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Blockchain & SCO60 Whitepaper

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Program Contents

1. Executive Summary

With an increase in transactions and volumes in cryptoassets like tokenized securities dedicated regulation is introduced to address potential risks. In light of the incoming regulation banks must carefully assess their blockchain strategy to still benefit from the technology advantages of DLT while avoiding to increase regulatory costs.

In July 2024 the Basel Committee published the final version of the SCO60 rules that forms part of Basel III. SCO60 defines regulatory and prudential treatment of blockchain-based cryptoassets and banks' exposures considering on- or off-balance sheets amounts that give rise to credit, market, operational and/or liquidity risks (SCO60.4).

For tokenized securities the framework creates an 'all or nothing' situation for banks. These cryptoassets are either treated similarly to traditional assets and classified into Group 1 of the framework. Or, if they fail to meet all classification conditions, must face severe additional capital charges of 100% or up to 1250% treated as Group 2 assets making the use of blockchain technology in the financial industry less attractive.

This whitepaper touches upon SCO60 and goes through the four classification conditions of SCO60 on Asset Properties, Legal Framework, Network Infrastructure, and Involved Entities. These are then mapped to the in-production SWIAT Blockchain Ecosystem to show how banks can achieve regulatory compliance today and benefit from cryptoassets as well as blockchain technology in the future. Consequently, the potential impact on the market is discussed by analyzing the impact and the influence on the business model of three different groups: banks, asset managers and retail.

The key finding of this whitepaper is that banks choice of blockchain will impact their ability to scale their business on the blockchain. SCO60 leaves no room to correct flawed blockchain infrastructure via additional measures – except for transitioning to a compliant blockchain. Hence, when banks adopt the prudential approach, the use of permissionless and public blockchains is likely to be decrease if they cannot adapt to the Group 1 requirements and as soon as the financial industry eyes a plateau of productivity and scaled production.

SCO60 is scheduled for January 2026. Banks should undertake preparatory actions now if they want to leverage the promised benefits of cryptoassets and blockchain technology.

“We believe the next step going forward will be the tokenization of financial assets, and that means every stock, every bond… will be on one general ledger.”

Larry Fink, BlackRock, Chairman & CEO, January 2024[1]

2. Introduction

Tokenization, digital assets and blockchain technology are on the rise. Besides proof-of-concept transactions, new laws, and pilot regimes, the potential for a scaled productive use of the technology and assets in token form has been acknowledged by SCO60, a new Basel committee standard relating to cryptoasset exposures.

In 2022 the Basel Committee published Prudential treatment of cryptoasset exposures (SCO60) with the aim to support the exercise of market discipline and contribute to reducing information asymmetry amongst banks and market participants. It addresses potential risks arising from using Blockchain or Distributed-Ledger-Technology (DLT). The framework, initially scheduled for January 2025, is set to become part of Basel III and has been rescheduled for January 2026 to give members time “to implement the standard in a full, timely and consistent manner.”[2] Furthermore, in the European Union transitional rules which vary yet implement the core structure of SCO60 to EU Regulation[3] have already been formally accepted in May 2024 by the European Parliament[4]. Meanwhile in July 2024 Basel disclosed the final revised standard[5]. Hence, banks can start to prepare for complying with the Basel Framework on Cryptoasset Exposure. A key reason driving this regulation is to ensure financial stability of banks while using blockchain technology. As in general with capital requirements, the intention is to limit bank’s risk-taking incentives ex-ante and ensure their ability to absorb losses ex-post. As a consequence of capital requirements, banks have safety buffers available in distress scenarios when funding conditions worsen.

The objective of this whitepaper is:

- to explain the cornerstones of the current SCO60 framework,
- understanding SCO60 in context with SWIAT as an in-production system, and
- show its implications on banks blockchain-related business potential and its resulting effects on the wider financial industry.

As the financial industry is eyeing for the plateau of productivity within the Gartner Hype-Cycle, this whitepaper shall as well offer guidance and an overview for decision-makers in setting up a scalable and viable operational blockchain setup.

1 Fink sees Tokenization of Financial Assets as Next Step: https://youtu.be/HTveRlW7QPo?feature=shared&t=161 (last access: 12th September 2024)
2 Press release: Governors and Heads of Supervision reiterate commitment to Basel III implementation and provide update on cryptoasset standard (bis.org) (last access: 12th September 2024)
3 EU regulation No 575/2013 (CRR)
4 Regulation - EU - 2024/1623 - EN - EUR-Lex (europa.eu) (last access: 12th September 2024)
5 Disclosure of cryptoasset exposures (bis.org) (last access: 12th September 2024)

3. Basel Framework SCO60

The following chapter explains the scope of SCO60 including the key conceptual aspects of the Basel Framework. It proposes regulation for banks that member states should implement.

The key takeaway of SCO60 is a prudential behavior of banks towards the blockchain and distributed ledger technology. With a well-designed system and operational setup, banks avoid putting their business at risk while transitioning to and benefiting from digital assets.

The Basel Framework addresses potential risks arising from the technology that are not or not exhaustively covered by existing frameworks for banks. In essence, SCO60 requires banks to verify that business continuity is ensured and that introduced dependencies to a multitude of (new) actors due to decentralization are properly analyzed, assessed and reflected via capital treatments

3.1 Distinction of Assets (Group 1 & 2)

The framework differentiates between cryptoassets by categorizing them into two groups called Group 1 and Group 2. Depending on the categorization different regulatory treatment applies, usual Basel capital treatments or up to 1250% risk weighing. In general, Basel classifies as cryptoassets:

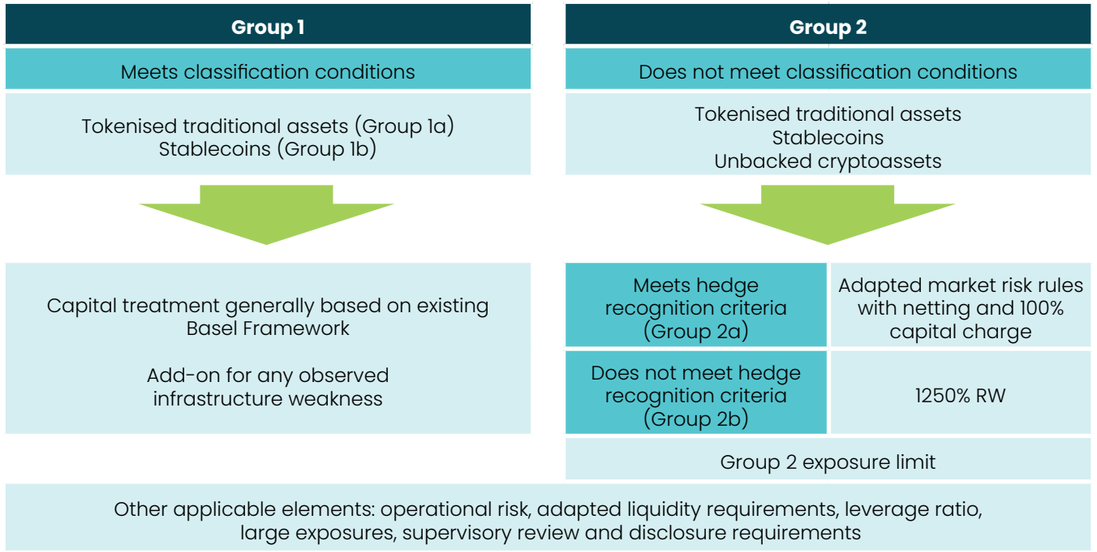
- private digital assets that
- depend on cryptography and distributed ledger technologies (DLT) or similar technologies." (SCO 60.1)

Furthermore, dematerialized securities (without physical certificate to electronic book-keeping using above-described technologies) are considered as tokenized securities and are within the scope of the Framework. Central bank digital currencies (CBDCs) are explicitly excluded as further consideration on CBDCs will be shared by Basel.

Cryptoassets that classify into Group 1 must comply with all the defined classification conditions of the Framework on an ongoing basis (SCO60.6-22) to avoid additional regulatory treatment (Group 1a tokenized traditional securities, Group 1b Stablecoins), while cryptoassets that fail to comply with any of the classification conditions are subject to either additional capital charges of 100% or require a risk weight of 1250%. This depends on whether the cryptoassets qualify into Group 2a or Group 2b. Nevertheless, even Group 1 cryptoassets might require additional regulatory treatments, if infrastructure weaknesses have been observed.

In the current state of the Framework, bank's total exposure to Group 2 assets is limited to 1% or 2% of a bank's Tier 1 capital.

Figure 1 Group Classification by Basel



To avoid additional capital charges and regulatory requirements just because the same use case is being conducted on a DLT, it will become crucial for banks and their immediate business environment that the cryptoassets in use fall under the classification of Group 1. Meaning, tokenized traditional assets and cryptoassets with effective stabilization mechanisms that meet the classification conditions on an ongoing basis.

3.2 The classification conditions

The Framework sets 4 key classification conditions which cryptoassets of Group 1 must comply with on an ongoing basis to not classify as Group 2. This subchapter summarizes the requirements of SCO60, for an in-depth analysis the original framework of SCO60 should be used. The conditions could be generalized into the following aspects:

1. Asset Properties
2. Legal Framework
3. Network Infrastructure
4. Involved Entities

1. Asset Properties

In essence, classification condition 1 requires from a risk perspective that the asset properties of the cryptoasset are similar to the equivalent asset form, being an offchain asset. The tokenized form of an asset should not introduce new risks (e.g., redemption or new credit or market risks). Though for cryptoassets with stabilization mechanisms (Group 1b), limitations have been set towards which kind of assets can be used as underlying, how these must be managed and monitored, and that the use of algorithmic mechanisms are excluded from Group 1.

2. Legal Framework

The second classification condition ensures that the asset fits into the surrounding jurisdiction and that all rights and obligations are legally enforceable. A legal review by banks and a full transferability and settlement finality, in the sense of irrevocably and unconditionally transferred[6], at all times is compulsory. In many DLT-environments the Consensus Mechanism (e.g., Proof-of-Work, or Proof-of-Stake) relies on 'Probabilistic Finality'. This may create forks that need rules to resolve conflicts. This may lead to uncertainty about settlement finality, whether the committed transaction is postponed or must be re-committed. Other Consensus Mechanisms however like Proof-of-Authority (PoA) offer immediate 'Total Finality' without the possibility of forks.

3. Network Infrastructure

The Basel Framework clarifies within its third classification criteria that the same prudential treatment of and regulatory requirements for technology like for any other technology stack apply. Meaning that entities associated with key functions like issuance, validation or transfer don't pose any material risks and have a risk governance and control policies in place. Furthermore, the network ecosystem must be well described and may not pose and threats or unknown dependencies for the banks. Existing and incoming regulation apply to DLT too, like General Data Privacy Regulation (GDPR) or Data Operational Resilience Act (DORA) in the European Union.

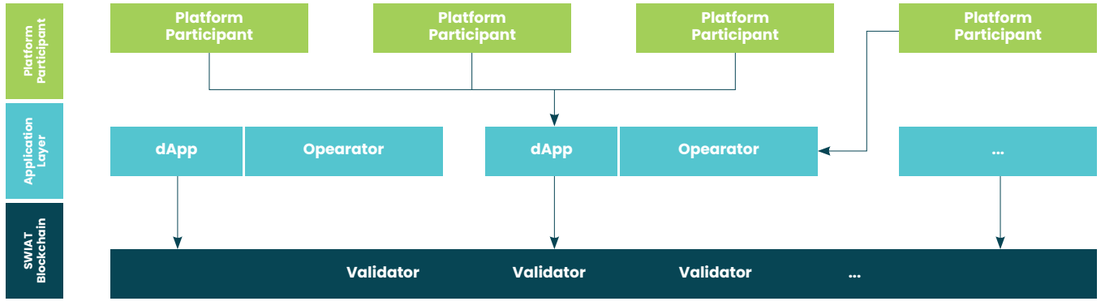
4. Involved Entities

The last classification condition sets the bar for the surrounding ecosystem of the technology. As in case with other technology, banks must conduct a due diligence on key providers that might affect the performance of the bank. The Basel Framework therefore requires an analysis of all involved entities in the operation of the DLT, including validators. They should either be regulated and supervised or have an appropriate risk management in place. In addition, a comprehensive governance framework is mandatory for the involved entities to classify cryptoassets into Group 1.

6 Cryptoasset standard amendments (bis.org) (last access: 12th September 2024)

4. SWIAT Governance Model

SWIATs governance is set up in such a way that it gives cryptoassets the potential to classify for Group 1. This is achieved by a specific design of the ecosystem and a clear distribution of roles and responsibilities at any time – manifested in legally binding contracts.



The generalized Governance Model consists of 3 different layers, building the infrastructure bottom-up:

- SWIAT Blockchain
- Application Layer
- Platform Participants

Thereby, providing entities with much needed structured and reliable information for evaluating SCO60's classification criteria. In this chapter a generalized version of the SWIAT Governance Model will be explained with a focus on crucial aspects to comply with the Basel Framework. The generalized model can be used as a blueprint for analyzing DLT-setups and checking for Basel-compliance.

SWIAT Blockchain

The SWIAT Blockchain with its Validators forms the foundation of the SWIAT ecosystem. It includes exclusively the Blockchain Software[7] to create a network of Validators. The Validators task is limited to providing availability and computation power of their Validating Nodes, thereby ensuring a stable and reliable infrastructure layer. Validators must comply with a defined set of requirements[8] and sign a Validator Agreement.

Application Layer

Building on the SWIAT Blockchain, like building on an Infrastructure-as-a-Service solution, the Application Layer is composed of decentralized Applications (dApps[9]) and it's Operators. Each dAppp must have at least one Operator in charge. An application might be a tokenization engine, collateral management solution, and more. A prerequisite for running an application as an Operator are signed dApp Operator Terms.

Platform Participants

Similar to known AppStores for smartphones, Platform Participants are free to choose any dApp in the SWIAT Ecosystem. To use an application Platform Participants must agree to each terms-of-use of each application[10]. As an entry condition for incoming Platform Participants, each entity must agree to Terms of Use which ensure that Platform Participants act on a level playing field. The Terms of Use are general terms addressing the use of the platform.

Network Terms

All ecosystem related Terms[11] are countersigned by the Network Coordinator SWIAT that bundles legal relationships and orchestrates the functioning of the different layers. The set of agreements and terms are also referred to as Network Terms. They allow to enforce rules between the actors and remain compliant with other regulatory requirements like sanction mechanisms etc.

dApp-specific Participant Agreements are signed between the Operator and the dApp Participants.

In general, organizations can assume one or multiple roles in the ecosystem (Validator, dApp Operator, or Platform Participant).

In general, the SWIAT Blockchain setup could be moved into a foundation to create a blockchain infrastructure with little potential for conflict of interests and a strong potential for collaborative competition (Co-Opetition). This could develop into a regulated financial layer one infrastructure.

5. Framework to Implementation

Bringing theoretical frameworks into production often faces implementation challenges.

. In this chapter the requirements from SCO60 for classifying cryptoassets into Group 1 and Group 2 will be mapped on a high-level with the SWIAT Governance Model. The Model helps banks in complying with the requirement of assessing and monitoring the compliance with the four classification conditions on an ongoing basis in accordance with international standards. Financial institutions must fully document the information used to verify the compliance with the standards. In the case of the SWIAT ecosystem, financial institutions can refer to the Network Terms as source and proof.

To achieve compliance with SCO60 three parts of DLT ecosystems must align:

- Compliant setup of the Platform Participant (e.g., Operations and Risk Management)
- dApp Operator
- SWIAT Ecosystem (SWIAT Blockchain, Validators, Network Coordinator)

Assuming that banks will act compliant to regulatory requirements in general and SCO60 as well, dApp Operators and the blockchain ecosystem that they are using must ensure compliance with SCO60.

Classification Conditions	dApp Operator	SWIAT Ecosystem (Blockchain, Validators, Network Coordinator)
CC1: Asset Properties	dAPP Operator ensures compliance with use case specific requirements	n.a. / not influenced by the Blockchain Infrastructure
CC2: Legal Framework	Rights and obligations are clearly defined and legally enforceable	Total Finality via PoA Consensus Mechanism and contractual setup with Validators
CC3: Network Infrastructure	n.a.	SWIAT's Infrastructure-as-a-Service setup allows for a full analysis (e.g., outsourcing, operational resilience etc.)
CC4: Involved Entities	Depends on the operational setup of the dApp	Well-known and clearly identifiable entities must meet eligibility criteria

7 Open Source Version of Hyperledger Besu

8 Operational requirements: 99% uptime and availability, connectivity & firewall, DDoS protection, ISO 27001 or equivalent, 10x5 Support, eligible jurisdiction; Technical requirements: 2vCPU, 4GB RAM, 200 GB Storage, Linux; further information on Validators on the SWIAT Blockchain: Validators / SWIAT (last access: 12th September 2024)

9 Decentralized Applications (dApps) are composed of Smart Contracts, API Server Components, and Graphical User Interfaces.

10 Platform Participants that have signed a dApp Participant Agreement are called dApp Participants. Platform Participants can participate in multiple dApps, becoming dApp Participants in multiple applications.

11 Validator Agreement, dApp Operator Terms, Terms of Use for Platform Participants

CC1: Asset Properties

Parameters set by the SWIAT Governance Model puts the focus on compliance with CC1 on the dApp Operator and how the dApp has been set up for operations. This allows for an open, vibrant, and competitive ecosystem. For instance, tokenization providers vary strongly from each other as each tokenization engine (dApp) works differently. Hence, tokenization providers (dApp Operators) remain in competition with each other for the best operational setup to comply with classification condition 1. The SWIAT ecosystem provides the platform participants with the necessary entry conditions to apply the Basel Framework and to avoid additional regulatory treatment by a faulty designed infrastructure.

CC2: Legal Framework

The classification condition 2 is the only condition in which dApp Operator and the SWIAT Ecosystem should be jointly analyzed.

On one hand, the dApp Operator must ensure that the cryptoasset incl. all rights, obligations, and interests are clearly defined and legally enforceable, and that required documentation on the asset is publicly available. Furthermore, only the dApp Operator can guarantee that stabilization mechanisms (for Group 1b assets) work in compliance with SCO60, and that redemption executions are conducted within 5 calendar days.

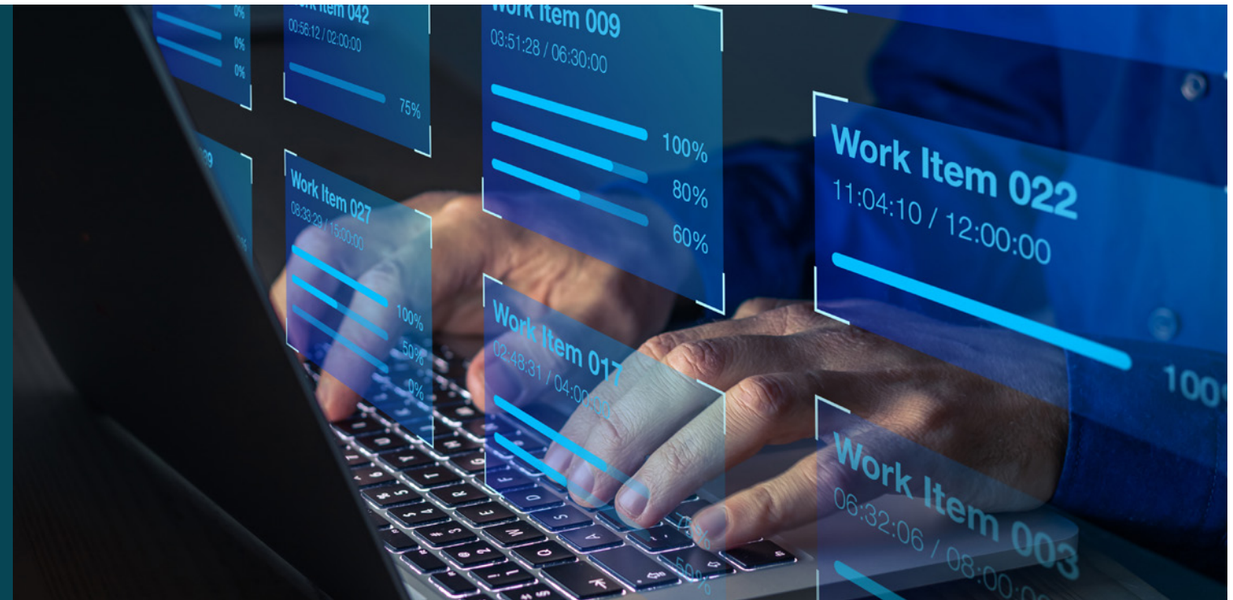
On the other hand, SWIAT avoids forks and 'Probabilistic Finality' and ensures 'Total Finality' through the PoA Consensus Mechanism IBFT2.0[12]. Furthermore, for documentation purposes, e.g., compulsory legal reviews, and for exchanges with regulators, Platform Participants can reference to the Network Coordinator and the respective contracts that allow for a clear distribution of responsibilities. For instance, the Validators commit to providing computation power over a defined period to the SWIAT Blockchain, ensuring full transferability and settlement finality for all assets at all times – considering that the dApp allows the Platform Participants to undertake such actions.

CC3: Network Infrastructure

In the SWIAT Ecosystem, the SWIAT Blockchain functions similar to Infrastructure-as-a-Service (IaaS) solutions, e.g., Cloud. If the dApp is configured adequately, the SWIAT Blockchain is reduced to a decentralized blockchain function call execution layer and introduces no new risks on the cryptoasset. For instance, the Validators of the SWIAT Blockchain that validate incoming blockchain function calls solely provide the contractually obligated computation power and availability.

The Ecosystem has been designed with regulatory requirements of banks in mind, therefore, the Network Coordinator forms the centerpiece of the contractual structure of the SWIAT Ecosystem. In case of regulatory requirements like operational risk analysis (e.g., outsourcing), operational resilience, or Anti-Money-Laundering (AML) and Countering the Financing of Terrorism (CFT), the

12 Istanbul Byzantine Fault Tolerance 2.0, a Proof of Authority based consensus mechanism



+25

# of legal Entities on the SWIAT Blockchain

Network Coordinator can provide required information about participants in the SWIAT Ecosystem. While information on particular transactions between Platform Participants would be provided by the respective dApp Operator. Only clearly identified entities are allowed to join the SWIAT Ecosystem making AML and CFT compliance easier than on any other blockchain, e.g., requirement for LEI. The SWIAT Blockchain is a restricted network, private and permissioned.

CC4: Involved Entities

Working together with well-known and clearly identified entities within the SWIAT Ecosystem and clearly splitting responsibilities between Infrastructure-providing services (e.g., running a Validator) and offering dApps, allows to easily comply with classification condition 4. The governance framework is legally enforceable and provides a comprehensive framework. Furthermore, the eligibility criteria for becoming a Validator or dApp Operator ensure that the entities are either regulated and supervised or have appropriate risk management standards in place.

In essence, compliance with SCO60 within the SWIAT Ecosystem comes down to the operational setup of the dApp and how the dApp Operators offer their solutions to banks. The SWIAT Blockchain and all it involved actors provide the infrastructure on an "as-a-Service" level and clearly defines roles and responsibilities. Including well-known and identifiable Platform Participants, the SWIAT ecosystem is scalable as well as regulatory compliant, making it possible to classify cryptoassets, tokenized securities or cryptoassets with stabilization mechanisms into Group 1.

Current set of Validators on the SWIAT Blockchain

DekaBank · standard chartered · LBBW · adesso · GFT · NTT DATA · sopra steria · think tank BUSINESS SOLUTIONS · swiat

6. Potential Implications on the Market

The Basel Framework is tailored for banks. Nevertheless, the potential implications on the market reach beyond banks as banks form vital parts of the financial industry's value chain.

Market Participants	Impact of SCO60	Influence on business model
Banks	Direct	High
Asset Managers	Indirect	Medium
Retail	Indirect	Low

SCO60 applies whenever a cryptoasset creates 'exposure', including "on- or off-balance sheets amounts that give rise to credit, market, operational and/or liquidity risks" (SCO60.4). Furthermore, SCO60 addresses as well banks' cryptoasset activities like custodial services or risk management, thereby, not necessarily limiting its application exclusively to credit, market or liquidity requirements.

Within this section selected market participants and market segments will be addressed in direct or indirect context to SCO60 showcasing some of the potential implications.

Banks

Considering its direct application to banks, banks are directly influenced on business opportunities and operational impact by the Basel Framework of SCO60. Today banks are running their business in a streamlined fashion at large scale. Any changes and limitations by Middle- and Back-Office units requires meticulous planning and time. Therefore, banks must choose an operational setup that provides their Front-Office Units a stable and reliable pool of digital assets that are available for financial transactions. Hence, traditional assets in tokenized form must fulfill all SCO60 requirements to classify into Group 1 for a scalable use. In all other cases, banks would incur new capital charges leading to an increased cost of business for banks in comparison to conducting the same business offchain in traditional infrastructure. Banks must be vigilant in using blockchain-technology to not counter the value proposition of DLT-based efficiency gains and instead creating higher costs.

To ensure scalability and limit ongoing efforts for classifying cryptoassets into Group 1 and 2, banks should choose a Blockchain Ecosystem that complies with classifications 3 and 4 and makes analyses on classification conditions 1 and 2 easy.

Asset Managers

Even though not directly targeted by Basel's SCO60, asset managers are indirectly impacted by the framework. Banks are key trading counterparts for asset managers in capital markets. If asset managers want to sell of cryptoassets that banks classify into Group 2, banks might offer worse prices than in comparison to traditional assets if banks try to compensate the additional costs of capital charges. Even if the cryptoassets go onto the banks trading books, banks must be prepared to provide all required information and comply with all regulatory treatments in case the cryptoassets are part of the trading inventory. In case of tokenized securities within Group 2, asset managers might experience a reduced set of options to sell at best price. Furthermore, considering today's information that asset managers disclose to investors on custody chains and security, asset managers will probably raise similar question as in SCO60 to win investor's trust.

In essence, asset managers remain with three different scenarios: 1. maintain Status Quo relying on traditional securities which provides its own challenges as more and more digitally native assets are issued, 2. focus on Group 1 cryptoassets, 3. find answers to the challenges provided by Group 2 cryptoassets.

Retail

Depending on the positioning of a bank in the value chain towards retail customers, even retail customers might be affected. However, the impact of SCO60 on retail will be indirect and generally low. Banks will most likely find operational setups that allows them to either comply with SCO60 standards themselves or work together with partners strategically. Banks could potentially offer retail customers access to Group 2 assets via brokers, agent models, or other third-party models.

In general, even for the retail business banks will consider SCO60 in their operational setup, because getting the blockchain-setup wrong could drain margins and lead to high capital charges.

7. Conclusion

In conclusion, SCO60 is a strong and strict regulatory framework for banks setting clear guidelines for the use of blockchain technology within the financial industry. The defined quality standards for the use of technology raise the bar for the blockchain ecosystem and will separate the wheat from the chaff.

The classification conditions address key parts of the value creation process: Asset Properties, Legal Framework, Network Infrastructure, and Involved Entities. In essence, SCO60 acknowledges the uniqueness of decentralized technology and ensures a level playing field by stating similar requirements as for any other use of technology within the financial industry. In general, the framework will push the industry to build on Group 1 cryptoassets. In particular in the case of tokenized securities the financial industry will either build on Group 1 or remain with the Status Quo, due to the severe additional capital charges on Group 2 (100% or 1250%).

Though it seems difficult to build blockchain ecosystems that allow cryptoassets to classify into Group 1, SWIAT demonstrates how a strong foundation for banks could look like for building a scalable business using blockchain technology, leveraging the benefits of digital assets. In addition, the SWIAT Ecosystem provides financial institutions with a strong governance model with a clear definition of roles and responsibilities at any time.

All three layers (Platform Participants, Application Layer, Blockchain Infrastructure) must fit together seamlessly to ensure that cryptoassets classify into Group 1 – in particular tokenized securities will require a Group 1 classification to become an attractive alternative in comparison to its traditional representations. SCO60 however does not accept cryptoassets on flawed Blockchain Infrastructure into Group 1, making the choice of the right Blockchain Infrastructure the most important setup decision for scalability. Considering the high requirements on blockchains, the use of permissionless and public blockchains as infrastructure for tokenized securities will plummet as soon as the industry eyes for scaled production and a plateau of productivity[13].

Looking forward, ecosystem-wide preparations are already under way or will start at banks in 2025 since it will come into effect in January 2026. Financial institutions that have not started yet, must act to ensure operational readiness as soon as the framework applies – or may need to consider discarding cryptoassets, blockchain technology, and DLT-based competitive advantages from their strategic roadmap.

Meanwhile, banks must carefully monitor how SCO60 is conveyed into national law since the basel framework become part of legislative processes. Hence, banks may deal differently with SCO60 requirements, e.g., the transitional rules in the CRR in the European Union.

13 On 28th August 2024 Basel published Working Paper 44 dedicated to Novel risks, mitigants and uncertainties with permissionless distributed ledger technologies (bis.org) (last access: 12th September 2024)

Disclaimer

About SWIAT

SWIAT is a 2022 founded Frankfurt-based FinTech that develops blockchain software for an open decentralized financial market infrastructure.

As a settlement network, the blockchain-based transaction platform is available to banks and financial institutions and enables them to issue regulated digital assets. As an open platform and international network, SWIAT aims to become a settlement standard in this area.

SWIAT shareholders are DekaBank, LBBW, Standard Chartered and the fintech Comyno.

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