Banking Trends & Figures 2023

Technology – an enabler or a threat?

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Foreword

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Luxembourg continues to stand as a testament to resilience and growth within the European banking landscape. The country builds on its strong legacy of openness and stability to position itself as a key location for e-commerce, private banking, asset servicing, e-payment institutions and FinTechs directly linked to financial services. For this reason, its banking sector, spurred by this ecosystem of partners, has continually proven to be a crucial contributor to the country's economy. In this context, this year's Banking Trends and Figures report explores the convergence of banking and technology and how it is revolutionising the delivery and consumption of banking services.

Banking institutions in Luxembourg are facing increasing pressure to transform their traditional systems and capitalise on the beneficial advancements that technology brings to the industry. Nevertheless, it is crucial to maintain awareness of potential risks that might arise with the digitalisation efforts. Customer centricity still sits at the heart of the digitalisation drive, compelling banks to carefully navigate the balance between adapting too swiftly and potentially alienating their customers or adapting too slowly and risking customer attrition.

In the first part of our report, we take an extensive look at some key emerging technological trends within banking and some of the associated benefits that are being leveraged to propel innovation, create incremental business value, enhance customer experiences, and streamline operational efficiency. This discussion is juxtaposed with the potential threats posed by factors such as cybersecurity risks and the importance of acquiring the right talent in order to remain relevant.

We then discuss the future of the banking industry and how banks can play to win amid the exponential growth in technological advancements.

The second part of this report provides an analysis of the financial statements of the largest segments of banks present in Luxembourg. This review is aimed at better understanding the dynamics within the different country segments, as well as their relative developments relative to the overall Luxembourg market. As with previous iterations of the report, we have maintained the composition of the six main country segments: UK/North American, Chinese, French, Swiss, German and Luxembourg banks, which constitute our 'home' segment. Within each of these segments, we highlight changes and developments from the prior year and discuss observed trends.

We envision that the advent of new technologies and the ability to harness its perks could boost the differentiation appeal of banks in Luxembourg. Further, with the evolution in regulatory frameworks that call for greater transparency and disclosure of ESG-related data, emerging technology could allow banks to adapt their digital infrastructure to gather and report on a broad range of ESG data. In this context, it is becoming increasingly clear that we have decisive times ahead and now is the time to take proactive steps.

I wish you a pleasant reading and look forward to sharing new insights in this new edition!

Julie Batsch

Executive Summary

The financial services industry has historically lagged behind when it comes to adopting new technologies. However, in the post-COVID era, maintaining any form of competitive edge without leveraging technology has become almost impossible. Digitalisation has revolutionised the way financial services are delivered, empowering customers with convenient and accessible channels for banking. This digital transformation is already leading to increased efficiency, reduced operational costs, and improved customer experiences. Consequently, banks need to undertake specific modernisation efforts in order to shift from a sole dependence on legacy systems if they are looking to maintain or expand market share, meet security and compliance requirements, optimise cost efficiencies and attract talent.

This year's edition of the PwC Banking Trends and Figures takes a deep dive into the state of technology within the banking sector, outlining six ways in which banks are leveraging it to shape their value proposition:

- Cloud Computing is Sparking Industry-Wide Technological Transformation;
- AI is at the core of automation, personalised services and security;
- Collaboration with FinTech firms is accelerating digital transformation initiatives;
- Digital solutions are enhancing customers' experience and relationships;
- Banks are optimising operational efficiency through emerging technologies;
- Evolution of regulatory frameworks has impacts on further technology adoption.

While the report explores the convergent impacts of these trends, it also takes into account that banks' technological transformation is not linear. Thus, it also points out five challenges that banks face in their attempts to effectively adapt to technological changes:

- Increased reliance on third-party providers could stifle business continuity;
- Growing digitalisation is heightening cybersecurity and data quality risks;
- Rapid technological advancements risk customer and employee alienation;
- Widespread technological transformation is intensifying market competition;
- Finding the best-fit talent will be key in banks' market positioning.

Navigating these trends and challenges will be vital in enabling Luxembourg banks to maximise the inherent benefits of their technological transformation. In this context, the report identifies four key considerations that, if implemented, will facilitate banks' journey towards the future of banking within the rapidly evolving technological space:

- Leverage AI and data analytics to improve customer experience and service costs;
- Foster digital trust by investing in cybersecurity and data protection;
- Attract and retain talent through continuous upskilling;
- Develop an agile culture in a swiftly evolving digital landscape.

Ultimately, banks' ability to successfully deploy technology hinges on an ability to navigate the nuances between harnessing technology to drive progress and proactively dealing with related risks. This balancing act would also need to be complemented with strategic decision-making aimed at driving their digital transformation efforts.

Leverage AI and data analytics to improve customer experience and service costs

Banks are increasingly leveraging the power of AI and data analytics to revolutionise the customer experience. By implementing advanced algorithms and machine learning models, financial institutions can gain deeper insights into customer behaviours, preferences and needs. This allows them to offer more personalised services and tailored financial solutions, thereby improving customer satisfaction. Additionally, the rise of GenAI, AI-based chatbots and virtual assistants will make it easier for customers to access information and respond to inquiries in real time. For banks, the benefits are just as compelling, including reduced operational costs, improved risk management, and improved quality of service. By leveraging AI to streamline processes and anticipate customer demands, banks can also foster greater customer loyalty, thereby driving long-term profitability and competitiveness in a dynamic financial landscape. The synergy between banks and AI-driven analytics promises a win-win scenario, where customers will benefit from greater value and convenience while banks achieve operational excellence and sustainable growth.

Foster digital trust by investing in cybersecurity and data protection

Banks should seek to build digital trust and gain a competitive edge by adopting a unified strategy for managing cyber threats and protecting customer and sensitive data. To do this, they need to invest in data protection, implement strong cybersecurity measures, and actively combat cyber threats across their technology infrastructure. Establishing clear obligations and responsibilities with external partners regarding cybersecurity is also crucial. By prioritising cybersecurity and data protection, banks can protect and enhance their reputation as well as improve customer trust.

Attract and retain talent through continuous upskilling

As banks embark on aligning their organisations with their technological goals, they must be deliberate in overcoming skill gaps and reduced productivity that may hinder their ability to innovate. With the adoption of complex advanced technologies, upskilling is necessary to equip employees with the skills to leverage these tools effectively, unlocking their potential to enhance decision-making and drive business growth. To further attract and nurture top talent, banks in Luxembourg should also consider investing in the creation of digital talent and innovation hubs.

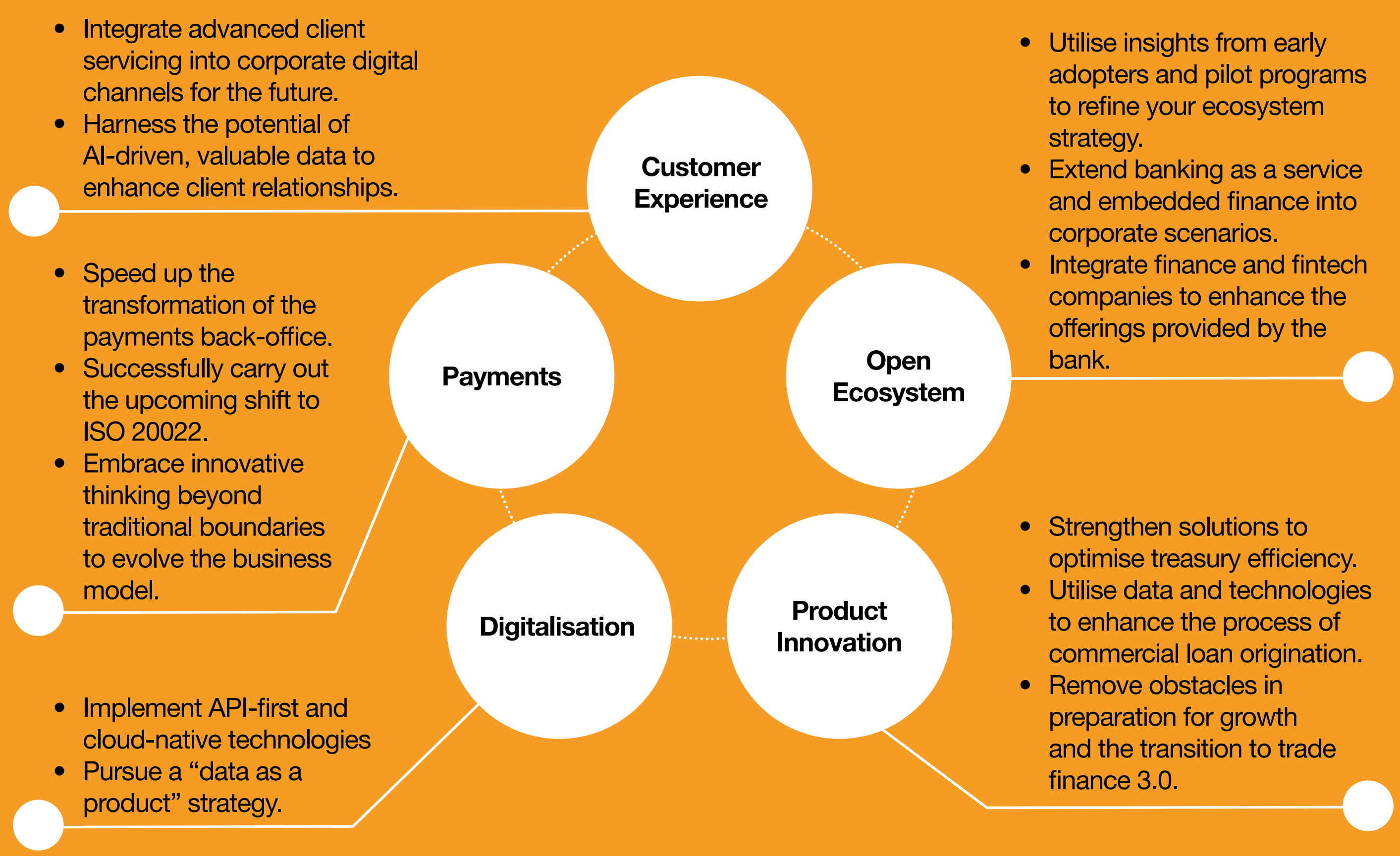
Develop an agile culture in a swiftly evolving digital landscape

Developing an agile culture will require banks to foster a mindset of innovation, adopt agile methodologies, make data-driven decisions, encourage cross-functional collaboration, and monitor industry trends. This will also require some organisational adjustments throughout the bank to enable it. Focus needs to shift towards the removal of traditional silo-based organisational models from within value chains. By incorporating these strategies, alongside technological enablers such as DLT, Cloud, API, AI and data analytics into their operations, banks can navigate the technological landscape, adapt to market demands, and deliver enhanced financial services to meet the evolving needs of their customers.

Introduction

Customer centricity continues to underscore the significant wave of technological transformation sweeping across the banking industry. Within various segments of the industry – retail, corporate and private, an increasing need for convenience, speed, and tailored solutions is driving banks to collaborate more closely with FinTech companies, create immersive customer experiences in a connected ecosystem, and foster the emergence of specialised roles. Undoubtedly, the surge in technology holds many benefits for banks, and the sphere of technology-driven innovation is expected to shape varying aspects of the industry's future (Exhibit 1).

Exhibit 1 Banking technology trends will shape the years to come



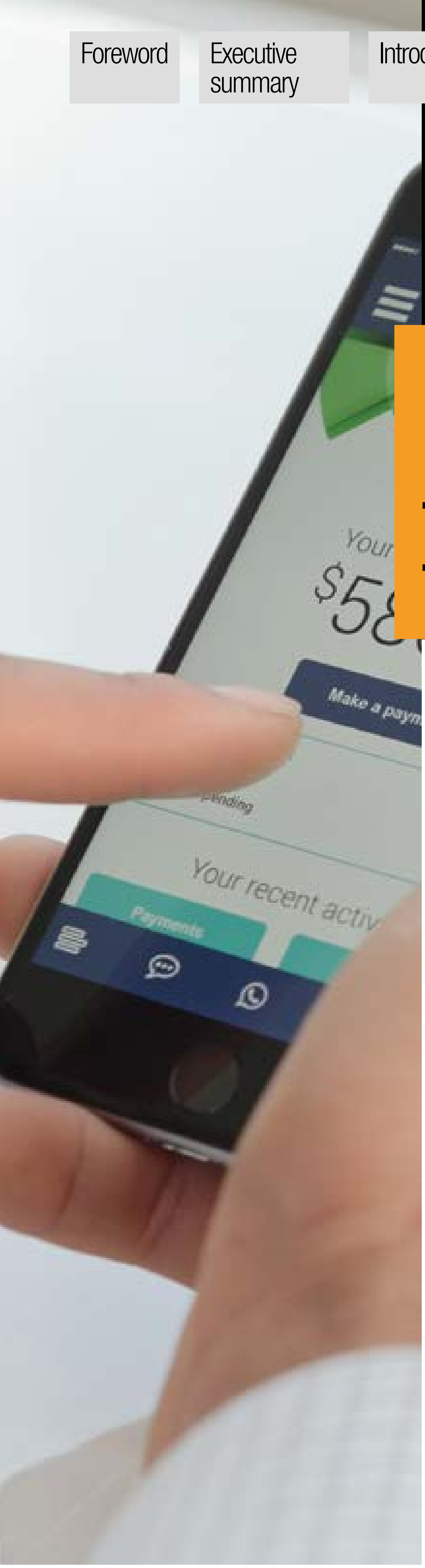
Source: PwC Market Research Centre

As anticipated, this rapid technological disruption is prompting banks to adapt to this shift in order to stay competitive and relevant, and Luxembourg is no exception in this regard. Banks in the Grand Duchy have begun taking steps to integrate innovative technologies such as data analytics, deep learning, and AI in their service delivery. DLT technology and cloud-based solutions are also being considered to enhance efficiency and gradually replace traditional infrastructure, solutions, applications, and services. Meanwhile, emerging technologies like biometric and virtual identification are seeing increasing adoption in the banking sector.

Despite these notable strides, there still remains further progress to be made, particularly given Luxembourg's position as a global centre for prominent European and foreign banks catering to a wide variety of clients. With the continuous expansion of technology, it has become imperative for banks in the country to reassess their approach to navigating this rapidly changing landscape, especially as the boundaries between technology and banking become increasingly blurred. Not only that but Luxembourg banks must also proactively address the potential technology-related challenges that could impede their ability to deliver exceptional customer value.

In this context, this year's report goes beyond last year's singular focus on a specific aspect of technology – payments. Instead, it provides a broad overview of some of the key technological developments that are driving transformation within the Luxembourg banking sector. It then goes on to discuss some of the challenges posed to banks in their adoption of technology and provides some key considerations for banks looking to remain competitive as they embark on their technological transformation journey.

Source: PwC AWM Market Research Centre, PwC Strategy&



1

Empowering banks through technological transformation

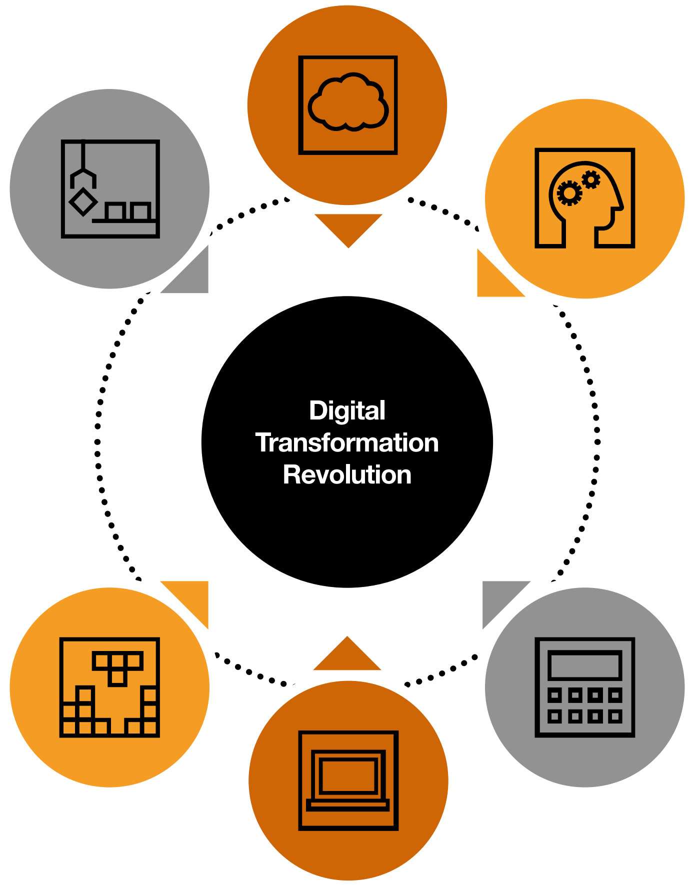
The convergent impact of multiple technological innovations is propelling the banking industry towards a shift from legacy to digital processes, offering unparalleled efficiency and personalised customer experiences. Albeit at a slow pace, Luxembourg's banking sector is beginning to adapt to these technological innovations, as evidenced by a number of noticeable trends (Exhibit 2).

Exhibit 2: Drivers of technology adoption in the Banking Industry

Cloud Computing
Cloud computing is enabling adoption of AI & robotic process automation, enhancing processing speeds & operation efficiency.

Technological Regulatory Frameworks
The proliferation of technology necessitates the development of regulatory frameworks to guide its ethical and responsible usage.

Artificial Intelligence (AI)
AI is leading operation automation and improving customer experience while reducing expenses and enhancing transaction security.



DLT, Decentralised Finance & Embedded Finance
DLT is enhancing efficiency and reducing costs through the implementation of decentralised systems. Embedded finance is also driving consolidation across various platforms.

Fintech Collaborations
Banks are increasingly partnering with fintechs to drive their digital transformation journey.

Digital Solutions
Digital solutions such as digital IDs are enhancing customer security by reducing fraud and identity theft risks.

Source: PwC Market Research Centre

In this section, we assess how these trends are playing out and enabling greater innovation within the Luxembourg banking landscape. We note that as banks progress in their digital transformation journey, technological advancements will continue to play a key role, especially as greater capability in this area increasingly becomes a key differentiating factor. That being said, it is worth noting that managing these technologies in silos is likely to lead to a failed digital transformation. Indeed, success will be contingent on how well banks manage the interdependencies between their systems and business strategy.

1.1. Cloud Computing is Sparking Industry-Wide Technological Transformation

The role of cloud computing in banking has come to the fore in recent times, with an increasing appreciation of the technology's ability to combine and streamline data algorithms and software platforms, boost the efficiency of high-volume operations such as payments and data reconciliations, and facilitate the building of tailored products and services. The convergence of robust cloud solutions and the increasing availability of synthetic datasets is outpacing traditional ones, offering banks the opportunity to partner with emerging cloud service providers to leverage this technology. Moreover, New Ways of Working (NWOW) platforms such as Microsoft 365 and Google Suite are increasingly supporting banks' efforts to embark on their cloud journey, especially in a post-COVID landscape.

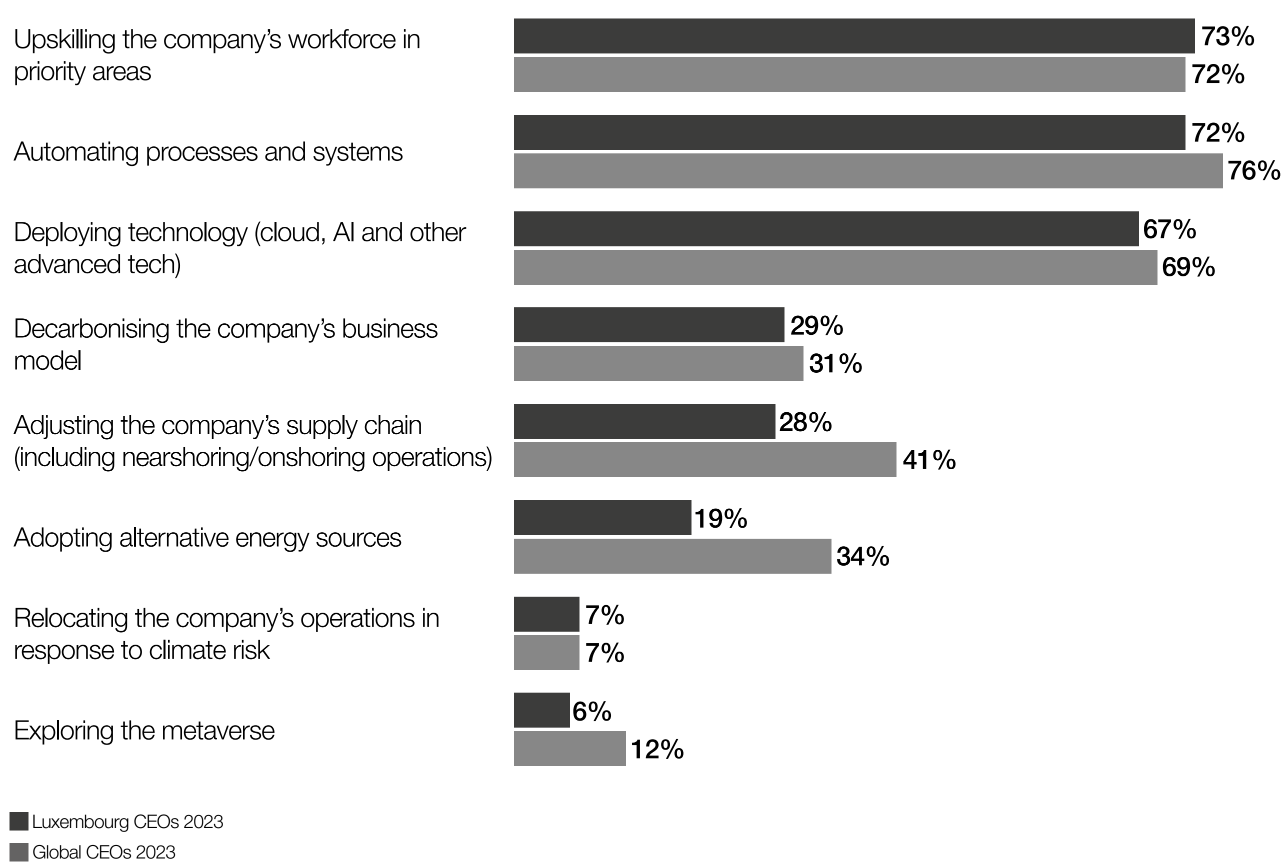
Although the Luxembourg banking sector has traditionally been slower than other EU countries in embracing cloud solutions due to complexities related to security, supervisory approvals, and a clear regulatory framework, the trend is gradually evolving. A more innovative regulatory approach and a clearer framework for cloud solutions are enabling banks to begin their cloud journey at pace - with a focus on non-core activities at this point in time.

Luxembourg's Advanzia Bank, for example, has migrated its infrastructure towards the cloud to scale up service delivery and flexibility. This intervention became necessary to enable the exclusively digital bank to accommodate their growing influence within the Cards-as-a-Service (CaaS) space. Further, a 2022 survey by the Luxembourg Bankers Association[1] (ABBL) shows that 70% and 85% of respondents have either adopted or are planning to adopt cloud services for Infrastructure-as-a-Service (IaaS) and/or Platform-as-a-Service (PaaS) use cases and Software-as-a-Service (SaaS) use cases respectively.

Should this trend persist, we are likely to see increased investments by banks aimed at establishing centralised platforms for enhanced agility, swift product development, and improved innovation capabilities. PwC Luxembourg's 2023 CEO Survey underscores this point, indicating that cloud technology, along with other emerging technologies, is set to become a primary investment focus for 69% of financial services CEOs in the upcoming 12 months[2] (Exhibit 3).

[1] ABBL, (2023) ABBL Cloud Adoption Survey 2022
[2] PwC, (2023) 'Winning today's race while running tomorrow's: 26th Annual Global CEO Survey – Luxembourg findings'

Exhibit 3: Planned Investments in the Next 12 months



Source: PwC Luxembourg 2023 CEO Survey Report

The pursuit of a successful cloud migration would require cohesive efforts across all business functions, upskilling and recruitment of skilled talent and a seamless synergy between business and IT teams. Thus, strategic planning becomes the foundation for striking the right balance between business drivers, technology needs, and market dynamics. Moreover, prioritising cloud applications and strategic data architecture, as well as forging strong partnerships with dependable security and risk experts are critical steps on this transformative journey. In addition to this, further developments to address GDPR and other regulatory concerns will also be crucial.

1.2. AI is at the core of automation, personalised services and security

AI-based technologies are seeing a proliferation across various industries and banking is no exception. In the banking industry, this development is enabling process automation with impacts on improving operations, compliance and risk management processes, and enhancing customer relationships. It is also helping bankers improve daily workflow processes. Thus, by leveraging AI technologies, banks can unlock efficiencies, reduce costs, and enhance service and product quality.

Despite being limited and in relatively early stages, Luxembourg has made some strides in its adoption of AI-based technologies within its banking sector. To illustrate this, a 2021 PwC survey indicated that 80% of banks made little to no use of AI although all respondents demonstrated interest in integrating AI and process automation into risk and finance operations[1]. However, a 2023 joint study by the Central Bank of Luxembourg and the CSSF[2] illustrates the gradual uptick in the trend, showing that 68% of banks have planned investments in AI - up from 32% in 2021. Particularly, the aforementioned study noted the five top use case areas to be Anti-Money Laundering/Fraud detection, process automation, product marketing, customer insights, and cyber security.

For some of these banks, like Banque de Luxembourg, which primarily uses AI in its private banking practice, AI offers an opportunity to strengthen client relationships and build trust while freeing previously spent time on repetitive tasks. Others like BGL BNP Paribas are exploring AI-driven customised solutions with the introduction of Genius, an AI digital assistant that offers advice, alerts, and recommendations via personalised messages to customers, allowing them to effectively manage their accounts and budget their expenses.

In the context of security, AI is being used to enhance transaction monitoring and security in real-time, proactively safeguarding institutions against potential risks. By analysing user data and transaction patterns, AI algorithms can promptly detect suspicious transactions and flag them. Other security applications involve the use of voice biometrics and facial recognition technology to enable customer authentication in various scenarios, including account opening, information access, and transaction verification. Given that these biometric traits cannot be replicated digitally, they are highly useful for establishing a high level of security for bank clients and limiting the possibility of fraud activities.

The development of Generative AI (GenAI), though still nascent, is also poised to accelerate the trajectory of AI adoption among Luxembourg banks. While it is being applied primarily for its automated data discovery and unstructured data ingestion properties, its evolution will open up new perspectives to drive efficiency and automation – although data confidentiality concerns remain to be addressed. In this context, more clarity on data protection concerning the use of Generative AI in the banking sector would be beneficial.

[1] PwC The Use of AI in the risk and finance functions of Luxembourg Banks

[2] CSSF and Banque Centrale du Luxembourg (2023). 'Thematic review on the use of Artificial Intelligence in the Luxembourg Financial Sector,' May 2023

In the near future, greater investments in AI-based technologies could see the broader adoption of these technologies, allowing banks to extend their application into areas such as market sentiment analysis, cross-channel customer experience analysis, algorithmic trading and robo-advisors. Already, the Luxembourg Bankers' Association (ABBL) has partnered with the Interdisciplinary Centre for Security, Reliability and Trust (SnT) of the University of Luxembourg to conduct research aimed at helping the banks address potential challenges related to the reliability of AI within the sector[1]. Beyond this, however, challenges related to data governance and quality will also have to be addressed to enhance the further uptake of AI within the country's banking sector.

[1] ABBL (2023). 'Annual Report 2022,' April 2023

1.3. Collaboration with FinTech firms is accelerating digital transformation initiatives

While initially considered as disruptive forces challenging traditional banking models and offering innovative and customer-centric solutions, FinTechs are increasingly being embraced by banks seeking to leverage digital transformation to maintain their market position and enhance profitability. Such collaborations facilitate the digitalisation of financial institutions' ecosystems, offering access to talent, technology, new product and customer segments, and resulting in improved offerings such as digital wallets for electronic transactions and merchant processors for electronic payments.

This is the case in Luxembourg, where a thriving FinTech environment particularly reinforces its position as a key player in the financial industry. The country has attracted and continues to attract FinTech companies, providing immense collaborative opportunities with local and international banks in the country. The highly networked nature of the Luxembourg financial centre also favours cooperation and partnership in the FinTech space. To illustrate this, several Luxembourg retail banks came together to form LUXHUB[1], in an attempt to integrate the ecosystems of the banking and third-party providers (TPPs) while also streamlining and speeding compliance with PSD2 (EU Payments Services Directive II).

In the 2022 PwC Corporate Banking survey[2], 70% of banks in Luxembourg agreed that collaborating with FinTech companies would be a future requirement for corporate banking businesses, while only 37% actually collaborate with FinTech companies despite the perceived benefits of such partnerships. This leaves the door wide open to potential future partnerships. In this context, declining FinTech valuations present an opportunity for banks to pursue purpose-driven acquisitions and collaborations. By scouting for viable FinTech companies, banks stand to complement their existing capabilities and potentially boost profitability.

[1] LUXHUB (https://luxhub.com/)

[2] PwC (2022) 'Corporate Banking Survey Uncovering the jewel of Luxembourg's Banking industry'

1.4. Digital solutions are enhancing customers' experience and relationships

In line with the evolving needs and expectations of customers, the banking sector is increasingly prioritising the delivery of personalised customer experiences through technology. By incorporating interactive tools such as video, augmented reality and other emerging media formats, banks are enabling more convenient and seamless customer interactions. In addition, the leveraging of vast amounts of client data is allowing banks to gain insights into customers' preferences, financial situations, and goals, so as to be able to offer more tailored products and services. This approach is not only fostering customer loyalty and maximising customer lifetime value, but it is also allowing banks to expand their traditional offerings, attract new clients and gain market share.

This trend is evident both across retail and private banking segments. Retail banks are actively rolling out digital banking solutions, personalised financial advisors, and convenient payment options to address the changing needs and preferences of retail customers. Spuerkeess, for instance, has introduced MIA, a complimentary personal financial management tool designed to streamline its customers' financial management processes. The AI-based tool calculates customers' budgets, and tracks expenses and spending patterns, identifying where savings can be made. It also helps users establish financial targets, provides recommendations, and offers financial literacy resources. Further, in collaboration with local FinTech company VIREO, the bank has developed an all-in-one solution for direct tax payments. This innovative tax assistant system simplifies the tax payment process, enabling greater efficiency and convenience.

Within private banking, the application of wealthtech is enabling banks to offer bespoke wealth management solutions to high-net-worth individuals (HNWIs). Given the advancements in AI, machine learning, and automation, entire value chains are being transformed through enhanced omnichannel interactions meant to drive customer engagement (Exhibit 4). As wealth management evolves, the emergence of Wealthtech is revolutionising how banks manage and grow the financial portfolios of their HNWI clients. Particularly, the technology is optimising wealth management strategies with a focus on democratising investment opportunities and providing personalised financial advice.

Exhibit 4: Pursuing a meaningful customer journey via Wealthtech

Source: PwC Market Research Centre

In the area of payments, the emergence of digital payments and mobile wallets is positioning banks to offer cutting-edge payment solutions that address the increasing demand for instant and electronic transactions, and provide cost-effective, flexible, and convenient options for customers. Meanwhile, the introduction of digital IDs is helping to curtail fraud and identity theft by ensuring more secure means of identity verification, which has traditionally been an arduous and fragmented process, particularly in cross-border transactions. Over the last 15 years, LuxTrust has developed and maintained a comprehensive national identity scheme, empowering 99% of Luxembourg's population with digital identity and offering vital support to 95% of all retail banks in the country[1]. By leveraging digital identity solutions, banks in Luxembourg are simplifying the customer verification process and instilling trust in cross-border transactions, with impacts on reducing abandonment rates, enhancing risk management practices, and achieving significant cost savings.

[1] LuxTrust (2020). 'Identity verification: the first step to get your digital identity'

1.5. Banks are optimising operational efficiency through emerging technologies

Apart from enhancing convenience and seamlessness for bank customers, banks are also using technology to streamline their processes and enhance operational efficiency. In this context, we have seen a surge in digital solutions in recent years such as Distributed Ledger Technology (DLT) – particularly blockchain as one of its representatives. With its heightened transparency, efficiency, and accountability benefits, DLT has the potential to enable banks to streamline cross-border trades, achieve cost savings, create a customer-centric financial landscape and develop new revenue streams (Exhibit 5). Within the lending business, for instance, blockchain technology offers a secure and efficient approach that benefits both lenders and borrowers. On one hand, DLT-based assets (e.g., crypto-assets and tokenised real-world assets) can be used as collateral, thus allowing lenders to manage risk, authenticating asset ownership, and also widening the pool of eligible borrowers. On the other hand, blockchain facilitates the streamlining of the lending process, enhancing transparency, automated documentation, and cost reduction.

Exhibit 5: Perspectives on DLT

Key Features
- Decentralised infrastructure
- Distributed ledger
- Consensus mechanism
- Smart contracts
- Transparency & immutability

Benefits
- Peer-to-peer transfers
- Settlement acceleration
- Rule-based workflows automation
- Reduced counterparty risk
- Increased assets velocity

Use Cases
- Real-world assets tokenisation
- New asset class
- Cross-border payments
- Funds distribution
- Collateral optimisation

Source: PwC Market Research Centre

In the area of asset servicing, DLT is set to enhance banks' efficiency at fund distribution and counterparty settlements through tokenisation. This involves the digital representation of assets and their transfer on a blockchain DLT infrastructure, eliminating the need for multiple intermediaries in certain markets. The potential reduction in intermediary fees leads to lower transaction costs, which is particularly advantageous for Luxembourg-based funds typically burdened by high cross-border distribution costs. Luxembourg players are increasingly exploring the use of DLT to improve investment fund transactions and interactions between Transfer Agents, payment systems, and investors. FundsDLT, for instance, is using blockchain technology to allow investors to purchase funds through a decentralised platform via their smartphones. It also automates repetitive fund operations to drive efficiency in cross-border fund distribution. In a recent development, Deutsche Börse has acquired FundsDLT in a move which, combined with the evolution of regulation, could further strengthen the investment fund distribution ecosystem in Luxembourg and see further progress in this segment in upcoming years.

Embedded finance is another solution that banks are leveraging to consolidate various service offerings and to streamline their operations. With the ability to integrate savings, credit, insurance, and investment tools into non-financial apps or websites, embedded finance presents an opportunity for banks to redefine their business models and harness innovation by developing their own Banking-as-a-Service (BaaS) capabilities. It will also allow them to directly access crucial data and customer insights and manage the risks associated with multiple third-party partnerships. This shift towards embedded finance will be driven, in part, by an influx of entrants and non-banking organisations aiming to meet the ever-growing demand for seamless financial services. Disruptive players like branchless neo-banks and digitally agile insurers are also challenging traditional financial services, seeking to democratise and revolutionise the industry.

Further, the introduction of XC platforms to streamline the process of settling tokenised versions of central bank reserves from different nations is enhancing the efficiency of cross-border transactions. In the Grand Duchy, the proliferation of payment and electronic institutions is underpinning a remarkable growth in real-time payments, with companies like Mangopay, Payconiq, Koosmik, and COMO Global leading the way as Luxembourg-based experts in electronic payment services and intelligent processing solutions.

From DLT to DeFi:
Empowering financial and crypto-assets innovation

Decentralised finance (DeFi) is another example of how DLT is challenging traditional banking systems. DeFi is built upon DLT infrastructure and leverages smart contracts to deploy autonomous business logic across a network of participants, with a potential to be particularly significant in rule-based environments such as the financial sector. Smart contracts[1], for instance, have been pivotal in enhancing efficiency and minimising the risk of errors or delays associated with manual reconciliation.

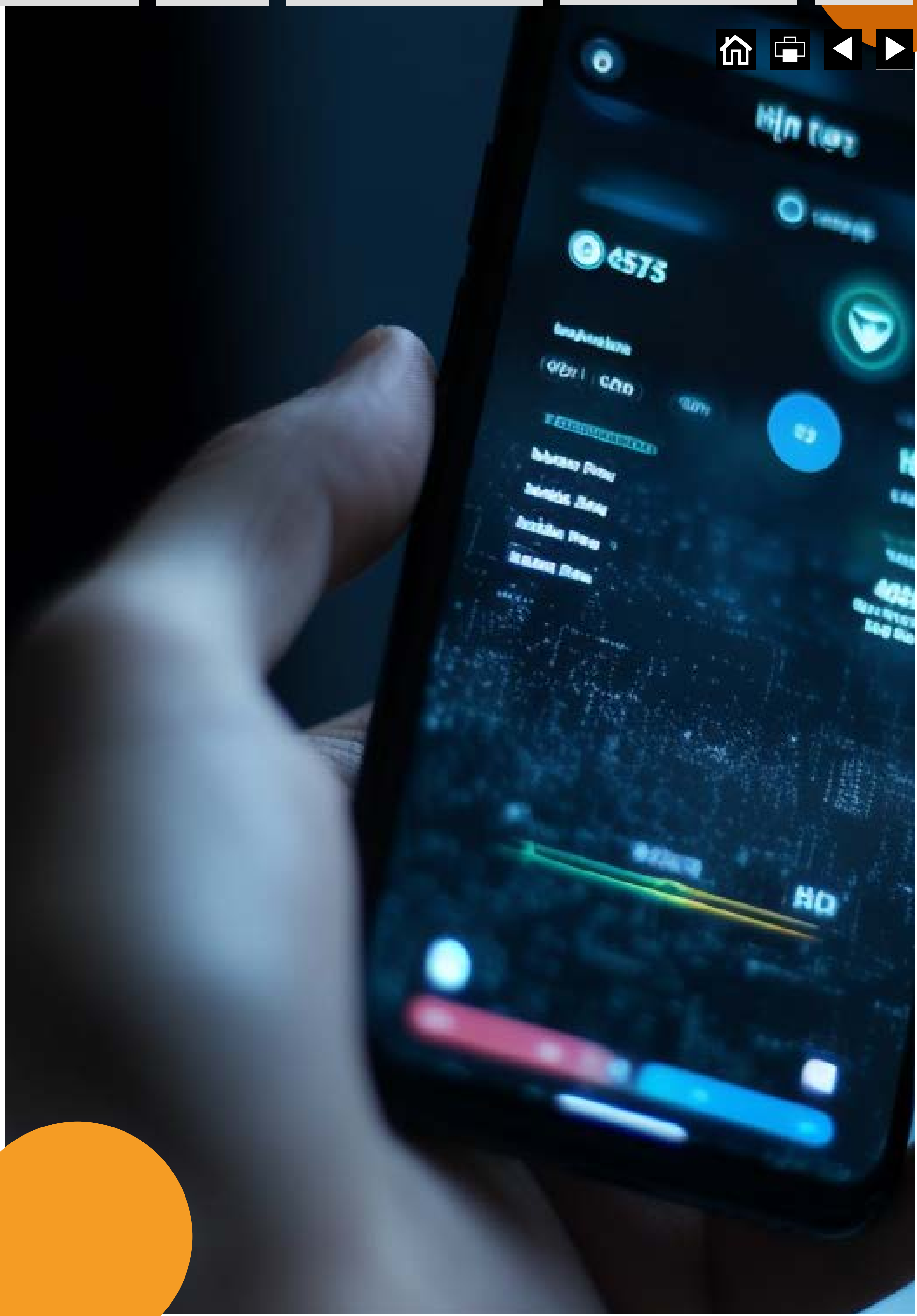
Within DeFi, individuals and institutions can trade, lend, and invest without centralised intermediaries around the clock and at a global scale. These DeFi applications, or "dapps," use crypto-assets and smart contracts to operate and trigger new risks to be mitigated, with a particular focus on the functional design and security considerations attached to these smart contracts.

Banks in Luxembourg have been actively pursuing strategies to drive growth by introducing new products and services in this segment. This trend is evident across various banking segments including retail and private banking. Swissquote Bank Europe, for instance, has launched a crypto-assets investment service following its acquisition of Keytrade Bank Luxembourg. This service includes popular crypto-assets like Bitcoin and Ethereum, along with traditional financial offerings. Spuerkeess has also partnered with the University of Luxembourg's Interdisciplinary Centre for Security, Reliability and Trust (SnT) to explore the potential of DeFi. One of the objectives of this collaboration is to explore how DeFi can be used to address challenges related to financial institution cooperation and data submission for market calculations.

Nevertheless, there remain some notable barriers to be addressed. According to PwC's 2023 Crypto-Assets Management Survey[2], nearly three-quarters (73%) of respondents believe the market infrastructures for crypto-assets in Luxembourg to be still lacking in maturity, while 70% agree that the limited expertise among local crypto service providers poses a significant barrier to the growth and adoption of crypto-assets in the country. Further, the country currently lacks a robust regulatory framework for crypto-assets as other asset classes do, with the CSSF's guidance on AML compliance for Virtual Asset Service Providers (VASP) remaining the closest thing to regulation governing the asset class. Improvements in this domain will be crucial to the further adoption of the technology.

[1] Self-executing programs stored on a blockchain that are used to automate the execution of an agreement without a central authority's involvement

[2] PwC, (2023) 'Crypto-assets in Luxembourg: Persistence Amidst Headwinds'



1.6. Evolution of regulatory frameworks has impacts on further technology adoption

The EU ICT[1] regulatory landscape has been very instrumental in delivering guidelines and frameworks that provide players in the financial services industry with specified parameters and standards to embrace technology. In this way, regulation helps to mitigate potential risks associated with the uptake of technology and data-driven business models. It also helps to level the playing field for banks, FinTech companies, and other financial service providers, thereby fostering healthy competition and enhancing the services provided to the end customer. Regulations in the EU financial sector are constantly evolving to shape the future of the banking industry, and this section will focus on some of the key regulations related to the emerging technologies mentioned previously (Exhibit 6).

At the moment, one of the major upcoming regulations is the Digital Operational Resilience Act (DORA), which is due to be applicable as of January 2025. With its implementation, we anticipate banks to continue their compliance journey by realigning and amending relevant operations and processes. The central theme of DORA revolves around ensuring that financial entities are prepared to identify, monitor, and most importantly, protect themselves from a variety of ICT and operational-related disruptions and threats.

When it comes to DLT, the implementation of the Blockchain III Law in Luxembourg is also set to further accelerate the adoption of blockchain technology within the financial sector[2]. This pilot regime, which came into force in March 2023 in Luxembourg, represents a major milestone in the country's development of a framework for DLT and aims to maintain the trust and confidence of market participants as they integrate blockchain into their operations. Its appeal lies in the fact that it now allows relevant financial players to use DLT on the financial market and as collateral, hence providing greater legal certainty. At the EU level, the entry into force of the Market in Crypto-Assets regulation (MiCA) in 2024 is expected to have a structural impact on crypto-assets adoption as it will not only level the playing field between traditional and crypto-pure players but also remove regulatory arbitrage within the EU[3]. Under MiCA, issuers and service providers in the crypto-assets space will be subject to stringent obligations aimed at ensuring market integrity, customer protection and fruitful adoption by market participants. This regulation will, in fact, impact Luxembourg by extension, creating new business opportunities for incumbents as well as for new entrants.

Moreover, with the evolution of AI set to intensify, the introduction of the EU AI Act becomes particularly important as it is the world's first comprehensive AI legislation. The Act takes a risk-based approach to AI systems, particularly defining restricted and high-risk AI. Banks using, developing, or intending to resort to AI-based credit scoring systems, for instance, and other similar use cases will have to review their systems in light of this new risk classification and the related requirements. Among other things, it will address concerns about AI biases by leaning towards responsible AI, which focuses on promoting human-centric and trustworthy AI. It emphasises the significance of human management and supervision of AI systems, highlighting the idea that AI should be used to enhance human abilities rather than replace human decision-making.

Exhibit 6: The Evolving Regulatory Ecosystem of Banking

Source: PwC Market Research Centre

Overall, these regulatory developments will shape the landscape for technology adoption in the banking sector, influencing how banks utilise technology to their advantage and for their clients' benefit.

[1] Information and communication technology
[2] PwC, (2023) The Luxembourg Blockchain III Law: a step forward into the new DLT era
[3] PwC, (2023) Approval of the first regulatory framework within the crypto-assets area: MiCa the ambitious game changer

2

Navigating banks' technology adoption challenges

Despite its many inherent benefits, the advancement of technology within the banking industry has not been without challenges which pose a significant dilemma to market players. Volumes of available data have led to increased customer data processing and digital data storage across banking operations, which creates multiple entry points for potential cyber-attacks and consequently data loss or theft.

Besides this, questions around the choice of technology to be adopted, vendors or third-party service providers, and implementation of responsible AI - among others - are significant issues that banks encounter in their technology adoption journey. In this section, we outline some of the looming technology-related challenges faced by the Luxembourg banking sector in its technology adoption efforts.

2.1. Increased reliance on third-party providers could stifle business continuity

As banks embark on their digital transformation initiatives, they are increasingly relying on technology and engaging with third-party providers to enhance their operations and deliver innovative services. Third-party service providers like cloud service providers, software vendors, data centres, or FinTech companies have become crucial for the uninterrupted operation of banks' digital systems. While this brings numerous benefits, it also amplifies banks' dependence on the availability and reliability of IT services. Any disruptions, or performance issues in these systems can have significant consequences, leading to service interruptions, dissatisfied customers and potential reputational damage.

To mitigate these risks, the banking sector in Luxembourg should consider diversifying their technology providers and establishing contingency plans. Having alternative vendors and backup systems in place can help ensure business continuity in the event of service disruptions or failures. Additionally, regular testing of disaster recovery plans and conducting mock scenarios can enhance preparedness and enable banks respond effectively to unforeseen IT service interruptions. Further, regular monitoring and performance evaluation of third-party services is also essential to ensure compliance with agreed-upon standards and to address any issues promptly.

2.2. Growing digitalisation is heightening cybersecurity and data quality risks

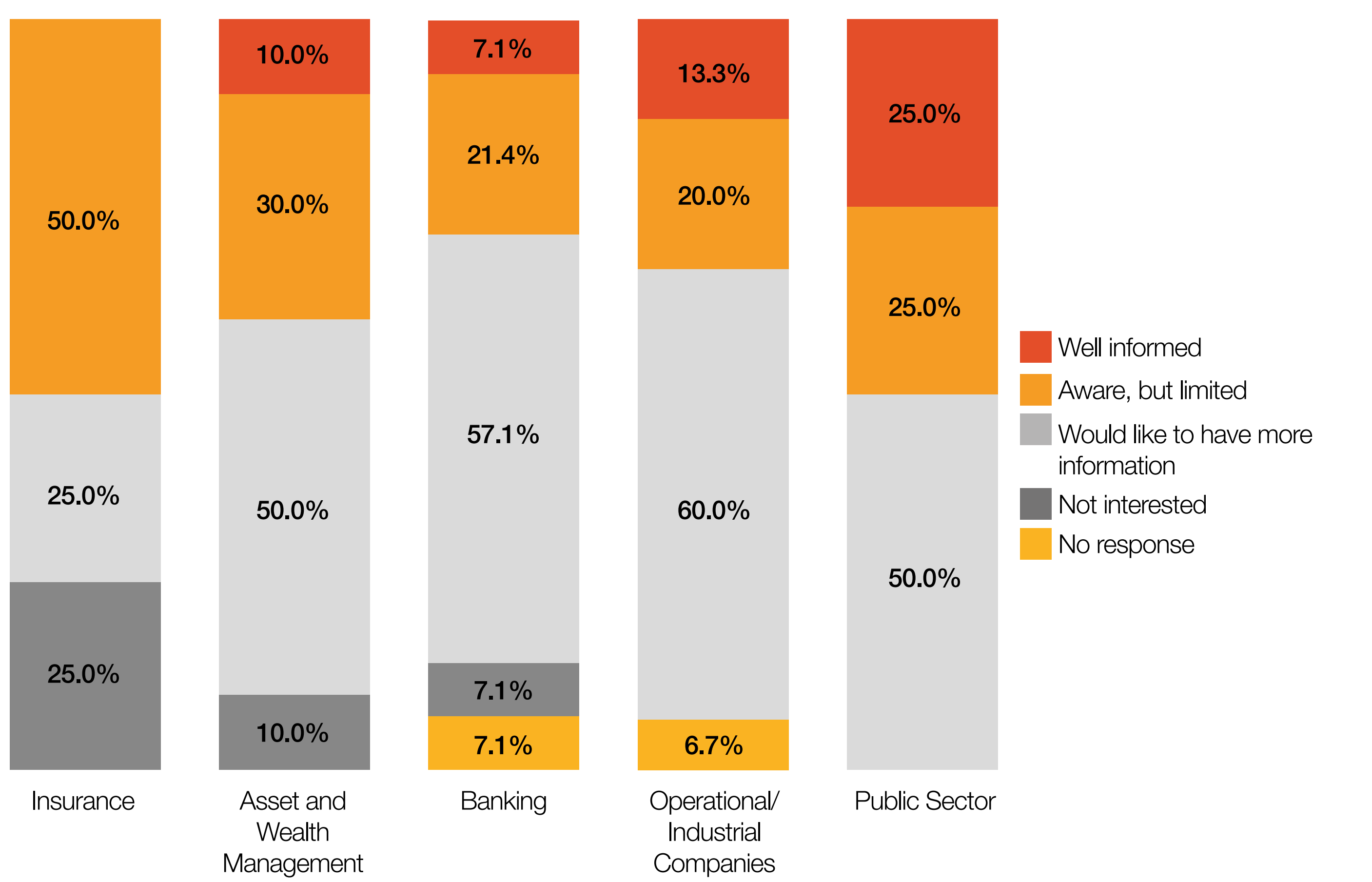
The high level of outsourcing and external partnerships that increasingly mark banks' technological transformation strategies introduce risks that need to be carefully managed. By sharing access to their systems and networks with third-party providers, banks expose themselves to potential cyber threats. PwC's recent Global Digital Trust Insights Survey[1] highlights this, with about 40% of respondents expecting mobile devices and emails to be the main channels for cybersecurity attacks. In Luxembourg, cyberattacks are spreading and becoming more complex as a result of the increased usage of web banking and the digitalisation of banking products and services. This points to the need for robust due diligence and the enforcement of compliance measures in banks' dealings with third-party or external collaborators.

Besides collaboration-related risks, certain technologies remain prone to hacking, such as DeFi, which could lead to potential data theft or loss. It is for this reason that collateralisation requirements restrict eligibility for many types of DeFi loans, with prospective borrowers required to provide collateral worth at least 100% of the loan value. To address these risks, the ABBL is working with regional, national, and international organisations to provide advice on how to identify and prevent potential hacking attempts and scams.

[1] PwC (2023) 'Global Digital Trust Insights Survey'
[2] PwC (2023) 'Use of Data Analytics and AI in Luxembourg--The Age of Generative AI

The ongoing AI revolution has also opened up discussions about data quality, with the EU's GDPR imposing obligations on organisations in Luxembourg regarding the identification, documentation, and storage of personal data collected and processed from EU residents. That being said, although 71% of banks in Luxembourg[2] have a clear and defined strategy for managing data within their companies, new regulations are still largely ambiguous for most of them. To illustrate this, only 29% (Exhibit 7) of the banking sector feels informed to some degree about the European AI Act, underscoring the need for banks in Luxembourg to amplify efforts to bridge this knowledge gap if they are to thrive in this emerging regulatory landscape.

Exhibit 7: Luxembourg's Lack of Regulatory Awareness In The Banking Sector



Source: PwC Luxembourg, 'Use of Data Analytics and AI in Luxembourg-2023 Edition

2.3. Rapid technological advancements risk customer and employee alienation

In the evolving banking industry, customer adoption is critical to the successful integration of new technologies. Banks need to ensure that customers are not only aware of the existence of emerging technological solutions but also understand their benefits and how they can enhance their banking experience. This requires banks to go beyond the mere provision of products and services and actively engage in communication and educational campaigns to highlight its features and advantages. Banks also need to ensure that the expansion of their technological product shelf occurs at a pace that customers can adapt to reasonably.

For instance, when it comes to the provision of interactive chat interfaces, banks are experiencing the need to consider factors such as ease of navigation, clear communication channels, and efficient response times to ensure that customers find the chat interface not only useful but also easy to use. This would require feedback-driven product revisions and enhancements. By gradually involving clients in their technological transformation strategy and providing the necessary resources to address customers' concerns, banks can increase adoption rates and increase customer engagement.

But customers are not the only ones likely to be impacted by swift technological adoption, bank employees could also face alienation due to significant changes in their workplace and roles. These changes, coupled with potential skill gaps, could hinder their effectiveness, underscoring the need for banks to implement gradual onboarding strategies when adopting new technology.

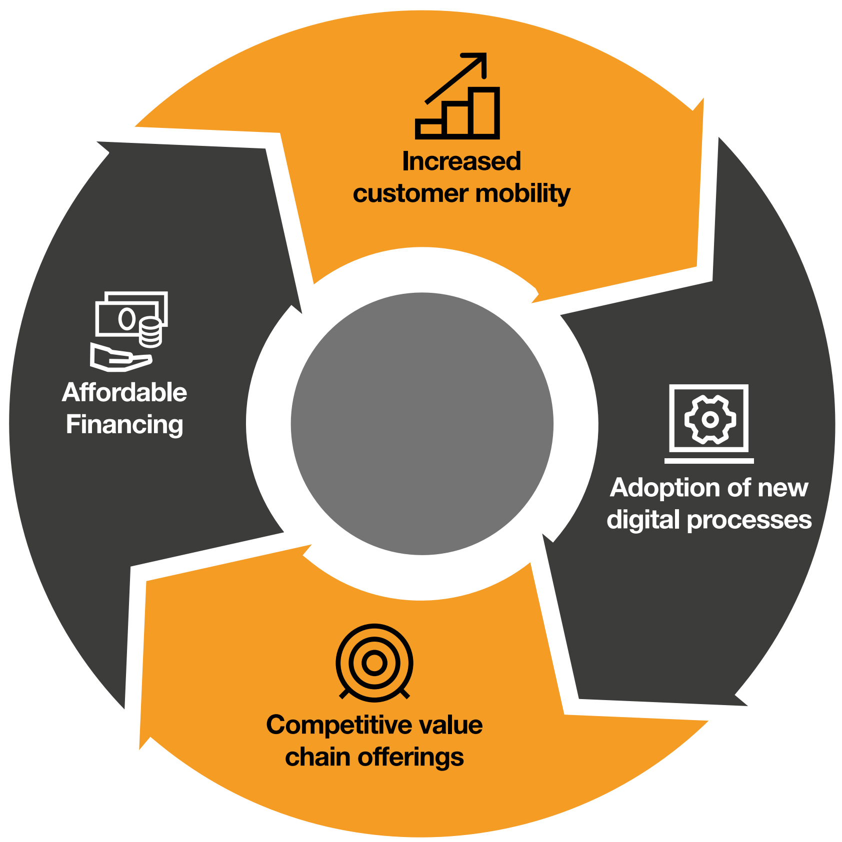
2.4. Widespread technological transformation is intensifying market competition

Amid the widespread availability and adoption of emerging technologies within banking operations, banks are facing heightened competition for market share, not only from other highly-adapted banks but also from digitally-native market entrants. With transformative technologies becoming increasingly accessible, factors like operational efficiency, product development, connectivity, data access, and customer convenience which were formerly seen as key differentiators are increasingly becoming standard industry expectations (Exhibit 8).

In this context, banks that lag in adapting their businesses accordingly risk losing out on the market positioning benefits that technology has to offer. To stay ahead in the short term, financial institutions will find it necessary to adopt and effectively apply emerging technologies, leveraging their potential to drive innovation and operational excellence. However, in the long term, sustainable differentiation will depend on the mastery of core capabilities such as the assembly of a skilled employee base and relationship management.

Expanding value chain coverage and developing new products and services have also emerged as key strategies for banks in Luxembourg to drive growth. This approach is influencing different segments of the banking sector, including retail banking, private banking, and corporate banking.

Exhibit 8: The rise of digitalisation fuels competition



Source: PwC Market Research Centre

2.5. Finding the best-fit talent will be key in banks' market positioning

The lack of relevant talent to drive digitalisation within banks poses another major challenge. In the pursuit of technological transformation, talent acquisition, relevant technology, research and development (R&D) are vital pillars. Banks therefore need to continuously enhance their knowledge and talent pool by adopting industry best practices from both domestic and international sources, and nurturing individuals with expertise in finance and information technology. Although the proliferation of AI and automation could potentially invalidate some job roles, this strategic approach is essential for achieving heightened levels of employee skill alignment and workforce optimisation.

Nonetheless, it is important to note that as certain jobs become obsolete, new roles will become vital, particularly in the fields of cybersecurity, programming and blockchain architecture, making it imperative for banks to attract top talent and have a core human resources strategy. PwC's CIO Pulse Survey points to this, showing that, every month in Luxembourg, almost 200 IT jobs are opened with the majority being developers or business analysts in core banking systems[1]. This demand is expected to persist, with the majority of CIOs surveyed predicting the rise in demand for skilled talents in all industries. Although it is currently challenging to find such skills in Luxembourg's market, banks who prioritise and attain this skill match stand to reap long-term advantages as these skilled personnel, after receiving thorough training, could generate long-term value for their employers.

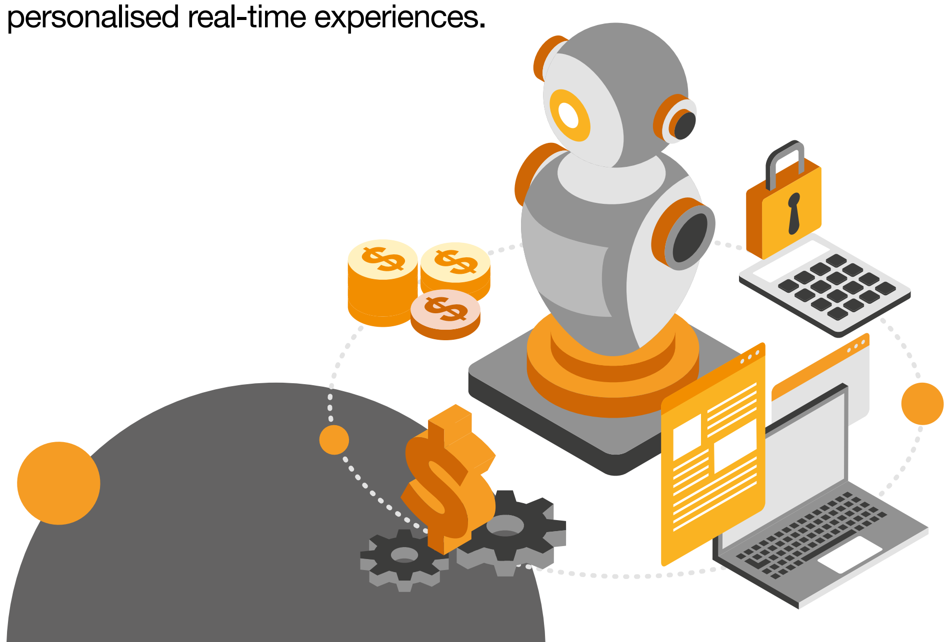
[1] PwC (2022) 'CIO Pulse Survey'

3

The way forward

The ongoing evolution of the banking sector through technological transformation is expected to persist well into the near future. AI will continue to develop and evolve, further transforming the banking industry to become an organisational layer that efficiently manages cross-enterprise processes at scale. As we look forward, certain roles will experience significant displacement while new ones emerge, prompting organisations to adopt positions that oversee the responsible utilisation of AI on a widespread level. Both institutions and consumers will be more comfortable with AI-driven financial decisions, and cross-functional AI personal assistants will increasingly play a pivotal role in customers' lives, managing their finances, facilitating purchases, and interacting with other AIs to complete tasks.

Augmented Reality, Virtual Reality (AR/VR), and by extension, the Metaverse, are set to transform the way individuals and businesses engage with the world around them. Through the synergy of AI, edge computing, and IoT, VR can generate personalised real-time experiences.



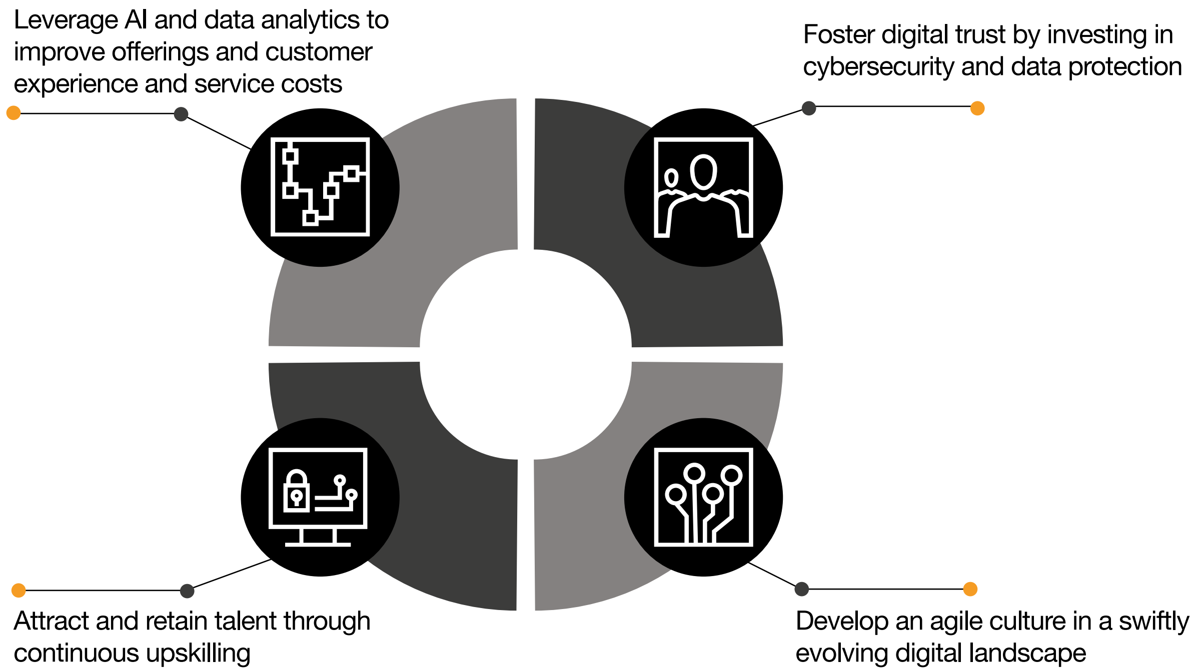
On the European front, Swissquote Bank's VR application continues to push the integration of immersive technology in banking. Its VR helmet creates a 360° trading wall that assists clients monitor the market and make instantaneous trades. Further developments could see AI-driven computer vision algorithms connected to AR devices with an ability to recognise products, check for their availability online, and facilitate seamless purchasing experiences. By the end of this decade, approximately 50% of banks worldwide will adopt AR/VR as an alternative means for customer and employee engagement[1]. Banks like BNP Paribas, ING and Bank of America are already making steady inroads in this area. In the case of ING Poland, the creation of a virtual branch on Roblox, the online gaming platform, is blending financial education simultaneously with fun activities to increase customer engagement.

[1] The Financial Brand, 2021 (https://thefinancialbrand.com/news/banking-trends-strategies/banking-future-projections-payments-technology-crypto-branches-competition-transformation-esg-124991/)

As we peer into the future, organisations will increasingly depend on service providers to test IT services, conduct financial reporting, and manage enterprise processes. We also anticipate a fragmentation of global data regulations, resulting in the emergence of multiple cloud ecosystems with unique rules and practices, posing challenges for global enterprises. Additionally, the adoption of "serverless" architecture will become widespread, enabling cloud providers to handle IT functions and substantially alleviating the workload for enterprise IT teams.

This section therefore outlines some key considerations to enable them to thrive in this landscape. Banks would have to leverage AI and data analytics to improve customer experience, foster digital trust by investing in cybersecurity and data protection measures, attract and retain talent through continuous upskilling, and remain agile in a swiftly evolving digital landscape (Exhibit 9).

Exhibit 9: Key Actions For A Successful Technology Transformation Journey



Source: PwC Market Research Centre

3.1. Leverage AI and data analytics to improve customer experience and service costs

To meet the rising expectations of customers and stay ahead of competitive threats in the AI era, Luxembourg banks must have a clear understanding of their strengths, local context, and current customer base. This begins with optimising their internal operations through extensive automation of manual tasks and leveraging AI technologies like machine learning and facial recognition to analyse vast amounts of customer data. When implementing these strategies, it is crucial for banks to ensure organisational integration and avoid fragmentation.

After streamlining internal processes, it is imperative to recognise that customers expect banks to be with them every step of the way, understanding their needs and providing a smooth experience across various channels. To achieve this, banks should adopt a unified approach that is aligned with their business strategy, ensuring seamless data management that allows access, handling, and use of data across departments for better decision-making.

Using cloud-native tools and API platforms would be key for this integration and improving customer experiences. Further, effectively implementing personalised elements across various channels would be vital for delivering excellent experiences and better results. In this context, AI and data analytics can help Luxembourg banks customise offerings for specific customer groups, speeding up transaction processing and service inquiries to enhance customer satisfaction and loyalty.

However, building customer loyalty and trust with regards to AI will require banks to demonstrate their alignment to the use of a responsible AI framework. In Luxembourg, PwC's Responsible AI Toolkit provides access to a suite of customisable frameworks, tools and processes designed to help developers and users harness the power of AI in an ethical and responsible manner - from strategy through to execution. A prominent feature of the toolkit is its focus on detecting bias in the outcome of applied algorithms and subsequently advising clients on remediation plans, and monitoring fairness throughout updates.

3.2. Foster digital trust by investing in cybersecurity and data protection

By having a unified strategy for the management of cyber threats and customer data, banks can foster digital trust, which has become a significant differentiator for customers. To this end, an increased focus on, and investments in data protection becomes crucial.

As banks develop centralised data-management infrastructure, it is essential to implement robust cybersecurity measures to secure data and applications. Actively combatting cyber threats across the entire technology infrastructure is crucial in safeguarding against risks within applications, operating systems, hardware and networks. This can be achieved through the implementation of centralised control towers that monitor data systems and networks, ensuring continuous oversight and protection. Further, banks must establish clear contractual obligations and responsibilities regarding cybersecurity with their partners to ensure consensus around data protection and risk mitigation.

In essence, as cyber risks extend beyond technology and encompass the landscape of financial services companies, banks that have strong cybersecurity and data protection measures in place stand to enhance their reputation and improve customer trust.

3.3. Attract and retain talent through continuous upskilling

Banks in Luxembourg must refine their employee value proposition in order to attract more tech talent and remain competitive. To do this, banks must rethink their hiring and retention strategies to accommodate the emerging technological landscape. Luxembourg already has an edge in this context, ranking among the top 20 (11th) in the 2022 INSEAD Business School's Global Talent Competitiveness Index[1], and further topping the list when it comes to luring talent.

With this advantage, banks must profile the diverse skills and expertise needed and focus on upskilling and reskilling to build teams with the right talent mix. By investing in employee development, banks not only enhance their capabilities but also create a culture of excellence that attracts top talent and drives organisational growth. The creation of digital talent and innovation hubs can also be beneficial in this regard. Banks can also foster an environment that attracts digital talent and encourages entrepreneurial thinking by providing cross-functional collaboration.

As routine tasks are automated, the banking sector should focus on retraining employees who are most affected and help them upgrade their skills to adapt to the changing landscape.

From this, it becomes clear that Luxembourg banks, in collaboration with the state, will need more concerted efforts to attract and retain talent. These efforts will strengthen the competitiveness and attractiveness of banks to make them more enticing to tech professionals.

[1] The Global Talent Competitiveness Index 2022

3.4. Develop an agile culture in a swiftly evolving digital landscape

As technology continues to be a crucial driver of change within the financial services industry, it is imperative for banks to develop an agile culture. This will improve their capacity to redesign, digitalise and realign their operating models at pace with emerging technological advancements. To cultivate an agile culture, banks must promote an innovative mindset, embrace agile methodologies, make data-driven decisions, foster cross-functional collaboration, and stay updated on industry trends. Achieving this also entails making organisational adjustments within the bank, specifically, shifting from traditional, silo-based organisational structures within value chains. Banks must create functional service level agreement metrics, utilising end-to-end measurements, and rethinking capabilities to streamline processes from design, through implementation, to stakeholder communication. This is needed to effectively address customer concerns from a customers' perspective and develop data-driven digital experiences that provide personalised engagement, efficiency, and convenience.

By integrating technological enablers such as DLT, Cloud, API, and data analytics, banks can reinforce agile values, leading to improved customer adoption and focus along the entire process chain. It is however essential to note that, part of being agile requires banks to evaluate their current competencies and make choices about which technologies to adopt and how to implement them.

4

Conclusion

Depending on how technology is harnessed, it can either become a vital tool for driving a bank's digital transformation or entirely undermine it. The technological trends unfolding on the global banking plane have ripple effects across various economies and industries, with Luxembourg's banking sector not being an exception. In addition, they hold great prospects for an unprecedented rally towards enhanced operational efficiency, innovative products, and personalised customer experiences. The trends discussed - cloud computing, AI, FinTech collaborations, digital solutions, blockchain, and the evolving regulatory landscape - collectively have the potential to revolutionise the industry positively.

However, with the numerous benefits these technological innovations come with, banks need to be aware of the related threats. Customers being at the centre of all this reinforces the essence of safeguarding against data security risks, privacy concerns, and the need for upskilling to adapt to exponential technological changes. Success in this direction will rely on finding the delicate balance between leveraging technology to drive progress and addressing the associated risks proactively. That notwithstanding, technological transformation is as much technology-driven as it is strategy-backed. Integrating technology within the overarching framework of a bank's strategy is crucial, and a mismatch between these two will be detrimental to success.

As banks swing between technology and strategy, they cannot afford to lose sight of the evolving regulations guiding the industry. The nature of banking operations exposes the sector to strict regulatory frameworks which when flouted, have huge financial and reputational implications. As various industries race to grapple with the exponential pace of technology, banks would need to transition from their legacy systems with a keen eye on the boundaries of such decisions. For banking institutions in Luxembourg, adopting a forward-thinking approach, prioritising cybersecurity measures, and maintaining a strong commitment to customer trust is the bedrock upon which they can thrive in a customer-centric technological future. In addition to this, the challenge of slow adoption needs to be addressed if banks are to avoid the risk of falling behind and losing out on key opportunities, especially as the pivotal role played by technology in banking becomes all the more crucial.

5

Overview of the Luxembourg banking sector's evolution

Key takeaways – Overview of the Luxembourg banking sector's evolution[1]

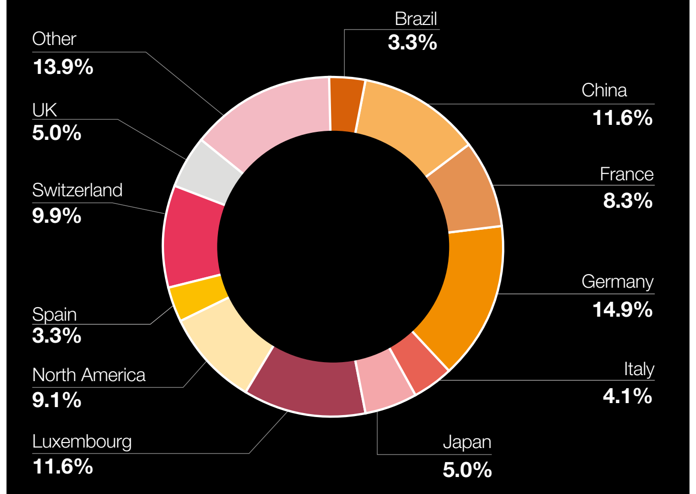
- With 121 authorised banks at the end of the financial year 2022, the number of banks decreased by three.
- Regarding the legal status, 78 banks are under Luxembourg law, 30 are branches of banks from EU Member States and 13 are branches of banks from non-EU Member States.
- In terms of geographical representation in the Luxembourg financial centre, German banks still make up the largest group at 14.9%, followed by Chinese and Luxembourgish banks both registering an 11.6% share, Swiss banks with 9.9% and North American banks with 9.1%.
- The following banks have started operations during 2022:
  - DONNER & REUSCHEL AG, Zweigniederlassung Luxemburg
  - Clearstream Fund Centre S.A.
  - J.P. Morgan SE, Luxembourg Branch
- The following banks were deregistered in 2022:
  - Keytrade Bank Luxembourg S.A.
  - BNP Paribas Securities Services, Paris (France), succursale de Luxembourg
  - J.P. Morgan Bank Luxembourg S.A.
  - Danske Bank International S.A.
  - Banque Puilaetco Dewaay Luxembourg S.A.
  - RCB BANK LTD, Luxembourg branch

1. Source: CSSF Annual Report 2022

Number of banks

Number of banks	2022	2021
Subsidiaries	78	81
Branches	43	43
Total	121	124

Countries of origin of banks established in Luxembourg



* Classification as per CSSF

Headcount

2022
26,012

2021
25,966

- In 2022, the headcount in the banking sector slightly increased by 46 staff compared to the prior year.
- Employment increased for 52% of banks, whereas it decreased for 36% of them.
- The gender diversity remains unchanged with 45% women and 55% men.

Balance sheet total (in EUR million)

2022
923,030

2021
953,122

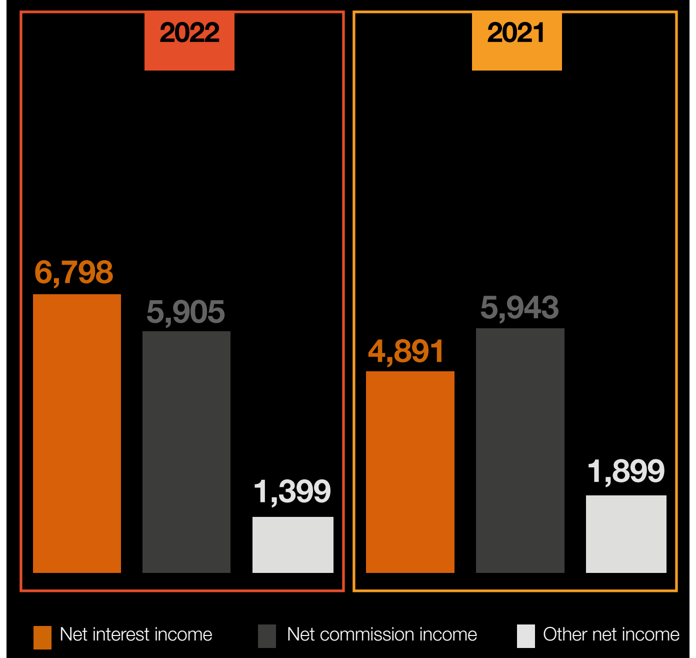
- In 2022, the balance sheet total dropped by EUR 30.1 billion (-3.2%). The downward trend was primarily due to the decline in deposits from investment funds and intra-group entities which likewise impacted the drop in loans and advances to central banks.
- The decrease in the asset side was principally driven by the downward trend in assets held with central banks (EUR -36.7 billion; -18.3%), followed by the decrease in fixed-income transferable securities (EUR -10.5 billion; -8.1%). The plunge was countered by the movements in fixed and other assets (EUR +9.2 billion; +40.8%) and loans and advances to customers (EUR +4.6 billion; +1.8%) and credit institutions (EUR +3.4 billion; +1.0%).
- On the liabilities side, the banking sector registered significant drops in amounts owed to credit institutions (EUR -18.5 billion; -6.3%), amounts owed to customers (EUR -7.6 billion; -1.5%) and amounts owed to central banks (EUR -6.8 billion; -42.9%).

- Net profits slightly increased by EUR 80.0 million (+2.0%), with 77% of banks having positive results in 2022 (82% in 2021).

Annual net profit or loss (in EUR million)

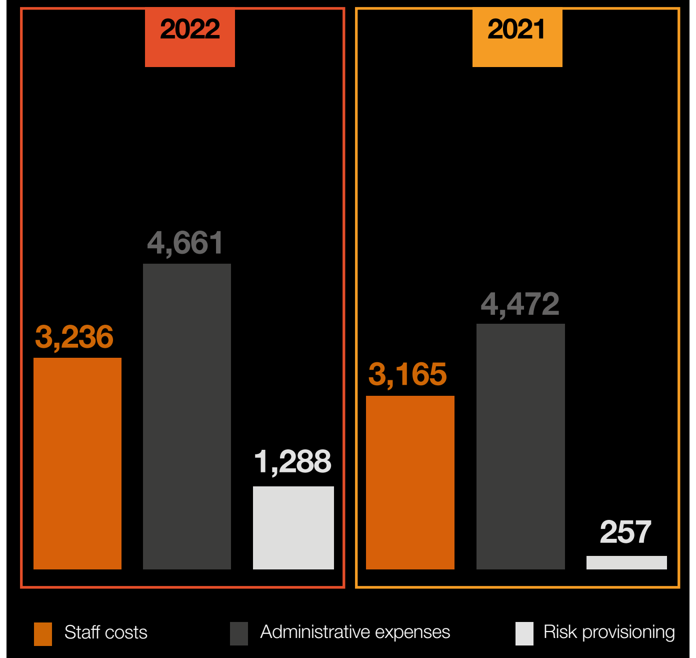
2022	2021
4,101	4,021

Banking income (in EUR million)



- Banking income registered a growth of EUR 1.4 billion (+10.7%) in 2022. The net interest income had a sizeable increase of EUR 1.9 billion (+39.0%), mainly due to the rise in key interest rates in the second half of 2022, whereas net commission income showed a rather steady trend (EUR -38.0 million; -0.6%).
- Other net income declined by EUR 500.0 million (-26.3%) which is characterised by valuation losses on hedging and securities portfolio.

Overall expenses (in EUR million)



- General expenses continued their upward trend with an increase of EUR 260.0 million (+3.4%) which is reflective of the growth in both general administrative expenses (EUR +189.0 million; +4.2%) and staff costs (EUR +71.0 million; +2.2%).
- Net provisions were considerably higher in 2022 by EUR 1.0 billion (+401.8%). This surge was primarily influenced by the impact of conflict in Ukraine coupled with the anticipated provisions in relation to decelerated economic performance and exposures on non-performing assets outside Luxembourg.

Cost-income ratio

- The cost-income ratio had a minimal increment, mirroring the slight growth in net profit as evidenced by the increase in banking income (+10.7%) which was countered by the surge in provisions (+401.8%).

- The average capital ratio total of the banking sector declined from 24.3% to 23.1% in 2022 but it remained substantially higher than the regulatory ratio requirement set at 10.5%.
- Moreover, the Luxembourg banks consistently register high prudential ratios year-on-year.

Solvency ratio

2022	23.1%
2021	24.3%

Return on assets

0.44%	0.42%
2022	2021

Return on equity

6.70%	6.33%
2022	2021

- Both ratios remained steady as the annual net profits showed a slight growth of 1.4%.

North American/ UK segment
Chinese segment
French segment
Swiss segment
German segment
Luxembourg segment

6

Overview of developments in each segment

As in previous years, you will also find in this publication an analysis of the financial statements of the largest country segments of banks present in Luxembourg. This review aims at better understanding the dynamics within the different country segments, as well as their relative development against the overall Luxembourg banking market, which recorded a positive performance in net profit by 2.0% in 2022.

In order to ensure continuity over time, we have kept the composition of the six main country segments: German, French, Swiss, UK/North American and Chinese banks alongside Luxembourg banks, which are part of the "home segment". For each of these segments, we highlight changes compared to the previous year and discuss observed trends.

The **North American/UK segment** underwent considerable transformation with the departure of J.P. Morgan Bank Luxembourg S.A and the subsequent establishment of the Luxembourg branch of J.P. Morgan SE, headquartered in Frankfurt. Overall, seven out of eight banks were profitable. With an environment of fairly high interest rates, a sustained growth in loan portfolios is observed and this translated to increased net interest income (+35.3%) across the segment.

The **Chinese segment** continued to rally around its core activity of corporate banking. The segment is primarily dominated by three major banks collectively contributing (94.2%) to the aggregate balance sheet.

The **French segment** witnessed two major developments: the merger of Swissquote Bank Europe S.A and Keytrade Bank Luxembourg and the closure of the Luxembourg branch of BNP Paribas' Securities Services.

Despite these shifts, the French segment continued on its progressive trajectory and closed the year with an increase in annual net profit compared to the previous year (+35.7%).

The **Swiss segment**, as has been the case for several years, retained a core emphasis on asset servicing and private banking. Banks within the segment recorded an overall increase in annual net profit (+45.0%) in comparison with the preceding year.

In the **German segment**, we continue to experience diversified offerings in private banking, corporate banking, and asset servicing. These services are looking to receive a further boost with the addition of the new branch - Donner & Reuschel AG - to its ranks. The German segment recorded an increased annual net profit from the previous year (+67.2%).

The **Luxembourg segment** reflects the most diversified segment across all six segments with private banking, corporate banking, asset servicing and custody playing central roles in service delivery. Since the last report, the market has seen the entry of Clearstream Fund Centre S.A. and the exit of Compagnie de Banque Privée Quilvest S.A. as a result of a reversed merger with Fideuram Bank (Luxembourg) S.A. Comparing annual net profit performance against the preceding year, the "home" segment recorded an increase in this metric (+21.7%).

Despite shared economic and regulatory conditions, each segment showcases distinct strengths amidst challenges. This reflects the resilience of the country's banking sector while underscoring the importance of tailored approaches to navigate the evolving banking landscape.

Key takeaways – North American/UK segment

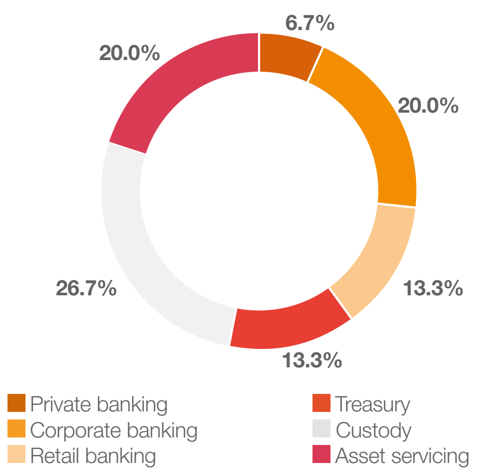
- The UK/North American segment had seen a certain notable transformation in 2022 concerning the merger of J.P. Morgan Bank Luxembourg S.A. and J.P. Morgan Bank (Ireland) plc, into J.P. Morgan SE which is headquartered in Frankfurt, Germany. Following the merger, J.P. Morgan SE established its branch in Luxembourg, J.P. Morgan SE – Luxembourg Branch. As a result, the overall number of banks still remained constant.
- The aggregate balance sheet decreased by EUR 1.2 billion (-2.4%). This was mainly driven by the drop at RBC Investor Services Bank S.A (RBC) (EUR -4.1 billion; -20.3%) and Northern Trust Global Services SE (Northern Trust) (EUR -1.3 billion; -17.9%), partially compensated by the increase at HSBC Private Bank (Luxembourg) S.A (HSBC) (EUR +3.1 billion; +56.7%). Moreover, the overall decrease in the balance sheet was mainly attributable to loans and advances to credit institutions (EUR -3.7 billion; -11.8%) and bonds and transferable securities (EUR -2.5 billion; -38.4%), favourably capped by the strong growth in loans and advances to customers (EUR +4.3 billion; +56.5%) which was seen in all banks involved in credit lending activities.
- On the liabilities side, the segment was characterised by a decrease of the amounts owed to customers by EUR 5.7 billion (-15.9%) primarily attributable to RBC (EUR -5.0 billion; -29.0%), partially capped by the increase in amounts owed to credit institutions (EUR +3.2 billion; +61.6%) primarily attributable to HSBC (EUR +2.6 billion; +60.6%).
- The revenue structure in the segment, historically depended - and still depends - on the net commission income, showing in 2022 an aggregate balance of EUR 918.3 million, slightly decreased (EUR -52.5 million; -5.4%) and mainly stemming from two banks: Northern Trust (EUR -33.9 million; -12.6%) and RBC (EUR -17.2 million; -8.9%). Notably, the decrease was mainly influenced by the drop in value of assets under administration attributed to the closure of RBC's Milan branch and the transfer of depositary clients to the newly established UK entity Northern Trust Investor Services Limited.

  Favourably, such a decrease in net commission income was countered by the increase in net interest income (EUR +103.5 million; +35.3%), with PayPal (Europe) S.à r.l. et Cie, S.C.A. (Paypal) contributing the most (EUR +84.2 million; +48.4%) followed by RBC (EUR +18.9 million; +37.3%), as characterised by continued growth in loan portfolio with higher interest rate environment.
- Overall, seven out of eight banks were profitable this year, with PayPal (EUR 73.1 million), John Deere Bank S.A. (EUR 58.9) and Northern Trust (EUR 54.1 million) contributing the most.
- The segment's headcount decreased by 102 FTE (-4.7%) with a corresponding drop in staff costs of EUR 11.1 million (-3.3%), mainly driven by RBC (-182 FTE, -19.7%) as the result of the closure of its Milan branch. Risk provisioning increased by EUR 184.3 million (+587.6%) primarily attributable at PayPal (EUR +175.7 million; +694.6%) million in relation to loan impairment charges on credit products while the overall administrative expenses grew by EUR 16.6 million (+2.7%).

Number of banks

Number of banks	2022	2021
Subsidiaries	8	9
Branches	10	9
Total	18	18

Business areas



Annual net profit or loss (in EUR million)

2022	2021
259	321

Headcount

2022	2021
2,064	2,166

Cost-income ratio

Balance sheet total (in EUR million)

2022
46,744

2021
47,900

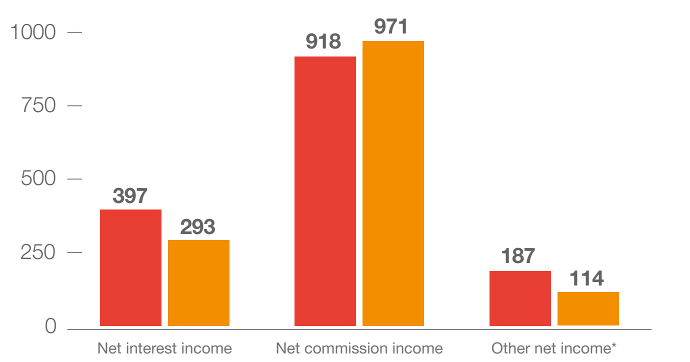
Return on equity

2022	2021
5.68%	7.86%

Return on assets

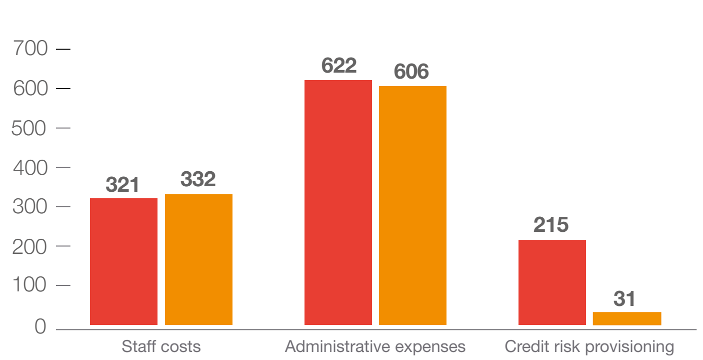
2022	2021
0.55%	0.67%

Banking income (in EUR million)

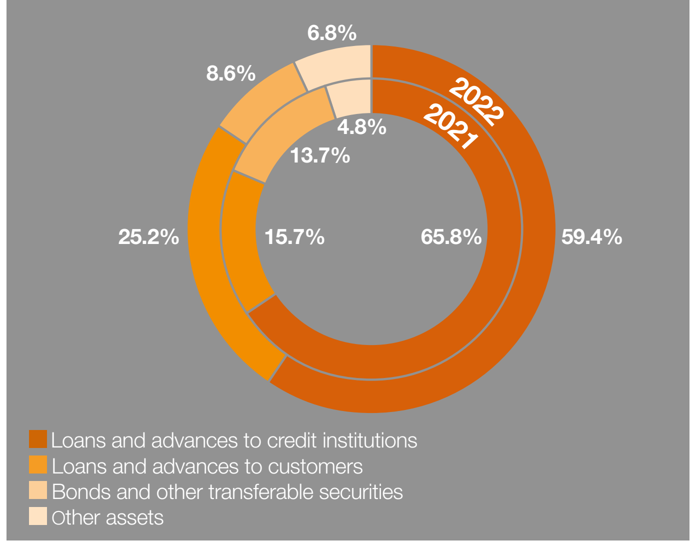


*other net income includes: net profit/loss on financial operations (including gains/losses on derivatives & revaluation gains/losses), other net operating income and dividend income

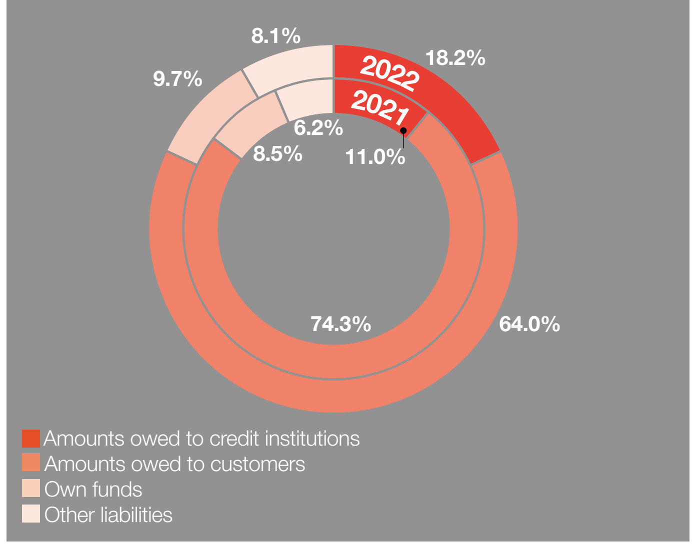
Staff costs, administrative expenses and credit risk provisioning (in EUR million)



Breakdown of assets



Breakdown of liabilities



Ranking of balance sheet totals (in EUR million)

Ranking	Bank	2022	2021	Shift	Change in rank
1	RBC Investor Services Bank S.A. (*)	16,414	20,582	-20.3%	=
2	PayPal (Europe) S.à r.l. et Cie, S.C.A.	11,566	11,140	3.8%	=
3	HSBC Private Bank (Luxembourg) S.A.	8,566	5,466	56.7%	▲ +1
4	Northern Trust Global Services SE	6,109	7,437	-17.9%	▼ -1
5	John Deere Bank S.A. (*)	3,185	2,605	22.3%	=
6	CIBC CAPITAL MARKETS (EUROPE) S.A. (*)	769	542	41.9%	=
7	Brown Brothers Harriman (Luxembourg) S.C.A.	119	112	6.3%	=
8	RBS International Depositary Services S.A.	16	16	0.0%	=
	TOTAL	46,744	47,900	-2.4%	

(*) Please note that the bank's Financial Statements closing date is 31 October 2022.

Ranking of annual net profit or loss (in EUR million)

Ranking	Bank	2022	2021	Shift	Change in rank
1	PayPal (Europe) S.à r.l. et Cie, S.C.A.	73.1	145.3	-49.7%	=
2	John Deere Bank S.A. (*)	58.9	45.2	30.3%	▲ +2
3	Northern Trust Global Services SE	54.1	72.5	-25.4%	▼ -1
4	Brown Brothers Harriman (Luxembourg) S.C.A.	50.6	52.7	-4.0%	▼ -1
5	RBC Investor Services Bank S.A. (*)	28.8	14.6	97.3%	=
6	RBS International Depositary Services S.A.	0.9	0.4	125.0%	=
7	CIBC CAPITAL MARKETS (EUROPE) S.A. (*)	0.1	-3.2	103.1%	=
8	HSBC Private Bank (Luxembourg) S.A.	-7.4	-6.1	-21.3%	=
	TOTAL	259.1	321.4	-19.4%	

(*) Please note that the bank's Financial Statements closing date is 31 October 2022.

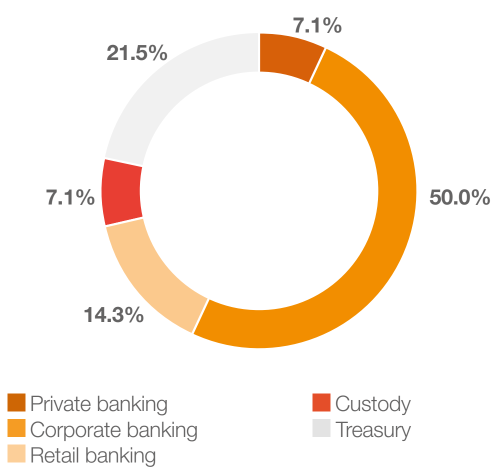
Key takeaways – Chinese segment

- The number of banks in the Chinese segment remained constant in 2022, with the corporate banking still as the key business area.
- The Chinese segment is characterised by three main players representing 94.2% of the aggregate balance sheet – i.e. Bank of China S.A. (Bank of China) (EUR 8.6 billion), Industrial and Commercial Bank of China S.A. (ICBC) (EUR 7.4 billion) and China Construction Bank (Europe) S.A. (EUR 3.2 billion).
- The aggregated balance sheet of the Chinese segment increased by EUR 3.5 billion (+21.0%) principally due to the growth in loans and advances to credit institutions (EUR +2.4 billion; +40.8%) and loans and advances to customers (EUR +1.2 billion; +13.9%). The increase in loans and advances to credit institutions were mostly from Bank of China (EUR +1.4 billion, +47.4%) and ICBC (EUR +0.9 billion; +45.2%) while the increase in loans and advances to customers was mainly driven by ICBC (EUR +0.5 billion; +21.7%) and Bank of Communications (Luxembourg) S.A. (EUR +0.3 billion; +75.3%).
- On the liabilities side, notable increases were attributed to amounts due to credit institutions (EUR +2.1 billion; +35.8%) and customers (EUR +1.2 billion; +18.9%). The rise in the amounts due to credit institutions were mainly driven by Bank of China (EUR +1.4 billion; +59.9%) while ICBC plays as the main contributor (EUR +0.9 billion; +32.7%) to the increase in amounts due to customers.
- Compared to 2021 figures, the Chinese segment showed an increase in banking income (EUR +7.2 million; +3.2%) driven by the rise in net interest and commission income (EUR +55.8 million; +30%) linked to the growth of lending activities, partially capped by the decrease in other net income (EUR -48.6 million; -128.4%).
- On the human capital side, there was a slight reduction in staff of 12 FTE (-1.3%) with ICBC contributing the most (-10 FTE). Both administrative expenses and staff costs showed a minimal increase of EUR 4.1 million (+6.7%) and EUR 1.9 million (+1.4%).
- The increase in risk provisioning (EUR +157.5 million; >1,000.0%) was mainly attributable to increased value adjustments on assets at ICBC (EUR +136.6 million; >1,000.0%), driving the increase in the segment's net loss from EUR -5.1 million (2021) to EUR -161.3 million (2022).

Number of banks

Number of banks	2022	2021
Subsidiaries	7	7
Branches	7	7
Total	14	14

Business areas



Annual net profit or loss (in EUR million)

2022	2021
-161	-5

Headcount

2022	2021
916	928

Cost-income ratio

Balance sheet total (in EUR million)

2022
20,384

2021
16,840

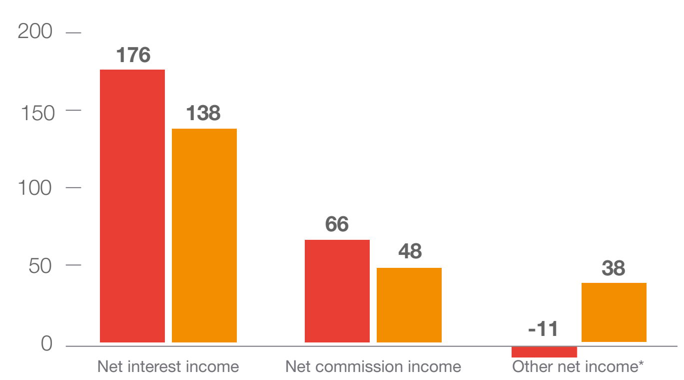
Return on equity

2022	2021
-8.90%	-0.26%

Return on assets

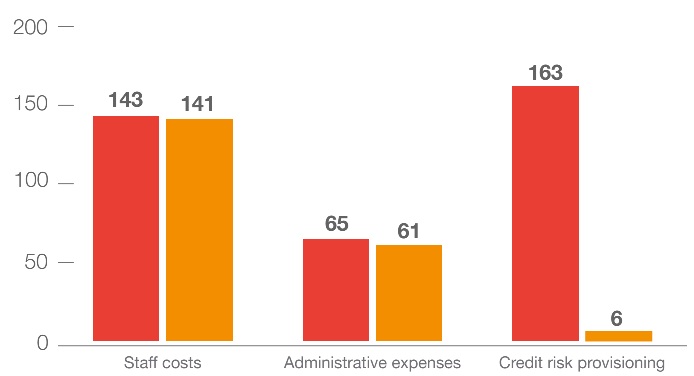
2022	2021
-0.79%	-0.03%

Banking income (in EUR million)

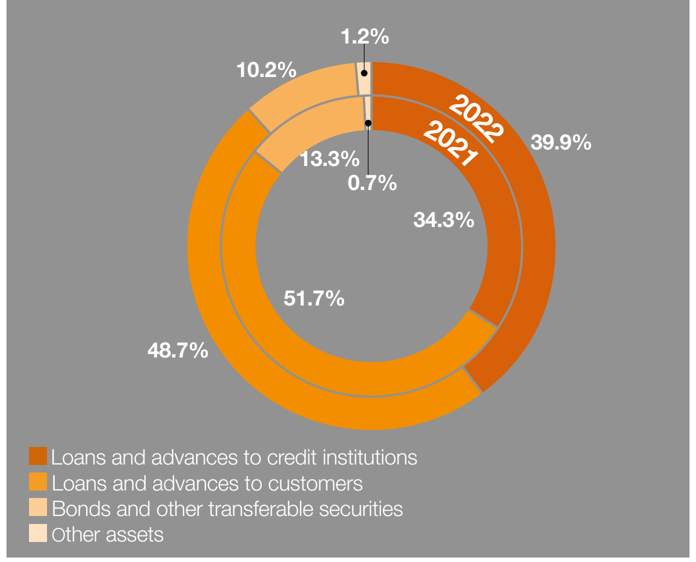


*other net income includes: net profit/loss on financial operations (including gains/losses on derivatives & revaluation gains/losses), other net operating income and dividend income

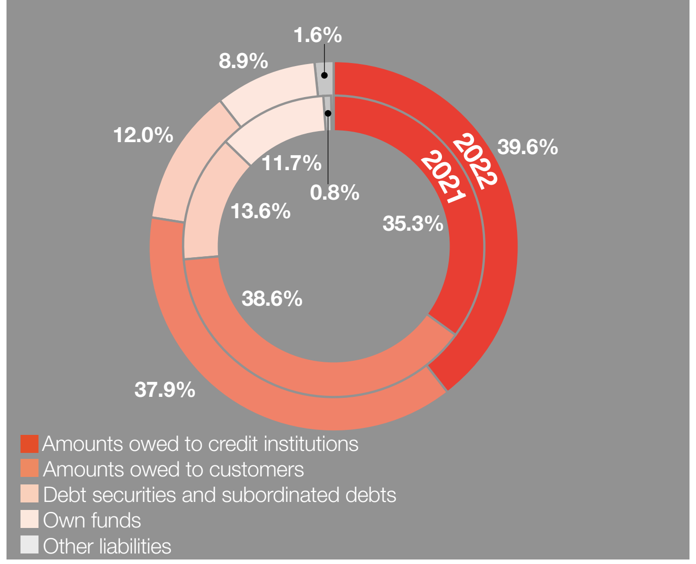
Staff costs, administrative expenses and credit risk provisioning (in EUR million)



Breakdown of assets



Breakdown of liabilities



Ranking of balance sheet totals (in EUR million)

Ranking	Bank	2022	2021	Shift	Change in rank
1	Bank of China (Europe) S.A.	8,623	6,905	24.9%	=
2	Industrial and Commercial Bank of China (Europe) S.A.	7,404	6,246	18.5%	=
3	China Construction Bank (Europe) S.A.	3,164	2,688	17.7%	=
4	Bank of Communications (Luxembourg) S.A.	993	760	30.7%	=
5	China Everbright Bank (Europe) S.A.	104	152	-31.6%	=
6	Agricultural Bank of China (Luxembourg) S.A.	51	39	30.8%	▲ +1
7	China Merchants Bank (Europe) S.A.	45	50	-10.0%	▼ -1
	TOTAL	20,384	16,840	21.0%	

Ranking of annual net profit or loss (in EUR million)

Ranking	Bank	2022	2021	Shift	Change in rank
1	Bank of China (Europe) S.A.	14.4	26.4	-45.5%	=
2	China Everbright Bank (Europe) S.A.	1.1	0.1	>1,000%	▲ +2
3	Agricultural Bank of China (Luxembourg) S.A.	0.6	1.2	-50.0%	=
4	China Merchants Bank (Europe) S.A.	-4.5	-1.0	-350.0%	▲ +1
5	Bank of Communications (Luxembourg) S.A.	-9.0	-11.9	24.4%	▲ +1
6	China Construction Bank (Europe) S.A.	-16.1	-21.1	23.7%	▲ +1
7	Industrial and Commercial Bank of China (Europe) S.A.	-147.7	1.2	<-1,000%	▼ -5
	TOTAL	-161.2	-5.1	<-1,000%	

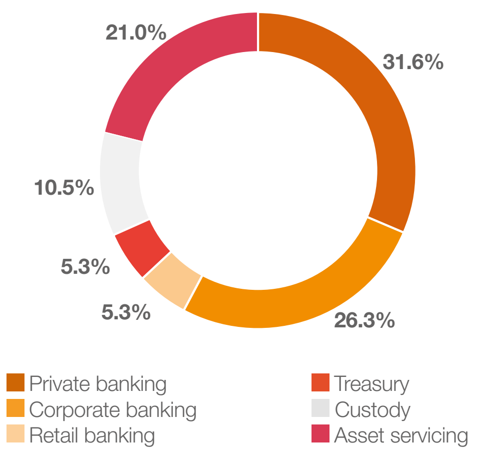
Key takeaways – French segment

- The number of banks in the French segment has decreased by two (2022: 10; 2021: 12) as a result of the acquisition of Swissquote Bank Europe SA of Keytrade Bank Luxembourg S.A. by way of merger in April 2022 and the closure of one of the Luxembourg branches of the group BNP Paribas.
- The aggregate balance sheet increased by EUR 3.8 billion (+3.9%) mainly due to the growth in loans and advances to credit institutions (EUR +5.5 billion; +9.5%) mostly driven by Société Générale Luxembourg S. A. (SGL) and CA Indosuez Wealth (Europe) S.A. (CA Indosuez) for EUR 3.7 billion (+11.2%) and EUR 1.4 billion (+13.6%) respectively, partially compensated by the decrease in bonds and other transferable securities (EUR -1.0 billion; -14.0%).
- On the liability side, amounts owed to customers registered an increase of EUR 3.5 billion (+6.3%) with SGL contributing the most (EUR +1.7 billion; +7.2%), followed by Société Générale Capital Market Finance S.A. (EUR +1.1 billion; +10.2%).
- Net profit grew by EUR 114.9 million (+35.7%), with six out of eight banks increasing their profits in 2022. Banking income showed a 24.8% growth, from EUR 1.0 billion in 2021 to EUR 1.3 billion in 2022. The trend was mainly influenced by net interest income (EUR +137.6 million; +49.1%) and other net income (EUR +121.7 million; +39.8%), while net commission income remained rather stable (EUR -5.9 million, -1.3%). Net interest income had a sizeable increase in 2022 as the result of the rise in key interest rates. The movement was mainly driven by SGL (EUR +48.3 million; +32.3%) followed by Banque de Luxembourg S.A. (EUR +41.3 million; +69.5%) and CA Indosuez (EUR +34.9 million; 92.3%). Other net income was likewise driven by SGL (EUR +58.4 million; 20.7%) and Banque de Luxembourg S.A. (EUR +14.2 million; 19.9%) as the result of dividends received on variable income securities.
- The segment's overall expenses increased by EUR 120.3 million (+16.8%) mainly in relation to staff costs (EUR +27.7 million, +8.3%) and administrative expenses (EUR +8.8 million, +2.9%). More so, there was a notable increase in the risk provisioning (EUR +84.7 million; +106.0%) mainly attributable to Société Générale Financing and Distribution S.A (EUR +76.6 million) due to the increased impairments triggered by deteriorating credit risks on loan portfolio.
- Overall, the segment's headcount decreased by 76 FTEs (-2.6%) mainly attributable to CA Indosuez Wealth (Europe) S.A. (-35 FTE; -5.6%). Cost-income ratio registered a favourable evolution in 2022 of 60.3% (2021: 67.3%) resulting from the overall positive performance of the French segment.

Number of banks

Number of banks	2022	2021
Subsidiaries	8	9
Branches	2	3
Total	10	12

Business areas



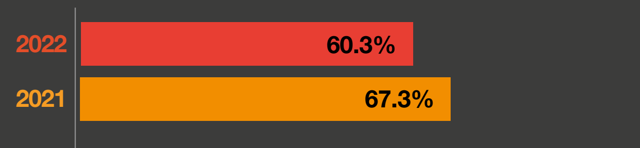
Annual net profit or loss (in EUR million)

2022	2021
437	322

Headcount

2022	2021
2,850	2,926

Cost-income ratio



Balance sheet total (in EUR million)

2022	2021
101,538	97,718

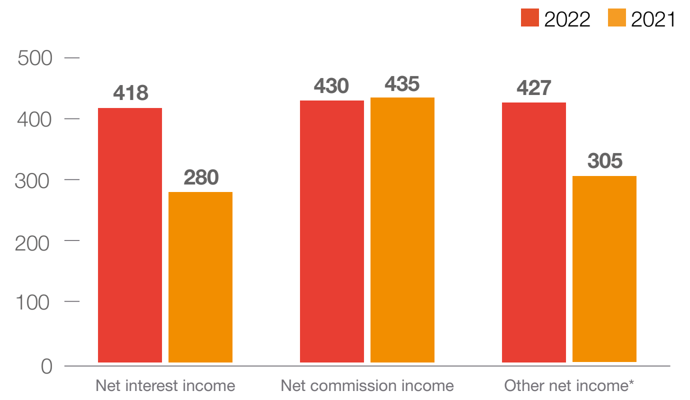
Return on equity

2022	2021
7.99%	6.51%

Return on assets

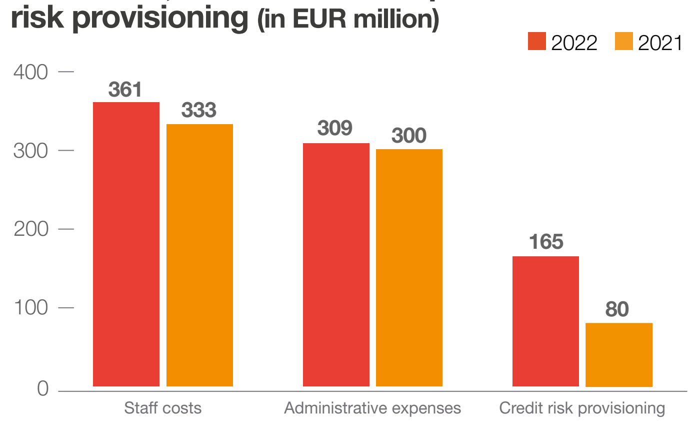
2022	2021
0.43%	0.33%

Banking income (in EUR million)

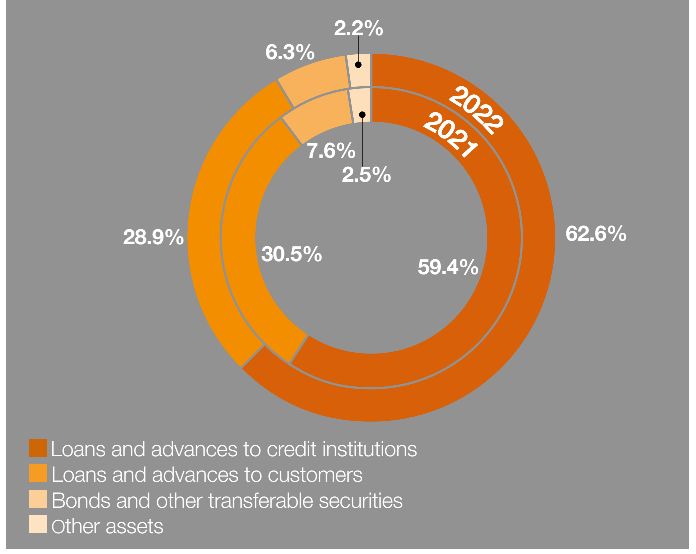


*other net income includes: net profit/loss on financial operations (including gains/losses on derivatives & revaluation gains/losses), other net operating income and dividend income

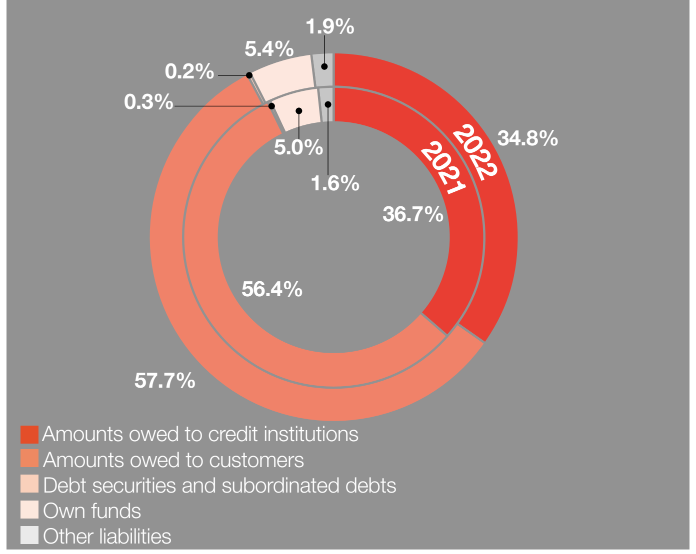
Staff costs, administrative expenses and credit risk provisioning (in EUR million)



Breakdown of assets



Breakdown of liabilities



Ranking of balance sheet totals (in EUR million)

Ranking	Bank	2022	2021	Shift	Change in rank
1	Société Générale Luxembourg S.A.	52,416	51,334	2.1%	=
2	CA Indosuez Wealth (Europe) S.A.	15,077	14,151	6.5%	+1
3	Banque de Luxembourg S.A.	14,633	14,178	3.2%	-1
4	Société Générale Capital Market Finance S.A.	12,059	10,904	10.6%	=
5	Natixis Wealth Management Luxembourg S.A.	4,919	4,811	2.2%	=
6	Banque Transatlantique Luxembourg S.A.	977	754	29.6%	+2
7	Banque BCP S.A.	785	784	0.1%	=
8	Société Générale Financing and Distribution S.A.	672	802	-16.2%	-2
	TOTAL	101,538	97,718	3.9%	

Ranking of annual net profit or loss (in EUR million)

Ranking	Bank	2022	2021	Shift	Change in rank
1	Société Générale Luxembourg S.A.	343.5	262.9	30.7%	=
2	CA Indosuez Wealth (Europe) S.A.	82.4	6.2	>1,000%	+1
3	Banque de Luxembourg S.A.	72.1	65.1	10.8%	-1
4	Natixis Wealth Management Luxembourg S.A.	9.3	-3.1	400.0%	+3
5	Banque Transatlantique Luxembourg S.A.	3.9	3.8	2.6%	-1
6	Société Générale Capital Market Finance S.A.	0.1	0.1	0.0%	=
7	Banque BCP S.A.	-0.3	-13.6	97.8%	+1
8	Société Générale Financing and Distribution S.A.	-74.2	0.5	<-1,000%	-3
	TOTAL	436.8	321.9	35.7%	

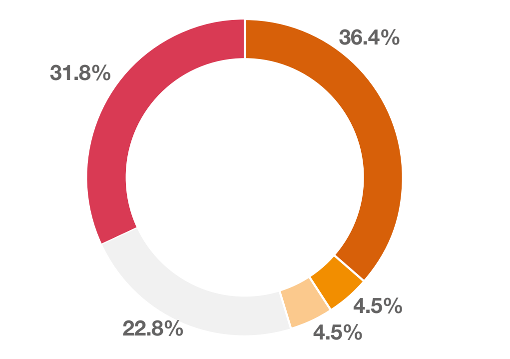
Key takeaways – Swiss segment

- The number of banks in the Swiss segment remained constant in 2022, with private banking and asset servicing still as the key business areas.
- The aggregate balance sheet total in the segment decreased by EUR 2.2 billion (-6.1%). The overall variation is primarily attributable to the decrease in loans and advances to credit institutions (EUR -4.1 billion; -20.5%), partially compensated by the increases in bonds and other transferable securities (EUR +1.4 billion; +28.4%) and in loans and advances to customers (EUR +0.3 billion; +3.1%). The decrease in the loans and advances to credit institutions was mainly related to Credit Suisse (EUR -2.5 billion; -50.2%) and Pictet & Cie (Europe) S.A. (Pictet) (EUR -1.9 billion; -39.6%).
- On the liabilities side, the amounts owed to customers registered a decrease of EUR 3.9 million (-12.3%) mainly driven by Credit Suisse (Luxembourg) S.A. (Credit Suisse) (EUR -3.5 billion; -45.2%) and Pictet (EUR -2.4 billion; -23.4%), partially compensated by the increase recorded by Bank Julius Bear Europe S.A. (EUR +1.1 billion; +44.1%). The amounts owed to credit institutions registered an increase of EUR 1.2 billion (+63.7%), mainly attributable to Pictet (EUR +1.0 billion; +311.5%).
- Banking income continued to show a positive trend (EUR +138.1 million; 13.9%) causing the net profit to increase by EUR 83.4 million (+45.0%). Net interest income significantly increased in 2022 by EUR 145.9 million (+148.4%), while net commission income decreased slightly by EUR 28.5 million (-4.0%), still remaining as the key revenue driver for the Swiss segment, generating EUR 676.1 million and representing 59.7% of the banking income of EUR 1.1 billion.
- Overall expenses increased in 2022 (EUR +42.4 million; +5.6%), driven by the rise of administrative expenses (EUR +46.7 million; +16.8%), partially offset by the decrease of credit risk provisioning (EUR -5.1 million; -51.0%). Staff costs remained stable compared to last year. The increase in administrative expenses stems from Union Bancaire Privée (Europe) S.A. and Bank Julius Baer Europe S.A. both recording an upward trend of EUR 14.3 million (+81.8% and +30.0%, respectively). The overall headcount slightly increased by 105 FTE (+4.7%), mostly attributable to Bank Julius Baer Europe S.A. (+49 FTE) and Union Bancaire Privée (Europe) S.A. (+40 FTE).
- The overall positive results of the Swiss segment compensated for the increase in administrative expenses, which resulted in decreased cost-income ratio from 76.4% in 2021 to 70.9% in 2022.

Number of banks

Number of banks	2022	2021
Subsidiaries	9	9
Branches	3	3
Total	12	12

Business areas



Annual net profit or loss (in EUR million)

2022	2021
269	185

Headcount

2022	2021
2,331	2,226

Cost-income ratio

Balance sheet total (in EUR million)

2022
34,551

2021
36,777

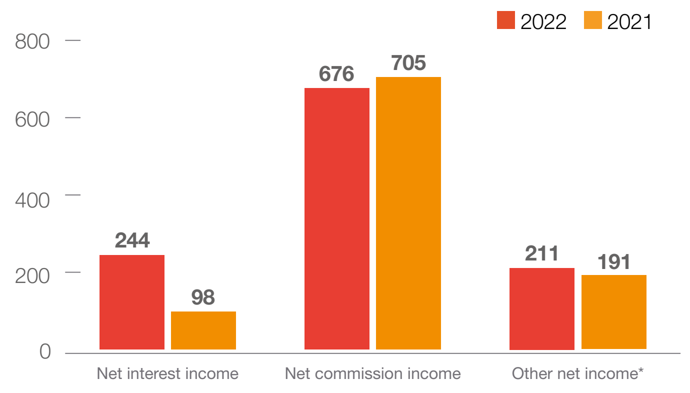
Return on equity

2022	2021
11.31 %	9.56%

Return on assets

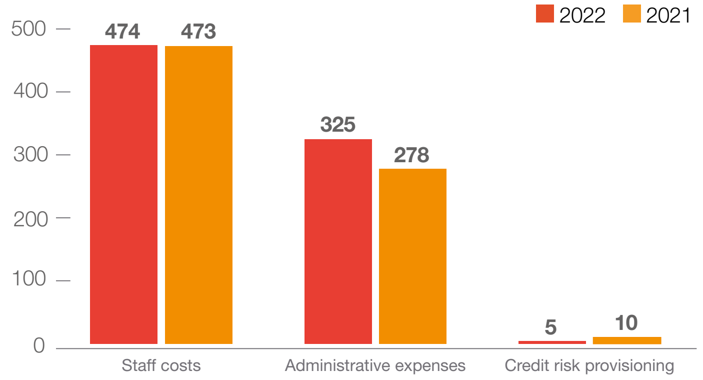
2022	2021
0.78%	0.50%

Banking income (in EUR million)

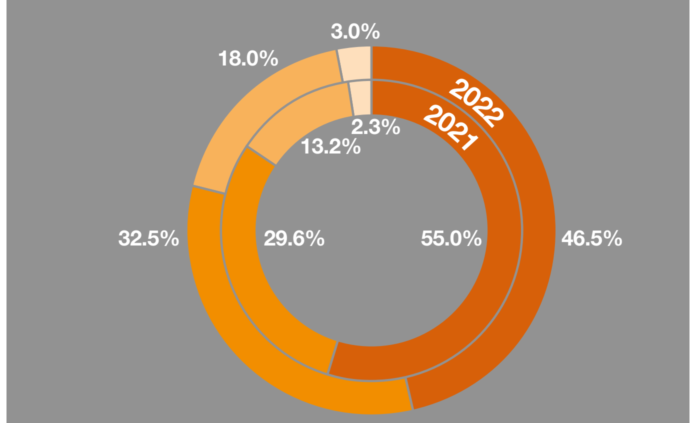


*other net income includes: net profit (loss) on financial operations (including gains/losses on derivatives, revaluation gains/losses), other net operating income and dividend income

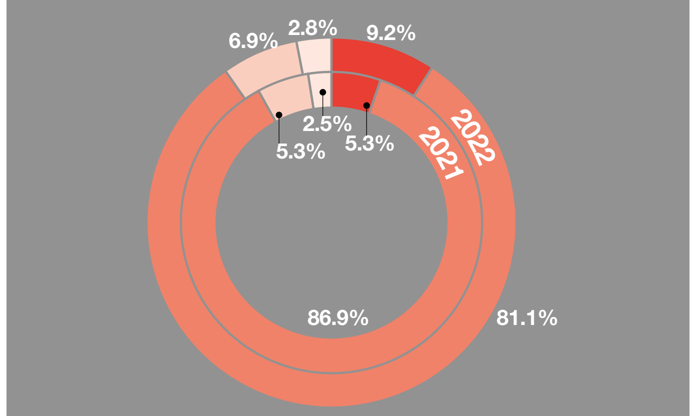
Staff costs, administrative expenses and credit risk provisioning (in EUR million)



Breakdown of assets



Breakdown of liabilities



Ranking of balance sheet totals (in EUR million)

Ranking	Bank	2022	2021	Shift	Change in rank
1	Pictet & Cie (Europe) S.A.	10,362	11,588	-10.6%	=
2	Credit Suisse (Luxembourg) S.A.	5,276	8,706	-39.4%	=
3	Edmond de Rothschild (Europe) S.A.	5,147	5,028	2.4%	=
4	Bank Julius Baer Europe S.A.	4,086	3,016	35.5%	▲ +1
5	EFG Bank (Luxembourg) S.A.	3,550	3,295	7.7%	▼ -1
6	Union Bancaire Privée (Europe) S.A.	3,030	1,875	61.6%	▲ +1
7	Lombard Odier (Europe) S.A.	1,841	2,224	-17.2%	▼ -1
8	Swissquote Bank Europe S.A.	793	427	85.7%	▲ +1
9	Mirabaud & Cie (Europe) S.A.	466	618	-24.6%	▼ -1
	TOTAL	34,551	36,777	-6.1%	

Ranking of annual net profit or loss (in EUR million)

Ranking	Bank	2022	2021	Shift	Change in rank
1	Pictet & Cie (Europe) S.A.	135.8	79.7	70.4%	=
2	Credit Suisse (Luxembourg) S.A.	28.7	50.4	-43.1%	=
3	Bank Julius Baer Europe S.A.	27.1	19.5	39.0%	▲ +1
4	EFG Bank (Luxembourg) S.A.	26.5	-5.4	590.7%	▲ +5
5	Edmond de Rothschild (Europe) S.A.	26.0	38.1	-31.8%	▼ -2
6	Lombard Odier (Europe) S.A.	14.5	-3.4	526.5%	▲ +2
7	Union Bancaire Privée (Europe) S.A.	8.1	1.2	575.0%	=
8	Swissquote Bank Europe S.A.	2.9	3.0	-3.3%	▼ -3
9	Mirabaud & Cie (Europe) S.A.	-1.0	2.2	-145.5%	▼ -3
	TOTAL	268.6	185.3	45.0%	

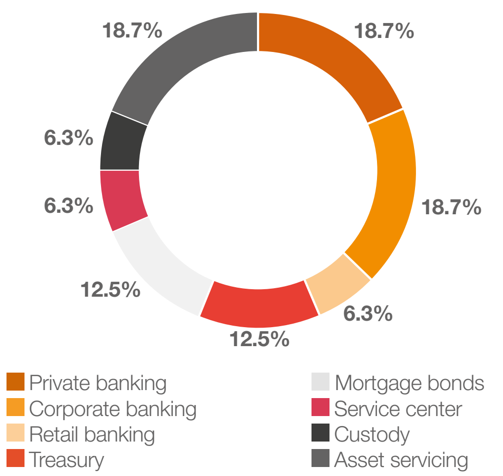
Key takeaways – German segment

- The number of banks in the German segment increased in 2022 since DONNER & REUSCHEL AG opened a new branch in Luxembourg. The main business areas of this segment remain private banking, corporate banking and asset servicing.
- The aggregate balance sheet of the German segment has increased by EUR 2.8 billion (+4.2%) due to the increase in loans and advances to credit institutions by EUR 3.2 billion (+12.8%) and in loans and advances to customers by EUR 1.6 billion (+5.9%), partially compensated by the decrease in bonds and other transferable securities (EUR -1.7 billion; -12.0%). The overall increase was driven by DZ PRIVATBANK S.A. (DZ) (EUR +3.9 billion; +18.6%) and by Deutsche Bank Luxembourg S.A. (DBL) (EUR +2.0 billion; +7.2%), partially offset by Commerzbank Finance & Covered Bond S.A. (EUR -1.7 billion; -20.6%) and NORD/LB Luxembourg S.A. Covered Bond Bank (NORD/LB) (EUR -1.4 billion; -13.5%).
- On the liabilities side, the segment was mainly characterised by an increase of amounts owed to credit institutions by EUR 3.4 billion (+12.5%) and of amounts owed to customers by EUR 2.5 billion (+13.3%), partially compensated by a decrease in debt securities issued by EUR 2.0 billion (-20.6%), primarily at DZ. The key drivers were DBL and DZ, increasing their amounts owed to customers (DZ) and owed to credit institutions (DBL) respectively by EUR 2.8 billion (+23.1%) and EUR 2.2 billion (+12.1%).
- The overall strong growth of net profits (EUR +89.6 million; +67.2%) was primarily driven by the remarkable increase in the net commission income (EUR +55.0 million; +101.3%), mainly driven by DBL (EUR +40.7 million) because of increased lending fees and commissions, as well as the increase of other net income (EUR +101.5 million; 320.5%). This increase was mainly driven by DZ (EUR +64.9 million; +311.8%) due to the result from financial investments from writing-up the investment in DZ PRIVATBANK (Schweiz) AG. As the lending activity is core for all the banks of the German segment, the key revenue stream remains net interest income, which slightly increased during the year (EUR +2.7 million; 0.5%) where the interest result was positively influenced by higher income in the credit and money market divisions mainly due to the changed interest rate regime as well as by taking advantage of market opportunities in liquidity management. The upward trend in other income was driven by DZ (EUR +64.9 million; 311.8%) mainly stemming from dividends and income on financial investments.
- Overall administrative expenses increased by EUR 32.9 million (+14.3%) driven by DBL (EUR +18.3 million; +16.0%) and DZ (EUR +17.9 million; +22.9%), the latter of which saw higher IT and regulatory costs, as well as advertising and consulting costs to strengthen the growth. The segment's headcount has slightly increased by 29 FTE (+2.0%), mainly driven by DZ (+35 FTE); the rise in staff costs (EUR +7.2 million; +4.0%) was thus mainly related to DZ (EUR +3.8 million; +3.0%).
- The positive results of the German segment further improved the cost-income ratio that decreased from 69.5% in 2021 to 63.1% in 2022.

Number of banks

Number of banks	2022	2021
Subsidiaries	5	5
Branches	11	10
Total	16	15

Business areas



Annual net profit or loss (in EUR million)

2022	2021
223	133

Headcount

2022	2021
1,525	1,496

Cost-income ratio

Balance sheet total (in EUR million)

2022	2021
69,907	67,106

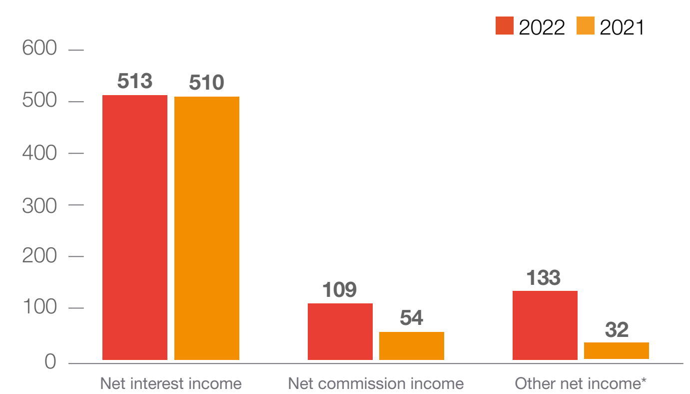
Return on equity

2022	2021
2.88%	1.78%

Return on assets

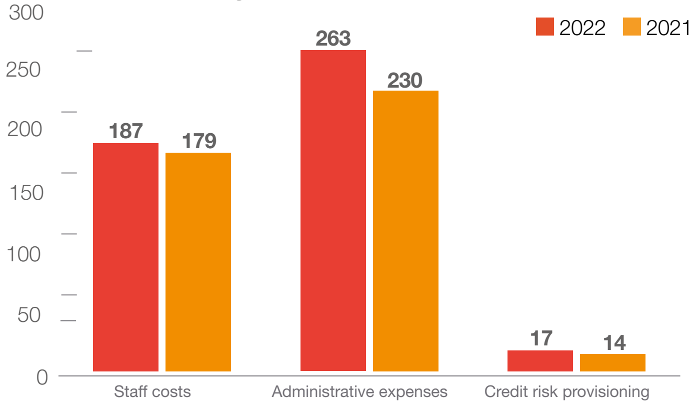
2022	2021
0.32%	0.20%

Banking income (in EUR million)

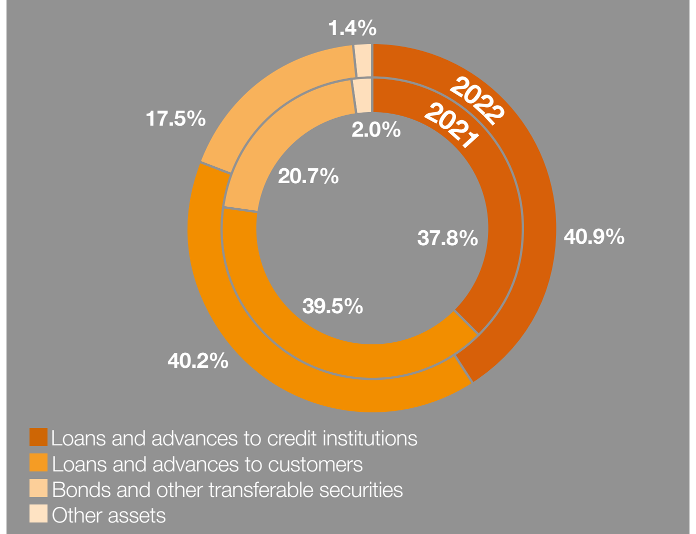


*Other net income includes: net profit/loss on financial operations (including gains/losses on derivatives & revaluation gains/losses), other net operating income and dividend income

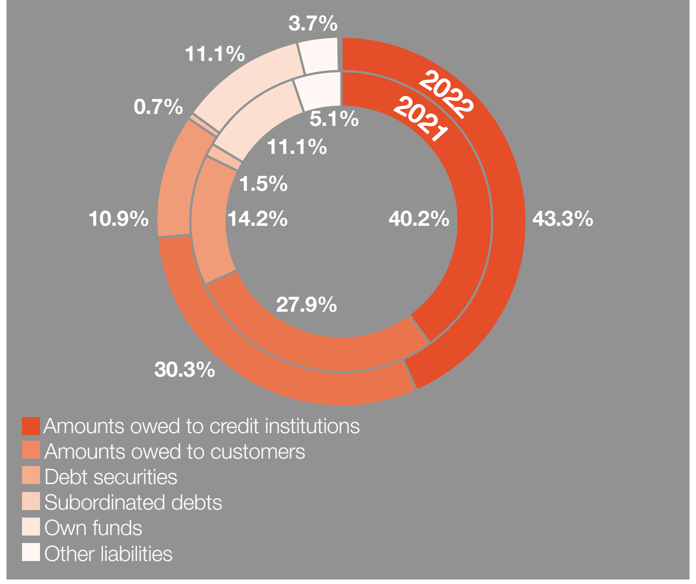
Staff costs, administrative expenses and credit risk provisioning (in EUR million)



Breakdown of assets



Breakdown of liabilities



Ranking of balance sheet totals (in EUR million)

Ranking	Bank	2022	2021	Shift	Change in rank
1	Deutsche Bank Luxembourg S.A.	29,507	27,530	7.2%	=
2	DZ PRIVATBANK S.A.	24,813	20,915	18.6%	=
3	NORD/LB Luxemburg S.A. Covered Bond Bank	9,155	10,579	-13.5%	=
4	Commerzbank Finance & Covered Bond S.A.	6,379	8,030	-20.6%	=
5	FIS Privatbank S.A.	53	52	1.9%	=
	TOTAL	69,907	67,106	4.2%	

Ranking of annual net profit or loss (in EUR million)

Ranking	Bank	2022	2021	Shift	Change in rank
1	Deutsche Bank Luxembourg S.A.	186.4	147.6	26.3%	=
2	DZ PRIVATBANK S.A.	79.4	23.4	239.3%	=
3	NORD/LB Luxemburg S.A. Covered Bond Bank	13.7	-4.0	442.5%	▲ +1
4	FIS Privatbank S.A.	-2.3	0.0	<-1,000%	▼ -1
5	Commerzbank Finance & Covered Bond S.A.	-54.3	-33.7	-61.1%	=
	TOTAL	222.9	133.3	67.2%	

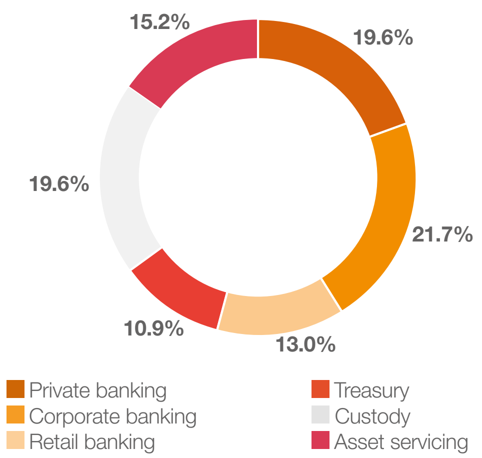
Key takeaways – Luxembourg segment

- The Luxembourg segment had seen certain notable developments in 2022 such as the entry of Clearstream Fund Centre S.A. in October 2022 and the exit of Compagnie de Banque Privée Quilvest S.A. as a result of a reversed merger with Fideuram Bank (Luxembourg) S.A. and renamed Intesa Sanpaolo Wealth Management S.A. As such, the number of banks in the Luxembourg segment managed to remain constant as at year end 2022.
- The Luxembourg segment is characterised by three large players — i.e. Banque et Caisse d'Epargne de l'Etat, Luxembourg (BCEE), BGL BNP Paribas S.A. (BGL) and Banque Internationale à Luxembourg S. A. (BIL) - which in 2022 make up 81.0% of the aggregated balance sheet.
- The aggregated balance sheet showed another year of strong growth, increasing by EUR 5.2 billion (+3.1%), mainly stemming from BCEE (EUR +3.1 billion; +5.8%) and Banking Circle S.A. (Banking Circle) (EUR +1.5 billion; +71.2%). The segment's growth was mainly driven by loans and advances to customers which continued to cover almost half of the segment's asset portfolio (2022: 48.2%), contributing an increase of EUR 3.6 billion (+4.5%).
- On the liabilities side, the amounts owed to customers remained the key driver covering 72.9% of the aggregated balance sheet and with a notable increase of EUR 9.0 billion (+7.7%). The increase was largely driven by BCEE (EUR +4.2 billion; +11.4%) due to the influx of deposits from businesses, individuals and the public sector and Banking Circle (EUR +1.4 billion; +74.5%) due to increased volume of payment accounts.
- Net profits continued to show an overall positive trend (EUR +138.2 million; +21.6%) resulting from the steady growth in banking income by EUR 331.8 million (+12.5%), partially countered by the overall increase in expenses of EUR 185.7 million (+9.9%). Net interest income managed to register a strong performance (EUR +314.6 million; +23.9%) which was mainly driven by BCEE (EUR +88.4 million; +22.1%) and BGL (EUR +72.3 million; +16.0%). The trend was the result of the rise in interest rate and steady growth in credit activities. Net commission income resulted in a positive evolution of EUR 38.2 million (+4.5%) with Banking Circle contributing the most (EUR +15.5 million; +74.2%) influenced by higher transaction volume of payment and related services.
- The segment's headcount increased by 268 FTE (+3.2%) with a corresponding increase in staff costs by EUR 75.2 million (+7.3%), mainly attributable to Banking Circle (+113 FTE; +38.8%). Administrative expenses likewise showed an increment of EUR 72.5 million (+9.5%) with BCEE and BGL as the main drivers, registering an increase of EUR 27.3 million (+18.9%) and EUR 17.9 million (+12.6%), respectively, attributable to the increased regulatory contributions (e.g. Fonds de Résolution Luxembourg) during the year. Additionally, credit risk provisioning showed an upward movement of EUR 38.0 million (+42.1%) with BCEE (EUR +77.3 million ; +244.9%) contributing the most which is mainly triggered by value adjustments in response to uncertain economic conditions, followed by BIL (EUR +30.2 million ; +76.1%) and BGL (EUR +16.4 million ; 44.2%) and was partially compensated by Quintet Private Bank (Europe) S.A. (EUR -91.9 million ; -95.1%).

Number of banks

Number of banks	2022	2021
Subsidiaries	13	13
Branches	0	0
Total	13	13

Business areas



Annual net profit or loss (in EUR million)

2022	2021
777	639

Headcount

2022	2021
8,762	8,494

Cost-income ratio

Balance sheet total (in EUR million)

2022	2021
172,142	166,957

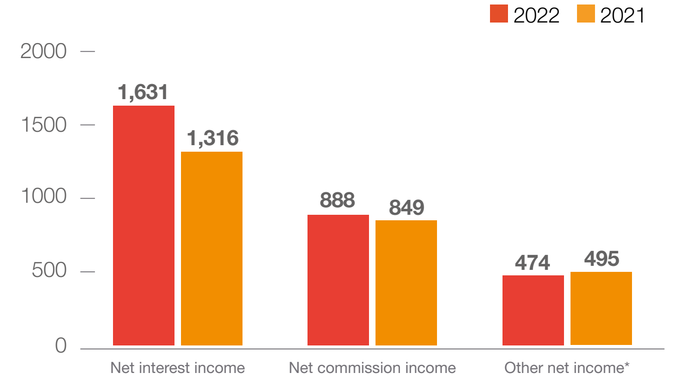
Return on equity

2022	2021
4.55%	3.91%

Return on assets

2022	2021
0.45%	0.38%

Banking income (in EUR million)



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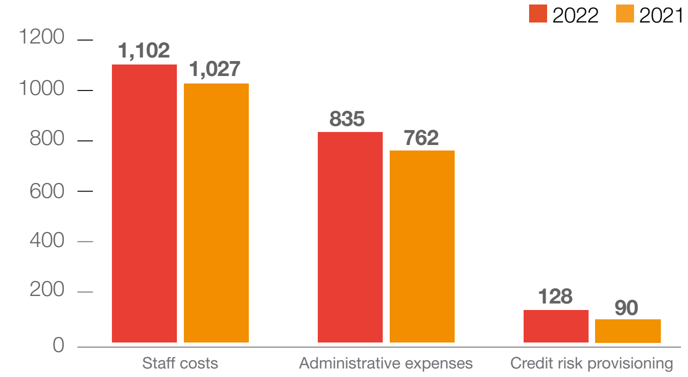
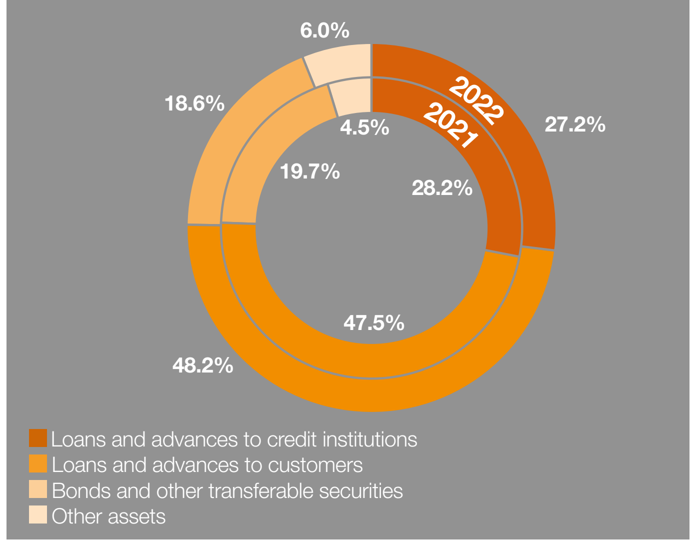
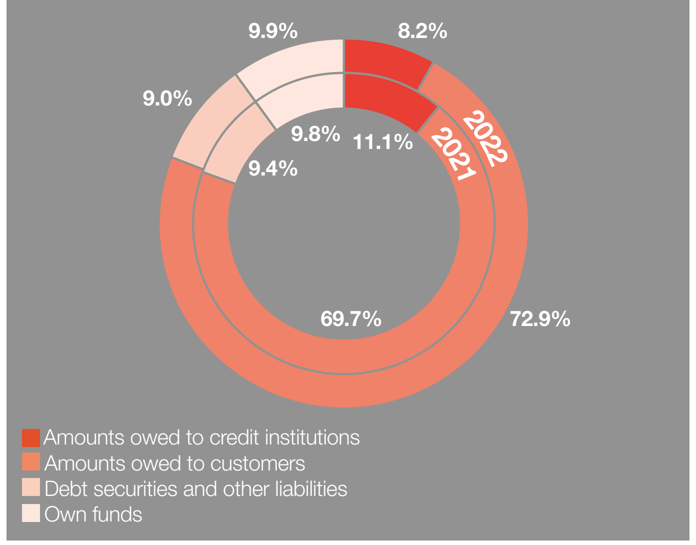
Staff costs, administrative expenses and credit risk provisioning (in EUR million)



Breakdown of assets



Breakdown of liabilities



Ranking of balance sheet totals (in EUR million)

Ranking	Bank	2022	2021	Shift	Change in rank
1	Banque et Caisse d'Epargne de l'Etat, Luxembourg	56,906	53,764	5.8%	=
2	BGL BNP Paribas S.A.	50,986	51,643	-1.3%	=
3	Banque Internationale à Luxembourg S.A.	31,576	31,472	0.3%	=
4	Quintet Private Bank (Europe) S.A.	13,010	12,851	1.2%	=
5	Banque Raiffeisen S.C.	10,754	10,156	5.9%	=
6	Banking Circle S.A.	3,659	2,138	71.1%	=
7	European Depositary Bank S.A.	1,619	1,565	3.5%	▲ +1
8	Société Nationale de Crédit et d'Investissement	1,603	1,567	2.3%	▼ -1
9	Banque Havilland S.A.	939	992	-5.3%	=
10	Clearstream Fund Centre S.A.	376	-	NA	NEW
11	Bemo Europe - Banque Privée S.A.	293	355	-17.5%	▼ -1
12	RiverBank S.A.	246	197	24.9%	=
13	Fortuna Banque S.C.	175	257	-31.9%	▼ -2
	TOTAL	172,142	166,957	3.1%	

Ranking of annual net profit or loss (in EUR million)

Ranking	Bank	2022	2021	Shift	Change in rank
1	BGL BNP Paribas S.A.	433.0	373.0	16.1%	=
2	Banque et Caisse d'Epargne de l'Etat, Luxembourg	234.7	236.8	-0.9%	=
3	Banque Internationale à Luxembourg S.A.	99.0	101.6	-2.6%	=
4	Société Nationale de Crédit et d'Investissement	35.6	77.9	-54.3%	=
5	Banque Raiffeisen S.C.	23.7	19.8	19.7%	=
6	Clearstream Fund Centre S.A.	8.4	0.0	NA	NEW
7	Quintet Private Bank (Europe) S.A.	7.6	-140.1	105.4%	▲ +6
8	European Depositary Bank S.A.	2.8	8.9	-68.5%	▼ -2
9	Bemo Europe - Banque Privée S.A.	-2.6	-4.4	40.9%	=
10	Fortuna Banque S.C.	-5.3	7.8	-167.9%	▼ -3
11	RiverBank S.A.	-6.7	-6.1	-9.8%	▼ -1
12	Banking Circle S.A.	-25.4	-19.6	-29.6%	=
13	Banque Havilland S.A.	-27.8	-16.8	-65.5%	▼ -2
	TOTAL	777.0	638.8	21.6%	

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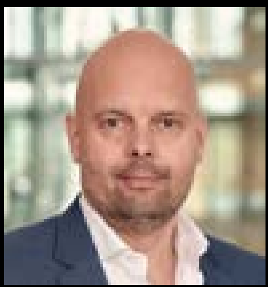

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