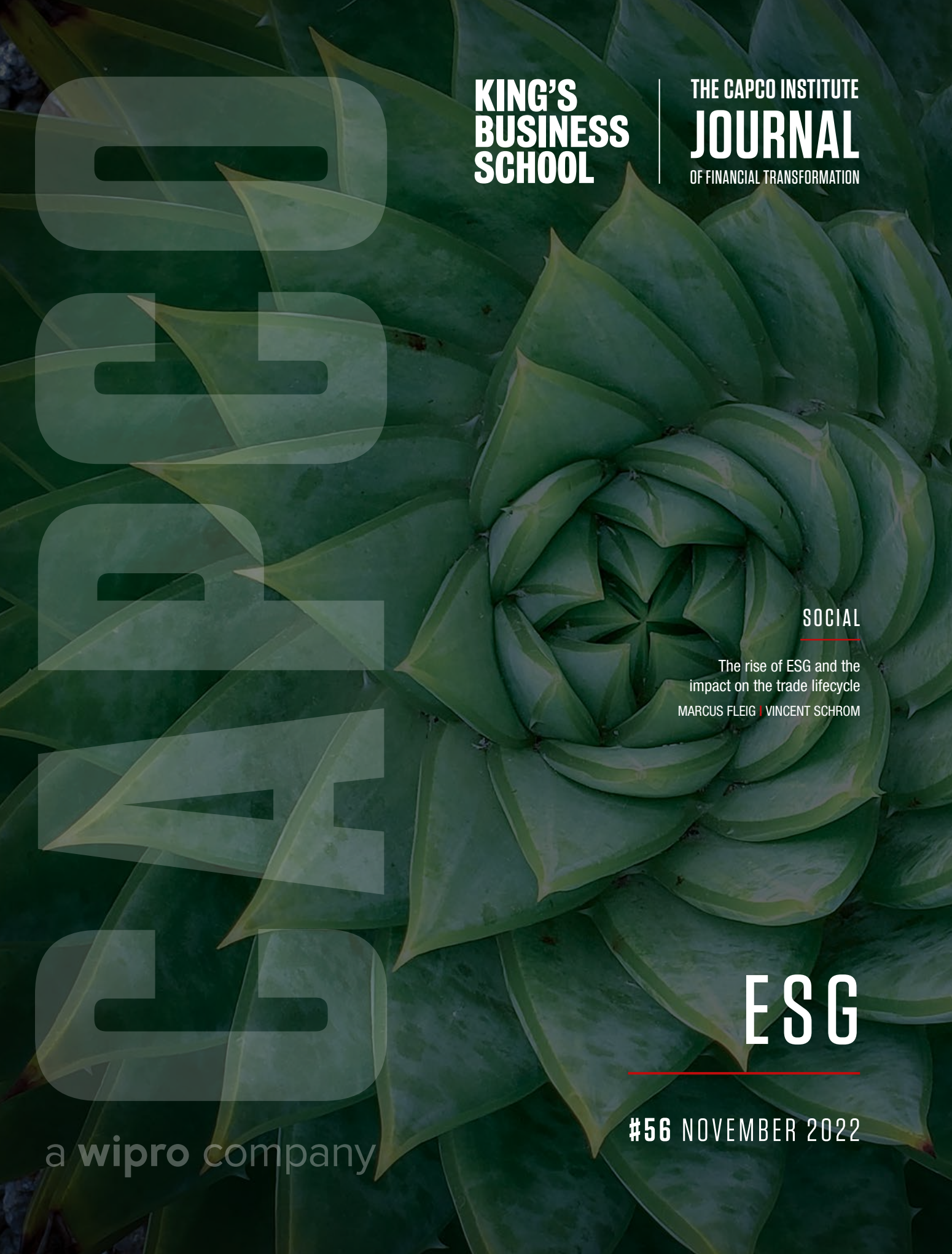

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The rise of ESG and the impact on the trade lifecycle

MARCUS FLEIG | VINCENT SCHROM

ESG

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DEAR READER,

Welcome to edition 56 of the Capco Institute Journal of Financial Transformation, produced in partnership with King's Business School and dedicated to the theme of ESG – environmental, social and governance.

We all recognize that transformation towards a green economic system via sustainable finance is needed, welcome and inevitable. Our clients have a crucial role to play here. Acknowledging the scope and complexity of the evolving ESG landscape, we are perfectly positioned to prepare them for the ESG era.

With climate change accelerating and generating physical events on an unprecedented scale, governments and societies are considering measures to mitigate carbon emissions via net zero initiatives. The focus is firmly on greater sustainability and more equitable policies in response to shifting public attitudes. ESG considerations are reshaping investment risks on the one hand, and opening the way for green financing and sustainable technologies and innovations on the other.

This edition of the Journal examines all three pillars – environmental, social, and governance, highlighting efforts by regulators and practitioners to create a unified approach.

Moving forward, compliance with emerging ESG standards will be a critical differentiator for long-term business success. Data will also play a critical role in delivering the transparency and insights required to validate the ESG credentials of businesses, and investment strategies. Advances in areas such as machine learning, artificial intelligence and cloud technologies will be key to establishing a future model of sustainable finance.

This edition draws upon the knowledge and experience of world-class experts from both industry and academia, covering a host of ESG topics and innovations including the value of tracking Return on Sustainability Investment (ROSI) and the importance of moving away from purely external risks to addressing issues that can have positive commercial and societal impacts.

I hope that that the research and analysis within this edition will prove valuable for you as you shape your own ESG strategies, policies, and innovation.

Thank you to all our contributors and thank you for reading.

Lance Levy, **Capco CEO**

THE RISE OF ESG AND THE IMPACT ON THE TRADE LIFECYCLE

MARCUS FLEIG | Senior Consultant, Capco
VINCENT SCHROM | Associate, Capco

ABSTRACT

Using a reverse engineering approach, we seek to map the impact of the rise of ESG products along the trade lifecycle and the functional architecture of financial institutions. We find that ESG does not change the trade lifecycle per se, but shifts the focus to the pre-trade phase due to regulatory and risk considerations, disclosure and verification of KPIs, as well as data management requirements. As a result, ESG provides an impetus to improve front office performance, integrate sustainability risk into risk management, and credibly redirect capital flows to sustainable investments. ESG is thus a lever for synchronizing front to back office systems, particularly with respect to ESG-related client data gathering, rating tools, and downstream systems. Our analysis of the functional architecture shows a marginal impact on the throughput-relevant functions, however, the enrichment of different data models has to be ensured from the beginning in order to effectively serve the output-relevant functions, especially with regard to ESG-relevant functions like reporting.

1. INTRODUCTION

Sustainability is top of the agenda in the corporate world. Issuers are increasingly facing demands from investors, stakeholders, and regulators to proactively consider environmental, social, and governance (ESG) issues in their business operations. The increased focus on ESG has implications for how issuers, underwriters, and lenders participate in the capital raising process. Following the Paris Agreement, significant progress has been made across the spectrum of capital raising instruments, by significantly upscaling the financial resources available for reallocating capital towards sustainable investments.

In this paper, we focus on the ongoing implementation of ESG as a core principle in various capital raising instruments and the central role it plays in accelerating the transition to net zero. Rather than conclude with measurable impacts, we aim to provide a point of view on the current situation and highlight some major implications that ESG will have on each step of the trade lifecycle. Using a reverse engineering approach, we seek to map the impact of the emergence of sustainable and sustainability-linked products along the trade lifecycle and the functional architecture of financial institutions. Overall, we find that ESG does not change the trade lifecycle per se, but shifts the focus to the pre-trade phase due to regulatory and risk considerations, disclosure and verification of KPIs, as well as data management requirements. As a result, ESG provides an impetus to improve front office performance, integrate sustainability risk into risk management, and credibly redirect capital flows to sustainable investments. ESG is thus a lever for synchronizing front-to-back office systems, particularly with respect to ESG-related client data gathering, rating tools, and downstream systems. In addition, ESG data gathering, management, and system implementation require clear workflow definition, IT interfaces, and staff training. Moreover, the centralization of ESG-related data is key to further supporting and improving the entire trade lifecycle process. Finally, our analysis of the functional architecture shows a marginal impact in the throughput-relevant functions, however, the enrichment of different data models has to be ensured from the beginning in order to effectively serve the output-relevant functions, especially with regard to ESG-relevant functions like reporting.

2. MARKET OVERVIEW

Global equity and debt capital markets constitute by far the most important sources of funds for the transition to a low-carbon society, bringing about substantial reallocation of financial resources within the economy. In 2021 alone, the global volume of issued debt securities that were categorized as being sustainable amounted to more than U.S.$1.6 trillion, resulting in a total volume of U.S.$4 trillion by the of the year.[1] In contrast, the volume of sustainable-labeled equities raised in 2021 is significantly lower, at U.S.$48 billion, though its importance to the ESG transition is immense and is expected to increase over the next decades.[2]

2.1 Sustainable debt market

The sustainable debt market comprises two main types of financial assets: bonds and loans. While the sustainable bond market reached about U.S.$1 trillion in 2021, total bond issuance was around U.S.$9 trillion,[3] meaning that it accounted for about 10 percent of the total global bond issuance. The largest region for issuance of sustainable bonds was Europe, at 54 percent, followed by the Americas, at 22 percent, and Asia-Pacific, at 18 percent.

When discussing the sustainable bond market, it is important to distinguish between the different types of bonds currently being offered on the market. Leading the way in sustainable bonds are the so-called green bonds, whose proceeds must by definition be used to finance environmental projects. The green bond market has seen strong growth, reaching a 2021 record high of U.S.$489 billion, almost double that of 2020. Social bonds, whose proceeds must be used to finance social projects, came second with a market value of U.S.$193 billion. Finally, while the volume of sustainability bonds[4] is similar to that of social bonds, their proceeds must be used to finance a combination of environmental and social projects.[5]

Sustainability-linked bonds are characterized by the fact that they are linked to a sustainability target. If progress is made toward the goal, the bond's interest rate drops, and vice versa if no progress is made (in the latter case, the coupons would increase).[6] To measure such progress, key performance indicators (KPIs) are needed, which are usually agreed between the counterparties and tailored to the issuer's overarching sustainability strategy (for example, reduction of emissions to a certain level, achieving a certain rank in specified sustainability rating, etc.).[7] This is applicable to any sustainability-linked product, not only bonds. Sustainability-linked bonds reached a record U.S.$92 billion in volume in 2021, growing nearly 1,000 percent compared to 2020. According to S&P Global Ratings, sustainability-linked bonds still have plenty of room for growth and will continue to be the sustainable bond product with the highest growth rate.

Similar to the sustainable bond market, the sustainable loan market can also be divided into two main categories, namely green loans, whose proceeds must be used for environmental projects, and sustainability-linked loans, whose interest rate is linked to a specific sustainability target and is adjusted depending on the borrower's achievement of that target.[8] The development and diversity of sustainable debt instruments and the subcategories of bonds and loans are shown in Figure 1.

2.2 Sustainable equity market

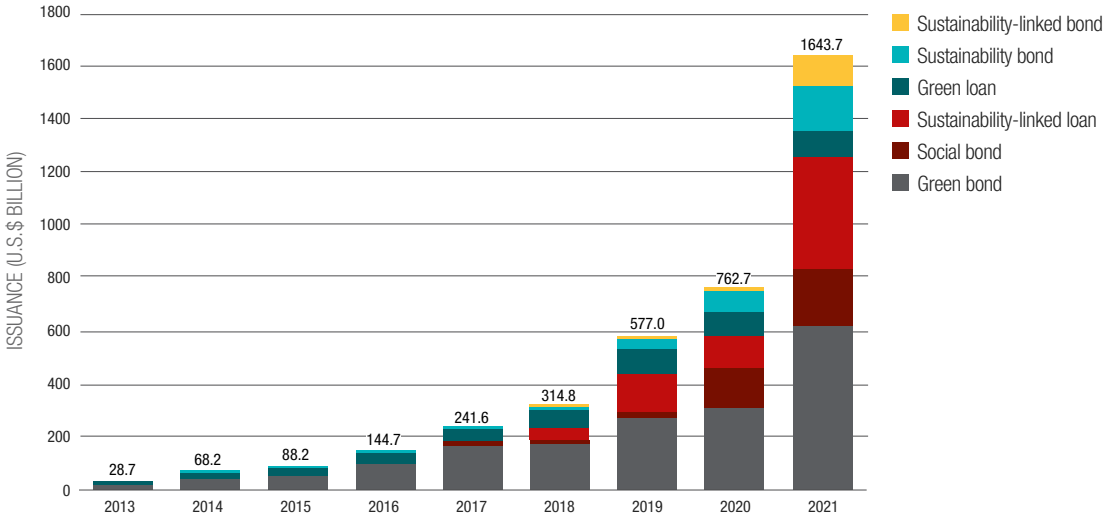
Although the sustainable public equity market is significantly smaller than the overall stock market, with a share of only about 5 percent, it has grown much faster than the overall stock market, with a difference of 26 percentage points. This indicates a growing importance of the sustainable stock market and suggests that its size as a subclass of the overall stock market will continue to increase in the coming decades.

The sustainable equity market reached a record U.S.$48 billion in 2021, growing by 43 percent compared to 2020. The dominant market was the Americas, with U.S.$26.6 billion in equity raised, followed by Asia-Pacific and Europe, with U.S.$12.3 billion and U.S.$7.9 billion, respectively. In comparison, the global equity market in 2021 was U.S.$1.05 trillion, up 17 percent from 2020.[9]

Despite the volume of sustainable equity issued by global ESG companies in 2021 being significantly lower than sustainable debt, the importance of equity is essential for a successful ESG transition, as raising shareholder equity can be an effective tool for companies to make necessary early-stage investments in new and unproven technologies. It also signals an ongoing and

1 https://bit.ly/3DesXSN
2 https://refini.tv/3gon3Wj
3 Ibid, https://bit.ly/3yVlqpa
4 https://bit.ly/3EZxdqu
5 https://refini.tv/3MMwGKi
6 https://bit.ly/3MLQHk8
7 https://bit.ly/3gr7ux3
8 https://bit.ly/3TI1h47
9 https://bit.ly/3VBVrNk

Figure 1: Annual sustainable debt issuance, 2013-2021



Source: BloombergNEF, Bloomberg L.P.

permanent commitment to sustainable investment, implying that a company's business strategy is linked to sustainable impact. Overall, ESG is playing an important role in the equity, bond, and credit markets.

2.3 Sustainable derivatives

Sustainable derivatives are still considered as niche products,[10] but a progressive development of the market volume can be observed.[11] Among sustainable derivatives, there are two main kinds of products: derivatives tied to ESG benchmarks, especially equity indices, and sustainability-linked derivatives (SLD).

The functioning of the first type is no different from derivatives on conventional indices or benchmarks, only the underlying is different. On the other hand, SLDs create an ESG-linked cashflow as part of a traditional derivative. Here, KPIs are used to monitor progress or compliance with ESG targets similar to sustainability-linked debt assets. However, both the KPIs and their linkage to pricing or cash flows vary significantly, as they are typically agreed between counterparties and traded over the counter. This practice creates a standardization and information problem[12] for SLDs, which is currently being addressed by the International Swaps and Derivatives Association (ISDA).[13]

These problems also make it difficult to get a market overview of the open interest in SLDs. Returning to ESG benchmark derivatives: EUREX, as the world's largest provider of such derivatives, indicates a record value of almost U.S.$5 billion in 2021[14] – almost three times the value in 2020. However, compared to the previously mentioned figures, the volume is rather small.

3. REGULATORY PRESSURES

In addition to investor demand for sustainable financial products, mirrored by mounting volumes of sustainable-labeled debt, equity, and derivative instruments, regulators are also putting pressure on financial market participants and companies to incorporate ESG considerations into their business.

[10] https://bit.ly/3THL6OI
[11] https://bit.ly/3gdfZLR
[12] https://bit.ly/3zkH7Q3
[13] https://bit.ly/3VGUDXz
[14] https://bit.ly/3CSbkGQ

The European Union has introduced its Sustainable Finance Disclosure Regulation (SFDR), which aims to improve transparency in the market for sustainable investment products, prevent greenwashing, and increase transparency around sustainability claims made by financial market participants.[15]

The U.S. Securities and Exchange Commission (SEC) is also considering introducing ESG-related regulations. In May 2022, the Commission proposed requiring additional information about ESG investment practices.[16] The SEC has also established a Climate and ESG Task Force within its Division of Enforcement.[17] It is expected that the SEC will follow the path of the European Union, making it likely to adopt reporting standards that make it easier for investors to compare companies' sustainability efforts, creating a level playing field.

In Asia-Pacific, the regulatory landscape for ESG is not yet as advanced as in Europe, but in recent years ESG information disclosure has increased in many countries.[18] For instance, in July 2022, the Monetary Authority of Singapore released its disclosure and reporting guidelines for retail ESG funds, with the goal of enhancing the comparability of retail ESG fund's disclosures to support investor decision making and to prevent greenwashing.[19]

The recently published ECB climate stress test results for banks, the U.S. methane reduction plan, and the final report on an E.U. social taxonomy are further regulatory actions that indicate ESG, and climate-related issues, are here to stay and will affect all economic agents and financial market participants.[20]

With the growing number of reporting requirements, such as the Sustainable Finance Disclosure Regulation (SFDR), or the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), cruciality grows for every company to integrate ESG into its business model and proactively address the issue.[21] For many companies, however, this presents a significant challenge. Besides additional data requirements on ESG-related activities, which is particularly difficult for the example of Scope 3 (supply chain) emissions of companies with a large and diversified value chain, companies also need to integrate climate risks into their risk management processes and ensure they meet changing reporting requirements, to name just a few of the challenges ahead.

4. Trade lifecycle

After a brief market overview of sustainable and sustainability-linked products and their product-specific characteristics, as well as the regulatory burden they impose on firms, the question arises as to how these products might impact the classic trading lifecycle of conventional financial products. To this end, we first outline a simplified trading lifecycle with typical front, middle and back office functions before going into detail about the potential impact associated with the emergence of sustainable and sustainability-linked products.

In simple terms, the front office handles all the processes that must take place before a transaction can be executed. These include, among others, customer onboarding, KYC, product structuring, pricing, documentation, and labeling. In the middle office, product orders are then captured, routed, confirmed, and executed. Finally, in the back office, deals are settled, and processed through other supporting back office functions. Some functions, however, cannot clearly be allocated to one of those. For instance, risk management activities, including the managing of sustainability risks, which can be located in the middle office while having some touchpoints in the front office as well. Due to the regulatory focus on reporting of sustainability risk, however, the back office currently also plays a major role as it merges and edits the output from preceding adaptions to ESG. This focus is also reflected in following sections.

4.1 Front office

The central question is whether and which adjustments are necessary at all in the front office to trade sustainable or sustainability-linked products. To find an answer to this, we start from the regulatory requirements in a reverse engineering approach. The regulatory concerns mentioned are primarily common standards that need to be communicated to customers, as well as disclosed and reported to regulators and customers. Since disclosure and reporting requirements affect the end of a trade lifecycle, all preceding activities

[15] https://bit.ly/3yW4j6K
[16] https://bit.ly/3Cloar2
[17] https://bit.ly/3eNlMX6
[18] https://bloom.bg/3SeU0Bz
[19] https://bit.ly/3SiF6ua
[20] https://bit.ly/3Sh4Mr1; https://bit.ly/3TA0pZa
[21] https://bit.ly/3Silsyk

must be aligned to meet these requirements. Consequently, sustainable products are a prime example of the need for synchronization between front to back office systems.

The first touchpoint in the front office is the origination and labeling of sustainable or sustainability-linked products. Furthermore, an indirect implication for their pricing is given by greater willingness to pay higher prices for such products.[22] Since the SFDR requires all financial market participants and financial advisors to disclose information on whether and how ESG criteria are applied to products prior to sale, this information must either be available or collected from the outset. Only if this is the case is it possible to adequately disclose and report at the end of the trade lifecycle whether the product does not materially affect any of the sustainability objectives of the E.U. taxonomy, and/or what are the principal adverse impact indicators (PAIs) associated with the origination of a product.

This means that product-related ESG data and KPIs must already be available to, or collected by, customer-facing employees. For bank-wide reporting, conventional products must also be provided with ESG data in the future. Another example of data to be fed into the data management system is the customer's green investment preferences under MiFID, which need to be assessed at the time of onboarding a new customer. MiFID preferences then need to be categorized to enable (automized) matching with products that fit the respective preference category. Besides such preferences, KYC should assess ESG-related risks of the counterparty itself too. The importance of a centralized internal data management and processing architecture enriched with the ESG data required by regulation is obvious. It supports all downstream processes throughout the trade lifecycle.

This also refers to the documentation of sustainable product transactions. For example, if trading is important to the business model, it must be possible to trace which parts of the transactions in the trading book consist of sustainable products. The requirement stems from the Capital Requirements Regulation (CRR, amendment to the E.U. taxonomy). In the future, credit institutions will have to track and disclose their green asset ratio (GAR). This is defined as the ratio of assets financed or invested in taxonomy-aligned activities to total assets. The bottom line is that the classification of a product as sustainable determines what information and data must ultimately be disclosed and how the "pass-through" functions in the middle to back office processes must enrich the documentation. In the longer run, similar consequences might unfold for brown, unsustainable assets, if regulation expands its scope of increasing transparency to this countertype of products.

4.2 Middle office

In the middle office especially, data-related issues need to be addressed in the context of sustainable products. Having in mind the functioning, definitions, and requirements of products as outlined above, internal models for KPI, index, or rating monitoring need to be developed and kept up to date. This is elementary, especially in the context of sustainability-linked products, as progress towards an agreed sustainability target must be closely monitored throughout the entire trade lifecycle. The internal effort needed for this is immense since relying on external data and evaluations creates exposure to well-known ESG data issues[23] and hence to risk of greenwashing accusations. The resulting value of investing in data management functions for, for example, report creation to feed front office and risk teams is considerable as well.

While scoring, KPI calculation, data modeling, or report creation is a greater topic concerning sustainability-linked products, in general limit and position management in the middle office are supposed to check potential limits (e.g., defined by the respective fund policies) of sustainable products. However, both the ESG data- and limit/position-related tasks are required along the whole product lifecycle.

4.3 Back office

We now turn to the back office functions involved in ESG, starting with the clearing and settlement functions. Here, too, ESG-related changes can be observed; for example, due to the ECB's new rules on collateral eligibility for green/sustainable products, which have been in force since 2021.

A well-known ESG consideration is the integration of sustainability risks into risk management functions. In general, the European Banking Authority (EBA), mandated to elaborate on ESG risk inclusion into the three pillars of the banking prudential framework, does not yet provide specific guidance

[22] Riedl, A., and P. Smeets, 2017, "Why do investors hold socially responsible mutual funds?" Journal of Finance 72:6, 2505-2550

[23] Avramov, D., S. Cheng, A. Lioui, and A. Tarelli, 2022, "Sustainable investing with ESG rating uncertainty," Journal of Financial Economics 145:2, 642-664; Dumrose, M., S. Rink, and J. Eckert, 2022, "Disaggregating confusion? The EU Taxonomy and its relation to ESG rating," Finance Research Letters 48, 102928

on the adaption of traditional risk management processes at credit institutions or investment firms.[24] However, it is required to "report" on how ESG-related risks are integrated (e.g., MiFID II, SFDR, or SEC disclosures).[25] This current reporting focus of risk considerations is why those are largely located in the back office in this section. Of course, and as discussed above, the input for this is also gathered along front and middle offices. Regarding the associated methodological integration approach, there has long been discussion in the U.S. about treating ESG risks separately from credit risks, market risks, and operational risks.[26] However, the EBA believes that ESG risks materialize through traditional financial risks (i.e., credit, market, operational, reputational, liquidity, and funding risks). According to EBA, material ESG risks should be embedded in the internal capital adequacy assessment process (ICAAP) and internal liquidity adequacy assessment process (ILAAP) frameworks as part of the risk appetite and as drivers of financial risks.[27] In addition, the development of ESG risk monitoring metrics at the receivable, counterparty, and portfolio levels is recommended. In order to verify the resilience and adequacy of the ESG-integrated risk framework, the EBA considers back testing and stress testing to be crucial.

In this context, reference can be made to the results of the 2022 ECB climate stress test, which highlights significant shortcomings when it comes to preparedness for climate-related shocks. Considering that climate risk and the E-dimension in ESG have probably enjoyed the most attention among ESG risks, the structural unpreparedness of capital markets in this regard is alarming, with 60 percent of institutions having no internal stress testing framework in place at all.[28] Such prudential, but also internal ESG-related stress tests are furthermore recommended by the Basel framework.[29]

The bottom line of all recommended ESG risk practices and related regulatory frameworks is the same: financial risk is lower when exposure to sustainable investments is higher.[30] In Europe, KPIs to monitor this exposure are already defined in the Capital Requirements Regulation (CRR) based on the E.U. Taxonomy and the Task Force on Climate-Related Financial Disclosures (TCFD), and will soon be required to be reported. For credit institutions, the "green asset ratio" (GAR) is complemented at different levels of granularity by other taxonomy alignment ratios, such as at the level of the banking book, fees and commissions, financial guarantees supporting debt instruments, and counterparties.[31]

These KPIs from the CRR move into disclosure and reporting as the last activities in the trading lifecycle that are affected by sustainability. The KPIs from the CRR mentioned in the previous paragraph provide input to risk management – but also, as mentioned above, to the required disclosure content. The SFDR contributes to this – for example, financial market participants must disclose at the product/asset level whether it is (not) sustainable. More than 30 sustainability indicators and PAIs have been defined to support the required information. They are intended to show how the sustainable products as presented earlier in this paper contribute to the sustainability goals of the taxonomy and why they do not harm any of these goals. As noted earlier, the capital markets-related rules are intended to be complementary, as their various disclosure requirements have different audiences and levels of granularity. Adequately addressing these differences and aligning them with European sustainability reporting standards significantly complicates reporting.

The need for additional disclosures and the data required to support them continues to evolve with regulatory developments. Consequently, the regulatory department should support the post-trade functions by continuously monitoring the regulatory landscape. In this way, it can make a valuable contribution to the sustainable development of the ESG data management architecture. Compared to Europe, regulation in the U.S. and Asia-Pacific is not as advanced. However, the ASEAN Committee on Capital Market Development is working on a taxonomy for sustainable finance with similar objectives as in Europe; the U.S. Financial Stability Oversight Council has published 2021 recommendations on climate risk management and disclosure similar to the EBA Pillars 3 ITS.[32]

[24] https://bit.ly/3ShpqHG
[25] https://bit.ly/3geaFb4
[26] https://bit.ly/3Tc31wB
[27] https://bit.ly/3ThULep
[28] https://bit.ly/3s8qa7n
[29] https://bit.ly/3EZxHgj
[30] https://bit.ly/3eKIKiS; https://bit.ly/3EYEjf1
[31] https://bit.ly/3CQ4GAZ
[32] https://bit.ly/3SnYzto

Figure 2: Typical trade lifecycle process

A. PRE-TRADE SALES/INITIATION: (FRONT OFFICE)	B. TRADE CAPTURE/ EXECUTION: (FRONT OFFICE)	C. CONFIRMATIONS & RECONCILIATIONS (MIDDLE OFFICE)	D. CLEARING & SETTLEMENT: (BACK OFFICE)	E. OPERATIONS & ACCOUNTING: (SUPPORT)
Client onboarding which includes: • KYC (know your customer) process • Client information capture • Client ruleset.	An investor/client willing to buy/sell securities typically places an order through an intermediary, known as a broker or agent (the market makers) where: • Automatic matching of the orders takes place based on price and quantities • New issue/when issued securities market is originated.	• Successful execution will generate a confirmation by the institutions/brokers. • Further, institutions/ brokers will send these details with fees and charges to their custodians who will validate whether: – The trade has happened on desired securities – The trade is correctly processed – Prices and charges are as per the agreement.	Normally, a trade gets cleared and settled in the client's account in T+2 days. It is typically the responsibility of the clearing corporation to either clear: • Funds (buy transactions) or • Securities (sale transactions) This process informs all members of their obligations and nets all obligations from cash transactions and sales of securities.	Includes firm maintenance of end-of-day margins/ collaterals, reporting and cash management of daily transactions.

Source: Capco

Finally, we return to the simplified representation of the trade lifecycle. As described, the disclosure-focused regulation requires output at the end of the lifecycle. However, this output must be made compliant through some reverse engineering – starting with pre-trade ESG adjustments such as customer onboarding or product development. Subsequently, transactions must be accompanied by ongoing documentation of the new criteria, for example, to identify which are sustainable and which counterparties are engaged. As these documentation requirements arise from regulatory requirements, aligned and centralized data management and processing along the various "offices" is key. The next section shows how the outlined activities associated with the lifecycle of sustainable products translate to functional units in the financial institution and process-related changes.

5. FUNCTIONAL ARCHITECTURE

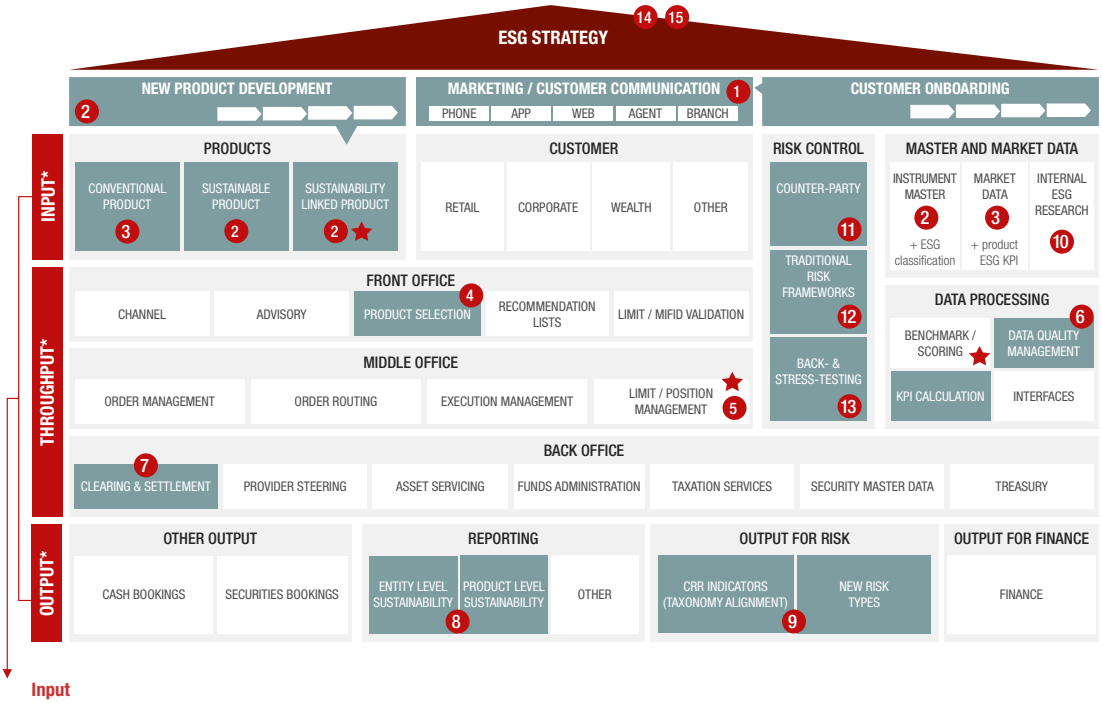
In this section, another perspective is embodied to further break down the ESG-induced implications onto the organizational functions bearing the trade lifecycle covered before. Figure 3 shows an exemplary representation of the functional architecture of a trade lifecycle. Of course, the "technical" architecture, one level deeper, may vary from institution to institution. Compared to the trade lifecycle illustration in Figure 2, Figure 3 provides a more nuanced view of where ESG measures are needed. The impact of the throughput functions, apart from data processing, is rather marginal compared to the other functions. The enrichment of various data models must be ensured from the very beginning in order to effectively serve the throughput- and output-relevant functions.

5.1 Input stage

We are starting with customer onboarding. It is expected that banks will soon be formally required to produce ESG scores for customers, suppliers, and partners. In itself, this is expected to change existing KYC processes. Typically, questionnaires are used to assess the risks associated with counterparties or issuers. For entity-level ESG scoring and potential risk resulting from this, another questionnaire needs to be added. The main finding of information should be the alignment of the counterparty taxonomy.[33] As mentioned above, MiFID II requires green investment preferences to also be assessed in these questionnaires. Thus, if retail customers are served who have communicated their ESG/green investment preferences in some form, these ESG considerations must be included in the new product process. Specifically, this

[33] https://bit.ly/3sfDImZ

Figure 3: The ESG-impacted functional trade lifecycle architecture



Input
The "input" stage of the functional architecture refers to activities and adjoined functions that are no immediate part of the trade in the strict sense. Rather, they are responsible for providing essential input, thereby enabling the trade kick-off in the front office and its client-facing functions.

Throughput
The "throughput" stage, in turn, refers to activities and adjoined functions that indeed are direct part of the trade lifecycle. From front to back office, involved functions contribute to finalizing what is commonly understood as "the trade"

Output
The "output" stage refers to functions that process trade-related information from input and throughput functions and generate required output for their superordinated departments (e.g., finance, risk management, reporting).

DEPARTMENTS | FUNCTIONS | ESG-AFFECTED FUNCTIONS

1. Assessment of customer green investing preferences
2. Sustainability/ESG information, categorization and setup (especially SFDR-required)
3. Conventional product data enrichment (to comply with entity level non-financial reporting (NFR) requirements)
4. Product selection based on customer preferences
5. Limit checks for sustainability products and green funds
6. Proactive data quality management (to address ESG data issues and process accurate information)
7. New collateral eligibility rules for sustainable/ sustainability-linked products
8. New regulatory reporting on product and entity level (e.g., SFDR, NFRD)
9. New risk-related quantitative and qualitative disclosure requirements (Taxonomy, its CRR amendment, Pillar 3 EBA guidance)
10. Inhouse research to assess ESG criteria and complement external vendor data
11. ESG-scoring and risks assessment of customer/counterparty
12. Integration of material ESG risks as drivers of traditional risks (e.g., into ICAAP, ILAAP)
13. Back- and stress-testing against ESG-related shocks to assess preparedness
14. Employee ESG knowledge building
15. Inclusion of ESG into organization overarching strategic endeavors
- ★ Additional sustainability-linked product-specific impacts

Source: Capco research
Disclaimer: Due to the constantly evolving ESG-related regulation, this depiction of impacts should be perceived as non-exhaustive

means that banks must first create inventories and categorize MiFID II products and determine how sustainability goals will be achieved to enable matching with preferences. For non-MiFID products, it is essential to explain and document why they qualify as such. This general product- and customer-related information will serve as the basis for data management functions.

These data management functions must determine whether additional data needs arise from this new information. The E.U. Benchmark Regulation and the SFDR RTS communicate specific data requirements and indicators, particularly at the product level. If additional data is required, the question is how to source and process them. One way is to obtain the corresponding data from third-party vendors. However, in order to find the "right" data, measures and indicators from selected external providers should first be evaluated in terms of content and underlying methodology. The concern about different data providers is that the data provided may differ greatly in terms of content and methodology, even for the same indicator.[34]

Obtaining the right data is essential for the product design mentioned above. Even for emissions of "conventional" products, a minimal set of ESG data must be collected to meet the Non-Financial Reporting Directive's (NFRD) entity-level reporting requirements. For sustainable and sustainability-linked products, data on appropriate KPIs and PAIs must be available from the outset to fulfill the aforementioned pre-contractual documentation. The specific content this documentation should contain depends on the product in question and can be derived from various sources.[35] In any case, the KPIs must be specific, objective, quantifiable, and verifiable.[36]

Especially for sustainability-linked products, these KPIs can vary widely – ESG objectives and KPIs are usually defined in discussions with the counterparty. In order to be prepared for the increasing market demand for sustainability-linked products, it is recommended, for example, by the ISDA, to establish a common KPI framework for counterparties on the buy- and sell-side.[37] This will increase efficiency across all products, since in this way variations of actually standardizable product characteristics due to bilateral agreements are supposed to decline.

5.2 Throughput stage

Figure 3 shows that product selection based on customer preferences is the first affected front office task of the "pass-through" phase. In order to find and select products that meet the customer needs, the employees involved must understand the differences in KPIs and how "good" performance contributes to the specific sustainability goals. Consequently, training is critical as they are also the first line of defense against greenwashing. The goal is to synchronize front office expertise with middle and back office data processing skills.[38]

One reason is that data processing capabilities are required to continuously calculate and evaluate the ESG KPIs of products. This task becomes particularly challenging for sustainability-linked products. ISDA points to a low level of standardization,[39] and the U.N. PRI notes a low level of detail in contract information.[40] However, tracking such KPIs may be the least negligible task in an ESG-adapted functional architecture. How else can deliverables or events relevant to contract termination and payments be verified?

To ensure that all downstream processes are equipped with the necessary data, the initial spotlight could be laid on identifying key data elements (KDEs). To identify such KDEs, PAI formulas defined by SFDR can be examined for the data elements required to calculate them. Following sustainability-related products, this can also be applied to agreed-upon KPIs and their calculation. Once these KDEs are identified, data availability and inherent complexity should be assessed to assign some processing simplicity score to identified KDEs. Low scores would indicate data that is rather unavailable, requiring alternative approaches to sourcing and processing. This means that, for example, sustainability-linked products that require such low-scoring ESG KDEs are difficult to track.[41] Looking at limit and position management, overcoming such ESG data challenges is not a problem. For example, if a critical threshold of sustainable assets is defined here at the fund level, "only" the performance needs to be tracked. No ESG performance data is required for any readjustments.

[34] https://bit.ly/3F6HQHU
[35] For the example of fund vehicles as most recently targeted by SFDR RTS, ESMA Supervisory Briefing to NCAs: https://bit.ly/3eOnSXY
[36] https://bit.ly/3eKITCl
[37] https://bit.ly/3CRaWbA
[38] https://bit.ly/3CMB6fP
[39] https://bit.ly/3yZ6shY
[40] https://bit.ly/3eUH0mW
[41] Source: Capco research

The same applies to collateral management in clearing and settlement functions. Here, the new ECB rules from 2021 must be considered: since then, sustainability-oriented bonds have been eligible as central bank collateral in Eurosystem credit operations and Eurosystem outright purchases for monetary policy purposes. In this context, the coupons of the bonds must be linked to either environmental targets of the E.U. Taxonomy Regulation and/or to the SDGs of the United Nations.[42] For the end of 2024 and beyond, institutions may also consider and adjust to a cap on the collateralization of debt issued by high-carbon companies.[43]

5.3 Output stage

Since 2021, ESG-related reporting and disclosure obligations are already in place in Europe. The E.U. is ahead of other regions in developing ESG regulations. For the output stage, we now outline steps to comply with, e.g., SFDR-required website and regular periodic disclosures. Those present regulatory pieces that receive major attention recently. The reporting content already described in the previous section is omitted from this section.

Regarding website disclosures, a separate website section titled "sustainability related disclosures" should be created. Here, the products are clearly presented with their sustainability characteristics. Articles 24 and 37 of the SFDR Delegated Regulation provide further instructions on structure and content. For regular periodic reporting, a special annex to the annual report must be prepared (following the templates of Annexes IV and V of the SFDR Delegated Regulation). In the report itself, reference to this annex must be made in a prominent place. Obviously, extensive elaboration is possible on the content of this paragraph alone.[44]

The actions to be taken by the risk management functions are multifaceted. To avoid overlap with the previous section, only some credit risk-specific recommendations are added here. There is a shared vision among credit raters to improve the consideration of ESG factors in credit ratings. To this end, the extent of materiality of ESG issues should be assessed for different issuers. The Sustainability Accounting Standards Board's (SASB) materiality map provides some guidance in this regard. Based on the (harmful) business activities of issuers, some institutions exclude certain issuers in advance. In general, risk teams should engage in dialogue with investors to identify and understand ESG risks to creditworthiness, and to derive information for their own assessment methodologies in the context of credit ratings.

6. CONCLUSION

ESG is playing an increasingly important role in equity and debt capital markets. Significant growth rates of sustainable and sustainability-linked products suggest how the market will change in the coming decades. With the financial services sector playing a pivotal role in the transformation to a more sustainable economy, the question is how to integrate ESG into the capital raising process. Using a reverse engineering approach that aims to map the impact of the emergence of sustainable and sustainability-linked products along the trade lifecycle and identify the affected divisions within a financial institution, we find six key considerations. First, ESG does not change the trade lifecycle per se, but shifts the focus to the pre-trade phase due to regulatory and risk considerations, disclosure and verification of KPIs, and data management requirements. Second, ESG provides impetus to drive front office performance, to credibly redirect capital flows towards sustainable investments, and embed sustainability in risk management. Third, ESG levers the synchronization of front to back office systems, particularly with respect to ESG-related client data gathering, rating tools, and downstream systems. Fourth, ESG data gathering, management, and system implementation require clear workflow definition, IT interfaces, and staff training. Fifth, the centralization of ESG-related data is key to further supporting and improving the entire trade lifecycle process. Finally, our analysis of the functional architecture shows a marginal impact in the throughput-relevant functions, nevertheless the enrichment of different data models has to be ensured from the beginning in order to effectively serve the output-relevant functions, especially with regard to ESG-relevant functions like reporting.

[42] https://bit.ly/3TGushJ
[43] https://bit.ly/3Srpncs
[44] https://bit.ly/3DfieYj

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