) launched the *Fit4Digital* programme to support the digitisation of SMEs in 2016. The objective is to introduce new ICT processes into the companies' different operational functions (human resources, marketing, data security, purchasing, finance, etc.). The state pays half the costs in the diagnostic and project phases.

The Digital Tech Fund was launched in 2016 to finance the development of startups in the ICT sector. It will be involved in various areas: cybersecurity, FinTech, Big Data, Internet of

Things, etc. It will also be used to finance technology transfers from the Centre for Security and Trust (SnT) of the University of Luxembourg. The fund will be implemented in the form of a public-private partnership.

Building on its experience in the financial sector, Luxembourg will also seek to develop the FinTech sector. For this purpose, the Luxembourg House of FinTech (LHoFT) was opened in 2016. Its mission will be to advance the innovation and development of the FinTech sector in Luxembourg.

Highlight 2017[14]: The Rifkin study

At the initiative of the government of the Grand Duchy of Luxembourg, the economist Jeremy Rifkin carried out a synthesis study on the strategy for the "Third industrial revolution". It identified nine pillars, one of which is the smart economy.

This study, initiated by the Ministry of the Economy, involved more than 300 stakeholders. Luxembourg is the first country to carry out this exercise at a national level.

According to the concept developed by Jeremy Rifkin, Information and Communication Technologies, renewable energies and new means of transport must converge in a "smart network".

This strategic study was presented in November 2016 at the Forum on Sustainability.

[14] "Highlight 2016": **"Digital Lëtzebuerg"** was announced in October 2014. This overarching initiative has been put in place to support Luxembourg's transition towards a digital society and a digital economy.
For many years, Luxembourg's digital economy has experienced outstanding growth. Successive governments focused first on the infrastructure necessary to provide the best environment for the development of ICT sector companies. However digital transformation must include all aspects of public and private life. Thus the Luxembourgish government wanted to provide a unifying framework for all the countless public and private initiatives that comprise the economy and digital society.
www.digital-luxembourg.public.lu

5 Digital Public Services

5 Digital Public Services	Luxembourg		Cluster	EU
	rank	score	score	score
DESI 2017	**19**	**0.49**	**0.59**	**0.55**
DESI 2016	21	0.36	0.57	0.51

	Luxembourg					EU
	DESI 2017			DESI 2016		DESI 2017
	value		rank	value	rank	value
5a1 eGovernment Users % internet users (last year)	**36%** 2016	→	**15**	**36%** 2015	**15**	**34%** 2016
5a2 Pre-filled Forms Score (0 to 100)	**30** 2016	↑	**20**	**20** 2015	**23**	**49** 2016
5a3 Online Service Completion Score (0 to 100)	**77** 2016	↓	**19**	**78** 2015	**19**	**82** 2016
5a4 Open Data[15] % of maximum score	**57%** 2016	↑	**14**	**15%** 2015	**26**	**59%** 2016

In the digital public services dimension, Luxembourg ranks well below the European average, 19th in 2016, having progressed slightly from its 2015 placing, 21st. 36 % of Internet users submitted online forms to public authorities (comparable with the EU average of 34 %). However, according to the e-government benchmark, Luxembourg only has a score of 30 for pre-filled data in online forms (EU average: 49) and a score of 77 for life events that can be completed online (EU average: 82). The substantial progression of Luxembourg in open data should be noted: according to the measure of the European Open Data Portal, there was a significant jump from 15 % in 2015 to 57 % in 2016, causing a speedy ascent up the ranking, from 26th to 14th place.

In Luxembourg, the Centre for Information Technologies of the State (CTIE) is responsible for the provision of IT services, the preparation and updating of a normative framework for IT projects and the modernisation of the state, and the production and personalisation of secure administrative documents. Digital government action is based on three principles: digital first, once and only, and transparency. For electronic invoicing, Luxembourg has an access point, operated by the Belgian company *Babelway*, to the Pan European Public Procurement Online (PEPPOL) network which can receive electronic invoices since December 2016. By this action, the Luxembourg government already meets the requirements of Directive 2014/55/EU. Directive 2010/45/EU on electronic invoicing has been implemented in Luxembourg law on 29 March 2013. Regarding open data, Luxembourg implemented the PSI (Public Sector Information) Directive in 2016. The transposition into Luxembourg law of Directive 2013/37/EU, known as the "PSI II directive" was voted on 19th April 2016, and the law was promulgated on 23rd May 2016.

[15] Change of data source. The historical data have also been restated. The new source is the European Data Portal.