

THE TECHNOLOGY,
MEDIA AND
TELECOMMUNICATIONS
REVIEW

EIGHTH EDITION

Editor
John P Janka

THE LAWREVIEWS

THE

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TELECOMMUNICATIONS
REVIEW

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PREFACE

This fully updated eighth edition of *The Technology, Media and Telecommunications Review* provides an overview of evolving legal constructs in 26 jurisdictions around the world. It is intended as a business-focused framework for both start-ups and established companies, as well as an overview for those interested in examining evolving law and policy in the rapidly changing TMT sector.

Broadband connectivity and wireless services continue to drive law and policy in this sector. The disruptive effect of new technologies and new ways of communicating creates challenges around the world as regulators seek to facilitate the deployment of state-of-the-art communications infrastructure to all citizens and also to use the limited radio spectrum more efficiently than before. At the same time, technological innovation makes it commercially practical to use large segments of ‘higher’ parts of the radio spectrum for the first time. Moreover, the global nature of TMT companies compels them to address these issues in different ways than before.

A host of new demands, such as the developing internet of things, the need for broadband service to aeroplanes, vessels, motor vehicles and trains, and the general desire for faster and better mobile broadband service no matter where we go, create pressures on the existing spectrum environment. Regulators are being forced to both ‘refarm’ existing spectrum bands, so that new services and technologies can access spectrum previously set aside for businesses that either never developed or no longer have the same spectrum needs; and facilitate spectrum sharing between different services in ways previously not contemplated. Many important issues are being studied as part of the preparation for the next World Radio-communication Conference to be held in 2019. No doubt, this Conference will lead to changes in long-standing radio spectrum allocations that have not kept up with advances in technology, and it should also address the flexible ways that new technologies allow many different services to co-exist in the same segment of spectrum.

Legacy terrestrial telecommunications networks designed primarily for voice are being upgraded to support the broadband applications of tomorrow that will extend economic benefits, educational opportunities and medical services throughout the world. As a result, many governments are investing in or subsidising broadband networks to ensure that their citizens can participate in the global economy, and have universal access to the vital information, entertainment and educational services now delivered over broadband. Many governments are re-evaluating how to regulate broadband providers, whose networks have become essential to almost every citizen. Convergence, vertical integration and consolidation also lead to increased focus on competition and, in some cases, to changes in the government bodies responsible for monitoring and managing competition in the TMT sector. Similarly,

many global companies now are able to focus their regulatory activities outside their traditional home, and in jurisdictions that provide the most accommodating terms and conditions.

Changes in the TMT ecosystem, including increased opportunities to distribute video content over broadband networks, have led to policy focuses on issues such as ‘network neutrality’ – the goal of providing some type of stability for the provision of the important communications services on which almost everyone relies, while also addressing the opportunities for mischief that can arise when market forces work unchecked. While the stated goals of that policy focus are laudable, the way in which resulting law and regulation are implemented has profound effects on the balance of power in the sector, and also raises important questions about who should bear the burden of expanding broadband networks to accommodate the capacity strains created by content providers and to facilitate their new businesses.

The following chapters describe these types of developments around the world, as well as the developing liberalisation of foreign ownership restrictions, efforts to ensure consumer privacy and data protection, and measures to ensure national security and facilitate law enforcement. Many tensions exist among the policy goals that underlie the resulting changes in the law. Moreover, cultural and political considerations often drive different responses at the national and the regional level, even though the global TMT marketplace creates a common set of issues.

I would like to take the opportunity to thank all of the contributors for their insightful contributions to this publication, and I hope you will find this global survey a useful starting point in your review and analysis of these fascinating developments in the TMT sector.

John P Janka
Latham & Watkins LLP
Washington, DC
October 2017

LUXEMBOURG

*Linda Funck*¹

I OVERVIEW

The Luxembourg TMT sector has evolved from being predominantly a provider of voice services into a diverse, competitive and interconnected industry using terrestrial, satellite and wireless transmission systems. Today, Luxembourg has first class infrastructure and telecommunication networks and is counted among the top locations for electronic communication services and infrastructure. In the 2016 edition of the Global Information Technology Report (GITR Report) published by the World Economic Forum, Luxembourg is listed ninth out of 139 countries with regard to innovation in the digital economy, and its steady upward trend relating to its overall score is recognised.

The ICT development index 2016, analysing the introduction of ICT and the potential for ICT-related development, ranked Luxembourg 11th out of 175 countries.²

Traditionally, the sector was limited to a very few players. Telecommunication and postal services were operated for several decades as a public monopoly of the state-owned *Entreprise des Postes et Télécommunications (EPT)*.³ The radio and television sector was controlled and developed from its early years by a privately owned company. Indeed, the first radio broadcasting in Luxembourg was initiated by the founders of the current broadcaster, CLT-UFA. The privately held operator was ensured a leading role in the national and international development of the radio and television sector, and today RTL Group ranks as the top television and radio broadcaster in Europe. Luxembourg has also been a pioneer in non-terrestrial communication technology. SES-Astra, a Luxembourg-based company created in 1985, was Europe's first private satellite operator, and SES now has global standing.

The presence of important market players in the TMT and TMT-related sectors in Luxembourg and related know-how and experience have led the government to make efforts to maintain, create and further develop its electronic telecommunication technologies with the aims of being among the best places in Europe and abroad to do business within the sector and of being a hub for e-services in Europe. These aims have been continuously pursued and reaffirmed by the government since 2010 to date. To reach these aims, the government, together with a group of private investors, set up a fund dedicated to ICT⁴ start-ups: the Digital Tech Fund. The GITR Report confirms the success of these efforts, as Luxembourg is in first and second position, respectively, in relation to its political and regulatory environment regarding individual usage. Luxembourg is ranked fifth and sixth,

1 Linda Funck is a partner at Elvinger Hoss Prussen.

2 <http://www.luxembourg.public.lu/en/actualites/2016/12/06-rapportITU/index.html>.

3 The new commercial name is 'Post Luxembourg'.

4 Information and communication technologies.

respectively, in terms of the importance of ICT in the government vision's and governmental success in ICT promotion. According to the Digital Economy and Society Index of the European Commission, Luxembourg is ranked second among all European Union countries in regard to its connectivity and human capital.⁵

Luxembourg combines many features that are beneficial to the development of an ICT sector, including the diversity and multilingual skills of the population and workforce, a geographical location in the centre of Europe and an important financial industry in need of high-performance communication technologies. In addition, Luxembourg has gradually developed a state-of-the-art digital infrastructure, international telecommunication connections (offering fast and reliable connectivity to other European cities at very low latency rates), efficient national communication networks, performant data centres, a comprehensive, evolving and innovative legal framework, and cutting-edge research, safety and security, all of which contribute to Luxembourg's increasing attractiveness to technology organisations and electronic communication services, and also to financial institutions, companies active in biotechnology and medicine, and other e-businesses. Luxembourg figures among the top locations for ICT infrastructure (data centres, high speed connectivity and internet traffic, low latency internet), and it offers specialised expertise to keep data safe.

The presence of regulated ICT 'support' professionals of the financial sector (PSFs), who are subject to the same confidentiality obligation as banks, provides considerable comfort and security to clients in the financial sector in areas such as the outsourcing of IT functions.

More recently, Luxembourg has focused strongly on developing the FinTech industry, for which Luxembourg is very attractive as it combines a huge range and variety of financial services, performant and innovative technology, and open-minded regulators, public authorities, private players and associations who are ambitious to follow and develop a sector that is evolving rapidly and is omnipresent in the overall global economy.

The quality of the communication infrastructure has led numerous actors in the gaming (online video games) and gambling sectors to set up their headquarters in Luxembourg.⁶ Global brands in the media and internet world such as Amazon, eBay, PayPal, Vodafone Procurement, Intelsat, RTL Group, Milicom and Skype all have European headquarters or major operations in Luxembourg.

The presence of Level 3 in Luxembourg (one of the most important operators of telecommunication services at the level of the backbone internet) confirms Luxembourg as a centre of excellence in the internet sector. Luxembourg is also attractive to a number of e-payment and e-money services institutions and can be considered as Europe's e-payment hub, with brands including Digicash, Amazon Payments, Mercedes Pay SA, Yapital, Six Payment Services, Rakuten and Mangopay all based in Luxembourg. Several software giants, including Microsoft, Symantec and Open Text, also have places of business in Luxembourg. Luxembourg also has a strong reputation for service availability, security and data protection, and responsive and open-minded authorities.

The CSSF, Luxembourg's financial sector supervisory commission, has granted Bitstamp a payment institution licence, and has made the company the first nationally licensed bitcoin exchange. Many other companies active in the virtual currencies sector want to establish themselves in Luxembourg, and are currently trying to obtain a licence, once more confirming the attractiveness of Luxembourg for ICT businesses.

5 <https://ec.europa.eu/digital-single-market/en/desi>.

6 Big Fish Games, Bigpoint, Innova.

Luxembourg has a long-standing official policy of welcoming pan-European companies in addition to creating the appropriate framework for the development of local businesses, and offers multiple opportunities to start-ups by creating an environment that allows existing market players to come into contact with young entrepreneurs. For example, the House of Start-Ups will host the Luxembourg city incubator, a project conducted by the Luxembourg Chamber of Commerce, Lux Innovation and the Ministry of Economy that intends to accompany between 150 and 200 innovative start-ups in a variety of industry sectors.⁷

In 2016, the proportion of employees in the ICT sector in relation to the total of all employees was 4.6 per cent, constituting the fifth-highest proportion in the European Union, with an average of only 3.5 per cent in the European Union.⁸

Efforts are also being made in ICT research, with a focus on the security, reliability and trustworthiness of ICT systems and services.⁹ In the context of increasing the influence of digital technologies in every aspect of our lives and throughout all business areas, and with the further and constantly evolving development in cloud computing and e-archiving, digital security is a key element of the success of the digital economy. Important improvements are being made to the legislation in order to adapt the national legal framework to overcome barriers related to the use of new technologies.

Luxembourg is keen to join forces with other European countries. In 2016, for example, Luxembourg started planning, in cooperation with the European Commission, France, Spain and Italy, the creation of a European supercalculator, allowing private and public players to access top-notch software tools.¹⁰ The declaration of European cooperation in the context of 'high performance computing' (HPC) was signed by the Luxembourg Minister of Economy on 23 March 2017, which marked the official start of the collaboration between the signatory countries (Luxembourg, Germany, Spain, Italy, Portugal, France and the Netherlands). These countries will join forces to implement the strategy for a European HPC network, of which Luxembourg was the initiator.¹¹

Luxembourg is highly present at European-level discussions and negotiations, and stout in its defence of its position in the global process of harmonisation and liberalisation while supporting the direction of European regulation. At a national level, research and development in the ICT sector is conducted by a number of government-promoted institutions.¹² In developing its communication networks in the context of the investment realities and opportunities in the telecoms and media sector, the challenge is to direct investment in a way that ensures that the right type of network is built and that public investment works in cooperation with the private sector so as to promote a more competitive telecoms environment. The government has been very active in negotiating and defending the interests of Luxembourg in the adoption process of the European Telecoms Package. Similarly, the government has actively taken part in the discussions regarding the Data Protection Regulation (GDPR): adopted on 14 April 2016, it will be applicable from 28 May 2018.

7 <http://www.luxembourg.public.lu/en/actualites/2017/07/12-startup/index.html>.

8 <https://ec.europa.eu/digital-single-market/en/scoreboard/luxembourg>.

9 Interdisciplinary Centre for Security, Reliability and Trust, Computer Science and Communication.

10 www.digital-luxembourg.public.lu/fr/actualites/promotion/2016/itwXavierBettel/index.html.

11 <http://www.luxembourg.public.lu/en/actualites/2017/03/27-hpc/index.html>.

12 For instance, the Luxembourg Institute of Science and Technology (LIST).

The development of the information society is a key government priority. In addition to the aforementioned policies, it has created an action plan called ‘e-Luxembourg’ with the ultimate goal that Luxembourg administrations, corporations, education personnel and individuals may efficiently use and have access to electronic communication means to help improve their quality of life. Many filings, registrations and requests to public administrations (such as those of the tax, social security and energy sectors) can be made online. In 2015, 135,000 administrative procedures were transmitted electronically, representing an increase of 330 per cent compared to 2014.¹³ The government has adopted a GED system (electronic document management) and banned the use of paper with the aim of streamlining internal government structures so as to become more cost-effective. Luxembourg has also introduced electronic identity cards.

In 2014, the Council of Government announced the launch of a strategy called ‘Digital Luxembourg’. The objective of this strategy is to strengthen and consolidate the position of Luxembourg in the ICT sector. The Digital Luxembourg platform aims to assemble private players and public institutions federating inter-sectoral and cross-sectoral interaction. Taking into account the constant need for a workforce with strong skills in IT, Luxembourg implemented the ‘Digital (4) Education’ strategy. The first WebForce3 school has been established, which aims to train people to become qualified for a developer or junior integrator job in three-and-a-half months.¹⁴ The school is part of the ‘Fit4coding’ initiative launched by the government and co-financed by the European Social Fund.

Luxembourg strongly encourages the development of a Digital Single Market, for instance through the eIDAS Regulation and the Directive on network and information security (NIS), as this will strengthen Luxembourg’s position within the European area. In addition, the government is aware of the fact that the continuance of the success and competitiveness of Luxembourg’s financial sector will depend on, *inter alia*, the availability of cutting-edge services based on FinTech.¹⁵ A FinTech working group has been established with representatives from different associations active in the financial and technological sectors with the aim to solve and answer specific problems and questions related to FinTech. The Luxembourg House of Financial Technology was officially launched on 25 April 2017, which is an initiative for finance. It is a public–private partnership aiming to establish Luxembourg as a European FinTech centre by offering start-up incubation and co-working spaces.¹⁶

In January 2017, the Secretary of State of the Economy presented the Creative Industries Cluster Luxembourg, which aims to support the economic development of the sector, and which includes activities such as architecture, crafts, visual arts, design, styling, the games industry, marketing and communication, literature, publishing, the performing arts and new media.

Convergence has been achieved by creating rules and regulations, regulatory authorities and consulting entities at the national, European and international level that embrace the diversity, interconnectivity and interrelatedness of the various industries and players. The increasing convergence between telecommunications, information technology and media has led to the adoption of the regulatory framework that was introduced into Luxembourg law

13 Rapport du Gouvernement 2015, p.11.

14 <http://www.gouvernement.lu/5507489/08-ecole-webforce>.

15 Financial sector-related technology.

16 <https://www.wort.lu/en/luxembourg/FinTech-luxembourg-house-of-financial-technology-open-for-business-58ff0984a5e74263e13bcf3d>.

by two laws of 27 February 2011 (Telecoms Package). The Telecoms Package is designed to provide for one set of rules for all electronic communication services and networks. The continuing development of the ICT sector constantly calls for adjustments to the current legislation and regulations at both national and European level (see Section II.ii).

As a result of convergence, it is extremely important that interconnectivity and free access to all operators and service providers within the TMT sector is ensured in an equal manner. The use of one infrastructure for different types of services is of particular importance, and it is crucial that the operators and owners of the infrastructure or networks make these available to the other participants in the TMT sector. This is particularly true in Luxembourg because of the small size of the market. Efforts are continually undertaken to ensure competitiveness among players in the TMT sector. Ensuring Luxembourg's international connectivity will be at the top of the political agenda in future with the aim of ensuring the lowest latency rates with major capitals, the lowest prices and the presence of the most important carriers.

Importantly, the government supports the principles of network neutrality (i.e., keeping a free architecture, open and non-discriminatory terms, guaranteed access without unjustified conditions on electronic communication networks) and pushed towards the adoption of EU Regulation 2015/2120, laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the European Union, which was finally adopted on 25 November 2015 during Luxembourg's presidency of the European Union Council. This Regulation is seen as a major achievement for the Digital Single Market.

Competition among incumbent operators and alternative operators remains an important element for e-industry players.

II REGULATION

TMT services cover an extremely wide scope of technology and services, with different laws and regulations applicable that entail various regulatory authorities supervising different services and related technology. The competent ministry in Luxembourg for the telecommunication and media industry is currently the Ministry for Communication and Media.

i Regulators and regulated activities

The Law of 1997 created the Luxembourg Institute of Telecommunications (ILT), whose duty is to supervise and regulate the telecommunications sector. In 2000, the tasks of the ILT were widened to encompass the Luxembourg energy sector and postal services and, as a consequence of the Law of 1997, it was renamed the Luxembourg Institute of Regulation (ILR).¹⁷ The scope of the ILR's tasks has been modified on several occasions, and for the last time by the Laws of 27 February 2011 and 26 July 2011. The ILR is an independent regulator and is not funded by public state funds paid for by taxpayers, but is rather financed by the operators of the sector supervised and regulated by the ILR.

The Law of 27 February 2011 on electronic communication services and networks (Electronic Communication Law) and the Law of 30 May 2005 as amended by the Law of 27 February 2011 on organisation and management of radio spectrum (Spectrum Law)

¹⁷ www.ilr.lu.

clarify the allocation of competences between the Minister for Communication and the ILR in different sectors. The ILR is entitled to set rules in accordance with European directives and national law. Additionally, it controls the efficient use of infrastructure for the benefit of consumers. It is entitled to determine the fees and conditions under which communication networks are operated, and services rendered so as to allow the formation of a competitive market. It also has the authority to draw up reports and proposals, which it must submit to its board and the government. It gives advice, and prepares statistics and regulations.

The ILR is competent to receive notifications and to grant authorisations or licences in relation to the provision or operation of electronic communication network services, and assists the competent minister in the allocation of licences for radio spectrum. It is also in charge of establishing the plan for frequencies and updating the public registers required by law for the various TMT sectors. In addition, it has the power to issue administrative sanctions against operators that breach laws or regulations, and may act as a dispute settler between competing operators and as mediator between customers and operators.¹⁸

The ILR is not empowered to monitor and regulate abuses of dominance. It is, however, responsible for ensuring that dominant players do not exclude other competitors from the sector, and it may take measures and issue rules to ensure a competitive market if, in its opinion, proper competition is no longer possible.

In regard to media, the Law of 8 April 2011 on electronic media (Media Law) was amended by the Law of 27 August 2013. The governmental commissions existing under the former law (i.e., Communication Media Service, Independent Radio Broadcasting Commission and the National Programming Council (CNP)) have been replaced by one single authority: the Luxembourg Independent Audiovisual Authority. Its main responsibilities are to:

- a* ensure service providers' compliance with the law;
- b* grant or withdraw broadcast permits;
- c* ensure access to audiovisual programmes for persons with a visual or hearing disability;
- d* stimulate on-demand audiovisual media service providers to promote and distribute European works;
- e* encourage audiovisual media service providers to elaborate codes of conduct concerning the broadcast of inappropriate contents; and
- f* impose sanctions on non-compliant service providers such as fines, withdrawal of permits, warnings and suspension of transmission.

The National Commission for Data Protection (CNPDP), created by the Law of 2 August 2002 on the protection of individuals with regard to the processing of personal data, is the authority in charge of the supervision of the electronic communication market as far as data protection issues are concerned.

The CNPDP controls the processing of personal data in Luxembourg and ensures compliance with the data protection regulations, in particular those relating to the confidentiality and security of processing operations. In addition, it has advisory competence towards the government. Although the CNPDP is a public institution, it enjoys independence in carrying out its mission.

18 ILR Regulation 11/151/ILR of 4th April 2011. See annual report 2013 on <http://www.ilr.public.lu/publications/rapports-annuels/2013.pdf>.

It has investigative competence that allows it direct access to data of processing operations. As an investigative body, the CNPD is allowed to issue administrative sanctions. Upon the entry into force of the new GDPR in 2018, the CNPD will see its powers enhanced as it will, *inter alia*, be able to impose fines of up to 4 per cent of a company's worldwide turnover, and will derive powers from both the GDPR and Luxembourg-specific legislation for residual matters.

The TMT sector is extremely broad and diversified. Due to the specifics of the various industries on the one hand and their interrelatedness on the other, it appears that laws and regulations apply to more than one specific service within the TMT sector, thus resulting in a large amount of applicable legislation and regulations. The main laws are:

- a* the Law of 27 July 1991 as amended by Law of 17 December 2010, and the Media Law as amended for the last time by a Law of 14 December 2015;
- b* the Law of 11 April 2010 on freedom of expression in electronic media, amending the Law of 8 June 2004 (as amended) on the freedom of expression in the media sector;
- c* the Electronic Communication Law, abrogating the Law of 30 May 2005 on electronic communication services and networks (Former Electronic Communication Law) as amended;
- d* the Spectrum Law;
- e* the Law of 30 May 2005 regarding the organisation of the ILR as amended (most recently by a Law of 19 June 2015);
- f* the Law of 30 May 2005 on the specific provisions regarding the protection of individuals as to the processing of personal data in the electronic communication sector and amending Articles 88-2 and 88-4 of the Criminal Instruction Code as amended;
- g* the Law of 14 August 2000 on electronic commerce as amended (Electronic Commerce Law);
- h* the Law of 18 April 2001 on copyrights as amended (Copyright Law);
- i* the Law of 2 August 2002 as amended (most recently by a Law of 23 July 2016) regarding the protection of individuals as to the processing of personal data (Data Protection Law);¹⁹
- j* the Luxembourg Constitution;
- k* the Law of 11 August 1982 on privacy (Privacy Law);
- l* Article L222-12 to L222-23 of the Consumer Code regarding distance contracts on financial services, abrogating the Law of 18 December 2006 on distance selling of financial services;
- m* Article L222-2 to L222-11 of the Consumer Code;
- n* general laws applicable to all aspects not specifically regulated by specific laws or regulations, and in particular the provisions of the Luxembourg Criminal Code (LCC) (e.g., in relation to pornography, discrimination, racism, violence, theft and piracy) and the commercial code with the amended Article 567 (See Section VI.i);
- o* the Law of 2 April 2014, amending, *inter alia*, the Consumer Code, Electronic Data Protection Law and Electronic Commerce Law (2014 Law);
- p* the Law of 18 July 2014 on cybercrime;²⁰

19 The GDPR will harmonise the applicable data protection law and the Luxembourg legislator is in the process of adopting relevant legislative texts to cover matters where Member States keep a certain autonomy. Such a bill of law is supposed to be presented to the Parliament in the autumn of 2017.

20 See Section III.iv.

- q the Law of 25 July 2015 on electronic archiving as well as two Grand-Ducal regulations on the execution of Article 4 Section 1 of the Law and on the dematerialisation and conservation of the documents;
- r the Law of 22 March 2017 on measures to reduce the cost of deploying high-speed electronic communications networks;
- s the Law of 7 June 2017 on electronic communication services and networks;
- t Bill of Law No. 6763 modifying the Criminal Procedure Code and Electronic Data Protection Law;
- u Bill of Law No. 6976 on the exchange of personal data and information in police matters;
- v Bill of Law No. 7049 modifying the Law of 2 August 2002 regarding the protection of individuals as to the processing of personal data; and
- w Bill of Law 7168 relating to the protection of individuals as to the processing of personal data in criminal matter and for national security measures.

In addition, a large number of Grand-Ducal regulations and other regulations (particularly from the ILR) have been adopted in relation to the implementation of the various laws.

ii Ownership and market access restrictions

Luxembourg rules and regulations do not, in principle, impose ownership restrictions within the TMT sector, except for in certain specific sectors. Regarding telecommunications services, the previous authorisation regime has been replaced by a less stringent notification regime.

There are no ownership restrictions for being granted a concession to operate Luxembourg satellite systems or broadcast a Luxembourg programme via satellite or cable except that for the latter, a broadcasting licence may only be granted to a legal entity incorporated under Luxembourg law.

Because spectrum is considered a rare resource, its management and use is reserved to the state. Licences to use spectrum may, however, be granted to third parties subject to the conditions of national legislation, related regulations, or international or European agreements and treaties.

There is no specific national regulation on cross-ownership of media companies. However, the general laws on competition still apply.

iv Mergers and acquisitions

There is no specific Luxembourg authority regulating mergers or acquisitions in the TMT sector. The ILR's competences are to guarantee competitiveness on the Luxembourg TMT market, and as such it will monitor acquisitions and mergers in the sector so as to evaluate their position on the market *ex post*.

The Law of 23 October 2011 on competition, which prohibits restrictive agreements and abuses of dominant position, provides for an independent authority, the Council for Competition Matters (CCM), which is in charge of investigating cases, consultative missions and sectoral inquiries (or inquiries regarding types of agreement). The Investigation Division for Competition Affairs has been abolished. The CCM is also the decision-making body and exercises various powers for the execution of its mission (i.e., finding and sanctioning legal violations, drafting opinions, undertaking market studies, getting information about

companies and executing missions allotted to the national CCM). Decisions by the ILR in relation to regulation of competition must be made in agreement with the CCM. None of the relevant authorities has *ex ante* powers; nor may they prevent mergers or acquisitions.

III INTERNET AND IP-BASED SERVICES

i Internet and internet protocol regulation

Prior to the Electronic Communication Law, internet services were regulated by the Law of 21 March 1997 relating to telecommunication services and the operation of telecommunications networks (Law of 1997).

Even though the Law of 1997 did not provide for specific internet or internet protocol regulations, but covered telecommunications services and networks more generally, in the absence of the express exclusion of internet services and in the light of the definition of 'telecommunication services and networks',²¹ internet services were considered to be governed by this Law.

The Former Electronic Communication Law introduced certain changes and widened the scope of existing regulation to a larger range of communication technologies, and introduced the definitions of 'electronic communication network' and 'electronic communication services' as opposed to 'telecommunication services'. The new terminology reflected the increased scope of the services and networks that are now regulated. Express reference to internet services is made.

Neither the Law of 1997 nor the current Electronic Communication Law provide for any specific rules applicable to internet services or IP-based services as opposed to traditional telephony services, except that due to the specific nature of telephony services, certain additional rules apply to the provision of telecommunication services that are offered to the public. The Electronic Communication Law provides for certain specific obligations applying to publicly available telephony services and public telephone networks.²² These specific regulations are to ensure a universal service to the resident population, and apply only to traditional telephony.

As previously noted, the ILR is the competent regulator in charge of the supervision of the services rendered both in relation to internet services and traditional telephony services. The operation or provision of electronic communication services or networks is subject to notification to the ILR.²³ No distinction is made between traditional telephony and internet or IP-based services. To the extent the definition of electronic communication services can be broad, there are circumstances where a follow up might be of interest, as certain case-by-case exemptions do apply. Although no licence is required, notified entities are subject to a certain number of formalities and filings, and have to pay an administrative fee.

21 The abrogated Law of 1997 provided for a definition of 'telecommunication services' and 'telecommunication networks', with 'telecommunication' having been defined as 'each transmission, issue or reception of signals, images, sounds or data of any nature, by wire, radio, by optical or by electromagnetic means'.

22 Articles 11 and 12 of the Electronic Communication Law.

23 Article 5 of the Electronic Communication Law.

The Electronic Communication Law provides for a global legal framework applicable to all electronic telecommunication services and networks, with certain specifics depending on the type of service or network, ensuring however that the whole sector is consistently governed by the same legislative and regulatory national framework.

ii Universal service

The development of communication infrastructure in Luxembourg is among the top priorities of the governmental programmes in the field of the information and communication technology. The government has been developing broadband infrastructure services for approximately 10 years.

Since the end of 2011, a 100 per cent standard (fixed) broadband coverage (DSL up to 25Mbps) has been available to all Luxembourg households.²⁴ By the end of 2015, NGA²⁵ reached 94 per cent (compared to a European Union average of only 76 per cent of households),²⁶ with 4G broadband availability in Luxembourg reaching around 95 per cent in urban and rural areas.²⁷ Luxembourg residents are very connected, with 97 per cent being internet users.²⁸

The installation of optical fibre has constantly progressed since 1997, and Luxconnect,²⁹ the city of Luxembourg and EPT are joining efforts to cover the whole territory with optical fibre. FTTH, using fibre optic cable, is progressing, and 51 per cent (+9 per cent since 2015) of all Luxembourg households are now connected to FTTH.³⁰ In addition to work being carried out on the deployment of optical fibre throughout the country, efforts are also being made on existing networks to increase broadband speeds.

By the end of 2016, around 46 per cent of households had broadband subscriptions for less than 30Mbps, 35 per cent for between 30Mbps and 100Mbps, and 19 per cent above 100Mbps (+58.2 per cent since 2015),³¹ highlighting the trend of Luxembourg's population subscribing to high-speed broadband.

In Luxembourg, a notable market trend towards bundled offers (broadband mobile or fixed telephony and TV) continues. At the end of 2016, 84 per cent of all internet access is commercialised with at least one other service.³² Luxembourg today benefits from an extremely developed FTTH architecture.

The ultimate aim of the government is to provide households and businesses with downstream speeds ranging up to 1GB/s and upstream speeds of 500Mbps by 2020. EPT and other alternative operators offer ultra-high speed internet access.

iii Restrictions on the provision of service

Pursuant to the Electronic Data Protection Law and the Data Protection Law, ISPs and operators of electronic communication services and networks are compelled to ensure the

24 Luxembourg 2011 Telecommunication Market and Regulatory Developments.

25 Next Generation Access (VDSL, DOCSIS 3 cable and FTTP).

26 Europe's Digital Progress Report – 2017.

27 <https://ec.europa.eu/digital-agenda/en/scoreboard/luxembourg>.

28 <https://ec.europa.eu/digital-single-market/scoreboard/luxembourg>.

29 Luxconnect was created at the initiative of the government.

30 ILR Statistical Report 2016 p. 7.

31 ILR statistical report 2016, p. 29.

32 ILR statistical report 2016, p. 40.

confidentiality of communications exchanged by way of electronic communication means. The general rule is that other than the user, no person is allowed to listen to, intercept or store communications and data relating to the traffic and location without the agreement of the user. This prohibition does not apply to:

- a* communications relating to emergency calls;
- b* commercial transactions to the extent that they constitute proof of the transactions;
- c* authorities investigating and acting in relation to a *flagrante delicto* act or within the scope of criminal offences in order to ensure national and public security; and
- d* cookies.

In relation to data resulting from commercial transactions and cookies, the user or parties to a transaction must be informed that their data may be processed, the conditions (in particular the duration) and aim of the storage, and the possibility of the user opposing such data processing. Moreover, in relation to cookies, a specific consent to the storage (opt-in) is required. Article 29 Group issued a number of recommendations and clarifications as to the use of cookies. With the entry into force of the new GDPR in 2018, the use of cookies can only be carried out with the express consent of the user. The user must have a real choice, and no risk of deception or negative consequences if the user chooses not to give his or her consent.

For the purpose of criminal law enforcement, specific conditions must be met to have recourse to intercepted communications data. In addition, for the purpose of research, monitoring and pursuit of criminal offences and with the sole aim of providing relevant information to the judicial authorities, each ISP or operator must store traffic information and locational data for a period of six months. The Law of 24 July 2010 has amended the scope of criminal offences by limiting the possibility of only consulting the data that relate to criminal offences resulting in penal sanctions of more than one year's imprisonment. Grand-Ducal Regulation of 24 July 2010 relating to traffic data and localisation data determines the category of traffic data that may be useful for the research, observation and prosecution of criminal offences, as well as the manner pursuant to which such information is made available to the authorities.

Intellectual property theft and piracy are regulated by:

- a* the Copyright Law;
- b* the LCC;³³
- c* the Privacy Law; and
- d* the Electronic Data Protection Law and the Data Protection Law.

There is currently no public authority in Luxembourg that exercises global supervisory or monitoring power over the content and traffic data of network operators, ISPs and users, as this would violate essential privacy principles. Similarly, and for the same reasons, network operators may not control the content, application and services accessed by their network users.

The practice of deep packet inspection is prohibited in Luxembourg, as it infringes confidentiality rules and constitutes an invasion of privacy in complete violation of the above-mentioned legislation. The same analysis would apply to the filtering of data processed by means of electronic communication means.

33 Articles 309, 460, 488, 505, 509-1 and following of the Luxembourg Criminal Code.

However, network operators, data centre operators and PSFs are obliged, in order to comply with secrecy or confidentiality requirements, and to avoid the invasion of privacy, piracy or intellectual property theft, to take appropriate technical and organisation measures, and to have systems and procedures (firewalls, encryption, secured and restricted access, etc.) in place that render the network and data processing via their network secure.

iv Security

National security

The Electronic Communication Law, the Electronic Communication Data Protection Law and the Data Protection Law provide for specific applicable measures to ensure national interests.

In certain circumstances where national security (including public health and public order) is endangered, the government may requisition the entire electronic communication network established in Luxembourg, as well as the connected equipment, or prohibit the provision of some or all electronic communication services.

To maintain access to the emergency services, the government may also dictate special conditions for the use of electronic communication services and networks. Although storage of personal data is generally prohibited, the Electronic Communication Law provides for an exception in relation to storage of traffic data relating to emergency calls or the inspection of false alerts, attacks or abusive calls.

The Law of 23 July 2016, creating a High Commission for national protection, attributes special powers to this High Commission to prevent, anticipate or manage any crisis and its effects and consequently encourage the return to a normal state. For example, the protection of critical infrastructure includes all activities aiming to prevent, attenuate or neutralise the risks of a reduction or discontinuity of services essential to the protection of vital interests or personal needs for all or part of the country or its population.

Furthermore, following the recent terrorist attacks, a bill of law on the exchange of personal data and information in police matters has been introduced to transpose EU Framework Decision 2006/960/JAI and certain dispositions of EU Framework Decision 2008/960/JAI.

Finally, the Law of 7 June 2017 abolished anonymous prepaid SIM cards for mobile phones. Mobile operators will have to deactivate prepaid SIM cards with a Luxembourg number whose holders have not yet been identified. Consequently, they will have to collect certain data in relation to the identification of their clients before activating purchased prepaid cards.

Privacy and consumer protection

Privacy and consumer protection in the electronic communication domain is guaranteed by both the Consumer Code and the Media Law. They set guidelines and restrictions in relation to commercial advertisements and specific provisions for the protection of children.

Information about consumers must be treated confidentially and may not be rendered accessible to third parties, and the processing of consumer data is allowed only if it falls within the criteria defined by the relevant laws. Processing of data is subject to the principle of legitimacy of processing. Each data processor located in or using physical means located in Luxembourg to process data is subject to a notification or prior authorisation procedure addressed to the CNPD depending on the nature of the data processed and the purpose for doing so.

Sharing of consumers' personal data is strictly prohibited by law, unless the consumers give their express consent. Where locational data are being stored and processed by an operator, a user must be informed thereof and must be able to oppose any such action (the process for which must be clearly set out and communicated to the user).

Luxembourg law prohibits the addressing of advertisements or other unrequested communication to persons by electronic means without their consent. If the supplier of a product received email addresses during a previous sale, he or she can use such email addresses to promote analogous products and services unless the concerned persons request that such actions be stopped.³⁴

Protection of children

There is no specific legislation or regulation that ensures the protection of children online.

In 2011, Luxembourg ratified the United Nation Convention in relation to children's rights and the Convention of the Council of Europe concerning protection of children against exploitation and sexual abuses, and is involved in the implementation of their provisions.

Moreover, the government is issuing a number of recommendations and supporting various projects to render children and their parents aware of the risk related to the use of the internet. The 'Bee Secure' project has been drawn up in the context of the EU Safer Internet Programme, which gives directions for the use of the internet to children, parents and educational staff.

Generally, the policy is to familiarise children with new technology rather than filtering or blocking access to various types of information (which might, however, be an alternative); the intention is to teach children how to use the internet safely and to always be aware of the risks related to such use.

Children's rights are protected by provisions of the Luxembourg Criminal Code (LCC). Further to the adoption of the Law of 21 February 2013 amending Articles 372 and 377 of the LLC, the LLC provides for enhanced sanctions in relation to sexual child abuse matters. The 'BEE Secure Stopline' is a project operated by a national consortium that provides a structure to report illegal information transmitted over the internet anonymously. The E-commerce Law requires information service providers to withdraw or render inaccessible any illegal content that they become aware of. The Media Law includes specific children protection provisions.

The University of Luxembourg is an active member of the 'EU Kids Online' project, a multinational research network seeking to enhance European children's opportunities and safety, and to reduce their risks.³⁵

In relation to the adoption of the 2014 Law, CNP lobbied to introduce an appropriate visual warning obligation. A Grand-Ducal Regulation was adopted on 8 January 2015 for the protection of minors regarding audiovisual media services.

Cybersecurity

Cybersecurity is a government priority, and individuals and companies are encouraged to take appropriate technical measures to defend themselves against cyberattacks.

34 Article 11 of the Electronic Data Protection Law.

35 <http://www.saferinternetday.org/web/eu-kids-online/home>.

Similarly, as with the internet project for children, the government has created 'CASES Luxembourg', a project accessible by all internet users whose purposes are to make the public aware of potential cyberattacks that are inherent in internet use, and to advise on how to identify potential cyberattacks. In this context, it is worth mentioning the certification authority, Luxtrust, which manages electronic certificates with the highest level of security.

Network operators and ISPs are required by applicable law to comply with stringent security measures.

As a response to the increasing number of cyberattacks, the LCC has been amended to include offences in the electronic communication sector.

The government pursues efforts to prevent and fight cybercrime, and in 2011 created two dedicated structures: the Luxembourgish Cybersecurity Board (CSB), whose mission is to work on a strategic plan against attacks via the internet; and the governmental Computer Emergency Response Team (GOVCERT), linked to ANSSI, the competent body to deal with incidents of cybercrime in public information systems and the security of the information systems for the public sector and critical infrastructures. (ANSSI was created in 2015.)

GOVCERT also cooperates with the High Commissioner for Protection (HCPN) and the Technology Centre for State Information. Both HCPN and GOVCERT have adopted a cybersecurity plan that has been submitted to the Counsel of Government. The CSB has determined five priorities (on both the national and international level) on which Luxembourg shall focus.³⁶ The CSB has asked a working group to review the national strategy regarding cybersecurity to determine whether any amendments are necessary. Furthermore, the government has signed a letter of intent with Belgium and the Netherlands to cooperate in the prevention of and fight against cybercrime. Luxembourg regularly hosts conferences on cybersecurity that are mainly dedicated to experts in security matters.

The CSB acts as a central point of information and contact for users to report cybersecurity incidents, which should allow the CSB to supply businesses with this information and put them in a position to take appropriate action to fight the risk against security.

The Computer Incident Response Center Luxembourg, which is the official computer emergency response team (CERT) of Security made in Luxembourg (SMILE), is competent for the private sector, municipalities and non-governmental entities in Luxembourg.

After the delay in the implementation of the European Council Convention on Cybersecurity (CCC) and Directive 2013/40/EU relating to attacks against information systems, a law relating to cybercrime was adopted on 18 July 2014. Such law adapts the national substantive and procedural criminal law to the specific needs of fighting cybercrime. The law introduces certain new criminal offences into the LCC, including in particular the misuse of identity, 'phishing' and illegal interception of computer data supplementing the legal instrument of computer-related crimes, which includes the illegal access to, and hacking and deletion of, computer data. The law also amends the Criminal Procedure Code to achieve the requirements of the CCC regarding the prompt preservation of stored computer data and traffic data.

Further, SECURITYMADEIN.LU, an initiative launched in 2015 by SMILE, has the objectives of coordinating governmental initiatives, and supporting and making the public more aware of cybersecurity issues. In addition, SECURITYMADEIN.LU aims to develop an ecosystem for cybersecurity that will reinforce the visibility of Luxembourg information

36 Ministry of State, National Cybersecurity Strategy.

security players and services. SECURITYMADEIN.LU and the activities of SMILE are an integral part of the national strategy that intends to position Luxembourg as a trusted ICT centre.³⁷

In May 2016, the government announced a collaboration, through their respective CERTs,³⁸ between the new national agency for the security of information systems and SMILE in relation to all activities in connection with the detection, management and notification of incidents.

In addition, at the European level, Directive EU 2016/1148 on network and information security of the European Parliament and the Council was adopted on 6 July 2016. This Directive will aim to ensure a high common level of NIS in the EU.

Furthermore, the eIDAS Regulation will allow an appropriate security level for electronic identification means to be reached, and will consequently enhance security for e-businesses and electronic communication services.

Finally, in October 2016, the Secretary of State of Economy announced the creation of a centre of expertise in regard to cybersecurity in Luxembourg that will help to strengthen the country's positioning and the economic attractiveness for undertakings in the ICT sector.³⁹

Emergency response networks

Traditionally, Luxembourg first responders and other emergency responders (such as police, customs and civil protection) benefit from a dedicated network that was still analogue (RIFO). With the adoption of the Law of 20 May 2014 for the financing of a national integrated radio communication network for Luxembourg, RIFO was replaced by RENITA. RENITA is based on the terrestrial trunked radio digital technology and, in the case of any congestion of mobile networks, the RENITA network is less exposed to inherent risks. RENITA has been operational since July 2015.

On an international scale, the government has actively cooperated on the strengthening of emergency telecommunication and rapid response services in the event of disasters. It has developed a nomadic satellite-based telecommunication system, 'emergency.lu', which aims to assist humanitarian agencies to respond to communities affected by natural disasters, conflicts or protracted crises.⁴⁰ As of 2012, this platform was available as a public global service. At the end of 2014, the emergency.lu solution was extended for a period of six years by the government.⁴¹

At an EU level, harmonisation of the digital frequency relating to these services has been achieved, permitting interoperability.

IV SPECTRUM POLICY

i Development

The increasing development of wireless communication, media and information technology are also affecting spectrum policy in Luxembourg.

37 www.gouvernement.lu, 9 June 2015.

38 <http://www.gouvernement.lu/6037806/30-cybersecurite-anssi>.

39 <https://www.wort.lu/en/business/security-luxembourg-to-launch-cybersecurity-centre-in-2017-580725845061e01abe83a969>.

40 www.itu.int/net/pressoffice/press_releases/2011/52.aspx#.VecVX1IcQUI.

41 www.ses.com/4233325/news/2014/20469026.

The need for radio spectrum has increased significantly over the past few years, and Luxembourg actively participates in the elaboration of a pan-European spectrum policy and favours a more flexible and efficient use of spectrum.

In a contribution paper to the European Commission in 2010, Luxembourg indicated that it is in favour of a more flexible use of spectrum while emphasising that it is crucial that more flexible use will not negatively impair the current quality of services or entail harmful interferences. Luxembourg has expressed its concern that a more flexible use would need to take into consideration the characteristics of more specific and sensitive technology, which would be more prone to harmful interference than others.

During the negotiations that led to the adoption of the European regulatory framework, Luxembourg explained that one of its top priorities was to maintain national competence in relation to the management of the spectrum and full subsidiarity in this area.

ii Flexible spectrum use

As a result of the Law of 27 February 2011 amending the Spectrum Law, allocated licences are no longer personal.⁴² On that account it is currently possible to sell, transfer or sublease allocated spectrum, thus enhancing the flexibility of spectrum use. The Spectrum Law also provides for the possibility of spectrum sharing.

The mobile use of spectrum dedicated to fixed use is possible as a matter of the applicable law and regulations, and is in line with the principle of technological neutrality.

iii Broadband and next-generation mobile spectrum use

According to the 12th edition of the 'eGovernment benchmark' of the European Commission, fixed high speed internet is accessible for 100 per cent of the population of Luxembourg, compared with 97 per cent for the rest of the European Union. For the 'new generation' high speed internet (greater than 30Mbps), 94 per cent of the population is covered compared with only 72 per cent for the other EU Member States.⁴³

In Luxembourg, the increasing need for spectrum for use by the offer of increasing broadband services is partly solved by opening additional frequencies or the release of spectrum for the use of broadband and next generation mobile services.

Luxembourg completed the switch-off of analogue television broadcasting in 2006, which was replaced by DTTV. The released spectrum (generally referred to as 'the first digital dividend') is used for next-generation mobile services.

The ILR has adopted a new frequency plan that came into force in January 2016. The new frequency plan takes into account Decision (EU) 2015/750 of 8 May 2015 of the European Commission on the harmonisation of the 1,452–1,492MHz frequency band for terrestrial systems capable of providing electronic communications services in the European Union.

In 2015, frequency bands 900MHz and 1800MHz were made available for various mobile communication technologies. Frequency bands 800MHz and 2.6GHz have also been opened. In that respect, in October 2011 Luxembourg concluded an agreement with its neighbouring countries regarding reducing the risks of interference due to overlapping

42 Article 2 of the Law of 27 February 2011 amending Law of 30 May 2005 on organisation of the management of electronic waves.

43 See footnote 28.

coverage in the frequency band 790–862MHz. This agreement became effective on 1 January 2014.⁴⁴ Another multilateral agreement between France, Germany, Switzerland and Luxembourg concluded in 2014 concerned the allotment of preferential frequency blocks in the 406.100–410.000MHz band to ensure equal spectrum access in the respective border areas. A bilateral agreement was also signed with Germany regarding Luxembourg and Germany's common approach in dealing with the 470–694MHz and 694–790MHz frequency bands.

Licences within the 900MHz band have been renewed to the existing operators and one new operator, and the use thereof has been expanded to different technologies. These licences allowed the introduction of 4G technology (LTE) in Luxembourg specifically. In addition, the three operators have spectrum in the 1800MHz band, allowing flexibility for the introduction of innovative new technologies. Certain operators⁴⁵ have spread out an operational 4G network covering a large number of Luxembourg's population and offer 4G services. By the end of 2014, 96 per cent of the population in Luxembourg already had access to this network.⁴⁶

Following a public consultation launched in July 2016 for frequency band 2.1GHz, EPT, MTX Connect Sàrl, Tango and Orange will be allocated 14.85MHz in the 2.1GHz band to be used by no later than 1 January 2020.

At a European level, the European Commission has adopted a decision to make more spectrum available for mobile services in the 700MHz band (694–790MHz) by 2020, allowing the provision of high-quality internet to users, whereas the sub-700MHz area (470–694MHz) will remain available, as a priority, for audiovisual services.⁴⁷ This development is in line with the deployment of 5G, foreseen as from 2020.

In August 2017, the ILR launched a public consultation to assess the amount of interest in the 700MHz band, the possible use thereof and the quantity needed. Responses had to be provided by end of September 2017.

iv Spectrum auctions and fees

Given the small size of the market and the limited number of operators, the experience of the authorities shows that allocations of spectrum through auctions or 'beauty contests' do not produce satisfactory results. Hence, while theoretically possible as a matter of law, auctions are not currently conducted in Luxembourg.

The Spectrum Law provides for various procedures for the allocation of spectrum licences such as competitive selection, comparative selection or by a public bidding procedure for the best offeror. The competent minister will determine the applicable procedure on a case-by-case basis after having undertaken a public consultation, and will publish this decision in the Luxembourg Official Gazette and in the EU Official Journal at least one month prior to the launch of the procedure.⁴⁸

The fees payable to the state (as owner of the national spectrum) for the allocated spectrum are determined by a Grand-Ducal Regulation of 21 February 2013 on royalties for

44 ILR, Annual Report, 2013, p. 36.

45 Orange/Tango/EPT (now Post Telecom), Join Wireless, Cegecom.

46 <https://ec.europa.eu/digital-agenda/en/country-information-luxembourg>.

47 http://europa.eu/rapid/press-release_IP-16-207_en.htm.

48 Article 6 of the Spectrum Law.

radio frequencies.⁴⁹ The Spectrum Law has modified the allocation and recovery of the fees payable in relation to spectrum licences in favour of the ILR. Public services and authorities are not subject to the payment duty to the extent that spectrum is used for the provision of services within the scope of national defence, public security or emergency services.

V MEDIA⁵⁰

i Restrictions on the provision of service

The Media Law has been amended several times, with the most recent amendment having taken place on 27 August 2013. The Law aims to cover all types of audiovisual and sonorous media. High importance is placed on content regulation, protection of children, non-discriminatory content, and the form and the content of commercial advertising.

ii Internet-delivered video content

It is difficult to measure the importance of internet video distribution in Luxembourg given the absence of surveys or statistics on this phenomenon. The only indicator is the fact that, as in most other Western countries, people watch less traditional TV, which seems to indicate that internet video is becoming more popular, particularly with the younger public. Given the general availability of cable and satellite TV, the impact so far has been minimal. In addition, based on the high connection rates of Luxembourg residents to the internet, it should be expected that this move will not pose dramatic problems for consumers.

VI THE YEAR IN REVIEW

i Key legislation

Considering the increasing importance of transnational transactions carried out by electronic means, in addition to being in favour of the implementation of Digital Single Market policies, Luxembourg is also in favour of the implementation of a uniform framework on electronic identification and electronic authentication that should help to increase security and trust in online transactions and electronic commerce. This was proposed to be achieved at EU level through EU Regulation No. 910/2014 of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market, which entered into force on 1 July 2016, and the adoption of a regulation of the European Parliament and of the Council laying down measures concerning the European single market for electronic communications and to achieve a connected continent, and amending Directives 2002/20/EC, 2002/21/EC, 2002/22/EC, and Regulations (EC) No. 1211/2009 and (EU) No. 531/2012, which is still being discussed within the Council.

In an era of the development of internet payment services, where one of the main challenges remains compliance with know-your-customer requirements, Luxembourg has adopted a regulation that softens the identification requirements for transactions below certain threshold amounts.

EU Regulation 2015/2120, adopted on 25 November 2015, definitively dictated the abolition of roaming charges by June 2017. This enhances competition among operators

49 Grand-Ducal regulation of 21st February 2013 on royalties for radio frequencies.

50 Information in this section has been largely drawn from the government's annual report 2011 and 2012.

and creates attractive offers for consumers, and it is of particular importance to Luxembourg residents, given the small size of the Luxembourg territory. A bilateral agreement concluded in 2015 between the ILR and the Belgian Institute for Postal Services and Telecommunications had already opened up the possibility for Luxembourg and Belgian customers to use their mobile phones between those two countries without paying 'roaming' charges.

Luxembourg actively cooperates with other European countries on the implementation of the GDPR and participates in the Article 29 Group working on the guidelines for the implementation of the new provisions of the GDPR.

The announcement by the government of the 'Digital Luxembourg' strategy, launched in August 2014, and the 'Digital (4) Education' strategy, launched in May 2015, evidences the government's efforts to continue the development of the ICT sector with the aim of making Luxembourg a high-tech centre of excellence. At the end of 2016, Vodafone and Technoport SA opened a joint innovation centre in Luxembourg, which confirms the government's strategy to reinforce the country's visibility as a centre of innovation for ICT and telecommunications.⁵¹

Government policy aims at further promoting the ITC sector and related infrastructure (data centres, etc.) as one of the pillars of the Luxembourg economy. The government continues to invest heavily in the security of networks and infrastructure as one of the main components in the development of electronic communication systems. As of January 2017, Luxembourg, with its eight Tier IV data centres, had 40 per cent of the total number of Tier IV data centres in Europe (Tier IV being the highest level possible for a data centre with very high security and availability standards).⁵² In May 2017, Luxembourg and Estonia announced that Luxembourg will host the first 'data embassy', with the aim of storing sensitive data for the Estonian government on servers located in the Grand Duchy.⁵³

The government has created various structures at the national level to prevent and combat cybercrime and other attacks on electronic communication services and infrastructures. The creation of the Cybersecurity Board and the CERT, and the adoption of a national strategy in cybercrime matters, demonstrate the government's absolute determination to fight and prevent cybercrime.

Mobile services are now included in the 2GHz frequency band. Many other decisions and policies taken in this field have been in line with European policy.

The continuing development of the online video games sector in Luxembourg and the establishment of internationally known companies is encouraging LU-CIX, Luxembourg's commercial internet exchange, to develop its services. The government has renewed efforts to establish efficient technical infrastructure and a business-friendly legal environment to assure the best development possible for these companies in Luxembourg.

The government has also continued its ICT promotion efforts, with the competent government organ visiting various countries and states in 2016 and 2017. In addition, a Luxembourg delegation travelled to various countries to show the government's support for Luxembourg start-ups. A digital tech fund was launched in 2016 by the government and various private investors, and the €20 million raised by the fund will be used to support Luxembourg-based early-stage ICT start-ups. A public-private seed fund, it aims primarily,

51 <https://www.wort.lu/en/business/technology-vodafone-and-technoport-s-a-open-innovation-centre-in-luxembourg-5852cee253590682caf163bb>.

52 <http://www.innovation.public.lu/en/decouvrir/pourquoi/secteursinnovants/finance/index.html>.

53 <http://www.itnation.lu/lestonie-aura-ambassade-digitale-luxembourg>.

but not exclusively, to invest in areas such as FinTech, cybersecurity, big data, digital health, media and next generation communication networks, and digital learning.⁵⁴ The first two investments were announced in July 2017: Nektria and iTravel will each receive €500,000 to further develop their activities.⁵⁵

In addition, two House of BioHealth buildings have been made available for start-ups active in the health field in Luxembourg.⁵⁶

Luxembourg has also attended various conferences organised in Luxembourg and throughout the world. Luxembourg hosts the annual ICT Spring Conference. In 2017, the Conference was mainly focused on deepening digital knowledge, capturing the value of the fast-evolving FinTech industry and exploring the impact of space technologies.

In the satellite sector, SES has continued to expand its fleet of satellites offering a global connectivity covering 99 per cent of the world's population, and it is investing in new onsite infrastructure. At the time of writing, SES had launched two satellites in 2017, with four more launches being planned before the end of 2018, with the aim of expanding its activities in Europe, Asia and South America.⁵⁷ The broadcasting of ultra HD (UHD) content is another SES priority. SES currently broadcasts over 30 UHD channels worldwide, making it the world leader in regard to the UHD line-up.⁵⁸ SES is part of a 16-member consortium that has been tasked with integrating satellites into 5G networks, thereby enabling ubiquitous and instantaneous 5G coverage and capacity.⁵⁹ SES has also announced its support for the European Commission's action plan for the deployment of 5G in Europe, and strongly believes that Europe has the potential to become the global leader in 5G, enabling economic growth, sustainability and high-quality jobs.⁶⁰

Furthermore, SES has signed a partnership agreement with the LIST that will allow cooperation throughout their international network of research partners that have unique expertise in satellite communications, widening the scope of SES's international research activities together with that of reputable universities. The new partnership agreement further enhances Luxembourg's technology ecosystem by attracting start-ups to develop their businesses in Luxembourg, and will facilitate the transfer of new technologies stemming from national public and private research.⁶¹

ii Key mergers and takeover activity

No major takeover activity has taken place over the past six months, but actors in the ICT sector have taken the opportunity to develop their activities and services in their respective areas of predilection in the light of new technologies (cloud, e-archiving, roaming, digital payment services, etc.).

54 www.luxembourgforfinance.com/en/news/launch-digital-tech-fund-support-luxembourg-based-early-stage-ict-startups.

55 <http://www.itnation.lu/premieres-prises-de-participation-digital-tech-fund>.

56 Luxembourg 2020, Plan national pour une croissance intelligente, durable et inclusive.

57 <https://www.ses.com/our-coverage/satellites>.

58 www.ses.com/ultra-hd.

59 <https://www.ses.com/press-release/ses-and-sat5g-spearhead-development-ubiquitous-5g-network-capabilities>.

60 fr.ses.com/6859799/news/2016/22331759.

61 http://www.digital-luxembourg.public.lu/en/actualites/innovation/2017/20170316_SESLIST/index.html.

VII CONCLUSIONS AND OUTLOOK

The digital economy is an important Luxembourg pillar and a top priority of the government. Luxembourg is considered to be located in the middle of the 'Golden Ring'.⁶² Continuing efforts are made to favour the development of new communication and information technologies. The development of international connectivity and security in the current context remain key priorities. The adoption of the 'Digital Luxembourg' and 'Digital (4) Education' strategies show the government's commitment to and awareness of the importance of the ICT sector and ICT-related services. The development of FinTech services is strongly supported by many market players and the government. The Luxembourg 'House of Financial Technology' opened in April 2017.

At the end of 2016, the Prime Minister announced the launch of the 'Infrachain' project. A memorandum of understanding has been signed between five public and private partners to begin working immediately on a national blockchain infrastructure project.⁶³

Luxembourg has become a European leader in terms of broadband penetration, and continues to attract new companies active in the ICT sector. The fast development of ICT services has increased the need for additional spectrum, and the decision to open the 700MHz band is consistent with the country's radio spectrum policy programme.

The rapid development of cloud computing services and the creation of a legal framework for e-archiving will continue to be driving forces for the development of data protection legislation and the internet security sector. The ultimate aim is to consolidate a feeling of trust in the online environment, which is essential to the development of this sector of the economy.

Luxembourg is keen to take advantage of the growing demand for high performance infrastructure bandwidth capacity and the connectivity needs of the e-economy: Luxembourg's geographical location close to the major European cities is a clear advantage.

Luxembourg will continue to develop high-standard data centre services and facilities. The location of the first green centre worldwide shows its commitment to research and development into new infrastructure and technologies. Many Luxembourg data centres (eight out of a total of 23) offer Tier IV design, while most of the other centres are classified Tier III. Luxembourg hosts the European Commission's data processing centres and, at the end of 2016, a new data centre for the European Commission was inaugurated in Betzdorf, which, according to the former European Commissioner for Digital Economy and Society, is a world-class data centre offering a modern, reliable economic IT infrastructure for the Commission.⁶⁴

In addition to recognising the importance of developing networks and guaranteeing security, the government and its partners are aware that the long-lasting and efficient development of the digital economy requires e-skills, and they are thus active in promoting ICT business to students. Awareness of training opportunities and careers in the ICT sector is one area of development of the digital economy in Luxembourg (e-skills project), and goes hand in hand with the Digital (4) Education strategy. Children, students and teachers are, for instance, granted free access to Office 365, an environment proposing platforms and computer applications to satisfy the administrative and educational needs for the national

62 Luxembourg and ICT: a Snapshot.

63 <http://www.itone.lu/actualites/xavier-bettel-announces-launch-infrachain>.

64 http://www.digital-luxembourg-public.lu/fr/actualites/infrastructure/2016/20161216_eudatacenter/index.html.

education. MathemaTIC was created to proposing a digital learning environment for mathematics for children. BEEcreative, an initiative of the Ministry for Education, provides a space of discovery and creation intending to stimulate the creativity of the next generation. Furthermore, a pilot project was launched in September 2016 in three different schools, allowing 35 students to participate in the new Luxembourg Tech School.⁶⁵

Luxembourg is also keen to adopt the measures and implementing actions necessary to allow the efficient and consistent application of the new GDPR once it comes into force. A number of consultations and conferences have been organised by the regulators to ensure that the new Regulation will be consistently implemented. The adoption of the Network and Information Security Directive will also have an impact on the national legislative framework, and Luxembourg is keen to count itself among those countries that can ensure very high standards in terms of security. Furthermore, the eIDAS Regulation entered into force in July 2016, and constitutes a European legal framework that will enhance security for e-businesses and electronic communication services.

Luxembourg continues to pursue its path towards innovation and to constantly search for new opportunities. Luxembourg's launch of its space research initiative in 2016, and the adoption of the law on the exploration and use of space resources passed on 13 July 2017 ensuring that private operators working in space can be confident about their rights to the resources they extract in outer space, demonstrate how progress-oriented Luxembourg is and will continue to be.

65 Activity report of the government, p. 14.

ABOUT THE AUTHORS

LINDA FUNCK

Elvinger Hoss Prussen

Linda Funck is a partner with Elvinger Hoss Prussen, which she joined in 2000 when she became a member of the Luxembourg Bar.

Her principal fields of activity are mergers and acquisitions, banking, financial and securities laws, corporate restructuring and IT, IP and data protection law. In the field of TMT, Linda Funck regularly advises local and international companies on all IT aspects, and is a regular adviser to clients seeking to establish, restructure or develop their TMT activities in Luxembourg.

She holds a master's degree in law from the Université Paul Verlaine in Metz. She is fluent in English, French, German and Luxembourgish.

ELVINGER HOSS PRUSSEN

2, Place Winston Churchill
BP 425
L-2014 Luxembourg
Tel: +352 4466440
Fax: +352 442255
lindafunck@elvingerhoss.lu

www.elvingerhoss.lu



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