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FinTech for sustainable finance

Technology as an enabler of Luxembourg's Sustainable Finance Strategy

FROM VISION TO REALITY

December 2022

We are proud to host the world's leading ***GREEN EXCHANGE*** *for the listing of sustainable securities.*

Nasir Zubairi CEO, The LHoFT Foundation

Foreword

Having observed the increasing, and critical, focus on sustainability across the world and, more specifically, in Luxembourg over the past 5 years, the LHoFT team have kept a close eye on the developments within the finance sector in relation to sustainable finance as well as the key driving force of regulation. Though, like many at the time, I was aware that the world had a problem that we needed to address, it was in October 2018 that I fortuitously had the dinner company of one of the researchers of the about-to-be-published IPCC Special Report on the impacts of global warming of 1.5 °C.; the dinner discussion was incredibly sobering as to some of the issues the Earth and we, humanity, face.

As the impetus in addressing the ESG challenges we face has accelerated over the past few years, Luxembourg has sought, with the capabilities and tools we have, to do what we can to help the world change and ensure a sustainable future. Critically, the sector of sustainable finance, with its set of financial regulations, standards, norms and products aimed at enabling the transition to a sustainable global economy, in particular with a focus on the much-needed energy transition, has become a strategic pillar of Luxembourg's financial services sector and its agents.

Luxembourg has done much to take a leading role in sustainable finance since the adoption of the Paris Climate Agreement in 2015. We are proud to host the world's leading 'green exchange' for the listing of sustainable securities. Green and sustainable finance is always a prominent facet of the agenda of the numerous finance-orientated conferences that take place in the Grand Duchy. But there is still much that can be done.

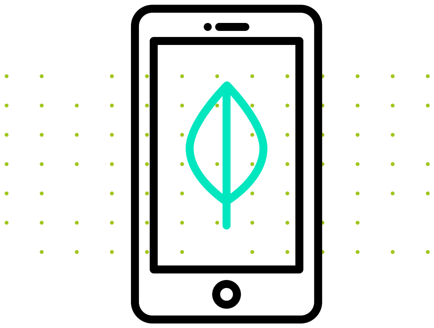
With the burgeoning growth of FinTech across the globe and likewise in Luxembourg and its success in driving efficiency, effectiveness and change in the finance sector to meet ever-evolving customer needs, the obvious question that has arisen is how FinTech can specifically assist in, if not accelerate, the widespread adoption of sustainable finance and the associated regulations that are still blossoming.

There have been a few studies published focusing on particular segments of FinTech; for instance, concerning the use of Distributed Ledger Technology for the issuance and life-cycle management of green securities, theories and actions to create ESG ratings, or the use of technology to comply with sustainable finance taxonomies. What we have sought to do with this report, together with our research partner Deloitte, is to compile a more holistic picture of the potential opportunities for 'Green FinTech' specifically in the context of Luxembourg's financial centre.

Through extensive field research, we sought to understand the challenges and opportunities faced by financial institutions and other relevant actors in relation to sustainable finance and to identify ways for FinTech solution providers to help address these challenges and opportunities. Furthermore, we sought to identify barriers that need to be overcome to enable this to happen and what practical actions can be taken.

There is still a lot of uncertainty, and there is considerable concern over costs in relation to fulfilling sustainability requirements. How do we measure impact? How do we benchmark? How do we comply? How do we insure against greenwashing? How do we absorb the costs of change to our operating model and business strategy, and where do we acquire the talent to make these changes happen?

These are just a few of the questions to which our report provides—if not definitive answers—at least food for thought and concrete proposals with a view to fuelling the relatively nascent Green FinTech sector in Luxembourg.



In the now well-established understanding of the sustainability challenge—i.e., leaving a better planet and society for future generations—the EU Action Plan on Sustainable Finance has been essential to recognising the importance of the financial sector in contributing to sustainability.

Since the EU Action Plan was launched, we at Deloitte Luxembourg have closely observed the plan's impact on the financial sector and how its institutions have reacted. Whether 'only' focused on complying, or regarding the EU Action Plan as an opportunity to revise their strategy to integrate sustainability, or simply continuing upon a path already long characterised by sustainable finance, we have seen how all financial institutions have quickly responded to and taken onboard the changes and requirements.

While the beginning of 2021 was characterised by relatively muted reactions—with concerned institutions mainly required to apply the SFDR's website publication rules by March 2021—the entry into force of the periodic reporting and pre-contractual disclosures deadlines in early 2022 have accelerated the dynamism within the financial sector. We expect this intensity to continue with new requirements arriving even after 2023.

One of the primary reasons for this growing momentum is that all these requirements depend on one thing: data, specifically ESG data, which financial institutions did not use until recently, being mainly focused on financial performance. Going forward, these institutions are not only expected to integrate ESG data into their IT landscape, but they must be able to use it meaningfully for the purpose of, among others, reporting, interacting with clients on their sustainability preferences, manufacturing new products, and distributing these products on the market.

The need for ESG data is central and common to all impacted financial institutions—and this is where FinTechs enter the scene.

Over the years, we have witnessed how the FinTech ecosystem has developed and blossomed in Luxembourg. FinTechs have had the opportunity to develop and offer their services regarding many regulatory topics, and there is no reason why sustainable finance should be any different. This is especially true because, through their technology, FinTechs can solve some of the challenges around sustainable finance regulations, including ESG data.

Our interviews and the accompanying desk research for this joint study with the LHoFT have confirmed the potential of FinTechs for sustainable finance. We hope that, overall, the study provides valuable insights for many different Luxembourg actors, as there is a lot that can and should be done to attain sustainable finance.

*The need for **ESG data** is central and common to all impacted financial institutions—and this is where FinTechs enter the scene.*

Francesca Messini Deloitte Luxembourg, Sustainability Leader

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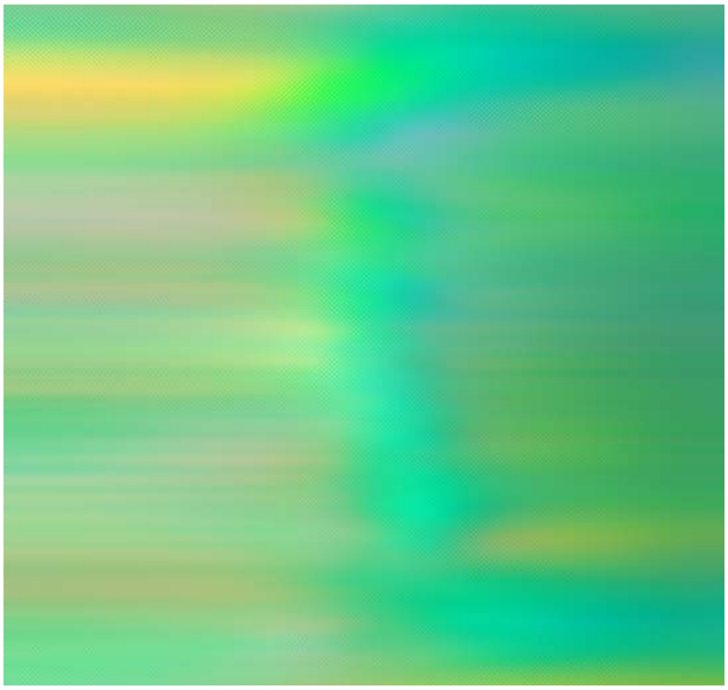
Executive summary

Executive summary



This joint study of the Luxembourg House of Financial Technology (LHoFT) and Deloitte explores the role that financial technologies (FinTechs) can play in supporting financial institutions (FIs) in their sustainable finance efforts. Based on interviews with 27 entities ranging from FinTechs to FIs, associations and other public establishments, and complemented by desk research, this study demonstrates several opportunities which, to be realised, require the removal of certain barriers and mitigation of certain challenges. While the study draws from findings across the EU overall, it is strongly focused on the status of and implications for Luxembourg.

Sustainability is a priority for our society and our planet, and FIs have a role to play to this end. First, the study describes some of the motivations for intermediary actors like FIs to work towards sustainability via sustainable finance. Above all, science tells us that to maintain a livable planet, we must stay below an increase of 1.5 degrees celsius compared to pre-industrial times. Beyond this overarching motivator, this study focuses on two crucial drivers when exploring the role of FinTechs: (i) consumers and their changing behaviour, and (ii) the recent and upcoming regulatory changes. Both create the need for more informed and transparent decision-making and consumption processes, which—as will become evident—requires data and technology, a core competency of many FinTech firms.

Luxembourg enjoys a rich FinTech and sustainable finance environment, and a number of actors operate in the country to boost these two topics within this top financial centre. From the LHoFT to the Luxembourg Sustainable Finance Initiative (LSFI), the International Climate Finance Accelerator (ICFA), the Luxembourg

Stock Exchange and Luxembourg Green Exchange (LGX), Luxembourg Finance Labelling Agency (LuxFLAG), and finally the European Investment Bank and its Climate Bank Roadmap[1], the ecosystem of actors in Luxembourg illustrates a healthy interaction between the private and public sectors.

The report's main conclusions can be summarised as follows:

- **overall, the Luxembourg FinTech sector's Environmental, Social and Governance (ESG) offerings are growing.** On the one side, interviewed FinTechs believe they have the possibility to enter a welcoming, multicultural and dynamic market. And on the other, FIs recognise the need to work with FinTechs to benefit from their knowledge and technology and effectively face the complexities of sustainable finance
- **the complexities of sustainable finance are mainly related to the availability and proper management of ESG data** for disclosure and reporting. Therefore, data is both the main area of focus of ESG FinTechs and the main area of need for FIs. Here, FinTechs can support with data collection, integration and consolidation, as well as quality assurance and report production
- **the necessary shifts to attain sustainable finance goals, like regulatory and behavioural consumer changes, require education about the topic.** All interviewed actors confirmed the needed expertise because of (i) the novelty of sustainable finance for the finance sector's traditional actors and (ii) the relentless schedule of regulatory changes since the Sustainable Finance Disclosure Regulation, Regulation (EU) 2019/2088 (SFDR) entered into force in 2021, which will likely continue until less mature regulations apply, such as the Corporate Sustainability Due Diligence Directive, Directive COM/2022/71 final (CSDD). This ongoing regulatory chain also creates a certain level of uncertainty; the implementation timeline is sometimes illogical, with certain requirements currently live requiring others that will only apply in the future, as well as definitions that European authorities have not yet confirmed or agreed. FinTechs have an opportunity to support the ecosystem regarding these challenges, thanks to the knowledge and technical expertise they naturally develop to build their solutions
- **at the same time, FinTechs may suffer from this uncertainty in the regulatory landscape;** however, this is not ultimately deemed to be a show-stopper for continuous innovation in sustainable finance solutions
- **a collaborative, multi-stakeholder and cross-sectoral approach can be extremely beneficial to sustainability overall, sustainable finance specifically, and the realisation of some of the identified opportunities.** As sustainability is a global issue, the response cannot be orchestrated within country and industry silos. A holistic multi-stakeholder approach that supports sharing information and best practices can also help mitigate some of the challenges identified in this study: the regulatory uncertainty, access to the right data, and availability of talent with the necessary knowledge and expertise. Collaboration also enables the sustainable finance ecosystem to be inclusive when moving ahead, and not leave any actor behind that could be able to contribute impactfully to the cause
- **while collaborative initiatives can help, regulator and government initiatives may also support the impact of FinTechs in sustainable finance.** The perception is that Luxembourg's administrative processes can be further aligned with FinTech's current window of opportunity to contribute to sustainable finance. This alignment can also be accompanied by specific incentives to allow FinTechs to safely 'play' in the playground to test their solutions. While sustainable finance is a generic ambition of all ecosystem actors, a more specific vision is needed for all actors to align and organise themselves accordingly. Such vision-setting could entail, for example, defining Luxembourg's area of focus and added value when it comes to FinTech and sustainable finance.

There are challenges and opportunities for many actors that orbit around sustainable finance in Luxembourg. While some conclusions may seem only relevant to FIs and FinTech, in reality, several other stakeholders—including associations, the government and regulators—also have a role to play.

Finally, the heterogeneity of the study's conclusions and their implications, as well as the challenges and opportunities identified, indicate the participants' eagerness and conviction, which is ultimately a good omen to the dynamism and impact we can expect from Luxembourg's sustainable finance sector in the years to come.

1. *European Investment Bank, The EIB Group Climate Bank Roadmap 2021-2025, September 30, 2020.*

Introduction

Introduction

Sustainability is and will continue to be at the core of everyone's actions to transition to a climate-neutral economy by 2050. Based on its three core pillars of ESG, sustainability strives to redirect attention from a merely profit-oriented society to a more holistic triple bottom line approach.[2]

Due to its intermediary role, the financial services industry is central to these efforts. Yet, faced with a strong and omnipresent regulatory framework, tougher competition and declining margins, the sector has developed a degree of risk-aversion and organisational inertia that may impede the redirection of financial flows to a sustainable future.

While this inertia is by no means the only obstacle to a successful transition towards sustainable finance and sustainability overall—significant portions of this report are dedicated to challenges arising from data availability and processing, the need to attract and support relevant talent, and cross-sectoral issues—it could specifically impede the cultural shift implied in the very term 'sustainability'. This obstacle may be further pronounced among Luxembourg FIs, as the decision-making power supporting this shift and related initiatives are often located outside the country.

The European Environment Agency (EEA) stipulates that it is essential to "scale up investments and reorient the financial sector to support sustainable projects and businesses".[3] In practice, while public funds may be deployed to support innovation via subsidies or for sustainable procurement and infrastructure investments, the brunt of the transformational effort to a more sustainable economy requires the financial sector to redirect private capital to sustainable investment.

Against this backdrop, this study's guiding question was whether and how FIs need to leverage the agility and innovative potential of FinTech firms to master the enormous complexity entailed by the widespread ESG integration into financial services.

Of the many factors aiding the shift towards ESG integration and sustainability, two stand out regarding this transformation within the financial sector:

The approaching generational wealth transfer:

"by 2030, around 30% of global wealth will change hands – to those of the next generation."[4] Millennials and Generation Z have a vested interest and a keen focus on sustainability,[5] challenging the status quo. In this context, sustainable investing is seen as a unique opportunity for achieving a combination of objectives, weighted according to individual preferences: higher returns, broad societal impact, a reduced risk profile, and last but not least, a reduced or net-positive environmental impact. In their efforts to cater to this perception and the related client demand, both incumbent institutions and innovative challengers are increasingly exploring digital technology as a green finance lever in lending and investments, or as an embedded feature in payments. Financial service providers appear to have recognised the potential of impactful, end-user-facing innovations to raise sustainability awareness and differentiate themselves within the competitive landscape.

An example of such innovative service offerings is debit and credit cards tracking the consumer's carbon footprint by leveraging purchase data.[6]

2. Kelsey Miller, *The Triple Bottom Line: What It Is & Why It's Important*, Harvard Business School, December 8, 2020.
3. European Environment Agency, *Europe's state of the environment 2020: change of direction urgently needed to face climate change challenges, reverse degradation and ensure future prosperity*, November 17, 2021.
4. Credit Suisse, *When wealth changes hands. Focusing on the next generation*, May 20, 2021.
5. Marguerita Cheng, "8 Characteristics Of Millennials That Support Sustainable Development Goals (SDGs)," Forbes, June 19, 2019.
6. European Banking Federation, *Towards a Green Finance Framework*, September 28, 2017.

The regulatory context:

The EU Green Deal requires the integration of the ESG pillars of sustainability to protect investors and ensure the smooth functioning of financial markets by making them more resilient, efficient and transparent.[7] The latter objective is particularly pronounced on the Governance side. With the SFDR's entry into force in 2021, financial market participants must disclose previously hidden information, and revise their approach to sustainability in accordance with the SFDR's Articles 6, 8 and 9. Similarly, the proposed CSDD—which is complementary to the already adopted Corporate Sustainability Reporting Directive, COM/2021/189 final (CSRD)—demands a greater understanding and monitoring of a company's value chains, as large corporates' sometimes vast supply chains are part and parcel of their ESG footprint in particular.

De facto, the understanding of financial products, cashflows and the investment strategies of trusted financial managers has become the norm—and consequently, financial market players are forced to meet the growing sustainability interest. To satisfy this increasing demand, the European Union is also amending the Markets in Financial Instruments Directive, Directive 2014/65/EU (MiFID II),[8] requiring market players to consider and incorporate clients' sustainability preferences into investment decisions.

In the context of 'sustainability preferences' and to support the product classifications, the EU Taxonomy, Regulation (EU) 2020/852,[9] provides guidance on what can be classified as environmentally sustainable, specifically tackling six aspects:

1. climate change mitigation
2. climate change adaptation
3. sustainable use and protection of water and marine resources
4. transition to a circular economy
5. pollution prevention and control
6. protection and restoration of biodiversity and ecosystems

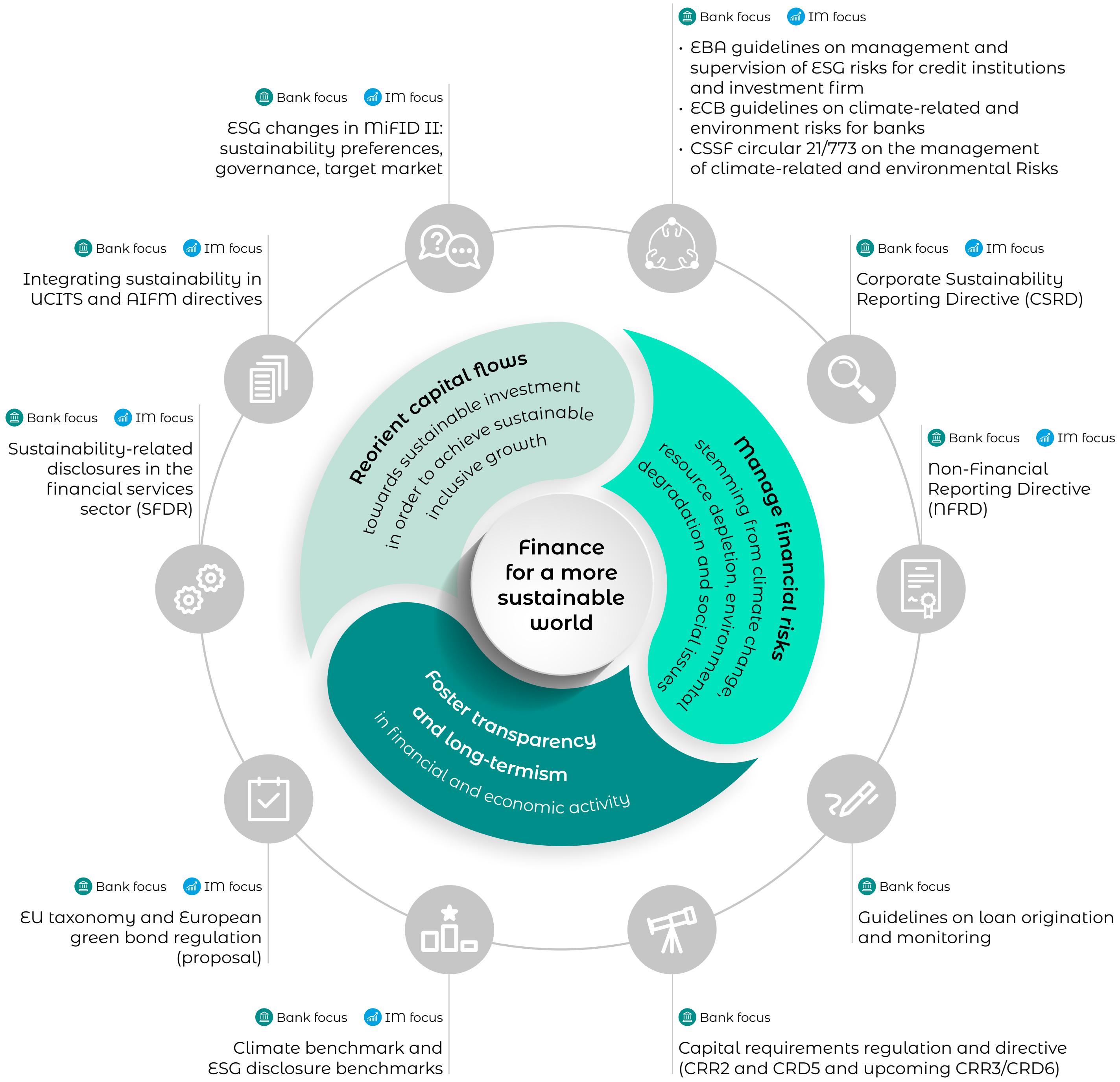
Establishing a standard EU-level definition of an environmentally sustainable economic activity, the EU Taxonomy aims to avoid market fragmentation to protect private investors against the risks of greenwashing.[10] Certain players will also need to add sustainability elements to their existing non-financial disclosures, with the CSRD replacing the existing Non-Financial Reporting Directive, Directive 2014/95/EU (NFRD). Ultimately, the recently created set of regulations aims to enable the redirection of financial flows towards sustainability, while reducing greenwashing risks and protecting investors.[11]

The main regulations and directives affecting the sustainable finance market are shown in figure 1, which is illustrative and non-exhaustive.

Despite numerous regulatory and client demands, FIs face obstacles in contributing their mite to the net-zero shift. While FIs had already been collecting, managing and analysing quantitative data mainly relating to the financial aspects of their products and services, the sudden expectation to integrate and manage quantitative and qualitative data for financial and non-financial factors calls for new skill sets, processes, governance and assets.

7. *Eugenia Macchiavello and Michele Siri, "Sustainable Finance and FinTech: Can Technology Contribute to Achieving Environmental Goals? A Preliminary Assessment of 'Green FinTech'", European Banking Institute Working Paper Series no. 71 (2020).*
8. *Commission de Surveillance du Secteur Financier, "MiFID rules related to sustainability: application of the requirements relating to client sustainability preferences and publication of ESMA's consultation paper on MiFID II product governance guidelines," August 2, 2022.*
9. *European Commission, "EU taxonomy for sustainable activities," last accessed August 16, 2022.*
10. *Ibid.*
11. *Macchiavello and Siri, "Sustainable Finance and FinTech: Can Technology Contribute to Achieving Environmental Goals? A Preliminary Assessment of 'Green FinTech'."*

Figure 1: Main regulations for the sustainable finance market



IM: Investment Management

> Translating qualitative data into measurable and comparable metrics poses a particular challenge. In this context, we observe the increase of conventional data sources being complemented by new players specialised in sustainability, ESG, and the quantification of qualitative data. Against this backdrop, financial technology has an important role to play.

The catalyzing role of FinTech

A FinTech is an innovative firm that creates added value for FIs and end users by using technology to lower costs, boost income, deliver greater efficiency and usability, or comply with legal requirements. Services generally come in the form of software, applications, algorithms or even hardware, and tend to be targeted at specific industry sectors or activities of the acquiring FI.

To illustrate these niches, FinTechs specialise in certain back-office related branches of investment management (FundTechs), wealth management (WealthTechs), regulations (RegTechs), insurance (InsurTechs), and green finance (Green FinTechs). In Luxembourg, the B2B segment of the FinTech ecosystem is dominant, as innovators are actively encouraged to complement and future-proof the offering of traditional FIs.

For the purposes of this report, Green FinTechs focus on FinTech-related innovations that address environmental protection and climate change, as aligned with: "the Sustainable Development Goals (SDGs) **7** (Affordable and Clean Energy), **11** (Sustainable Cities and Communities), **12** (Responsible Consumption and Production), **13** (Climate Action), **14** (Life Below Water), **15** (Life on Land), and **17** (Partnerships for the Goals) as one SDG which generically has an impact on all SDGs. Green FinTech innovations are defined by a blended-value mission entailing the coexistence of impact objectives (e.g., increasing the flow of financial resources for sustainable development) and business objectives (e.g., safeguarding a financial return to be able to continue creating impact in the long run)."[12]

The fact that many existing FinTech providers are expanding their offering with sustainability and ESG-targeted services is testimony to the sector's agility.

Globally, the FinTech ecosystem is expected to play a leading role in the sustainable finance transition by leveraging artificial intelligence (AI) and data analytics[13 14]. Indeed, Green FinTechs are thought to improve the global carbon footprint by developing innovative solutions: "FinTech development is helping economies [advance] towards the low energy transition".[15]

Although the impact is said to vary across regions,[16] FinTech innovation is nevertheless recognised as one of the main drivers of green economic growth and high-level economic development, thereby accelerating improvements in the ecological environment and economic structure.[17] As emphasised by the European Commission in the EU Green Deal, FinTechs are a vital enabler for achieving the sustainability goals on a cross-sector scale as they can accelerate and maximise the "impact of policies to protect the environment and deal with climate change".[18]

Financial inclusion is indispensable to sustainability and can be furthered through FinTechs. Generally:

i. "FinTechs can serve niche communities who do not have a bank account in the traditional financial market,

ii. FinTechs can reduce costs for clients through increased competition, and

iii. FinTechs can offer financial services in remote locations, far from traditional financial institutions."[19]

12. Darius Nassiry, "The Role of FinTech in Unlocking Green Finance: Policy Insights for Developing Countries," Asian Development Bank Institute Working Paper 883, November 2018.
13. Tadiwanashe Muganyi, Linnan Yan, and Hua-ping Sun, "Green finance, FinTech and environmental protection: Evidence from China," Environmental Science and Ecotechnology 7 (2021).
14. Sébastien Duchêne, "Review of Handbook of Green Finance," Ecological Economics 177 (2020).
15. Ran Tao, Chi-Wei Su, Bushra Naqvi, and Syed Kumail Abbas Rizvi, "Can FinTech development pave the way for a transition towards low-carbon economy: A global perspective," Technological Forecasting and Social Change 174 (2022).
16. Guangyou Zhou, Jieyu Zhu, and Sumei Luo, "The impact of FinTech innovation on green growth in China: Mediating effect of green finance," Ecological Economics 193 (2022).
17. Yuxue Yang, Xiang Su, and Shuangliang Yao, "Nexus between green finance, FinTech, and high-quality economic development: Empirical evidence from China," Resources Policy 74 (2021).
18. Green Digital Finance Alliance, "FinTech Empower People to Green Their Home", accessed August 16, 2022.
19. Luiz Antonio Joia and Joaquim Pedro Vasconcelos Cordeiro, "Unlocking the Potential of FinTechs for Financial Inclusion: A Delphi-Based Approach," Sustainability 13 (2021).

"In Luxembourg, we have one of the highest concentrations of financial institutions, hence a great opportunity to have Banks and FinTech working together towards the same goals and delivery of ESG targets."

HSBC Luxembourg

Luxembourg's strategic positioning towards sustainable finance and financial technology

Luxembourg, with its tech-friendly regulatory environment,[20] is not only a premier wealth centre and the second largest fund centre in the world,[21] but also home to cutting-edge FinTech solutions. Worldwide, Luxembourg is known as a leading location for FinTech development.[22] To exemplify, FinTechs with the desire to reside in Luxembourg are given opportunities from day one, with the LHoFT right at their disposal.

The LHoFT is a public-private initiative that enables technology innovation to develop and thrive within Luxembourg's financial services industry.[23] In doing so, the LHoFT plays a crucial role in growing FinTechs' presence and integration within Luxembourg's economy. Owing to the unique composition of its board of directors, the LHoFT can rely on broad industry experience and representation, thereby facilitating start-ups' entrance into the Luxembourg market. The LHoFT proactively supports the development of FinTechs that hold potential for the transformation of the Luxembourg's financial sector. As a subset of their focus, the LHoFT works with Luxembourg's microfinance and development sectors to help FinTechs with financial inclusion objectives worldwide. The LHoFT is supported by key strategic partners, most prominently, by the catalysers of the LHoFT initiatve, Luxembourg for Finance and the Ministry of Finance. The LHoFT has developed a series of Catapult programmes with the Ministry of Economy and the Directorate for Development Cooperation and Humanitarian Affairs that provide valuable assistance to FinTechs in their growth ambitions.

The fruits of this proactive and strategic development policy are evident in the number of FinTechs present in the Grand Duchy, which currently exceeds 250 entities; a drastic increase since the role of FinTechs was defined in 2015[24] and since the LHoFT's inception in 2017.

In parallel, by leveraging its strategic positioning, Luxembourg has seen the rise of many green-finance-oriented FIs, initiatives and programmes to support and enforce sustainability in Luxembourg businesses, such as the following:

- the LSFI, a not-for-profit association focused on designing and implementing the Luxembourg Sustainable Finance Strategy by raising awareness, and promoting and helping to develop sustainable finance initiatives within Luxembourg[25]
- the EIB Climate Finance Platform, a joint initiative between the EIB and Luxembourg to mobilise and support investment in international climate finance, especially regarding climate change mitigation and adaptation[26]
- the ICFA, a unique 2-year programme providing fund managers with financial support, training, coaching and other benefits in embracing climate action in investment management[27]
- the Amundi Planet Emerging Green One Fund, the world's largest green bond fund on emerging markets, aims to increase the capacity of emerging market banks to fund climate-smart investments[28]
- the Luxembourg Stock Exchange, which launched the LGX, the world's first platform dedicated to green, socially responsible and sustainable securities
- the LuxFLAG investment labelling system, a unique, internationally recognised validation tool available to asset managers to certify their products while reflecting regulatory and market practices.[29]

In this context, this report focuses on Luxembourg's FinTech ecosystem and investigates whether it could serve as a sustainability enabler.

20. Luxembourg for Finance, "National FinTech Platform: The LHoFT," accessed August 16, 2022.
21. ERCB Luxembourg, "Luxembourg, the best location for FinTech development," video, 2:59, June 8, 2015.
22. Jean-François Hugon, Luxembourg is becoming the "place to be" for FinTech IT operations, EBRC Luxembourg, December 10, 2019.
23. Luxembourg House of Financial Technology, "About Us," accessed August 16, 2022.
24. Arendt, Luxembourg Bank and FinTech Study for 2020, May 17, 2021.
25. The Luxembourg Sustainable Finance Initiative, "About Us", accessed August 16, 2022.
26. European Investment Bank, "Luxembourg-EIB Climate Finance Platform," accessed August 16, 2022.
27. International Climate Finance Accelerator, "Welcome to the International Climate Finance Accelerator," accessed August 16, 2022.
28. Amundi, "IFC and Amundi successfully close world's largest green bond fund," press release, March 16, 2018.
29. LuxFlag, "What we do", accessed August 16, 2022.

Methodology

Our report is based on complementary desk and field research.

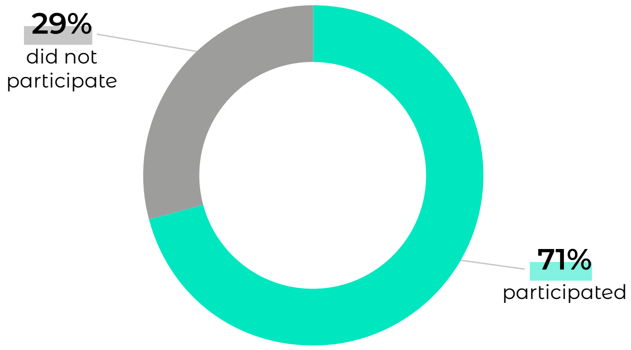
Desk research

To gather information on the sustainability and FinTech sectors, and on current best practices to marry ESG and FinTech, relevant desk research was conducted. Based on the first round of research, an interview guide and interview questionnaire for field research and an ESG FinTech map were developed. Further desk research was sequentially performed to understand and contextualise the information received during the interviews.

Field research

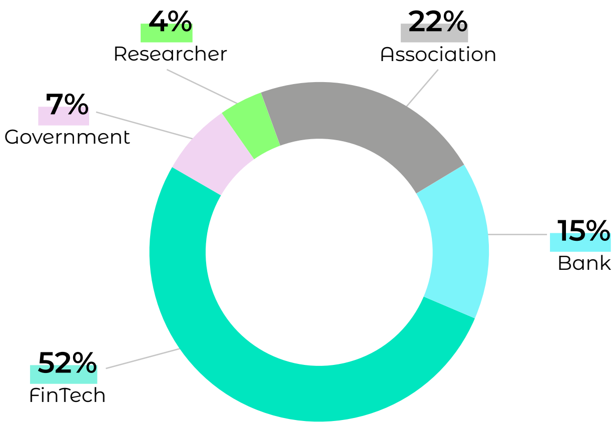
Twenty-seven vital players in Luxembourg's financial industry were interviewed to gain a holistic understanding of the as-is situation and how FinTechs can support sustainability in the financial sector. Such players included established FIs, FinTechs, and professional associations of the financial sector. Labour- and time-intensive interviews were chosen over a survey to gain a deeper understanding of the respondents' views and needs via a quasi-dialectical method. The interviewee distribution was as follows:

Participation rate
(as % of total interviewee requests sent out)



Seventy-one per cent of interviewees responded. The majority of participants were FinTech (52%), followed by associations (22%) and banks (15%). The remaining 11% were from government and research areas.

FI type division
(as % of total FI participants)



The interview guide and questionnaire developed during the desk research phase tackled the following topics:

- the **perceived maturity** level of the FinTech industry within the field of sustainability, in general and in Luxembourg
- to what extent **Luxembourg potentially stands out** as a hub for sustainability and green finance
- **what ambitions the ecosystem could reach for** to support sustainability and green finance further
- **to what extent FinTechs could support and help fill a gap** to achieve more structured and integrated sustainability, and where FinTechs could help specifically
- the relationship with and impact of **the regulatory framework.**

To maximise the relevance of the received information, questions were slightly reformulated depending on the type of actor interviewed. All questions were geared towards Luxembourg and allowed for global comparison. The information collected solely represents the interviewee's opinion and not always the standpoint of the respective firm.

The report first looks at the extent of FinTechs' impact on sustainable finance in Luxembourg, seeking to understand factors contributing to this footprint, the scope of the current offer and what needs are being addressed. Based on this, we then identify some potential trends—some that we define as 'bold plays'—which could be explored, not only through the entrepreneurial drive of FinTech firms but also contributions from Luxembourg's overall sustainable finance ecosystem. With a view to practical implementation, we identify enabling factors and potential obstacles to the further development of the Luxembourg FinTech ecosystem geared towards sustainability. Accordingly, the study concludes with a series of calls for action.

Main findings

Recent societal and economic **macro changes** (such as those driven by the COVID-19 pandemic), as well as an emerging regulatory framework and a shift in mindset and aspirations among millennials, are contributing to an **increased focus on sustainability**.

While still in its infancy, **the Luxembourg Sustainable Finance FinTech sector is seeing a growing number of FinTechs** working on sustainability and sustainable finance. While more FinTechs are developing ESG solutions, the variety of ESG topics being tackled is relatively limited, relating mainly to data and reporting.

When dissecting the three pillars, **the E and the G are seemingly more developed in Luxembourg** based on our interviews—due to the regulatory focus on the Environment and Luxembourg's historical maturity on Governance aspects, intertwined with the financial centre's functional bias with a heavy emphasis on middle- and back-office functions. However, it is commonly agreed that focusing on one or the other pillar is ill-advised.

There is significant demand among FinTechs and FIs for increased and more structured **dialogue and cooperation across sectors and regions**. For a topic—and challenge—as far-ranging as sustainability, there is no alternative to a multidisciplinary and cross-sectoral approach.

Data management and processing is today perceived as the main benefit of working with FinTechs and remains **the primary focus** when developing solutions. This concerns data collection, use and quality assurance. There is a call to increase access to data and support open data initiatives, driven not least by the multidisciplinary and cross-border nature of sustainability. However, this is counterintuitive for a sector like finance, where data confidentiality issues continue to prevail.[31]

30 ABBL and KPMG, *Luxembourg Cloud Adoption Survey second edition*, July 2022.

It is **fundamental** that all stakeholders—FinTechs and FIs alike—that are keen on offering sustainability-related services, products and solutions **align their internal business practices** with these findings.

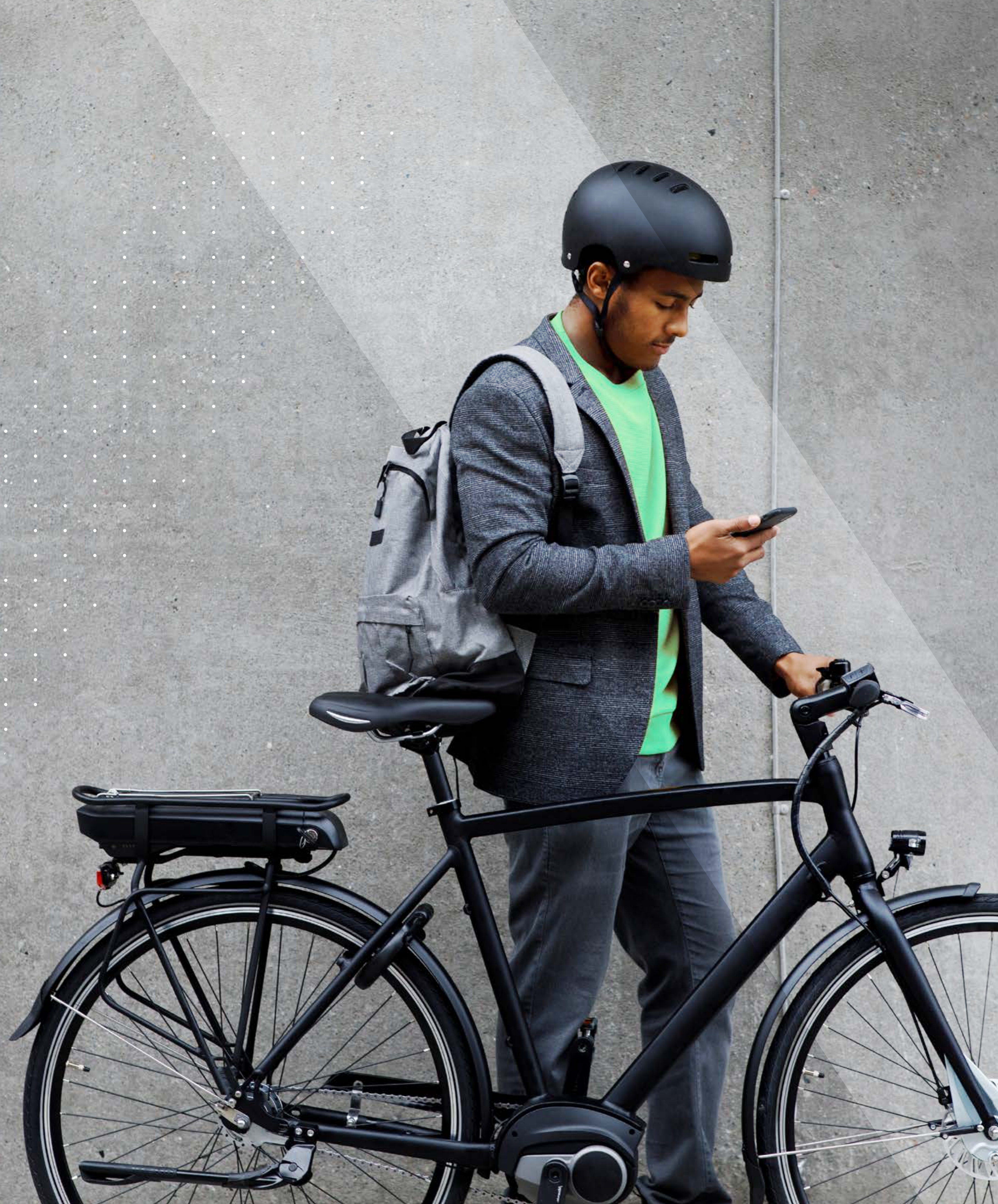
Administrative hurdles to setting up a FinTech in Luxembourg should be removed to **ease the entry of new market participants** with significant maturity and relevant expertise in the sustainability field. This alignment is necessary to ensure FinTechs capitalise on the opportunity to share their knowledge and services when FIs most need them.

For FinTech solutions to yield **maximum benefits**, overarching upgrades to IT and financial market infrastructures will be required. It should be noted that the EU's sustainability agenda is advancing in lockstep with its Digital Finance Package, the Capital Markets Union and other flagship initiatives.

A lack of clarity and guidance on regulations, especially regarding certain definitions, represents a stumbling block to the implementation of sustainability-orientated innovative solutions. While study participants point to this uncertainty as an impediment to investing in these innovations, there is a commonly shared recognition that **the certainty of change** incentivises the search for and development of **future-proof solutions**.

The need for **suitable educational efforts** and **the availability of talent** are both a concern and an opportunity. Stakeholders need to gain a sufficient understanding of sustainability, ESG and the related legal and regulatory framework to capitalise on these developments.

For sustainable finance to come of age, **a more inclusive approach** is needed when considering relevant actors such as small-to-medium-sized enterprises (SMEs) and geographies such as emerging markets. While the application of the emerging legal and regulatory framework is being phased in, service providers operating in Luxembourg's cross-border financial hub should **get ahead of the curve** and plan for the inevitable.



Where do we stand today:

Current FinTech footprint within **sustainable finance** in Luxembourg

From the FinTech perspective

Generally, study participants see the FinTech industry increasingly converging with the sustainability area; however, this process is still at an early stage. A participant pointed to several macro events that may have influenced this move at the micro level of individual FinTechs: the recent and upcoming regulations on sustainable finance, the new generation's mindset to understand the impact of their investments, and the COVID-19 pandemic refocusing attention on health, sustainability and social cohesion, among others.

Indeed, "the unprecedented challenges incited by the pandemic have augmented how corporations view sustainable practices and, as a result, have placed them at the fore of their strategic priorities."[31]

The COVID-19 crisis appears to have augmented the focus on sustainable finance, especially among millennials who "have a more sustainable mindset than previous generations."[32] Millennials believe that the way they choose to spend their money can influence change (75%), or even lift people out of poverty (84%).[33] This is true in Luxembourg too:

"Millennials want to know not just how much return an investment will make, but how it will make that return and at what cost to people, [the] planet, or communities—and consequently [there is] high interest from the financial institutions." – Study participant

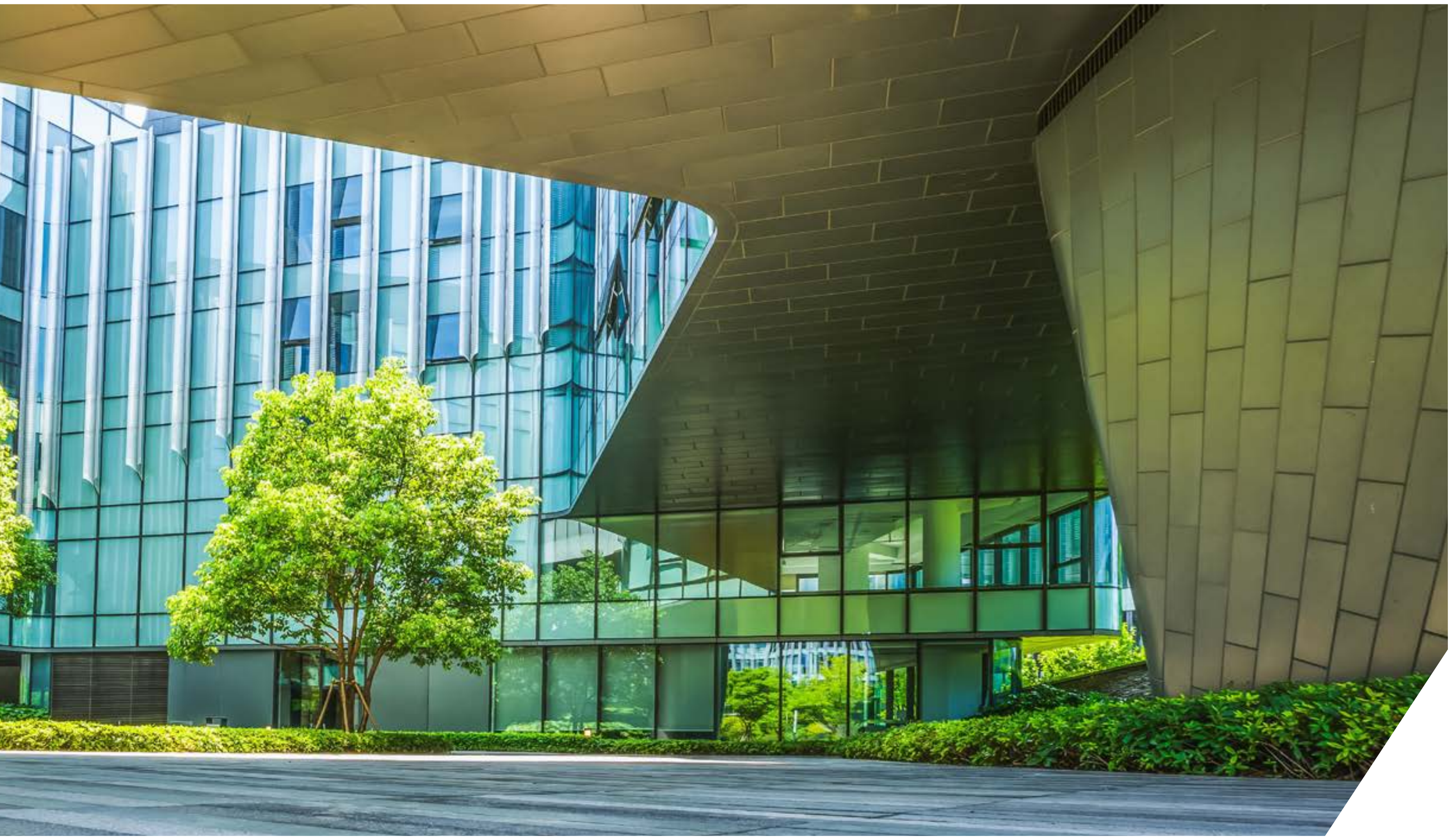
According to one participant, the ongoing and upcoming regulatory changes provide fertile ground for FinTechs to increase their footprint within sustainable finance, because these regulatory changes apply to a wide variety of FIs. In contrast, another FinTech participant argued that while many actors are offering tech solutions on sustainable finance, most of these solutions actually come from established service providers; there are only a few pure-play FinTechs that primarily specialise in ESG.

Looking deeper into how FinTechs are engaging with ESG, while globally the E pillar may seem to be FinTechs' main area of focus—due to current regulations honing in on environmental issues—locally, we find that the G pillar is better catered for than the E and the S. This is due to the well-established governance-oriented culture that has grown and strengthened within the financial sector since the 2007–2008 financial crisis.

For example, the advanced technological solutions FinTechs offer, such as AI, deep learning and machine learning, are essential to bolstering FIs' capacity to comply with know-your-customer standards and anti-money laundering requirements.

One emerging trend, reinforced by the increased reliance on IT services and digitalisation during the pandemic, is to consider cybersecurity as an essential element of corporate governance. In Luxembourg, at least one LHoFT-affiliated FinTech (Intangic, formerly known as Cyberhedge) formally caters to this area of financial services.

31. Ouida Taaffe, Why demand for sustainable finance is growing, The London Institute of Banking & Finance, July 16, 2020.
32. World Economic Forum, "What The Rise Of The Millennial Investor Means For A Sustainable World," Forbes, February 8, 2021.
33. Ibid.



In comparison, the S pillar seems to be less served by the FinTech industry in Luxembourg. This pillar could, for example, translate into additional FinTech offerings via InsureTechs, sustainable finance FinTechs (SFFs) and impact-investment-orientated FinTechs.

According to our study's participants, while FinTechs working on sustainable finance seem to be broadening their footprint in Luxembourg, the range of actual solutions offered is seemingly too narrow to meet the demand side's needs and mainly limited to regulatory reporting solutions.

"We have not seen yet a massive influx of new industry solutions that FinTech would have on offer to meet the new needs from financial market participants in the specific context of sustainable finance, be they driven or not by the regulatory agenda." – ALFI

Another prevailing impression is that while sustainable-finance-related FinTechs are increasing in Luxembourg, their ability to scale remains to be seen. In fact, presumably because of the growing but nascent nature of Luxembourg's sustainable finance market, the necessary capital to support the development of new solution providers remains to be deployed.

At the same time, there is consensus that some areas of sustainable finance will not present much opportunity for FinTech solutions. For example, regarding ESG ratings, one participant believed that many new providers would be prevented from offering value-added solutions, hampered by the amount of investment required to build up capacity in this field—from identifying the standards that underlie the ratings, to collecting and processing relevant source data, ensuring interoperability with other existing standards and ratings, and providing useful applicability to as many industries as possible. Another study participant highlighted the restrictions of the contractual clauses governing the use and reuse of ESG data, which limits the ability of third-party providers to build upon these datasets to deliver added value to financial sector participants and end users.

A possible reason why the range of sustainability-orientated solutions is ostensibly not rising in lockstep with the number of FinTechs is due to the subject's learning curve. While 'sustainability' and 'sustainable finance' have become part of our everyday dictionary, until recently, FIs and FinTechs were still trying to grasp what these terms were about and the challenges they hid. "For example, it is not yet clear what conditions need to be in place for sustainable investment strategies to also be financially worthwhile for investors."[34]

Moving from the 'what' (to do to enhance sustainability) to the 'how' (to achieve these objectives) takes time. While we could comfortably say we are in the 'how' phase overall, not least due to the ongoing, rapid implementation of the EU sustainability framework, this may not be true for the entire ecosystem.

"The ecosystem is increasingly moving away from ideas into execution and delivery of tangible solutions, so it is essential that we leverage existing data points to drive our decision-making process and prioritize activities which will have the greatest positive impact to achieve our ESG goals." – HSBC Luxembourg

Indeed, a lot of the 'what' is still unclear, especially when it comes to regulatory requirements; for example, regarding the data to be used for ESG purposes to satisfy both traditional financial return considerations and the emerging regulatory perspectives (which we explore in chapter 8 of this report). In the face of the emerging and fast-evolving nature of the sustainability topic and legal framework, some study participants believed that sustainability work has only been focused on the risk management side of the spectrum, with other opportunities remaining underexplored.

34. Deutsche Bundesbank, The sustainable finance market – an overview, November 15, 2019.

From the FIs' perspective

Whereas sustainability is fast becoming a core consideration for FIs, so far, it seems that Luxembourg financial actors regard the topic as a burden and a financially costly constraint, rather than something that will create opportunity.

Challenges related to data availability and its management, an overarching and transformational topic that FIs continue to grapple with, make the redirection of financial flows to more sustainable choices more complex and burdensome. Indeed, data is vital to:

"…measuring climate risks and results of impact strategies, developing decarbonization scenarios, identifying the ESG preferences of savers or also having a global 360 degrees view with financial flows tracked along the value-chain." – Luxembourg Chamber of Commerce

One of the issues with data is the lack of a single reference benchmark to judge the level of sustainability, which leads to uncertainty about which information is more or less relevant and appropriate for different sectors. "Benchmarking, or how data providers define companies' peer groups, can be crucial in determining the performance ranking of a company."[35]

While the interviewed FIs seemed broadly motivated by the sustainability topic, if data and compliance challenges continue to hamper the effective translation of ambition into strategy and products, then the commitments FIs make may only be superficial and increase the risk of greenwashing. Greenwashing represents a major issue that is gaining momentum. In chapter 7, we lay out how FinTechs can play a guiding role in reducing the risk of greenwashing and consequently reputational risk, especially as greenwashing is not always due to deliberate misconduct but can also arise from stakeholders' perception.[36]

GREENWASHING explained

"Greenwashing describes a situation in which a firm makes misleading or exaggerated claims about the environmental benefits of its products or services […] This could result in investors buying the wrong product, undermining trust in the market and leading to misallocation of capital intended for sustainable investors."[38]

35. Sakis Kotsantonis and George Serafeim, "Four Things No One Will Tell You About ESG Data," Journal of Applied Corporate Finance 31 (2019).
36. Deloitte, Greenwashing risks in asset management, May 2022.
37. Ibid.

Combining the two perspectives:

Both FIs and FinTechs are seemingly motivated to engage more in sustainable finance. While the Luxembourg ecosystem does provide these financial actors with fertile ground to nurture this developing area, there is a perception that the opportunities for dialogue and joint projects between them could be further boosted, strengthened and structured.

"There is an existing dialogue between these actors, however, the issue is that there is a lack of practical and scalable projects associating FinTech with business opportunities. However, the situation is evolving rapidly, and this could change in the future with clearer and harmonised rules to report ESG information." – ABBL

There are reasons to believe that Luxembourg could solve this perceived lack of practical and scalable projects; for example, through the Luxembourg ecosystem's close proximity between relevant players, a unique differentiator identified by most study participants.

"Luxembourg enjoys the presence of the two types of stakeholders within a close geographic area and institutional network fostering the connection between these worlds." – ALFI

The size of the market and the intimacy of the ecosystem enable a deep and free exchange of ideas, thus benefitting players—FinTechs, FIs and corporations—who want to connect and work together, offering the advantage of easier access to a diverse range of stakeholders working on and specialising in diverse topics. Chapter 8 deals with leveraging this dynamic for action.

Comparing Luxembourg with the rest of the world

In general, the EU is seen as more advanced than other world regions in how it thinks about and acts upon sustainability and sustainable finance, with its regulatory framework more mature and encompassing than those of other regions. Within this context, interviewees converge on the perception of Luxembourg's level of maturity.

- some perceive Luxembourg to be number one in terms of green finance in the EU, due to the ecosystem it enjoys and its leadership with flagship projects such as Green Bonds
- study participants broadly agree that other EU capitals are no more advanced in the field of sustainable finance than Luxembourg

"There seems to be much more excitement in Luxembourg than in other cities when it comes to sustainability and the FinTech world." – Domos FS

"Luxembourg is one of the leading and driving European financial centres in the field of sustainable finance and stands out for its high level of cooperation with other international centres to advance the global green agenda." – Luxembourg for Finance

- this momentum appears to translate into what market players actually experience. A FinTech study participant, originating from outside Europe and choosing Luxembourg to set up, praised the support and openness provided by the Luxembourg FinTech and start-up ecosystem

"The broader attitude to innovation is really positive and supportive. There are very few places in the world that are so welcoming." – Alis Exchange

- Luxembourg also has the added advantage of its smaller size in terms of geography and population compared to other country hubs, meaning that decisions can be made faster and access to decision-makers, advisors and complementary, cross-disciplinary points of view can be easier

"[Luxembourg's] differentiator n.1 is its small size and culture of collaboration." – LuxFLAG

- Luxembourg's prominence in the realm of investment funds is also significant. The specific expertise this entails, coupled with regulatory expertise, is essential for sustainable finance, as the asset management world plays a major role in redirecting financial flows to sustainable economic activities. Similarly, targeting specific functions that are largely represented within the country—middle- and back-office functions—could help further boost Luxembourg's SFF sector
- Luxembourg is able to build upon its already established RegTech arena, thus becoming a point of reference for the Governance component of ESG:

"Luxembourg already has expertise in RegTech, and that will/can increase because of the upcoming regulations (SFDR, [EU] Taxonomy, MiFID II) which could increase the use of RegTech in terms of reporting." – LuxFLAG

- Finally, Luxembourg's diversity and multiculturalism are important assets, making it an attractive financial centre for incoming, foreign FinTechs as well as for the establishment of new entities

Considering the above arguments and combining them with the Grand Duchy's historical and now well-established cross-border expertise, Luxembourg holds significant potential to not only defend its leadership position in green finance but also to establish leadership in Sustainable Finance FinTech. The latter would also be a natural continuation of the local FinTech ecosystem's organic development in response to FIs' need for technological evolution for their core functions, as they are increasingly impacted by ESG considerations. Chapter 8 elaborates on ways to turn this vision into reality.

Having a clear plan and strong focus on long-term strategy is also fundamental, particularly in the realm of sustainability and sustainable finance, because of the limited talent availability, a topic further explored in this study:

"Talent is rare generally, and even more so in Luxembourg." – Quintet Private Bank

In this context, being able to attract and manage talent efficiently is particularly vital to an organisation's success.

However, it seems that Luxembourg's ESG FinTech sector has not yet found its focus:

"Luxembourg does not [yet] leverage its 'sweet spot factor'." – uni.lu

What opportunities does sustainable finance provide for FinTechs?

Equipped with a picture of Luxembourg's FinTech offering in terms of sustainability and sustainable finance, and considering the demand from the FIs as well as the potential areas of development identified for Luxembourg, this chapter investigates opportunities for FinTechs to explore. On an individual company level, this evaluation must be complemented by each FinTech's unique strategic positioning and capabilities.

Facilitating data access and data management

Data is often the first application that comes to mind when both supply (FinTech) and demand (FIs) think of sustainable finance and FinTech. Indeed, the different regulations framing sustainable finance require more transparency that, in turn, strictly depends on data.

"We expect this FinTech maturity in ESG in Luxembourg to change with the regulations; we also expect an increase in compliance requirements, like with regards to how firms can use data to be compliant/gain a competitive advantage. That's where FinTechs can play a role." – ICE Sustainable Finance Data

Ultimately, the push for transparency will help redirect investor choices and the financial flow to more sustainable options. One example includes the European Securities and Markets Authority's (ESMA) call for evidence on ESG ratings that aims to develop a clear "picture of the size, structure, resourcing, revenues and product offerings of the different ESG rating providers operating in the EU" by addressing three crucial target groups: users of ESG ratings, ESG rating providers, and entities subject to the rating assessment of ESG rating providers.[38]

To support transparency, an FI must report on their own products and services, and technology becomes vital in this context. Indeed, "Artificial Intelligence (AI) and FinTech-powered ESG screening and analysis solutions have become 'strategic enablers' that can address some of the inherent ESG information biases and, potentially, even ESG rating divergences arising from corporate self-reporting, and annualised, backward looking reporting of information."[39]

"FinTechs in combination with AI have a key role to play." – UBS Luxembourg

Machine learning and Natural Language Processing (NLP) technologies are crucial to retrieving and interpreting ESG information in real-time to "provide a meaningful approach for ESG complexity management", as well as to enhance transparency.

"Increased transparency can be achieved through digital solutions e.g. an application to monitor the Environmental and Social outcomes of one's investments, reduced impacts as well as mitigation/adaptation capacities." – ABBL

38. ESMA, "ESMA launches call for evidence on ESG ratings," press release, February 3, 2022.
39. Martina Macpherson, Andrea Gasperini, and Matteo Bosco, "Artificial Intelligence and FinTech Technologies for ESG Data and Analysis," Social Science Research Network, February 22, 2022.

The current lack of transparency and comparability increases the probability of confusion and discrepancies among data providers. Ongoing research at HEC Liège has found there is profound divergence among data providers, with ESG ratings differing in results and influenced by firm-specific characteristics, and financial constraints in particular.[40]

Whereas leverage was found to negatively impact ESG scores, size—measured in terms of assets and/or headcount—and data availability—measured as the quantity of ESG information disclosed by the firms—showed positive influence. Among rating providers, the size-ESG rating relation was not equally present among all ESG rating companies analysed for the research.

Nonetheless, the size-ESG rating relation may be dual: on the one hand, larger firms may have more resources to disclose and invest in ESG, thereby obtaining higher ratings. Conversely, companies achieving better scores are likely to attract more capital and incur fewer costs in the long term, such as reputational, physical or taxation costs, allowing them to build more resources and induce growth.

ESG ratings also show different results due to the complexity inherent in rating providers' methodologies. For example, one ESG rating provider analysed in the HEC Liège study not only relies on considerably more complex methods than other providers, but also places higher importance on analyst experience and discretionary aspects.[41]

"The problem is not the lack of data per se but finding the right data, knowing how to clean and use it, and then how to interpret it." – Luxembourg Sustainable Finance Initiative (LSFI)

What do FIs need when it comes to data? They need solutions that allow them to collect data from relevant sources while maintaining quality—i.e., integrating a form of data validation—and distribute this data through appropriate channels to ultimately produce reports. Data validation and quality assurance are particularly fundamental to avoid greenwashing. As a whole, such data availability will enable

"better economic decision-making, regulation and risk management." - Luxembourg Chamber of Commerce

What should be considered when working on data solutions is the added value the data provides to users and their customers; this is especially true in the financial sector where

"Attention is a scarce resource of investment practitioners. Because attention is precious, you have to bring the necessary information in the investment process. You need to help investors to move quicker." – Alis Exchange

The study participants proposed several approaches to providing ESG data solutions:

- creating a **data hub**, facilitated by FinTech participants, to support the collection, assessment, storage and use of data, to which all relevant FIs could contribute. Such a hub or cluster approach could also facilitate comparisons and harmonisation. Financial sector participants should bear in mind that competition is likely to arise from BigTech data providers, as evidenced by the Monetary Authority of Singapore's (MAS) recent announcement of a dedicated hub for developing sustainability-focused FinTech solutions with Google Cloud.[42] Indeed, as noted by one study participant,

"Transparency is the playing field for data providers." – Nordea

- increasing focus on areas of the financing world that are underserved to date, such as SMEs and emerging markets:
  - while the data challenge is a global one and leaves no one behind, it disproportionately affects **SMEs**, which play a crucial role in the move towards a sustainable economy. Their limited resources and the resulting difficulty in producing clear, coherent and complete data can hinder their access to capital. As this access is fundamental to their operations and growth and, by extension, to realising their full sustainability impact on the ground, SMEs must be enabled and empowered to collect the right data
  - while a significant number of fund managers work in **emerging markets**, they grapple every day with limited and poor-quality datasets; therefore, data collection for sustainability could pose a considerable challenge, providing FinTech firms with a meaningful opportunity.

40. Anouck Faverjon, Céleste Hardy, Marie Lambert, and Laurent Prunier, "Documenting ESG rating bias that influence performance analysis: A comparison between data providers," presented at AFFI 2022, May 25, 2022.
41. Faverjon, Hardy, Lambert, and Prunier, "Documenting ESG rating bias that influence performance analysis".
42. Monetary Authority of Singapore, "MAS and Google Cloud Launch Point Carbon Zero Programme to Catalyse Climate FinTech Solutions," press release, July 26, 2022.

Setting up data solutions

The utopian ideal is a universal ESG data solution, with an approach and framework that allows as many different sectors as possible to benefit from broad data availability and data analysis tools, instead of a sector-specific approach and framework with less capacity to provide data on uncatered actors and markets. Stepping stones towards 'global' solutions could be cross-border or EU-level initiatives with cross-sectorial input, including:

- supporting FIs in **managing big data** through technology, insofar they require and are open to such support
- consolidating and facilitating **access to 'alternative' data**, for example, by analysing news and social media posts via a sentiment-analysis tool. These ESG-related informal data points can be beneficial to integrate brand and reputation elements into ESG compliance actions and strategies
- exploring an expanded **role for financial sector regulators** in facilitating access to and validating ESG data. In Luxembourg, the CSSF 4.0[43] initiative foresees the implementation of advanced digital solutions such as a data lake, real-time supervision of certain financial sector segments, and enhanced efforts to ensure the regulator's workforce keeps up with the financial sector's technological transformation. Similar initiatives focusing on sustainable finance and ESG data can be envisioned on both EU and national levels.

Such 'bold plays' aim to drive progress for broad swathes of the economy, and would likely enable network effects while benefiting from economies of scale. However, can decision-makers unite to realise such a solution?

43. *Thierry Labro, «CSSF 4.0, le régulateur en temps réel» Paperjam, July 3, 2020.*

Educating financial players

If we imagine a best-case scenario where data is widely available and easily accessible, it is essential that both the data handlers and the data receivers and users actually understand it. This study finds that a significant and broad educational effort is required to ensure alignment with sustainability objectives across financial and corporate sector functions. Study participants **invariably agreed that more education on sustainable finance is fundamental**, and FinTechs can take a leading role in improving the population's financial and digital education.[44] FinTechs are not only able to provide "superior customer experience relative to incumbent firms in various areas of consumer finance,"[45] but

"FinTech can be used to up-skill employees as well as to educate people in a way that will allow for more informed decisions in sustainable finance related decisions." – ABBL

FinTechs have a unique role to play in disseminating knowledge because:

- FinTechs typically need to become (or hire) experts on specific subjects to develop their solutions, while FIs usually try to leverage the knowledge and expertise within their group or headquarters. FIs who may already work with these in-house experts can further complement their need for knowledge and expertise by reaching out to FinTechs, who could help FIs continue building their sustainable finance capacity. FinTechs could also—in contrast to FIs with headquarters outside Luxembourg—offer a more specialised knowledge set focusing on their local environment, which is sometimes lacking at the group level. Ultimately, the combination of both complementary in-house (headquarters) and external (FinTechs) expertise can be extremely beneficial
- FinTechs—both in the B2B and the B2C segments—often rely on a value proposition anchored in a superior user experience. To achieve this, FinTechs must apply design thinking—putting themselves in the user's shoes—by continuously challenging themselves to understand the ultimate user's knowledge and competence to offer them the best experience possible.

In this context, FinTechs could particularly focus on supporting ESG-related education in three ways:

- **clarifying the difference between ESG as a risk and an opportunity:** as mentioned in previous chapters, study participants felt that many market participants still view ESG requirements as a risk and a burden rather than a business opportunity
- **educating financial and investment advisers:** they must be able to understand ESG to best support their clients in ultimately redirecting financial flows to sustainable finance
- **educating investors and customers:** as they are the ones with the capacity to 'vote with their wallets', FinTechs can help *"create an 'activist investor' mentality." – uni.lu.*

44. Joia and Cordeiro, "Unlocking the Potential of Fintechs for Financial Inclusion: A Delphi-Based Approach."
45. Thomas J. Chemmanur, Michael B. Imerman, Harshit Rajaiya and Qianqian Yu, "Recent Developments in the FinTech Industry," Journal of Financial Management, Markets and Institutions 8, No. 01 (2020).

Bridging the talent gap

FinTechs have a discrete opportunity to benefit from the sudden and massive unmet demand for specialist knowledge in sustainable finance.

This could take the form of **providing tailor-made advisory services beyond FinTechs' current offering**. As FIs implement regulatory requirements, the focus quickly and inevitably moves to **how** these requirements will impact the internal organisation, processes and procedures. In this context, FIs need help with implementing regulatory requirements via technology solutions and ensuring they stay up to date with the rapidly changing environment affecting implemented solutions; for example, new or evolving application programming interface (API) standards, data sources and regulations.

"Last year I realised that we were in the 'what' phase, where incumbents were trying to understand what was happening, and Greenomy was [thus] providing consultancy to raise the understanding of the [EU] Taxonomy and SFDR." – Greenomy

Interestingly, as one study participant noted, specialised FinTechs can provide this advisory support not only to FIs but also to SMEs at a comparative disadvantage to large firms regarding internal resources. Therefore, alongside helping integrate SMEs into the sustainable finance arena through data, FinTechs' related advisory and consultancy services could be another way to support SMEs on their sustainability journey.

"A big opportunity for FinTechs is the education of clients and helping them through this complex journey, in particular small and medium-sized enterprises. Not all companies have the same level of knowledge, budget and expertise, hence it is key that they receive the right support and guidance."

HSBC Luxembourg

The added value of bridging the talent gap is not only achieved by FinTechs' deep expertise in their specific service offering related to, for example, regulatory compliance with the emerging EU sustainable finance framework, but also due to their overall mindset and approach to work:

"FinTechs are creative places, they operate in a highly agile way, and they can help solve some of the macroeconomics issues, within the ESG space, we are facing today." – HSBC Luxembourg

The fostering of creativity and innovation inherent to the FinTech start-up culture can offer FIs and other actors a differentiating benefit. Likewise, study participants perceive that FinTechs are well-positioned to attract top talent in areas relevant to sustainability. As they strive to offer a work environment that embraces innovation, creativity and agility alongside professional and personal development, FinTechs count among the most attractive employers today.[46]

According to Citigroup's Digital disruption report,[47] the total headcount of US- and EU-based financial service providers is likely to plummet by 30–40% by 2025 as top talent migrates to FinTechs. Given the sector's innovation imperative and steady influx of investments, FinTechs play a pivotal role in attracting a young, highly skilled workforce to a country,[48] ultimately contributing to its economic growth.

46. Vivek Ravisankar, "How To Attract FinTech Talent In A White Hot Job Market," Forbes, March 14, 2022.
47. Ronit Ghose, Ashwin Shirvaikar, Keith Horowitz, Josh Levin, Simon Ho, Greg Baxter, Jonathan Larsen, and Aditya Menon, Digital Disruption: How FinTech is Forcing Banking to a Tipping Point, Citigroup, March 2016.
48. Nikhil Barshikar, "How the FinTech Industry is Drawing Young Talent in the Country," Entrepreneur, May 29, 2018.

Expanding beyond regulatory compliance

"FinTechs are a tool of economic inclusion",[49] all the while supporting financial development and efficiency.[50] While it makes sense for FinTechs to focus initially on compliance, given the EU's legal and regulatory evolution, FinTechs could reach further to position themselves as actors of cultural change, which are essential in the transition to a more sustainable economy and society. Indeed, "the biggest driver of transformation is cultural change", and there is evidence that FinTechs enable this shift,[51] driving social and corporate change by democratising access to finance, and spurring financial inclusion through the power of tech.[52]

The FinTech sector's emergence is already contributing to behavioural change through several dynamics. FinTechs empower individuals with historically limited access to financing by providing new opportunities for financial inclusion. In parallel, tech-powered solution providers allow incumbent FIs to redirect resources towards strategic matters and growth opportunities while staying profitable through their core business.

Increasing adoption by traditional FIs, together with an ever-changing regulatory, technological, and macroeconomic environment, accelerates the "FinTech revolution".[53] This revolution entails an enormous digitalisation and automation effort across the financial sector, while supporting FIs in broadening their offering. Consequently, customers are increasingly involved in managing their personal finances, as financial technology creates a "more convenient way for consumers to communicate with banks",[54] "by closing the gap between unbanked, under-banked and developed societies, opening the door to the global digital economy, bringing a long-term societal transformational change for the financially excluded/underserved, while leading to inclusive economic growth helping move towards a more just and equitable society."[55]

49. *Standard Chartered, How FinTechs and banks can build inclusive and sustainable growth together, November 5, 2021.*
50. *IMF, "Balancing FinTech Opportunities and Risks," speech by Tao Zhang, June 10, 2019.*
51. *ING, FinTechs help change our culture – Benoît Legrand, July 27, 2017.*
52. *Craig Cecilio, "Money Matters: How FinTech Can Drive Social Change," RealLeaders, September 30, 2020.*
53. *Henri Arslanian and Fabrice Fischer, The Future of Finance: The Impact of FinTech, AI, and Crypto on Financial Services (Palgrave Macmillan, 2019).*
54. *Eugin Prakash Pathrose, Nileena Saroja, and Mayakannan Selvaraju, "FinTech and Future of Banking in Emerging Economies Post Covid 19", SPAST Abstracts 1 no. 01 (2021).*
55. *Dimitrios Salampasis and Anne-Laure Mention, "FinTech: Harnessing Innovation for Financial Inclusion," Handbook of Blockchain, Digital Finance, and Inclusion, Volume 2 (Elsevier, 2017).*

One study participant mentioned that:

"FinTechs ... can encourage the adoption of green technologies, raise additional funds towards the energy and ecological transition and limit the negative externalities of the financial sector through the transformation of practices and propose new responsible financial products."

In concrete terms, sustainability involves examining the entire end-to-end supply chain, while pushing for even greater involvement by institutional and retail investors. However, as a study participant pointed out, **the retail client base has had "barely any chance to access [sustainable finance]"**—for reasons intimately tied to the development of responsible and sustainable investment practices, which was instigated for and until recently largely confined to institutional asset owners and asset managers.

FinTechs' potential role as education and expertise providers may also drive change. If retail customers currently lack the opportunity to participate in the sustainable finance revolution, it is not only due to a shortage of suitable financial services and products but also a lack of knowledge.

One example is the FinTech firm October, offering retail-investor-oriented solutions with ESG-based services through a platform for everyday citizens to support SMEs needing loans.[56] October's success rests on its ability to apply a superior user experience to a business need; SMEs benefit from significant reduction in paperwork and loan collateral provisions, among other perks, while lenders benefit from a lean payment system and ready access to a user-friendly dashboard that breaks down their lending activity along different verticals.

Such solutions provide a level of analysis and data visualisation that can be easily grasped by the end-user, empowering them to become active agents of change via better-informed investment decisions that consider sustainability criteria.

Another vector for the popularisation of sustainable finance could be Distributed Ledger Technology (DLT), since the technology is premised on transparency, openness and cryptographic principles enabling a new approach to the all-important concept of trust, which fosters inclusion as a result. Simultaneously, DLT shows significant promise for increasing efficiency and speed in certain financial applications while reducing costs. In recognition of this technological potential, the EU's DLT Pilot Regime for financial market infrastructures is set to kickstart a period of experimentation in this regard, with the explicit encouragement for collaboration between incumbents, FinTechs and academic researchers.[57]

"DLT ensures transparency for investors and allows them to monitor whether their projects reach their targets, introducing new ways of accessing information." – ABBL

The convergence of the EU's sustainable finance agenda and its Digital Finance Package, which includes the DLT Pilot Regime, is an additional incentive to explore advanced technological solutions like DLT market infrastructure to tackle the challenges of the transition to sustainable finance and a sustainable economy overall.

Some study participants also believed that DLT holds promise for sustainable finance applications for reasons beyond the technological. For example:

"Crypto promotes a culture to tackle poverty and provide more transparent information and [can] be a playing field for everyone who has little understanding of how the financial market works, it ensures access to all." – Bitstamp

Consequently, integrating DLT concepts into ESG strategy implementations can yield societal benefits, such as greater financial inclusion and decentralisation.[58] A major attribute of crypto-assets and related DLT-based technology is the disintermediation they provide, driving significant improvements in terms of governance,[59] albeit also raising as-of-yet unresolved legal questions. At the same time, as a study participant pointed out, the DLT infrastructure's environmental footprint should be carefully assessed and managed to ensure that its social and governance benefits are not outweighed by its environmental impact.

56. October, "About us," accessed August 16, 2022.
57. Deloitte, DLT Pilot regime released: how EU is preparing for tomorrow's digital securities market, June 3, 2022.
58. Morgan Stanley, Should ESG Investors Own Cryptocurrency?, March 25, 2022.
59. Ibid.

Collaborating with the wider ecosystem

To support and enable the opportunities explored so far, study participants emphasised the importance of working together: "There is a need for greater international collaboration".[60] Joint initiatives, such as partnerships or co-investment schemes, are considered crucial to strengthen the ecosystem and unlock the opportunities ahead for FinTechs in sustainable finance. This involves ensuring data solutions solve real challenges and meet users' needs, building sustainable finance knowledge, making sure talent is placed and retained intelligently, and allowing more stakeholders to benefit from the sustainable finance evolution.

"Collaborations are important, because the topic of sustainability is very multidisciplinary." – Filedgr

A recent example of a Luxembourg public-private partnership contributing to the net-zero transition and sustainable growth in emerging markets is the impact strategy recently launched by Schroders (alternative investment fund), BlueOrchard (investment manager), and the Luxembourg Ministry of Finance. This landmark partnership is aimed at channelling both public and private investments via "an innovative Luxembourg-based vehicle that will help close the climate finance funding gap."[61] These collaborations are urgently needed to make progress on the EU Green Deal, and the inclusion of FinTechs will likely catalyse momentum.

FinTechs have much to offer to collaborative and open initiatives; after all,

"FinTechs love to solve coordination problems." – Alis Exchange

Arguably, the constant search for ways to turn solutions into common goods is rooted in some FinTechs' very DNA; for example, companies focusing on open banking solutions or developers of decentralised finance (DeFi) applications. However, this clashes with the business philosophy of traditional financial (and corporate) entities, who are typically protective of their data and IP that form, they believe, a foundation of their competitive advantage or 'moat'.

When it comes to a concept as all-encompassing as sustainability where—beyond the regulatory efforts—ultimate success will be determined by cultural and mindset change, building ad hoc solutions for each participating actor could result in fragmentation, without benefitting the ecosystem overall. Therefore, scalability, robustness and security are called for, as is collaboration, to support innovation and ensure high levels of quality, coherence and consistency.

"It should be about data coordinating and data collaborating, and the FinTech ecosystem has a role to play in it." – Alis Exchange

A catalyst to boost collaboration could be co-investment programmes, which bring together financial sector and corporate incumbents and FinTechs through consortiums or clusters—with incumbents contributing their expertise and FinTechs their creativity, innovative capacity and agility.

Depending on how industry associations work with and facilitate such programmes, their resulting solutions could either benefit specific aspects of sustainable finance or contribute to solving broader industry-level challenges, for example, in the form of mutualisation platforms. Most study participants sounded the call for creating these collaborative opportunities, highlighting the thirst for more intra-sector and cross-sector synergies and osmosis (further explored in chapter 8).

60. IMF, "Balancing FinTech Opportunities and Risks," June 10, 2019.
61. The Luxembourg government, "Luxembourg Ministry of Finance appoints Schroders and BlueOrchard to accelerate climate action with a landmark partnership," press release, June 16, 2022.

ESG-focused or ESG-wide approach: an open question?

When considering FinTech applications in sustainable finance, a question that arises is whether they should focus on one of the three ESG pillars, or all three.

Arguments in favour of a holistic approach

Study participants broadly felt that FinTechs should tackle ESG pillars as a whole because the dependencies between the pillars do not allow for a 'tunnel vision' approach—and ignoring two of the three pillars inevitably means that one's understanding of the chosen pillar will suffer.

Indeed, the design of sustainable finance regulations illustrates that, while each ESG pillar has its own specific definition, they are still interconnected, and FIs are expected to consider this link. One example is the SFDR's Do No Significant Harm principle, where FIs cannot label products as 'sustainable investments' if they significantly harm any other environmental or social objective than their main investment objective.

Therefore, FIs are better supported with solutions organised by activity vertical instead, which may well span across the E, the S and the G. For example, ALFI has identified the below activity verticals:

1. data collection, analysis and crunching
2. market research
3. active engagement policies
4. risk management
5. reporting to investors
6. regulatory reporting
7. legal documentation

This activity-oriented approach can also allow FinTechs' technical expertise to percolate across different business segments.

"The E, S and G are all equally important components of the wider strategy, and it is key that they are viewed as complementary to each other rather than in isolation. This is essential to succeed in our joint mission to improve our future."

HSBC Luxembourg

Arguments in favour of a siloed approach

While a holistic approach to ESG is advantageous, FinTechs could also benefit from targeting a particular pillar for the following reasons.

Environmental

Based on our interviews, the Environmental pillar is seemingly top of mind for both FinTechs' search for applications and for FIs' search for support. This is due to the worldwide and very visible challenge of the climate emergency, which is a focal point of current regulations.

"With the global focus on climate change and international efforts to curb carbon emissions and pollution, resource consumption, clean air, and water, etc., the unavoidable impact of business activities on the environment is under scrutiny." – Luxembourg Chamber of Commerce

Governance

While Governance is already well-represented in the Luxembourg ecosystem, having been ingrained in the thinking of financial service providers since the 2007–2008 financial crisis, the area of Governance expertise continues to evolve and offers opportunities for further development.[62] Luxembourg's rich RegTech ecosystem and specialised law firms can help the financial sector stay abreast of sustainable finance developments and ensure its continued competitiveness.

"Most critical at this stage is that we begin to ask the right questions, with an eye toward the corporate form's flexible capacities, in order to identify more sustainable governance reforms than those presently garnering substantial attention. Until we begin to scrutinize the fundamental attributes of the corporate form and the decision-making incentives they produce with reference to long-term sustainability, effective responses to the interconnected crises we face today will continue to elude us."[63]

Additional factors like the significant number of independent directors also play to Luxembourg's strength in terms of Governance.

Social

Despite FinTechs' greater interest in the E pillar and the strong local epresentation in the G pillar, focusing on the Social pillar could open the door to new opportunities.

Because a 'Social' taxonomy is still being defined by the EU,[64] it can be complicated to propose an impact measurement approach without clear definitions of Social pillar topics. This presents FinTechs an opportunity to assist incumbents with a complex task:

"This element is trickier to manage/contribute to because there are different views on what the S actually means. That's probably where data is hardest to find. Maybe there's a role to play for FinTechs." – Alis Exchange

Social factors are also often the result of Environmental events and Governance set-ups. For example, a study looking at the synergies and trade-offs between SDGs[65], which can be linked to each ESG pillar, shows how "SDG 1 [No poverty, a Social goal] has synergetic relationship with most of the other goals, whereas SDG 12 [Responsible consumption and production, an Environmental goal] is the goal most commonly associated with trade-offs."

Therefore, given that Governance is a focal point of the Luxembourg FinTech ecosystem, FinTechs can leverage their expertise and competencies on this topic to explore the Social pillar. Similarly, because Social factors can be linked to Environmental events, those FinTechs that have developed specific Environmental offerings in response to current regulations can build on these skills and knowledge to explore the Social pillar.

From a business development point of view, FinTechs have the opportunity to cater to the Social pillar by, for example, partnering with wealth managers and financial advisers of high-net-worth individuals wishing to pay close attention to the Social impact of their investment decisions, with a view to their personal legacy:

"There's clearly an opportunity, especially when going to the high bracket of wealth where people want to have an impact and want to leave a legacy." – Quintet Private Bank

62. Christopher M. Bruner, "Corporate Governance Reform and the Sustainability Imperative," The Yale Law Journal 151, no. 4 (2022).
63. Ibid.
64. European Commission, "Platform on Sustainable Finance," accessed September 20, 2022.
65. Prajal Pradhan, Luís Costa, Diego Rybski, Wolfgang Lucht and Jürgen P. Kropp, "A Systematic Study of Sustainable Development Goal (SDG) Interactions," Earth's Future 5, no 11 (2017).

What may be required to grasp the opportunities

FinTechs are being driven to develop and provide much-needed solutions for FIs' sustainability transitions within a sustainable finance regulatory framework that, while necessary, is currently laden with ambiguity and subject to ongoing changes. The regulatory timeline has not always helped FIs to prepare their expected deliverables and fulfil their compliance efforts.

For example, the ESG-related MiFID II changes are expected to require investors' sustainability preferences to be taken into account when providing products and services. However, the Principal Adverse Impact statements—required for one of the three sustainability preference types an investor may have—are not planned to be made available until January and June 2023 under the SFDR.

Further uncertainty can also arise from the differences between EU and non-EU jurisdictions as well as for entities who rely on cross-border business models.

Such conditions can **reduce the motivation to launch significant projects until there is more clarity**, resorting to a 'wait and see' mindset that can hinder the rapid growth of sustainable finance.

"Feedback from our members is that to a large extent, we are very much in a 'learning by doing mode'; the regulatory agenda is a moving target, with many missing blocks pre-empting firms from engaging further." – ALFI

This lack of certainty and maturity may impede FinTechs' opportunities, with their FI interlocutors not speaking the same language due to differing interpretations of the rules and definitions. However, the regulatory opacity and uncertainty can be turned into opportunity, wherein FinTechs can drive a level of standardization by leveraging their value proposition and building significant market share with their solution. This chapter explores the required conditions for benefits, opportunities and innovation to become a reality.

Consistent translation of regulations

The complexity of an uncertain regulatory framework is not only linked to the regulatory timeline; the way these regulatory requirements are translated by FIs is equally important, with some elements getting 'lost in translation'. For example, ALFI raised how there is still a

"debate on the concepts of eligibility under the [EU] Taxonomy versus effective Taxonomy alignment".

Another study participant emphasised that FinTechs can only deliver meaningful contributions once data needs and specifications are clearly defined.

The lack of standardisation of how data is measured and reported can lead to different results, which some study participants deemed unacceptable regarding a global effort to implement sustainable finance. The different results, methodologies and standards do not help to create an environment of trust, which is crucial to convince investors and corporates alike to redirect financial flows to sustainable alternatives.

"As a business or personal user, I don't trust the data or ESG ratings for a company when there is a big discrepancy of the results coming from different data providers." – Moniflo

Ultimately, study participants expect the robustness of ESG data to reach the same level as accounting data, standards and methodologies already in place today.

Achieving trust and robustness in ESG data requires that regulations are interpreted in the same way and a high level of standardization. The data must also be easily accessible. Singapore's regulator, the MAS, is leveraging technology to help the local industry with the ESG data challenge by subsidising and coordinating several projects in relation to ESG data under the banner of "Project Greenprint". These include: an ESG Disclosure Portal to promote consistency and allow for comparability of data; Data "Orchestrator(s)", a network of data platforms to aggregate and enable access to trusted ESG data sources; and an ESG Data Registry, a blockchain based network of registries that record and maintain provenance of ESG certifications and verified data.

Some supranational initiatives tackle this issue, such as the European Single Access Point (ESAP). To date, there are more than 200 obligations for public reporting, more than 35 existing legislative frameworks, and more than 150,000 existing reporting entities, but the public's free access to EU- and national-level financial and sustainability-related information is limited.[66] The ESAP aims to overcome these difficulties via a centralised data repository and search system that provides access to national and EU-wide information.

As a result, investors should have better information for decision making and the task of ESG related compliance and reporting should be made easier; however, while this represents a step in the right direction, even this opportunity is flawed as

"...the information at that stage will only be limited to large listed corporates, and we will miss the big picture [that] includes the SMEs that comprise the backbone of the EU economy." – ABBL

As discussed previously, to allow for the broad implementation of sustainability criteria into business and financial decision-making, there is a dual need for further integration of SMEs while accounting for their resource constraints compared with large corporates.

This specific challenge of including all necessary actors in the scope of sustainable finance regulations is further explored later in this chapter.

66. European Commission, "Capital Markets Union: Commission proposes new measures to boost Europe's capital markets," press release, November 25, 2021.

More expertise, education and openness

"We note that there are also barriers related to the technical (financial and scientific) expertise that is required." – ABBL

While education represents an opportunity for FinTechs to contribute to the sustainable finance journey of FIs, large-scale educational efforts are also essential to realising FinTechs' bold plays. This entails the dissemination of knowledge around the core concepts of sustainability, what this means for FIs and their proactive role in it and, finally, an understanding of the **expectations set by both regulators and customers**. Therefore, low levels of education erode the necessary foundation for the whole ecosystem to address challenges, related opportunities, and the potential for targeted innovation via R&D.

Indeed, study participants argued that these needs must be clearly defined by FIs themselves, i.e., the ultimate user of the solution in a B2B context. **If FIs lack this awareness and understanding, which subsequently impacts their collaborative engagement, identifying unmet needs and defining adequate solutions becomes tricky, corroding the welcoming environment that FinTechs need to thrive.**

Study participants also believed that the regulator needs to boost its internal capacity to deal with the emerging sustainability framework, to support the development of relevant solutions through effective knowledge dissemination and fruitful, expert dialogue with industry participants.

The need for education also extends to FinTechs, as only a handful have specialised in sustainable finance and sustainability expertise from the get-go.

"A key barrier for incumbents is to understand the legislation, which is very complex." – Greenomy

Finally, to ensure any solutions proposed by FinTechs meet a receptive market environment, education on sustainable finance should also be improved among retail customers. As an example, if the current efforts to classify products as Article 8 or Article 9 under SFDR do not resound with customers with the power to decide where to invest, the aim of redirecting financial flows towards sustainable choices will not be achieved, even if all regulatory requirements are met. Indeed, as one study participant mentioned:

"We need to bridge the gap between legal professional requirements and users' understanding and awareness. [...] We can be as regulated as we want to be, but regulation isn't addressing the needs and demands of the user. (Almost) Nobody on the street knows what an Article 8 or 9 is, or what the [EU] Taxonomy is."

"People [retail customers] want simple, understandable data that's adapted to their needs. We can create proper education for them [retail customers] that guides and motivates, [and] understands their frustrations." – Moniflo

In the same way that today's lack of widespread education around sustainability is an issue relevant to all stakeholders of the sustainable finance ecosystem, the solution could also be multi-stakeholder; i.e., achieved through talent osmosis, where people moving between companies carry over, build and share their personal knowledge and expertise.

Educational initiatives can also take the form of partnerships between the public sector and FinTechs. For example, financial and digital skills could be expanded within the scope of general education through teacher training, adapting school curricula, and adult education initiatives, to further enhance the level of financial inclusion in Luxembourg.[67]

Amidst the greater emphasis on digital and financial skill sets, individual members of the FinTech community as well as FinTech entities could play a role in knowledge dissemination. The enhanced education of consumers and investors would contribute to a more efficient market in the medium-to-long term.

Knowledge transmission can take various forms, for example, via the FinTech for Sustainable Finance Development workshop offered by the United Nation's environmental programme.[68] This aims to raise "awareness among financial institutions on the strategic role that FinTech could play in addressing the financing challenges of the sustainable development agenda including the role of FinTech in:

- improving financial inclusion of underserved groups (low-income citizens and SMEs);
- building resilient infrastructure (e.g. energy);
- fostering innovation (small holder agriculture, sustainable and land use);
- promoting sustainable industrialization in the MENA region."[69]

Some study participants believe that traditional educational offerings are not designed to scale enough to drive broad societal awareness and change, strengthening the case for FinTech-based solutions that combine commercial offerings with an educational component.

67. Chemmanur, Imerman, Rajaiya and Yu, "Recent Developments in the FinTech Industry."
68. United Nations Environment Programme Finance Initiative, "FinTech for Sustainable Development," accessed August 16, 2022.
69. Ibid.

Technical infrastructure upgrade

Technological upgrades, especially those to core financial software stacks and financial market infrastructure, are a relevant factor in sustainable finance, being significant enablers of collaboration and integration between incumbents and FinTechs. While FinTechs may have all the right services and products on offer, there can be considerable discrepancies between FIs' legacy IT and FinTechs' contemporary IT. **Therefore, FIs wishing to benefit from FinTech solutions must continue investing in their own digital transformation programmes, with an emphasis on interoperability, via APIs for example.**

FinTechs also need to pay close attention to and fully understand the dependencies within the financial infrastructure. As noted by one study participant:

"FinTechs are working on ESG solutions to support sustainability, however, the whole tech industry needs to keep an eye on their own hardware setups if you really want to have an impact. Indeed, you may download an app proposed by a FinTech, with an interesting ESG solution, but one forgets that behind that app there is a massive infrastructure that also requires adapting. Basically, in the whole 'tech' part of the 'FinTech', there is still not much attention to detail." – Filedgr

Based on our interviews, the reuse of ESG data across a company's IT architecture and its different functions and processes is seemingly limited by specific agreements with data providers.

This problem hinders a holistic and company-wide approach to ESG data, which would be beneficial to start viewing ESG as a business opportunity rather than just a risk and a burden.

Increased inter-sectoral and cross-sectoral collaboration

To facilitate some of the opportunities and tackle the challenges identified in this report, inter-sectoral and cross-sectoral collaboration must occur. **If collaboration is set up meaningfully, there can be a healthy transfer of knowledge, talent and shared opportunities, contributing to the holistic, multi-stakeholder and multidisciplinary approach that is a precondition to global sustainability.**

A structured inter-sectoral and cross-sectoral collaboration should perhaps start by aiming to determine a broadly agreed set of needs, risks and opportunities, and understanding the set of current capabilities:

"We need to understand what each player needs to be able to help with, especially in an ecosystem like Luxembourg. If not, we will not make any progress." – Moniflo

Likewise, BNP Paribas states that "leveraging a multi-provider approach leveraging a mix of standard ESG data providers (e.g. MSCI, Sustainalytics, etc), complemented by specialized providers (FinTechs) and consultants yields the most promising results."[70]

The case for this type of collaboration is made by the following examples, which are linked to the challenges explored in this study:

- the data challenge: while each actor may require slightly different types of data to comply with their specific regulatory requirements, the overall aim is to understand how sustainable a given product or activity is, which is relevant to FIs, non-FIs and the public sector alike. Multiplying efforts to understand how to gather and use this data creates redundancies and inefficiencies
- the talent challenge: with sustainability becoming top of mind for many companies' leadership—whether due to regulations, or reputational implications and a bottom-up customer push—the need for subject matter expertise is shared across all sectors. The search for talent—specifically the ability to attract talent from outside Luxembourg—will more likely bear fruit if the economy and public policies are broadly aligned to the sustainability topic. As such cohesion on a national level conveys a strong signal to highly skilled professionals
- the inclusion challenge: some companies are too small to duly contribute to sustainability and sustainable finance. Setting up and promoting initiatives that allow many different actors to participate and benefit from resources and knowledge-sharing would help smaller companies work towards sustainable finance despite their resource constraints.

In short,

"More alignment between different parties helps [identify] areas where action is appropriate. A space where people can come together, share ideas and needs, and where then a robust plan can be built upon. [We should facilitate] consultation among the parties to create something that makes sense among all stakeholders." – ICFA

This intra-sectoral and cross-sectoral collaboration requires the support of multiple stakeholders. By virtue of their mission, professional associations are natural facilitators of these collaborative endeavours. While associations in Luxembourg have already set up several working groups, these do not typically include FinTechs and only cover the association's specific economic sector. Therefore, associations could identify ways of breaking down these barriers, for example, through creating working groups that involve the membership of several associations and the FinTech ecosystem.

70. Jean-Philippe Hecquet, FinTechs and the ESG data challenge – Six case studies of emerging technologies, BNP Paribas, November 20, 2019.

A crucial benefit of these new fora would be the multilateral dissemination of knowledge among FIs and FinTechs with a view on targeted R&D. While FI study participants were generally keen to work with FinTechs on sustainable finance, they were concerned that FinTechs sometimes do not grasp their company's challenges and instead want to rigidly apply their own framework and solutions. By contrast, a 'co-creation' mindset makes it easier for FIs to see the value FinTechs can bring to them.

Associations that took part in this study showed openness to more collaboration; for example, through setting-up specific initiatives like accelerator programmes and funding schemes (such as the Point Carbon Zero Programme launched by the Monetary Authority of Singapore and Google Cloud) to help FinTechs become more engrained in sustainable finance. However, across the board, the interviewed associations underlined that these programmes and partnerships must be **supported by the public sector**. Government support through public-private partnerships for younger, less established companies is viewed as a critical enabler and catalyst for developing innovative solutions in the sustainability domain.

"There's no dedicated acceleration programme to nurture sustainability start-ups and to attract them to Luxembourg." – ICFA

The Luxembourg Chamber of Commerce proposed three main objectives to be achieved through dedicated working groups or specific programmes:

- raise awareness, promote and communicate to the wider public, to potential acquirers (FIs or corporates) and importantly to investors, about FinTechs engaging with sustainability and sustainable finance
- enable a network of companies, industrial sectors and FinTechs to allow 'matchmaking' between these actors
- boost the competition between FinTechs who want to participate in sustainability and sustainable finance, by ranking their solutions for example.

Furthermore, more structured collaboration mechanisms will boost Luxembourg's attractiveness to FinTechs that already offer sustainable finance solutions, responding to the demand from FIs as evidenced in this report's findings.

"Mobilising green entrepreneurs and powering the startup/FinTech engine of innovation will be essential to bring new technologies to multiple sectors and make progress on global climate goals. Fostering the growth and opportunities of green entrepreneurs, by getting these founders networked, connected and resourced, will drive the development of green talent and green economies all over the world." – Luxembourg Chamber of Commerce

Such intra-sectoral and cross-sectoral collaboration among traditional players and FinTechs would contribute to the competitive advantage of Luxembourg as a whole, beyond the financial centre.[71]

While Luxembourg's room for action via national legislation is limited, EU-level initiatives provide a measure of opportunity, such as the Open Data Directive (EU 2019/1024),[72] which invites players to create common data spaces. This directive could make valuable data available to a variety of players, including investors, consultants, supervisors and rating agencies.

The call for **increased collaboration could potentially go beyond Luxembourg's geographical borders**. In a context where talent and expertise are scarce, collaborations with other FinTech and sustainable finance hubs should be considered, as they could:

- relate to multinational FIs that face distinct challenges from one jurisdiction to another and are looking for cross-border expertise as a result
- provide FinTechs with network benefits in terms of knowledge acquisition and market access
- avoid 'silo' mentalities that run counter to the overarching challenges of the sustainability topic
- deliver comparative advantages to countries that actors in one geography may have over others.

"The question could also be – when looking at other European hubs: do we have to reinvent everything in Luxembourg, or could we instead partner with other capitals on certain specific competencies? The latter could enhance our local ESG ecosystem." – Quintet Private Bank

71. Thomson Reuters, "How regtech can transform your regulatory compliance," 2017.
72. Macchiavello and Siri, "Sustainable Finance and FinTech: Can Technology Contribute to Achieving Environmental Goals? A Preliminary Assessment of 'Green FinTech'."

Alignment between administrative procedures and business needs

Study participants pointed out the bureaucratic hurdles FinTechs must clear when setting up a presence in the Grand Duchy. This red tape hinders the FinTechs ability and eagerness to start developing and providing their solutions, if only to test them in the market.

Therefore, **to maximise sustainable finance opportunities, Luxembourg should consider easing the bureaucracy of setting up new, innovative businesses that tackle sustainability issues,** as there is broad agreement that technology and innovation are fundamental enablers for boosting these prospects.

Other steps that could help in this area include:[73]

- increased regulatory outreach, communication and exchanges with the sector
- regulatory information gathering and studies involving FinTechs
- an offer-specific regulatory regime, tailor-made to the FinTech landscape in Luxembourg.

73. David W. Perkins, Cheryl R. Cooper, and Eva Su, *Financial Innovation: Reducing FinTech Regulatory Uncertainty*, Congressional Research Service, April 25, 2019.

Broader inclusion of ecosystem actors

This chapter has emphasised that sustainability and sustainable finance concern all actors, not only large established companies. Unfortunately, this is still not fully recognised by the current regulatory framework, which mostly excludes SMEs. If this regulatory framework is an important trigger driving sustainable finance and sustainability overall, then as ALFI stated, "we are missing the boat".

Even if SMEs are inevitably subjected to sustainability regulations later via a 'phased-in' approach, **it would be a mistake to exclude them from the ecosystem's current efforts, initiatives and programmes, as sufficient time and effort is required to prepare them for what is to come.**

In the face of the inevitable 'when', not 'if' SMEs are included in the scope of sustainability regulations, foresight becomes a necessity and preparedness an asset.

Managing the risk of (FinTech) saturation

Let's imagine that all barriers and challenges have been duly tackled and removed, and that sustainable-finance-orientated FinTechs are blooming in Luxembourg, which has become an attractive hub for these solutions and related talent. In this scenario, a risk of FinTech saturation may need to be managed. We define this as a scenario where FIs are unable to differentiate between and effectively evaluate the plethora of FinTech offerings. This implies a multiplication of due diligence efforts on behalf of FIs, which hampers the business development function.

To manage this risk, market research is fundamental. FIs who envision using technology-based solutions for sustainable finance need to invest in proper market research to understand and differentiate between FinTechs. Such **due diligence is essential to effectively select collaboration partners, structure deal terms and proof-of-concept work adequately, and hedge against the risk of failure.**

In Luxembourg, Fin5Lab, a joint initiative between this report's authors, is a due diligence platform for FinTechs that aims to facilitate effective FI and FinTech collaboration to bridge this due diligence gap.[74] Platforms like Fin5Lab could represent ideal intermediaries to enhance cross-industry exchange and collaboration while managing the risk of saturation upfront.

With this in mind, study participants underlined that an increasing number of relevant players entering the market will always be a net positive in the end, because it entails a growth in available solutions benefitting from the various players' views, approaches and inherent strengths, which increases the likelihood that the financial sector's needs are adequately addressed.

74. Fin5Lab, "Home page," accessed August 16, 2022.

Walking the talk

Whether companies are 'only' obliged to comply with rules and regulations, or pushed by a more strategic and philosophical driver, **they cannot operate, organise, produce and service sustainably if they do not first practice what they preach internally.**

Proactivity is required to transition from 'talk' to 'walk'; it starts with an awareness to set clear objectives and re-organise the company to meet these goals. Two examples of areas for further reflection include:

Energy-intensive processes

While FinTechs may be capable of offering solutions to support FIs in becoming more sustainable, this cannot be at the expense of worsening energy efficiency, thus creating a paradox. For example, though huge strides are being made to enhance energy efficiency in DLT, such as the recent ethereum network upgrade from Proof of Work (PoW) to Proof of Stake (PoS) reducing energy consumption by 98%, implementing solutions using DLT could result in negative environmental results, such as excessive energy consumption and electronic hazardous waste, ultimately outweighing the technology's positive Governance benefits.

Diversity within the organisation

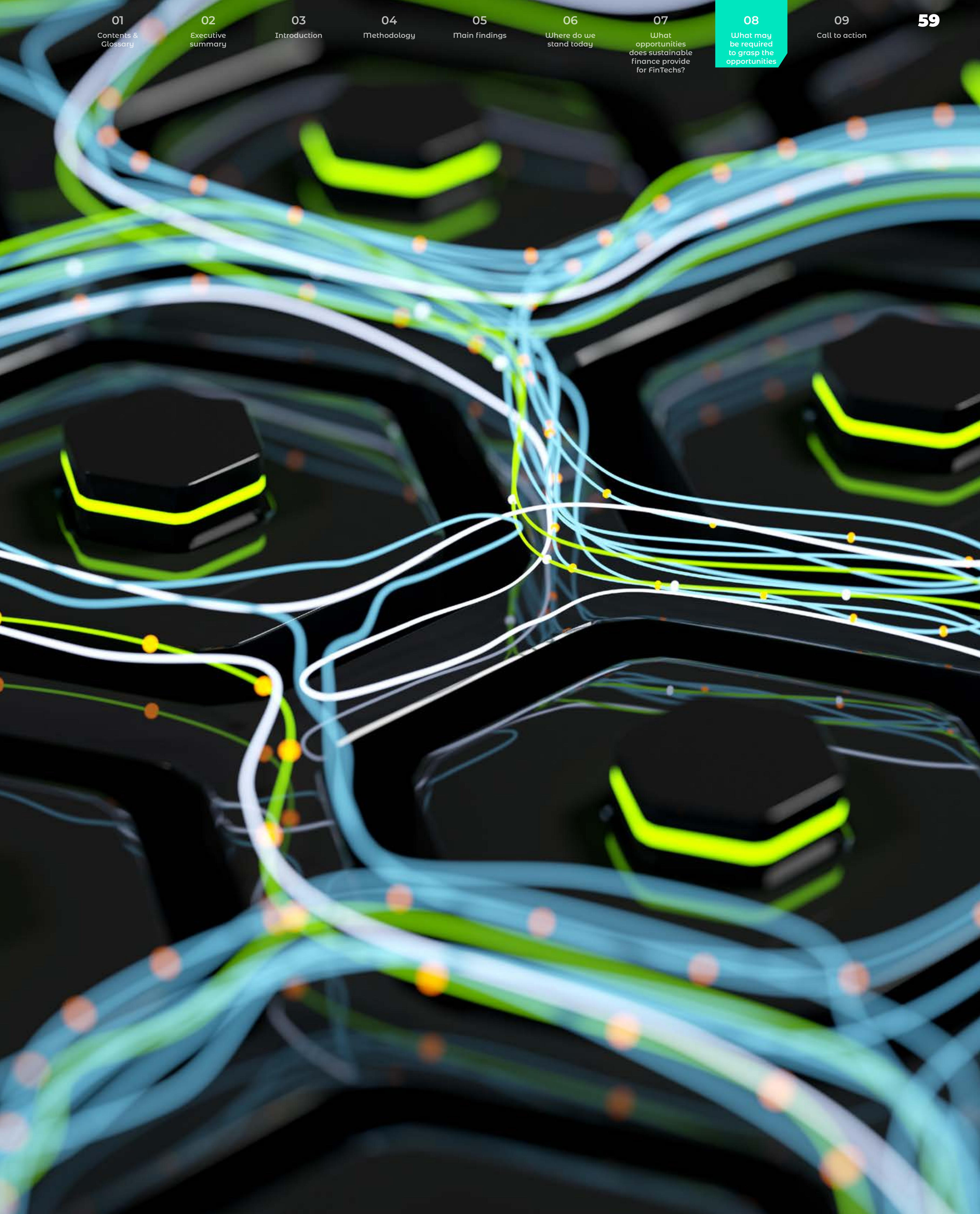
While FinTechs represent innovation, creativity and progress, these companies are not excluded from the struggle for diversity. Equal representation of men and women within FinTechs is still a remote target, resulting in issues such as women struggling to raise venture capital.[75] Further research is needed on this topic, which the LHoFT recognises and meets head-on via its gender inclusion programme.

Because FinTechs are often founded by financial service veterans, and both the financial service and the technology sectors are male-dominated, it may be unsurprising that men are over-represented among FinTech founders and staff. While FinTechs should be concerned by the adverse consequences of insufficient diversity on the quality of deliverables, they should also worry about their limited credibility when offering sustainability-related topics where diversity is fundamental to the S and G pillars.

It should also be noted that diversity goes beyond gender and that FinTechs, especially as they grow and mature, benefit from the inclusion of talent beyond the purely technical or financial profiles that often dominate the sector.

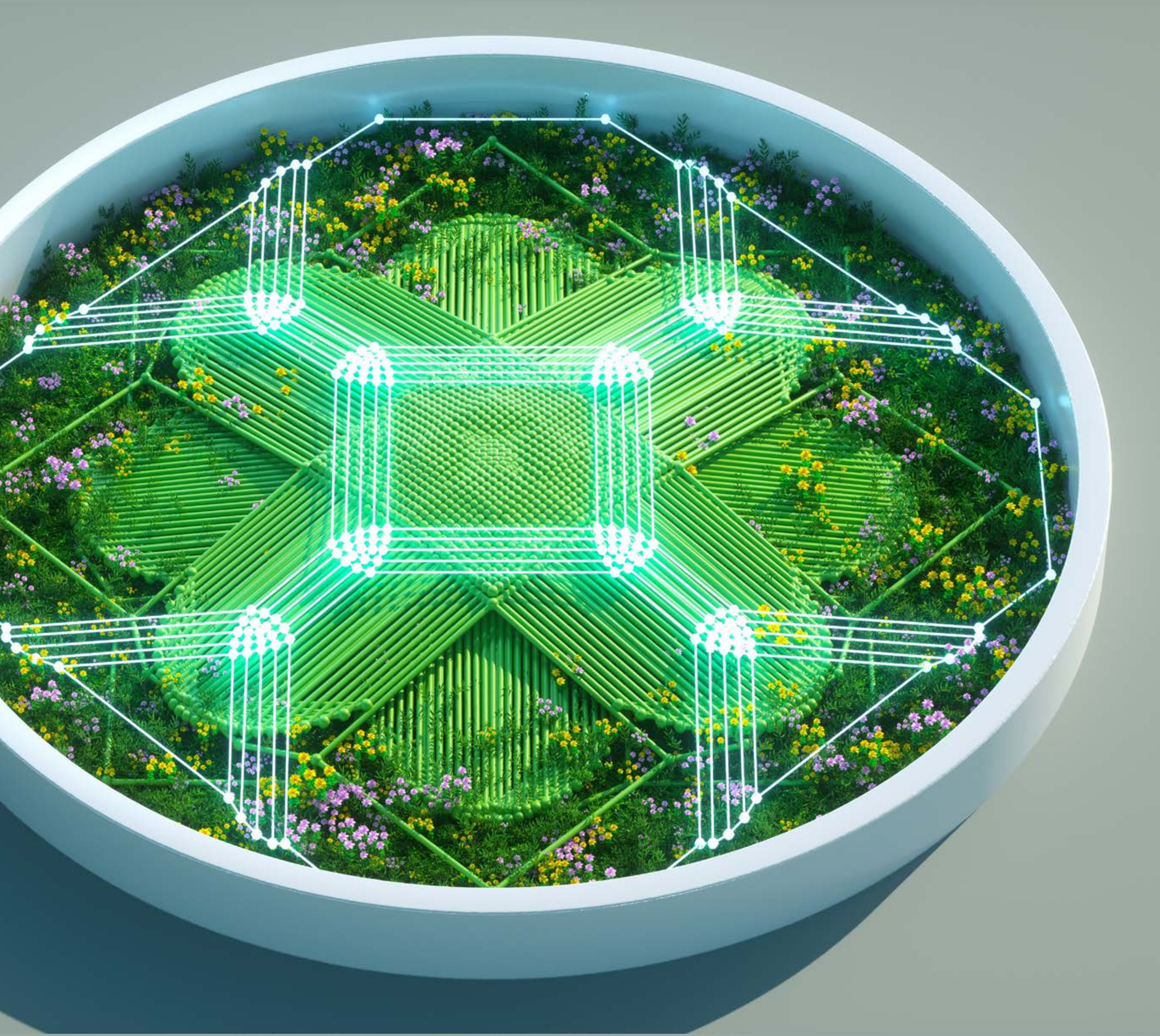
Energy usage and diversity are only two corporate sustainability examples that FinTechs should consider tackling to credibly work with sustainability and sustainable finance solutions.

75. Financier Worldwide, "Championing diversity in FinTech," October 2019; Paige McNamee, "The Future of Regulation: FinTech's persistent dearth of diversity," Finextra, May 12, 2022.



Call to action

This research outlines several challenges and opportunities for FinTechs in the realm of sustainable finance, for FIs wishing to work with FinTechs, and for Luxembourg as a hub promoting sustainable finance as a focus of future growth. This chapter outlines several concrete calls to action to get things moving.



Expanding the national strategy around sustainability and (financial) technology

Working towards sustainability is not only a source of opportunities; first and foremost, it is an unavoidable undertaking if we wish to pass on a liveable planet to future generations. For this reason, Luxembourg should urgently define and fine-tune its national sustainability vision and actor ecosystem. Despite the LSFI publishing its Luxembourg sustainable finance strategy,[76] this study's participants emphasised the need for additional strategic ambition and clarity—for example, regarding the extent that technology can be considered within the national strategy for sustainable finance.

Such a vision can be supported by a deep dive into the country's strengths and capabilities. Decision-makers can then identify the best positioning for both the country and the industry, define where to focus efforts and resources, and understand what is needed to realise our goals.

76. Luxembourg Sustainable Finance Initiative, Luxembourg Sustainable Finance Strategy, February 2021.

Alternative strategic considerations

While playing to Luxembourg's strengths—such as the fund industry, middle- and back-office functions, and governance-focus in FIs and existing RegTechs—can clearly offer growth opportunities for Luxembourg SFFs, alternative strategies for further development could be considered. Some food for thought includes:

- **defining a sustainability strategy**, which usually entails the minimum steps of stakeholder mapping, stakeholder engagement, materiality assessment and materiality matrix definition, objectives and targets settings, initiatives identification, and related planning. As this process can be a novelty for many companies, FinTechs can provide much-needed support in this area. For example, facilitating, structuring and potentially automating the engagement process with stakeholders, identifying the material topics, facilitating governance, and monitoring the roadmap implementation
- **biodiversity and management and protection of marine resources** will represent two key topics that FIs will need to manage as the related Delegated Acts come into force in 2023. In this context, FIs will have to learn to 'speak a new language'—while they are already grappling with other new concepts such as climate change mitigation and adaptation. Specialised FinTechs could also cater to this need by supporting FIs with specific knowledge and technology in these fields
- **working side-by-side with FIs to help them re-evaluate their processes and identify new ways of working to avoid inefficiencies:** while many sustainability solutions are being identified to mitigate the inefficiencies and burdens of old processes, one innovative way to enable sustainability is to re-assess current processes under a value-chain approach, and explore new processes that are more efficient and sustainable.

These alternative strategies can bear fruit if also supported by regulatory bodies that, with the right capabilities and expertise, can aid the sector.

Building organisations with a purpose

Companies will likely face a continuous flow of regulatory requirements, stemming from public sector visions and action plans that follow a top-down approach. When implementing these regulatory requirements, it is easy to get lost in the nitty-gritty of operational implementation. Therefore, organisations must embed the higher purpose of sustainability into their corporate culture.

In the case of FIs and FinTechs, this requires a keen awareness of shifting investor and consumer preferences. But more essentially, it means reverting to the basics of sustainability, i.e., the health of the planet and its future liveability that, in turn, will drive business, trade and commerce.

"The goal is collaboration, the future of the planet, and the wellbeing of humanity. These should be our common goal; without this, there is no purpose behind the work we are doing." – Moniflo

The 'how' for reaching that 'why' is integrating and internalising externalities—which require firms to understand and factor all internal and external variables into their business strategies and operating models—and embracing the triple bottom line approach mentioned at the beginning of this report:

"Externalities are too often forgotten when defining policies that guide the regulations. [Instead] solving externalities should remain the north star."
Alis Exchange

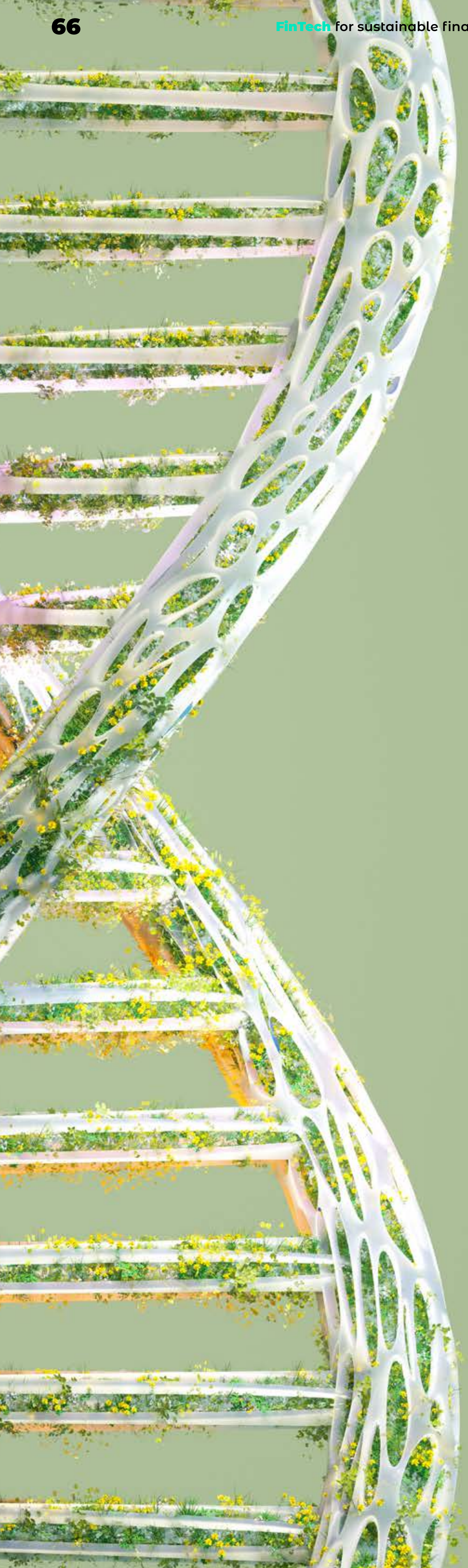
Providing targeted fiscal incentives

The Luxembourg government will need to continue playing an active role in fostering the transition towards sustainable finance and a sustainable economy. Implementing an ambitious action plan requires identifying and creating appropriate incentives to motivate companies to work towards sustainability.

There is an open question regarding the degree to which the State is willing to welcome and support risk-taking and innovation in the sustainable finance sector, specifically Sustainable Finance FinTech, to help it grow and blossom. A study participant offered food for thought:

"If a wealthy individual has 100k somewhere, they'd always invest in real estate instead of a start-up. Instead, they could receive a tax credit on an investment in start-ups [...] to be backed-up if [said] start-up fails. It is important to change the reward side to fit the risk."

Intangic



Turning FinTech into a national asset

The ability to anticipate expected changes and the agility required to adapt quickly to unforeseen shifts are competitive advantages for FinTechs. As a corollary, supporting the presence of Green FinTechs and their collaboration with Luxembourg incumbents should be viewed as a high-multiplier investment against the backdrop of the country's sustainable finance ambitions.

"Definitely an unclear regulatory framework makes it difficult to really work on innovation and technology, but ultimately regulations actually lead us to invest in innovation and technology." – Intangic

While FinTechs benefit from competitive advantages in sustainability due to their agility and innovative capacity, it is debatable that promising FinTechs will naturally choose Luxembourg to develop their sustainability-related offering. Against the backdrop of the Luxembourg financial centre's specificities and limitations, which this report discussed in some detail, the fulsome development of a Sustainable Finance FinTech offering in Luxembourg would benefit from targeted initiatives via industry consortia, boot camps and collaboration with professional associations, as well as public policies such as modernised administrative procedures, fiscal incentives or subsidies.

The call for broad cross-sectoral collaboration must be reiterated:

"FinTech alone won't solve the problem; culture, values, education and cross-ecosystem collaboration are key. In fact, it is essential to have as many people as possible involved in this - sustainability's ultimate goal is neither B2B nor B2C oriented but for the entire world." – Moniflo

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Some information within this report may become outdated in the future, in particular with regards to the evolution of regulatory texts.

the LHoFT Luxembourg House of Financial Technology

The LHoFT Foundation ("the Foundation") is a national initiative backed by both the public and private sector in Luxembourg with the objective of driving technology innovation and digitalisation for Luxembourg's Financial Services industry. Learn more about the Foundation, its activities and how it makes an impact here.

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