

Economy

ELENA DANESCU

INTRODUCTION

Situated in the centre of Europe and bordered by two major powers, France and Germany, the small Grand Duchy of Luxembourg (with a total area of just 2,586 sq km and, in January 2016, a population of 576,249 inhabitants, according to official estimates, of whom 46.7% were foreigners)—a multicultural, multilingual and crossborder area par excellence—has always sought to maintain an openness to its neighbours, for reasons of security, and to give itself access to larger markets. The fact that the country did not have its own currency increased this need for openness and made monetary policy a key factor for integration.

In the 19th century Luxembourg was part of the German customs and trade union (Zollverein). Following the First World War, the country embarked on a process of economic and monetary integration with Belgium via the Belgium–Luxembourg Economic Union (initially set up in 1921 and regularly extended over the ensuing decades). It also played a driving role in the economic and political rapprochement of the three countries—Belgium, the Netherlands and Luxembourg—in the Benelux Economic Union (established in 1944 and restyled as the Benelux Union in 2008). Following the Second World War, it was ultimately with the European project that these integration efforts began to bear fruit and take on a new dimension. Luxembourg was one of the six founding members of the European Coal and Steel Community (ECSC) and the European Economic Community (EEC); in 1952 the country became the workplace and one of the permanent seats of the institutions of the European Community (later European Union—EU), and it played a pioneering role in the establishment of Economic and Monetary Union (EMU).

These achievements boosted the standing of this constitutional monarchy that was already renowned for its political stability and social consensus, for the foresightedness and pragmatism of its long-term leadership and for its ability to manage crises and adopt an innovative approach. In political terms, European integration and multilateral co-operation enabled Luxembourg to become an equal partner in the decision-making processes and leadership of European organizations. In economic terms, these features gave the country the tools it needed to forge a development model that could underpin the creative growth of its social market economy, while preserving the majority of its vital interests—particularly the steel industry and the financial centre—over the long term. With a gross domestic product (GDP) growth rate of 4.9% in 2015 and of 3.5% each year between 1990 and 2014, the highest GDP per caput among the Organisation for Economic Co-operation and Development (OECD) member states, a level of material well-being more than 37% above the European average, an unemployment rate of 6.9% and sound public finances, Luxembourg is currently one of the most prosperous countries in the world. How did the country manage to achieve this? What are its current strengths and weaknesses? What are its ambitions, and what future challenges can it expect to face?

FROM AGRARIAN ECONOMY TO KNOWLEDGE ECONOMY: AN OVERVIEW

Throughout the 20th century Luxembourg experienced several periods of transition. The largely agriculture-based economy became industrialized, driven by a powerful steel industry which remained the dominant sector from the immediate post-Second World War years to the mid-1970s. The country had a considerable competitive advantage in this respect owing to iron ore deposits in Luxembourg itself and in the neighbouring French region of Lorraine. The industrial flagship was *Acieries Réunies de Burbach-Eich-Dudelange* (ARBED), founded in 1911, which developed its production in Europe and established a global network of sales outlets. Between 1953 and 1968 the steel industry contributed approximately 25% of the

country's GDP growth, while steel production represented 50% of its added industrial value. Over the same period, the nominal wage grew by 29.3%. The improvement in living standards led to the emergence of the middle class and an increase in urbanization. The Government improved the social security regime and extended it to all workers, thus helping to close the gap in social equality, raise living standards further and boost social cohesion in the country over the long term. The asymmetry between steel output (e.g. 6.4m. metric tons of steel in 1974) and national requirements (approximately 5% of this output) meant that Luxembourg had to export its steel production, which made the country entirely dependent on the international economic climate. Most of Luxembourg's steel went to the EEC. Membership of the Community organizations had a positive impact on the country, multiplying its wealth and boosting living standards. At the same time, the contrast between Luxembourg's thriving steel industry and its small population prompted it to look beyond its borders to augment its workforce. This resulted in several waves of immigration, especially from Italy at the turn of the 20th century and from Portugal in the late 1960s. The discrepancy between the required and available capital in the country meant that it needed to tap into foreign capital. Luxembourg also looked abroad for expertise.

Even as the steel industry reached its peak, the Government set about exploring possibilities for economic diversification, introducing a suitable legislative framework with the establishment of the Board of Industrial Development in 1959, the adoption of the framework law on economic expansion (1962) and the creation of the *Société Nationale de Crédit et d'Investissement* (SNCI, 1980). It managed to attract major multinational companies in other manufacturing sectors (glass, chemicals and plastics) and in the service industry (trade, tourism and public administration). Most of the new companies that came to the country were from the USA, such as Goodyear, DuPont de Nemours and Guardian. Nevertheless, 60% of foreign direct investment into Luxembourg was from its neighbours Germany and Belgium. The early 1970s saw the rise of a new growth sector for Luxembourg: the international financial centre. This was the result of action taken by the Government as well as several external factors, including the interest equalization tax introduced by the USA in 1963 and the German securities transfer tax (*Kuponsteuer*) introduced in 1965. US capital and German banks were attracted to Luxembourg. Germany was the main investor in the banking sector, with 53% of all investments. The international financial centre would also become a 'laboratory' for the single European currency, one of the architects of which was Pierre Werner (Prime Minister of Luxembourg in 1959–74 and again in 1979–84, and Chairman of the expert committee that drafted the 1970 Werner Report, which formed the basis of EMU). The Luxembourg Stock Exchange, *Kredietbank SA Luxembourg-geoise*, the *Banque Internationale à Luxembourg* and *Cedel* also played a major role.

In 1974 the steel industry began to decline, marking the end of the 'Trente Glorieuses'. Luxembourg was forced to implement considerable structural changes and embarked on its second major transition, from an industrial economy to a service economy based on the financial sector. This was reflected by fundamental changes in the structure of the country's economic value added. Between 1970 and 2011 the share of industry contracted sharply from 47% to 8%, while the share of the steel industry shrank from 28% to 2%. From the mid-1980s the country's economic growth accelerated, driven by its financial centre. During 1985–2007 average annual GDP growth was 5.3%, twice as much as that of neighbouring countries and of the member states of the EC/EU. In 1998 the financial industry employed approximately 20,000 people (some 10% of the working population), generating 20% of GDP and directly providing between 30% and 40% of the country's public revenue. An indirect impact of this sector was the development of business in related specialist areas, including

information technology, data processing, intellectual property, legal and accounting expertise, training and business services.

Luxembourg is an export-intensive economy and the trade deficit is a recurrent characteristic. Between 1988 and 2016 the balance of trade averaged –€300m., reaching an all-time high trade deficit of €30m. in February 1988 and a record low of –€1,060m. in September 2012. In 2015 the deficit stood at €5,800m., down from the previous year because of an increase in exports and a decrease in imports. The share of foreign trade in Luxembourg's GDP is higher than 30%. EU countries are by far the country's largest trading partner, accounting for about 84% of exports and 87% of imports. Its three main trading partners are Germany, France and Belgium; its top customer is Germany (more than 27%) and its leading supplier is Belgium (nearly 24%). Luxembourg mainly exports iron and steel, chemical and rubber products, glass, electrical and electronic equipment, and financial services, its most profitable export. The country remains dependent on imports of energy (mineral fuels and oil) and most of its consumer goods. Luxembourg has successfully diversified its exports outside the EU and the country is now developing trade relations with countries in Asia and the Middle East.

The expansion of the financial industry resulted in the emergence of a new phenomenon in Luxembourg: in order to meet its workforce requirements, the country turned to cross-border workers. This new development was made possible only by labour mobility, the discrepancy in unemployment rates between Luxembourg and its neighbours, and a positive wage differential. In 1998 crossborder workers made up one-third of the country's workforce. Of the total workforce 55% were non-Luxembourgers. Concerted state intervention (in the form of investing to boost productivity, controlling mass unemployment by introducing community projects, activating the ECSC's aid mechanisms and developing a productive synergy with Belgium) and the spectacular growth of the financial sector enabled the country to avoid a painful socio-economic crisis. Political leaders improved the legislative and institutional infrastructure underpinning the financial centre in three main areas, implementing international regulations, setting low taxes and establishing strict rules on banking secrecy. The leaders explored possibilities for further economic diversification in innovative, competitive areas such as audio-visual technologies and communications satellites, as reflected in companies such as the Compagnie Luxembourgeoise de Télédiffusion and the Société Européenne des Satellites (SES). SES is now the world's leading satellite operator, reaching 99% of the global population. As regards the steel industry, in 2001 ARBED merged with Usinor and Aceralia, thus creating Arcelor, which in turn merged with Mittal Steel in 2006. ArcelorMittal, which has its headquarters in Luxembourg, is currently the world's largest steel producer.

To reconcile economic interests and social stability, the Government opted for a proactive social policy, with key measures including an automatic wage indexation mechanism based on increases in the cost of living (1965), the 40-hour working week (1975), a guaranteed minimum income (1986) and the expansion of the health care system. Labour relations were strengthened. In 1977, during the steel crisis, a Consultative Tripartite Committee (comprising the Government, employers and the unions) was established, acting as a shock absorber for both sides of industry. The Committee complemented the Economic and Social Council set up in 1966 as well as the various trade organizations and unions; it formed the basis of the Luxembourg social model, which relies on democracy, social solidarity and consensus to underpin social and economic development.

In 2007, during the emergence of the 'sub-prime' mortgage crisis stemming from low-income borrowers' inability to meet repayment obligations on lending, Luxembourg had the EU's largest banking sector and was a highly specialized, widely diversified global financial centre (with investment funds, insurance companies and banks, most of which were branches of foreign-based establishments). Since Luxembourg's economy was strongly driven by this sector, the potential vulnerabilities were considerable. In 2008 the financial sector contributed 29% of the country's GDP, 12% of jobs and 20% of total tax revenues—a significantly higher proportion than in

any other OECD country. The global financial crisis resulted in a decrease of 20% on the aggregated balance sheet of Luxembourg's banks and a decline in GDP of 5.4%. The 2009 downturn was less severe than that of the steel crisis in 1975, which was an exception for European countries. The contraction of the financial sector led to a fall in tax revenues, which raised the risk of a long-term impact on the sustainability of the generous Luxembourg social security system, placed under growing pressure by an ageing population.

Another problem was the country's ongoing structural unemployment, despite a rise in the overall employment rate. In 2014 GDP increased by 4.1%, returning to its pre-crisis level (during 2000–07 GDP rose by roughly 4.7% per annum). The Government bailed out two major crossborder banks, Dexia and Fortis, which were experiencing serious difficulties; both required recapitalization equivalent to 6% of GDP. However, government aid, in the form of guarantees and injections of capital, was less extensive than in other OECD countries. Three small Icelandic banks were placed under the legal administration of the Financial Sector Supervisory Commission (CSSF). All these problems, which were caused by crossborder issues, were resolved without severe difficulties, and contagion to other establishments in the financial centre was avoided. Although Luxembourg fared better than its partners in the eurozone, the crisis had a lasting effect on the country's competitive advantage, particularly because it had to align its financial regulations with European and international initiatives (such as budget constraints, prudential supervision and increased transparency).

If it were to guarantee its future position in a competitive globalized environment, the country would face a major strategic challenge: it had to diversify its economy while preserving the competitiveness of the financial sector. Luxembourg took the decision to focus on innovation as the main driver of sustainable growth, embarking on its third major transition—from a financial economy to a knowledge-based economy.

CURRENT SITUATION AND CHALLENGES

In 2015 Luxembourg returned to its excellent pre-crisis levels, consolidating its status as one of the world's most competitive economies. The *Global Competitiveness Report* published in 2015 by the World Economic Forum ranked Luxembourg in eighth place in the EU and in 20th place at international level (out of 140 countries) in terms of competitiveness and medium- and long-term growth potential. Luxembourg was recognized for its economic efficiency, its business-friendly environment and the reform-minded agenda of the public authorities. There follows a summary of the main characteristics of the Luxembourg economy and the current challenges facing it.

Sustained Growth

Luxembourg's real GDP grew by 4.9% in 2015 (2010 prices), one of the highest growth rates in the eurozone. This increase was driven by the contribution of net exports. Although private investment remained somewhat anaemic (except for goods transport and the satellite industry), public investment was boosted by major projects in two areas: research and intellectual assets based around the University of Luxembourg, and infrastructure and innovative industries (information and communication technology—ICT, energy and logistics), the showcase for which is the Belval development cluster on the France–Luxembourg border. In terms of prices, the decrease in the price of basic commodities, especially oil, resulted in inflation of 0.5% in 2015. This had a knock-on effect, leading to the postponement of the next automatic wage indexation (last applied in 2013) until late 2016 or mid-2017. The low growth in wages and upswing in production exacerbated the loss of cost competitiveness. Growth rates are projected to be close to 4% in both 2016 and 2017. The economy will be supported by very favourable monetary conditions, domestic demand and gradual improvements to exports of services.

Financial Services: A Pillar of the Economy

In 2015 the current account showed a surplus as a result of exports of services. Representing more than 30% of GDP, financial services continue to drive Luxembourg's economy. The country is currently the leading European centre for

investment funds (it is ranked second at international level behind the USA) with net assets under management of more than €2,500,000m., managed in 13,000 portfolios and traded in more than 70 countries. It is the leading centre for private banking in the eurozone and the largest reinsurance centre in Europe. As of 31 July 2016 it was home to 141 banks from 28 countries (with assets of €773,267m.), which employ some 45,040 professionals. Reforms to increase transparency (including the automatic exchange of tax information for individuals on 1 January 2015 and the end of banking secrecy by 2017) led to Luxembourg's removal from international 'grey lists' in these areas in October 2015. The attractiveness of Luxembourg as a financial centre is liable to be affected by the process of tax and financial harmonization at EU and OECD level and the new regulatory environment: namely, the three pillars of Banking Union (the Single Supervisory Mechanism, the Single Resolution Mechanism and the European deposit guarantee scheme), and the liquidity regulation provided under the Basel III agreement. To offset this risk, the country is pursuing the diversification and specialization of its financial industry. Some examples of this approach include the opening of Le Freeport in Luxembourg; the country's specialization as a centre of expertise for Islamic finance in Europe (the Luxembourg Central Bank—BCL—was the first European central bank to become a member of the Islamic Financial Services Board) and as a hub for banks from the People's Republic of China in continental Europe; and specific expertise in microfinance via LuxFLAG. The country set up the Luxembourg Institute for Training in Banking and also the Luxembourg School of Finance, which, as well as offering postgraduate courses, provides a specialist environment for high-level research.

Sound Public Finances Within a Strategic Framework

In 2015 Luxembourg's public accounts were finely balanced, with a surplus of just 0.2% of GDP, compared with 1.4% in 2014. To counter the deterioration in its budget balance, the Government introduced multiannual corrective measures, with a medium-term aim of reaching a structural surplus of 0.5% of GDP. In 2015 the budget surplus reached €672m. (68% more than expected) and the central administration deficit stood at €502m. (41% lower than expected). Public investment rose by 12%. Fiscal consolidation measures, including a slight increase in the value-added tax rate from 15% to 17%, the introduction of a temporary tax of 0.5% on individual income, as well as cuts in spending, should help improve the nominal balance during the period 2016–18. To encourage equality and social cohesion in line with the traditional Luxembourg social model, this fiscal reform protects people on low incomes, single parents with dependent children, those just embarking on their working lives, and the middle class. In 2015 the maximum income tax rate stood at 42%. Tax avoidance measures were boosted through the creation of a new criminal offence known as 'aggravated tax fraud'.

The progressive reduction in the tax rate for local authorities (down from 21% in 2015 to 18% in 2018) is strengthening competitiveness and boosting trust in the economy. This is reflected by an employment rate of 72.1%, which is considerably higher than the EU average. Government debt in Luxembourg (23% of GDP) is four times lower than the eurozone average (94.5% of GDP).

This factor, together with Luxembourg's strong economic foundations, means that it is the only eurozone country apart from Germany to have been awarded an AAA credit rating by financial ratings agencies—a major asset for the country. The main challenges facing Luxembourg are the rising costs of an ageing population—among the highest in the eurozone—as well as the introduction of measures designed to standardize financial practices.

Employment: A Highly Skilled, Multinational Workforce

During 2009–14 employment in Luxembourg grew at an average rate of 2.1% per annum, compared with a decrease of 0.5% in the eurozone as a whole. The pace of employment growth in Luxembourg continued to rise, reaching 2.4% in 2015, albeit still less than the pre-crisis level. This growth in the labour market benefited crossborder workers (an increase

of 3.2%) more than residents (1.9%). The unemployment rate of 6.1% remained one of the lowest in Europe. Despite strong job creation, the unemployment rate remained at that level owing to a failure to exploit the full employment potential of the resident population. Employment rates remained low among the youngest and oldest sectors of the population. The benefits system and the mandatory income-splitting policy (which discourages a second person in the household from working) acted as a brake on employment. Luxembourg has a highly qualified workforce; the percentage of 30–34-year-olds having a higher education qualification stood at 52.7% in 2014—one of the highest rates in Europe. The country is therefore not too far from its 2020 target of 66% (higher than the general European target of 40%). This trend was confirmed by the 2014–15 reform of the government-funded grant scheme for students in higher education, which was also extended to the children of cross-border workers. Secondary education remains a cause for concern, with results that are lower than the EU average (according to the OECD Pisa rankings). This can be attributed primarily to the socio-economic difficulties encountered by underprivileged pupils, but also to the challenge posed by the trilingual approach of the Luxembourg school system. Adapting teaching and professional training to meet the needs of the employment market remains a major challenge. Poverty and social exclusion (affecting 19% of the total population) are among the lowest in the EU. High real estate prices are one of the main causes of social exclusion. Social transfers play a vital role in overcoming poverty, especially in view of increasing wage inequalities.

A General Improvement in the Business Environment

After several years of mixed performances, the Luxembourg business environment experienced a marked improvement in 2015, driven to a large extent by increased economic efficiency and competitiveness, reforms introduced by the Government and a more positive sentiment among business circles. Professional organizations (such as the Chambers of Commerce, Trades, Crafts, Tourism, Hospitality, etc.) have worked alongside the Government within a high-level committee to boost small and medium-sized enterprises (SMEs) and entrepreneurship. Effective, innovative instruments such as the SNCI and the secure interactive platform MyGuichet.lu, through which individuals and companies can carry out administrative procedures online, have been established. By participating in programmes and networks at European and Benelux level and within the Greater Region (which includes Luxembourg and areas of Belgium, Germany and France), the country's economic stakeholders have been able to defend Luxembourg's specific interests and make better use of the opportunities provided by the single market. Although Luxembourg excels in areas such as contract enforcement, crossborder trade and building permit acquisition and the country is the European leader in terms of arbitration and business conflict management, there is still scope for improvement in terms of its management practices and access to some independent professions such as architecture, engineering and health care, and it needs to open up its network industries (e.g. postal services and telecommunications) to competition, since the service providers in these sectors are still entirely state-owned.

In 2015 there were 32,006 companies in Luxembourg (up by 5% from 2014), with almost one-quarter in the area of trade, 20% involved in specialist, scientific and technical activities, and 10% in the construction industry. SMEs represented 77% of all the country's companies, employing some 170,000 people (45% of the active population) and contributing 73% to the economic value added. The entrepreneurial climate was improved, with a comprehensive reform of company law, administrative simplification, the law on the creation of 'one euro' companies, the establishment of the Luxembourg Future Fund by the SNCI and the European Investment Fund for financing entrepreneurial investment. This should help to speed up reforms in vital long-term areas for Luxembourg including employment, tax policy, productivity and private investments in research and development. The country's strong position in international comparisons and benchmarks in 2015 has helped to boost its image in the business community as a dynamic, open economy that is conducive to the

development of growth projects, despite recent attacks by foreign media on the financial centre (WikiLeaks).

Dynamic, Effective Public Authorities

The current Government, formed after the early general election in October 2013, is composed for the first time of a coalition of the *Demokratesch Partei* (DP—Democratic Party), the *Lëtzebuenger Sozialistesche Arbechterpartei* (LSAP—Luxembourg Socialist Workers' Party) and *Déi Gréng* (The Greens). The Prime Minister is the Liberal Xavier Bettel, who took over from Jean-Claude Juncker. The latter led the various coalition Governments formed between 1995 and 2013 by the *Chrëschtlech Sozial Vollekspartei* (CSV—Christian Social People's Party), sometimes with the Socialists and sometimes with the DP, before becoming the first elected President of the European Commission in 2014. Juncker, who held the finance then treasury portfolios while Prime Minister, was also the first permanent President of the Eurogroup in 2004–13. Prior to Juncker, two other Luxembourgers had been appointed to chair the European Commission: Gaston Thorn (Prime Minister in 1974–79 and President of the European Commission in 1981–85) and Jacques Santer (Prime Minister in 1984–95 and President of the European Commission in 1995–99). The influential nature of this leadership has given Luxembourg a role in the European integration process that far outweighs the country's socioeconomic size.

Immediately after its formation, the Bettel Government set out its priorities for action, targeting the economy (given the specific nature of the country's powerful international financial centre), public finance, the social welfare system and education, energy efficiency, the modernization of the rule of law and the democratization of society. Innovation, generated by research, was identified as being the primary driver for growth and competitiveness. In accordance with the parameters set by the Stability and Growth Pact, the Europe 2020 strategy and the requirements for the completion of EMU, the Government embarked on a programme of reforms introduced during the European Semester (the evaluation and co-ordination of medium-term economic and fiscal policy in the eurozone). The annual National Reform Programme, the Stability and Growth Programme for five-year periods (with the latest version covering 2016–20) and the National Action Plan for Employment were adopted. A new independent body, the National Council of Public Finance, was established to monitor the country's public finances and to evaluate medium-term economic and budget forecasts. The Government introduced the principle of 'zero-based budgeting' (whereby all expenses must be justified in terms of political priorities) and 250 measures (the *Zukunftspak*) to reduce structural public deficit, with the aim of reaching a structural balance of 0.5% of GDP by the end of the Government's term in office without resorting to austerity measures. The tax reform, led by Minister of Finance Pierre Gramegna, which is scheduled to come into force in 2017, will result in annual losses of €400m.–€500m. for the Government. However, it will not affect the significant measures to promote employment, vocational training and education, matters which are still high on the agenda for social dialogue and are the focus of ongoing discussions within the Standing Committee for Work and Employment and the Economic Committee (*Comité de Conjoncture*).

The 'Digital Lëtzebuerg' strategy is turning Luxembourg into a 'smart nation'. This strategy consolidates ICT as a field of excellence for the economy and encourages the creation of start-ups in the areas of e-commerce, digital content, cloud computing, big data and e-skills. Particular efforts are being made to digitize government services in a move towards greater transparency and access to information (e.g. the 'eGovernment' and 'open government' concepts), and to boost innovation in the financial sector. An economic diversification strategy to create jobs is focusing primarily on the creative sector (the audiovisual and space industries), energy efficiency and sustainable development.

The Government is also targeting the development and diversification of the financial sector—a traditional mainstay of the Luxembourg economy—in terms of both activities and geographical markets. In accordance with the requirements of Banking Union, the regulatory and macro-prudential super-

vision framework has been overhauled, with a reform of the Luxembourg Deposit Guarantee Association, a revision of the responsibilities and interactions between the BCL and the CSSF, and the introduction of cash controls under the Single Supervisory Mechanism. The *Haut Comité de la Place Financière* offers a forum for dialogue between stakeholders from the financial centre and legislative oversight bodies. Efforts to boost fiscal transparency came to fruition in October 2015 when OECD's Global Forum deemed that Luxembourg was 'largely compliant' with international standards and the country was removed from international 'grey' lists.

To finalize the adoption of a new constitution, a referendum was held on 7 June 2015 in which people were asked to vote on three major issues: the right to vote in national elections for foreigners living in the country for more than 10 years; lowering the voting age to 16 years; and limiting the length of political terms of office. Although the negative result did not compromise the stability of the political regime, the overwhelming—and unexpected—rejection of the Government's proposals weakened the ruling coalition and strengthened support for the opposition CSV; this could hinder the adoption of future reforms which require a consensus-based approach among all parties.

European policy tends to be an area of general consensus in Luxembourg, and this was reflected when the country assumed the 12th presidency of the Council of the European Union in the second half of 2015. The Luxembourg Presidency was faced with two major issues—the worsening refugee crisis and the rise of terrorism following the Paris attacks on 13 November—to which it offered specific answers. Despite these particular circumstances, it was able to implement its 'Europe for Citizens' work programme, with innovative measures in the area of social governance, the digital economy and development policy. A political agreement was reached between the European Parliament and the European Commission for an Interinstitutional Agreement on Better Law-Making, which resulted in 34 issues being concluded under the co-decision procedure (including the EU's 2016 budget, the reform of the EU Court of Justice, a European data system for air passengers and the 'data protection' package). Luxembourg represented the EU at the UN Climate Change Conference (COP21), held in Paris, France, at the end of 2015, which led to the first binding global agreement on climate change. As well as its expertise in mediation and compromise, the Luxembourg presidency was notable for its organizational efficiency, with the country's diplomatic service, expertly led by Minister of Foreign and European Affairs Jean Asselborn, playing a major role. Some 1,503 formal meetings were held in Brussels, Belgium, including 49 Council meetings and nine extraordinary sessions. The 262 events held in Luxembourg were attended by 22,644 participants and 6,875 delegations.

TOWARDS A 'THIRD INDUSTRIAL REVOLUTION'

Given its specific characteristics, Luxembourg faces a considerable strategic challenge if it is to guarantee its future in a globalized economic and energy environment. It needs to diversify its economy while safeguarding the competitiveness of its financial sector and the long-term sustainability of the Luxembourg social model, characterized by a high standard of living, high employment and a good level of social cohesion. The country's ageing population and the related welfare expenditure could jeopardize the long-term viability of its public finances.

Under the Europe 2020 strategy, the country has set itself ambitious national objectives for 'smart, sustainable and inclusive' growth and has identified innovation as its driving force. The consolidation of a knowledge-based economy has become a major political priority. Between 2000 and 2014 investment in public research increased five-fold, with one of the Government's key projects being the *Cité des Sciences* in Belval. This multidisciplinary, multi-sector platform houses nearly all of the country's higher education, research and innovation activities, as well as innovative private companies such as the Technoport and the House of BioHealth.

The main player in public research is the University of Luxembourg, established in 2003, an institution with a multi-

lingual, interdisciplinary approach. With three faculties, three interdisciplinary centres, 1,132 teaching staff and researchers and 6,172 students from 114 different countries, it has been recognized as one of the world's top 15 young universities. It is renowned for its expertise in ICT, biomedicine, financial technology, physics and engineering, as well as learning science, law and management. For the period 2014–17 the Government allocated the University of Luxembourg €590.8m. out of a total investment of €1,155.8m. in research and higher education. Some €324.8m. went to the public research centres and €240.2m. to programmes and instruments under the National Research Fund.

In the private sector, however, the opposite pattern can be seen, with a sharp drop in investment (which represented just 0.7% of GDP in 2014, compared with 1.5% in 2000). This can be explained by a decline in the industrial base and low investment in the financial sector as well as by a lack of co-operation between public research bodies and the business sector. The recent synergistic reform of the National Research Fund and the three public research centres (which specialize in health, science and technology, and socio-economic research), the new system of governance for public research via multiannual performance contracts that make funding dependent on the achievement of specific scientific targets (e.g. the number of patents, spin-offs or prototypes, income from the sale of licences, etc.), new funding instruments via public-private partnerships and participation in the Horizon 2020 European programme should help to strengthen the critical mass and relevance of public research. Luxembourg is therefore consolidating its growth by investing in the intangible dimension of productivity: education, research and innovation. The diversification of the economy involves identifying niche skills and specializing in high-value-added activities such as technology-intensive industries and knowledge-intensive services, especially in the fields of computer science, intellectual property, consultancy, telecommunications, logistics and infrastructures. The Luxembourg Cluster Initiative, led by Luxinnovat, has given rise to the BioHealth Cluster, the crossborder Materials & Production Technologies Cluster, the EcoInnovation Cluster, the ICT Cluster (supported by the 'Digital Lëtzebuerg' strategy) and the Space Cluster.

It should be noted that Luxembourg has tripled its budget for space technology over the past five years; this sector plays a major role in the country's economy, representing 1.82% of GDP. A member of the European Space Agency (ESA) since 2004, Luxembourg has expressed its wish to establish its own space agency, as recently announced by the Deputy Prime Minister and Minister of the Economy, Etienne Schneider. The Government, keen to consolidate the country's position as a European centre for the exploration and exploitation of space assets, has recently launched the SpaceResources.lu initiative, which aims to boost economic growth and provide new prospects for space exploration. With a dedicated legislative and regulatory framework that offer legal safeguards concerning the ownership of space-based resources, as well as a specific budget, this initiative will pave the way for a 'new space' industry, providing a basis for access to mineral resources in the earth's orbit and beyond. By hosting the next generation of the space industry, Luxembourg, with its 30 years of experience in groundbreaking space activities, is consolidating its appeal. This will give the country a key role in boosting co-operation between the EU and the ESA and their member

states, and enable it to establish its position at the forefront of the development of an ambitious European space policy.

In 2015, under the leadership of US economist Jeremy Rifkin, Luxembourg launched a major debate on a 'third industrial revolution' with the aim of establishing a new long-term Luxembourg economic model based on the convergence of information and communication technologies, energy and transport within a smart network. This role of Luxembourg as a laboratory for a knowledge-based, sharing economy further boosts the country's image as a 'smart nation'.

CONCLUSION

Luxembourg's economy has come a long way since the Second World War, especially in recent years. The once bipolar agricultural/industrial society has become a competitive society largely based on knowledge-intensive services, characterized by high-performing human capital, political stability, prosperity and a strong welfare system. The country is a driving force for the Greater Region in economic terms. Among the key growth factors for Luxembourg, five can be identified as particularly important: the country's integration into larger economic areas, the systematic development of infrastructures, a permanently available workforce (through migration and crossborder workers), the existence of growth niches and high-value-added economic diversification (starting with the iron and steel industry, moving into the financial sector and arriving today at a service- and knowledge-based economy), and a high level of social protection. The country's proactive political leadership, a source of long-term continuity, has turned exogenous challenges into opportunities, integrating them into a creative economic policy. It was this approach that enabled Luxembourg's international financial centre to emerge in the early 1960s, aided by legislative and regulatory provisions in the USA and Germany; to become a 'laboratory' for a common European currency following the 1970 Werner Report; and to specialize in private banking in the wake of the debt crisis in Latin American countries in the early 1980s. The stability provided by the country's many long-standing Prime Ministers, leaders of successive coalition governments of varying compositions, has enabled the development of a sustainable and highly specific 'ordoliberal' model based on symbiosis between free competition and institutional order, with a strong social backbone. Within Luxembourg's long-term strategic vision, the economy has been the main area on which political platforms have converged, underpinned by two pillars: a balanced approach and a culture based on consensus and peaceful labour relations. The 'Luxembourg consultation model' and Luxembourg's specific brand of social democracy largely reflect this: agreement is reached between the 'social partners' (within the tripartite and the Economic and Social Council) before legislation is adopted by the Chamber of Deputies, thereby creating an environment conducive to social solidarity where any potential disagreements can be identified and resolved in advance. The country has consolidated its national identity by opening itself up to the international community. Looking to the future, if Luxembourg is to safeguard its welfare state and boost competitiveness, it will have to tackle three recurrent issues: an ageing population, unemployment (especially among young people and over the long term) and the sustainability of the social security system.