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" **Dear readers,**

Luxembourg is committed to nurturing an environment where companies can generate value from data in a manner that guarantees data protection and personal privacy.

Over the past two decades, the country has invested in building the data economy. Our objective is to put in place a fully integrated data value chain that combines Luxembourg's datacentres, high-performance computer and national data exchange platform with our expertise in cybersecurity and our skills and talents in the fields of research, cloud computing and supercomputing.

In this edition of Crossroads Magazine, you will discover key initiatives and companies that drive our development forward. Please feel free to reach out if you would like to join our efforts to build the data economy of tomorrow.

Mario Grotz, Director General for Industry, New Technologies and Research at the Ministry of the Economy
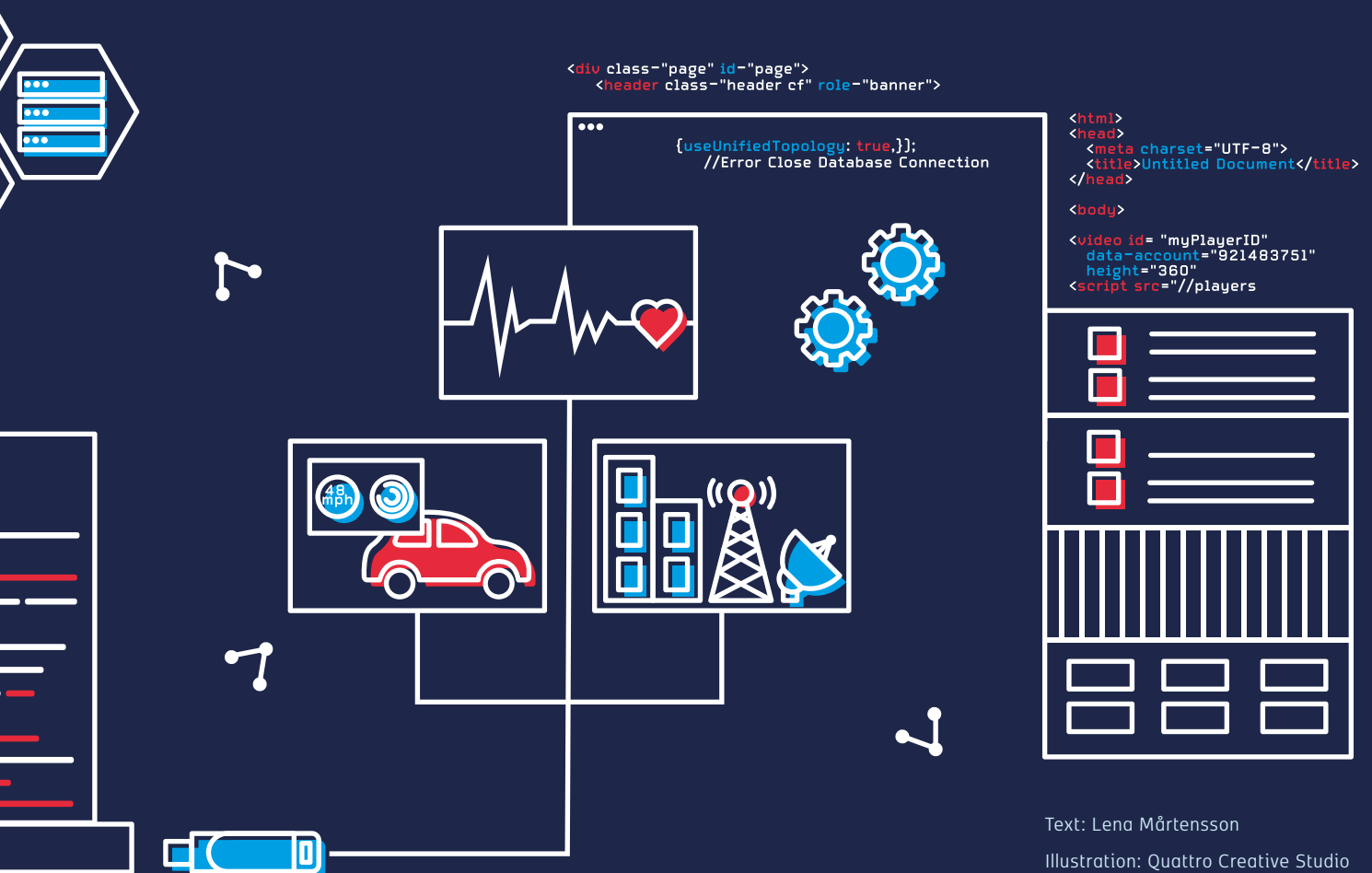
Unlocking the value of data

Data is an increasingly valuable resource. Luxembourg pursues an ambitious strategy to build a data economy that unlocks the immense value of this asset. Capitalising on its track record as an industrial and financial centre and a hub of the European Union, the country is developing an economy where the use of data drives innovation and contributes to the UN's sustainable development goals.

Luxembourg's ambition is to be qualified as Europe's most trusted and connected data economy. The country is an anchor of stability and a guardian of European values, as well as a centre of innovation and a magnet for talent, investors and entrepreneurs. It strives to create a marketplace that combines efficient data protection with access to world-class technologies to serve as a springboard to and within the European market.

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Text: Lena Mårtensson

Illustration: Quattro Creative Studio

A reliable partner for expanding the data economy

We spoke to the Luxembourg Minister of the Economy, SMEs, Energy and Tourism, Lex Delles, about Luxembourg's progress towards becoming a leading data economy.

Why is it so important for Luxembourg to become a leading data economy?

Lex Delles: Data is a crucial driver of innovation, economic growth and societal development. The amount of data will continue to grow rapidly, and as the world increasingly relies on digital technologies, the ability to efficiently manage, analyse and utilise data is essential for competitiveness.

The availability of large, high-quality datasets enables the deployment of data-based solutions, including artificial intelligence (AI) applications. Recent and ongoing developments in fields such as large language models, generative AI and explainable AI clearly indicate that all economic players will be impacted. We expect to see AI applications in different sectors such as cybersecurity, mobility, energy, finance and healthcare in the near future, on the national as well as on the European and international scale.

In this context, secure data management forms the backbone of a robust and trustworthy AI ecosystem. It is essential for ensuring that AI systems operate on reliable, compliant and ethically sourced data while maintaining privacy, security and legal as well as regulatory compliance.

By positioning Luxembourg as a leader in the data ecosystem, we aim to attract high-tech industries, foster innovation and create high-value jobs, thereby ensuring long-term prosperity and resilience.

On what foundation from the past are you building the strategy to achieve this ambition?

Luxembourg has a solid legacy of economic diversification and innovation. Once a leading steel producer, the country has been transformed into a diversified, service-based economy and a global financial hub.

This evolution required the development of a robust infrastructure, a highly skilled workforce and a pro-business environment. The expertise acquired in data management and security, combined with our investments in digital infrastructure, our constant drive for innovation as well as our commitment to regulatory excellence, today form the foundation for our data economy ambitions.

These ambitions are also complementary to and aligned with our efforts to maintain the competitiveness of the national economy through innovation. We focus in particular on key sectors ranging from finance and space to mobility, energy and healthcare.

Lex Delles,
Minister of the Economy, SMEs, Energy and Tourism

Luxembourg has invested heavily to foster a flourishing data economy. What do you consider as the most important achievements so far?

Key initiatives include the deployment of optical fibre across the country, placing Luxembourg among the most connected countries in the world. The development of high-performance computing facilities, such as the business-oriented supercomputer MeluXina, and the establishment of the Luxembourg House of Financial Technology (LHoFT), also helped drive innovation. Earlier investments in secure, state-of-the-art datacentres and the creation of the national innovation agency, Luxinnovation, were also pivotal. These achievements have positioned Luxembourg as a prime location for data-intensive businesses and research.

Several services and initiatives are put in place to encourage the use of this state-of-the-art infrastructure by a wide range of actors. One example is the thematic calls for research projects launched to build expertise and explore the development of data and AI-based solutions for specific use cases.

What are Luxembourg's main assets in the field of data?

The world-class digital infrastructure is of course a cornerstone, but I would also like to highlight our political stability and highly skilled, multilingual workforce. Luxembourg's strategic location in the heart of Europe, combined with our advanced regulatory framework for data protection and cybersecurity, further enhances our appeal.

Additionally, our strong commitment to fostering innovation through public-private partnerships and research initiatives contributes to the supportive ecosystem for data-driven enterprises.

> "**Luxembourg aims to be a key player in the European data economy.**

The cross-border dimension is always essential for Luxembourg. What role can the country play in the European data economy?

Luxembourg aims to be a key player in the European data economy by acting as a hub for cross-border data flows and collaboration. We contribute with our expertise in data security, our advanced digital infrastructure and our role in initiatives such as GAIA-X, a European initiative aimed at developing a federated and secure data infrastructure. By promoting interoperability and data sharing across borders, we support the creation of a unified digital market that enhances Europe's global competitiveness.

Why are initiatives fostering internationally interoperable data so important?

Initiatives like GAIA-X and CLINNOVA, an international project focused on enabling precision medicine through data federation, standardisation and interoperability, are crucial because they promote the development of a secure, sovereign and interoperable data infrastructure that can be trusted across borders.

For a small, open country like ours, interoperability is always key. These initiatives facilitate collaboration and innovation by ensuring that data can be seamlessly shared and utilised, driving progress in areas such as healthcare, research and industry. They also help safeguard data sovereignty and enhance the competitive edge of European businesses on a global scale.

This type of transversal initiative – whether sector-agnostic like GAIA-X or domain-specific such as CLINNOVA – foster the creation of synergies between different parties concerned by enabling and facilitating data sharing. The resulting increase in accessible high-quality datasets forms the starting point for developing innovative AI-based solutions by both the academic and the industrial communities.

What role can Luxembourg play in data collaborations with countries outside Europe?

Luxembourg can serve as an experienced and reliable partner in international data collaborations. Our technological expertise and secure datacentres, combined with our deep knowledge of

regulatory frameworks, make us an ideal location for hosting and managing sensitive data.

By facilitating cross-border data initiatives, we can help bridge gaps between different regulatory environments, promote global standards for data interoperability and drive international research and innovation projects. Luxembourg can also play an important role in guaranteeing European sovereignty.

What are the next important steps for Luxembourg to further develop its data economy?

We will continue to invest in cutting-edge digital infrastructure and foster a culture of innovation. We are currently preparing to set up a next-generation supercomputer that will be particularly suited for the training, validation and inference of AI models. In line with our general sustainability efforts, state-of-the-art technology will be used to guarantee minimised environmental impacts. LuxProvide, the company in charge of MeluXina, will host one of the first quantum computers in the EU.

Our long-term vision is to create a dynamic and resilient data economy that not only supports local businesses, but also positions Luxembourg as a leader in digital transformation. The implementation of AI-based solutions in sectors where exceptionally significant benefits are expected, will be explored. These include sectors which are particularly well aligned with the national economy and our diversification strategies, such as finance and space, but also others that are crucial for the welfare of the broader society, like energy and healthcare.

I envision a future where Luxembourg leverages data to improve public services, empower businesses and enhance the quality of life for its citizens, all while maintaining the highest standards of data security and ethical use.

"**We will continue to invest in cutting-edge digital infrastructure and foster a culture of innovation.**
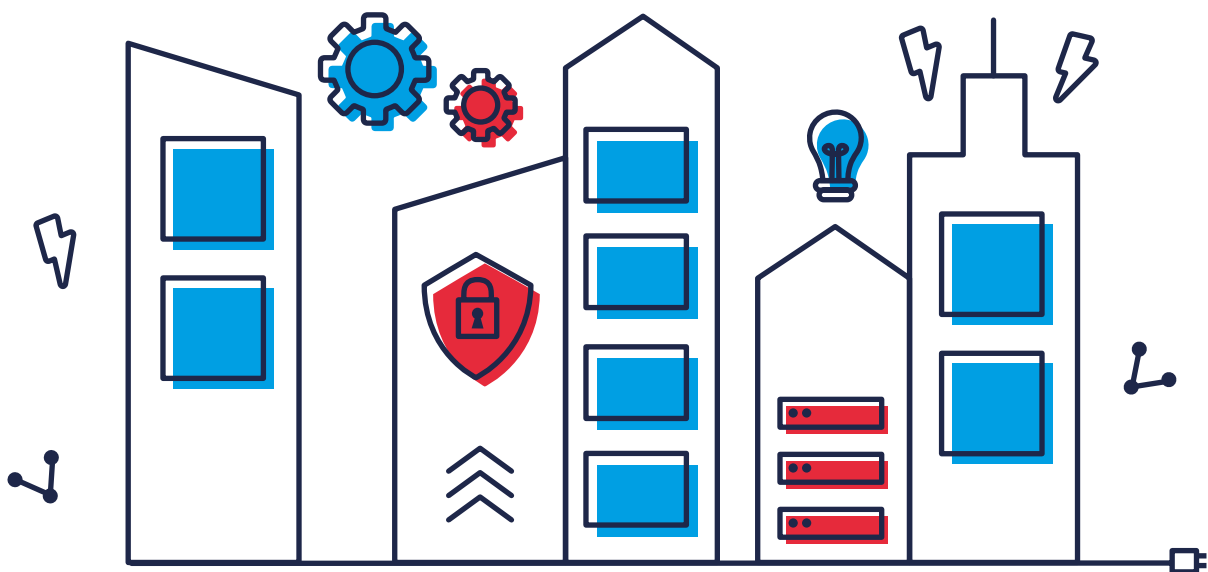
Text: Lena Mårtensson

Photo: Jessica Theis

Foundations of a robust data economy

Luxembourg is creating a safe environment where data-driven projects can thrive. Ecosystem players are enhancing supercomputing access for small companies, training future HPC experts, fortifying public data protection and facilitating secondary data use.

Texts: Jean-Michel Gaudron and Abigail Okorodus

Value creation from secondary data

The Luxembourg National Data Service (LNDS) aims to facilitate the responsible re-use of public-sector data by public and private entities. "We offer know-how, build capabilities and provide tools, infrastructure and data services. Our objective is to prepare data for secondary use in a trustable way," says CEO Bert Verdonck.

The LNDS provides guidance for accessing necessary data, streamlining access procedures. An initial consultation helps to determine the best way forward. The organisation also ensures data quality and facilitates knowledge sharing. It currently supports over 70 data projects in different fields. "Our approach is quite unique on the international level: while initiatives in other countries tend to address this topic sector by sector, we target all sectors and are supported by several government ministries," adds Mr Verdonck.
lnds.lu

HPC access to empower startups and SMEs

MeluXina, Luxembourg's supercomputer operated by LuxProvide, excels in data processing speed and is accessible to startups and SMEs. Through the "Initiate" and "Cashback 80%" programmes, smaller entities that traditionally find it harder to afford or utilise these resources are provided with the support needed to leverage supercomputing capabilities for their projects. Filipe Pais, Chief Customer Success Officer at LuxProvide says, "our goal is to democratise access to supercomputing."

"Initiate" offers startups from across the world compute power, storage and expert guidance for high-performance computing (HPC) projects, enabling them to develop and test ideas without financial or other operational constraints.

"Cashback 80%" supports Luxembourg-based startups and SMEs by reimbursing 80% of HPC usage costs. "For every euro spent, they receive 80 cents back," notes Mr Pais. Since its launch in late 2023, over 20 startups have benefited from "Initiate," with many expected to move to the "Cashback 80%" programme.
luxprovide.lu

Trust-worthy data processing standards

Luxembourg implements and promotes ethical data standards. "While the EU General Data Protection Regulation provides overarching rules, data use frameworks are multilayered," explains Max Spielmann, Government Commissioner for Data Protection with the Luxembourg State. "Our responsibilities involve ensuring the protection of personal data and privacy rights in the context of processing operations carried out by public sector bodies."

EU provisions on personal data processing, implemented into national law in 2018, are complemented by specific frameworks like the European regulation on the European Health Data Space and the Data Governance Act on the secondary use of data.

A key initiative is the "once-only" principle, which is part of a legislative proposal recently presented to the Luxembourg parliament. "It simplifies procedures and reduces the administrative burden for citizens, businesses and state administrations, while enhancing data protection by limiting unnecessary data collection and storage."

Additionally, this draft law sets conditions for the lawful secondary use of data. "Altogether these measures constitute a strong set of safeguards. Luxembourg's stable economic and research environment, and its state-of-the-art facilities also make it a very attractive destination for data-centric entities," concludes Mr Spielmann.

Disconnected sovereign cloud

Clarence, a joint venture between LuxConnect, Tier IV data centre operator and optic fibre provider, and the telephony and ICT service provider Proximus, offers Europe's first disconnected sovereign cloud solution. By being fully isolated from the internet, it eliminates risks present in online environments.

"Clarence is a fully Luxembourgish solution, with management, engineering and operations handled entirely by Luxembourg entities. By design, the data of the clients is fully secured and protected from any external misconduct," asserts Pascal Rogiest, General Manager of Clarence.

The platform leverages Google's technology stack but operates independently from Google. "We benefit from all the engineering intelligence, including the AI tools of Google but within an isolated environment. This allows a massive set of business applications for clients under their full control," he adds. A significant set of customers to whom the organisation is discussing with are precisely international companies that wish to come or be more present in Europe.

"Two key elements often attract international players. One is the de-facto compliance with European regulations, which they cannot avoid if they want to be active in the region. The other is the direct integration into Luxembourg's ecosystem and cloud infrastructure." Clarence enables both.
clarence-cloud.com

A master's degree creating HPC talent

In 2023, the University of Luxembourg launched a Master in High Performance Computing (MHPC) dedicated to the new challenges and needs related to high-performance computers. "In addition to subjects such as artificial intelligence, it covers many other fields such as physics or chemistry that require such computing capabilities to advance science," explains Dr Pierre Talbot, co-director of the MHPC.

With this master's degree, the University of Luxembourg is one of the eight European universities that are members of the EUMaster4HPC consortium, created a year earlier under the impetus of the EuroHPC Joint undertaking, with a view to designing and implementing the first pan-European master's programme dedicated to high-performance computing.

The aim is to create a body of academic knowledge on HPC, based on mobility and the creation of a real community in Europe. MHPC students will continue the two years of training at the University of Luxembourg, which leads to a national diploma. They have the option to do one of the years in another EUMaster4HPC institution, to then hold a double degree with a pan-European dimension.
mhpc.uni.lu.lu

SnT: Excellent science, impactful partnerships

Carlo Duprel & Barbara Grau,
University of Luxembourg

The university's Interdisciplinary Centre for Security, Reliability and Trust (SnT) fuels Luxembourg's data economy with science-based solutions to data-related business challenges.
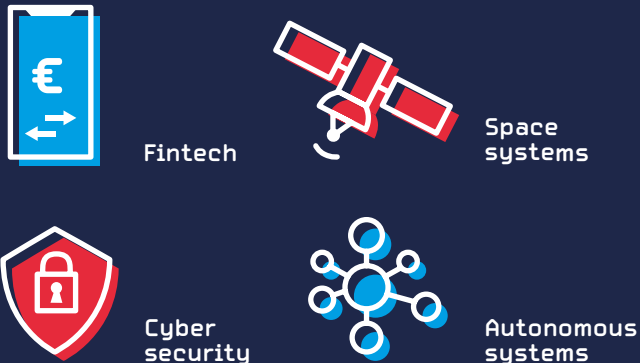
SnT was set up as the University of Luxembourg's first interdisciplinary centre in 2009 with a clear vision: to play an instrumental role in Luxembourg by boosting R&D investments leading to economic growth and highly qualified talent.

"Universities are still accused of being isolated ivory towers, and sometimes rightly so. However, the SnT stands out for its strong involvement in the local ecosystem. We combine excellent research – the University of Luxembourg ranks among the world's 150 top universities for computer science and top 10 for software engineering research – with working with industry," underlines Carlo Duprel, the centre's Head of Tech Transfer. The focus research areas, which are fintech, space systems, cybersecurity and autonomous systems, reflect sectors of key strategic importance for the national economy.
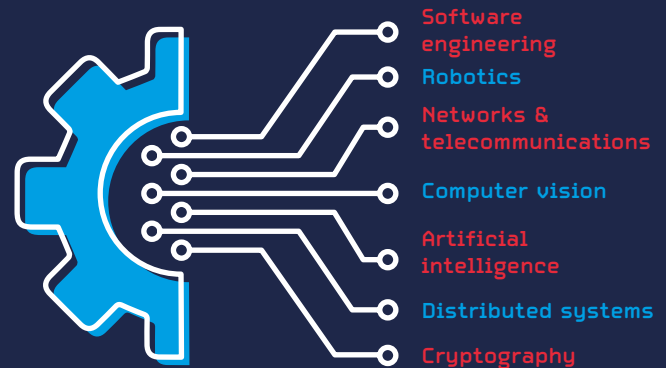
A win-win model for strategic partnerships

SnT's partnership programme, which today includes over 65 partners, is at the heart of this endeavour. Its collaborative, demand-driven research model is based on strategic partnerships that bring added value to researchers and industry partners alike. "While our partners want to solve their business challenges, we want to do market-relevant research resulting in scientific publications," says Dr Duprel. "Our unique model enables us to achieve both. We only engage in collaborations

SnT strategic research areas

€

Fintech

Space systems

Cyber security

Autonomous systems

SnT enabling technologies

Software engineering

Robotics

Networks & telecommunications

Computer vision

Artificial intelligence

Distributed systems

Cryptography

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that have a real scientific interest for us and where we can be of real use to our partners."

The scope of the programme spans from technology concept development to prototype demonstration. "A typical collaborative project lasts three years, and in many cases, our partner companies need only a few additional months to refine the concept before they can commercialise it," explains SnT's Partnership Development Officer, Barbara Grau. She describes the collaboration model as a win-win relationship. "Our partners have access to state-of-the-art technology, high-level expertise and concrete project outcomes. In exchange, they give us access to data and enable us to test our research in real-life environments."

Most projects are based on a 50-50 model where each of the partners carries 50% of the costs and the project results are owned jointly. Many projects receive co-funding from the state or the Luxembourg National Research Fund.

SnT works with different types of partners, ranging from large industrial groups and financial institutions to SMEs, startups and public bodies. Cooperations include, for example, a project with the retail bank BGL BNP Paribas aimed at creating an AI metamodel tool to effectively monitor AI solutions in a fast changing financial, regulatory and economic setting. Another project with the electromechanical solutions developer Cebi Group aimed to implement industry 4.0 solutions in its production line. "Many partnerships are recurrent: as soon as one collaboration comes to an end, our partners want to launch the next one," says Ms Grau.

Developing talent

This type of successful collaboration does not happen by coincidence. "We take great care to employ people – professors as well as PhD students – who have a genuine desire to work with industry," Dr Duprel points out. The PhD students involved in joint R&D projects typically spend half their time at SnT and the other half at the partner's premises, which contributes to giving them an in-depth understanding of business needs.

"The PhD students, who work under the supervision of more experienced researchers, are a main success factor," says Ms Grau. "We hire a PhD candidate for each project with a profile that matches the specific R&D topics. The selection process is done together with the partner."

"Today we have around 200 PhD students from over 50 different countries, half of whom are working in collaborative projects. Around 40% of them stay in Luxembourg. In many cases, the companies are so happy with the PhD students that they recruit them once the project ends and they have finished their PhD," says Dr Duprel. "This means that SnT also contributes to the Luxembourg data economy with a steady influx of highly skilled talents."

Text: Lena Mårtensson

Photo: Jessica Theis

Infographic: Quattro Creative Studio

A data economy built on trust

Internationally renowned for its forward-thinking cybersecurity polices, Luxembourg is developing an open data economy founded on trust.

François Thill, Ministry of the Economy
& Pascal Steichen, Luxembourg House of Cybersecurity

We also see cybersecurity as an economic success factor.

Cybersecurity is often mainly considered as a defence matter, but Luxembourg has a different point of view. "We also see cybersecurity as an economic success factor. To support businesses as well as public bodies, we have developed a very interesting setup of infrastructure and services that you rarely find elsewhere, if at all," says François Thill, Director Cybersecurity and Digital Technologies at the Ministry of the Economy.

One unique element is the capacity to keep internet data transfers between Luxembourg entities within the national territory. Mr Thill points out that this set-up makes it very difficult for third parties to "eavesdrop" on the data. It also enables the country to protect itself very well against distributed denial-of-service (DDoS) attacks as long as the internet traffic stays within its borders.

A second key point is that many services are running in datacentres with the highest security standard, Tier IV. One example is LuxConnect datacentre which hosts the business-oriented supercomputer, MeluXina. "To my knowledge, this is the only supercomputer that processes data in a Tier IV datacentre, which guarantees an exceptionally high standard of physical security. In addition, such datacentres are greatly resilient in terms of connectivity, energy and cooling."

This high level of trust is crucial for the data economy to prosper. "Companies are often very reluctant to transfer their data to any type of third party as it includes information of great value. They will only be willing to work with a data exchange platform, supercomputer or other service if they are sure that their data is protected in the same way as if it would be if it remained on their premises," Mr Thill points out.

Cybersecurity dataspace

Another component is the seamless synergy and cooperation between different players. Luxembourg was among the first countries to map all the actors in its cybersecurity ecosystem, an exercise that is now being replicated in many other countries. "Knowing the companies and having a clear view of what is going on is essential for building relevant strategies," says Pascal Steichen, CEO of the Luxembourg House of Cybersecurity. He is also the chair of the European Cybersecurity Competence Centre (ECCC), in charge of coordinating, harmonising and synchronising cybersecurity research and innovation activities in the EU.

Mr Steichen also underlines Luxembourg's involvement in the development of methods, tools and mechanisms that foster information sharing in the field. The internationally recognised threat sharing platform "MISP" operates from Luxembourg and has proven that companies are willing to contribute with data to collaborative initiatives. The next step is now to further fuel the data economy via a pioneering open cybersecurity dataspace.

"Antivirus, firewall and intrusion detection programmes require constantly updated information about current threats and vulnerabilities from all over the world. Such information can be obtained from specialised providers, but at a very high cost that makes it inaccessible to 80% of businesses, especially small and medium-sized companies," says Mr Thill. "We are going to build a collaborative dataspace where such information is shared and available for free to anyone interested in developing or using open-source cybersecurity tools. We hope that this will result in affordable solutions for all types of companies. The data can also be used for research purposes."

Welcoming innovative businesses

The country is welcoming international cybersecurity companies that fit into its ecosystem. "The managed security service companies that are already here are overwhelmed by demand," Mr Thill explains. "We also want to attract more innovative businesses that can develop solutions for SMEs." The focus is mainly on companies from European countries, but not only. "Japan and South Korea are interesting as their personal data protection regulations are considered equivalent to those of the EU, which means that processing of European data is allowed and trusted. This makes cooperation very easy."
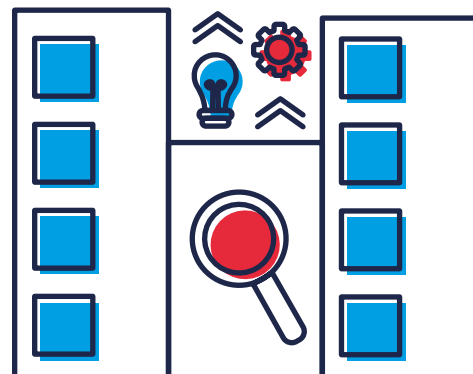
Text: Lena Mårtensson
Photo: Jessica Theis

Implementing cross-border quantum key distribution

A Luxembourg-led partnership is at the forefront of implementing an end-to-end network, secured with quantum key distribution, in a cross-border context.

In the next few years, quantum computing is expected to revolutionise the use of data, outperforming even the most powerful classical computers. It will also challenge the traditional cryptographic techniques used to ensure cybersecurity. "It is still difficult to imagine all the consequences of combining artificial intelligence and quantum computing, but we will probably have some surprises," says Mohamed Ourdane, who heads the cybersecurity department at POST Luxembourg. "It's very important for us to be prepared, not only in terms of technologies but also in terms of skills."

POST plays a key role in Luxembourg's data economy as the main telecommunications infrastructure and ICT service provider. The company has extensive experience of developing cybersecurity solutions for securing its own networks as well as for clients in Luxembourg and abroad. To take this activity to the next level, the company decided in 2022 to join a project aimed at developing a next-generation cybersecurity solution, based on quantum key distribution (QKD).

Secure terrestrial and space links

The use of quantum keys makes it possible to verify the integrity of digital communications. However, it requires specifically dedicated fibre lines and hybrid satellite-terrestrial networks for long-distance communications (secure nodes). Mr Ourdane explains that the first step of the project is to put a terrestrial network in place. "We have deployed a link between Windhof in Luxembourg and Redu in Belgium, complete with QKD boxes that generate the keys used to protect the transport layer and for encryption schemes. The boxes are sourced from the South Korea-owned company ID Quantique, but the system architecture can work with appliances from other providers as well using a specific key management system."

The second phase is to extend the key exchange network to Singapore by building a secure node in space. "We will demonstrate that we are able to build a secure system for exchanging quantum-generated keys, extended to Asia via satellite," Mr Ourdane comments.

The European Space Agency-funded project is managed by Starion Luxembourg, a provider of system engineering for space, defence and critical infrastructure. Researchers from the University of Luxembourg's Interdisciplinary Centre for Security, Reliability and Trust (SnT) are developing the

secure appliance that will use the quantum keys, while POST Luxembourg sets up the overall architecture and deploys the terrestrial links. HITEC Luxembourg will oversee the setup of the optical ground station that will be implemented on the roof of the Windhof datacentre. The consortium also includes Canadian quantum-safe cybersecurity pioneer evolutionQ, in charge of providing the key management system, and SpeQtral, a Singapore-based company dealing with space-based transmission to create a quantum key distribution communication network using the satellite link.

Mohamed Ourdane,
POST Luxembourg

Strategic preparations for the future

For Mr Ourdane, the QKD project is of strategic importance not only for Luxembourg, but for Europe as well. "As a central ICT hub in the EU and beyond, it is important for Luxembourg to be a frontliner in the data economy. Implementing quantum computing and security is a logical continuation of the strategy that previously resulted in the business-oriented supercomputer MeluXina, for example. For Europe, it is important to develop technical sovereignty as much as possible, not least in the field of cybersecurity."

He also underlines how crucial the project is for POST. "In today's digital society, a whole country can get stuck if telecommunications fail. As a key infrastructure provider, we have to be prepared to deal with any future threat that may appear."

According to Mr Ourdane, innovation should be at the heart of the strategy of all businesses. "Even traditional and public or state-owned enterprises must innovate and dare to venture into new areas outside their traditional services. A high-profile project like this one is also an excellent way to attract and retain talent – a key success factor for the future," he concludes.

> **It's very important for us to be prepared, not only in terms of technologies but also in terms of skills.**

Text: Lena Mårtensson
Photo: Jessica Theis

Marta Duponselle & Michael Mossal,
NTT DATA Luxembourg

Cloud-native solutions for the power of data

Leading IT infrastructure and services company NTT DATA, headquartered in Japan, plays a key role in Luxembourg's efforts to build dataspaces for secure and compliant data exchange.

NTT DATA came to Luxembourg in 2010 and today, in addition to serving the local market, it is running innovation projects on the broader European scene. Examples of high-profile initiatives include the race management system built for the Isle of Man TT races, and the renowned AVATAR project aimed at building a complete digital twin of an airplane. "We make Luxembourg shine as an innovation hub," emphasises Marketing Director Marta Duponselle.

A common denominator of these and other projects is that they are fully based on cloud native service design and can run in private and public cloud environments. "Unstructured data is only valuable when you are able to transform it into meaningful information, notably by using large language modules to leverage artificial intelligence," says Michael Mossal, Senior Digital Transformation Director at NTT DATA Luxembourg. "A dedicated ecosystem – a dataspace – is

then the most suitable solution for defining how to store the transformed, use-case specific and structured data in a way that is compliant with data protection legislation."

Managing large-scale COVID-19 testing

When the COVID-19 pandemic hit in 2020, Luxembourg decided to put in place a voluntary large-scale testing of the entire population and cross-border workers, aimed at detecting positive cases early. Laboratoires Réunis, a private laboratory for medical analyses, took the lead and contacted NTT to develop the IT solution needed.

"We had six weeks to deploy a cloud native application, connecting a whole range of different systems including healthcare processes and the repository of citizen data, and make it able to send the test results to citizens' mobiles," Mr Mossal recalls. "We pointed out that this could only be done through an innovative, cloud-native solution, and that there was no regulation available in Luxembourg supporting us for doing this in the public cloud. Due to the urgency of the situation, we still went ahead, with the clear commitment to bring in experts to cope with the local regulation as soon as the first version was out. Human lives were at stake!"

The system developed was a huge success. For NTT DATA, it opened the door for further work in the health sector. After supporting the development of a digital platform and data strategy for Luxembourg hospital Hôpitaux Robert Schuman (HRS), the company and HRS developed two use cases for the government on how to improve heart disease and stroke care through 5G-transmitted data. "As no real patient data was required in this research project, we could leverage public cloud services. After successfully delivering another award-winning project, several doctors wanted to see our system in production, but once again there was no regulation allowing us to handle real health data in a similar production environment."

Luxembourg dataspace for health

This encouraged NTT DATA to join forces with the HRS, the Luxembourg Institute of Health, the University of Luxembourg, Agence eSanté, the Luxembourg National Data Service (LNDS) and Luxinnovation to develop a pioneering federated dataspace for secure and compliant health data exchange while fully adhering to EU regulations. "The consortium is

building a federated dataspace where national data related to our next two use cases, diabetes and oncology, will be stored and exchanged. Similarly to other European countries, the project defines, for the first time, how health data will be made available for primary and secondary use in the future," explains Mr Mossal. "If researchers want to use this data for research purposes, for example, the LNDS can grant them access for secondary use in a way that fully respects data privacy and local regulations. We are taking local regulations into account, but are also fully aligned with the European Health Data Space (EHDS) to facilitate cross-border data exchange."

The Dataspace4Health project represents a significant step forward in the digital transformation of Luxembourg's healthcare ecosystem. However, the outlook is broader than just health. "The Ministry of the Economy has foreseen this project as a foundation that can be leveraged for other verticals. Further dataspaces for mobility, energy and more can make use of the same concept and rules," Mr Mossal underlines.

Global data exchange

While the focus is primarily European, NTT DATA Luxembourg is also working with NTT DATA in Japan and the University of Tokyo on the secure and regulated health data exchange between Luxembourg and Japan. "We are in early stages, but Japan and Europe have very similar approaches when it comes to data interoperability and exchange. Dataspaces in both countries have the same underlying foundation, which enables us to work together and exchange data fully in line with European regulations," comments Mr Mossal. "Working from Luxembourg is unique – the country is rarely the first mover, but as it has short decision processes, a great ecosystem, leading research institutes and a forward-looking government, it is very agile and can sometimes leapfrog to come up with truly innovative ideas."
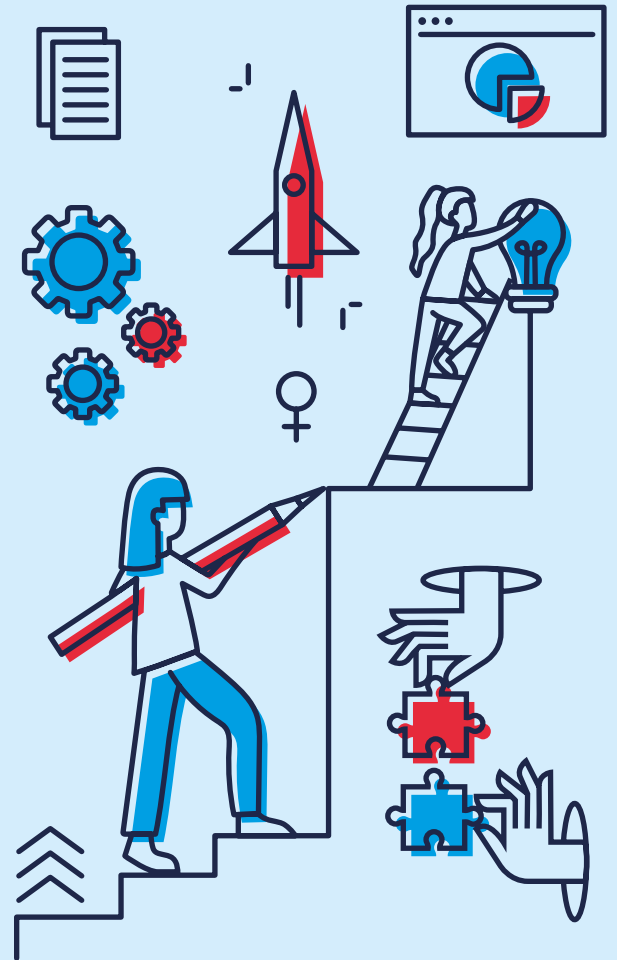
Text: Lena Mårtensson
Photo: Jessica Theis

Start-up corner

Empowering women entrepreneurs

There are still relatively few women entrepreneurs in the world of tech startups. However, initiatives to support them are multiplying and Luxembourg players are actively contributing to the promotion of this diversity.

A report on gender inequality, published in June 2023 by the World Economic Forum, indicated that women hold less than a third of positions in the technology sector. In Luxembourg, this proportion is around 25%. More specifically, startups founded – or co-founded – by women account for some 6% of the country's 550 startups. Globally, only 3% of venture capital investments are for startups founded or co-founded by a woman.

The Luxembourg startup ecosystem provides both financial and managerial support for entrepreneurs. Whether it is for establishing teams, searching for funding or validating the business model, different players (institutions, investors, coaches) are involved to make life easier for startup founders.

In addition to the Fit 4 Start acceleration programme, which provides 20 selected startups each year with 6 months of coaching and mentoring by experts, free access to a co-working space and financial support of up to €150,000, a number of tailor-made services are also offered.

"Better results with women"

Women entrepreneurs are still in minority in this field, even though 3 of the 20 startups in the last edition of Fit 4 Start were created or are led by women. "However, many reports around the world show that when women hold decision-making or management positions within organisations or companies, the results are better," says Sasha Baillie, CEO of Luxinnovation, Luxembourg's national innovation agency. Initiatives exist to empower women entrepreneurs. For example, since 2021, the European Women TechEU pilot programme has been supporting deep-tech startups (those considered to be the most innovative) led by women. In 2023, two entrepreneurs from Luxembourg were among the beneficiaries of this programme.

The fact that Pulse – the new name of the Luxembourg Startups Association – is now chaired by a woman is part of this dynamic. "The players in the startup ecosystem, grouped under the Startup Luxembourg brand, are all committed to stimulating economic development through innovation. Each one represents a vector for transmitting this message and raising awareness of the fact that it is advantageous for the economy and for society in general when women occupy these positions," says Jonas Mercier, Startup Luxembourg Coordinator.

Seeds of Bravery
€20 million to support Ukrainian tech startups

Luxembourg is part of Seeds of Bravery (UASEEDs), an initiative funded by the European Innovation Council (EIC) aimed at integrating Ukrainian tech innovators into European markets. The objective is to strengthen Ukraine's tech landscape, supporting local entrepreneurs for global success.

The programme provides direct financial support to at least 200 Ukrainian deep tech startups, granting each up to €60,000. This funding aims to help them develop a comprehensive business model that will serve as their roadmap and design a growth strategy with clear objectives and milestones. Luxinnovation is in charge of supporting Ukrainian startups' pan-European integration.

Additionally, the EIC offers non-financial support to selected startups, such as business advisory services and networking opportunities. This action makes it possible to strengthen the capacity of Ukrainian innovators to interact with the European innovation ecosystem, access new markets and benefit from European funding instruments.
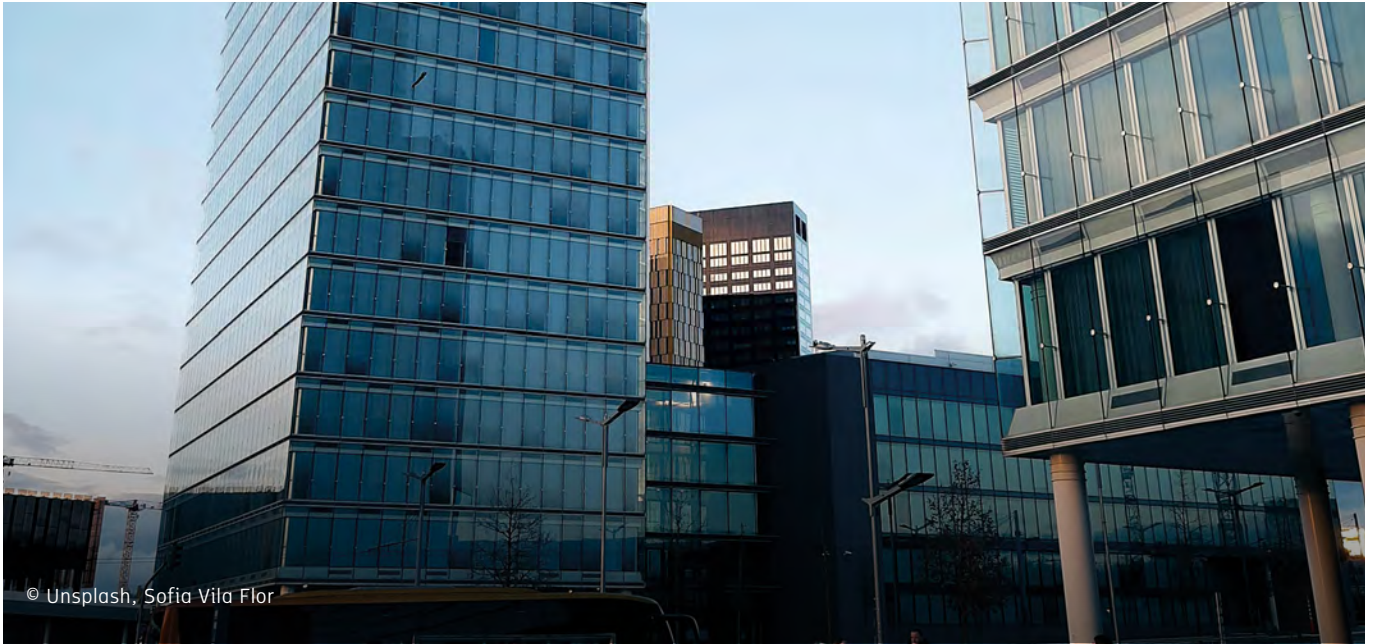
seedsofbravery.eu

> **However, many reports around the world show that when women hold decision-making or management positions within organisations or companies, the results are better.**

Sasha Baillie, CEO of Luxinnovation

Texts: Jean-Michel Gaudron

News

FOREIGN DIRECT INVESTMENT Luxembourg's investor appeal surges

© Unsplash, Sofia Vila Flor

72% of senior executives surveyed by EY plan to invest in Luxembourg within the next year. The country also remains the top destination for FDI projects per capita.

EY released its *2024 Luxembourg Attractiveness Survey* on 13 June 2024. The study examines foreign direct investment (FDI) in Europe and Luxembourg, as well as how (potential) investors perceive the country's competitiveness. The professional services network EY surveyed 150 C-suite executives, with around half already having operations in Luxembourg.

For the third consecutive year, Luxembourg ranked first in the total FDI projects per capita, with 5.67 projects per 100,000 people. It is followed by Cyprus, Portugal and Ireland. France and the UK, despite larger populations, rank sixth and seventh.

Luxembourg has been able to capture the attention of an increasing number of investors. In fact, its attractiveness to investors is at an all-time high, with 72% (up from 46% in the previous survey) of executives planning to invest at some point during the next 12 months. Additionally, 60% of investors believe Luxembourg's attractiveness will increase during the next three years. In the meantime, transforming this enthusiasm into concrete projects is key.

Executives planning to establish operations in Luxembourg are targeting diverse activities: business support services (53%), training centres (40%), sales and marketing offices (39%), R&D (34%), supply chain and logistics (16%), manufacturing (15%), and headquarters (15%).

According to the report, the three main sectors for FDI in Luxembourg currently are: finance (28%), business & professional services (22%), and software/digital & IT services (14%). In terms of activities, business services projects account for 44%, followed by manufacturing (14%) and headquarters (14%).

Olivier Coekelbergs, Country Managing Partner at EY Luxembourg states: "Luxembourg now stands before a prime opportunity to harness this investor optimism. The government's comprehensive national plan, which addresses a spectrum of pertinent issues, demands swift and strategic implementation. We are already witnessing the rollout of several measures."

INVESTMENT

Mobility: Teraki and PonyAI choose Luxembourg…

Two major players in mobility have chosen Luxembourg to establish a relevant presence.

German Teraki has registered a new office from where it plans to expedite market entry for developing AI-based software for autonomous vehicles. The company's expansion into Luxembourg was partly driven by the opportunity to leverage the country's robust and growing automotive and mobility ecosystem.

The California-based mobility company Pony.ai has signed a memorandum of understanding focused on R&D and deployment of autonomous vehicles in Luxembourg. The company chose Luxembourg as its launch pad due to the country's commitment to becoming a hub for autonomous mobility in Europe and its welcoming ecosystem for autonomous vehicles, including a streamlined regulatory environment and strong government support for innovative technologies.

INVESTMENT

… as does Japanese Thermalytica

Thermalytica, a spin-off of the National Institute for Materials Science (NIMS) in Japan, whose technology focuses on enhanced insulation performance adapted for both terrestrial and space applications, has opened a subsidiary in Luxembourg.

"Opening a subsidiary in Luxembourg is another major step for us as we expand into the European market," comments Rudder Wu, co-founder and CTO of Thermalytica. "I am very impressed by the spirit of openness and collaboration that prevails within the Luxembourg startup ecosystem. It made perfect sense for us to embark on our European journey from Luxembourg."

TALENT ATTRACTION

IMD World Talent: Luxembourg on the podium

Luxembourg ranks third in the "IMD World Talent Ranking 2024". The report evaluates 67 economies based on their ability to attract, develop and retain talent. The indicators used include investments in education, quality of life, and the country's attractiveness to foreign talent.

Switzerland, Singapore and Luxembourg dominate the ranking, demonstrating their resilience in talent management despite the current global economic challenges.

FUNDING

€178.59m in Horizon Europe grants awarded

Luxembourg applicants are quite successful across the different pillars of the Horizon Europe programme. The total amount of grants received was €178.59 million at the end of July 2024.

The private sector emerged as the leading recipient, accounting for 54% (€96,67 million). Research centres received 25%, and the higher education sector, represented by the University of Luxembourg, 15%. The predominant sectors in Luxembourg contributing to funding are the digital, industry, and space cluster, followed by the climate, energy, and mobility cluster and the health cluster, respectively.

Luxembourg has shown a consistent increase in proposal success rates in the 2021-2023 period. On average, the proposal success rate of 19.63% is well above the global EU success rate (16%). The country also shows one of the highest numbers of applications per scientist and engineer.

DEFENCE INNOVATION Luxembourg joins NATO's DIANA network

© Unsplash, NASA

Several Luxembourg innovation facilities have been selected to integrate the Defence Innovation Accelerator for the North Atlantic (DIANA) of NATO.

Established in 2022, the DIANA network ensures that the North Atlantic Treaty Organisation (NATO) harnesses the best of dual-use innovation for transatlantic defence and security. This structure provides companies with the resources, networks and guidance necessary to develop cutting-edge technologies to address critical defence and security challenges.

The DIANA network comprises 23 accelerators and 182 test centres spread across the 32 NATO Allies.

In a joint effort by the Luxembourg Directorate of Defence and Luxinnovation, the incubator Technoport will act as the central accelerator site for DIANA in Luxembourg, supported by several test centres: the Luxembourg House of Cybersecurity, the Luxembourg Space Agency, the Space Campus, the Luxembourg Institute of Science and Technology and the Interdisciplinary Centre for Security, Reliability, and Trust (SnT) at the University of Luxembourg.

"We are delighted that the national ecosystem is strengthening its links with NATO. Luxembourg has a lot of expertise to share and we will do our part in maintaining the Alliance's technological edge. Exchanges within DIANA will also enrich our innovators and strengthen transatlantic cooperation. And let us not forget the crucial synergies between DIANA and the Luxembourg domiciled NATO Innovation Fund," explains Luxembourg Minister of Defence Yuriko Backes.

"In the booming innovation ecosystem in Luxembourg, this integration into NATO's DIANA network will put the spotlight on national areas of excellence such as space, data, smart materials, biotechnology and quantum," affirms Sasha Baillie, CEO of Luxinnovation, the national innovation agency.

Buy-in from private players, in particular startups which are the true cradle of innovation, is essential. Maintaining an open dialogue and strengthening public sector engagement with the entire ecosystem are key to success.

"In the current context, it is crucial to link all initiatives to maximise synergies and ensure that all our efforts complement each other. The European Union, NATO and national players must work together," concludes Ms Baillie.

HOUSE OF **STARTUPS**

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POWERING BUSINESS

Sustainable composite materials for vehicles of the future
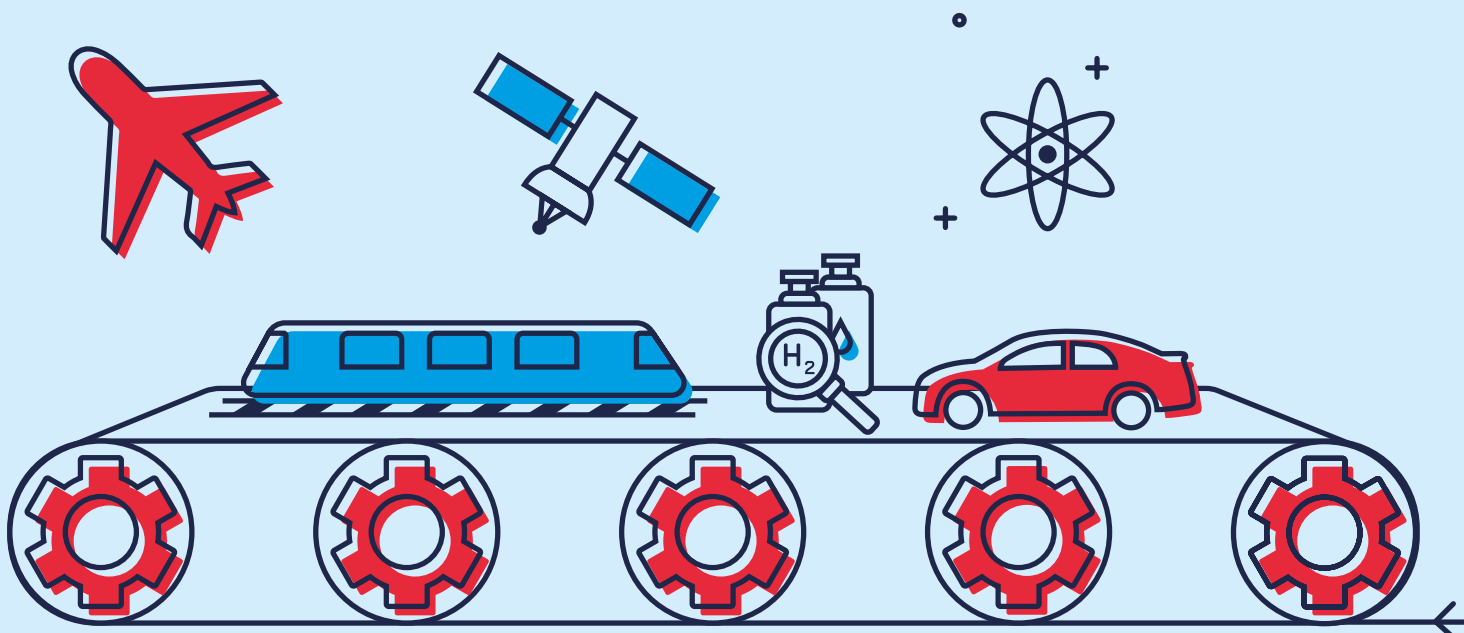
The transport industry plays a key role in society's efforts to reduce greenhouse gas emissions. An essential element for success is the availability of ultra-lightweight, recyclable materials with a low carbon footprint.

The Sustainable Composites Material & Manufacturing (SCMM) Innovation Centre of the Luxembourg institute of Science and Technology (LIST) develops sustainable composite materials to meet the evolving demands of tomorrow's road, rail, space and aeronautic vehicles. The centre cooperates with OEMs and their suppliers around the world to develop demonstrators aligned with their specific requirements and constraints.
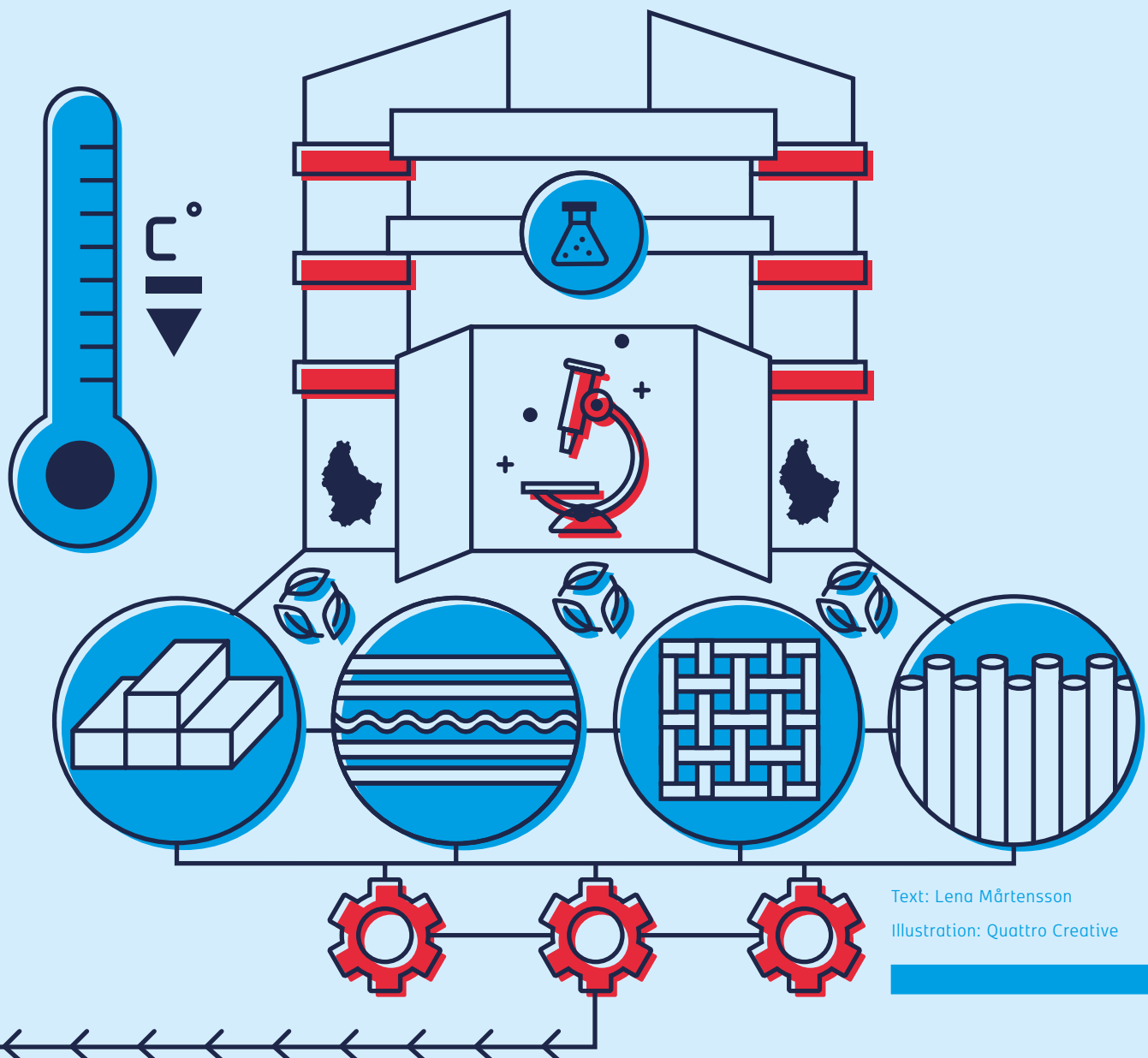
Text: Lena Mårtensson

Illustration: Quattro Creative

Light, natural, recyclable: Innovative materials for mobility

The Luxembourg Institute of Science and Technology creates sustainable composite materials fulfilling the needs of transport equipment manufacturers.

Developing and designing composite materials with a very low carbon footprint that meet the needs of the transport sector is the mission of the Sustainable Composite Materials & Manufacturing (SCMM) Innovation Centre of the Luxembourg Institute of Science and Technology (LIST). The work is carried out in close cooperation with industry partners.

"Our current research agenda is driven by concrete market needs initially defined by three major transport OEMs (original equipment manufacturers): Toyota, Airbus and Thales Alenia Space," explains Thierry Girot, Core Technologies Leader at LIST and the SCMM coordinator. "We are currently expanding our technology portfolio through the addition of new OEMs, like Iveco Group, and tier suppliers active in transport sectors as well as with new members working in the composite value chain. We recently welcomed Kordsa and DowAksa, two major materials suppliers within the composite industry. Our objective is to further develop lightweight, sustainable composite solutions aligned with specific requirements and constraints in terms of costs, production processes and so on."

The SCMM aspires to deliver demonstrators that will be integrated into vehicles. "Our range of demonstrators includes automotive components based on natural fibre composites, sustainable hydrogen tanks for the automotive sector, interior components for the aircraft industry, and lightweight and repairable panels for space applications," says Dr Girot.

Including the entire sustainable composite materials value chain

To build these demonstrators, the team of material experts conducts research and technology development along the entire composites value chain, spanning from raw materials development to manufacturing and end-of-life processing of the components. "Our partners find our value chain approach unique. While developing lightweight and sustainable composite parts, we have in-house capabilities for developing sustainable fibres and fillers as well as chemistry skills enabling us to develop our own innovative resin systems and customised formulations, allowing improved performance, durability and end-of-life recyclability towards full circularity. This unique set of assets attracts a lot of attention from industry," Dr Girot points out.

The focus is on developing biobased composite materials while also using eco-friendly processes that combine low energy consumption with reduced waste and safe chemicals. The researchers work to define how complex composite parts can be disassembled to facilitate the reuse of components at the end of its lifespan.

Work starts at low technology readiness levels, for which the LIST's researchers have their own research agenda including technologies with a higher element of risk. "The SCMM doesn't conduct any blue-sky research: we select and use technologies

that have already been demonstrated, at least at the lab scale, and turn them into solutions that will take industry a step further," says Dr Girot. "One example is natural fibres, a bio-based feedstock already used by the automotive industry for less demanding applications such as panels for the interior of passenger cars. We have been able to demonstrate and patent technologies where the performance of bamboo fibre is much higher and could potentially be used for more demanding applications such as exterior or load bearing applications. LIST is actually at the forefront in this field."

Calling transport OEMs and their suppliers

As the technology readiness levels of the technologies increase and move closer to market application, the cooperation with the SCMM's partners intensifies. "The OEMs set the scene, but it is crucial that we involve their suppliers, who will ultimately produce and sell the components integrating our composite materials. This is why national and international stakeholders such as Euro-Composite, Gradel, DowAksa and Kordsa are part of our initiative. We invite companies worldwide involved in the polymer and composites supply chain – from raw material suppliers to tier suppliers – to contribute with their technologies and be part of shaping and implementing the demonstrators and testing them in relevant conditions," Dr Girot underlines.

Although the SCMM specifically targets the transport sector, the developed technologies can be applied to domains beyond that field. "Our technologies can meet the needs of other industries as well. Anyone interested in cutting-edge composite materials is welcome to contact us to explore how they could apply our solutions."
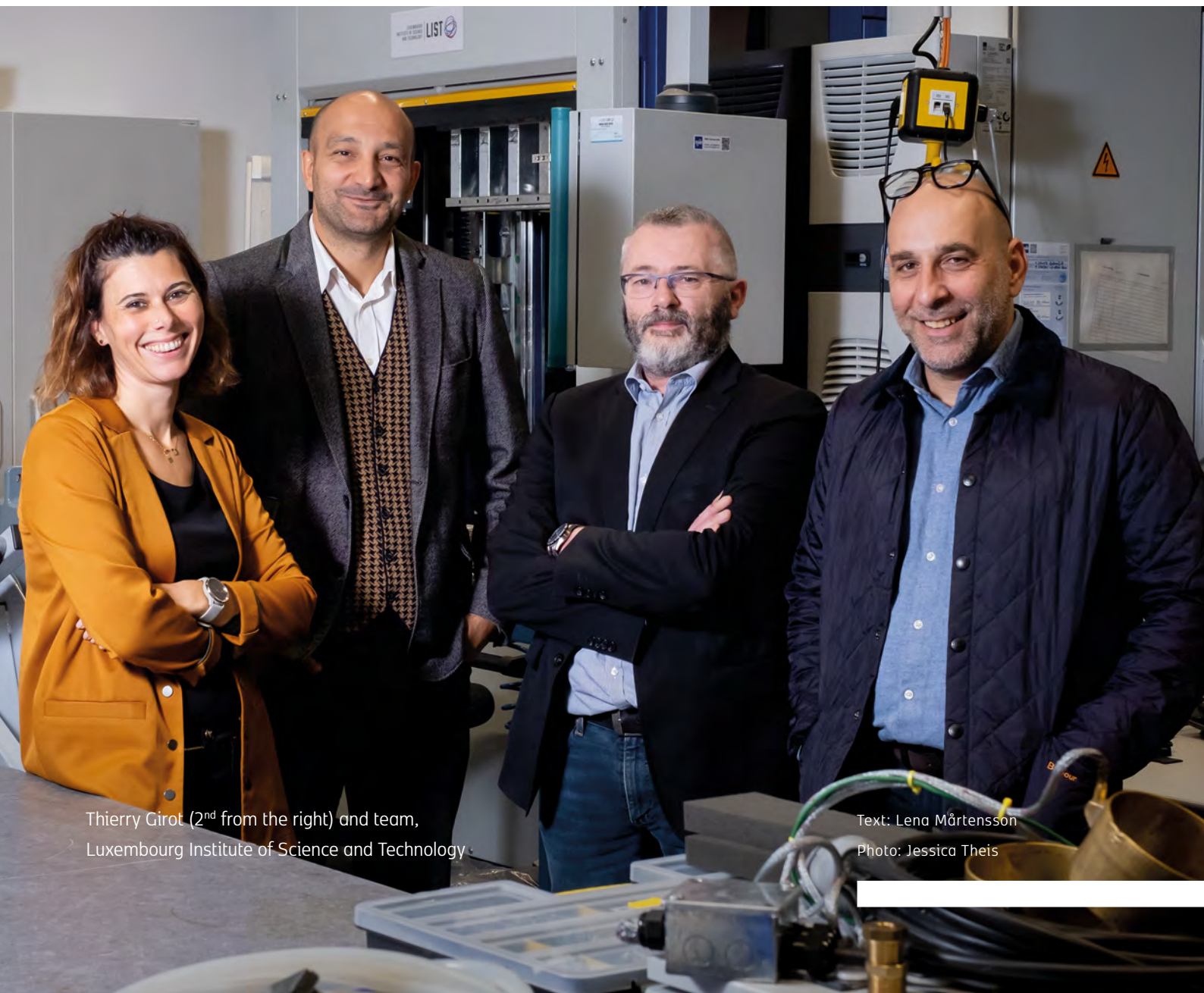
Thierry Girot (2nd from the right) and team,
Luxembourg Institute of Science and Technology

Text: Lena Mårtensson
Photo: Jessica Theis

Optimising ultra lightweight technology

Deeptech solution provider Gradel has developed a unique ultra lightweight technology in partnership with the Luxembourg Institute of Science and Technology.

Innovation has been central for Gradel ever since its creation in Luxembourg almost 60 years ago. Initially developing special purpose machines for the nuclear sector – an activity that still represents 40% of its business – the company has also developed a patented process for casting metallic spluttering targets used for coating architectural and automotive glass. However, it was its venture into the space market in 2010 that opened the door to its new speciality: ultra lightweight technology.

Unique technology

"We started by developing mechanical ground support equipment, but we also wanted to do flight hardware components for satellites which must be very light," recalls CEO Claude Maack. "This kicked off our work with lightweight materials. Over the past five years, we have developed a completely new technology – Gradel Robotic Additive Manufacturing, commercialised under the name of GRAM – that can be used in the composites manufacturing industry."

GRAM aims to use a bionic design. It uses endless filament fibres – carbon, basalt, flex, hemp or flax – that are impregnated with any resin on the robot applicator developed in-house to realise large and complex 3D structures. The composite material created is placed strength conform in the direction of the loads, in the precise quantity needed including a safety margin. "In-between there is air, so it couldn't be any lighter," Mr Maack comments.

He also points out that the composite material used is highly optimised. "While standard processes drill holes in, and thus cut, the fibres to impregnate them with resin, we take the fibre around a pin. This enables us to handle five times higher loads compared to competitive processes by using 70% less material. Even if the safety margin would be doubled, our parts would remain ultra lightweight. In addition, we produce no waste."

The extremely light 3D structures created have weight savings of up to 70%, without compromising any technical requirements. For the transport industry, this means both lower direct costs and considerable CO_2 reductions. This technology is unique and complementary to all other state-of-the-art composite manufacturing processes.
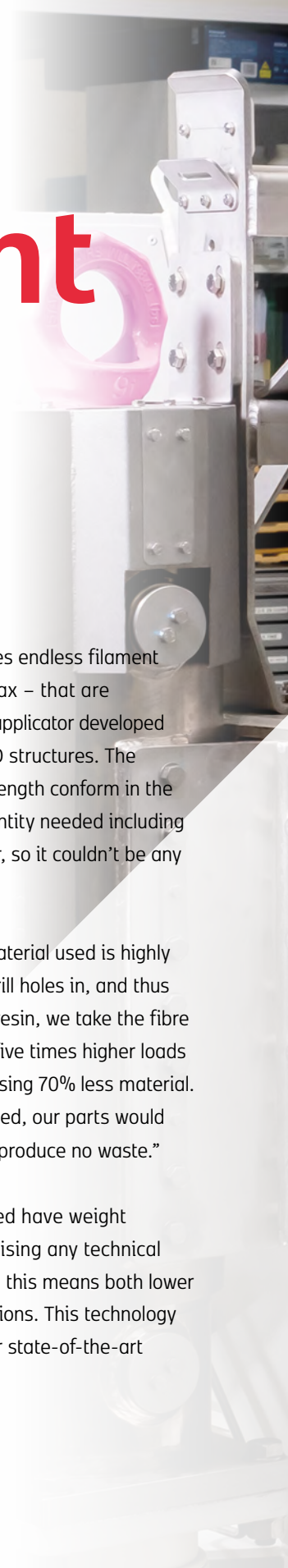
Claude Maack, Gradel

Collaborative research

The patented GRAM winding equipment for lightweight structures was developed by Gradel in collaboration with the Luxembourg Institute of Technology (LIST) through an R&D project supervised by the European Space Agency that also included Airbus, Thales Alenia Space and OHB. When LIST set up its Sustainable Composite Materials & Manufacturing (SCMM) Innovation Centre, Gradel immediately became a member.

Two joint projects have been launched so far. The first one, which is done in partnership with Toyota, focuses on developing a hydrogen tank with Gradel's winding technology. Two different resins are being compared: an off-the-shelf solution and a vitrimer resin developed by the SCMM. "Vitrimer is a gamechanger in the composite industry as the fibres can be separated from the resin and reprocessed. This makes it the composite material fully circular by design," says Mr Maack.

A second collaborative project is aimed at producing a lightweight structure for the door hinges of Airbus planes, demonstrating that the technology can meet all requirements in terms of mechanical resistance, stiffness and more. "Our technology can bring enormous added value in the field of aeronautics," Mr Maack points out. The company is also increasingly targeting defence applications.

An excellent team

This, however, is just the beginning of the cooperation. "The SCMM is an excellent partner willing to work on technologies that are closer to market launch than many other research centres," says Mr Maack. "The SCMM membership also enables us to have regular contacts with key industrial players."

But the most important factor is the team. "They have a real understanding of the need to industrialise the solutions and not only do R&D. They also have some outstanding experts and are at the forefront in the field of vitrimer, which is central for composite materials in the future."

Gradel's ambition is that their technology will become an industrial standard in the coming 10 years. To take it even further, the company is working with Data Design Engineering, a South Korean business recently established in Luxembourg, on a project aimed at adding artificial intelligence into the entire GRAM process. "I think that the lightweight business will drive our activities in the next decades," Mr Maack concludes.

Text: Lena Mårtensson
Photo: Jessica Theis

Co-creating solutions for the future of composite technologies

Kordsa's expertise in reinforcement materials aligns with SCMM's goal to develop composite materials with low carbon footprint. Both entities are exploring high-potential projects in the next three years.

In July 2024, Kordsa, a subsidiary of Sabancı Holding, embarked on a three-year partnership with the Sustainable Composite Materials and Manufacturing (SCMM) Innovation Centre at the Luxembourg Institute of Science and Technology (LIST). The collaboration aims to meet Kordsa's sustainability goals by providing innovative solutions for composite end users, particularly in the automotive and aerospace industries.

The company is a global leader in tire and construction reinforcement, composite technologies, and compounding. Headquartered in Türkiye, it operates across 7 countries and has over 4,500 employees. This newly signed international partnership highlights SCMM's openness to global collaboration.

"SCMM's groundbreaking research in sustainable composites aligns perfectly with our vision, and its reputation for driving innovation in these areas made it an ideal partner. Our decision to collaborate with SCMM reflects our commitment to advancing material technologies, especially in the realm of sustainable composites. By collaborating with SCMM, we aim to combine our expertise in reinforcement with their innovative approach to sustainability, positioning ourselves as leaders in developing the next generation of composite materials," explains Müge Yenmez, Kordsa Chief Technology Officer & Regional General Manager, Composite EMEA.

A vision to reinforce life

Innovation and sustainability are already at the heart of Kordsa's mission. "We have a strong track record of developing high-performance solutions for sectors such as automotive and aerospace. Our vision of 'Reinforcing Life' drives everything we do," points out Ms Yenmez.

Its composite business unit specialises in producing semi-finished products such as prepregs, towpregs, slitpreps, and honeycomb structures. These materials are processed through moulding techniques like autoclave, oven curing, or pressing to create composite parts. Kordsa integrates various polymers with fibre reinforcements such as carbon, glass, aramid, and natural fibres, playing a key role in the composite value chain.

The company is now in the early stages of exploring how its expertise can be integrated into several of SCMM's ongoing projects. "These projects are focused on composite materials, and we believe Kordsa can contribute significantly through our experience in developing and manufacturing high-performance

" **SCMM's groundbreaking research in sustainable composites aligns perfectly with our vision, and its reputation for driving innovation in these areas made it an ideal partner.**

intermediate products using a variety of fibre reinforcements. Our technical expertise in combining diverse polymer systems with sustainable solutions gives us a unique edge in enhancing the performance of composite materials," she asserts.

Both partners are in close communication with original equipment manufacturers (OEMs) to better understand their needs and identify solutions to address key industry challenges. "While we are still in the planning phase, we are excited about the potential synergy between our capabilities and SCMM's innovative foundation," states Ms Yenmez.

Shared goal of sustainability

Ms Yenmez notes that the partnership with SCMM is built on a solid foundation, and they are confident that by aligning their capabilities with the innovation centre's research expertise, they can co-create groundbreaking solutions for the future of composite technologies.

The current priority for Kordsa is to gain a deeper understanding of ongoing projects by continuing to engage with OEMs and other key stakeholders. "These discussions will help us pinpoint where Kordsa's material solutions can have the most significant impact," she underlines. "We will concentrate on leveraging our expertise in developing lightweight, durable, and sustainable composite materials to enhance the existing project work. As we further define our role in this collaboration, we'll work closely with SCMM to ensure that our technical contributions not only meet industry needs but also support our shared goal of sustainability," she concludes.

Text: Abigail Okorodus
Photo: Ahmet Şahin

Market expansion from Luxembourg
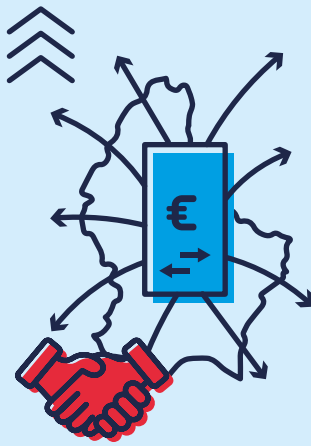
> **This ecosystem has enabled Cebi to forge strategic partnerships, exploit synergies, and work towards Luxembourg's broader industrial vision.**

From its Luxembourg roots, Cebi has grown into a global manufacturer of electromechanical solutions for the automotive and other sectors. The support of local partners has been instrumental in its growth and innovation efforts.

Founded in 1976, Cebi designs and manufactures electromechanical solutions for the automotive, household appliances, and ventilation sectors. Its product portfolio includes actuators, temperature sensors, and locks, with Cebi recognised as a world leader in actuators and automotive washer systems, and the European leader in temperature sensors and closing systems.

Today, the group operates 7 R&D centres, 11 production sites and 6 sales offices across the world. "We have always placed innovation and technology at the heart of its business strategy," explains Member of the Executive Board, Lynn Elvinger.

The company has a strong presence in Luxembourg, with four key structures. A competence centre that serves as the hub for innovation and development of its products, and where engineers design new sensors in response to customer demands. It also runs a local production plant manufacturing components that supplies virtually all the thermostats assembled by European carmakers, and the majority of temperature regulators fitted in European washing machines, tumble dryers, dishwashers and irons.

Lynn Elvinger, Cebi

In addition, its international base in Luxembourg serves as the group's headquarters, providing support and coordination across all its locations. Finally, its testing arm provides laboratory services to manufacturers and companies in their research and development.

State-of-the-art testing laboratory

In 2021, it inaugurated a testing facility in Luxembourg to bring together its R&D departments, enhancing collaboration between product and process specialists. The lab aims to offer testing services to third party companies in the region. "We keep extending the offer of testing services ranging from 3D printing, material analysis, mechanical, climatic, environmental or thermal shock testing to electromagnetic compatibility testing," says Ms Elvinger. "We just invested in a Shock Response Spectrum testing module, which assesses the impact resistance of products and systems, especially for industries such as aerospace, automotive, and construction. The lab has already opened doors to new business relationships, bringing us into contact with players we hadn't collaborated with before, especially in Luxembourg." These connections have, in turn, led to new opportunities for knowledge-sharing and discussions around product applications, innovations and even subsidies.

Strong support of the industrial ecosystem

As part of the biggest advantages Luxembourg offers as a business location, Ms Elvinger highlights: access to cutting-edge technology and advanced research facilities, a central position in Europe, a highly skilled and multilingual workforce, and a business environment that encourages innovation and development, among others.

Local partnerships within the country's dynamic ecosystem have been particularly key in its continuous growth and innovation. The group has leveraged the country's network of innovative startups and high-tech companies to access world-class expertise and cutting-edge technologies.

Industry organisations like the multisectoral business federation FEDIL and automotive supplier association ILEA, have promoted collaboration with local manufacturers. The University of Luxembourg has also provided access to specialised talents and recruitment opportunities. The national innovation agency, Luxinnovation, additionally fosters a favourable climate for industrial development to thrive.

"This ecosystem has enabled Cebi to forge strategic partnerships, exploit synergies, and work towards Luxembourg's broader industrial vision," points out Ms Elvinger. Over the next 5-10 years, the company aims to navigate the automotive industry's transformation and explore new markets.

Text: Abigail Okorodus

Photo: Jessica Theis

Starred gastronomy

Luxembourg's culinary reputation is not limited to its Moselle wines alone. The country also offers a gastronomy made with quality ingredients, authentic flavours and unique regional know-how.

Luxembourgish cuisine reflects the cultural diversity of the country. Whether it is a friendly bistro or a gourmet restaurant, Luxembourg has something for everyone.

Although small in size (672,050 inhabitants), the country has no less than ten Michelin-starred restaurants (nine with one star and one, Ma Langue Sourit in Moutfort, with two stars). This makes it the 2nd country in the world (behind Switzerland) with the highest number of Michelin-starred restaurants in proportion to the number of inhabitants.

Luxembourg also has four restaurants with the "Bib Gourmand" label, awarded by the Michelin guide inspectors, who reward restaurateurs offering "careful cuisine at moderate prices".

Text: Jean-Michel Gaudron

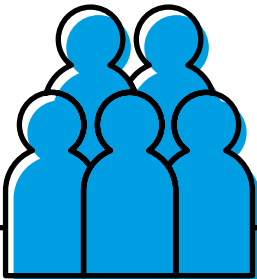Photo: Aurelio Rodriguez

Luxembourg in figures

2,586 km²

(57 km from West to East and 82 km from North to South)
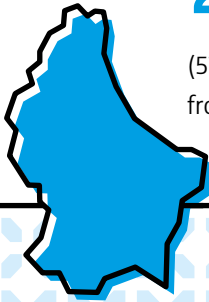
90,903

(GDP per inhabitant at market prices (purchasing power standard, 2022) EU average: 35.425

672,050 inhabitants

Population (01/01/2024) including 354,372 Luxembourgers and 317,678 non-Luxembourgers representing more than 170 nationalities
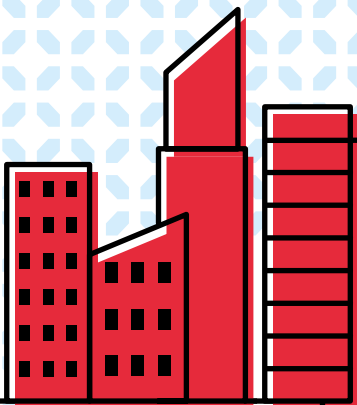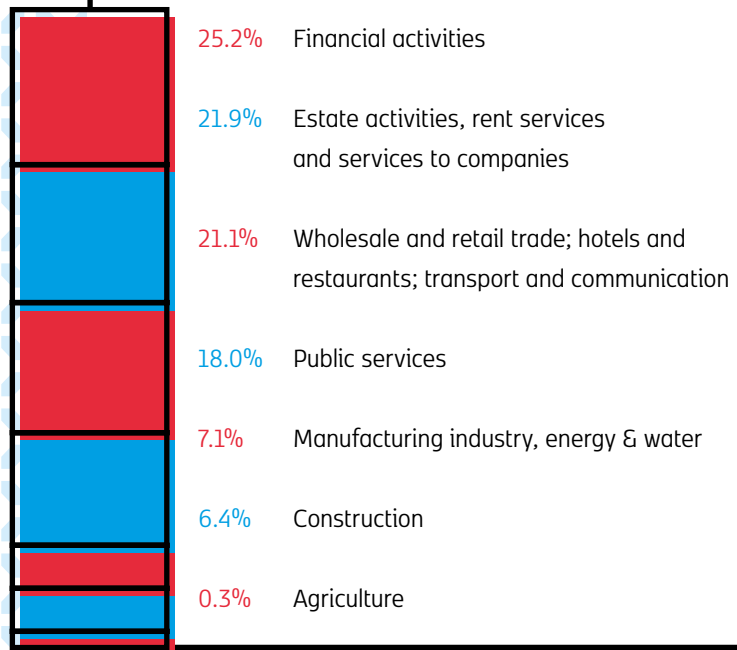
1,7 %

Annual inflation rate (August 2024)

EU average: 2.2%

Structure of the gross value added

at basic prices (2023)

25.2% Financial activities

21.9% Estate activities, rent services and services to companies

21.1% Wholesale and retail trade; hotels and restaurants; transport and communication

18.0% Public services

7.1% Manufacturing industry, energy & water

6.4% Construction

0.3% Agriculture

European institutions

Luxembourg is home to no less than 12 European institutions and bodies.

Text: Jean-Michel Gaudron

Illustrations: Quattro Creative

Source: STATEC, ADEM, Chamber of Commerce, Eurostat

Text: Lena Mårtensson

Business info Luxembourg

New Luxembourg law facilitates the hiring of skilled staff

A new law, adopted in September 2023, makes it easier for employers in Luxembourg to recruit non-EU nationals. It also grants family members of third-country nationals holding a residence permit access to the labour market as soon as they arrive in Luxembourg.

Why choose Luxembourg?
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Simplified procedures for hiring third-country nationals

All EU and EEA citizens, as well as members of their family (who are also EU or EEA citizens), enjoy freedom of movement within the EU, giving them the right to work and reside in any EU Member State. Non-EU citizens – so-called "third-country nationals" – not yet present in Luxembourg need a residence permit, followed by a residence title allowing salaried employment.

ADEM, the national employment agency, publishes annually a list of professions in high demand, based on objective data (number of job vacancies reported to ADEM, number of registered job seekers for the same profession, number of declared positions for which no suitable candidate could be found).

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Find more information about the support available for international companies considering coming to Luxembourg at tradeandinvest.lu/how-we-help

Easier access to the labour market for third-country nationals

For listed professions in high demand, ADEM is exempted from its obligation to conduct a labour market test and check for available job seekers already in Luxembourg matching the employer's requirements. The certificate will be issued within five working days.

For jobs not listed as highly in demand, the labour market test will still be conducted, but with shorter timeframes. ADEM will have seven working days to verify if job seekers meeting the required qualifications for the declared position are available in Luxembourg.

Family members of third-country nationals holding a Luxembourg residence permit on the basis of family reunification will be authorised to work in Luxembourg as soon as they arrive, giving them direct access to the labour market. This amendment applies to holders of a "family member" residence permit.

As a result, they will no longer need to apply for a work permit or a self-employed permit before starting a salaried or self-employed activity. Free access to the labour market is explicitly mentioned on residence permits issued from 1 September 2023, which now bear the words "authorised to work in Luxembourg".

Find more information on:

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Luxembourg Trade & Investment Offices (LTIOs)

"An excellent entry point for technology-driven businesses"

Thierry Santer,
LTIO Seoul

Several South Korean companies have recently opened their European offices in Luxembourg. Thierry Santer, Executive Director of the Luxembourg Trade and Investment Office (LTIO) in Seoul, explains why.

Why are so many South Korean companies choosing Luxembourg?

South Korean companies aiming to expand their business abroad traditionally looked at the US and Asian markets, but Europe is increasingly on their radar. However, coming to Europe implies many questions, such as which country to choose, which markets to prioritise and how to manage many different languages.

Luxembourg is an excellent entry point for technology-driven businesses as it provides easy answers to these questions.

Companies quickly realise that they are not bound to the Luxembourg market only, but can instantly address the larger European markets. In addition, virtually everyone in Luxembourg speaks English. Korean companies are also surprised to see how easy and quick it is to get in touch with high-level decision makers.

What do you like most about your new home country, and what do you miss from Luxembourg?

One of the most compelling aspects of Korea is the dynamic attitude of its entrepreneurs and investors. Korea simply bubbles with opportunities and people are not shy to launch innovative businesses. Things move fast, but they are always carried out with care and accuracy. However, I miss switching between many different languages throughout the day, as is common in Luxembourg. And I miss affordable apples!

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