INSTITUTO UNIVERSITÁRIO DE LISBOA

Business Model Innovation for Sustainability: The adapted modus-operandi of corporate and investment banks

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MSc in International Management

Supervisor:

PhD. Professor Carlos Hernandez Jerónimo, Invited Assistant Professor,

ISCTE-IUL

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BUSINESS
SCHOOL

Department of Finance

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"*One day, in retrospect, the years of struggle will strike you as the most beautiful"*

- *Sigmund Freud*

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RESUMO

Num ano que se destacou pela atenção dada ao papel impulsionador dos bancos nas alterações climáticas, é necessária a implementação de medidas suplementares face aos cenários climáticos ameaçadores. Tal exige uma mudança no modelo de negócio dos bancos, atualmente focados na geração de lucros, regularmente alcançados em detrimento do meio ambiente e da sociedade.

A fim de conhecer as soluções adotadas pelos bancos e de criar um modelo de negócio sustentável para o setor, foi elaborada uma revisão literária e entrevistas a 10 indivíduos especializados na banca sustentável. As entrevistas captaram o conhecimento dos indivíduos relativo a nove arquétipos, assentes no conceito de ESG.

O estudo revelou que a mudança nos modelos de negócio dos bancos está associada ao enquadramento sustentável da UE e à vinculação a tratados e alianças, que desencadearam alterações nos produtos financeiros; assessoria estratégica; portfólio de crédito, nas estratégias relativas a setores específicos, e ferramentas internas.

Palavras-Chave: Modelo de Negócio Sustentável; Banca Corporativa e de Investimentos; Banca Sustentável.

JEL: L89, M19.

ABSTRACT

In a year that stood-out for the unprecedented attention to banks' role in driving climate change, incremental steps need to be taken in the face of threatening climate scenarios. This requires a shift in banks' business model, as the existent ones are focused on profit generation, frequently achieved at the detriment of environment and society.

To unveil the solutions adopted by banks and to create a sustainable business model for the sector, the researcher elaborated a literature review and conducted a set of interviews to 10 individuals specialized in sustainable banking. The interviews assessed the individuals' knowledge on nine archetypes, which are rooted in ESG values.

The study unveiled that the shift in banks' business model is rooted in the EU sustainability framework and in the commitment to agreements and alliances. This has led to changes in the financial products; strategic advisory; loan portfolio, industry-specific strategies; and internal tools.

Key Words: Sustainable Business Model; Corporate and Investment Banking; Sustainable Banking.

JEL: L89, M19.

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List of Abbreviations

BAU – Business as usual

BM – Business Model

CIB – Corporate and Investment Banking

CSR – Corporate Social Responsibility

ESG - Environmental, Social, and Governance

FS – Financial Statements

GDPR – General Data Protection Regulation

GHG – Greenhouse Gas

IEA – International Energy Agency

IT – Information Technology

IPCC – Intergovernmental Panel on Climate Change

KPI – Key Performance Indicators

O&G – Oil and Gas

PSS – Product-Service Systems

SBM – Sustainable Business Model

SDG – Sustainable Development Goals

I - INTRODUCTION

Banks' roles as financial intermediaries and capital-allocators place them at the center of economic life and as facilitators of the structural changes required to transit to a low-carbon economy. This study defines banks as financial intermediaries responsible for balancing savings' accumulation and investments' allocation, in a way that regulates the value of money and supports economic growth and governmental entities, especially in crisis times, in line with banks' key role in controlling financial indicators (Light & Skinner, 2021).

Although banks are facilitators of the transition to low-carbon, they have an established central role in driving climate change. Banking on Climate Chaos (Kirsch *et al.,* 2022), driven by a set of data, determines that the support of any bank to any company that is expanding fossil fuels is driving climate chaos, thus warning that the recently standardized policies to ban coal financing are simply insufficient. Additionally, IPCC (Allen *et al.,* 2018) has alerted for a rapidly closing window of opportunity to ensure a livable future, not being endured additional delays on global action.

The Banks' position as both 'facilitators' to change and 'drivers' to climate chaos call for a change in this sector's business model, a tool that empowers interdependencies among the various activities of the business enterprise (i.e., channels, partnerships, etc.), architecting the way it creates and delivers value to its customers. Business models, traditionally, focus on profit generation, often delivered in detriment of environment. However, enterprises increasingly intend to protect themselves against climate risks and uncertainty in resource costs, quality, and supply.

Thus, scholars were prompt to innovate this notion and to conceptualize a Sustainable Business Model (SBM), defined in this study as a tool that empowers innovative solutions with the aim of converting environmental and social issues into business opportunities, equally prioritizing environmental, social and economic values in the business strategy to create value to multiple stakeholders. Amongst the proposed frameworks, the Archetypes of Business Models for Sustainability proposed by Lüdeke-Freund *et al.* (2016) better integrate ESG values, enabling its seamless adaptation to various industries and generation of demonstrated positive results.

Overall, the present study seeks to unveil the elements that have influenced the adoption of sustainable innovations in banks, especially in corporate and investment banking (CIB). The main innovative solutions adopted by CIB are also sought to be explored, especially through SBMs. Lastly, it is intended to present a SBM that can be adopted by the banking sector with the aim of reducing the environmental risks and leveraging emergent business opportunities. It is herein introduced the research question that kick-started the present study: *How can Corporate and Investment Banking Institutions embed sustainability in their business model?*

A qualitative approach is undertaken to collect the primary data, which materialized in in-depth interviews performed to 10 individuals specialized in sustainable banking. The researcher leveraged its position in the banking sector, which provides visibility on the individuals that work in sustainability-focused teams in a given bank. The Thematic Analysis (TA) approach proposed by Braun & Clarke (2006) will guide the analysis of the qualitative data.

The present study, succeeding the introductory chapter, will develop a literature review on the concepts of business model and sustainable business model; on the context that urged banks towards low-carbon transition; and on banks' current strategic plans. The methodology chapter will provide detailed insights on the research question, objectives, and methods; the data collection procedure; the sample characterization; and the qualitative data analysis approach. The fourth chapter, dedicated to data analysis, will present the interviews' results and crosscheck these with the literature review results. The research will round-off with the conclusion, bibliography and appendix chapters.

II - LITERATURE REVIEW

2.1. Corporate and Investment Banking

The European Commission (European Commission, 2017) distinguishes banks for their key role as financial intermediaries, enabling to channel funds from savers to investors, thus balancing the accumulation of savings and its allocation to productive investments, in order to support innovation and economic growth. Chen & Ebrahim (2018) enhance the banks' intrinsic link to governments and its subjection to rigid regulation as a result from the devastating consequences of the private sector downfalls to real economy.

Therefore, banks assist with money supply and regulation of its value. While normally not being responsible for issuing money, the private sector has the core role of creating money in the form of demand deposits (i.e., loans), by ensuring its circulation and interchanging it with fiat currency. Banks also assist central banks and fiscal authorities in crisis times, reason why, in 2008 and 2020, central banks provided additional liquidity to the private sector, so to control interest rates and avoid negative spillover effects from this key economic player (Light & Skinner, 2021).

Given the intrinsic focus of the present study in Corporate and Investment Banking, henceforth denominated CIB, the author has developed a literature review on this banking segment. CIB comprises the bank's division responsible for providing financial products to corporations, governments, and institutional clients. To better understand this concept, we can divide CIB into two parts. Corporate banking division is mostly focused on corporate clients and provides capital markets financing and investment, securitization and consulting services with a focus on longer-term relationship. Investment banking, in turn, is focused on corporate, governmental and institutional clients, organizes complex transactions and provides mergers, acquisitions and reorganization services, and it is often transaction-focused (Iannotta, 2010).

In sum, this study defines banks as financial intermediaries responsible for balancing savings' accumulation and investments' allocation, in a way that supports economic growth, money supply and governmental entities, especially in crisis times, resultant from banks' key role in controlling financial indicators and from its negative spillover effects, reason why these are strongly bound to rigid regulations. In turn, CIB is the banking segment that serves corporate, governmental, and institutional clients, providing them capital markets financing and investment, securitization, strategic consulting and mergers, acquisition and reorganization services.

2.2. Business Model Definition

Business Model is defined by Athanasopoulou & de Reuver (2020) as "the core logic of how an enterprise creates and captures the value of innovations". Prescott & Filatotchev (2021) define it as a framework for "understanding the effectiveness of corporate governance practices as being mediated by

interdependencies between organizations and their environments", this way analyzing "their efficiency and effectiveness in addressing multiple stakeholders demands".

Lanzolla and Markides (2021) further developed the concept of business model as an activity system that focuses on internal and external interdependencies among activities, linking resources and capabilities, alongside with a web of activities that transcends the focal firm. This interdependency enables to connect value creation to value capturing. The authors argue that, by bringing emphasis on interdependencies among the activities of the firm, the business model represents new 'lens' in the strategy school.

The literature review provided different and additional perspectives on the business model definition, being these disclosed in Table 1.

Table 1 – Business model definitions

Author (Year)	Definition
Teece (2010)	"A business model articulates the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers. It also outlines the architecture of revenues, costs, and profits associated with the business enterprise delivering that value"
Nielsen & Lund (2014)	"The business model is (…) the platform which connects resources, processes and the supply of a service which results in the fact that the company is profitable in the long term. This definition emphasizes the need to focus on understanding the connections and the interrelations of the business and its operations so that the core of a business model description is the connections that create value"
Wells (2016)	(…) a business model can be defined as having three constituent elements: the value network and product/service offering that defines how the business is articulated with other businesses and internally (…); the value proposition that defines how products and/or services are presented to consumers in exchange for money (…); and the context of regulations, incentives, prices, government policy and so on"

Massa *et al*. (2017) gathered the arguments from scholars and practitioners that have studied the business model concept, being them the following ones: (1) it appears to constitute a strategic priority for managers as it may be a source of above normal returns; (2) it represents a new dimension of innovation as it enables value by curating social and economic interactions; (3) it allows entrepreneurs to understand the design of new business models in order to take advantage of new opportunities at a time where the barriers to entry are lowering.

To round off, business model designates a tool that empowers interdependencies among the various activities of the business enterprise (i.e., channels, partnerships, etc.), architecting the way it creates and delivers value to its customers, while outlining the revenues, costs, and profits that result from the delivery of such value.

2.3. Sustainable Business Model (SBM)

Over the past two decades, various authors have shed light on the business model concept and its adaptation potential, with a special emphasis, as of recently, to environmental sustainability. Agwu & Bessant (2021) argue that traditional business models, which are deeply connected to profit generation and increasing competitive advantage, typically achieve these at the detriment of the environment and society.

Therefore, the business model approach has been increasingly present in sustainable business management discussions. While the business model is able to guarantee the unceasing focus on profit generation for shareholders, the social and environmental strand, on the other side, ensures that large corporates stay accountable to all stakeholders, facing less reputational risks and gaining competitive advantage. Therefore, these persistent challenges towards a sustainable future call for a change in the core of the business model (Ritala *et al.,* 2018).

Lüdeke-Freund *et al*. (2016) shed light on the business potential to develop innovative solutions, through SBMs, by converting the environmental and social issues into market opportunities. The second cornerstone of the authors' study is the broader notion of value in SBMs, evolving from its primarily economic base to the inclusion of social and environmental values, therefore placing the triple bottom at the core of corporate sustainability strategy. Finally, the authors undertake a system-level perspective, moving away from a perspective predominantly centered in customers and shareholders, to a firm's multi-stakeholders centered one.

Bocken *et al*. (2013, 2018) define SBMs as "innovations that create significant positive and/or significantly reduced negative impacts for the environment and/or society, through changes in the way the organization and its value-network create, deliver and capture value". Lüdeke-Freund *et al.* (2018) accentuate the value-creating activities, presented in the SBM patterns, as the key drive to solve ecological, social and economic problems. Stubbs (2019), similarly understands SBMs as an innovative construct that creates, delivers and captures value for profit-oriented businesses by placing at its core the environmental and social performance.

A consensus has been reached among scholars, agreeing that SBMs' main proposition is for companies to identify "the value uncaptured in their current business models" by solving social and environmental problems, this way generating more profitable ways to create competitive advantage (Yang *et al.* 2017). Breuer *et al*. (2018) compiled and compared the most relevant theoretical works on

SBM and identified four core guiding requirements to constitute a SBM: (1) sustainability-orientation; (2) extended value creation; (3) systematic thinking; and (4) stakeholder integration.

In sum, a SBM leans on the business model concept, developing it to incorporate innovations that enable to solve social and environmental problems and, consequently, create competitive advantage, this way shifting the way the organization creates, delivers and captures value; broadening the traditional notion so to include the social and environmental values, alongside with the economic value; and considering a wider range of stakeholders.

Consequently, various authors have worked towards the creation of a business model, tool-shaped, that assists companies embedding sustainability values in their daily operations. Massa *et al.,* (2017), when exploring the business model's future research directions, perceived the adaptation of the existing frameworks to sustainability as an inevitability. The authors defend that the corporate sustainability efforts should be redirected towards creating an extension of the existent business models so that they incorporate this new key tenant. Therefore, authors have been moving away from PSS and abstract approaches to SBMs and, instead, have been developing a broad range of sustainable business model tools with the goal of helping organizations implement sustainability in their day-to-day activities (Ritala *et al*., 2018), henceforth explored.

2.3.1. Archetypes of Business Models for Sustainability proposed by Lüdeke-Freund *et al*. (2016)

The archetypes of business models for sustainability have become a central element in the development of SBMs and have the following purposes: (1) to provide a way of organizing business model innovations for sustainability; (2) to define generic mechanisms for supporting practical business model innovation processes; and (3) to define a research agenda beyond the more commonly known approaches (Lüdeke-Freund *et al*. 2016).

The archetypes describe groups of solutions that can contribute to the business model innovation for sustainability. In order to provide useful orientation, the archetypes: (1) represent the mechanisms of sustainability-oriented business model innovation; (2) are clear, intuitive, mutually exclusive and explanatory, but not overly prescriptive; and (3) support entrepreneurs and managers in dealing with corporate sustainability challenges (Lüdeke-Freund *et al.* 2016).

Overall, the archetypes are a tool that support innovation projects. Given that a business model is a myriad of activities, the archetypes have been increasingly used in industry case-studies with the goal of understanding the sustainable innovations being adopted by the companies that belong to each specific industry (Agwu & Bessant, 2021; Ritala *et al.*, 2018). Lüdeke-Freund *et al*. (2016) developed the work of Bocken *et al*. (2014) and idealized nine archetypes for SBMs, presented in Figure 1, instead of the initial eight. Moreover, these are divided through three high-level groups that describe the main types of business model innovation: Environmental, Social and Economical innovations.

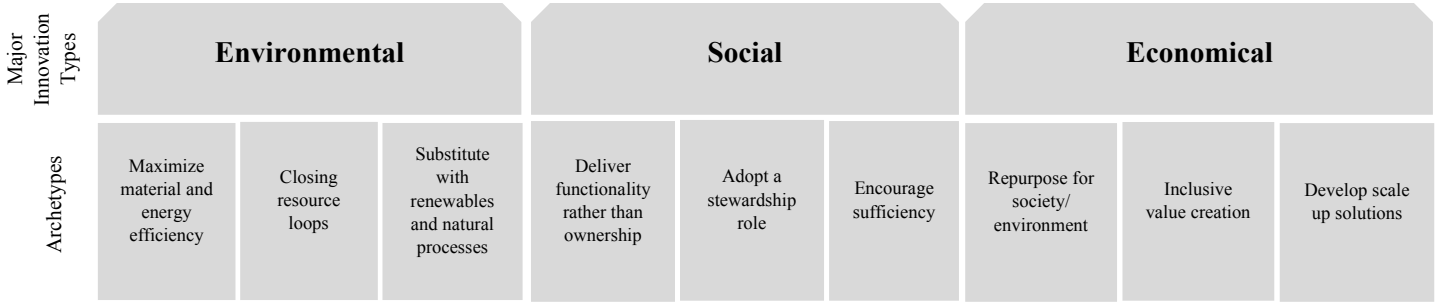


Figure 1 – The Archetypes of Business Models for Sustainability proposed by Lüdeke-Freund *et al*. (2016)

In order to obtain a deeper understanding of each archetype, Table 2 discloses the definition of each one of them, based on the study of Lüdeke-Freund *et al*. (2016).

Table 2 – The Archetypes definition (Lüdeke-Freund *et al.,* 2016)

Innovation Types	Archetypes	Definition
Environmental	Maximize Material and Energy Efficiency	Focused on the optimization of the resources used
	Closing Resource Loops	Concerned with reusing products and materials
	Substitute with Renewables and Natural processes	Concerned with business model innovations in renewables
Social	Deliver functionality rather than ownership	Focused on moving away from the necessity for ownership to access to the use and functionality of products through the service type of models, often referred to as PSSs
	Adopt a stewardship role	Focused on the Stewardship role and additional responsibility that a business might take on in order to address a specific social or environmental issue
	Encourage Sufficiency	Related to slow consumption consideration as part of the business model
Economical	Repurpose for society/ environment	Aims at changing the corporate structure for sustainability
	Inclusive Value Creation	Focused on sharing resources, knowledge, ownership, and wealth creation
	Develop Sustainable Scale-up Solutions	Concerned with delivering sustainable alternatives at scale to maximize sustainability benefits

2.3.2. Value Mapping Tool proposed by Bocken *et al.* (2013)

The Value Mapping Tool developed by Bocken *et al.* (2013) seeks to go beyond the delivery of economic value, proposing a broader and sustainable view of value by innovating the value proposition for the stakeholders. Therefore, it takes a network-centric approach, rather than a firm centric approach. In a first moment, the tool should help enterprises understand their business purpose and their value capture, alongside with their value missed, destroyed or wasted for a range of stakeholders (i.e., environments, customers, society, etc.), identified in Figure 2. Ultimately, companies should perceive the new value opportunities that emerge from this analysis.

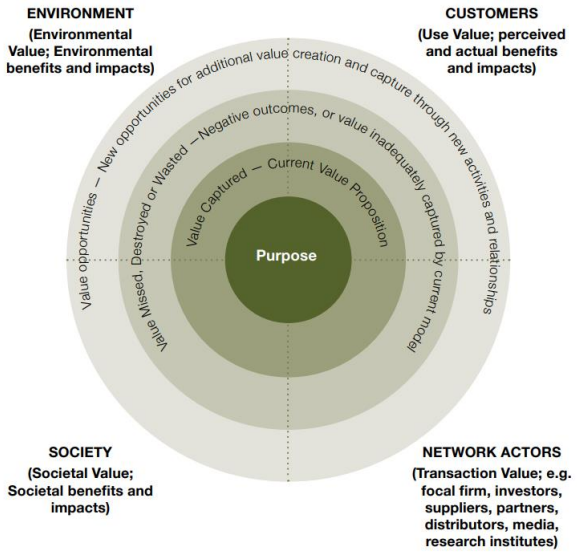


Figure 2 - Value Mapping Tool proposed by Bocken *et al*. (2013)

2.3.3. Sustainable Business Canvas proposed by Tiemann & Fichter (2016)

The Sustainable Business Canvas (SBC) was developed in the context of the StartUp4Climate, an initiative that aims to accelerate the energy transition in young companies. The (1) low complexity, (2) clear structure and (3) room for experimentation that characterizes the Business Model Canvas (Osterwalder & Pigneur, 2010) allowed the authors to easily adapt this model towards sustainability.

In order to create the Sustainable Business Canvas, the adaptations made to the BMC, presented in Figure 3, were the following ones:

1) The added Vision/ Mission building block is focused on defining the company's purpose and long-term goals (i.e., value and standards of behavior);
2) The "Competitors" and "Stakeholders" building blocks were added to the model, while the fields "Business Segments", "Customer Relations", and "Customer Channels" were merged in the field "Customers", this way emphasizing the stakeholders' role and shedding light on shared value;
3) New developed questions include both questions about new elements of the business model and sustainability-specific questions for all elements of the business model.

<table>
<tr><td colspan="5">Vision & Mission</td></tr>
<tr><td rowspan="2">Key Partners</td><td>Key Activities</td><td rowspan="2">Value Proposition</td><td rowspan="2">Customers</td><td>Competitors</td></tr>
<tr><td>Key Resources</td><td>Other relevant stakeholders</td></tr>
<tr><td colspan="2">Cost Structure</td><td colspan="3">Revenue Model</td></tr>
</table>

Figure 3 – Sustainable Business Canvas proposed by Tiemann & Fichter (2016)

2.3.4. Flourishing Business Canvas proposed by Upward & Jones (2016)

The Flourishing Business Canvas is a visual template which recently evolved from the "Strongly Sustainable Business Model Ontology" (SSBMO) (Upward & Jones, 2016), being considered the most radical extension of the Business Model Canvas of Osterwalder & Pigneur (2010).

This stakeholder-oriented design, presented in Figure 4, aims for enterprises to recognize the importance of the environment, society and economy, and, at the same time, to create value propositions that meet their needs. Therefore, the so-called enterprises' *flourishing goal* comprehends a deeper understanding of stakeholders' fundamental human needs so to create and capture financial value.

Moreover, the role of leaders is given particular importance in this toolkit as the main goal is to create a common language that enables them to collaborate more effectively so to develop stronger sustainable business models. These integrated solutions should drive to a combination of environmental regeneration, social benefits and financial rewards.

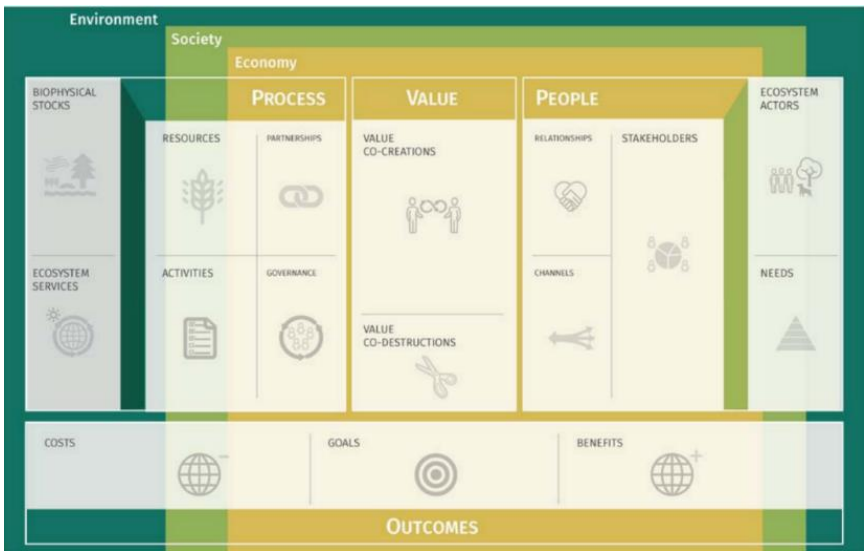


Figure 4 – The Flourishing Business Canvas proposed by Upward & Jones (2016)

2.3.5. Business Innovation Kit proposed by Breuer & Lüdeke-Freund (2017)

The Business Innovation Kit (BIK) (Breuer, 2013, 2016) enables entrepreneurial teams to explore several value-based business models for new or existing businesses. The Sustainable Innovation Pack (SIP) (Lüdeke-Freund, 2015), an extension of BIK, uses such groundwork and creates two additional card sets so to assist organizations to turn the chosen sustainability strategy into action.

The card set exercise starts with an assessment on the current innovation maturity and an agreement on the level the team aims to achieve, considering "the five levels of sustainability innovation maturity" (Lüdeke-Freund, 2015). These levels evolve from increasing innovation, but with a narrower scope, to radical and comprehensive ground plans. The five levels are (1) Innovation within components; (2) Innovation throughout components; (3) Sustainable innovation process; (4) Business model innovation; (5) Value network innovation.

The second card set aims to align each business model with the eight key business case drivers. This card set proposes different ways to improve a business model's sustainability performance in concert with, for example, revenues, efficiency or innovation, working as a selection criterion for the business model creation phase. Final discussions on the business scenarios challenges take place at this stage. The eight core drivers are following ones: (1) Costs (2) Risks; (3) Revenues; (4) Efficiency; (5) Reputation; (6) Workforce; (7) Innovation; and (8) Ecosystem. Figure 5 lays out, in an orderly manner, the card sets mentioned.

Figure 5 - Business Innovation Kit (BIK) proposed by Breuer & Lüdeke-Freund (2017)

2.3.6. The Triple-layered Business Model Canvas proposed by Joyce & Paquin (2016)

The Triple-layered Business Model Canvas (TLBMC) adds an environmental layer and a social layer to the traditional Business Model Canvas (Osterwalder & Pigneur, 2010). Therefore, TLBMC uses the

BMC as a way of exploring innovation opportunities regarding economic, environmental and social value creation, aiming at leveraging them.

In sum, TLBMC structures the business model in the three layers (economical, environmental and social), presented in Figure 6, with the aim of creating deeper and more integrated perceptions on how the organization creates value in relation to each layer. Following this train of thought, this design tool provides a clearer and easy-to-understand communication on the organization's impacts as it adopts meaningful sustainability-oriented innovations.

Economic Business Model Canvas

<table>
<tr><td rowspan="2">Partners</td><td>Activities</td><td rowspan="2">Value Proposition</td><td>Customer Relationships</td><td rowspan="2">Customer Segments</td></tr>
<tr><td>Resources</td><td>Channels</td></tr>
<tr><td colspan="2">Costs</td><td colspan="3">Revenue</td></tr>
</table>

Environmental Life Cicle Business Model Canvas

<table>
<tr><td rowspan="2">Supplies and Out-Sourcing</td><td>Production</td><td rowspan="2">Functional Value</td><td>End-of-Life</td><td rowspan="2">Use Phase</td></tr>
<tr><td>Materials</td><td>Distribution</td></tr>
<tr><td colspan="2">Environmental Impacts</td><td colspan="3">Environmental Benefits</td></tr>
</table>

Social Stakeholder Business Model Canvas

<table>
<tr><td rowspan="2">Local communities</td><td>Governance</td><td rowspan="2">Social Value</td><td>Societal Culture</td><td rowspan="2">End-User</td></tr>
<tr><td>Employee</td><td>Scale Outreach</td></tr>
<tr><td colspan="2">Social Impacts</td><td colspan="3">Social Benefits</td></tr>
</table>

Figure 6 – Triple Layered Business Model Canvas proposed by Joyce & Paquin (2016)

2.4. Contextualization

2.4.1. Regulatory and Market Context Driving CIB Towards the Low-Carbon Transition

The Intergovernmental Panel on Climate Change (IPCC) report (Allen *et al*., 2018) has alerted for the gradual physic effects of 1.5ºC global warming above pre-industrial levels and, at the same time, sheds light on the importance of strengthening the global response to the threat of climate change and sustainable development. In line with this, a number of agreements, governmental entities and institutions, henceforth presented by the author, have fomented the implementation of sustainable practices in the banking sector.

The Paris Agreement has already led the majority of EU-based banks to commit to the global net-zero emissions goal by 2050 (Light & Skinner, 2021). The Paris Agreement (United Nations, 2015), in its role of a legally binding international treaty, further sets the goal to limit the increase of the global average temperature well below 2ºC compared to pre-industrial levels; addresses the role of the banks in this transition in line with its capital allocation role; and encourages banks to take a proactive stand in reducing its clients impacts (United Nations, 2015).

In 2019, the European Commission, with aim of making Europe the first climate neutral continent by 2050, adopted a set of proposals, denominated the European Green Deal (European Commission, 2019), in which it is addressed the undeniable need to strengthen the cooperation with financial institutions in order to better direct financial and capital flows to green investments, thus leveraging capital allocation role of banks towards the fulfillment of the EU policy objectives.

The European Green Bond Standard, a voluntary standard, aims to reorient capital flows towards sustainable investments by establishing a green bond standard within the EU. The model is built on market best practices, being directed at issuers that wish to align with these, such as financial institutions that aim to finance a portfolio of green real estate mortgages or a company that aims to invest in a windfarm. Furthermore, the project eligibility depends on their alignment with the EU taxonomy (Technical expert group on sustainable finance, 2020).

Additionally, the UN-convened Net-Zero Banking Alliance (NZBA) brought together a group of banks that are committed to align their lending and investment portfolios with the net-zero emissions' goal. In order to leverage the vital role of banks in supporting the global transition to net-zero emissions, the signatory banks commit to: (1) transitioning the GHG emissions from their lending and investment portfolios so to align with the net-zero pathway; (2) setting 2030 targets and a 2050 target, within 18 months of joining; and (3) focusing the bank's 2030 targets on GHG-intensive sectors within their portfolios, where the bank can have the most significant impact (UN Environment Programme, 2021).

Lastly, the big three credit rating agencies - S&P, Moody's and Fitch - have recently recognized the influence that ESG factors have on the capacity and willingness of issuers to meet their financial commitments, leading to the incorporation of such considerations into ratings' methodology, assigning

a number of ESG points in their credit analysis and analyzing companies' ESG performance (Moody's Corporation, 2021; Sacchi Milan *et al*., 2022; Sustainable Fitch, 2021).

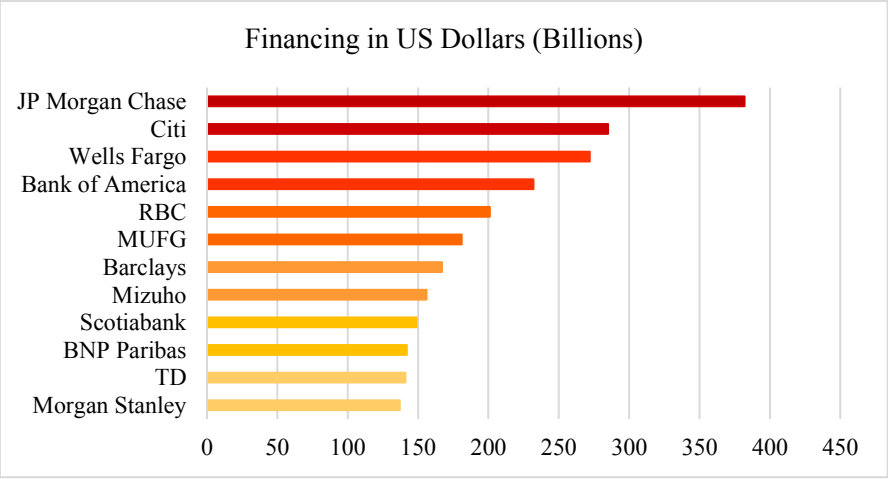
2.4.2. The Corporate and Investment Banks' Impact in Low-Carbon Transition

Financial market leaders have always developed mechanisms of private governance to solve complex problems that confront the financial system. By supplying credit and by funneling economic aid from governments to people in times of crisis, they operate at the center of economic life. Therefore, it is with somewhat predictability that we see banks increasingly considering climate change in their regular course of business to sustain their activity (Light & Skinner, 2021).

Light & Skinner (2021) argue that the banks' role in capital-allocation in relation to a particular set of economic incentives facilitate the kind of structural changes required to transition to a low-carbon economy. Moreover, the banks' place in society as 'financial intermediaries' and their 'contractual power' over operations and cashflow, and thus behavior of their borrowers, positions the banks as sources of private environmental and climate governance.

In line with this, the year of 2021 stood-out for the unprecedented attention to banks' role in driving climate change and for the broad adoption of net-zero commitments. Nonetheless, data shows, contrarily, that the financial sector continued its business-as-usual driving of climate chaos. Banking on Climate Chaos 2022 examined the financing to the fossil fuel industry by 60 commercial and investment banks, unveiling that $185.5 billion have been funneled, in 2021, to 100 companies that are fiercely expanding the fossil fuel sector. The Top 12 funding banks of fossil fuels is presented in Graph 1. The bottom-line is that banks need to urgently implement policies that cut their fossil fuel financing expansion and zero out the support to the industry. The policies adopted prohibiting the financing to coal companies, while crucial for global economy, only represent about 4% of the fossil fuel lending and underwriting, thus incremental steps still need to be taken by the financial sector (Kirsch *et al*., 2022).

Graph 1 – The Top 12 Banks financing fossil fuels globally, 2016-2021 (Kirsch *et al*., 2022)



While the role of public law regulators, such as OECD, in the increase of renewable-energy investments should also be considered (i.e., Renewable Energy Certificates (REC) (Ziaei, 2021), the role played by banks in the global warming through their financing and lending activities has thoroughly gathered the greatest consensus, being widely reported the increasing shareholders' pressure to shut off 'the money pipeline' to the fossil-fuel industry. The resolution filed by the shareholders of Credit Suisse Group illustrates this scenario as they have urged the bank to further disclose how it has been tackling the 1.5° Celsius goal of the Paris Agreement and how it will reduce its financing of fossil fuels to support that objective (Marsh, 2022b).

2.4.3. Net-Zero Path After Invasion of Ukraine

In line with the war outbreak against Ukraine by Vladimir Putin, the European Union imposed a wide range of individual and economic sanctions targeting Russia, having been announced, in May 2022, by the President of European Commission (von der Leyen, 2022), the sixth package of sanctions against Russia. Inevitably, the two major strands of the economic sanctions have a considerable impact on banks' daily operations, particularly in the financing to O&G.

On one hand, the sanctions related to the financial sector prohibit the Russian access to the capital markets of European Union, which has been materialized through the increase of borrowing costs for sanctioned enterprises and the prohibition of transactions with Russian state-owned enterprises. So far, the ripple effect, related to this strand, for EU banks has been quite little as the direct exposure to Russia was already quite small.

On the other hand, the energy sector sanctions represent, by far, the turning point due to the agreement to ban all Russian coal and oil, seaborne and pipeline, crude and refined, by the end of 2022. Furthermore, in its speech to the EU members, Ursula Von Der Leyen addresses the need for this package to bring massive investments, not only to secure alternative supply routes and to minimize the impact on global markets, but also to successfully lay the foundations towards a sustainable long-term growth (von der Leyen, 2022).

Henceforth, the scrutiny of banks' financing is only set to intensify with the invasion to Ukraine as "Russia's war machine" is strongly powered by fossil-fuel revenues (Marsh, 2022). Additionally, a coalition of 75 climate change-focused nonprofits has requested the 100 most exposed financial institutions to Russian fossil fuels to put an end to the investment and financing of Russia's O&G industries, and to divest from existing holdings (Marsh, 2022a). In sum, if banks were already under significant pressure to finance green energy and to advice clients towards a path of transition to low-carbon emissions, the war has unprecedently rushed the phase down of banks' exposure to fossil fuels and the allocation of capital investments towards renewable energy.

2.4.4. How Investment Banks Have Embedded Sustainability in their Business Model

Sustainable solutions have been growingly incorporated in CIB's core business strategy. Nonetheless, this has been done at a slow pace as only now have the climate crisis and fossil fuel's dependency been given a real sense of urgency for the many reasons previously enumerated. Therefore, the present chapter seeks to understand which environmentally sustainable measures have been adopted by CIB, with the main goal of building a SBM for this banking segment, based on the collected information.

To collect the most suitable and comprehensive information, the study focuses on the information disclosed in the strategic plan of banking institutions as these unveil an entity's value creation elements and the means through which it intends to achieve its mission and goals, being these typically released in Financial or Non-Financial Reports. Furthermore, it was considered key to rely on banking institutions that have been differentiated and recognized for greater and more aggressive investments in clean technologies and services, outperforming in diverse parameters, therefore progressing faster than their competitors. Consequently, the Corporate Knights' ranking 'Global 100 most sustainable corporations' plays a key role in the present chapter as the selection criteria of the CIB institutions to be studied (Corporate Knights, 2022).

The Global 100 most sustainable corporations is a world-renown ranking, awarded by S&P as best performing global sustainability equity index, and is based on an assessment to 6,914 publicly traded companies with revenues over US$1 billion. The companies are assessed across 25 performance indicators which include % sustainable revenue, % sustainable investment, carbon productivity, and climate commitments (Appendix A), being each company awarded with an overall score, resultant from the weighted average percentile rank score across the performance indicators (Appendix B). The data is collected through annual and sustainability reports, company's website, and supplemented with third-party providers' data (Corporate Knights, 2022).

Banks comprised a 10/100 of 2022's index. Table 3 lists the ten banks that were distinguished by the ranking for their sustainability efforts, ranking higher than their peers in the several parameters. Out of these 10 banking institutions, seven are based in European Union.

Table 3 – Global 100 most sustainable banking institutions (Corporate Knights, 2022)

G100 Rank	Company	Headquarters City	Climate commitments	Overall Score
21	Banco do Brasil SA	Brasília	1.5º, SBTi	B+
59	UniCredit SpA	Milan	NZBA	C+
60	Commerzbank AG	Frankfurt	SBTi, NZAM, NZBA	C+
61	ING Groep NV	Amsterdam	NZAM	C+
70	Nordea Bank Abp	Helsinki	NZAM, NZAO, NZB	C+
71	National Australia Bank Ltd	Melbourne	-	C+
76	BNP Paribas SA	Paris	SBTi, NZAM, NZAO, NZBA	C
80	Bank of Montreal	Montreal	NZAM, NZAO	C
90	Intesa Sanpaolo SpA	Turin	NZAM, NZAO, NZBA	C-
92	KBC Group NV	Brussels	-	C-

Once the list was collected on the world's most sustainable banking institutions, it was considered relevant to solely focus on the banking institutions that (1) are EU-based and that (2) exhibit higher levels of specialization in CIB.

The focus on EU-based banks stems from the study's intrinsic limitation to such framework, thus narrowing the study's scope and allowing to explore the adopted sustainable solutions on greater level of detail, while also enabling to link the EU context, explored in the literature review, to the sustainable solutions embedded by the banking institutions. The emphasis on banks that demonstrate higher levels of specialization in CIB is directly linked to main goal of the study, which is to collect information on the sustainable solutions that the pertained banking segment has tailor-made with the main goal of creating a SMB for CIB.

To select the banks that better fulfill the latest disclosed selection criteria, the study relies on financial and non-financial statements from the EU-based banks underscored in Corporate Knights' ranking. These statements reflected the existence of two common differentiating factors that are mentioned by each bank when referring to its corporate and investment clients: (1) the number of corporate and institutional clients in relation to the total number clients of the bank; and (2) the net income or revenues originated from the pertained banking segment in relation to the total. The available information on these two topics has been disclosed in Table 4. In sum, out of the seven EU-based banks, three banks considerably stood-out for their focus in CIB.

Table 4 – EU-based banks specialization level in CIB (Source: Elaborated by the author)

Banking Institution	Number of Corporate and Investment Clients/ Number of Clients (in Million)	%	Revenues or Income from Corporate clients/ Total Revenues (in Million)	%
UniCredit SpA (2021)	1 M / 15 M	6.6%	€ 8 275 M /€17 954 M	46%
Commerzbank AG (2021)	70 000/ 19 M	0.36%	€ 3 168 M/ € 14 M	21%
ING Groep NV (2021)	Not available[1]		€ 226 M/ € 18,490 M	1.22%
Nordea Bank Abp (2021)	550 000/ 9 M	5,7%	€ 2 010 M/ € 9 620 M	20.9%
BNP Paribas SA (2021)	18 000/ 30 M	0.06%	€14,748 M/ €46,235 M	33%
Intesa Sanpaolo SpA (2021)	17 000 /20,5 M	0.08%	€2,202 M/ €4,185 M	52.6%
KBC Group NV (2021)	Not Available[2]	-	-	-

Considering the described selection criteria, the Top 3 European Union-based most sustainable banking institutions with highest level of specialization in corporate and investment clients, henceforth studied, are the following ones: (1) UniCredit (2) Commerzbank AG; and (3) Nordea Bank

2.4.4.1. UniCredit SpA

UniCredit, in its Integrated Report (UniCredit, 2021), presents how it has embedded the ESG values into its core business and culture. This report details the banking institution's strategic plan for 2022-2024 with a great emphasis on its Integrated and Sustainable Business Model, presented in Figure 7. UniCredit starts by clarifying the means through which it intends to create value over time. Since the banking institution places the clients in the core of its strategy, its common purpose is stated to be: "Empowering Communities to Progress".

Figure 7 – UniCredit SpA Sustainable Business Model (UniCredit, 2021)

[1] This information is not disclosed by ING Groep NV, in part, due to the lack of considerable representation of such segment.

[2] KBC Group NV is a bank-insurance group, focused on retail, private banking, SME and mid-cap clients. Therefore, in the available sources, it was not perceived a focus in CIB.

The UniCredit's SBM embeds a new strategic plan, the "UniCredit Unlocked", aimed at moving towards renewal and an era of purpose and value creation. Five strategic imperatives rest in the core of 'UniCredit Unlocked': (1) growth and develop in their client franchise; (2) change the business model and how their people operate; (3) deliver economies of scale; (4) transform their technology leveraging digital and data; and (5) embed sustainability in all they do.

UniCredit focuses on creating sustainable expertise relating to ESG products for different business lines: Lending, Capital Markets, and Asset Management. The underlined ESG products adopted by the Bank are presented in Figure 8, being voiced the intent for its product range to be innovated and adapted according to clients' needs. This core value, coupled with other practices, such as tailored high-quality services and cross-border positioning to support clients in transactional and growth ambitions, aims at providing a balanced mix of best-in-class corporate solutions.

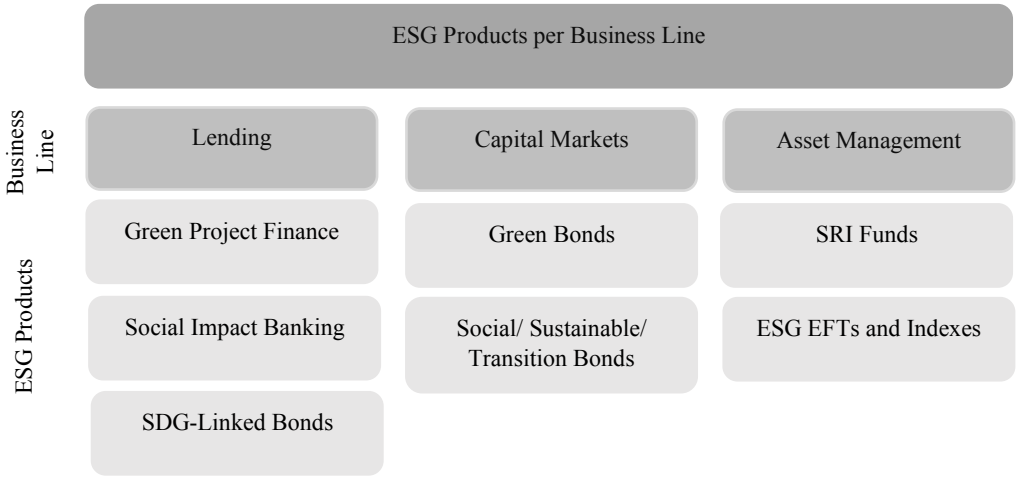


Figure 8 – UniCredit's ESG Products according to each Business Line (UniCredit, 2021)

The Governance segment of UniCredit's Sustainable Business Model is stated to be the one element that underwent the most significant evolution, as a result from the drive to integrate ESG criteria into the governing bodies. Therefore, it is underpinned the recent established ESG Committee which takes over, and expands upon, the sustainability responsibilities, supporting the Board of Directors to fulfill its ESG responsibilities, and the "Internal Controls & Risk Committee (ICRC)", which assists the Board of Directors in risk assessment in the ESG sphere. In closer contact with the client are the Sustainable Finance Advisory Team, facilitating clients' access to Europe's sustainable financing market, and the Commercial Business, which develops ESG-related solutions, later offered to the clients to support in seizing relevant business opportunities.

The digital and data segment is a key element in the Bank's BM, being recognized the unmatched business opportunities that lay upon such path. UniCredit's main expectations are the (1) development of a product offer and commercial strategy which reflects the client's needs to create sustainable long-term value; (2) the implementation of a lean operating model, keeping the core

competencies in-house to afford greater control and to maximize cost efficiencies and speed; and (3) the building of a seamless digital offer. Further initiatives have emerged such as the "Smart Invest", a tool that supports relationship managers in profiling and recommending sustainable and tailored investment management options in real time.

2.4.4.2. Commerzbank AG

Commerzbank AG, through its 'Combined separate non-financial report' (Commerzbank AG, 2021), takes a comprehensive approach to the Bank's Strategy 2024 program, where sustainability is a key cornerstone, alongside with customer orientation, digitalization and profitability.

Commerzbank's strategy program intends to implement sustainability in the core of its business through the strategic Group program "Sustainability 360º", aimed at forming a framework for the sustainability work in the relevant departments and projects. The Non-financial report is divided into four distinguishing parts: (1) Governance; (2) Strategy; (3) Risk Management; and (4) Metrics and targets.

The Governance structure of Commerzbank has been expanded in order to include the ESG Committee of the Supervisory Board, which tackles the sustainability issues in greater depth and sets ESG-tailored annual targets. In turn, the Group Sustainability Board is responsible for the management of the sustainable alignment of the business model, taking into account the requirements of the stakeholder groups. In line with the increasing sustainability-related regulatory requirements at national and EU Level (i.e., EU Taxonomy), the Group Sustainability Management was created to ensure the needed regulatory development and implementation.

Commerzbank loan portfolio has steered towards the requirements of the Paris Agreement, hence sector-specific target values have been established. The Bank's portfolio is now managed under the SBTi method, being used to calculate and reduce the CO2 emissions in the Bank's loan portfolio. This has similarly been implemented to emission-intensive client sectors, encouraging them to progress towards energy transition and to sustainably reduce emissions.

Moreover, the Bank intends to fully use the EU Taxonomy Regulation to develop new green products and services, relying on this framework to assess the sustainability of its transactions, business partners and customers. Through the full implementation of such regulation, it also aimed to disclose more extensive information, thus significantly increasing transparency in relation to sustainability. Until the full EU Taxonomy requirements come into force in 2023, Commerzbank discloses information on the required KPIs, introduced in Table 5.

Table 5 – Shares of total assets per KPI to be disclosed (Commerzbank AG, 2021)

KPI To Be Disclosed		**Shared of total assets**
KPI 1	Taxonomy-eligible assets	24.1%
KPI 2	Non-taxonomy eligible assets	30.4%
Taxonomy-relevant (KPI 1 and 2)		54.5%
KPI 3	Exposures to central governments, central banks and supranational issuers	12.8%
KPI 4	Derivatives	0.2%
KPI 5	Exposures to companies not subjected to the NFRD	9.9%
KPI 6	Trading Portfolios	8.5%
KPI 7	Short-Term interbank loans	0.1%

The integration of non-financial aspects into the Bank's risk management is perceived to be crucial for sustainable finance, given that climate risks are seen a cross-sectional driver that may materialize into known types of risk, particularly credit risk. Therefore, Commerzbank proceeded with scenario analysis in regards to the possible future impact of physical and transition risks in the loan portfolio. These physical risks include the rising seas levels and flooding for the real estate sector or the low water levels in rivers for chemical industries.

The Bank's portfolio was tested in different climate scenarios of the IEA and the IPCC. The risk management processes of the Bank have systematically changed according to such results. Therefore, the lending decisions to companies are no longer limited to an individual assessment, but encompass as well the extent to which they involve climate risks and their level of resilience to them. The transition risks are industry-specific, also existing a connection between the degree of adaption of a company and its progress in the transition, being the main goal the decrease the level of exposure to the hardest-hit sectors.

The qualitative risk analysis in the individual loan decisions is progressing towards a structured evaluation – an ESG score - which will be integrated in the portfolio analysis and management. Concerning the quantitative credit risk, it is intended to fully integrate the climate risks through, for example, pricing and reporting. Commerz Real introduced, in 2021, a risk management tool that assesses the real estate portfolio with regards to physical and transition risks. Moreover, an integrated sustainability data management system, supplemented with external partners data, has been implemented to collect all consumption and emission data in a reliable way, which will feed the risk and the sustainability assessment of transactions.

Commerzbank addresses the way energy revolution and reduction in CO2 emissions create the need for new technologies and products, therefore requiring large investments which represent

numerous opportunities for banking institutions. The Bank expanded its portfolio share and budget to project financing linked to renewable energies, including wind and solar parks in Germany, as well as offshore wind parks in Finland, France and the Netherlands.

The corporate customers, that until now focused on traditional financing solutions, are being advised on green loans or ESG-linked loans. The conditions for this type of syndicated loans are linked to the client's ESG rating, therefore the better performance, the lower will be the interest rates. Advisory is also being provided in relation to green, social and sustainably bonds. Corporate clients are also made aware of climate protection initiatives such as KfW's energy efficiency programs, which represent a set of attractive financing conditions for energy efficient buildings. In line with this goal, it is intended to attract suitable experts through innovative training programs and flexible working time models.

2.4.4.3. Nordea Bank Abp

Nordea Bank Abp relies on its Annual Report 2021 (Nordea Bank, 2021) to present its strategic long-term plan to fully integrate sustainability in its business model. The Bank's sustainable work rests on four strategic pillars: financial strength, climate action, social responsibility, and governance and culture.

To preserve the Bank's financial strength, Nordea developed a climate risk assessment tool, aimed at integrating transitional risk considerations into the credit decision, and an ESG data platform, this way integrating climate-related analysis into the investment research process and elevating the customer ESG assessment while ensuring the delivery of returns responsibly.

Furthermore, the Bank uses MSCI Climate Value-at-Risk (Climate VaR) model for listed equities and corporate bonds in order to assess the transition risks (policy risk) and physical risks (extreme weather risk) in a range of climate scenarios. On Policy risk, the MSCI Climate VaR captures the climate policies costs associated with each scenario and its potential impact on market valuations of investment portfolios. On extreme weather risk, a combination of short-term projections of historical climate data and a high-emissions long-term scenario are used, thus it is accounted the potential impact on market valuations of investment portfolios as a result of the extreme weather damages associate with each scenario.

The annual report devotes considerable attention towards its Climate Action. It is aimed for 90% of its exposure to large corporate clients in climate-vulnerable sectors to be covered by transition plans by 2025. In line with this, the Bank's disclosed emissions of the lending portfolio rely on the available clients' GHG emission data. Nonetheless, in order to improve the data quality, the Bank aims to move from score 5 of the PCAF data quality, towards scores 1, 2 and 3.

Oil, gas, and offshore; shipping; and mining and supporting activities portfolios were the first industries in which financed emissions were quantified and customers' alignment to GHG emissions

reduction pathway were assessed. In O&G industry, the Bank updated the sector guideline in order for this fossil fuel-based industry to phase-out unconventional O&G, leading to have 80% of the Bank's exposure covered by customer-level emissions data, while encouraging its clients to build credible Paris-aligned transition plans. In Shipping, Nordea presented a shipping portfolio 1.1% lower in carbon emissions than the global target trajectory, settled by the International Maritime Organization (IMO) framework, while 97% of new loan agreements for Nordea-financed vessels included a responsible recycling clause as a result of the Bank's commitment to the Responsible Ship Recycling Standards (RSRS) for banks.

On the governance and culture strand, it is underscored the recently created the Board Operations and Sustainability Committee (BOSC), which assists the Group Board fulfilling its sustainability responsibilities. Moreover, the Board Audit Committee (BAC) reviews the Bank's sustainability reporting and, in 2021, the Group Accountable Executive for ESG was appointed. To ensure that sustainability is integrated through all business areas and group functions, a Group-wide implementation program and an Operational Steering Committee have been established.

Furthermore, Nordea has committed to international tax reporting standards (i.e., OECD Common Reporting Standard, etc.). The Bank devotes a great effort towards data privacy, having stream-lined the relevant process elements, improved the governance structure and assigned more employees to data privacy operation, while continuing important work relating to GDPR.

Nordea Bank introduces a range of sustainable finance products and solutions, continuing to develop its product offering, presented in Table 6, as the market matures, in order to support its customers addressing climate change and further sustainability issues in their financing.

Table 6 – Sustainable finance offering (Nordea Bank, 2021)

Financing	**2021**	**2020**	**2019**
Green, social and sustainable bonds			
Number of bonds we arranged	109	90	67
Total apportioned deal value bonds in EURbn	5.83	4.86	3.40
Share in relation to total market value (%)	0.66	1.1	1.21
Sustainable-linked loans (SLLs)			
Number of sustainability-linked loans	60	13	11
Nordea's take-and-hold volume in EURm	7,520	1,487	745
Green corporate loans			
Number of customers granted green loans	389	358	178
Volume of green loans in EURm	5,229	2,277	1,083

In line with the Global Reporting Initiative, Nordea allocates significant resources to the materiality and impact analysis of its activities in order to identify the most significant sustainability impacts and to better integrate sustainability in its business strategy. On the materiality analysis, Nordea identified the SDGs that are most material to the Bank, meaning the topics where the Bank can have the most impact on. Also, the Bank's Impact Analysis Tool analyzes the impacts that climate adversities can have on its lending portfolio and balance sheet.

2.4.5. Selection Criteria and Presentation of the Sustainable Business Model for Banking Institutions

The Literature Review has unveiled the financial sustainable solutions that CIB laid down in order to incorporate sustainability in its BM. In order to select the SBM framework that will most-suitably display these new sustainable banking features, some elements were taken into account.

The researcher firstly explored the definition of a SBM for the banking sector. Venanzi & Matteucci (2022) established a link between ESG and the banking sector and developed a set of unique core characteristics that define a sustainable banking institution: (1) assures financial stability in terms of resilience to economic/ financial shocks; (2) decreases the systemic risk of financial system; (3) supports real economy more than profiting from riskier investment activities; (4) lowers business risk; (5) assesses creditworthiness accurately and rigorously; (6) assumes a long-term horizon in strategies/ policies; (7) assures best practices of corporate governance; (8) includes ESG risks in the bank risk management.

In line with this, the Archetypes of Business Models for Sustainability framework proposed by Lüdeke-Freund *et al*. (2016) demonstrated to be particularly useful because it works as an activity system that covers internal and external activities to which the company is linked, but that may represent a sustainability problem. Consequently, this recent and popular taxonomy enables to introduce a range of sustainable business model opportunities and to provide examples to practitioners. Moreover, this taxonomy, built upon the triple bottom line, is considered, by various scholars, (1) to cover the most common instances of sustainable business activities, (2) to incorporate sustainability at a sector-level and (3) to give sustainability the center stage position required by stakeholders (Ritala *et al*., 2018).

The author also took into account the sector-adaptability capacity of each framework, which is perceived to reach its highest potential with the framework of Lüdeke-Freund *et al*. (2016), having been the most commonly adapted SBM to a wide range of sectors (Agwu & Bessant, 2021; Ritala *et al*., 2018). Lastly, in view of the fact that company-level SBM cannot be fully planned since these are result from their own individual experience, this taxonomy has become the main ramp-up driver for the adoption of SBMs by companies within each industry, being widely used as an industry-level SBM and as a guidebook for companies (Lüdeke-Freund *et al*., 2016).

Grounded on this model, a sustainable business model for CIB has been assembled. This SBM is presented in Table 7 and relies on the available information unveiled by the literature review conducted.

Table 7 – General sustainable business model for CIB (Source: Elaborated by the author)

Major Innovation Types	Environmental			Social			Economical		
Archetypes	Maximize material and energy efficiency	Closing resource hoops	Substitute with renewables and natural processes	Deliver functionality rather than ownership	Adopt a stewardship role	Encourage sufficiency	Repurpose for society/ environment	Inclusive value creation	Develop sustainable scale up solutions
Innovations that fit the Archetypes	Linking clients to state aid programs for energy efficiency (i.e., attractive financing conditions)	Inclusion of responsible recycling clauses that legally bind the clients	Scale-down of exposure to intensive GHG - emissions sectors		Green financing advisory services and assistance in outlining the client's transition plan		Strategic Plan at the Bank's Group-level that fully embeds sustainability	Partnership with external data providers to obtain reliable clients' ESG data	Test Portfolio against Climate Scenarios
			Budget increase to renewable energy projects financing				Governance Changes: creation of sustainability-oriented teams and adaptation of executive bodies		ESG risk cores and ESG databases
							Commitment to transition-focused initiatives (i.e., Paris Agreement, SBTi Method, EU Taxonomy, IMO, RSRS, etc.)		ESG Products: green, social and sustainable bonds; SLLs: etc.
									Stricter compliance with transparency and disclosure requirements in FS on sustainability efforts

III - RESEARCH METHODOLOGY

In the present chapter, the study's methodology will be explored. Firstly, the research question to which the present study seeks to answer will be introduced, followed by a discussion on the objectives and assumptions underpinning the methodology. In a second part, it is taken a comprehensive look at the kind of data collection methods and sample characterization. Afterwards, it will be specified how the data was processed and analyzed.

3.1. Research Question and Objectives

In order to develop the present research, the description of the research question will be the immediate step, followed by the determination of the research objectives. These two elements will fully justify the methodology later undertaken, as this will be tailored to answer the initial posed research question to the best extent possible. Overall, as the literature review showcased the existing gaps in the topic under study, the research question and objectives will be centered around such missing elements.

Once the literature review was conducted, it was identified some lack of disclosed information on the research topic under study, as the elements resulting from such analysis were insufficient to provide a conclusive and comprehensive answer to research question that kick-started the present study: *How can Corporate and Investment Banking institutions embed sustainability in their business model?*

Resultant from the research question, a set of research objectives that aim to be achieved in the present study were established. In the first place, it is intended to unveil the elements that have influenced the adoption of sustainable innovations in banks, especially in CIB. On a second note, it is aimed to be identified the sustainable solutions that have been adopted in CIB so to reduce the risk linked to environmental scenarios, which the literature review unveiled to represent a gap in the study subject. Lastly, the final research objective is to present a sustainable business model that can be adopted by the pertained banking sector in order to reduce the environmental risks while leveraging emergent business opportunities.

The research objectives of the current study are as follows:

i. To unveil the elements that have influenced the adoption of sustainable innovations in banks, especially in CIB;
ii. To identify the solutions adopted in CIB in order to reduce the risk associated to environmental scenarios;
iii. To suggest a sustainable business model that banks can adopt in order to reduce the environmental risks while leveraging emergent business opportunities.

Stemming from the research objectives above posed, it was considered key to elaborate a range of sub-research questions that will serve as the structure around which the present paper will collect information/ data, subsequently used to answer the main research question. The sub-research questions have been consolidated and showcased in Table 8.

Table 8 – Research objectives, sub-research questions and literature review authors (Source: Elaborated by the author)

Research Objectives	Sub-Research Questions	Literature Review
i. To unveil the elements that have influenced the adoption of sustainable innovations in banks, especially in CIB	What are the major changes that you perceive to have taken place in CIB? What do you believe will/ still needs to change in banks' BM in the future? What are the key sustainable solutions have been scaled-up or have the potential to be scaled-up in the future?	UniCredit (2021)
ii. To identify the main changes/ procedures that investment banks have implemented in order to reduce the risk associated to environmental scenarios	How has credit risk scoring been adapted so to incorporate sustainable considerations? How has the governance framework been adapted? What changes have occurred in the bank's portfolio structure?	Commerzbank AG (2021) Nordea Bank (2021)
iii. To present a sustainable business model that banks can adopt in order to reduce the environmental risks while leveraging emergent business opportunities	What new sustainable elements have been incorporated in the bank's business model? How has the daily business activity shifted towards capturing sustainable business opportunities?	Ritala *et al*. (2018) Venanzi & Matteucci (2022)

3.2. Research Methods

This study will follow a qualitative approach (W. Creswell & N. Poth, 2018). This methodology is considered the most appropriate approach to explore this sustainability-linked subject, as this is known for its complexity and for representing a recent and emerging issue, requiring a detailed understanding. This is perceived by the researcher to only be possible to establish by ensuring a closer link with people and through one-on-one conversations.

The presented design further allows the qualitative researcher to follow an inductive logic, using complex reasoning throughout the collection and analysis of data, in order to draw a realistic set of conclusions (Bengtsson, 2016). This feature meets one of the study's main objectives which

is to manage collected data in a way that allows to build patterns or emphasize discrepancies during the data analysis, finalizing with the creation a sustainable business model for CIB.

The qualitative approach is also considered to be the most fitted due to the possibility of using multiple methods, rather than relying on one single data source, which is quite a distinguishing feature of this methodology (W. Creswell & N. Poth, 2018). By following such path, the researcher has the opportunity to pick the sustainable business model where she left it, built using the literature review elements, and complement it with the present study's results.

Moreover, in a qualitative study, the researcher is expected to play a leading role by gathering the data themselves, through examining documents and interviewing the participants. W. Creswell & N. Poth (2018) further adds that qualitative researchers do not tend to rely on questionnaires or instruments developed by other researchers. Bengtsson (2016) shares the same beliefs, arguing that open-ended, written questions cannot provide the same depth that an interview can provide in view of the fact that, this way, the qualitative researcher has the opportunity to deepen the discussion with the informants.

A limitation may be unveiled in the qualitative approach undertaken as one of its core characteristics involves in-field data collection, at the site where the participants are experiencing the study problem (W. Creswell & N. Poth, 2018). The present study does not comprehend an in-field observation as the sample is mostly composed by individuals located abroad in relation to the researcher's country since the rough majority of sustainable expertise was found to be held by individuals based in other EU countries. Therefore, the study design had to accommodate the limited available resources and leverage the multiple digital solutions, particularly video-conference, which played a key role in the data collection process.

In sum, the qualitative approach adopted will rely on in-depth interviews to collect the primary data. The path chosen will enable to attain detailed understanding on the interviewees' individual perspective, experiences and thoughts, which, in the banking sector, is expected to vary according to the team or country of the informant. This method further allows the researcher to understand the contextual features that may influence the participant's standpoint. A conversational approach will be taken, where the researcher is receptive to the meaning that the participants hold of the research problem and the participant can freely provide its perspective (W. Creswell & N. Poth, 2018).

3.3. Data Collection Proceadures

The sampling process follows a phenomenological approach. Therefore, the sample is composed of 10 interviewees (n=10), which is deemed to be the most suitable sample size for phenomenological studies (Moser & Korstjens, 2017). This sampling criteria selects the participants according to their experience with the phenomenon under study.

The researcher leveraged her position in the banking sector and her visibility on the individuals that work in sustainability-focused teams at a corporate and investment bank. This sampling approach based on the interviewees' sector experience is given deeper meaning than an approach focused, for example, on reaching out to a wider range of banks. This way, while the interviewees share a common experience in sustainable banking, it is ensured diversity in key elements such as the interviewees' bank branch, country, department, financial products dealt, seniority level, etc. This diversity in characteristics and expertise, ensures that all the complex elements that are so unique to this topic are being captured (Moser & Korstjens, 2017).

Geographically wise, the researcher privileged a sample that represents, to the best extent possible, the different perspectives of individuals within the European Union, which is in line with the approach followed throughout the whole study, thus ensuring that the expected variation of perspectives within a common political, economic and legislative background is represented.

In sum, all interviewees work at sustainable-linked teams in one corporate and investment bank and deal with corporate and institutional clients. Moreover, the interviewees were selected based on the researcher's extended visibility on the bank's organizational structure and are distinguished between each other according to the country, department, team or position. A small share of interviewees was recommended to the researcher during the course of the interviews. Each interviewee was directly contacted via e-mail, where a short introduction on the research was provided, followed by an invitation to participate in the study.

The interview script has been conceived in a way that it may be easily adapted to a formal or informal approach according to the seniority level of the interviewee within the bank, always consisting of open-ended questions to maximize the level of detail captured in regards to the interviewees' knowledge and unique perspective on the sustainable banking topic. The interview script, used by the researcher as a guide during each interview, may be seen in Appendix C.

On a more detailed view, the interviews were conducted through video-conference, where the researcher used the interview script as a guide, introducing each topic at a time and giving floor to the interviewees' input. Each interview took an average time of 45 minutes and took place in July of 2022, which corresponds to a period of sanctions to Russia, particularly financial and energy sanctions, as a result of the invasion to Ukraine. To be noted that the research had to be limited to the bank where the interview and researcher work and any confidential information disclosed about the bank has been disregarded due to strict employee confidentiality contractual terms and competition laws to which the researcher is entailed to comply.

3.4. Characterization of the sample

For the present study, 10 individuals (n=10) have been interviewed, being them linked to an international, European-based investment bank that ranked in the Top 10 banks represented in the

Corporates Knights 100 most sustainable corporations. Overall, the conducted interviews intend to capture information on the core measures being implemented in EU-based in CIB following the sustainability background described in the literature review. This information aims to be collected from individuals placed in the forefront of sustainable banking, who's daily work is centered around making the shift to net-zero carbon emissions throughout CIB.

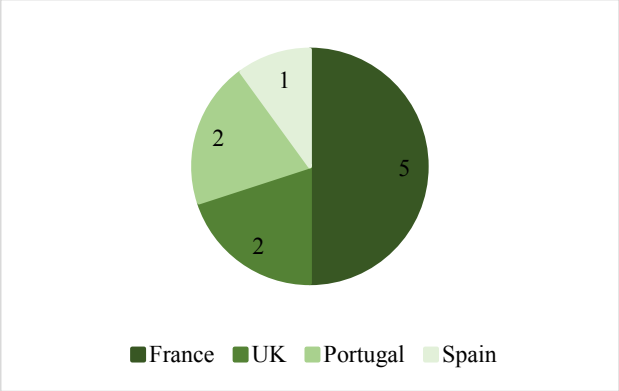
The interviewees can be differentiated by the country where they work, their department and, lastly, their team and position (Appendix D). In line with this, the informants, at the time of the interview, were all based in the EU, more precisely, in France (6), Portugal (2) United Kingdom (1), and Spain (1). Additionally, the departments being represented in the present study are the Sustainability Center; DCM Solutions; Global Banking UK Management; and Low Carbon Transition Group EMEA. Lastly, no two interviewees have the same four characteristics - country, department, team and position. The sample will be carefully analyzed henceforth.

The pertained banking institution distinguishes itself for being a French-based international bank, operating in 65 countries with nearly 190,000 employees, out of which 145,000 are located in Europe. As financial indicators are a key when characterizing any large corporate, but particularly banking institutions, it is worth noting that the interviewees' bank generated €46.2bn in revenues in 2021. In 2021, the pertained bank has also allocated €244bn to energy transition and to sectors considered as contributing directly to the achievement of the United Nations' SDGs, of which €23.4bn refer to the Sustainability-Linked Loans and €22bn to the green bonds. Moreover, the Group holds a key leading position in CIB, being ranked as the 1º European corporate and institutional bank in EMEA.

Therefore, the bank under study presents leading positions in the two core pillars of the present study: concerning the EU-based corporate and institutional bank pillar, the bank holds a leading position of CIB in EMEA, and respecting the sustainable banking pillar, the bank is represented in the Top 10 banking institutions of Corporates Knights' 100 most sustainable corporations ranking.

In line with Graph 2, it is intended for the sample to be representative of and limited to the European Union. The present study has previously identified its limitation to the EU scope with the purpose of potentially linking the politic and economic framework previously explored to the banks' sustainable pathway. An EU-based sample also ensures an in-depth and rich understanding on the study subject, enabling to analyze details and establish patterns, rather than taking the risk of generalizing too much. Therefore, the interviewees, at the time of the interview were working in France, UK, Portugal or Spain. These locations are similarly where CIB is the most represented with regard to the number of employees.

Graph 2 – Country where the interviewees work (Source: Elaborated by the author)



The interviewees are additionally characterized by the department they belong to, information which is represented in Graph 3.

Graph 3 – Interviewees' department (Source: Elaborated by the author)

Lastly, the researcher deemed to be critical the representation, to the best extent possible, of all sustainability-linked teams within the departments previously acknowledged. Moreover, even if two interviewees integrate the same team, they differ on position held in order to capture the unique yet multiple and complex measures being carried or implemented by each team towards the shift to a net-zero bank. The teams and positions represented in the present studied have been disclosed in the Appendix D.

3.5. Qualitative data analysis approach

The analysis of the qualitative data will follow a thematic analysis (TA) approach. This method, guided by Braun & Clarke (2006), intends to develop patterns of meaning, which the authors denominate as "themes", across a dataset that addresses the research question. This distinguishing feature goes in line with the underlying reason for the selection of a qualitative approach, which is to understand how CIB is incorporating sustainable innovations in its daily activities ("research question"), based on the interviews' output in relation to each set of questions ("themes").

It is worth noting that the TA is seen by Braun & Clarke (2006) as an umbrella term for a set of qualitative data analysis approaches that share some degree of theoretical flexibility, but

vary in the underlying philosophy and procedures for theme development. The authors created various clusters of approaches to TA, being the reflexive TA the selected cluster for this study.

The reflexive TA is noticeably theoretically flexible, enabling to be used in a range of theoretical frameworks and to address different types of research questions. Therefore, the reflexive TA presents very few inherent restraints around the type of data. That being the case, this method ties quite seamlessly with the data collection and sample approaches selected for the present study in view of the fact that, from the few limits set by the authors, none of these refer to the pertained approaches.

The one distinguishing feature of reflexive TA is the procedure for the theme development. While not prescribing a rigid process, Braun & Clarke (2006) outline a six-phase process to guide the researcher in systematically and robustly exploring, interpreting and reporting a pattern-based analysis from the dataset.

Phase 1, familiarization: the researcher began by familiarizing herself with the dataset by reading and re-reading the interview transcript and the interviews' output. Notes of potential points of interest were taken along each reading cycle.

Phase 2, generating initial codes: codes for the interviews' output were created by underlining the relevant text excerpts and by using the comment feature of Microsoft Word. It was aimed to draw attention to the interviewees' contributions that might be relevant to address the research question and to, later on, ease the search for the common elements among interviews, denominated as themes.

Phase 3, constructing themes: the researcher built potential themes by grouping the data that was relevant to each candidate, making use of the comment section created in the previous step, in order to later review the viability of each candidate's theme;

Phase 4 and 5, revise and name the themes: a pivot table using Microsoft excel was created and the initial codes, alongside with the relevant text excepts, were exported into one single sheet. It was created a column for the themes, another for the sub-themes and a last one for the text excepts associated to a sub-theme. Once a clear visual representation of the interviews results was attained, the researcher merged two themes into the same and eliminated another one. Lastly, each theme and sub-theme was categorized into one single informative name;

Phase 6, Write the report: at this point, the researcher was set to create the 'data analysis' chapter, which is divided into nine sub-chapters, each one of them related to one archetype previously introduced in this study. Within each sub-chapter, the themes and sub-themes, unveiled as a result from the thematic TA approach undertaken, will be presented by merging the data extracts (i.e., tables and graphs) with an analytic narrative.

IV - DATA ANALYSIS

The present chapter will breakdown and analyze the data that was collected in the in-depth interviews, conducted by the researcher to 10 individuals. The interviewees work at the same corporate and investment bank in sustainability-linked teams and were asked to provide their viewpoint on a set of questions, introduced by the researcher. The core goal is to collect information on the new sustainable solutions that have been embedded in CIB's business activity, resultant from the pressure of a sustainable-driven framework, and to consolidate the results in a SBM that can be adopted by the various banks.

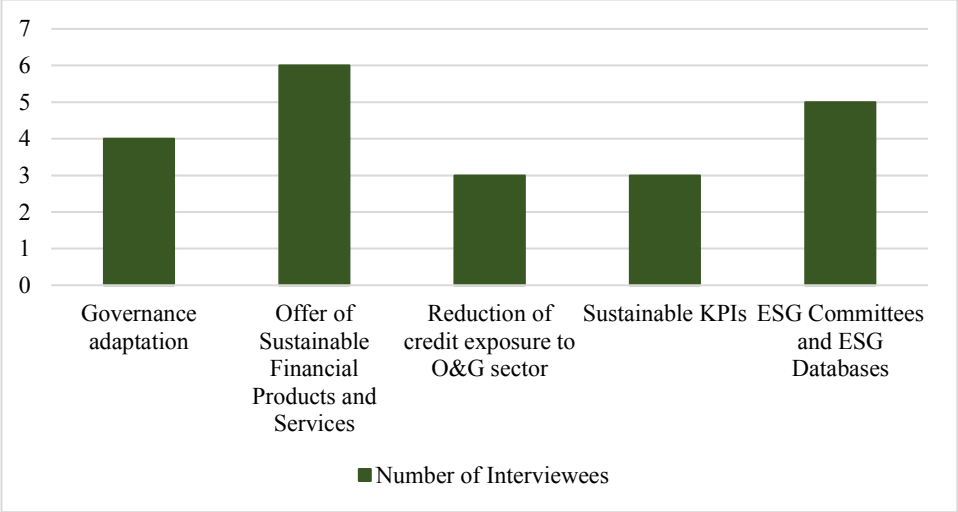
The data analysis chapter will be divided into nine sub-chapters, being each of these themes directly linked to one of the nine archetypes of the Archetypes of Business Models for Sustainability proposed by Lüdeke-Freund *et al*. (2016). Therefore, the sub-chapters will start by introducing the question posed to the interviewees and will be followed by a detailed breakdown of the common elements mentioned, also denominated as themes.

In the first place, the interviewees were asked to provide their view on two introductory questions, which were identified to be crucial, not only to start-off the interview in a seamless way and in an accommodating setting, but also to address the broader and non-archetype-related changes.

The first introductory question posed to the interviewees was the following one: *What are the major changes that you perceive to have taken place in CIB in line with the generalized commitment to the zero-carbon emissions goal and the overall current sustainability-focused framework?* The interviewees underlined the adaptation of existing financial products and services and the emergence of new financial solutions (6); the creation of ESG Credit Committees and ESG databases to assess client's ESG risk (5); the major adjustments in governance which have led to the creation of managing bodies solely focused on the pursuit of energy transition, embedding sustainability from top-down in the bank's structure (4); the steady and progressive cut in the financing of O&G companies (3); and the adaptation of KPIs, meaning low-carbon transition targets defined in the loan agreement, to which client must comply during the established period in order to enjoy less interest costs and so to not breach the contract (3).

The researcher crosschecked the interviewees' input, presented in Graph 4, with the literature review, concluding a strong alignment of both datasets on the solutions being adopted under this Archetype. While the governance and financial products adaption are a common feature to all of the analyzed banks, Nordea Bank (2021), Commerzbank AG (2021) and the interviews' results particularly emphasized the new sustainable KPIs targeted at the clients; the scale-down of exposure to GHG-intensive clients; and the incorporation of ESG tool.

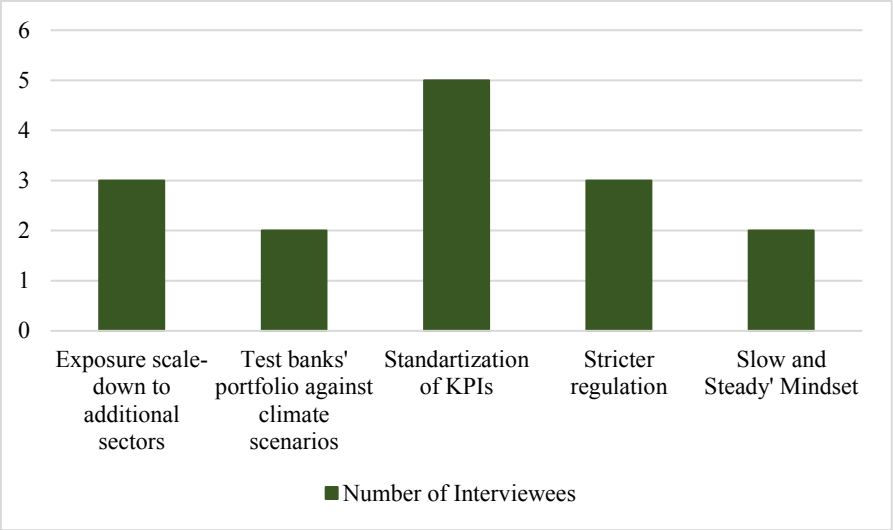
Graph 4 – Main changes in CIB (Source: Elaborated by the author)



The second introductory question posed to the interviewees was: *What do you believe will/ still needs to change in the future?* The expected future changes are related to the standardization of KPIs, especially when offering a Sustainability-Linked Loans, which is the most commonly-used sustainability-linked product (5); the inclusion of additional sectors to which banks will seek to scale-down their exposure, beyond carbon-intensive client sectors (3); stricter regulation on the way CIB pursues the transition to low-carbon emissions, coming upright from the EU framework (3); and the test by Central Banks of its banks' resilience against sustainable assumptions, generated from climate scenarios (2). Another element raised was the need to look at the future with 'slow and steady' mindset, given that a sudden cut in the financing to the O&G sector or the offer of only green products will make the most pollutant clients seek financing or equity elsewhere, potentially at higher costs, which will affect the dependent activities and will contribute to the fall-down of economy, rather than contributing to the transition to low-carbon emissions of these clients (2). Graph 5 presents the results obtained on this topic.

To be noted that Nordea Bank (2021), as presented in the literature review, has similarly adopted a model to assess the physical and transitional risks under a range of climate scenarios and, alongside with Commerzbank AG (2021), has voiced the intent to apply sustainability-related financial products to a growing range of clients. Lastly, while the intention to reduce exposure to a broader range of carbon-intensive clients over time has been generally expressed, no information, in the literature review, has been disclosed towards the importance and support of a 'slow and steady' mindset concerning the low-carbon transition, in light of a predictable and consequent economic crash.

Graph 5 – Main future changes (Source: Elaborated by the author)

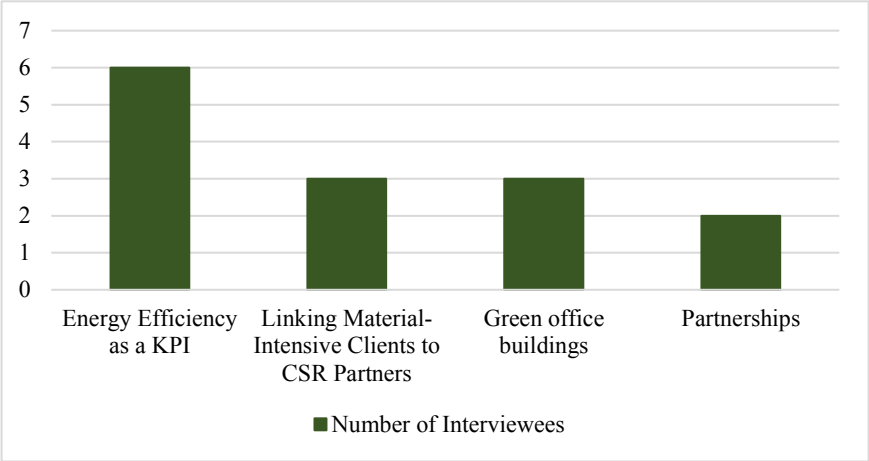


4.1. Maximize Material and Energy Efficiency

The first archetype-linked question is the following one: *Which internal and client-focused initiatives have you and your team undertaken so to incorporate/ pursue energy efficiency maximization in the daily business activity?* The interviewees stressed upon the maximization of energy efficiency being a commonly-used KPI in various clients' sectors (i.e., the automotive, telecom, real estate sectors, etc.), directing equal importance to the tailoring of these goals, even within the same sector, in order to make them more achievable at the client's level while offering higher-quality banking services (6); the investments being directed towards innovations that increase the energy efficiency of the bank's office buildings, creating 'green buildings' that are electric car and bike friendly, have motion-sensor lights throughout the whole building and high-tech elevators, among other innovations (3); the key role of the banks in linking the material-intensive clients with CSR partners, leveraging the intermediary role entrusted to banking institutions (3); and the partnerships being developed with, for example, IT servers that transform the wasted energy into heat for the building and for residences nearby the office building (2).

The literature review unveiled a very incomplete set of information available on this topic since it was simply mentioned the link enabled by banks between clients and energy efficiency state aids. Therefore, the two data sets, while not contradictory, do not unveil the same information, acting in symbiosis and complementary to each other. The interviews output has been consolidated in Graph 6.

Graph 6 – Initiatives that pursue the maximization of material and energy efficiency (Source: Elaborated by the author)

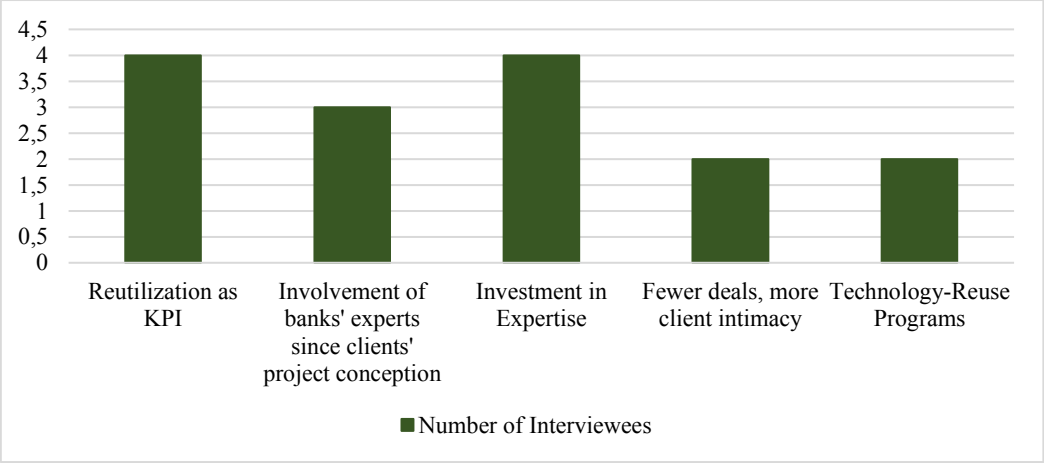


4.2. Closing Resource Loops

In line with the archetype related to the closure of resource loops, the researcher posed the following question to each interviewee: *Which internal and client-focused initiatives have you and your team undertaken so to incorporate/ pursue the closure of resource loops in the daily business activity?* The interviewees underlined the incorporation of raw materials' reutilization clause in green bond deals, in the shape of a KPI (i.e., car manufacturing and construction industries), compelling the clients to increase the percentage of re-used materials each year in order to benefit from the green bond-linked advantages (i.e., lower fees, etc.) (4); the major investments in talent-acquisition that have taken place with the aim of innovating and providing tailored financing solutions, which has led clients to adopt recently-unveiled techniques (4); the increasing involvement of the bank's low-carbon transition experts in the conception of construction projects (3); the replacement of deal-focused approach for a client-intimacy one (2); and the commonly adopted programs that give a second life to technology within banks, as the banking industry is knowingly a technology-intensive sector (2).

The information disclosed by Nordea Bank (2021) in the literature review similarly empathized the recycling-clauses included in the agreements with the clients, encouraging these to contribute to a circular economy, while also guiding them through their own strategic plan and tangible goals. Nonetheless, the available information on the pertained archetype was revealed to be quite incomplete and limited during the literature review. Therefore, while the few unveiled details are in line with the interviewees' viewpoint, the study's output concerning this topic, consolidated in Graph 7, enabled to disclose additional and much more comprehensive elements.

Graph 7 – New measures towards the closure of resource loops (Source: Elaborated by the author)



4.3. Substitution with Renewables and Natural Processes

In regards to the substitution of fossil fuels with renewable energy and natural processes archetype, each interviewee was firstly asked: *How do you perceive the client's risk assessment has been adapted during the transition to low-carbon emissions?* The informants have brought to the researcher's attention the aggravated risk-score for carbon-intensive clients, which has become a no-brainer, being created a direct link between O&G clients to riskier investments (5); the ESG internal databases, which focus on the collection and processing of client's data in order have live information on potential ESG adverse information, but to also accurately assess the client's risk score (4); and the ESG credit committees built from the ground-up, fully independent from the vanilla credit committees, and the requirement for the client to be approved by both committees in each yearly-credit review, process which includes the execution of a mandatory ESG Questionnaire (4); and the EU-Taxonomy pressure towards the incorporation of sustainability as an element of risk management and the higher investments on companies that stand-out positively against the regulation's definition of sustainability (2). Table 9 consolidates the interviewees inputs on this matter.

Table 9 – Changes in the client's risk assessment (Source: Elaborated by the author)

Change in risk assessment	Interviewees
Aggravated final risk score to carbon-intensive clients	2, 4, 5, 7, 10
ESG Ratings and Databases	1, 3, 6, 7
ESG Credit Committees	2, 4, 5, 7
EU-Taxonomy Regulation	8, 9

The second question posed to the interviewees was the following one: *What are the key practices that that you and your team have followed in order to efficiently transition to renewable energy and natural processes?* As disclosed in Table 10, the interviewees' inputs include the

gradual decrease in the bank's exposure to the O&G industry, thus being implied an increase in banking products and services costs for this sector; refusal to close new deals with O&G-related clients, and prioritization to reduce or exit the live deals' exposure through, for example, debt syndication; and the increase financing of green transportation (i.e., rail, etc.) and divesture in carbon-intensive transportation (i.e., shipping, etc.) (5).

It is key to ensure that high-standards are strictly kept during each deal and laying aside the deals that are not material to the bank (4); perform a deep analysis of each transaction and go back-and-forth with questions to collect more data in order to ensure that the client is not misleading the bank towards green-washing (4); ensure that the bank's future is being built upon transition towards green energy, but not doing it so fast to the point that it creates pressure in the economy and leads dependent industries to downturn (3); leverage the bank's position as intermediary with the aim of connecting companies committed to renewables' transition with investors (3); guide the client through energy transition by creating tailored financing solutions (3); adopt a relationship-focused approach, rather than a deal-focused one (2).

Table 10 – Key practices to be followed by CIB (Source: Elaborated by the author)

Key Measures	Interviewees
Scale-down of the Bank's Exposure to O&G-intensive clients	1, 4, 5, 7, 10
Higher standards	1, 3, 4, 7
Sharp-Attention towards Potential Green-Washing	1, 5, 7, 10
Focus on the Transition, but not so fast!	2, 6, 10
Leverage the Bank's Position as Intermediary	1, 4, 5
Guide the Client through Energy Transition	2, 4, 9
Relationship-focused	8, 9

It is worth noting that the literature review equally emphasized the scale-down of carbon-intensive clients (Commerzbank AG, 2021; Nordea Bank, 2021; UniCredit, 2021). However, the budget increase directed at financing renewable energy projects (Commerzbank AG, 2021) was not addressed by the interviewees when referring to this Archetype. The remaining interviews' data, while not contradictory, was not disclosed in the literature review.

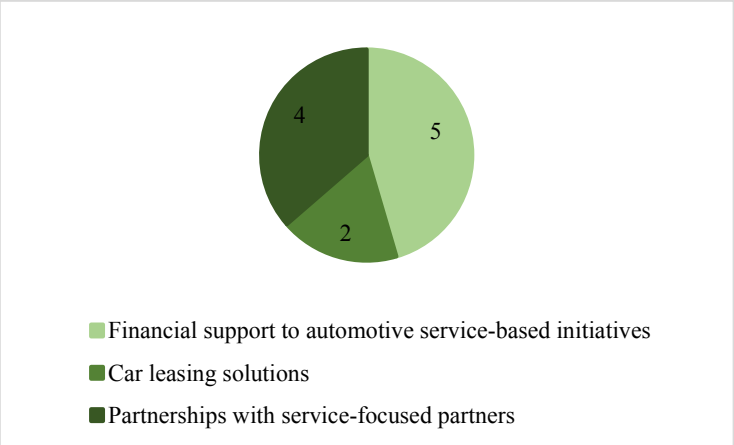
The researcher considered relevant to disclose the collected data in a table which unveils the answer of each interviewee due to some clear patterns identified. Interestingly, the interviewees that identified the change 'aggravated final risk score for carbon-intensive clients' tended to identify as key measures: 'scale-down of banks' exposure to O&G industry' and 'attention towards green washing' (5, 7, and 10). Also, the interviewees that identified the change 'ESG Ratings and Databases' perceived the needed to ensure 'higher standards', as a key measure (1, 3, and 7). Finally, both interviewees that mentioned the 'EU-Taxonomy Regulation', similarly mentioned the importance of ensuring a 'relationship-focused' approach.

4.4. Deliver Functionality Rather Than Ownership

In regards to the transition to a service-focused approach, the researcher posed the following question to each interviewee: *What initiatives are being undertaken by you and your team to ramp-up the transition from an ownership-based approach towards a service and functionality-based one?* Many initiatives are targeted at the automotive sector, towards which CIB is increasing the financing budget and expertise in order to support the growing number of automotive brands that are showing the willingness and drive to shift its approach from volume-based towards less energy intensive, value and service-based (5). It is similarly emphasized the partnerships with service-focused partners (i.e., the partnership with World Business Council for Sustainable Development (WBCSD) and the International Transport Forum to promote the Mobility-as-a-Service (MaaS) model) (4); and the way corporate banks have leveraged their position to create car leasing solutions at discount prices for its employees, discouraging the pursuit of a purchase pathway and rather encouraging its employees to return the asset to the economic cycle (2). Graph 8 consolidates the interviewees' inputs on this matter.

To be noted that the literature review unveiled a gap associated to this topic, as there was no information available concerning the way CIB can contribute to scale-up a service-focused approach, reason why the conducted interviews revealed to be of unmatched value.

Graph 8 – Initiatives being undertaken to ramp-up service-based approaches (Source: Elaborated by the author)



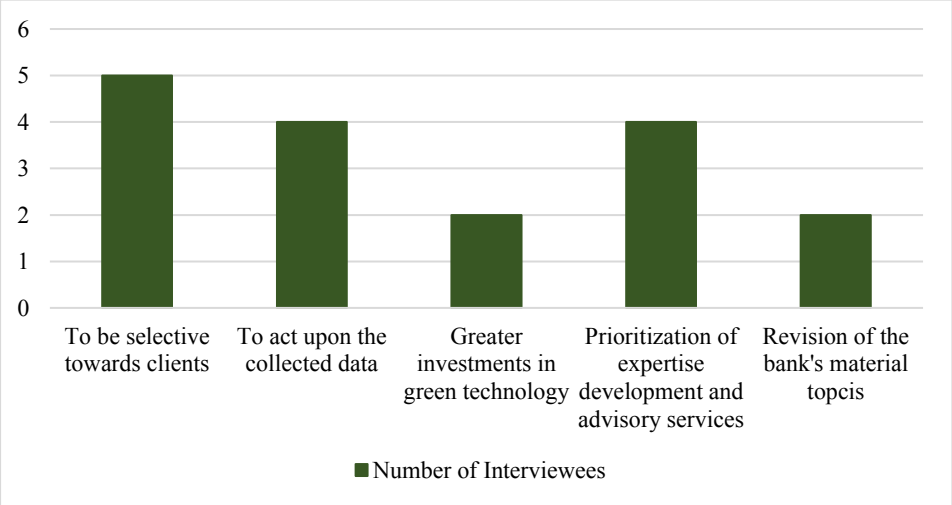
4.5. Adopt a Stewardship Role

Since the adoption of a stewardship role by banks, through which they act upon their major responsibility as managers of this transition process, is increasingly being demanded by the stakeholders, the researcher inquired the interviewees about the way this is being reflected in terms of practical initiatives and measures. The interviewees stressed upon the underlying meaning that comes with a corporate bank, that holds more power than certain sovereign countries, being selective on the clients that get to trade with the institution based on certain KPIs, sending an effective message to companies on the fact that the world is, indeed, changing towards

a sustainable pathway (5); the importance of collecting and processing data and to act on it, thus shaping the decision-making process along the way based on data with the aim of identifying and acting on the most critical points (4); the prioritization of sustainability advisory services and expertise development, by either upskilling internal staff or recruiting new talents (4); the increasing investments in both mature technology, such as solar and onshore wind, and emerging technologies, such as carbon capture innovations (2); and the regular assessment on the bank's material topics, ensuring that its strategy is align with the topics where the institution can have the most impact (2).

The information unveiled in the literature review, while not extensive, is in line with the interviewees' viewpoints. Commerzbank AG (2021) similarly emphasized the influence that lays upon the advisory services of banking institutions, having the capacity to change the client's environmental impact. It also mentioned the more aggressive and extensive investments being directed at both mature and emerging technologies. In sum, the interviews' results, disclosed in Graph 9, provided clearer and comprehensive details on this topic, which were not fully disclosed by the banks analyzed in the literature review.

Graph 9 – New initiatives undertaken to adopt a stewardship role (Source: Elaborated by the author)



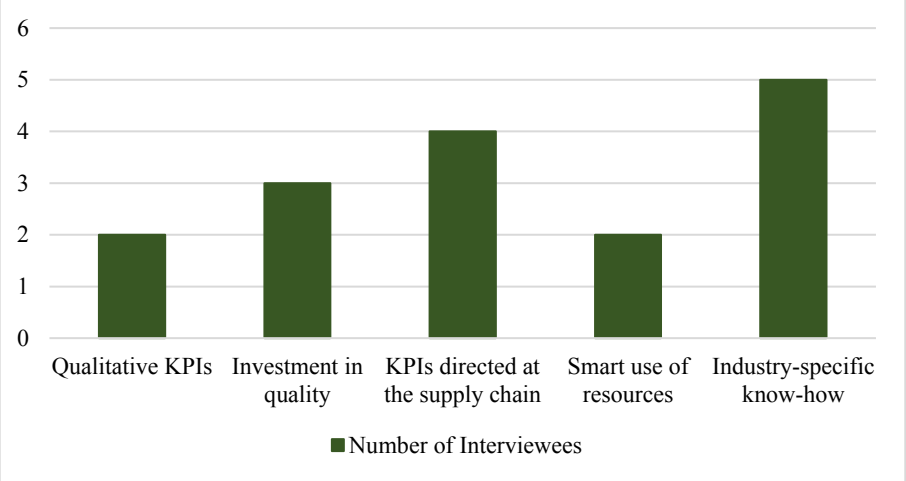
4.6. Encourage Sufficiency

In order to address the archetype related to sufficiency, each interviewee was requested to provide their input on the following question: *Which measures/ actions has your team undertaken so to encourage overall sufficiency, both relating to the bank's internal operations and to the client's ones?* The interviewees underlined the industry-specific know-how being captured and leveraged by banks so to respond to the clients' particular needs and intricacies (i.e., technique which enables to reuse aircrafts' steal) (5); and the goal to develop an appetite for less by banking institutions, not only directed at its clients, but similarly at its clients' supply chain, which has led the scope of the KPIs to go beyond the traditional barriers and to comprise targets that our client's

suppliers must similarly achieve (i.e., to obtain cacao from the supplier that provides the most fair trade) (4). It is similarly pointed-out the growing trend within companies of, rather than investing in quantity, to excel on quality, specially within aviation and automotive sectors, opportunity which has been intensely explored by corporate banks with the aim of offering financial advisory services and tailored financial products (3); according to the industry, the importance of encouraging client to not necessarily utilize 'less', but to rather use resources 'smartly', assisting them through strategic advisory (2); and the shift from quantitative KPIs to qualitative ones (2).

The literature review unveiled a severe lack of information disclosed on the initiatives towards the reinforcement of sufficiency, which places additional relevance in the interviews conducted as it enabled the researcher to attain knowledge, from scratch, on this archetype for the banking sector. The pertained results have been consolidated in Graph 10.

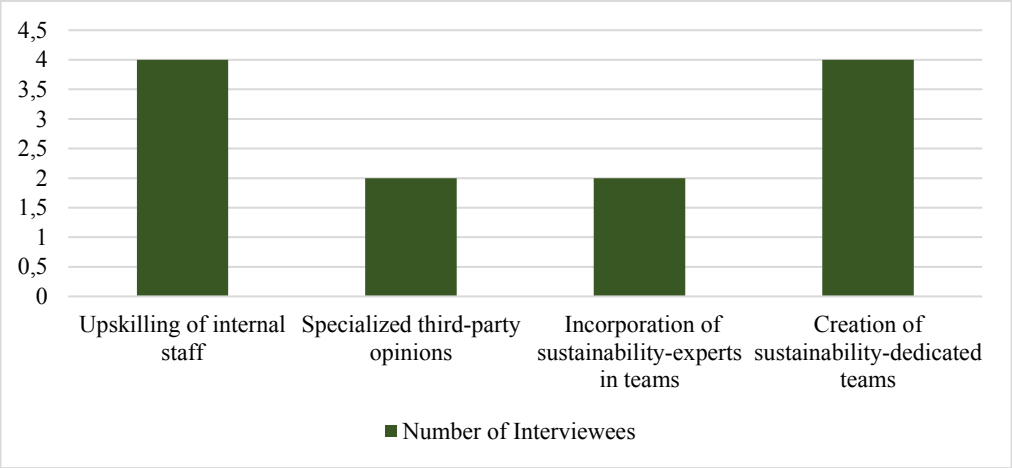
Graph 10 – Measures adopted to encourage overall sufficiency (Source: Elaborated by the author)



4.7. Repurpose for Society/ Environment

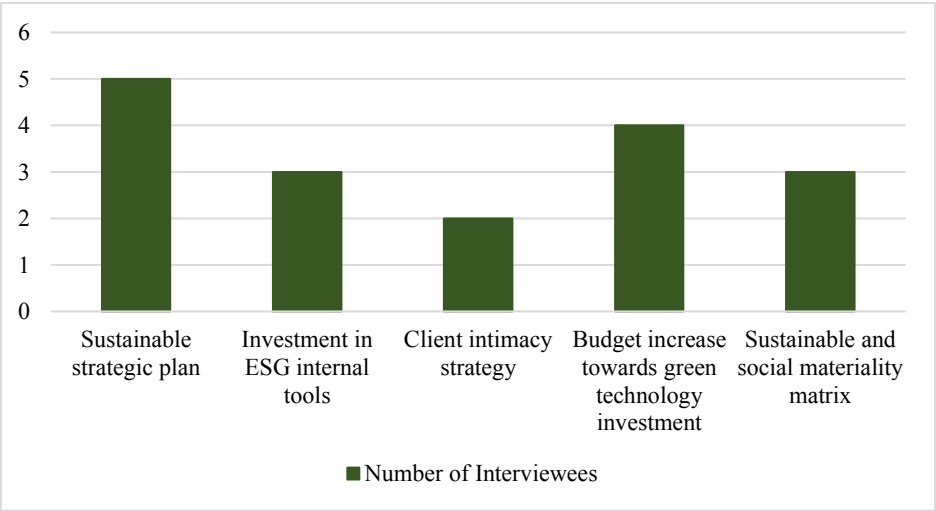
To understand the way banks have repurposed themselves for environment and society, the researcher firstly posed the following question: *How has the governance framework been adapted so to better incorporate sustainable solutions in the daily business activity?* As presented in Graph 11, the interviewees underpinned the internal revamps that have led to upskilling of internal staff (4); the creation from scratch of fully sustainability-dedicated teams, both on the executive level and on the remaining departmental layers below (4); the greater focus, in a first approach, on the most material topics, targeting teams that directly deal with O&G clients, and then moving towards the integration of sustainability-experts in each team, enabling to address the intricacies of the sustainability in every activity of the bank (2); and the hire of specialized third party opinions, especially from consulting firms, for the transactions that the bank intends to participate in (2).

Graph 11 – Adaptation of the governance framework (Source: Elaborated by the author)



On a second moment, the researcher raised the following question: *What changes have been implemented since the mentioned adaption of the governance framework to sustainability considerations?* The interviewees stressed upon their bank's GTS 2025 plan, which sets goals related to Growth, Technology, and Sustainability, being the first strategic plan that incorporates serious and scaled-up sustainability considerations (5); the increase in the bank's budget dedicated to accelerating the uptake of mature technologies, such as solar, onshore wind and geothermal, through dedicated lending services, but also through other project finance vehicles that enable the development of groundbreaking technologies (4); the creation of a materiality matrix related to the sustainable and social topics (3); the greater investments towards the development of ESG-linked internal tools, in order to assist the internal staff in the assessment of the credit risk of its clients (3); and the client intimacy strategy, in view of the fact that the bank's greater impact on environment happens through its clients (2). These results may be seen consolidated in Graph 12.

Graph 12 – Key practices adopted so to repurpose for society and environment (Source: Elaborated by the author)



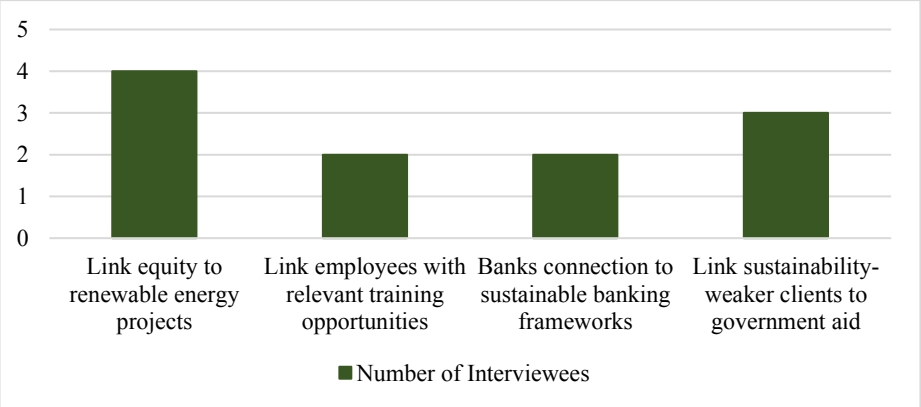
In sum, the data collected in the interviews is either complementary or aligned to the literature review's results, with a special focus to the governance framework, as all the analyzed banks have implemented similar changes, especially relating to upskilling of internal staff and creation of sustainability-focused teams (Commerzbank AG, 2021; Nordea Bank, 2021; UniCredit, 2021). Moreover, the implementation of a strategic plan that fully integrates sustainability considerations is a commonly undertaken measure by all pertained banks.

4.8. Inclusive Value Creation

In regard to the inclusive value creation archetype, the following question was raised to each interviewee: *In what way do you and your team promote the connection between the various stakeholders in order to promote/ ramp-up sustainability-linked initiatives?* The interviewees stressed upon the increasing and competitive number of equity providers that are seeking to fund renewable energy infrastructures and the key role of banks in linking the equity clients to project finance clients, so to create value-added opportunities (4); the role of banks in advising sustainability-weaker clients regarding greener assets so to incorporate these in its operations and to capture state aids (3); the participation of banking institutions in sustainable banking frameworks (i.e., Principle for Responsible Banking, Partnership for Carbon Accounting Financials, etc.) that intend to link banks with peers, scientist and industry experts, so to ensure their alignment with the net-zero emissions target by providing a set of tangible progressive targets (2); the greater focus on the internal staff's expertise, thus linking its employees with the pertinent external training opportunities and capturing talent (2).

To be noted that the collected data, consolidated in Graph 13, while being comparable with the information disclosed by Nordea Bank (2021), is not fully aligned. Undoubtedly, Nordea Bank (2021) has equally made an effort towards linking its employees with the relevant training opportunities. Nonetheless, the remaining connections enabled by Nordea, through which it aims to create value, focus on countering discrimination, promoting entrepreneurship and other social projects that the bank considers to be the most material.

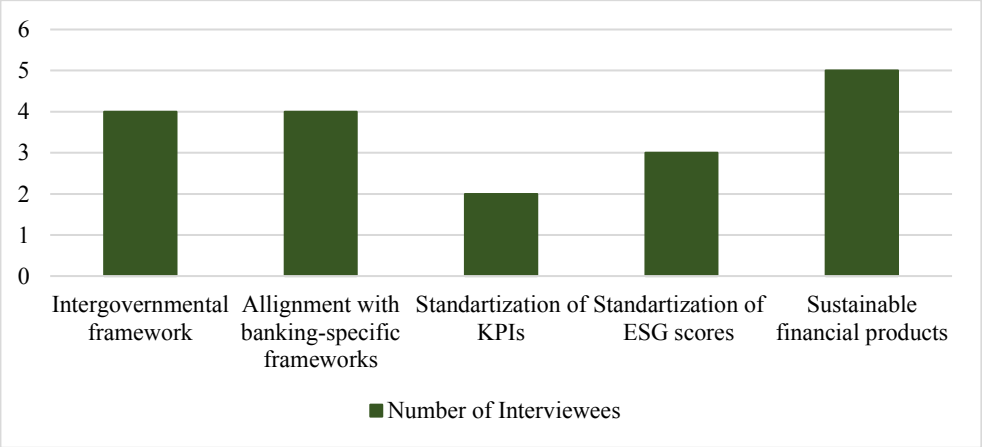
Graph 13 – Links established with the purpose of creating inclusive value (Source: Elaborated by the author)



4.9. Develop Sustainable Scale-Up Solutions

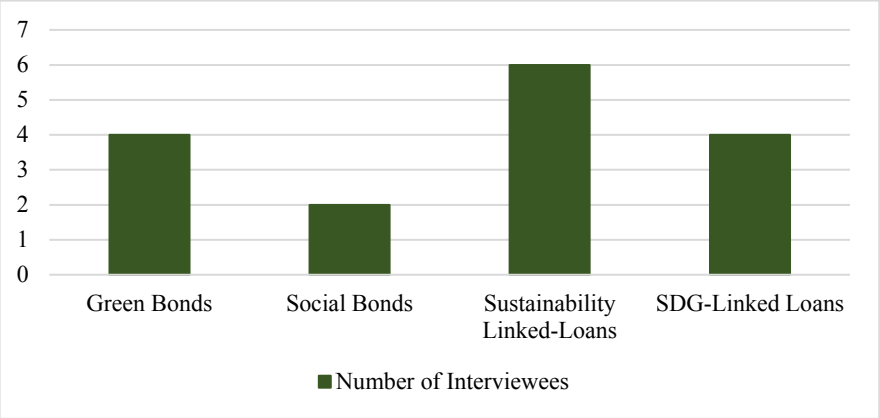
In order to address the archetype related to the development of sustainable scale-up solutions, the interviewees were asked, in a first moment, about the key sustainable solutions that have been scaled-up or have the potential to be scaled-up in the future. As presented in Graph 14, the following elements have been underscored: the sustainable financial products (5); the broad adoption of guidelines issued by intergovernmental frameworks (i.e., EU Taxonomy; EU Green Bond Standards; etc.) (4); the growingly commitment to specialized international sustainable banking frameworks, such as Net Zero Banking Alliance and Principle for Responsible Banking, through which it is established a common set of principles that guide the signatory banks in their sustainability journey (4); the creation ESG Risk Scores, defined during ESG Committees, for all clients of the banks, with no exceptions (3); and the growlingly standardization of KPIs within each industry (2).

Graph 14 – Key sustainable solution that have been/ will be scaled-up (Source: Elaborated by the author)



On a second moment, the researcher posed the following question: *What are the sustainability-related products that you and your team work with on the daily business activity?* The interviewees highlighted the sustainability-linked loans, perceived as the most flexible green financial product, as it simply implies the compliance with pre-settled KPIs (6); the green bonds, which are strictly linked to, for example, renewable energy projects (i.e., wind farms, etc.) (4); SDG-linked loans, associated to the sustainable development goals set by UN (4); and social bonds, which the interviewees apply, for example, to companies that operate in emerging countries (2). These results may be seen consolidated in Graph 15.

Graph 15 – Sustainable financial products dealt by the interviewees (Source: Elaborated by the author)



Overall, although the data fully aligns with the banking institutions analyzed in the literature review (Commerzbank AG, 2021), the interviews provided the researcher a few additional elements and a broader understanding on the topic, mentioning the current scale-up sustainable solutions and the path through which these solutions will evolve, with a great focus for intergovernmental and UN Banking-specialized frameworks.

4.10. Proposal of a Sustainable Business Model for CIB

Once the interviews were conducted and the data was analyzed, the researcher concluded that the vast majority of the interviewees either provided new elements or more detail on elements already unveiled in the literature review. A smaller share referred to information that the literature review disclosed, but the interviews failed to support. Overall, the literature review's results were simply insufficient, not enabling to generalize the outcome and apply to a wide range of banks.

Therefore, once the research results were merged with the literature review output, it was inferred that the material changes relate to the governance structure adaptation, alongside with the scale-down of banks' exposure to the most carbon-intensive sector and the increase, over time, of the sectors under this 'exit strategy', being key to keep a 'slow and steady' mindset so to not cause an economic downfall.

Moreover, the adoption of sustainable financial products; ESG risk scores and ESG credit committees; and legally-biding low-carbon KPIs already play a key part towards reaching the zero-carbon emissions goal and is becoming heavily standardized. The testing of banks' resilience against climate scenarios; the capture and retention of sustainability-linked expertise; and the diversification of financing vehicles for renewable-energy technologies are assisting in the reduction of credit risk, but also in better responding to market demands. Finally, the alignment with intergovernmental and banking sector-specific frameworks will keep playing a key role in assisting banks transitioning as they face even riskier and more complex climate scenarios.

The researcher's proposal of a sustainable business model for CIB is presented in Table 11, which is a result from the information disclosed by the analyzed banks in the literature review and the data collected from the 10 interviewees. A color scheme has been implemented in order to differentiate the literature review's output from the interviews' output: in black it is presented the information solely present in the literature review; in blue the information presented in both; and in green the information solely unveiled in the interviews.

Table 11 – Proposal of a Sustainable Business Model for CIB (Source: Elaborated by the author)

Major Innovation Types	Environmental			Social			Economical		
Archetypes	Maximize material and energy efficiency	Closing resource loops	Substitute with renewables and natural processes	Deliver functionality rather than ownership	Adopt a stewardship role	Encourage sufficiency	Repurpose for society/ environment	Inclusive value creation	Develop sustainable scale up solutions
Innovations that fit the Archetypes	Linking clients to state aid programs for energy efficiency (i.e., attractive financing conditions)	Inclusion of responsible recycling clauses that legally bind clients	Scale-down of exposure to intensive GHG - emissions sectors	Partnerships with service-focused partners (i.e., partnership to promote the Mobility-as-a-Service (MaaS) model)	Green financing advisory services and assistance in outlining the client's transition plan	Capture and leverage of Industry-specific know-how so to better respond to clients' specific needs (i.e., technique to reuse aircrafts' steal)	Strategic Plan at the Bank's Group-level that fully embeds sustainability	Partnership with external data providers to obtain reliable ESG data	Test Portfolio against Climate Scenarios
	Link Material and Energy-Intensive Clients with CSR Partners	Focus on fewer and bigger deals	Budget increase to renewable energy projects financing	Leverage Bank's position to create car leasing solutions for employees	Being selective on the clients that get to trade with the institution	Widening of KPIs' scope so to comprise targets for the suppliers of Bank's clients	Governance Changes: creation of sustainability-focused teams, adaptation of executive bodies and upskilling	Link equity to client's renewable energy projects	ESG risk scores; ESG databases; and ESG Credit Committees
	Green Office Buildings	Inclusion of bank's low-carbon transition experts in the conception of clients' construction projects	Perform deep analysis in all transactions to ensure that the Bank is not being misled towards green-washing	Focus on innovative financial solutions for clients with service-based initiatives, especially in the automotive sector	Collection and processing of data so to identify and act on the most critical points	Encourage clients through strategic advisory to not necessarily utilize 'less' resources, but to use it 'smartly'	Commitment to transition-focused initiatives (i.e., Paris Agreement, SBTi Method, EU Taxonomy, IMO, RSRS, etc.)	Link employees to relevant training opportunities	ESG Products: green, social and sustainable bonds; SLLs: etc.
	Energy Efficiency as KPI to be achieved by clients in order for them to beneficiate from attractive financing conditions	Reutilization Programs for Technology within the Bank	Leverage bank's position as intermediary so to connect the clients committed to renewables' transition with investors		Investment in expertise development by either upskilling internal staff or recruiting new talents	Tailored financial products for clients investing in quality and decreasing in quantity (i.e., aviation and automotive sectors)	Hire of third-parties specialized opinions	Participation of the Bank in sustainable banking frameworks that intend to link the Bank with peers, scientist and industry experts	Transparency on sustainability efforts and its disclosure in FS
			Aggravated final risk score to carbon-intensive clients		Financing vehicles for mature technology, (i.e., solar and onshore wind) and emerging technologies, (i.e., carbon capture innovations)		Integration of sustainability-experts within each team with simultaneous expertise on the team's BAU	Link sustainability-weaker clients to governmental aid programs	Commitment to specialized banking frameworks (i.e., Net Zero Banking Alliance, Principle for Responsible, etc.)
								Link sustainability-weaker clients to state aid programs	Standardization of KPIs within each industry
									Broad adoption of the guidelines issued by governmental frameworks (i.e., EU Taxonomy; EU Green Bond Standards; etc.)

V - CONCLUSION

Subsequent to the analysis of the data collected from interviewees specialized in sustainable banking and to the literature review performed on the banking sector sustainable framework and the consequent adaption of banks' strategic plans, this chapter intends to explore the final considerations linked to the data output, to provide the core findings of this study associated to each research objective initially set and to answer the research question.

Overall, this study sought to understand the elements that influenced the adoption of sustainable innovations in the banking sector, especially in CIB. In a second moment, it was intended to gather information on the main innovative solutions being embedded by banks through SMBs. Ultimately, the researcher intended to create a SBM that can be adopted by CIB so to reduce environmental risks and leverage business opportunities.

In order to fulfill the first study objective, both the literature review and the qualitative study provided truly insightful information. The research unveiled that the shift in banks' BM is rooted in the EU sustainable framework and in their commitment to international alliances and agreements, which support banks implementing zero-carbon emissions transition plans, while limiting their credit exposure, among other risks, and capturing important business opportunities. Concerning the EU framework, it is given a substantial attention to the European Green Deal and the European Green Bond Standard, not only because of its broad adoption by the banking sector, but also due to its high success rates in reallocating banks funds towards green investments in a way that does not cause economic downfalls and ensures higher profit generation opportunities.

On this topic, light is also shed on the sector-specific alliances and membership initiatives that are growingly taking space in the international arena. The most relevant initiative is the Net-Zero Banking Alliance (NZBA), which has been recognized for its trailblazing work in gathering the banking institutions with the highest yearly revenues and international reach, without involving governmental entities, so to help them build their own transition plan towards a common goal: to reach net-zero emissions by 2050. The interviews introduced the Principle for Responsible Banking, which has equally an outstanding reach and intends to assist banks aligning their activity with the Paris Agreement and the SGD goals, and the Partnership for Carbon Accounting Financials, focused on assisting institutions disclosing their sustainable efforts in an efficient and transparent way. The sustainable framework has similarly beneficiated from the agreements and impacting reports, such as the Paris Agreement and the IPCC report, which have drawn attention to the threating scenarios, raised awareness and called-out for global action.

Lastly, one of the most impactful elements that has ramped-up the broad adoption of sustainable solutions has been the attribution of credit points to the ESG topic and the addition of this ESG assessment in companies' rating, causing to downgrade or upgrade their final score, by

big three Rating Agencies. The reason why this generates such a substantial impact stems from the fact that the increase or decrease of a company's final rating will impact the interest rates of the enterprise's debt and its overall reputation. Moreover, the broad range of stakeholders, that, as presented in the literature review, are growingly impacting the way an enterprise operates, have into account the alignment of a corporation with the mentioned initiatives and their final rating, thus being key for banks to meet stakeholders' expectations so to sustain their future activity.

To fulfill the second objective, concerning the sustainable innovative solutions adopted by CIB, the researcher resorted to the qualitive study, materialized through in-depth interviews, since the literature review results, while complementary and of value-added, revealed considerable gaps. The innovative sustainable solutions that scored highest response rates were linked to emerging sustainability-linked financial products (i.e., sustainable-lined bonds, green bonds, SDG-linked loans, etc.) and to the creation of ESG tools and ESG risk committees, independent from the traditional and simultaneously-performed credit committee, both evaluating the clients' risk score, and thus interest rates, on a yearly basis (Commerzbank AG, 2021).

The additional sustainable innovation being broadly adopted is the establishment of sustainability KPIs for clients in legally binding documents (Nordea Bank, 2021), which has the dual purpose of steering the client through a transition route and to provide tangible and reachable goals. Additionally, the scale-down of exposure to fossil fuels is broadly pursued by banks and aligned with a risk-avoidance approach. However, the increasing investment in matured and emerging green technology represent banks' plunge into important market opportunities (Commerzbank AG, 2021). The structural changes in governance (i.e., sustainability-dedicated teams, etc.) and advisory services were a common framework to all the analyzed banks. To be noted that gaps related to climate scenarios models are perceived since the test of banks' portfolio against climate scenarios is still not widely adopted, representing an added exponential risk.

Concerning the third research objective, which sets the intention to propose a sustainable business model for CIB, the researcher merged the literature review output with the data collected from the interviews, so to create, to the best extent possible, a comprehensive and reliable set sustainable activities and solutions that can be adopted by corporate and investment banks to capture the emerging business opportunities and protect themselves against environmental risks. Overall, the gross majority of the interviewees either provided new elements or more detail on elements already unveiled in the literature review.

In a first moment, concerning the Environmental Innovation Type, more exactly the 'maximize material and energy efficiency' Archetype, this study proposes the usage of energy efficiency as a KPI in legally binding documentation; a proactive stand of banks in linking CSR partners to material intensive clients; and in linking clients to state aid programs for energy

efficiency. Concerning the 'closing recourse loops' Archetype the proposed SBM sheds light on the inclusion of responsible recycling clauses that legally bind the clients; the reutilization programs for technology within banks; and the inclusion of bank's low-carbon experts in the clients' construction projects. Lastly, on the 'substitution with renewables and natural processes' Archetype the main proposals lay upon the following elements: scale-down of exposure to intensive GHG-emissions sectors; budget increase to renewable energy projects financing; and aggravated risk score to carbon-intensive clients.

Onto the Social Innovation Type, the proposed SBM for CIB suggests the inclusion, in the 'deliver of functionality rather than ownership' Archetype, of partnerships with service-focused partners and a focus on innovative financial solutions for clients with service-based initiatives. Concerning the 'adopt a stewardship role' Archetype, the main proposal is the addition of green financing advisory services and assistance in outlining the client's transition plan; a selective approach relating to the clients that get to trade with the institution; investment in expertise development; and diversification of financing vehicles for emerging technology. Onto the 'encourage sufficiency' Archetype, the researcher suggests the leveraging of industry-specific know-how; the widening of KPIs' scope so to comprise targets for the clients' suppliers; and the tailoring of financial products for clients intending to invest in quality and decreasing quantity.

Lastly, in the Economical Innovation Type, this study's main suggestions are the addition, in the 'repurpose for society and environment' Archetype, of sustainability-focused strategic plan at the Bank's Group-level; hire of third-parties specialized opinions; governance changes; and the commitment to transition-focused initiatives. Relating to the 'inclusive value creation' it is proposed for banks' to partnership with external data providers to obtain reliable ESG data; to link equity providers to client's renewable energy projects; and to participate in sustainable banking frameworks. Onto the 'develop of sustainable scale-up solutions', the main proposals are to test of banks' portfolio against climate scenarios; industry-based standardization of KPIs; the broad adoption of intergovernmental guidelines; and the adoption of ESG data bases and credit committees and sustainability-linked financial products. To fulfill this last research objective, the new sustainable activities and innovations of CIB were transposed into the Archetypes of Business Models for Sustainability framework proposed by Lüdeke-Freund *et al*. (2016).

The most relevant findings that answer the research question, in a first moment, lay upon the alignment of corporate and investment banks with the intergovernmental and membership-based initiatives (i.e., European Green Bond Standards, NZBA, etc.) which assist steering their *modus operandi* towards common net-zero or low-carbon goals, since the broadly adopted phase down of fossil fuels financing is insufficient. Subsequently, it is this study's proposal that banks integrate in their day-to-day business activity the sustainable innovations disclosed in the research

(i.e., ESG committees; sustainability-linked financial products; tailored financial vehicles etc.), and to proceed with the mentioned Governance structural changes so to ensure that the emerging solutions, expected to continuously arise in the near future, are similarly and duly adopted, being required, to this end, a less traditional approach than the one currently being taken. Furthermore, besides tangible sustainable innovations, there are a set of practices that need to be simultaneously adopted, such as quality checks to avoid greenwashing and investment in relevant trainings and reliable databases, which, again, are quite dependent on effective Governance changes.

The research takes advantage of this opportunity to draw a few additional considerations. Firstly, it is worth mentioning that the initiatives undertaken by all banks unveiled a risk-avoidance approach, which is quite usual when dealing with emerging markets and technology, but not desirable when working with a such a small window of opportunity, since this requires aggressive investments towards effective solutions. On a second note, the research disclosed that the future of banking institutions, specifically corporate and investment banks, lays upon a continuous emergence of sustainability-linked innovative solutions and a steeper balance between climate risk-avoidance and leverage of new market opportunities, as environmental scenarios are set to aggravate and to impact the various strands of the financing portfolio. Moreover, to be noted that the testing of banks' portfolio against climate scenarios is still not widely adopted, not being taken into consideration the environmental changes in the final clients' risk score. These three elements reveal a certain delicateness in the banks' portfolio resilience. Nonetheless, overall, the sense of urgency perceived by the banks included in this study and the measures undertaken are considered adequate and aligned with the relevant international stakeholder's expectations, being needed, although, to dive into more relevant market opportunities and emerging green tech.

The researcher acknowledges limitations to the methodology undertaken. First, the interviews were performed to a total of 10 individuals, which is deemed to be the fair balance by the undertaken sampling approach but can equally represent a limitation when generalizing the SBM to other banks. Second, the interviewees all worked in the same bank due to the researcher's strict employee confidentiality contractual terms. Third, the selected SBM framework, while being the most widely accepted, still incorporates archetypes that are not fully suitable to specific sectors, including the banking sector. Lastly, the banking sector is target of intense confidentiality clauses, which translated into a retracted stand by a minority of interviewees.

Henceforth, the researcher endorses fellow colleagues to widen the sample size and the number of banks involved, but in a mindful way so to uphold expertise quality. The development of the Archetype framework should be equally prioritized in future researches. Moreover, the inherent limitations linked to this industry should be taken into account by leveraging complementary information sources so to endorse the research objectives and results' quality.

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VII – APPENDICES

7.1. Appendix A - The "Global 100" Climate Commitment Parameters

Table A.1. – "Global 100" climate commitment parameters (Corporate Knights, 2022)

Climate Commitment	
Business Ambition for 1.5ºC	1.5ºC
Science Based Targets Initiative	SBTi
Fashion Charter for Climate Action	FCCA
Net-Zero Asset Managers Initiative	NZAM
Net-Zero Asset Owners Alliance	NZAO
Net-Zero Banking Alliance	NZBA

7.2. Appendix B – The overall Score Percentile Rank Scores

Table B.1. – Overall score percentile rank scores (Corporate Knights, 2022)

Overall Score	Percentile Rank Scores
A+	Awarded to the top company
A	Above 75%
A-	70-75%
B+	65-70%
B	60-65%
B-	55-60%
C+	50-55%
C	45-50%
C-	40-45%
D+	35-40%
D	30-35%
D-	25-30%

7.3. Appendix C – Interview Script

Introductory Questions:

- What are the major changes that you perceive to have taken place in CIB in line with the generalized commitment to the zero-carbon emissions goal and the overall current sustainability-focused framework?

- What do you believe will/ still needs to change in the future?

Archetypes-related questions:

Maximize Material and Energy Efficiency

- Which internal and client-focused initiatives have you and your team undertaken so to incorporate/ pursue energy efficiency maximization in the daily business activity?

Closing Resource Loops

- Which internal and client-focused initiatives have you and your team undertaken so to incorporate/ pursue the closure of resource loops in the daily business activity?

Substitution with Renewables and Natural Processes

- How has the clients' risk assessment been adapted during the transition to net zero-carbon emissions?
- What are the key practices that you and your team have followed in order to efficiently transition to renewable energy and natural processes?

Deliver Functionality rather than Ownership

- What initiatives are being undertaken by you and your team to ramp-up the transition from an ownership-based approach towards a service and functionality-based one?

Adopt a Stewardship Role

- The adoption of a stewardship role by banks, through which they act upon their major responsibility as managers of this transition process, is increasingly being demanded by the stakeholders. How is this being reflected in terms of practical initiatives and measures?

Encourage Sufficiency

- Which measures/ actions has your team undertaken so to encourage overall sufficiency, both relating to the bank's internal operations and to the client's ones?

Repurpose for Society/ Environment

- How has the governance framework been adapted so to better incorporate sustainable solutions in the daily business activity?
- What changes have been implemented since the mentioned adaption of the governance framework to sustainability considerations?

Inclusive Value Creation

- In what way do you and your team promote the connection between the diverse range of stakeholders in order to promote/ ramp-up sustainability-linked initiatives?

Develop Sustainable Scale-up Solution

- What are the key sustainable solutions have been scaled-up or have the potential to be scaled-up in the future?
- What are the sustainability-related financial products that you and your team work with on the day-to-day business activity?

7.4. Appendix D – Characterization of the Sample

Table D.1. – Characterization of the sample (Source: Elaborated by the author)

Interviewees	Country	Department	Team and Position
1	Portugal	Sustainability Center	Sustainable Finance Solutions - Sustainable Finance Markets Analysts
2	France	Sustainability Center	Sustainability Lab – Project Manager
3	Portugal	Sustainability Center	ESG Data & Digital – Data and Digital Project Manager
4	France	Sustainability Center	Sustainability Lab – Project Manager
5	France	DCM Solutions	Sustainable Capital Markets - Sustainability Analyst
6	UK	Global Banking UK Management	Low Carbon Transition Group London - Corporate Finance Managing Director
7	France	Sustainability Center	Sustainable Finance Solutions – Project Manager
8	Spain	Sustainability Center	Sustainable Finance Solutions – Graduate Analyst
9	France	Low Carbon Transition Group EMEA	LCTG Innovation & Development – Business Manager
10	France	Sustainability Center	Sustainable Finance Solutions – Graduate Analyst