THE FOUNDATION OF INSTITUTIONALISATION

DIGITAL ASSET CUSTODY LANDSCAPE IN HONG KONG

FEBRUARY 2026

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FOREWORD

The advent of Bitcoin in 2009 heralded the dawn of a new investable asset class in the form of digital assets. While persistent regulatory uncertainty has long kept many traditional financial institutions on the sidelines, be it as intermediaries or investors, recent years have seen regulators across the globe providing clearer frameworks, safeguards, and legal standards, further legitimising the asset class and paving the way for greater institutional adoption.

In recent years, Hong Kong has been actively building a comprehensive legal and regulatory framework to support the responsible institutional adoption of digital assets, with a view to positioning the city as a leading global Web3 hub. Clear policy direction from the Hong Kong Special Administrative Region (HKSAR) government, together with local regulatory support, has reinforced this momentum, including the implementation of the Virtual Asset Trading Platforms ("VATP") regime by the Securities and Futures Commission ("SFC") and the introduction of a stablecoin regime administered by the Hong Kong Monetary Authority ("HKMA"). In addition, the Financial Services and the Treasury Bureau ("FSTB") and the SFC have conducted public consultations and published consultation conclusions on proposed licensing regimes for virtual asset custody services, placing strong emphasis on robust custody arrangements as a foundation for broader institutional participation.

Supported by this regulatory tailwind, institutional interest in digital assets continues to drive product innovation in the city, including tokenised assets, digital money, cryptocurrencies, and crypto asset exchange-traded funds ("ETFs"), creating a flywheel of adoption and innovation. However, given the relative immaturity of the market, material challenges remain - particularly in relation to security, operational resilience, and compliance expectations. This reinforces the pivotal role of digital asset custody as a foundational enabler of institutionalisation.

To better understand the current state of digital asset custody adoption in Hong Kong, Ripple and Quinlan & Associates conducted industry-wide research, comprising 65 survey responses across buy-side and sell-side institutions and 10 in-depth interviews. The findings provide insight into market readiness, adoption perspectives, and evolving priorities. We would like to extend our sincere appreciation to all participating organisations for their valuable contributions.

In our survey, nearly two-thirds of respondents indicated a preference for third-party custody over a self-managed custody model. Respondents also highlighted a perceived gap in the market: no single third-party custodian consistently offers the optimal balance of operational maturity, regulatory standing, and a proven track record across target use cases, prompting some institutions to evaluate self-managed custody. As there is no "one-size-fits-all" approach given the current market and regulatory maturity, financial institutions - particularly those with a regional and global footprint - are increasingly considering multi-custody orchestration solutions, a unified control layer that manages policy, approvals, and reporting across multiple custody systems. To fully capitalise on the opportunity presented by digital assets in the coming years, acquiring the right custody capabilities and selecting competent technology partner(s) will be of critical importance for financial institutions in Hong Kong.

We hope you enjoy reading this report and look forward to discussing how we can support your digital asset ambitions.

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EXECUTIVE SUMMARY

While digital assets have long operated in an unregulated or regulatory “grey” area, recent years have seen financial regulators across the globe introduce clearer frameworks, safeguards, and legal standards to bring digital assets under formal regulatory oversight, opening the door for greater institutional adoption. In fact, 77% of financial institutions we surveyed in Hong Kong have either already adopted digital assets or are actively planning to do so, with key interest areas including stablecoins, tokenised traditional assets (e.g., equities, fixed income securities, money market funds (“MMFs”), etc.), and crypto asset ETFs. Our findings indicate that 72% of all respondents expressed a strong interest in participating in tokenisation and 58% indicated the same for cryptocurrencies - reflecting increasing institutional interest on the back of greater policy support and regulatory clarity.

Despite growing institutional interest, several factors continue to keep some firms on the sidelines, such as technology and infrastructure gaps (e.g., the absence of mature, scalable, or interoperable solutions), business risks (e.g., potential exposure to financial crime, security, operational, or reputational risks), cybersecurity risks (e.g., threats of hacking, theft, phishing, ransomware attacks, etc.) and regulatory uncertainty (e.g., unclear rules, licensing requirements, or potential legal risks that may affect operations). In particular, security stands out as a primary concern, especially in light of notable hacks in recent years.

At the heart of any initiative for addressing the security needs of digital assets is custody, which acts as the foundational enabler underpinning all digital asset use cases and powers three core capabilities: (1) Security (i.e., private key management systems and vault configuration for safekeeping); (2) Compliance (i.e., programmable governance / policy engine and comprehensive reporting tools for compliance oversight); and (3) Interoperability (i.e., API gateway for interoperability with both internal and external systems).

To that end, financial institutions may adopt either a self-managed custody model (i.e., building in-house capability and directly managing private keys, with full control over access and the execution of digital asset operations) or a third-party custody model (i.e., delegating custody responsibilities to regulated digital asset custodians). Based on our research, financial institutions in Hong Kong show a clear preference for third-party custody (65%), driven by a desire to reduce operational burden, address internal expertise and resource constraints, and maintain focus on core business operations.

Despite this preference, survey respondents highlighted a clear market gap across the third-party custody options offered by bank-affiliated, exchange-affiliated, and independent custodians. While many institutions are more comfortable engaging bank-affiliated custodians, largely due to existing business relationships and trusted brand reputations, they often do not yet offer comprehensive digital asset custody capabilities. Conversely, although exchange-affiliated and independent custodians are frequently viewed as technically stronger, financial institutions remain cautious about engaging them due to limited regulatory track records and limited prior collaboration experience. This has created an impasse, with many institutions either taking a “wait-and-see” approach that slows down institutional uptake or adopting custody models on a “case-by-case basis” depending on the market and regulatory context across different jurisdictions.

To address this impasse, multi-custody orchestration solutions have gained traction. These solutions provide a unified interface for centralised management of digital asset custody operations, offering a balanced middle ground that enables institutions to explore and adopt different custody models while addressing challenges such as regulatory risk exposure, fragmented infrastructure, and misaligned governance and policy frameworks.

As partnerships remain the preferred approach for acquiring digital asset custody capabilities, financial institutions must carefully assess whether potential vendors can enable them to achieve four key objectives: (1) building a robust digital asset custody foundation, (2) defending against external and internal threats, (3) enforcing access, governance, policy, and execution control, and (4) enabling operational flexibility and scalability.

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SECTION 1

INSTITUTIONALISATION OF DIGITAL ASSETS

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MATURING INSTITUTIONAL DIGITAL ASSET ECOSYSTEM

KEY TAKEAWAYS

Although traditional financial institutions have taken cautious steps in facilitating and investing in digital assets over the past decade, they are now moving decisively to incorporate them into their business operations, actively participating and shaping the market across five key roles:

1. Asset Originator
2. Asset Manager
3. Underwriter
4. Broker / Dealer
5. Asset Owner

Through these roles, financial institutions are enabling institutional investors (e.g., sovereign wealth funds, family offices, corporate treasuries, etc.) to gain access and exposure to digital assets, including:

- Tokenised asset
- Digital money
- Cryptocurrency (e.g., BTC, XRP, etc.)
- Crypto Asset ETF

Financial institutions are playing an essential role in institutionalising the digital asset ecosystem in their capacity as asset originators, asset managers, underwriters, broker / dealers, and asset owners

FINANCIAL INSTITUTIONS ARE ASSUMING VARIOUS ROLES IN THE DIGITAL ASSET ECOSYSTEM…

1. ASSET ORIGINATOR
(Tokenisation Agents)

Creates and issues digital assets, establishing initial rights, structure, and economic terms before distribution

2. FUND MANAGER
(Fund / Portfolio Managers)

Manages digital asset portfolios, balancing allocation, risk, yield, and regulatory compliance on clients' behalf

3. UNDERWRITER
(Primary Market Facilitators)

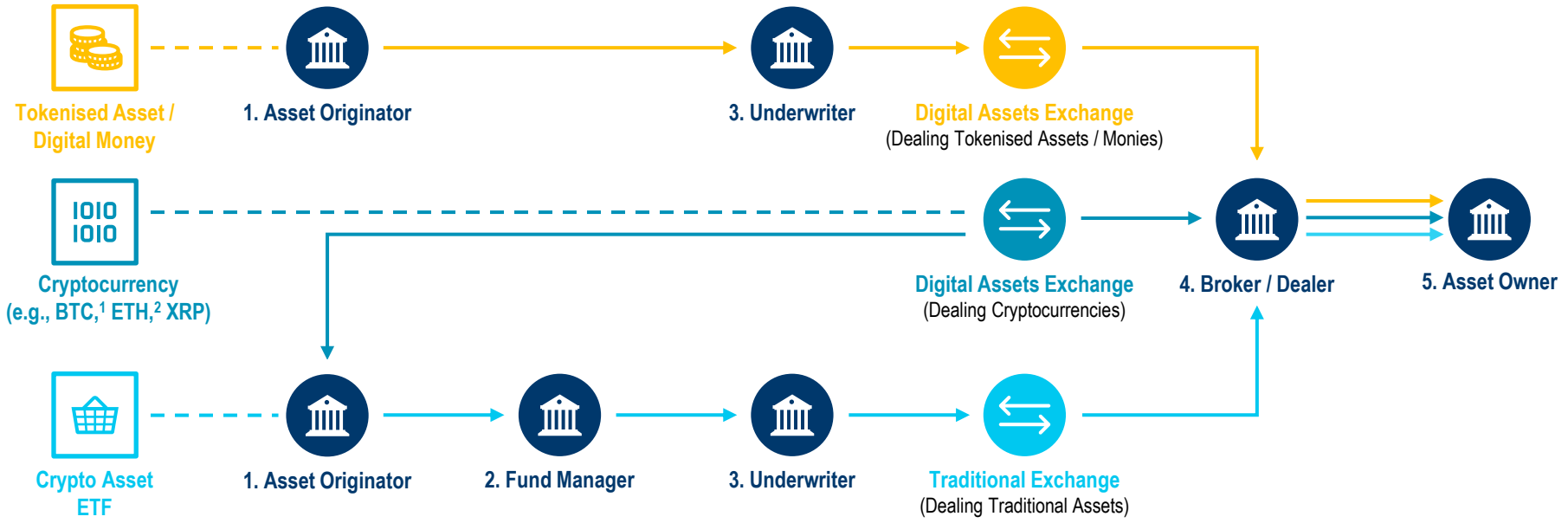
Structures and prices tokenised offerings, facilitating capital formation and distributing assets to investors

4. BROKER / DEALER
(Secondary Market Facilitators)

Provides trading access, executes client orders, and ensures liquidity across exchanges, OTC,[3] etc.

5. ASSET OWNER
(e.g., funds, treasuries, etc.)

Invests and holds digital assets, requiring custody, reporting, and regulatory clarity for investments



[1]Bitcoin; [2]Ether; [3]Over-the-Counter
Source: Quinlan & Associates analysis

HONG KONG POLICY & REGULATORY SUPPORT

KEY TAKEAWAYS

In recent years, the HKSAR government has taken notable steps to provide clear policy support geared at positioning the city as a premier global hub for virtual assets ("VAs") / digital assets ("DAs").

Together with the FSTB, the HKMA and SFC are actively shaping the regulatory perimeter by launching new regimes – and expanding existing ones – to address any material regulatory gaps, with an explicit emphasis on risk management and investor protection.

Growing policy and regulatory clarity are laying a strong the foundation for greater institutional participation in Hong Kong's VA ecosystem, creating participation opportunities for many financial institutions that have long been waiting on the sidelines.

Hong Kong is positioning itself as a premier global Web3 hub through clear policy and regulatory support, paving the way for greater institutional adoption of virtual / digital assets

Policy Direction in Hong Kong

2021-25, Selected Examples with Web3 Implications[1]

Jun 2021 (HKMA – Fintech 2025 Strategy)

Regulatory push to advance CBDC[2] exploration and the use of novel technologies, including DLT

Oct 2022 (FSTB – Policy Statement)

Policy direction to develop a vibrant and well-regulated ecosystem for VAs in Hong Kong

Feb 2025 (SFC – ASPIRe[3] Roadmap)

Regulatory push outlining 12 initiatives to enhance the security, innovation, and growth of VA ecosystem

Jun 2025 (FSTB – Policy Statement 2.0)

Policy direction under the LEAP[4] framework to establish Hong Kong as a premiere global hub for VAs

Nov 2025 (HKMA – Fintech 2030 Strategy)

Regulatory push under the DART[5] framework to accelerate the mainstream adoption of tokenisation

Regulatory Regime in Hong Kong

Current and Upcoming Regimes (As of January 2026)

REGULATORY REGIME	STATUS / REFERENCES
VA TRADING (Exchange platforms)	**In force (Jun 2023):** 11 VATP licences issued • ***Legislation:*** *AMLO (Cap. 615)* • ***Ref. Doc:*** *Guidelines for Virtual Asset Trading Platform Operators*
STABLECOIN (Stablecoin Issuers)	**In force (Aug 2025):** licences expected to be issued in Q1 2026 • ***Legislation:*** *Stablecoin Ordinance (Cap. 656)* • ***Ref. Doc:*** *Explanatory Note on Licensing of Stablecoin Issuers*
VA DEALING (Brokers and Dealers)	**Proposed:** Consultation conclusions published; bill targeted 2026 • ***Legislation:*** *Proposed amendments under AMLO (Cap. 615)* • ***Ref. Doc:*** *Consultation Conclusions: Legislative Proposal to Regulate Dealing in Virtual Assets*
VA CUSTODY (Custodians)	**Proposed:** Consultation conclusions published; bill targeted 2026 • ***Legislation:*** *Proposed amendments under AMLO (Cap. 615)* • ***Ref. Doc:*** *Consultation Conclusions: Legislative Proposal to Regulate VA Custodian Services*
VA ADVISORY (Investment Advisors)	**Proposed:** Consultation closed; conclusions not yet published • ***Legislation:*** *Proposed amendments under AMLO (Cap. 615)* • ***Ref. Doc:*** *Legislative Proposal to Regulate Virtual Asset Advisory Service Providers*
VA MANAGEMENT (Fund Managers)	**Proposed:** Consultation closed; conclusions not yet published • ***Legislation:*** *Proposed amendments under AMLO (Cap. 615)* • ***Ref. Doc:*** *Legislative Proposal to Regulate Virtual Asset Management Service Providers*

[1]The description under each example only highlights the parts applicable and relevant in the context of Web3 (e.g., virtual / digital assets, tokenisation, etc.); [2]Central bank digital currency; [3]Access, Safeguards, Products, Infrastructure, and Relationship; [4]Legal and regulatory streamlining, Expanding the suite of tokenised products, Advancing use cases and cross-sectoral collaboration, and People and partnership development; [5]Data & Payment Infrastructure, Artificial Intelligence, Resilience, and Tokenisation

Source: HKSAR LegCo, FSTB, HKMA, SFC, Quinlan & Associates analysis

HONG KONG INSTITUTIONAL INVOLVEMENT

KEY TAKEAWAYS

With proactive advancements in its digital asset agenda and strong interest from both buy- and sell-side financial institutions, Hong Kong is reinforcing its position as a global digital asset wealth hub.

As of mid-July 2025, according to the HKMA, 22 banks were distributing digital asset-related products, 13 banks were offering tokenised securities, and 5 banks were providing custodial services for digital assets. As of November 2025, there were 49 brokers allowed to provide virtual asset dealing services under an omnibus account arrangement and 6 asset managers issued in total 12 cryptocurrency ETFs.

Digital asset-related activities have continued to grow rapidly. In the first half of 2025, Hong Kong banks recorded HKD 26.1 billion in transactions involving digital asset-related products and tokenised assets - a 233% year-on-year increase, surpassing the total volume transacted in the first half of 2024.

We are already seeing a number of Hong Kong financial institutions taking an active role in distributing and offering digital asset-related products and services

Involvement from Traditional Financial Institutions

Banks (As of July 2025), Brokers and Asset Managers (As of November 2025)

22 Banks
Allowed to distribute **DA-related products**

13 Banks
Allowed to distribute **tokenised securities**

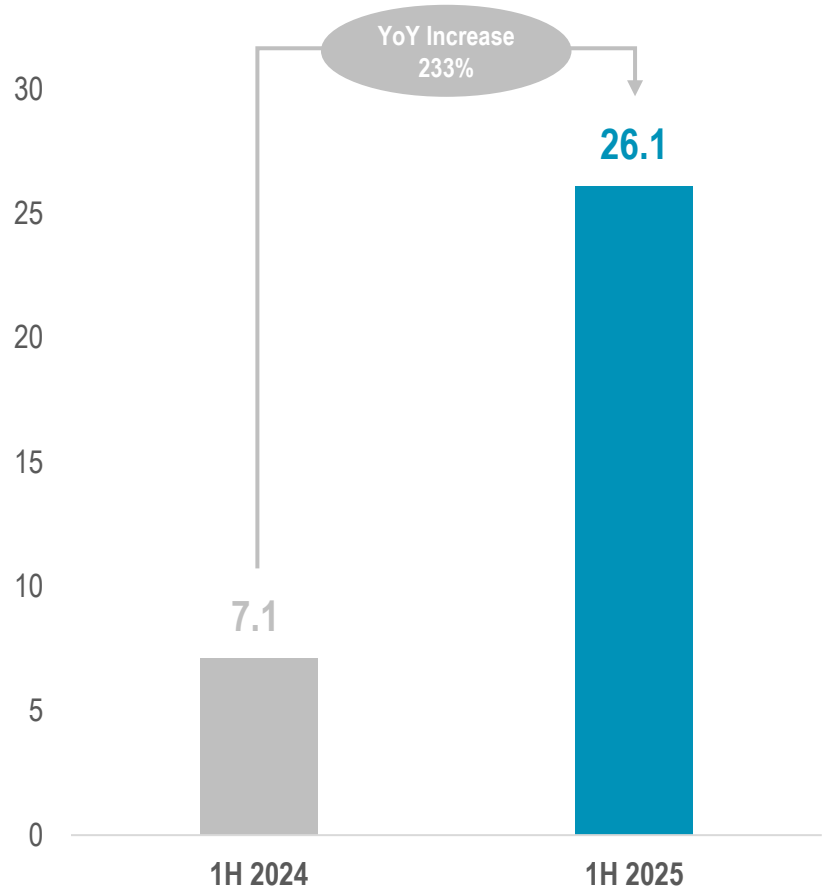
5 Banks
Allowed to provide **custodial services for digital assets**

49 Brokers
Allowed to provide **VA dealing services**[1]

6 Asset Managers
Issued **cryptocurrency ETFs**

Transaction Amount of DA-related Products & Tokenised Assets

Hong Kong Banks, HKD billion, 1H 2024 vs. 1H 2025



[1]Under an omnibus account arrangement
Source: HKMA, Quinlan & Associates analysis

HONG KONG MARKET ADOPTION / INTEREST

KEY TAKEAWAYS

Digital assets, ranging from tokenised real-world assets to cryptocurrencies, are increasingly being perceived as attractive investment vehicles, driving greater institutional participation in the market.

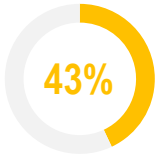
In Hong Kong, financial institutions have already begun incorporating digital assets into their operations, with 77% either already having adopted them or actively planning to do so. This reflects the growing recognition of their strategic importance for both sell-side and buy-side financial market participants.

Amongst Hong Kong financial institutions, tokenised traditional financial assets, fiat-referenced stablecoins, and crypto ETFs stand out as generating particular interest, partially due to their ease of adoption.

Collectively, these trends signal a deliberate shift in institutional behaviour in Hong Kong, as digital assets transition from niche experiments to a mainstream component of investment strategy.

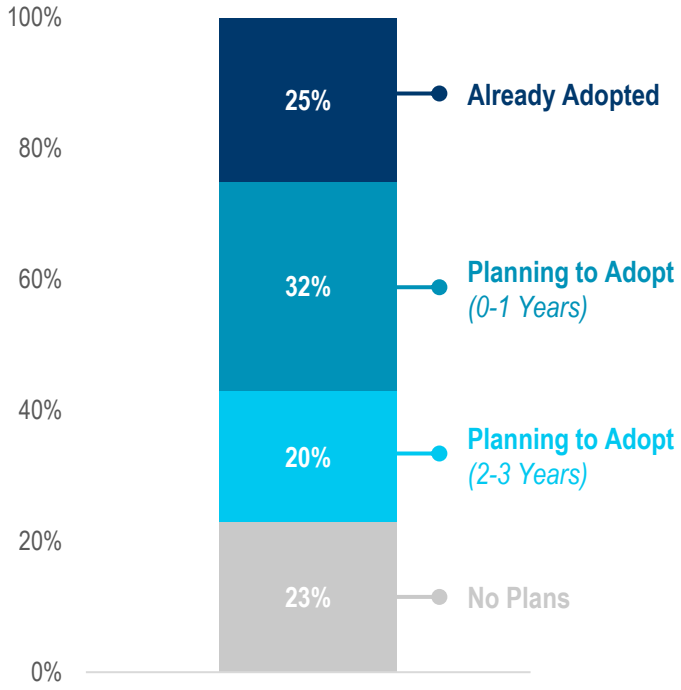
The institutionalisation of digital assets is driven by market forces from both the buy- and sell-side, with more financial institutions seeing digital assets as an important part of their strategies

Survey: Adoption Status
% Hong Kong Financial Institutions, 2025

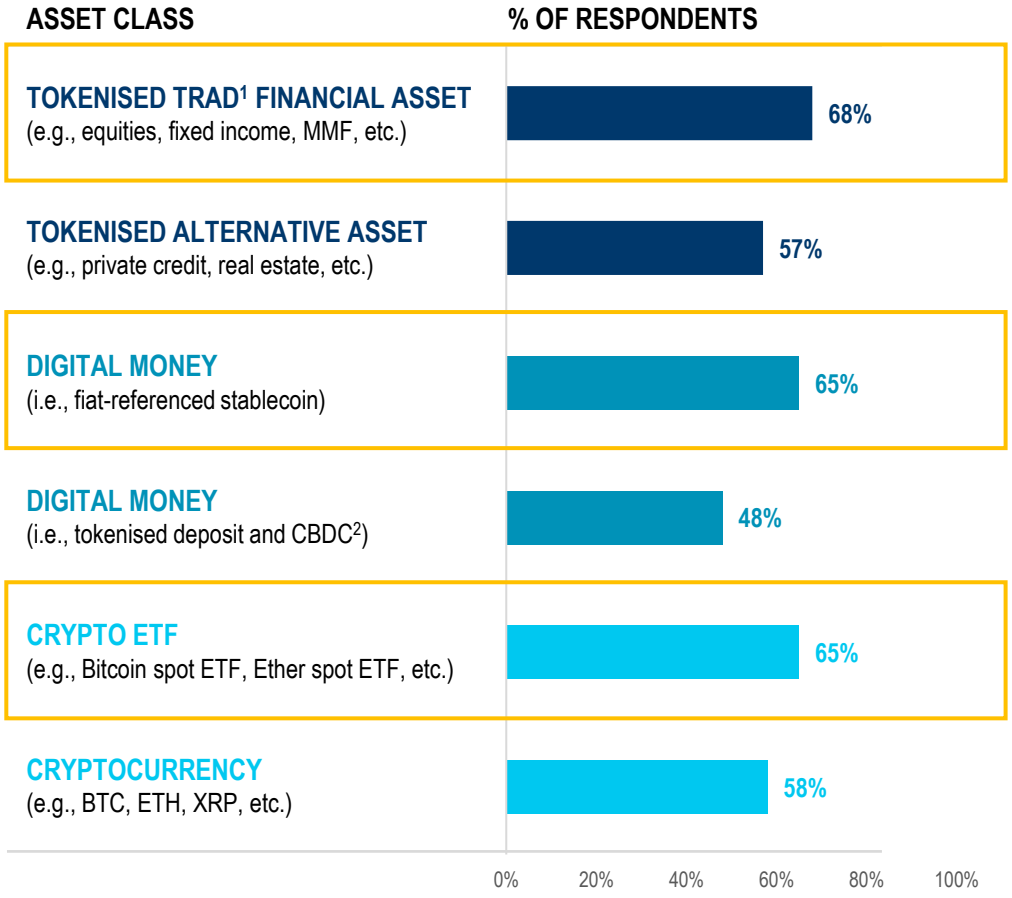


DIGITAL ASSETS AT THE CORE OF STRATEGY

…of respondents rate the importance of digital assets to their organisation's strategy as high / very high



Survey: Interest in Digital Assets
% Hong Kong Financial Institutions, 2025



[1]Traditional; [2]Central Bank Digital Currency
Source: Quinlan & Associates survey and analysis

PERSPECTIVES FROM HONG KONG FINANCIAL INSTITUTIONS

Market Adoption / Interest

Interviewed financial institutions varied in their interests in digital assets:

*"Digital assets are our strategic pillar, and we have launched products already. We see benefits **in** efficiency, allowing us to lower the access barrier, especially for the younger generation."*

- GLOBAL BANKING INSTITUTION

"While digital assets are not a core strategic pillar, our clients have an interest in getting exposure to this alternative asset class. Our multi-asset funds will likely move forward incorporating digital assets."

- GLOBAL ASSET MANAGER

"We understand that digital assets represent an important new phase for the industry, but we are taking careful steps in incorporating them while ensuring that we are fully prepared when the market is ready."

- REGIONAL BANK

High **Level of Interest** Low

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INSTITUTIONAL LEGITIMACY (1/5) – TOKENISED ASSETS

KEY TAKEAWAYS

The global tokenised asset market has experienced remarkable growth, with the total market capitalisation surging from USD 1.8 billion in 2021 to USD 35.7 billion in 2025.

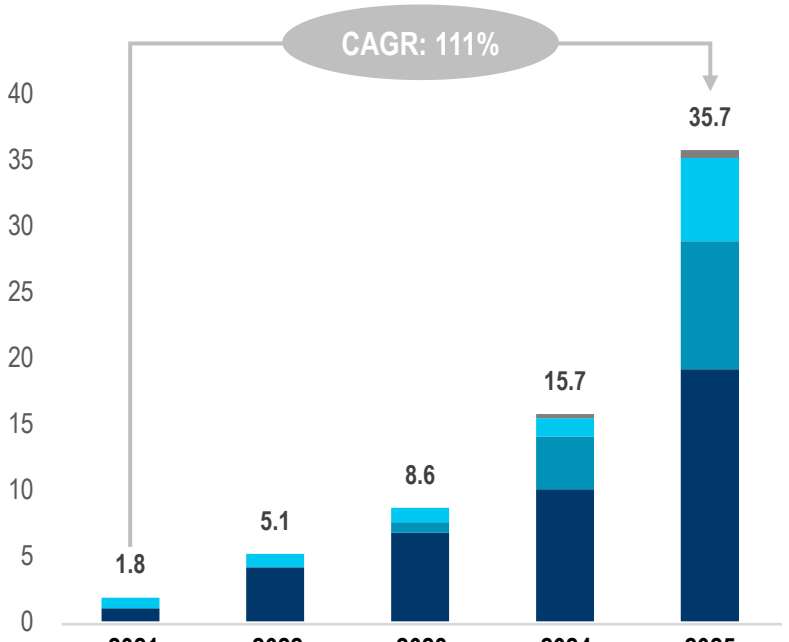
In the Hong Kong primary market, financial institutions are actively participating in the tokenised assets space. Our survey indicates 72% of institutions are either currently involved in or planning to be involved in the tokenised asset market, highlighting broad industry engagement.

This trend is driven by the pursuit of enhanced liquidity, improved market access, and opportunities for portfolio diversification and yield enhancement that traditional structures may not readily provide.

The tokenised asset market continues to gain significant global traction; likewise in Hong Kong, most financial institutions are already participating in - or planning to enter - this space

Tokenised Asset Market Capitalisation

Global, USD Billion, 2021-25 (As of Nov 2025)



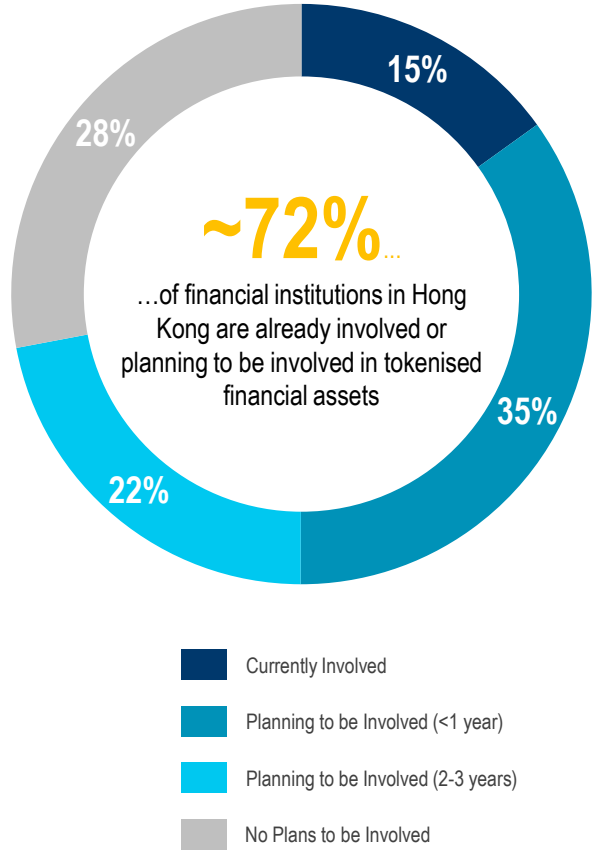
Asset Type	2021	2022	2023	2024	2025
Public Stocks	-	-	-	0.3	0.6
Alternative Investments[1]	0.8	1.0	1.1	1.4	6.3
Treasuries / MMFs	-	-	0.8	4.0	9.7
Corp. Bonds / Private Credits	1.0	4.1	6.7	10.0	19.1
Total	**1.8**	**5.1**	**8.6**	**15.7**	**35.7**

[1]Includes institutional alternative funds and commodities

Source: rwa.xyz, Quinlan & Associates survey and analysis

Survey: Tokenised Asset Involvement

% Hong Kong Financial Institutions, 2025



INSTITUTIONAL LEGITIMACY (2/5) – DIGITAL MONEY

KEY TAKEAWAYS

The stablecoin market has experienced significant growth over the past five years, with total market capitalisation increasing from USD 4.3 billion in 2020 to USD 300.8 billion by the end of November 2025, reflecting a significant CAGR of 105%.

This growth has been driven largely by leading stablecoins such as USDT and USDC, with newer entrants like Ethena USDe and RLUSD also contributing to recent expansion.

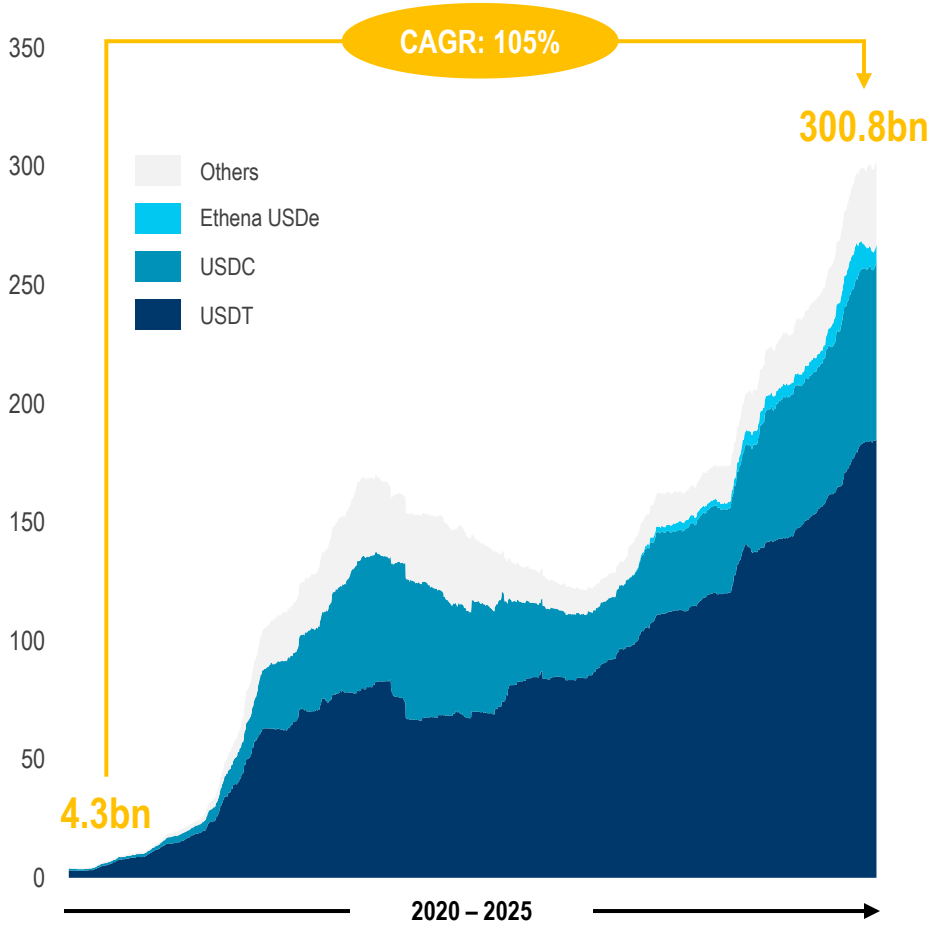
In Hong Kong, major financial institutions are actively venturing into the stablecoin market, with all three note-issuing banks either having applied for or expressing interest in a stablecoin licence.

As of 31 August 2025, the HKMA had received 77 expressions of interest. This signals intensifying competition and suggests banks will need to differentiate through trust, scale, and integration with existing financial infrastructure.

Over the past five years, the market capitalisation of stablecoins has expanded substantially, with several major financial institutions in Hong Kong actively venturing into the stablecoin market

Stablecoin Market Capitalisation

USD Billion, Jan 2020 – Nov 2025



Notable Stablecoin Exploration

Hong Kong, 2025

Financial Institution	Description
standard chartered	Formed a stablecoin issuer joint venture with Animoca Brands and HKT
中國銀行 BANK OF CHINA	Indicated interest in applying for a stablecoin licence
HSBC	Indicated interest in applying for a stablecoin licence
ICBC	Indicated interest in applying for a stablecoin licence

All 3 Note-Issuing Banks
Indicated interest in applying or have applied for a stablecoin license

36 Institutions
Have formally applied for stablecoin licence[1] to the HKMA

Source: rwa.xyz, Ledger Insights, Digital Watch, companies' websites, Quinlan & Associates analysis

PERSPECTIVES FROM HONG KONG FINANCIAL INSTITUTIONS

Tokenised Assets & Digital Money

Tokenised Assets vs. Crypto

"Tokenised assets are something we will look towards, but cryptocurrency is relatively out of scope at this point in time."

- GLOBAL ASSET MANAGER

"Pure crypto trading is less of a priority, but we are interested in tokenised assets, such as tokenised MMFs and stablecoins."

- LOCAL BANK

Familiarity & Ease

"From a financial asset point of view, the underlying of tokenised assets is something banks are relatively more familiar with."

- GLOBAL BANK

"It is relatively easier to tokenise mature financial assets than to tokenise other real-world assets."

- REGIONAL BANK

Earnings Potential

"While digital money may offer limited upside potential, tokenised traditional financial assets may generate meaningful income.

- REGIONAL BANK

"Tokenised assets may open up new revenue streams for the bank in the near future, and hence we are closely monitoring this space."

- LOCAL BANK

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INSTITUTIONAL LEGITIMACY (3/5) – CRYPTOCURRENCY

KEY TAKEAWAYS

Institutional participation in cryptocurrency trading has continued to scale at lightning speed. What was once a retail-driven market is increasingly being dominated by institutional capital flows, adding legitimacy, credibility, and liquidity to the digital asset ecosystem.

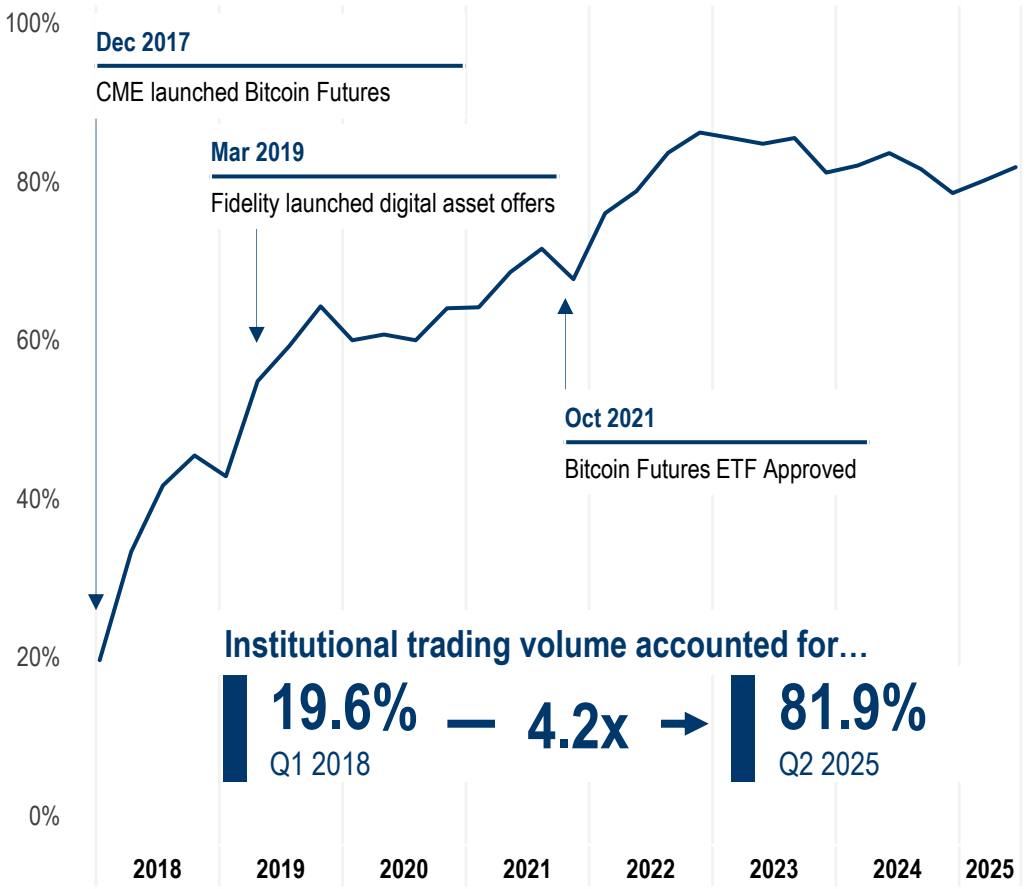
For example, the institutional share of trading volumes on Coinbase has grown nearly 4.2x over the past seven years, reflecting the steady entrance of professional investors. This trend has been reinforced by dedicated infrastructure, custody solutions, and compliance frameworks designed to accommodate large-scale capital deployment.

In Hong Kong, the same trend is equally evident, with a growing share of financial institutions having already executed or preparing to execute cryptocurrency trades. This ongoing shift illustrates that more institutions are no longer merely experimenting with crypto but are instead looking at the asset class as a core component of their investment strategies.

Institutional adoption is bringing greater legitimacy, credibility, and liquidity to the digital asset market, with institutions now dominating crypto trading activity across many exchanges

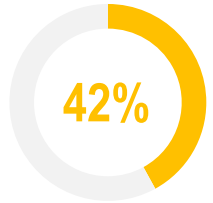
Coinbase: Share of Institutional Trading Volume[1]

% of Trading Volume, Q1 2018 – Q2 2025



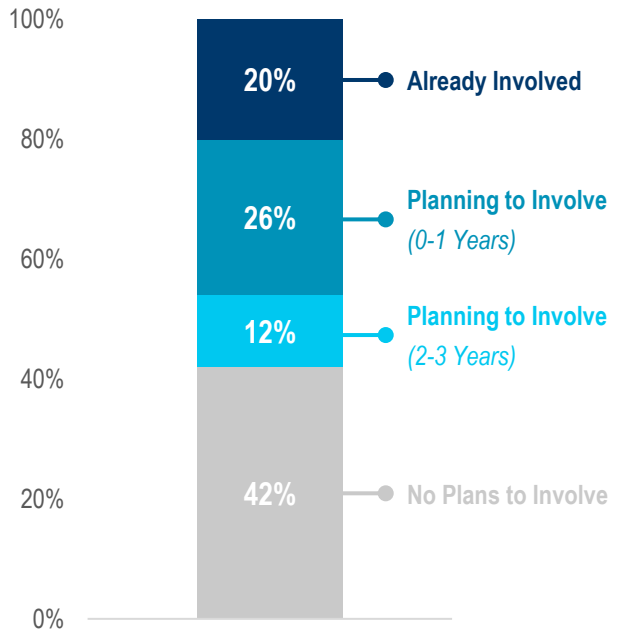
Survey: Cryptocurrency Involvement

Hong Kong Financial Institutions, 2025



CRYPTOCURRENCY AS A PRIORITY

…of financial institutions rated cryptocurrency as one of the earliest digital asset classes that they plan to be involved or are already involved



[1]Defined as hedge funds, small to large financial institutions, and corporations. The total trading volume represents the total trading volume (defined in USD) on Coinbase, which is taken as a proxy for the entire market

Source: Coinbase, The Block, CoinGecko, Quinlan & Associates survey

INSTITUTIONAL LEGITIMACY (4/5) – CRYPTO ASSET ETF

KEY TAKEAWAYS

The United States SEC's approval of spot Bitcoin ETFs has opened the door for structural growth, increasing institutional holdings of Bitcoin from under 4% to over 7% and driving more than a fivefold rise in Bitcoin ETF market capitalisation in less than two years.

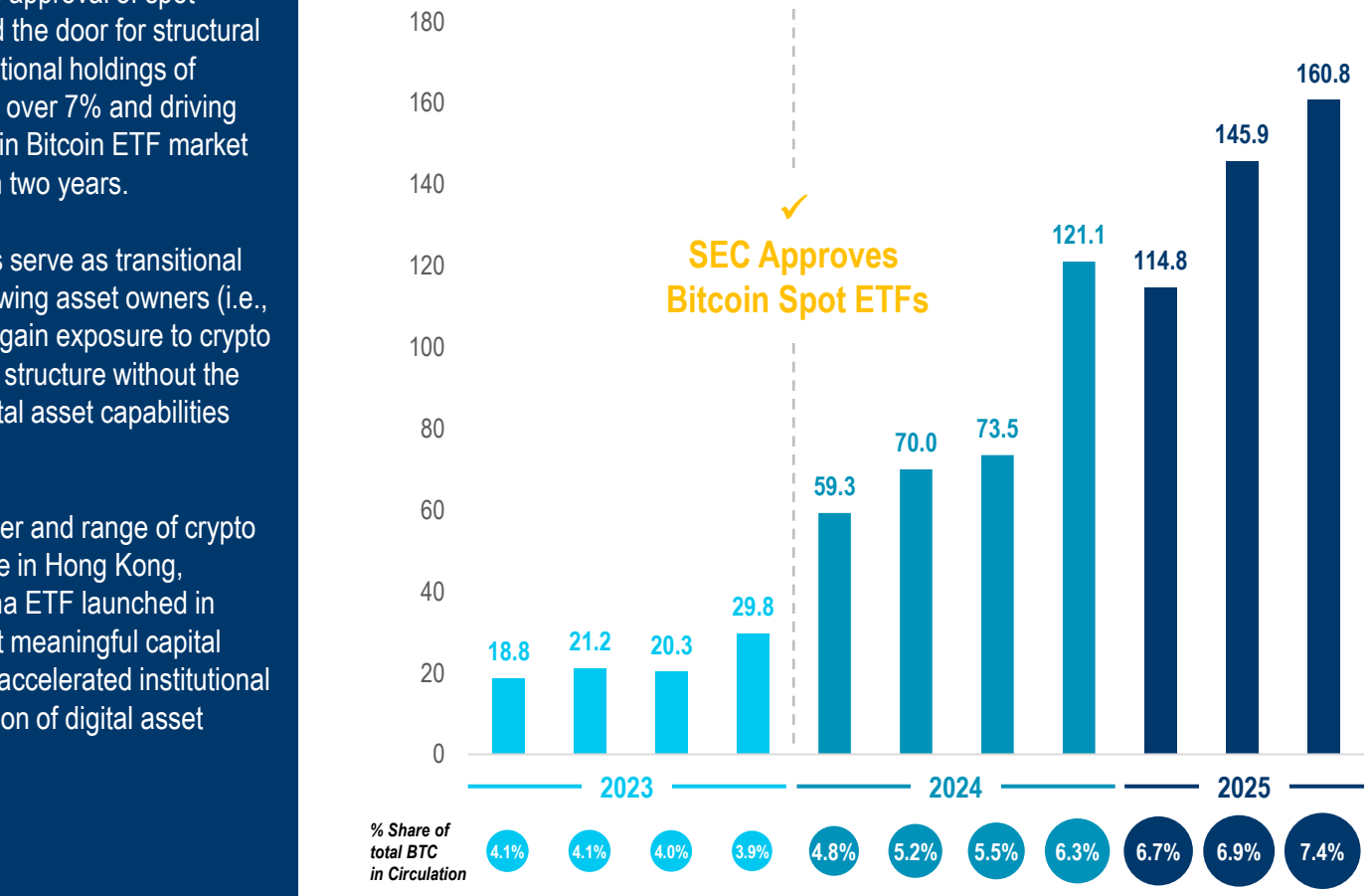
These crypto asset ETFs serve as transitional investment vehicles, allowing asset owners (i.e., institutional investors) to gain exposure to crypto assets through a familiar structure without the need to acquire new digital asset capabilities and infrastructure.

With an increasing number and range of crypto asset ETFs now available in Hong Kong, including the latest Solana ETF launched in October 2025, we expect meaningful capital inflows accompanied by accelerated institutional adoption and diversification of digital asset investment strategies.

Crypto asset ETFs represent an important milestone in the institutionalisation of digital assets and are expected to drive meaningful capital inflows into the broader digital asset market

Bitcoin ETF and Fund Market Capitalisation

USD Billion, Q1 2023 – Q3 2025



Crypto Asset ETFs in Hong Kong

As of November 2025

Financial Institution	Listed Crypto Asset Spot ETFs
華夏基金(香港) ChinaAMC (HK)	**ChinaAMC Solana ETF (3460.HK)** *Launched: 27 Oct 2025* **ChinaAMC Bitcoin ETF (3042.HK)** *Launched:* 30 Apr 2024 **ChinaAMC Ether ETF (3046.HK)** *Launched:* 30 Apr 2024
嘉实基金 Harvest Fund	**Harvest Bitcoin Spot ETF (3439.HK)** *Launched: 30 April 2024* **Harvest Ether Spot ETF (3179.HK)** *Launched: 30 April 2024*
博时基金 BOSERA FUNDS HASHKEY Capital	**Bosera HashKey Bitcoin ETF (3008.HK)** *Launched: 30 April 2024* **Bosera HashKey Ether ETF (3009.HK)** *Launched: 30 April 2024*
MicroBit	**MicroBit Bitcoin Spot ETF (3430.HK)** *Launched: 21 Aug 2025* **MicroBit Ether Spot ETF (3425.HK)** *Launched: 21 Aug 2025*

Source: Bitcointreasuries.net, New Hedge, Altii, CoinMarketCap, Quinlan & Associates survey and analysis

PERSPECTIVES FROM HONG KONG FINANCIAL INSTITUTIONS

Cryptocurrency vs. Crypto Asset ETFs

Survey: Cryptocurrency Exposure Preferences
Hong Kong Financial Institutions, 2025

Case for Direct Exposure to Cryptocurrency

END-CLIENT NEEDS

"Some clients may prefer to directly hold digital assets, similar to gold and other commodities."

- GLOBAL BANK

TRADING FEES & LIQUIDITY

"Direct holding can bypass the large spreads ETF issuers charge and offer liquidity 24/7."

- REGIONAL BANK

Case for Indirect Exposure via Crypto Asset ETF

EASE OF ONBOARDING

"We do not have a clear process of directly holding digital assets, so we will start with crypto asset ETFs."

- GLOBAL ASSET MANAGER

REGULATORY ASSURANCE

"A crypto asset ETF is still an ETF, which falls under SFC regulatory oversight."

- TRUSTEE

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INSTITUTIONAL LEGITIMACY (5/5) – STRATEGIC RESERVE

KEY TAKEAWAYS

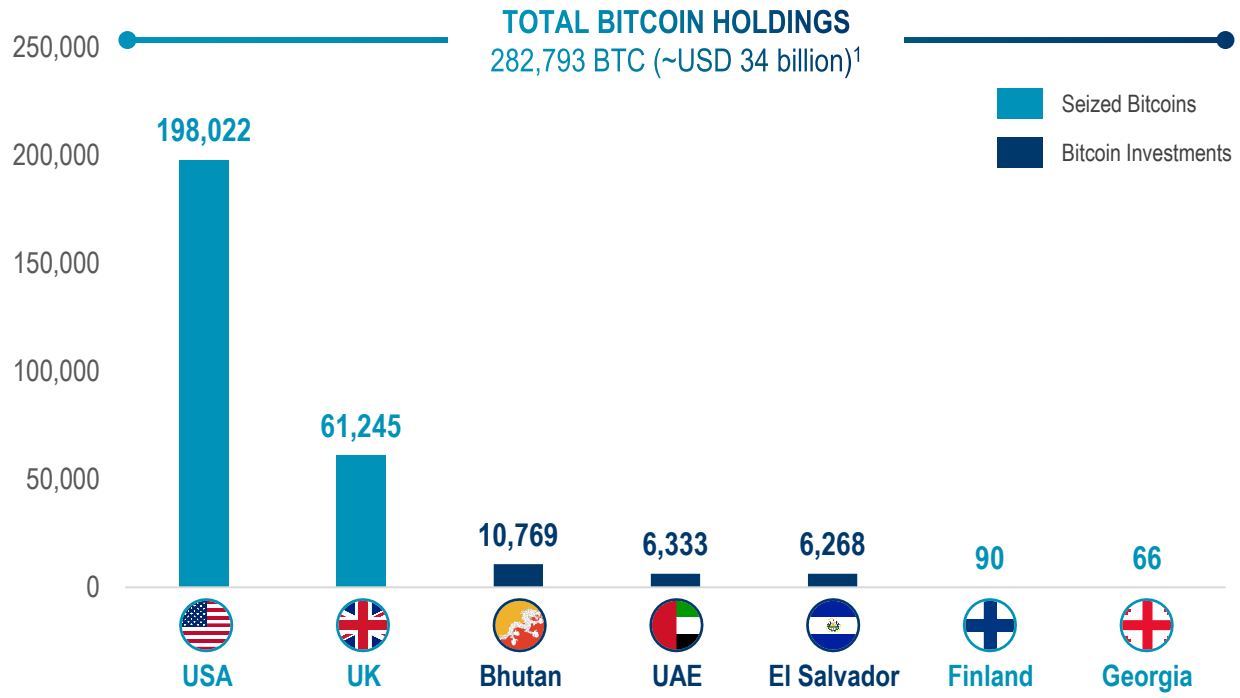
A growing number of governments are holding digital assets at the sovereign level, either incidentally or strategically, through two main channels:

1. **Asset Seizures:** Many jurisdictions acquire digital assets indirectly through law-enforcement actions, such as the confiscation of cryptocurrencies linked to criminal or sanctions-related activities. These seized assets can constitute the majority of a government's on-chain holdings, remaining under custody until liquidated or repurposed.
2. **Strategic Accumulation:** A small but notable group of jurisdictions, including El Salvador and Bhutan, has acquired or mined digital assets (e.g., Bitcoin) as a strategic reserve. This reflects a choice to diversify national holdings, hedge risks, and signal openness to digital asset innovation.

An increasing number of countries are gaining exposure to digital assets, either by retaining cryptocurrencies acquired through asset seizures or by deliberately building strategic bitcoin reserves

Public Holding of Bitcoin

Number of Bitcoins, October 2025



	USA	UK	Bhutan	UAE	El Salvador	Finland	Georgia
Value *(USD bn)*[1]	24.0	7.4	1.3	0.8	0.8	0.01	0.01
% of Total	70.0%	21.7%	3.8%	2.2%	2.2%	0.03%	0.02%

[1]Calculated Bitcoin Price of USD 121,487 on 8th October 2025

Source: CoinGecko, Binance, Cointelegraph, Quinlan & Associates analysis

Key Examples

Jurisdictions

United States

An executive order to establish a US Strategic Bitcoin Reserve & Digital Asset Stockpile (March 2025)

Centralise custody and consolidate management of digital assets seized by various federal agencies, which is expected to include **Bitcoin, Ethereum, Solana, and Cardano**

Bhutan

Bhutan's sovereign wealth fund leverages Bhutan's hydropower to mine Bitcoin and holds it as a long-term store of value

Directly invest in cryptocurrency, such as **Bitcoin, Ethereum, Polygon, BNB Chain, and Base,** and leverage renewable energy resources to directly mine Bitcoin locally

HONG KONG MARKET ADOPTION CONCERNS

KEY TAKEAWAYS

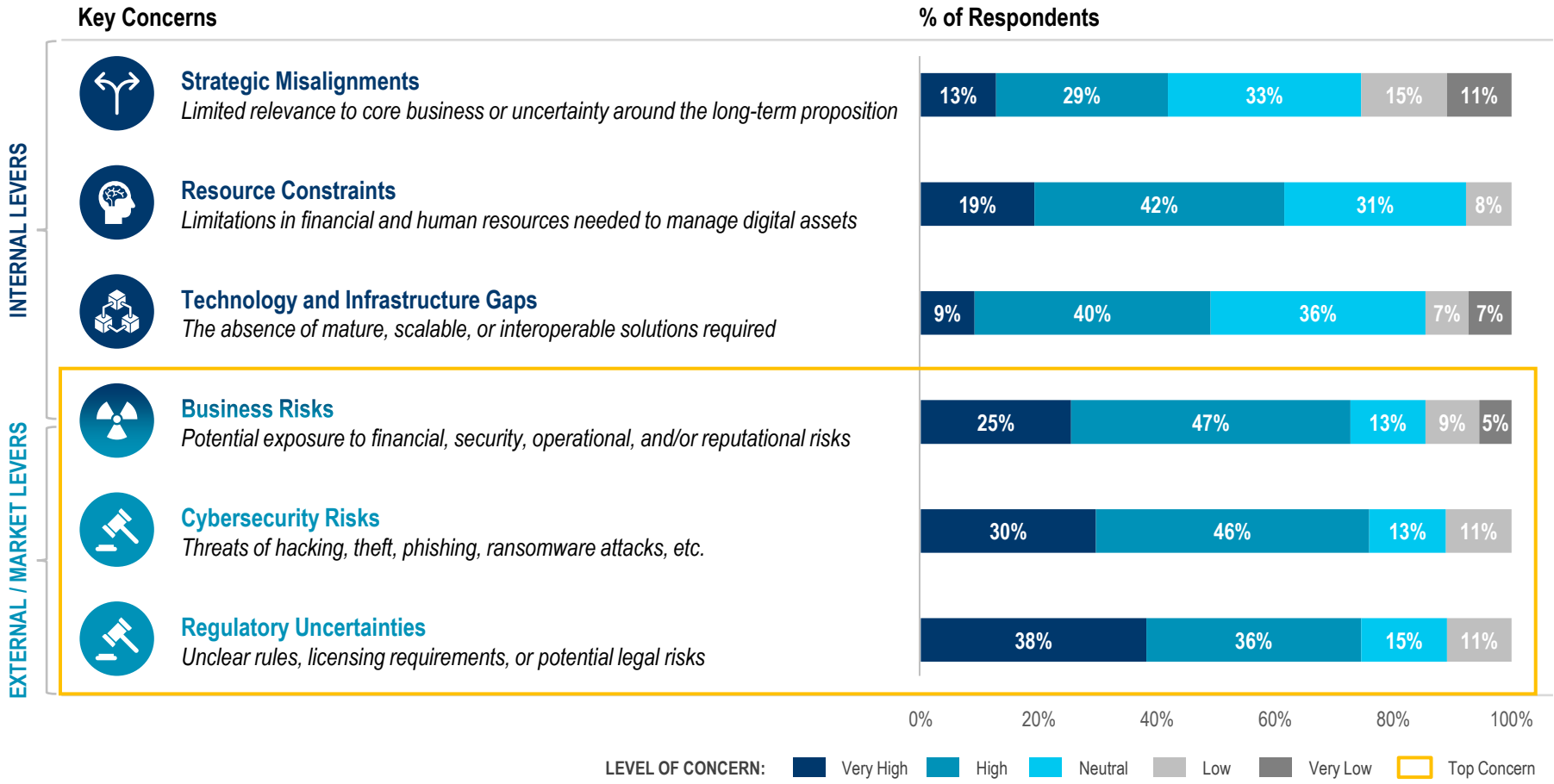
According to our survey, around 60% of Hong Kong financial institutions remain cautious about directly investing in and holding digital assets. Their concerns stem from a mix of internal, controllable factors and external, market-driven barriers.

Aside from regulatory uncertainty, risk concerns stand out as the single most significant hurdle. Around 70% of financial institutions cite risks, spanning cybersecurity, financial crime, operational resilience, and reputational exposure, as their top barrier.

With heightened sensitivity to cybersecurity and custodial weaknesses, risk mitigation has become a non-negotiable requirement for direct investment. And until institutional-grade security frameworks and trusted custody solutions are in place, financial institutions are likely to remain on the sidelines.

However, there are concerns about holding digital assets, with Hong Kong financial institutions raising regulatory uncertainty and risk concerns as the most significant

Survey: Key Concerns for Digital Asset Adoption
% of Respondents (Hong Kong Financial Institutions), 2025



Source: Quinlan & Associates survey and analysis

PERSPECTIVES FROM HONG KONG FINANCIAL INSTITUTIONS

Key Concerns for the Adoption of Digital Assets

Strategic Misalignment

"We have a strong heritage of stability and need to consider how suitable digital assets are for investors."

- GLOBAL ASSET MANAGER

Resource Constraints

"Digital assets require a lot of non-trivial investment, meaning that one needs to fight for internal resources."

- GLOBAL BANK

Technology / Infrastructure Gaps

"Web3 structures are very different from Web2; this is very new to banks and needs to be addressed."

- REGIONAL BANK

Business Risks

"The level of risk associated with cryptocurrency may not be aligned with our current risk appetite."

- TRUSTEE

Cybersecurity Risks

"Cybersecurity is an important risk for us to manage but there are solutions in the market that can help address it."

- LOCAL BANK

Regulatory Uncertainty

"We will closely monitor the market until regulators provide further clarity and our peers move forward."

- GLOBAL ASSET MANAGER

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SECURITY AS A KEY ISSUE TO BE ADDRESSED

KEY TAKEAWAYS

Several prominent crypto companies have experienced significant financial losses due to large-scale hacks. These security breaches are primarily driven by vulnerabilities such as poor private key management and staff shortages. The costliest hack occurred at Bybit, resulting in an estimated loss of USD 1.46 billion due to a private key leak in their hot wallet system.

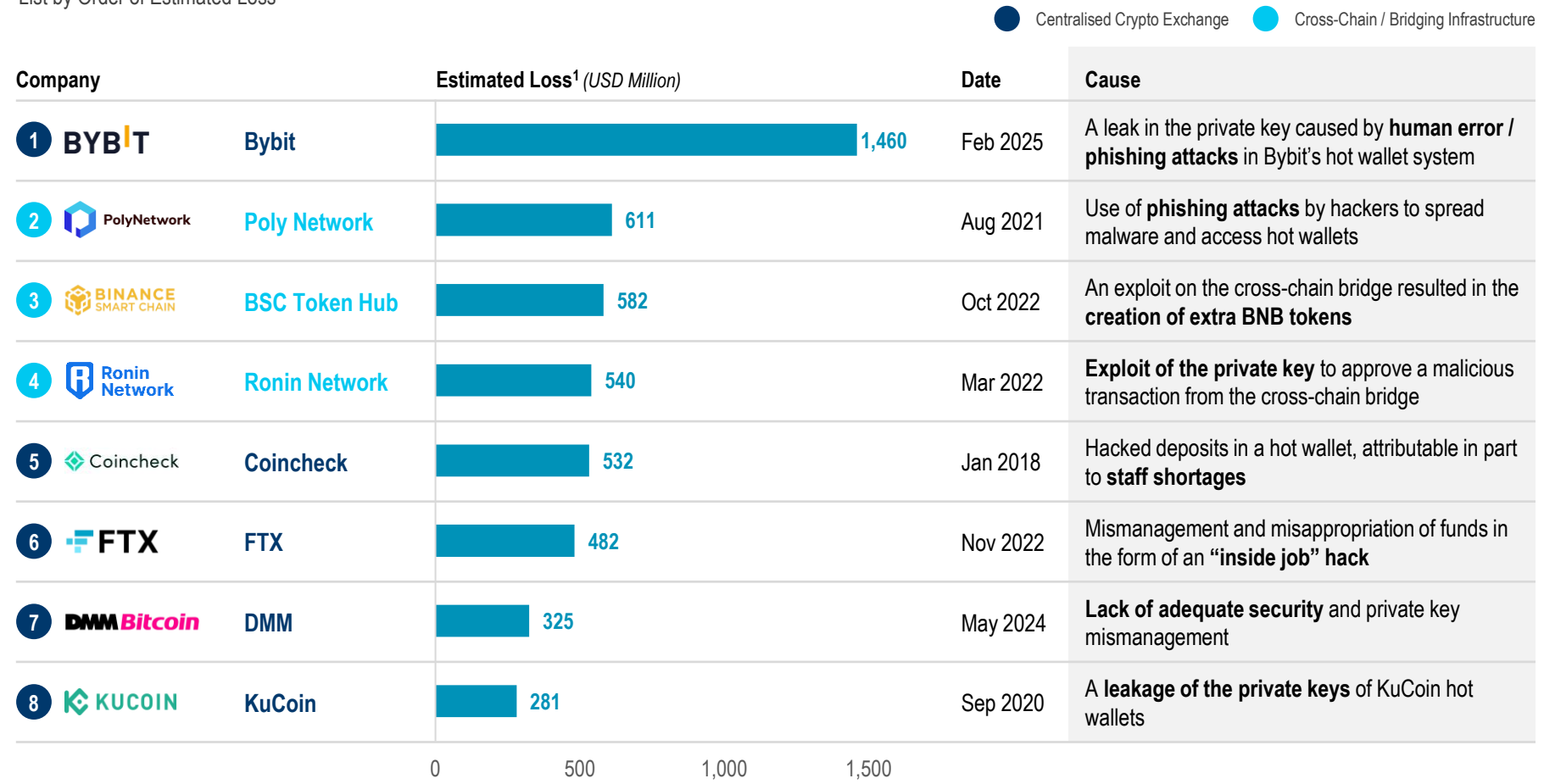
Other notable incidents include phishing attacks at Poly Network, exploits on the cross-chain bridges and private key at BSC Token Hub and Ronin Network respectively, and mismanagement and internal fraud at FTX.

Additionally, attacks involving insufficient security protocols, as seen in the DMM case, highlight systemic weaknesses across the industry.

These incidents have raised market concerns about the security of digital assets and may discourage investors from directly holding them.

Several firms have suffered significant financial losses from hacks, which were primarily caused by poor private key security and staff shortages, highlighting the need for improved asset safekeeping

Largest Crypto Hacks
List by Order of Estimated Loss



	Company	Estimated Loss[1] *(USD Million)*	Date	Cause
1	Bybit	1,460	Feb 2025	A leak in the private key caused by **human error / phishing attacks** in Bybit's hot wallet system
2	Poly Network	611	Aug 2021	Use of **phishing attacks** by hackers to spread malware and access hot wallets
3	BSC Token Hub	582	Oct 2022	An exploit on the cross-chain bridge resulted in the **creation of extra BNB tokens**
4	Ronin Network	540	Mar 2022	**Exploit of the private key** to approve a malicious transaction from the cross-chain bridge
5	Coincheck	532	Jan 2018	Hacked deposits in a hot wallet, attributable in part to **staff shortages**
6	FTX	482	Nov 2022	Mismanagement and misappropriation of funds in the form of an **"inside job" hack**
7	DMM Bitcoin	325	May 2024	**Lack of adequate security** and private key mismanagement
8	KuCoin	281	Sep 2020	A **leakage of the private keys** of KuCoin hot wallets

[1]Based on the cryptocurrency exchange rates at the time of theft
Source: Crystal Intelligence, Halborn, Ripple, Quinlan & Associates analysis

SECTION 2

THE FOUNDATION OF INSTITUTIONALISATION

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THE FOUNDATION OF INSTITUTIONALISATION

KEY TAKEAWAYS

Financial institutions participate in the digital asset market through issuance, facilitation, and investment.

Regardless of the form of participation - such as tokenisation, trading, payments, or other activities - the underlying digital assets must be (1) securely stored, (2) compliantly operated, and (3) seamlessly connected with both internal and external systems to enable full interoperability and scalability across business cases.

Digital asset custody forms the foundational layer that underpins all digital asset use cases for financial institutions. In essence, without robust custody, the institutionalisation of digital assets simply cannot be achieved.

Digital asset custody serves as the foundational layer of institutionalisation, providing the essential security, compliance, and interoperability required to help realise institutional digital asset ambitions

The Foundation of Institutionalisation of Digital Assets

Digital Asset Custody

Underpins all digital asset use cases for financial institutions, including tokenisation, trading, margin financing, lending, payments, collateral management, staking, and investment activities, by providing **three core capabilities: (1) security, (2) compliance, and (3) interoperability**

Source: Quinlan & Associates analysis

CAPABILITY (1/3) – SECURITY

KEY TAKEAWAYS

There are two core security pillars to consider when safeguarding digital assets:

1. **Key Management System ("KMS"):** Defines how private keys are generated, stored, protected, and used - implemented through hardware (e.g., Hardware Security Module) and/or software (e.g., Multi-Party Computation); and
2. **Vault:** Defines how private keys are stored and accessed to enable transactions on compatible blockchain(s), typically classified by connectivity - online (hot), hybrid (warm), or offline (cold) - balancing accessibility and security.

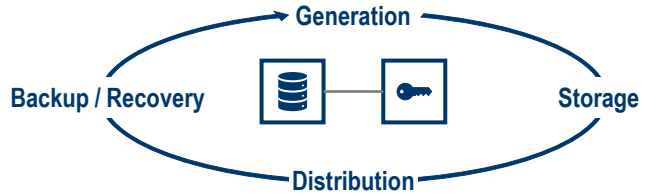
The options across both key management systems and vaults are not mutually exclusive in implementation; hence, financial institutions should determine the appropriate combination across these two pillars based on their specific business needs and regulatory requirements. For Hong Kong, regulators may prefer on-premises deployment in particular cases.

The private key management system and vault form two core pillars of digital asset safekeeping and should be adopted flexibly based on business needs and regulatory requirements

Capability 1: Security

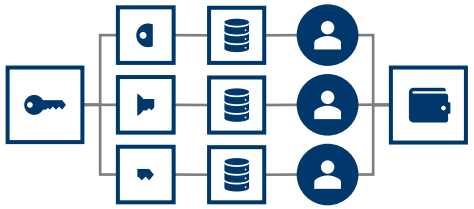
Safeguarding digital assets effectively

KEY MANAGEMENT SYSTEM



Hardware Security Module ("HSM")

A tamper-resistant physical device enabling highly secure private key operations including generation, storage, signing, and backup / recovery



Multi-Party Computation ("MPC")

A method that splits a private key into multiple shares (i.e., shards) across different parties or devices

Mechanism for secure private key operations including generation, storage, signing, backup / recovery

VAULT

Hot Storage (Online)

A vault connected to the internet for real-time transactions, offering convenience but higher exposure to cybersecurity risk

Warm Storage (Online / Offline)

A semi-connected vault that balances accessibility and security, typically used for controlled operational liquidity

Cold Storage (Offline)

An offline vault isolated from any network, designed for maximum security and long-term asset storage

Interface for accessing and transacting using private key(s) on compatible blockchain(s)

Source: Quinlan & Associates analysis

CAPABILITY (2/3) – COMPLIANCE

KEY TAKEAWAYS

Digital assets are subject to the same regulatory and compliance requirements as traditional financial assets. Specifically for Hong Kong, regulators typically follow *'same activity, same risks, same regulation'* principle". However, the pseudonymous and irreversible nature of blockchain transactions requires governance and control mechanisms to be exceptionally robust to ensure both security and compliance.

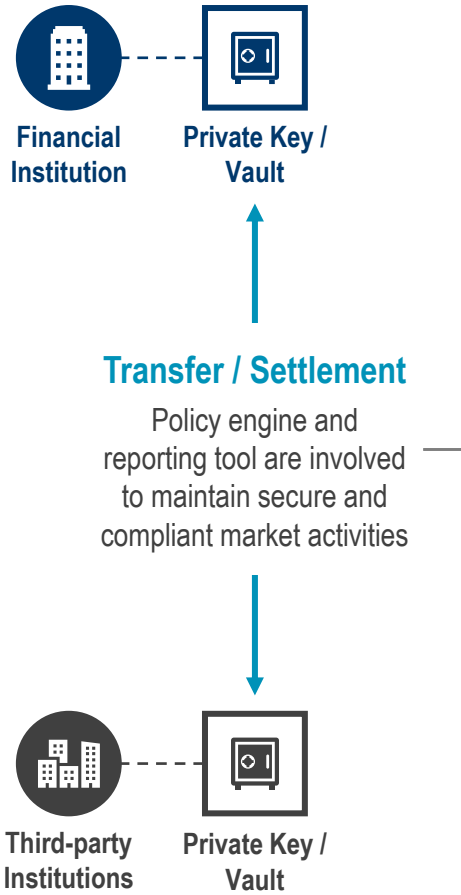
As both the KMS and vault form critical components of security, their access must be controlled by a governance and authorisation framework that clearly defines who has access, under what circumstances, and for what purpose.

Also, programmable policy engine(s) should be implemented to manage workflows within digital asset custody operations.

Following execution, comprehensive reporting tool(s) should maintain auditable records, issue escalations or notifications when necessary, and integrate reporting procedures.

Digital asset custody operations require stringent compliance oversight, which is supported by programmable policy engine(s) and comprehensive reporting tool(s)

Capability 2: Compliance
Enforcing robust and consistent governance and policy controls



GOVERNANCE / POLICY ENGINE(S)

Enforcing approval and transaction policies to ensure secure and compliant custody operations

Access Control for Key Management System & Vault
Identifying key stakeholders and establishing segregated roles / responsibilities for controlled access

Multi-layer Approval on Predefined Workflow
Seeking appropriate and required level of approval(s) from key stakeholders before executing actions

Compliance Checks
Running internal and external compliance requirements (e.g., KYC, KYT, AML, whitelisting, etc.)

Transfer Limits
Verifying minimum / maximum transfer thresholds and frequency for each counterparty involved

REPORTING TOOL(S)

Maintaining transparent, auditable records to ensure regulatory compliance and operational resilience

Audit Trail
Maintaining audit trails across ledgers with event logs and timestamps with cryptographic assurance[1]

Escalations
Notifying key stakeholders if suspicious or unauthorised activities are detected

Integrated Reporting
Allowing digital asset reporting to align with existing reporting paradigms through API-based delivery

[1]Refers to the use of techniques (e.g., cryptographic hashes, digital signatures, etc.) to verify the authenticity and integrity of data or transactions - ensuring that an audit trail has not been tampered with and that each record can be independently validated
Source: Quinlan & Associates analysis

CAPABILITY (3/3) – INTEROPERABILITY

KEY TAKEAWAYS

As the foundation of digital asset operations, custody must extend beyond safekeeping by seamlessly integrating with, connecting to, and accessing both internal and external systems and tools.

1. **Core Banking System:** Integrate with existing banking infrastructure, such as processing, payments, and compliance systems, to align custody operations with existing practices
2. **External Market Ecosystem:** Connect with market participants, such as liquidity aggregators and order and execution management system ("OEMS") providers
3. **Value-added Solutions:** Access supporting services and tools that enhance digital asset operations, such as risk / compliance management tools, market data services, and other operational enablers

This level of utility can be achieved through an API gateway, which serves as a bridge to unlock greater utility beyond safekeeping functions.

Digital asset custody must interoperate with both internal and external systems to fully unlock the broader utility beyond safekeeping

Capability 3: Interoperability
Maximising functional utility through interoperability

CORE DIGITAL ASSET CUSTODY INFRASTRUCTURE

SECURITY

- Key Mgmt System
- Vault
- Governance

COMPLIANCE

- Governance / Policy Engine
- Reporting Tools

API GATEWAY

INTEROPERABILITY

INTEGRATION WITH CORE BANKING SYSTEM
Processing (e.g., ledger, pricing system, etc.)
Payments (e.g. RTGS,[1] FPS,[2] etc.)
Risk & Compliance (e.g., KYC, AML, etc.)

CONNECTIVITY WITH EXTERNAL MARKET ECOSYSTEM
Liquidity Pool (e.g., liquidity aggregators, order and execution management systems, etc.)
Service Providers (e.g., tokenisation, staking, etc.)

ACCESSIBILITY TO VALUE-ADDED SERVICES / TOOLS
Credit Scoring Providers
Counterparty Risk Screening Tools
Transaction Monitoring Tools

[1]Real Time Gross Settlement; [2]Faster Payment System
Source: Ripple, Quinlan & Associates analysis

SECTION 3

DIGITAL ASSET CUSTODY OPTIONS

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DIGITAL ASSET CUSTODY OPTIONS

KEY TAKEAWAYS

When acquiring digital asset custody capabilities, institutions have two options:

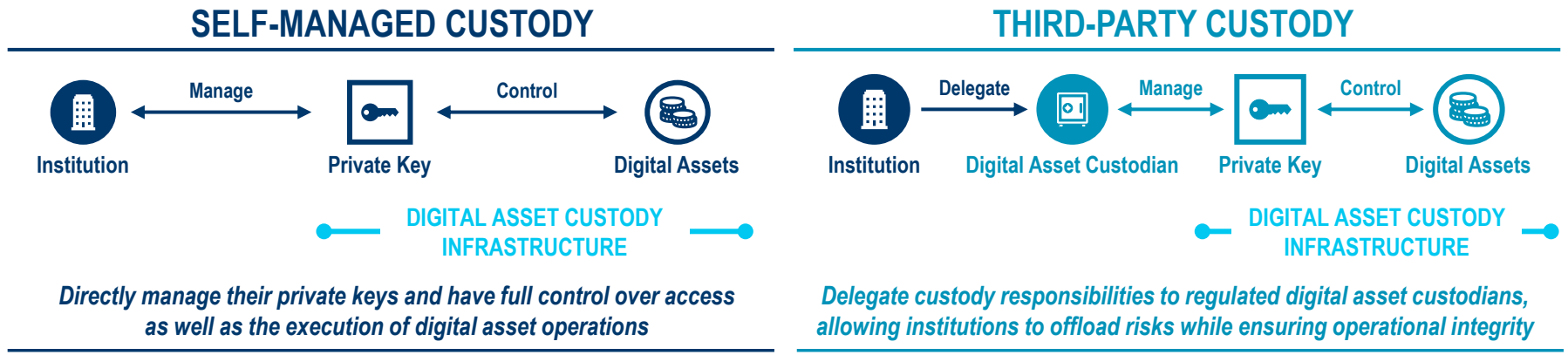
1. **Self-Managed Custody:** Building in-house capabilities, either through internal build or partnerships with digital asset specialists. This approach allows institutions to directly manage their private keys, granting complete control over access and the execution of digital asset operations; and
2. **Third-Party Custody:** Entrusting custody responsibilities to digital asset custodians. This approach enables institutions to delegate operational and risk management responsibilities with faster time-to-market.

Each option carries its trade-offs (e.g., control, ownership, customisation, compliance, future proofing, time-to-market, and risk exposure), which institutions should carefully assess to determine the most suitable approach for their business needs.

Institutions may choose to directly manage digital asset custody and/or delegate it to a third-party custodian, with both options requiring careful assessment of their respective trade-offs

Digital Asset Custody Options

Self-managed Custody vs. Third-party Custody



Full control over private key management, vault operations, and governance model	CONTROL / COUNTERPARTY RISK	Delegated control to a regulated custodian subject to contractual and service-level agreements
Customisable to align with internal systems, business needs, regulatory requirements, and security framework	CUSTOMISATION	Dependent on the custodian's product suite, available technology stack, and supported operational model
Full flexibility to design approval workflows, compliance checks, and reporting structures	COMPLIANCE	Operates within the custodian's predefined policy engine and compliance architecture
Highly adaptable for innovation, emerging asset types, and new product structures	FUTURE PROOFING	Reliant on the custodian's technology roadmap and willingness to support new products
Requires significant investment, integration effort, and longer implementation lead time.	TIME-TO-MARKET	Enables faster deployment with lower upfront cost and minimal integration complexity
Fully responsible for data, cybersecurity, operational, and regulatory / compliance risks	RISK DIVERSIFICATION	Risk diversification and mitigation through the custodian's regulated status and insurance coverage

Source: Quinlan & Associates analysis

HONG KONG MARKET PREFERENCE

KEY TAKEAWAYS

According to our survey findings, financial institutions in Hong Kong currently show a stronger preference for the third-party custody model (57% of sell-side and 80% of buy-side institutions), compared to self-managed custody (43% of sell-side and 20% of buy-side institutions).

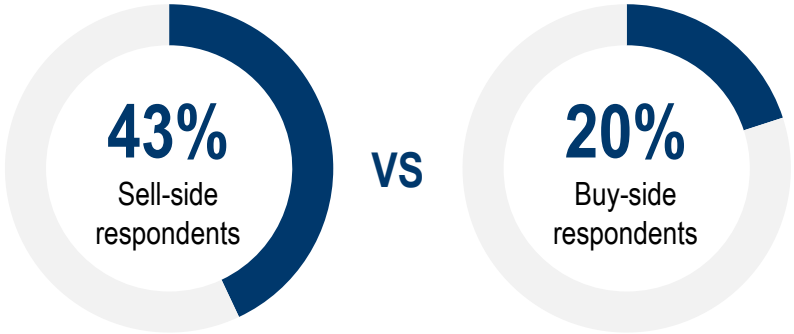
Institutions opting for self-managed custody primarily do so to meet regulatory compliance requirements, maintain greater control over assets and processes, and preserve a competitive advantage over their peers.

Conversely, those favouring third-party custody cite reduced operational burden, access to specialised expertise and resources not available in-house, and the ability to focus on their core business operations.

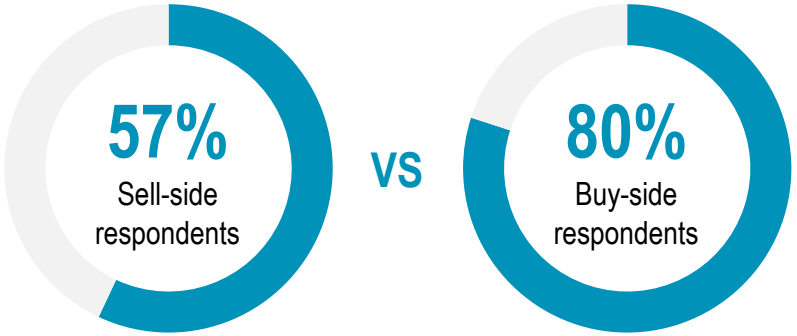
Hong Kong institutions show a stronger preference for third-party custody for efficiency and expertise, while others opt for self-managed custody for greater control and compliance

Digital Asset Custody Options Preferences
% of Respondents, Self-managed Custody vs. Third-party Custody

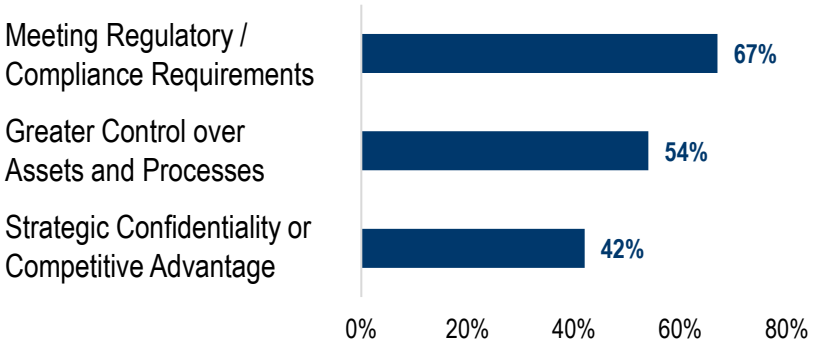
SELF-MANAGED CUSTODY
(BUILD IN-HOUSE CAPABILITIES)



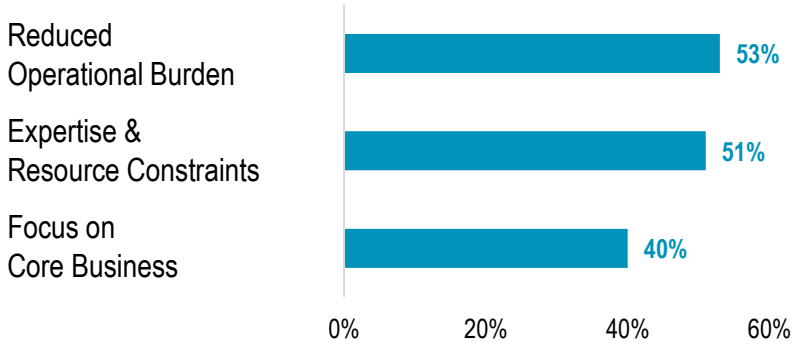
THIRD-PARTY CUSTODY
(OUTSOURCE CAPABILITIES)



TOP 3 REASONS FOR SELF-MANAGED CUSTODY



TOP 3 REASONS FOR THIRD-PARTY CUSTODY



Source: Quinlan & Associates survey & interviews

PERSPECTIVES FROM HONG KONG FINANCIAL INSTITUTIONS

Self-managed vs. Third-party Digital Asset Custody

SELF-MANAGED CUSTODY

Fully Ownership and Control

"We try to keep everything directly under our control, so our preferred approach is to build internal capabilities rather than rely on third parties."

- LOCAL BANK

New Business Opportunities

"We can be the custodian for other financial institutions. Digital asset custody service is one of the businesses that are looking into."

- GLOBAL BANK

THIRD-PARTY CUSTODY

Faster Time-to-Market

"Delegating digital asset custody operations to a third-party custodian allows quicker access to the market."

- REGIONAL BANK

Delegation of Non-core Proposition

"Custody is not part of our core business. We prefer to maintain our operating model by having third-party custodians across all assets."

- GLOBAL ASSET MANAGER

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MARKET GAP ON THIRD-PARTY CUSTODY

KEY TAKEAWAYS

While the market currently favours third-party custodians, most institutions surveyed believe these providers are not yet fully equipped to meet their operational and compliance needs for digital asset activities.

Among the three categories of third-party custodians - (1) bank-affiliated (e.g., HSBC, Standard Chartered, etc.), (2) exchange-affiliated (e.g., HashKey, OSL, etc.), and (3) independent custodians (e.g., Hex Trust) - there are differing levels of willingness to engage and perceived readiness.

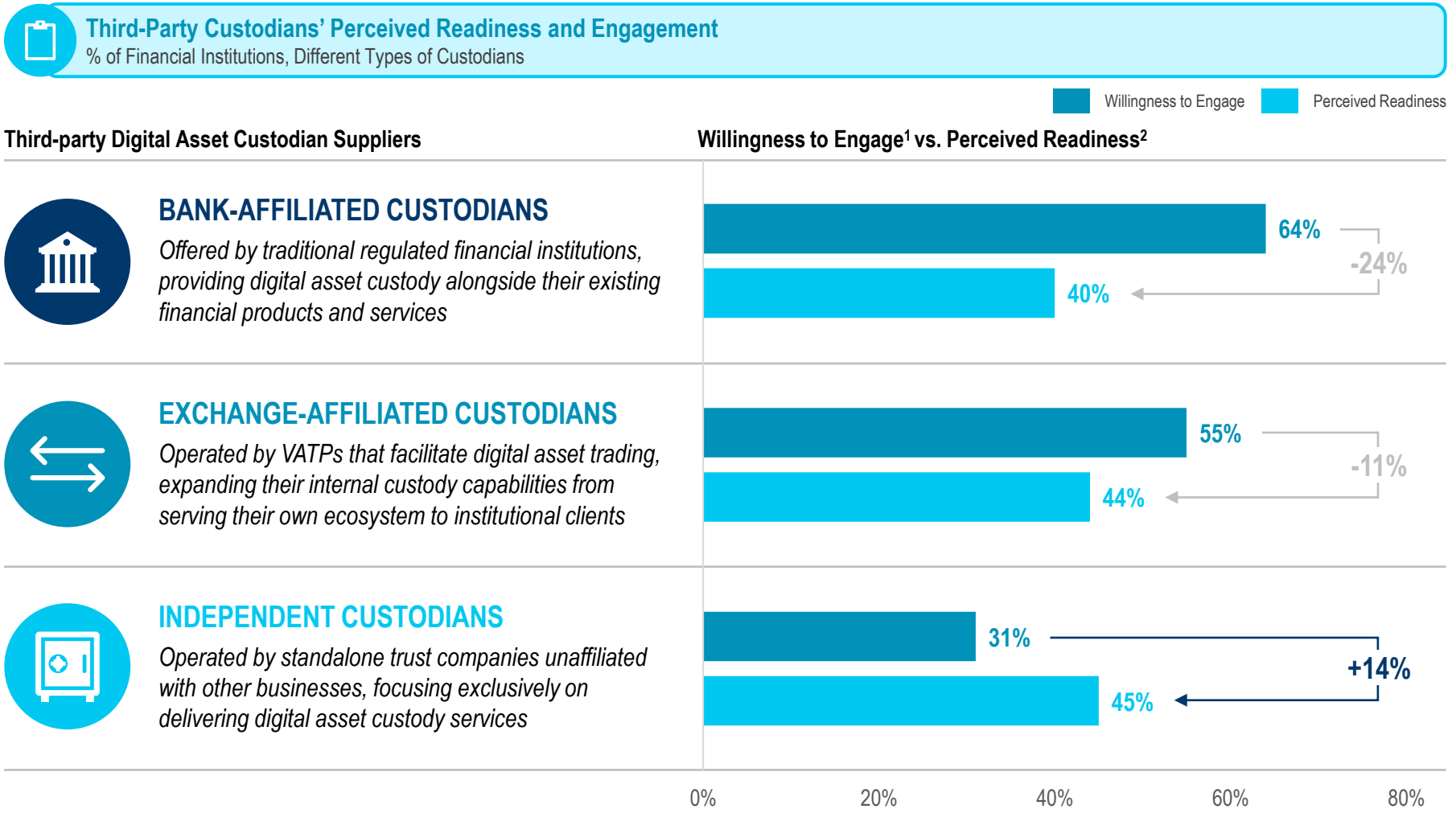
For instance, Institutions generally show a stronger willingness to engage bank-affiliated custodians, while viewing independent custodians as more operationally mature.

Given this gap, financial institutions are either taking a "wait-and-see" stance until solutions mature or selectively partnering with providers they deem most suitable for their current needs.

While the Hong Kong market favours third-party custody, there is broad agreement that available service providers are not yet fully equipped to meet digital asset operational needs

Third-Party Custodians' Perceived Readiness and Engagement

% of Financial Institutions, Different Types of Custodians



[1]% of financial institutions that selected "High" and "Very High" for their preference in partnering the digital asset custodian; [2]% of financial institutions that selected "High" and "Very High" for their perception on the digital asset custodian's technological / operational readiness to support their needs

Source: HKMA, SFC, FSTB, Quinlan and Associates survey & interviews

PERSPECTIVES FROM HONG KONG FINANCIAL INSTITUTIONS

Types of Third-party Custodians

Financial institutions recognised the relative strengths and weaknesses of each type of third-party custodians:

BANK-AFFILIATED CUSTODIANS

Existing Relationship

"We work closely with other banks already, so relying on existing trusted relationship would make more sense."

- REGIONAL BANK

Limited Technology Readiness

"Although we would like to work with banks, we understand that their relevant infrastructure is not quite there yet."

- FAMILY OFFICE

EXCHANGE-AFFILIATED CUSTODIANS

Regulatory Assurance

"As VATPs are currently regulated by the SFC, it would provide us with more assurance from a regulatory perspective"

- TRUSTEE

Perceived Skewness to Trading

"Services offered by VATPs are perceived to be focused on trading activities, but we prefer working with an agnostic provider."

- GLOBAL ASSET MANAGER

INDEPENDENT CUSTODIANS

Advanced Technology

"We understand that they can be more technologically advanced than financial institutions at this stage."

- GLOBAL BANK

Insufficient Brand Reputation

"We would prefer working directly with financial institutions with the same level of reputation in the market."

- GLOBAL ASSET MANAGER

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SECTION 4

MULTI-CUSTODY ORCHESTRATION

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NEEDS OF MULTI-CUSTODY ARRANGEMENT

KEY TAKEAWAYS

Similar to traditional custody operations, financial institutions with a regional or global footprint are likely to operate under multiple custody arrangements, driven by:

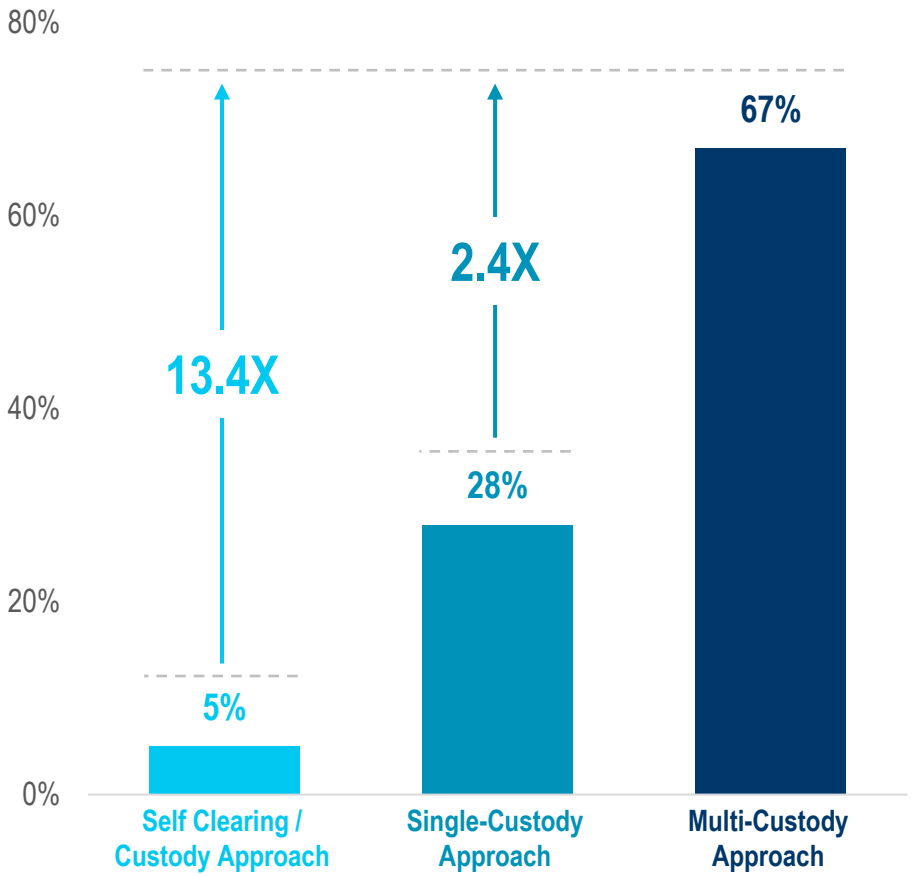
1. **Solution Unavailability:** Suitable third-party solutions may not yet be available or institution-ready in certain jurisdictions;
2. **Regulatory Requirements:** Institutions may adopt multiple custody models to remain compliant with local regulatory requirements and/or licensing constraints;
3. **Risk Diversification:** Institutions may diversify across custody arrangements to mitigate concentration risk; and
4. **Functional Specialisation:** Institutions may adopt multiple solutions to address distinct functional needs (e.g., asset coverage, staking, integration with specific networks / platforms, etc.).

This trend echoes traditional finance, where financial institutions similarly employ a range of custody options.

Similar to traditional asset custody operations, we expect financial institutions to strategically operate under a multi-custody arrangement for digital asset custody

Traditional Asset Custodial Approach by Firm

% of Wealth Management Firms, 2025



Source: Ripple, F2 Strategy, Quinlan & Associates analysis

Drivers for Multi-Custody Approach

Digital Asset Operations

1 SOLUTION UNAVAILABILITY

A financial institution may operate under a self-managed custody model, as third-party custody solutions are currently unavailable

2 REGULATORY REQUIREMENTS

A financial institution may operate across jurisdictions, requiring divergent requirements for digital asset custody

3 RISK DIVERSIFICATION

A financial institution may engage multiple third-party custodians to mitigate concentration risk and ensure business continuity

4 FUNCTIONAL SPECIALISATION

A financial institution may engage multiple custody providers to access the specialised capabilities offered by each provider

CHALLENGES IN ADOPTING MULTI-CUSTODY

KEY TAKEAWAYS

While operating under multiple custody models is often unavoidable in digital asset custody, it can create a range of challenges for financial institutions:

1. **Heightened Regulatory Risk Exposure:** Divergent regulatory obligations, audit standards, and counterparty risks increase the overall compliance and oversight burden
2. **Fragmented Infrastructure:** Operating multiple custody systems and interfaces leads to integration friction and maintenance complexity
3. **Governance & Policy Misalignment:** Inconsistent workflows, approval logic, and access controls across custody systems result in operational inefficiencies

Such divergence in regulatory expectations, custody infrastructure, and governance or policy frameworks may limit operational scalability and sustainability.

Multi-custody models raise several key risks, especially across multiple jurisdictions, raising challenges such as infrastructure integration difficulties and governance misalignment risks

Challenges in Operating Multiple Custody Models / Systems
Case Study: Global Financial Institution

JURISDICTION A		JURISDICTION B	
REGULATORY REQUIREMENTS • Third-party custodians preferred • Annual audits • Strict counterparty management	≠	**REGULATORY REQUIREMENTS** • Self-custody preferred • No statutory audit • Lenient counterparty management	✕ HEIGHTENED REGULATORY RISK EXPOSURE
THIRD-PARTY CUSTODIAN	≠	**SELF-MANAGED CUSTODY**	✕ FRAGMENTED INFRASTRUCTURE
GOVERNANCE & POLICY • **Compliance-driven governance** (e.g., detailed internal controls, internal audit cycles, segregated duties, consumer protection) • **Policies depend on regulatory requirements** (e.g., asset segregation, board attestation)	≠	**GOVERNANCE & POLICY** • **Risk-ownership-driven governance** (e.g., emphasis on technological security, internal accountability, market reputation) • **Policies depend on internal discipline and transparency** (rather than statutory compliance)	✕ GOVERNANCE & POLICY MISALIGNMENT

Source: Ripple, Quinlan & Associates analysis

MULTI-CUSTODY ORCHESTRATION

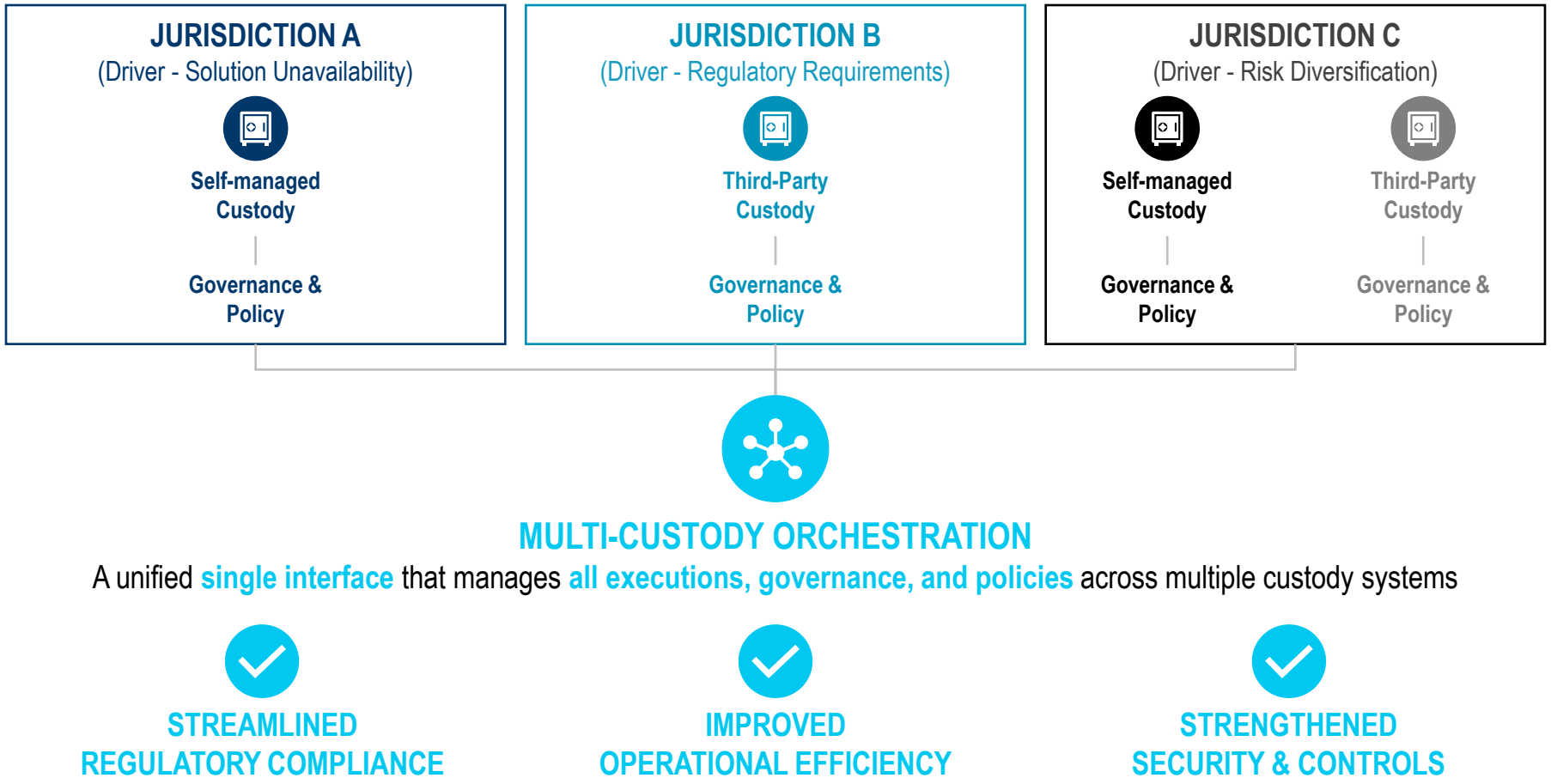
KEY TAKEAWAYS

Under such circumstances, financial institutions can benefit from implementing a multi-custody orchestration solution, where all execution (e.g., transfers, transactions, and corporate actions), governance, and policies are centrally monitored and configured across multiple custody systems. This enables financial institutions to:

1. **Streamline Regulatory Compliance:** Implements unified compliance enforcement and end-to-end audit trails across all custody operations, ensuring consistent regulatory reporting and simplified oversight;
2. **Improve Operational Efficiency:** Consolidates custody operations under a unified interface and infrastructure, reducing manual processes, integration friction, and long-term maintenance overhead; and
3. **Strengthened Security & Controls:** Applies consistent governance, workflow, access controls, and approval logic across all custody environments, minimising human error and unauthorised activities.

A multi-custody orchestration layer centralises all execution, governance, and policies, thereby streamlining compliance, enhancing efficiency, and strengthening security across all custody systems

Multi-custody Orchestration Solution
Case Study: Global Financial Institution



Source: Ripple, Quinlan & Associates analysis

SECTION 5

VENDOR ENGAGEMENT AND ASSESSMENT

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CAPABILITY ACQUISITION OPTIONS

KEY TAKEAWAYS

For capability acquisition, the market generally favours partnerships with specialised vendors, for the following reasons: (1) the scarcity of talent in sourcing and hiring Web3 specialists; (2) the need to reallocate resources to investments with higher ROI, and (3) the opportunity to leverage complementary solutions that support broader digital asset ambitions.

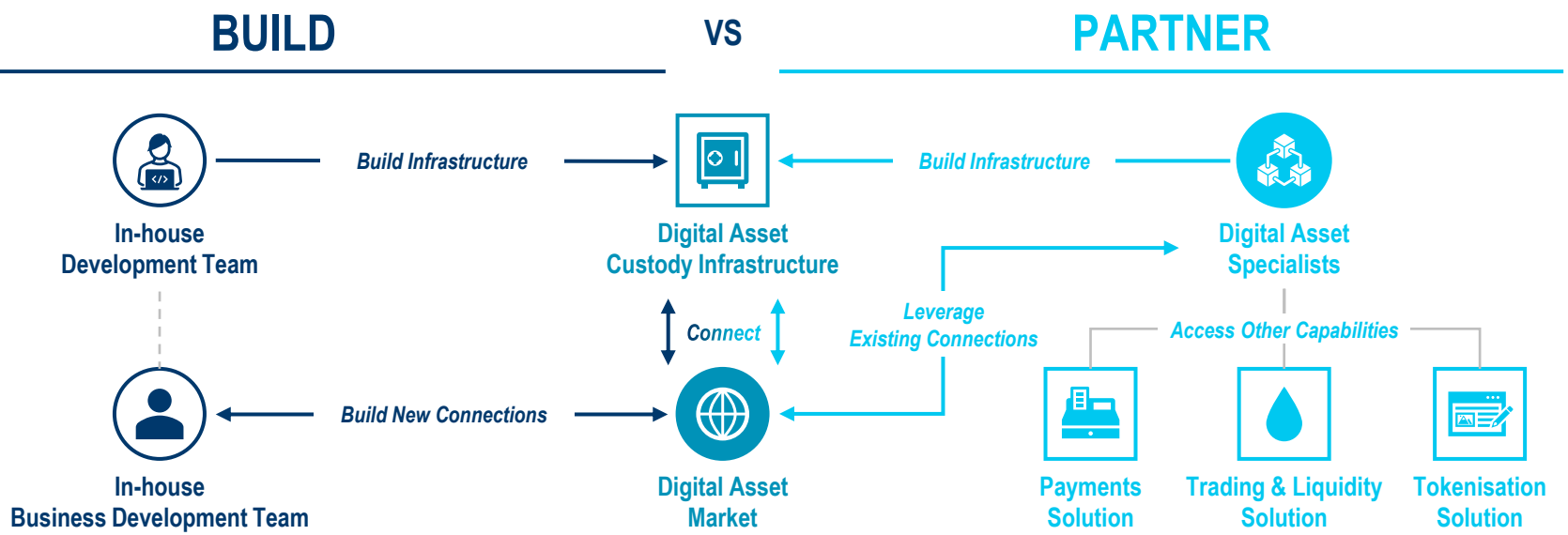
Notable examples for self-managed custody include BNP Paribas Securities Services with Fireblocks, Societe Generale-FORGE with Ripple Custody, and State Street with Taurus. These examples highlight a broader industry trend by financial institutions to seek external expertise for self-managed custody capability acquisition.

By partnering with established digital asset custody firms, institutions can achieve faster and more secure outcomes, while avoiding the significant delays, high capital expenditure, and operational risks associated with building in-house systems through internal resources.

Financial institutions partner with specialised vendors for digital asset custody capabilities to address talent shortages, optimise resources, and meet evolving business needs

Capability Acquisition Options

Build vs. Partner



PARTNERSHIP REMAINS THE PREFERRED APPROACH FOR CAPABILITY ACQUISITION

TALENT SCARCITY	RESOURCE OPTIMISATION	SUSTAINABILITY & SCALABILITY
Sourcing and hiring top-calibre talent with extensive and relevant experience in Web3 technology and business development remains challenging	Prioritising investments in higher ROI, revenue-generating differentiators redirects resources away from building non-revenue infrastructure in-house	Partnering with digital asset specialists offers access to complementary solutions that support a broader range of business cases beyond custody

Source: Quinlan and Associates analysis

GENERAL VENDOR ASSESSMENT

KEY TAKEAWAYS

Financial institutions typically follow a five-step value chain when engaging vendors for digital asset custody needs: (1) sourcing, (2) consideration, (3) negotiation, (4) onboarding, and (5) activation.

Financial institutions begin by identifying prospective digital asset custody vendors that are capable and ready to meet their service requirements.

Once suitable custodians are shortlisted, institutions should carefully assess them across company-level, SLA-level, and KYC-level criteria to ensure alignment with business objectives, contractual obligations, and compliance requirements.

After onboarding, both parties should work collaboratively to ensure the solution is effectively deployed and adopted across the organisation through initiatives such as training sessions, KPI tracking, and ongoing performance reviews.

Financial institutions follow a five-step process (i.e., sourcing, consideration, negotiation, onboarding, and activation) to assess, onboard, and implement digital asset custody solutions

Company-level Factors

- 2.1 Quality of Solution(s) Offered
- 2.2 Breadth of Solution(s) Offered
- 2.3 Track Record of the Company
- 2.4 Brand / Reputation
- 2.5 Cybersecurity / Data Privacy
- 2.6 Management Team
- 2.7 Implementation Support
- 2.8 Deployment Time
- 2.9 Pricing Model / Mechanism

SLA-level Factors

- 3.1 Data / Intellectual Property Rights
- 3.2 Payment Terms
- 3.3 Fee Structure
- 3.4 Service Locations
- 3.5 Vendor Access to Internal Resources
- 3.6 Reporting Obligations
- 3.7 Termination Clauses
- 3.8 Indemnity / Liability

KYC-level Factors

- 4.1 Business Registration Certificate
- 4.2 Ownership Structure
- 4.3 Internal Policies / Code of Conduct
- 4.4 Product Technical Specification
- 4.5 Existing Customer References
- 4.6 Security Certification
- 4.7 Revenue / Profitability Proof

Source: Quinlan and Associates analysis

CAPABILITY ASSESSMENT (1/2) – OBJECTIVES

KEY TAKEAWAYS

When evaluating a vendor for digital asset custody, financial institutions should determine whether vendors can enable them to achieve four key objectives with regard to digital asset custody:

1. Build a robust custody foundation by implementing appropriate systems, architectures, techniques, and procedures;
2. Defend against external and internal threats by ensuring the system meets regulatory expectations and industry-grade security standards;
3. Enforce access, governance, policy, and execution control to ensure the legitimacy and authorisation of every action; and
4. Enable operational flexibility and scalability to support long-term resilience as market, technology, and regulatory environments continue to evolve.

When evaluating partnership options for digital asset custody capability acquisition, financial institutions should assess whether vendors can enable them to achieve the four objectives

FOUR OBJECTIVES THAT VENDORS SHOULD HELP FINANCIAL INSTITUTIONS TO ACHIEVE

BUILDING A ROBUST DIGITAL ASSET CUSTODY FOUNDATION

KEY QUESTIONS

Can vendor(s) ensure full institutional ownership of private keys throughout their lifecycle with the latest best practices and blockchain principles?

CAPABILITIES

- Robust Key Management System
- Principle-based Architecture
- Strong Cryptography
- Air-gapped Signing

Institutional digital asset custody journey must begin with building a secure foundation from day one

DEFENDING AGAINST EXTERNAL AND INTERNAL THREATS

KEY QUESTIONS

Can vendor(s) deliver a zero-trust, bank-grade platform with continuous security testing and runtime controls that prevent, detect, and contain malicious behaviour?

CAPABILITIES

- Bank-grade Security
- Zero-Trust Layered Security
- Multi-layered Security
- Continuous Assurance

From there, the system must be protected against both internal and external risks

ENFORCING ACCESS, GOVERNANCE, POLICY, AND EXECUTION CONTROL

KEY QUESTIONS

Can vendor(s) provide a fully signature-driven platform with configurable governance without privileged users and auditability for complete traceability?

CAPABILITIES

- No Root or Privilege Users
- Configurable Gov[1] and Policy
- Signature-driven Workflow
- Audit Trail Integrity

Once the system is ready, governance and policy determine the legitimacy of every execution

ENABLING OPERATIONAL FLEXIBILITY AND SCALABILITY

KEY QUESTIONS

Can vendor(s) provide a custody platform that scales effectively while enabling flexible deployment, long-term cryptographic adaptability, and seamless asset migration?

CAPABILITIES

- Vault Scaling
- Flexible Deployment
- Crypto Agility
- Asset Migration

Finally, the system must be agile to scale and evolve over time in line with business needs

[1]Governance

Source: Ripple, Quinlan & Associates analysis

CAPABILITY ASSESSMENT (2/2) – TECHNICAL DETAILS

KEY TAKEAWAYS

To support the four objectives when establishing in-house digital asset custody capabilities, specialised vendors for digital asset custody solutions should be evaluated on their ability to deliver the 16 supporting capabilities.

Financial institutions should carefully assess, select, and tailor the custody model that best aligns with their business needs and operating requirements.

Choosing a vendor with strong technological capability, together with flexible and scalable deployment, to support both current and future requirements is a critical consideration for long-term success.

There are 16 supporting capabilities that financial institutions should carefully choose and implement with support from digital asset custody solution vendors

FOUR OBJECTIVES THAT VENDORS SHOULD HELP FINANCIAL INSTITUTIONS TO ACHIEVE

BUILDING A ROBUST DIGITAL ASSET CUSTODY FOUNDATION	DEFENDING AGAINST EXTERNAL AND INTERNAL THREATS	ENFORCING ACCESS, GOVERNANCE, POLICY, AND EXECUTION CONTROL	ENABLING OPERATIONAL FLEXIBILITY AND SCALABILITY
ROBUST KMS Provide secure lifecycle management of private key, while ensuring clients to maintain full ownership and control	**BANK-GRADE SECURITY** Ensure the system meets regulatory, risk, and compliance requirements aligned with stringent expectations	**NO ROOT OR PRIVILEGED USERS** Eliminate privileged or root accounts to remove single points of failure and reduce insider risk	**VAULT SCALING** Support limitless vault scaling while maintaining affordability, operational efficiency, and reliable performance
PRINCIPLE-BASED ARCHITECTURE Align security with blockchain trust principles and established industry best practices	**ZERO-TRUST SECURITY** Independently validate all data across system components to minimise the impact of potential compromise	**CONFIGURABLE GOV[1] & POLICY** Flexibly define and enforce governance and policy to guide workflows, multi-layer approval, and execution controls	**FLEXIBLE DEPLOYMENT** Allow deployment across on-premises, hybrid, and cloud options, supporting up to FIPS 140-2 Level 4 certified HSM
STRONG CRYPTOGRAPHY Ensure data integrity using proven, tamper-proof cryptographic techniques to prevent unauthorised modification	**MULTI-LAYERED SECURITY** Implement a multi-layered architecture that minimises attack surfaces and potential vectors of compromise	**SIGNATURE-DRIVEN WORKFLOW** Require digital signatures for all user actions, transactions, system changes, and governance operations	**CRYPTO AGILITY** Enable adaptation of cryptographic algorithms, protocols, and mechanisms as technology evolves
AIR-GAPPED SIGNING Allow cold storage signing to isolate high-risk operations while supporting optional offline orchestration	**CONTINUOUS ASSURANCE** Conduct regular black-box penetration testing with targeted white-box testing as part of formal audits (e.g., for MPC)	**AUDIT TRAIL INTEGRITY** Maintain immutable and transparent records of all actions to ensure full traceability and verification	**ASSET MIGRATION** Securely migrate digital assets across environments while managing inherent complexity and operational risk

[1]Governance

Source: Ripple, Quinlan & Associates analysis

IMPORTANCE OF FLEXIBILITY DEPLOYMENT

KEY TAKEAWAYS

When assessing specialised vendors, financial institutions should recognise that digital asset custody systems can be configured in multiple forms depending on business needs and operating models.

For sell-side institutions, the primary objective is to build a robust custody infrastructure to serve clients and support future market growth.

In contrast, buy-side institutions prioritise building the infrastructure necessary to participate in digital asset markets and capture new revenue opportunities.

As a result, custody system requirements will naturally differ across deployment models, security, compliance, and interoperability needs.

For full-service financial institutions, selecting a vendor that supports implementation flexibility is essential to minimise multi-vendor engagement challenges, such as heightened integration complexity and administrative burden.

Institutions should seek digital asset custody vendors that provide flexible deployment options across the security, compliance, and interoperability pillars to suit varying maturity levels and business needs

✓ Applicable
✗ Not Applicable

	SELL-SIDE (e.g., Bank & Custodian) To build a robust digital asset custody infrastructure for offering custody services to the market	BUY-SIDE (e.g., Hedge Fund & Fintech & Asset Manager) To establish supporting infrastructure to participate in the digital asset market and capture new revenue opportunities	
DEPLOYMENT MODEL			
On-premise	✓	✗	The nature and latency requirements of business determine the preferred deployment model
Software-as-a-Service	✗	✓	
SECURITY– KMS			
Hardware Security Module	✓	✗	HSMs offer higher assurance security to the stringently regulated sell-side, while buy-side prefers MPCs' operational flexibility and scalability
Multi-party Computation	✗	✓	
SECURITY – VAULT			
Hot (Online)	✓	✓	Sell-side's operations can vary by frequency and criticality, requiring a diverse spread, while buy-side firms prefer the fast retrieval times of hot storage due to their active workflows
Warm (Online / Offline)	✓	✗	
Cold (Offline)	✓	✗	
COMPLIANCE			
Governance Engine	✓	✓	Buy-side asset managers may not require an orchestration layer due to already having integrated / centralised systems with less fragmentation
Policy Engine	✓	✓	
Reporting Tools	✓	✓	
Orchestration Layer	✓	✗	
INTEROPERABILITY			
Integration	✓	✗	Buy-side firms use integrated portfolio and order management systems that consolidate core data and workflows, while sell-side firms have more complex and fragmented operations
Connectivity	✓	✓	
Accessibility	✓	✗	

Source: Ripple, Quinlan & Associates analysis

SECTION 6

RIPPLE CUSTODY

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RIPPLE CUSTODY

KEY TAKEAWAYS

Ripple is a financial technology company that offers solutions for businesses, including digital asset custody, global stablecoin payments, and prime brokerage. Ripple's stablecoin (RLUSD) and the cryptocurrency (XRP) are leveraged across these solutions.

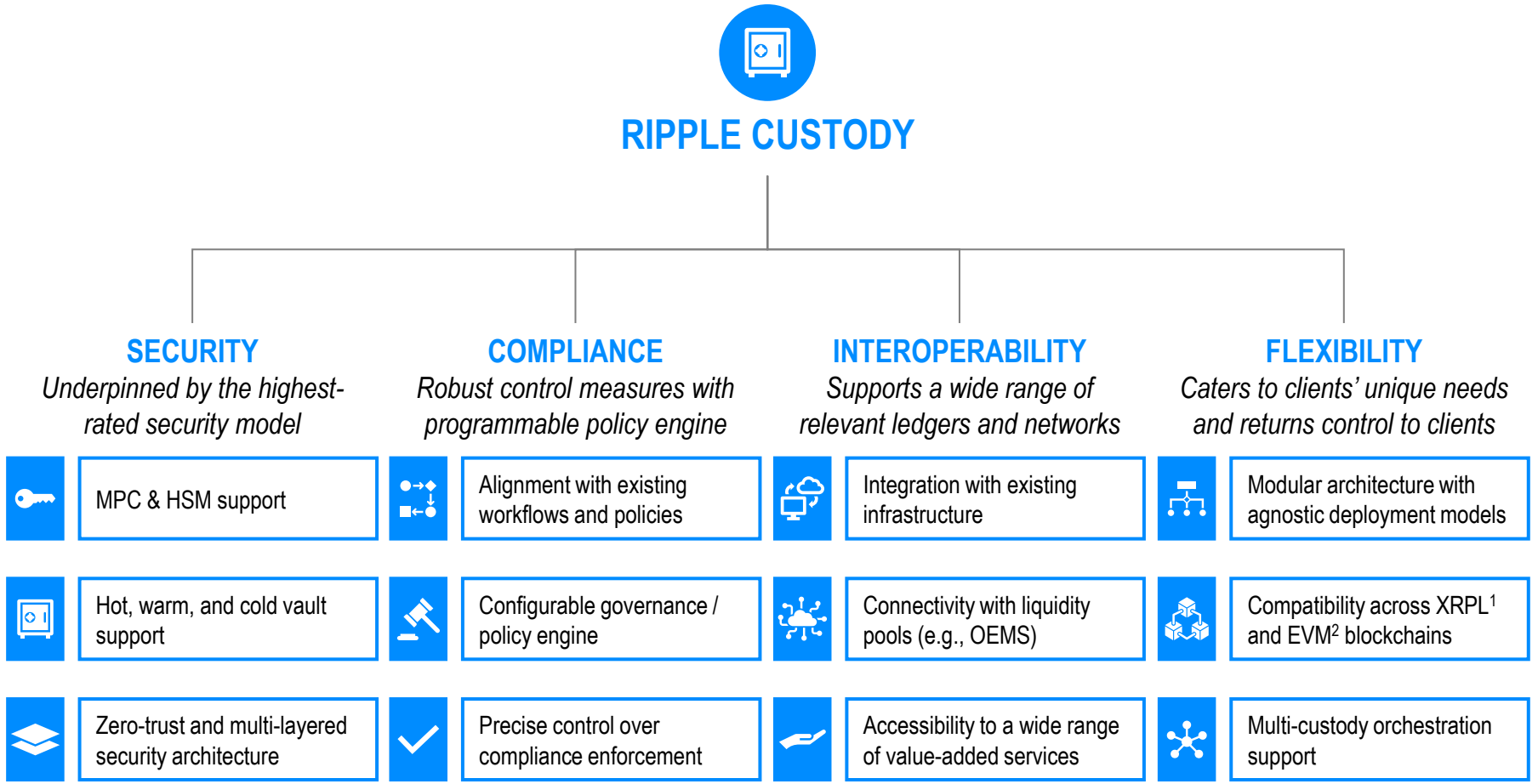
Ripple Custody is a core part of this proposition, enabling institutions to develop self-managed custody capabilities supported by four main pillars: (1) security, (2) compliance, (3) interoperability, and (4) flexibility.

Ripple Custody also delivers an orchestration layer that unifies self-managed and third-party custody platforms, enabling singular governance across the customer's entire digital asset portfolio.

With these capabilities, financial institutions across more than 20 jurisdictions have been able to develop, expand, and scale new digital asset business models with confidence.

Ripple Custody delivers an institutional-grade digital asset custody solution driven by security, compliance, and interoperability, complemented by flexible implementation capabilities

Ripple Custody
Overview



[1]XRP Ledger; [2]Ethereum Virtual Machine
Source: Ripple

CASE STUDY (1/2) – DIGITAL ASSET CUSTODY

KEY TAKEAWAYS

Ripple Custody supported DZ Bank to launch a digital custody offering for crypto securities in under 10 months through the deployment of a robust digital asset infrastructure.

The seamless integration of blockchain technology with existing processes enhanced capital market efficiencies that are compliant with the German eWpG law.

As a result of this partnership, the bank is now able to support secure and efficient transactions and wallet management, enabling new digital asset products and performance improvements.

Ripple Custody supported a leading German bank in launching a digital custody offering that seamlessly integrates with existing capital markets processes

Case Study: Digital Asset Custody Offering

DZ Bank

DZ BANK
Die Initiativbank

DZ BANK, a leader in the German financial sector, has successfully launched a digital custody offering for crypto securities such as tokenised bonds, integrating blockchain technology to enhance capital market efficiencies.

GOAL

Develop a cutting-edge solution for the custody, settlement, and management of digital assets, seamlessly integrated with existing capital market processes.

SOLUTION

Collaborating with Ripple Custody, implementation of a robust digital asset software infrastructure enables DZ BANK to incorporate blockchain analytics and wallet management into its offerings, delivering a comprehensive digital custody service to their clients for crypto securities under the German eWpG law.

Key Achievements

DZ Bank <> Ripple Custody Partnership

LARGE AUC SUPPORTED

DZ Bank recorded EUR 350 billion in assets under custody (“AUC”) as of August 2024

FAST TIME-TO-MARKET

The digital custody platform went live within 10 months using Ripple Custody’s solutions

SEAMLESS INTEGRATION

The solution integrates seamlessly with existing capital markets processes, improving operational efficiency

> “We are very proud that we are one of the first banks in Germany which really built and made their digital custody platform focusing on crypto securities according to the German securities law.”
>
> **Holger Meffert**
> *Head of Securities Services and Digital Custody*
> DZ BANK

Source: Ripple, Quinlan & Associates analysis

CASE STUDY (2/2) – MULTI-CUSTODY

KEY TAKEAWAYS

Ripple Custody supported one of the Global Systemically Important Banks ("G-SIB") operating multiple custody systems across different jurisdictions by deploying a single window interface powered by its proprietary unified governance and policy engine.

This arrangement enabled financial institutions to control governance and policies across different custody systems under a centralised operational environment.

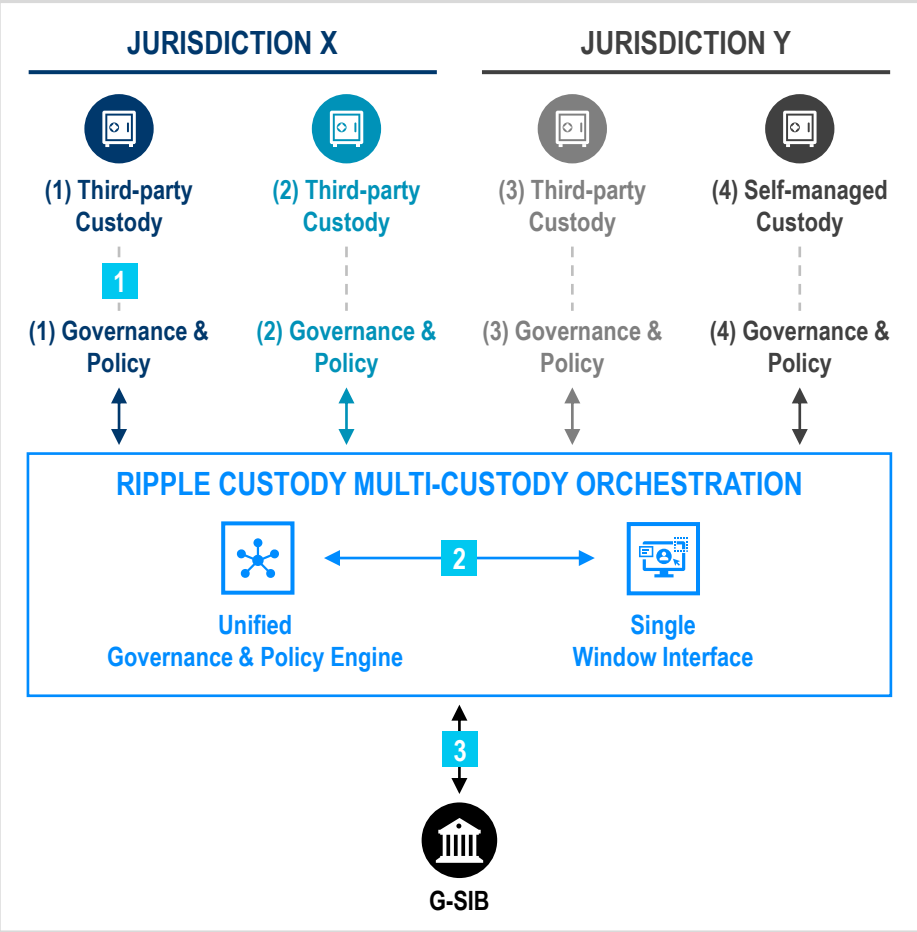
When changes occurred in any custody system (e.g., a third-party custodian under a specific jurisdiction), such updates are centrally managed by the G-SIB through Ripple Custody's multi-custody orchestration layer, ensuring alignment with the bank's globally standardised policies and practices.

Through this implementation, the bank was able to mitigate risks, ensure compliance, enhance security, reduce manual reconciliation efforts, and accelerate growth.

Ripple Custody enabled a G-SIB to centrally manage multiple custody systems across jurisdictions, enhancing compliance, security, and efficiency through Ripple Custody's orchestration solution

Case Study: Multi-custody Orchestration

G-SIB



Source: Ripple, Quinlan & Associates analysis

Procedure & Key Achievements

G-SIB <> Ripple Custody Partnership

1 CHANGE INITIATION
User manages the system of licensing, technology, and financial services infrastructure across jurisdictions and submits an intent to change

2 REQUEST MANAGEMENT
All custody activities are channelled through a unified governance and security framework that checks whether specified conditions are met

3 APPROVAL & EXECUTION
The approval process is executed as per specific workflow, with all policy interactions and resultant actions cryptographically signed and verified

RISK MITIGATION
Consistent policies minimise risks across digital asset holdings

REGULATORY COMPLIANCE
The platform creates a comprehensive and verifiable audit trail

ENHANCED SECURITY
Robust governance prevents unauthorised transactions and activities

HIGHER EFFICIENCY
The single interface reduces manual effort and operational complexities

ACCELERATED GROWTH
API-first approach enables scalability and connectivity for rapid growth

SECTION 7

HOW WE CAN HELP

ripple QUINLAN &ASSOCIATES

WHERE WE CAN SUPPORT YOU

KEY TAKEAWAYS

Quinlan & Associates can support your organisation in formulating a digital asset strategy that leverages blockchain-based financial technology infrastructure, through:

- Research & Analysis
- Strategy Development
- Collateral Development
- Roadmap Implementation

Ripple supports institutions in realising their digital asset strategies through a comprehensive suite of blockchain-based solutions, spanning:

- Asset Issuance & Tokenisation
- Custody & Governance
- Distribution Enablement
- Asset Servicing

Quinlan & Associates can support the development of your organisation's digital asset ambitions; Ripple can help realise them by deploying its institutional-grade digital asset infrastructure solutions

How We Could Help

Areas of Support

STRATEGY FORMULATION

QUINLAN & ASSOCIATES

Research And Analysis	Strategy Development	Collateral Development	Roadmap Implementation
▪ Industry analysis, including best practices/case studies ▪ Use case mapping ▪ Competitive benchmarking ▪ Feasibility studies	▪ Asset / ecosystem design ▪ Go-to-market strategy ▪ Financial projections ▪ Operating model development	▪ Business case development to secure executive buy-in ▪ Proposal development for end-to-end license application support	▪ Staff upskilling and training ▪ Solution partner engagement ▪ Project management support

SOLUTION IMPLEMENTATION

ripple

Ripple orchestrates internal and external ecosystem to support the entire tokenisation lifecycle on XRPL and EVM chains

Asset Issuance and Tokenisation	Custody and Governance	Distribution Enablement	Asset Servicing
✓ Mint, burn, and authorise any financial and real-world assets on major blockchain networks ✓ Configure governance arrangements in a simplified manner	✓ Custody digital assets issued on behalf of end-clients or for a bank's own treasury assets ✓ Settle with investors using stablecoin to seamlessly on/off-ramp	• Onboard and perform KYC on investors with on-chain whitelisting ✓ Transfer to primary investors ✓ Trade on XRPL DEX • List on centralised exchanges	• Income and redemption payments • Corporate actions • Cap table management • Regulatory reporting

✓ Supported natively by Ripple Custody
• Supported through ecosystem partners

Source: Ripple, Quinlan & Associates

DIGITAL ASSET CUSTODY JOURNEY

KEY TAKEAWAYS

Just like any typical business initiative, setting up digital asset custody infrastructure also needs to be carried out in a stepwise manner to ensure that a solid foundation is created along each step of the way.

To that end, financial institutions need to ask themselves the following key questions to accurately assess their current positioning:

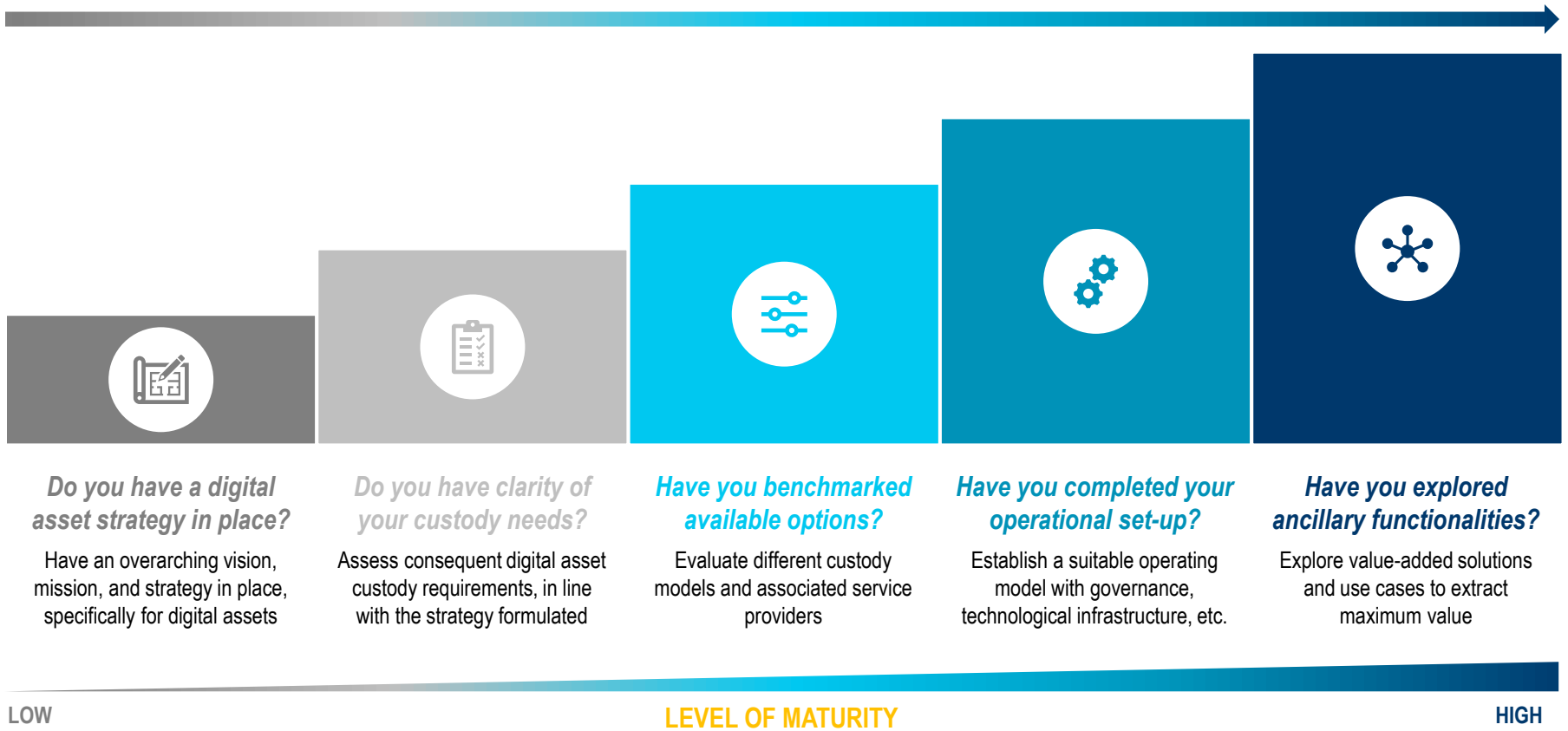
1. Do you have a digital asset strategy in place?
2. Do you have clarity of your custody needs?
3. Have you benchmarked available options?
4. Have you completed your operational set-up?
5. Have you explored ancillary functionalities?

As their answer to each of these sequential questions becomes a “Yes”, they will naturally achieve a higher level of maturity.

Before taking any future action, institutions first need to correctly gauge their current standing along the digital asset custody journey by level of maturity

Digital Asset Custody Journey

Five Stages by Level of Maturity



Source: Quinlan & Associates analysis

QUINLAN &ASSOCIATES

Quinlan & Associates is one of Asia's leading independent strategy consultancies. We are the first firm to offer end-to-end strategy consulting services.

From strategy formulation to execution to ongoing reporting, communications, and training, we translate cutting-edge advice into commercially executable solutions. With our team of top-tier financial service and strategy consulting professionals and our global network of alliance partners, we give our clients the most up-to-date industry insights from around the world, putting them an essential step ahead of their competitors.

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ripple

Ripple is the leading financial technology company that offers crypto solutions for businesses. We enable global financial institutions, businesses, governments and developers to store, move and exchange value, helping to unlock greater economic opportunity for everyone, everywhere.

Ripple Custody is a self-custody technology that enables secure transfer, settlement, and tokenization of digital assets. It is built to withstand the highest institutional demands and is FIPS 140-2 Level 4 certified, ISO 27001 certified, and SOC 2 Type II compliant.

WEBSITE www.ripple.com/solutions/digital-asset-custody/

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