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EFRAG Research project on Crypto-assets

Analysis of Scope – Initial Coin Offerings and Custodial services

Issues Paper

Objective

- 1 At its meeting in February 2019, EFRAG TEG discussed the scope and project plan for the EFRAG research project on crypto-assets (the EFRAG project). EFRAG TEG supported the proposed two-phase approach where the first phase – problem definition – examines the use, prevalence and trends of crypto-assets and whether crypto-assets and related activities give rise to accounting challenges that are not addressed in existing IFRS Standards (to be published as an EFRAG Discussion Paper). EFRAG TEG tentatively agreed that the scope of the EFRAG project should primarily focus on the following five crypto-assets related business segments and activities (five activities):
 - (a) Initial Coin Offerings (ICOs) (and similar offerings);
 - (b) Storage and custodial services;
 - (c) Mining;
 - (d) Investing and holding; and
 - (e) Payment services.
- 2 Furthermore, there are different types of crypto-assets including cryptocurrencies and different types of tokens (crypto-assets other than cryptocurrencies). Hence, the following different types of crypto-assets will also be within the scope of the EFRAG Project:
 - (a) Crypto-currencies (coins)
 - (b) Payment tokens
 - (c) Utility tokens
 - (d) Asset or security tokens
 - (e) Other types of tokens (e.g. hybrid¹ tokens)
- 3 The buying, holding, selling and transacting with these different types of crypto-assets is encompassed within the five activities outlined in paragraph 1 and there are potential, specific accounting challenges arising for the different types of crypto-assets. For example, there was an IFRS Interpretations Committee (IC) Agenda Decision in March 2019 on the accounting for crypto-currencies and several national

¹ Tokens with a combination of features of different types of tokens.

standard setters have also issued guidance on crypto-currencies. Hence, it is necessary for the EFRAG Research Project to include the different types of crypto-assets within the scope of the project.

- 4 The purpose of this session is to discuss ICOs and custodial services which are two of the crypto-assets activities within the scope of the EFRAG project. The objective is to obtain views from EFRAG TEG member on the analysis of the significance and accounting challenges of the two activities. Feedback is specifically sought on whether the data gathered so far and analysis undertaken on these two activities justifies further work towards developing related accounting solutions during the potential second phase of the EFRAG project. Alternatively, what type of analysis and outreach could enhance the intended problem definition during the first phase of the EFRAG project.
- 5 The remaining three crypto-assets activities (mining, investing and holding, and payment services) and other² aspects within the scope of the EFRAG project will be considered at future EFRAG TEG meetings.

Structure of issues paper

- 6 This paper examines the following areas in relation to ICOs and Custodial services:
 - (a) Perspective on required evidence for standard setting activity
 - (b) ICOs
 - (i) features, prevalence and trends- summary
 - (ii) accounting issues and solutions
 - (iii) preliminary conclusion
 - (c) Storage and custodial Services
 - (i) features, prevalence and trends - summary
 - (ii) accounting issues
 - (iii) preliminary conclusion
 - (d) Appendix A – Overview of Crypto-assets
 - (e) Appendix B – Detailed Analysis: ICOs and similar offerings- Features, prevalence, trends and risks
 - (f) Appendix C – Detailed Analysis: Storage and custodial services- Features, prevalence, trends and risks.

Perspective on required evidence for standard setting activity

- 7 As stated in paragraph 1, the scope of the EFRAG project during the problem definition phase includes:
 - (a) obtaining evidence that can ascertain the potential significance of crypto-assets related activities including ICOs for EU IFRS reporting entities; and
 - (b) identifying any related accounting challenges and gaps where there is no guidance under existing IFRS.
- 8 Notwithstanding the objective of the EFRAG project definition phase, we recognise that even for established economic transactions, it is challenging to obtain relevant

² EFRAG TEG recommended that the EFRAG project should also consider whether there are factors that differentiate crypto-assets from other assets that are not specifically addressed in IFRS Standards (such as emission rights and investments in commodities such as gold).

quantitative evidence that can, on a standalone and *ex-ante* basis, sufficiently³ demonstrate the need for the development of accounting solutions.

- 9 The investing or holding and issuance of crypto-assets is an innovative, unregulated and yet to be mainstream economic activity making it even more challenging to obtain illustrative quantitative evidence on the prevalence and economic significance for IFRS reporting entities. But efforts have already begun including the research conducted by the IASB staff and presented to the IFRS IC and the IASB during the course of 2018. The IASB research indicated that very few IFRS preparers reported holding crypto-assets in their 2017 financial statements. During the Accounting Standard Setters Advisory Forum (ASAF)⁴ April 2019 meeting, some of the members gave feedback on the monitoring activities and prevalence of crypto-tokens in their jurisdictions. The feedback⁵ indicated that token issuance was prevalent for unlisted entities in some jurisdictions (Korea) and the demand for GAAP was also expected to come from unlisted entities that apply local GAAP (UK, France). However, token issuance is prohibited in several jurisdictions (China and possibly Malaysia) and the scale is small in others (Australia and Hong Kong).
- 10 The need for evidence on the potential significance and materiality of the issuance and holding of crypto-assets by IFRS reporting entities is further emphasized by the varied viewpoints that were expressed at the April 2019 ASAF session on whether related standard setting should occur. One view was that requirements should follow the transactions and aim to bring transparency to markets. Another view expressed concerns about the potential legitimisation of the issuance of crypto-assets were standard setting activity to occur.
- 11 Notwithstanding the need for evidence, the fact that several national standard setters have felt the need to issue specific guidelines on crypto-currencies and ICOs is indicative of the need to clarify the related accounting. The same can be said of the tentative agenda decision issued by IFRS IC on cryptocurrencies.

A. INITIAL COIN OFFERINGS (ICOs)

Features, prevalence, trends and risks – summary

- 12 Appendix B includes a detailed analysis of features, prevalence, trends, associated risks and risk mitigation measures for ICOs. Appendix B is intended to be included as one of the chapters in the first phase (problem definition) Discussion Paper (subject to suggested improvements). The analysis is based on a range of sources including publicly available aggregate global and EU data, company-specific examples and academic literature.
- 13 This section highlights the key findings from the detailed analysis in Appendix B including showing that, at an aggregate level, there has been a significant and increasing volume of ICOs with varied levels of activity and market development across global and EU jurisdictions.

Key Findings

- 14 The ICO market began in 2014 and has experienced rapid growth, raising a total of approximately USD 24.7 billion up to the end of Q1 2019 with the completion of over

³ IFRS standard setting typically occurs after feedback from stakeholders (e.g. agenda consultation) and/or after issues are elevated to IFRS IC based on specific challenging real world fact patterns.

⁴ The ASAF discussion occurred in response to the paper by the French national standard setter (ANC) related to its guidance on ICOs.

<https://www.ifrs.org/-/media/feature/meetings/2019/april/asaf/asaf-meeting-summary-april-2019.pdf>

⁵ Quantitative data, if any exists, was not cited

5000 ICO projects in over 50 countries. European Economic Area (EEA) countries that rank⁶ in the Top 10 for ICO activity are UK, Switzerland, Estonia and Germany. ICOs also occur in multiple industries, although publicly available data indicates that financial services leads the issuance volume.

- 15 The growing significance of ICOs as a source of finance for some business sectors is evident as blockchain start-up ICOs have outstripped venture capital (VC). In the 14 months to February 2018, blockchain start-ups raised⁷ nearly USD1.3 billion in traditional VC rounds worldwide; compared to USD4.5 billion raised by ICO projects.
- 16 There are risks associated with ICOs because, unlike an IPO process in which a company is required to comply with strict registration procedures prescribed by securities regulators, the ICO process is largely unregulated in many parts of the world, including the EU.
- 17 The issuer of an ICO will typically publish an information document referred to as a “whitepaper”. This document (which is unaudited) provides information about the tokens (crypto-assets) being issued in the ICO. However, the information content of whitepapers can vary significantly.
- 18 As detailed in Appendix B paragraph B29, two recent academic studies indicate that the success rate of global ICOs exceeds 80%. However, information from other data sources⁸ suggest that approximately 80% of ICOs are scams. A potential⁹ reason for this inconsistent information on failure rate could be differing ICO samples and varied definitions of failure rate.
- 19 In the absence of a regulated market, there has been a rise in self-regulation and information intermediaries (information aggregators, ICO rating providers) who aim to reduce the information asymmetry between investors and issuers.
 - (a) Information aggregators disseminate crypto-market news and events; market statistics; and information about past, ongoing and future ICOs.
 - (b) ICO rating providers analyse token issuers and various attributes of the ICOs to provide an overall assessment of the quality of the tokens (crypto-assets) and its future prospects.
- 20 There has been market development with the emergence of offerings of tokens similar to ICOs but with greater levels of regulation. Offerings of tokens similar to ICOs include Security Token Offerings (STOs) and Initial Exchange Offerings (IEOs). As highlighted in Appendix B paragraph B41, it is expected that STO’s will attract high levels of investor attention in 2019 and beyond given their nature and the existing regulatory environment. IEO’s are also starting to increase in 2018/2019.

Potential accounting issues and solutions

- 21 In March 2019, the IFRS IC issued a tentative agenda decision on the accounting for cryptocurrencies. The tentative agenda decision does not cover the accounting for crypto-asset tokens issued in an ICO (or tokens acquired in a secondary market) or other matters specific to an ICO.

⁶ The top five jurisdictions are the United States, British Virgin Islands, Singapore, Switzerland and the United Kingdom.

⁷ According to Crunchbase database.

⁸ Satis Group.

<https://cryptoslate.com/satis-group-report-78-of-icos-are-scams/>

⁹ At this stage, we do not know why different sources provide such different information.

- 22 Although a number of jurisdictions have developed accounting guidance under local GAAP for crypto-assets, we are aware of only two jurisdictions with specific guidance for ICOs. Lithuania has developed detailed accounting guidance under local GAAP for ICO issuers and holders of tokens (crypto-assets). France has recently published an accounting framework to be applied for reporting under French GAAP, for ICO issuers and holders of crypto-assets.

Local GAAP requirements for ICO accounting

- 23 The guidance issued by France and Lithuania is summarised below.

France

- 24 *Issuers of tokens*: accounting based on the commitments made by the issuer regarding each token category issued as expressed in the whitepaper of the ICO and any other relevant document. Entities are required to distinguish between two types of tokens:
- (a) Security tokens - tokens with characteristics similar to securities and equity instruments (such as shares and bonds). The accounting treatment follows standards for similar financial instruments.
 - (b) Utility tokens - tokens with characteristics other than securities and equity instruments. The accounting treatment is based on the commitments and obligations conveyed by the tokens.
 - (i) The issuer will recognise a liability for the commitment and extinguish liability according to the commitment. Revenue is recognised in profit or loss based on the delivery of goods and services.
 - (ii) If token contains no commitment or obligation, recognise the counterpart in profit or loss when the token is issued (gain in profit or loss when token is issued).
 - (c) Hybrid¹⁰ tokens – allocations to the two categories mentioned above.

- 25 The accounting requirements are as follows

- (a) Amount recorded for all tokens issued by issuers based on the amount paid by subscribers - net of VAT or similar taxes, if any (these are recognised separately).
- (b) Disclosure requirements - Disclose impacts on accounting treatment in case of conditions and disclaimers attached to tokens.
- (c) *Tokens allocated to employees and other contributors to the activities of the issuer at privilege conditions* - record a discount by reference to the price paid by independent parties (or market value in case of absence of subscription to the ICO open to such parties at the date of token allocation)
- (d) *Holders of tokens (ICO and acquired through secondary market)* – the accounting treatment for acquirers of tokens in an ICO is the same as for other holders of tokens (not covered in this paper).

Lithuania

- 26 *Issuers of tokens*: accounting is based on whether tokens are in circulation or not and also on the rights and obligations arising from the tokens.
- (a) costs of setting up a platform to issue the tokens, smart contracts, whitepapers etc. that do not meet the definition of an intangible asset, are expensed;

¹⁰ Hybrid tokens are those that have a combination of the features of security and utility tokens.

- (b) costs incurred for circulated tokens that will not provide further economic benefits for the company after circulation of tokens should be immediately recognised as expenses;
- (c) tokens that are not circulated during an ICO (and remain the property of the issuers) are not recognised and are recognised only when the active market of token stabilises;
- (d) circulated tokens - the right granted to the purchasers of tokens may be the same as the rights of the holders of securities. Therefore, the liabilities of an issuer of tokens will depend on the nature of the rights granted. They may be similar to the rights of the holders of debt, equity instruments or other financial instruments. Issuer recognises a liability if it has an obligation or commitment to the holder:
 - (i) the issuer recognises a liability for the obligation to the holder of the tokens for goods or services to be provided in the future; the issuer must assess whether the liability is fixed or variable;
 - (ii) tokens that do not grant clear rights in the future for their holders to get a specific service, goods or assets from the company circulating them, the funds generated during circulation of such tokens may be designated for the establishment of the payment platform for the company further functioning – in this case the issuer recognises a liability as a payment received in advance. The liability is derecognised once the issuer commitments or obligations towards the holders have been fulfilled

27 *Holders of tokens* – the accounting treatment for acquirers of tokens in an ICO is the same as for other holders of tokens (this will be covered in the section relating to holders of crypto-assets which is not part of this paper).

Observations on accounting solutions

- 28 There are a number of differences and level of detailed requirements in the accounting requirements for ICO accounting developed by the French and Lithuanian national standard setters.
- 29 Furthermore, a number of areas would require further research in terms of developing accounting guidance under IFRS Standards. These include:
- (a) ICO issue costs incurred by the issuer including development costs associated with setting up a platform to launch an ICO. From an accounting perspective, an analogy could be made to IPO costs.
 - (b) Crypto-assets that remain the property of the issuer of the ICO (also often the founder of the crypto-asset) and are not placed in circulation. From an accounting perspective, an analogy could be made to an entity holding its own shares. However, this analogy might not be appropriate for crypto-assets as they are a different type¹¹ of asset from equity instruments. Hence, an entity holding its own shares may not be exactly equivalent to the holding of own crypto-assets.
 - (c) Crypto-assets given away for free in an ICO (or subsequent to the ICO) can be seen as analogous to issued bonus shares.
 - (d) Accounting issues that may arise from a fuller identification of the rights and obligations arising from crypto-assets issued in an ICO. The rights of the

¹¹ In March 2019 IFRS IC issued an Agenda Decision, which concluded that crypto-assets should be accounted for as either intangible assets or inventory.

holder (e.g. rights to access platform services, governance rights and profit rights¹²) and obligations of the issuer (e.g. performance obligations and other commitments) ought to be the basis for determining how the holder and the issuer of such crypto-assets should account for them. However, due to the general lack of information in the whitepapers, there is a need to further research on the spectrum of underlying rights and obligations arising from ICO issuances and to thereafter determine the appropriate accounting treatment from the perspective of the holder and issuer of the crypto-assets. Such research is also needed for accounting for crypto-assets acquired in a secondary market (such as an exchange).

- (e) Valuation and measurement of crypto-assets from the issuer's and holders' perspectives. As highlighted in Appendix B paragraphs B24 and B25, there is currently no commonly applied valuation model for crypto-assets.

Preliminary conclusion

- 30 Appendix B highlights information gathered by the EFRAG Secretariat from public available databases, academic research and other publications on ICOs related activity. The information and analysis is indicative of ongoing market development, the growing significance of ICOs as a form of issuer financing and highlights several risks associated with ICOs. The information gathered shows varied levels of market development and risks across jurisdictions and differing responses by national standard setters and regulators.
- 31 However, as noted earlier, there is an inherent challenge in gathering any form of standalone evidence that adequately meets the objective of the problem definition phase of the EFRAG project- namely ascertaining the significance for EU IFRS reporting entities. As highlighted in paragraphs 8 and 9, even for established economic transactions, it is challenging to obtain relevant quantitative evidence that can, on a standalone and *ex-ante* basis, sufficiently demonstrate the need for the development of accounting solutions.
- 32 The investing or holding and issuance of crypto-assets is an innovative, unregulated and yet to be mainstream economic activity. This makes it even more challenging to obtain illustrative quantitative evidence on the prevalence and economic significance for IFRS reporting entities. The paragraph below notes some limitations of the analysis and information gathered so far.

Limitations of analysis and information gathered

- 33 Although insightful on the growing scale of issuance of crypto-assets, the evidence gathered so far has several limitations including:
 - (a) Appendix B paragraph B23 highlights that ICOs occur across multiple industries but there is lack of sufficient granular data related to EU countries that demonstrates the materiality of ICOs for IFRS reporting entities.
 - (b) There is lack of data indicating the size of entities issuing ICOs and indicating the prevalence of this activity for listed versus unlisted entities.
 - (c) Our analysis also explored whether, in order to evaluate the prevalence of crypto-assets activities, it would be useful to apply artificial intelligence software (AlphaSense and Sentieo) for a textual analysis of the external reporting and communication documents of EU listed entities (filed

¹² Adhami, S., Giudid,G., Martinazzi, S. 2018. *Why do businesses go crypto? An empirical analysis of Initial Coin Offerings*, Working Paper, Bocconi University, Politecnico di Milano, School of Management- A review of 253 ICOs in this working paper showed that ICOs grant contributors access to platform services in 68% of the cases, governance powers in 24.9% of the cases and profit rights in 26.1% of the cases.

documents, management presentations). A pilot test using the AI software highlighted the difficulty in obtaining granular entity-specific data and showed that such an approach was unlikely to lead to any conclusion that was different from the research conducted by the IASB staff in 2018, which found limited prevalence for IFRS reporting entities.

- (d) As mentioned in paragraph 18, different sources have inconsistent conclusions on the failure rate of ICOs. This inconsistency can perhaps be explained by either differing criteria for evaluating failure rate and/or differences in the underlying sample used to assess failure rate.
- (e) As mentioned in Appendix B paragraph B12, it was a challenge to ascertain the consistency and comparability of the aggregated data in different publicly available databases.

Need for outreach to expert stakeholders

- 34 The noted limitations of the information gathered in Appendix B, highlights a need for the EFRAG Secretariat to conduct an outreach to expert stakeholders that might be able to provide additional data and case studies on the prevalence of crypto-asset related issuance and holding activities for IFRS reporting entities. The outreach could help strengthen the evidence gathered so far. Expert stakeholders could include market players, intermediaries, service providers, regulators, academics and auditors.
- 35 The EFRAG Secretariat will also be presenting the crypto-assets project to the EFRAG Academic Panel on 1 June 2019. One the questions posed to the academics will be on the type of data that can be predictive of prevalence of crypto-assets related activities.
- 36 Another objective of the outreach to experts, as suggested in paragraph 29(d), could be to identify the full range of rights (obligations) of crypto-assets holders (issuers) including those where there may be gaps in IFRS guidance.

National standard setters provide starting point for accounting solutions

- 37 On accounting solutions, the guidance provided by the French and Lithuanian national standard setters addresses a number of issues and could be a reference point for developing accounting guidance for ICOs. However, there are areas that require further research in terms of potentially developing guidance under IFRS. In the meantime, there may be other national standard setters that intend to develop accounting guidance on ICOs, which could also inform the EFRAG project.

Questions for EFRAG TEG members

- 38 Do EFRAG TEG members have any feedback on the information in Appendix B on ICOs that will be included as a separate chapter in the problem definition Discussion Paper?
- 39 Do EFRAG TEG members consider that the analysis, so far, on ICO features, prevalence, trends, associated risks and the identified accounting challenges justifies the need for further work in developing accounting solutions during the potential second phase of the EFRAG project?
- 40 Is there any ICO-related additional data and analysis that EFRAG TEG members recommend for the assessment and conclusion on the materiality of ICO activity for EU, IFRS reporting entities?
- 41 Do EFRAG TEG members agree with the potential accounting challenges identified in paragraph 29 that could be considered in proposing potential

accounting solutions to be included in IFRS Standards? Are there any other challenges that ought to be considered?

- 42 Do EFRAG TEG members have a view on the ICO related guidance that would be required to address identified accounting challenges and gaps?
- 43 Do EFRAG TEG members agree with the objectives of outreach to expert stakeholders?

B. CUSTODIAL SERVICES

Features, prevalence, trends and risks- summary

- 44 Appendix C includes a detailed analysis of features, prevalence, trends, risks and risk mitigation of custodial services. Appendix C (subject to suggested improvements) will be included as a separate chapter in the first phase (problem definition) Discussion Paper. Some of the key findings from the detailed analysis are highlighted below.
- 45 There are different ways to store and safeguard crypto-assets. A holder can store its crypto-assets:
- (a) in its own wallet, either acquired or set up on the internet; or
 - (b) using a custodial service (in which case the user does not always control the private keys).
- 46 The data from a Cambridge University study¹³ - 2nd Global Crypto-asset Benchmarking Study - portrays the use of different types of custodial services including cold storage and hot storage facilities. However, the data lacks granular information related to the EU.

Accounting issues

- 47 The EFRAG Secretariat is not aware of any national standard setters with guidance that addresses accounting challenges related to custodial service providers. However, it is likely that current IFRS Standards provide sufficient guidance for custodial service providers.
- 48 The main accounting challenge could arise from the perspective of holders of crypto-assets that are using custodial services (although the issue is also relevant for the provider of the services). The features of the distributed ledger technology (DLT) platforms such as the need for the holder to have private keys¹⁴ to access crypto-assets have implications that affect whether and to what extent individuals or entities have control over their crypto-assets and are able to recognise them as an asset. From the perspective of the provider, the question is whether they act as agent on behalf of its customers.

Perspective of the service provider

- 49 The service provider is either an entity that sells a storage device (such as hardware wallets) or one that holds crypto-assets on behalf of its customers and should therefore **not recognise** the crypto-assets on its balance sheet.
- 50 IFRS reporting companies that sell hardware wallets would account for these sales under IFRS 15 *Revenue from Contracts with Customers*. Currently many on-line sales providers, such as Amazon, sell hardware wallets such as the Ledger Nano.
- 51 A company that holds crypto-assets on behalf of its customers would typically charge a fee for providing custody services. For example, as mentioned in Appendix C paragraph, Swissquote a Swiss registered financial institution reporting under IFRS Standards, started to provide cryptocurrency trading and custodial services in 2017. The fees received would potentially be accounted for under either IFRS 15 *Revenue from Contracts with Customers* or IFRS 9 *Financial Instruments*. Other

¹³ This document can be found [here](#).

¹⁴ A private key is a secret number that allows the sending of crypto-currencies from a storage wallet. Though individual customers retain the legal ownership of crypto-assets held within a storage wallet, the holder of the private key can either be the individual customer directly controlling the storage wallet or it can be the custodian providing storage services. More details are in Appendix C.

financial institutions, as well as exchanges, also provide custody services or are likely to do so in the future.

Perspective of the owner (holder) of crypto-assets

- 52 From an accounting perspective, a key issue is around control of the crypto-assets, in particular when the owner of the crypto-assets does not control the private key and the consequent implications for asset recognition.
- 53 As explained in Appendix C, when a third party (a custodian) holds the crypto-assets it typically also holds the private keys. In the absence of a legal/enforceable contract between the custodian and the holder/owner of the crypto-assets, a question arises about who has legal ownership of the crypto-assets. A 2018 E&Y publication¹⁵ notes that in such cases the legal ownership could rest with the custodian.
- 54 The 2018 E&Y publication notes that some exchanges may restrict the holder's ability to transfer the crypto-assets to another exchange or the holder's own crypto-asset wallet. These limitations could alter the rights of the holder as they could effectively limit the holder's control over the underlying crypto-assets and the crypto-assets' potential to produce economic benefits and thus raise the question as to whether the holder can recognise an asset.

Preliminary conclusion

- 55 Appendix C has information and data that is indicative of different types of custodial services. However, there are limitations with this information towards informing on the prevalence of custodial services for EU IFRS reporting entities. Notwithstanding these limitations, any data that demonstrates the prevalence of ICOs and holders of crypto-assets is likely to indicate the demand for custodial services. This is because the demand for custodial services would be expected to be positively correlated with any trends in issuance/demand for crypto-assets.
- 56 Further to the outreach to expert stakeholders on the issuance and holdings on crypto-assets as proposed in paragraph 34, there could also be a need to conduct outreach to expert stakeholders to get their views on the significance and prevalence of custodial services. However, there is need to decide whether to distinguish and prioritise the data gathering for what could be considered as the primary crypto-assets activities (issuance and investment/holding) from the data gathering for secondary or intermediate activities (mining, storage and custodial services).
- 57 The main accounting challenge with custodial services arises from the need to identify the effective legal owners of crypto-assets.

Questions for EFRAG TEG members

- 58 Do EFRAG TEG members have any feedback on the information in Appendix C on custodial services that will be included as a separate chapter in the problem definition Discussion Paper?
- 59 Do EFRAG TEG members consider the analysis of features and associated risks of custodial services as outlined in Appendix C adequately illustrate the potential impact of custodial services? Has the analysis justified the need for further work towards developing accounting solutions during the potential second phase of the EFRAG project?

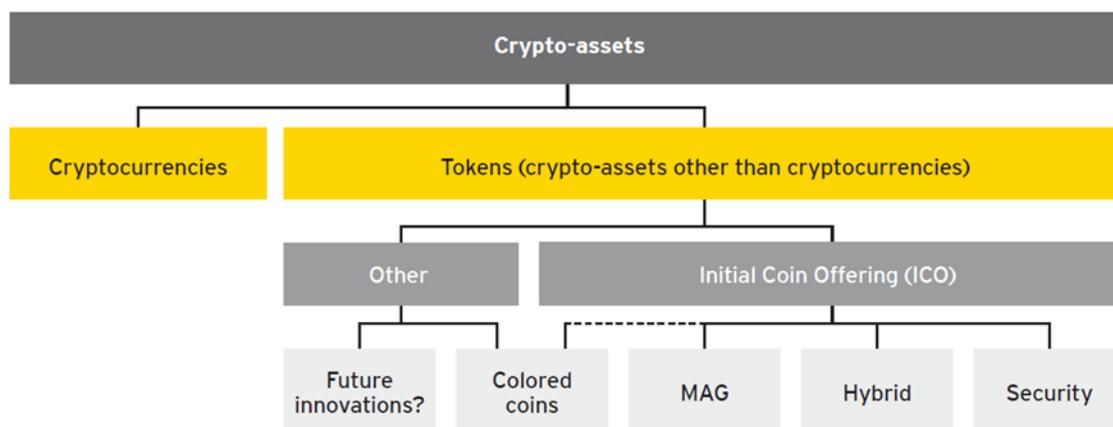
¹⁵ Applying IFRS *Accounting by holders of crypto-assets*, August 2018.

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| 60 | Do EFRAG TEG members agree that the potential accounting challenges mainly arise in relation to holders and legal owners of crypto-assets? Are there any unidentified accounting challenges from the perspective of custodial service providers that need to be considered? |
| 61 | Are there any custodial services related additional data or analysis that EFRAG TEG members would recommend that can demonstrate the materiality of custodial services for EU, IFRS reporting entities? |
| 62 | Should any additional data gathering, including the outreach to expert stakeholders, for primary crypto-assets activities (issuance and holding/investment) be distinguished from and prioritised over the data gathering for secondary or intermediate activities (mining, custodial services)? |

Appendix A: Overview of Crypto-assets

What are crypto-assets?

- A1. Crypto-assets are digital assets that users store and exchange electronically without the need for trusted intermediaries, and that are enabled by a network of computers running DTL software. There are two types of crypto-assets (1) cryptocurrencies and (2) tokens and illustrated in the diagram below.¹⁶



Cryptocurrencies

- A2. A cryptocurrency is a digital or virtual currency that is recorded on a distributed ledger and uses cryptography for security.
- A3. A cryptocurrency is designed to work as a peer-to-peer medium of exchange or means of payment, frequently referred to as a ‘coin’ or ‘digital money’. Examples are Bitcoin (BTC), Litecoin (LTC), and Monero (XMR). Although used as a medium of exchange, cryptocurrencies do not have some of the common properties of cash as a currency because they:
- are not legal tender and are not backed by any government or state;
 - are not directly related to the setting of prices for goods or services; and
 - do not give rise to a contract between the holder and another party.
- A4. A second category of cryptocurrencies are referred to as ‘infrastructure coins’ which aim to offer a platform for developing smart contracts¹⁷ which include hosting the development and launching of new cryptocurrencies and tokens based on the blockchain. Examples are Ethereum and NEO.

Tokens (crypto-assets other than cryptocurrencies)

- A5. A token is designed to work as a medium of exchange or means within a limited ecosystem and to offer an additional feature, such as representing right to access a product or service or ownership assets (like securities).
- A6. Tokens generally include utility tokens, security tokens and asset-based tokens. Some tokens are used as a medium of exchange for good or services other than those provided by the token issuer and can be referred to as cryptocurrencies or payment tokens.

¹⁶ E&Y publication *Accounting for Crypto-assets* published in 2018

¹⁷ Wikipedia defines a smart contract as follows - ‘A smart contract is a computer protocol intended to digitally facilitate, verify, or enforce the negotiation or performance of a contract. Smart contracts allow the performance of credible transactions without third parties. These transactions are trackable and irreversible’.

- A7. As discussed in Appendix B, tokens are initially issued through an ICO. During the ICO process, issuers exchange tokens against fiat currencies (such as the USD or the EUR) or cryptocurrencies (such as Bitcoin or Ethereum) to fund the development of their products and services.

Utility tokens (including payment tokens)

- A8. Utility tokens are intended to provide access digitally to an application or service by means of a blockchain-based infrastructure. A typical characteristic of a utility token is that it serves to provide access to the issuer's product, service or ecosystem (including discounts on products or services) and does not offer the holder any rights of ownership. Their value is determined by demand and supply. In some cases, a utility token may be used as a medium of exchange for goods or services provided by a party other than the issuer of the token. A key aspect of tokens is that, unlike equity securities of a company, they do not grant any control rights, or claims to dividends. Thus, investors buy tokens for their utility value or for speculative reasons such as a higher resale price.

Security or asset tokens

- A9. A security token has similar characteristics to a security and grants the right or possibility of receiving a pre-defined financial benefit (such as interest or a dividend). These can represent assets such as a debt or equity claim on the issuer. Security tokens promise, for example, a share in future company earnings or future capital flows. In terms of their economic function. Usually, but perhaps not always, the jurisdictions in which such tokens are issued apply legislation that regulates securities, making them the most strictly regulated compared to other types of tokens. Similar to a security token, an asset-backed tokens are backed by an existing asset (like a real estate portfolio).
- A10. [Agenda paper 12.03](#) presented at the EFRAG TEG meeting in February 2019 provides further information on crypto-assets and their relationship with the blockchain technology.

Appendix B - ICOs and similar offerings of tokens

B1. The data and analysis of ICOs and similar offerings of tokens has been broken down into the following sub-sections:

- (a) Features and mechanisms for ICOs;
- (b) Rationale for ICOs- issuer and investor perspectives;
- (c) ICOs prevalence and trends;
- (d) ICOs measurement and valuation issues;
- (e) ICOs risks and risk mitigation.

Features and mechanisms for ICOs

B2. An ICO is a means of raising funds for a new crypto-asset project. The ICO market began in 2014 although only a few ICO's occurred¹⁸ in the early years given the constraints to 'launch' an ICO.

B3. The term ICO has been derived from the term IPO (initial public offering) whereby a private firm lists its shares on a public stock exchange. However, unlike an IPO process in which a company is required to comply with strict and costly registration procedures prescribed by securities regulators, the ICO process remains largely unregulated in many parts of the world, including the EU.¹⁹

ICOs versus IPOs

B4. The ICO process as depicted in Figure 1 has both similarities and differences with an IPO process for companies that list on traditional stock exchanges. In both cases, investors exchange fiat (or crypto-assets in case of an ICO) for shares (tokens in case of an ICO) that have monetary value and are traded on a secondary market. However, there are important differences.

- (a) The ICO market is largely unregulated, whereas the IPO market follows a strict process defined by regulation where compliance can be costly and mandatory, governed by security regulators to protect the interest of investors. With an ICO, there is usually little information about the issuer (developer) undertaking the ICO, and none of the documents voluntarily shared by the issuer, such as the whitepaper, need to be audited or independently verified. This is why an ICO can be issued quickly compared to an IPO which can take months to complete due to the auditing process, internal control and governance implementation, registration process and other requirements.
- (b) ICOs are more similar to a crowdfunding model than to an IPO. Unlike shares in a company, crypto-asset tokens typically do not provide any form of control over the issuing company, and are generally not considered securities. Instead they are viewed as contributions to develop a project to which the token holder will be entitled to goods and/or services. However, some crypto-asset tokens have security-like features and are considered to be securities by security regulators in some jurisdictions. In addition, as explained in Appendix A paragraph A9, some tokens are issued as security tokens.

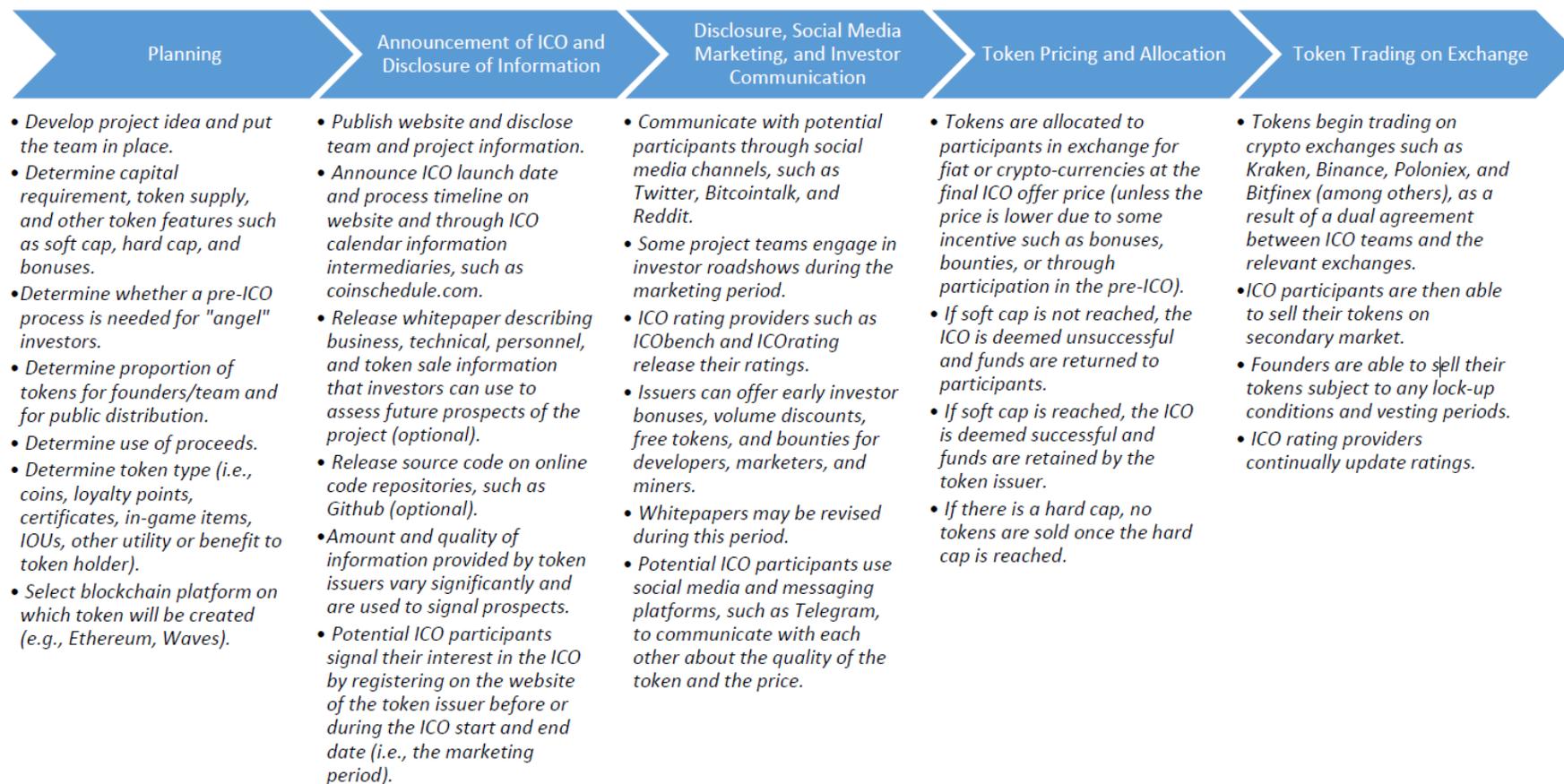
¹⁸ In 2015, the ICO process was streamlined with Ethereum's introduction of a standard for implementing tokens (ERC20).

¹⁹ Some EU countries are in the process or have already enacted legislation to regulated ICO's. France is one example but there could be others. In the United States, the SEC is carefully observing the ICO market and is contemplating potential regulatory actions. In some jurisdictions ICO's are banned. For example, China banned ICO's in September 2017.

- (c) Unlike IPO's that are generally conducted by companies with well-established technologies and products, the vast majority of ICOs are for projects that are at a very early stage of development; and only few of the entities have pre-existing products making ICOs a much riskier investment than IPO's.
- (d) Unlike securities issued through an IPO, tokens issued in an ICO typically do not include voting rights, anti-dilution protections and other features that are typical of a security issued in an IPO and are not subject to the more rigorous governance and audit requirements that oversee the entity conducting the ICO.
- (e) According to a working paper published in May 2018 *Digital Tulips? Returns to Investors in Initial Coin Offerings*²⁰ (Benedetti and Kostovetsky, 2018), the average ICO lasts 37 days (with a median length of 31 days) although this figure has recently been rising with an average of 41 days for 2018 ICOs.

²⁰ Benedetti,H., and Kostovetsky, L. 2018. Digital Tulips? Returns to Investors in Initial Coin Offerings. Working Paper, Boston University.

Figure 1: ICO Process



Source: Bourveau, De George, Ellahie and Macciochi, 2018

ICO information– Whitepapers and other sources of information

- B5. The issuers of the ICO will typically issue a disclosure document referred to as a whitepaper as well as a technical source code²¹ which are placed in the public domain via various specialised websites. The whitepaper can be seen as a form of unofficial prospectus.
- B6. Whitepapers are unaudited documents that provide information about the business purpose for the crypto-assets, technology, expected timeline, and background information about the team, ICO process, token distribution, and use of proceeds. While the whitepaper is not audited, the source code can be verified by external industry participants since the issuer can choose to release it on an online repository. The source code can provide information about the issuer's technology and thus signal the quality and future prospects of the project.
- B7. However, the level of detail and the type and quantity of information in a whitepaper vary significantly, with the length of whitepapers ranging from 2 pages to 94 pages according to a study²² conducted by the Columbia Business School, London Business School and University of Utah study (Bourveau, De George, Ellahie and Macciocchi, 2018). This study also notes that some ICO issuers do not release a whitepaper.
- B8. Other than the whitepapers, issuers of ICO's provide information through several disclosure channels – such as their website and social media platforms such as Twitter, Reddit and Telegram - which serve as forums where potential investors obtain information about ICO issuers and discuss the future prospects of the crypto-assets being issued.

Rationale for ICOs - issuer and investor perspectives

Issuer perspective

- B9. ICOs have a number of benefits from the issuer's perspective when compared to other established forms of raising funds including IPOs:
- (a) **Low cost of funding:** ICOs have become an important source of low-cost funding in the crypto-asset market by avoiding intermediaries and payment agents.
 - (b) **Easier access to secondary markets and quick liquidity:** ICOs provide liquidity that start-ups can obtain in a short period of time. Presuming ICO investors receive their tokens as planned, secondary market trading will commence as soon as the project lists its token on cryptocurrency exchanges. In contrast, VC-funded projects remain relatively illiquid until funds become available, either upon an exit through a sale or an IPO. Investors have to wait before being able to monetise their investment.
 - (c) **Builds the potential customer base:** As investors have the opportunity to get in on the ground floor of a project, they also provide the start-up with a community of potential users for its blockchain product when it goes live. An analysis by an academic working paper²³ of 253 ICOs between 2014 and 2017

²¹ Source code is the fundamental component of a computer program that is created by a programmer. It can be read and easily understood by a human being.

²² Bourveau, B., De George, E.T., Ellahie, A., and Macciocchi, D., 2018. *Initial Coin Offerings: Early Evidence on the Role of Disclosure in the Unregulated Crypto Market*. Working Paper, Columbia University, London Business School and Utah University.

²³ Adhami, S., Giudid, G., Martinazzi, S. 2018. : *Why do businesses go crypto? An empirical analysis of Initial Coin Offerings*, Working Paper, Bocconi University, Politecnico di Milano, School of Management.

showed that ICO tokens granted contributors the rights to access platform services in 68% of cases. The VC model does not offer the same multi-purpose possibility (i.e. of acquiring investors who are also potential customers).

Investor perspective

B10. ICOs have a number of benefits from the investor's perspective when compared to other established forms of raising funds including IPOs:

- (a) **Attractive returns:** Many ICO's have offered significant returns to investors; which according to some studies,²⁴ have seen average returns of 179% from the ICO price to the first day's opening market price, over a holding period that averages just 16 days. Benedetti and Kostovetsky (2018) conclude that tokens are sold in ICOs at a significant discount to their market price (and a much greater discount than IPOs) generating at least an 82% average abnormal return for the investor (weighted by capital invested). The draft study also shows that returns can continue to rise once the token is listed on an exchange.
- (b) **Investment is accessible to wide pool of potential investors:** Arguably an advantage ICOs possess vis-à-vis VCs is that virtually everyone can invest in the majority of ICOs. In contrast. VCs usually require a substantial initial outlay and tend to serve the wealthier investor segments, including institutions such as hedge funds, private equity firms and high net worth individuals.

ICOs prevalence and trends

Approach and limitations of analysis

B11. The prevalence and trends analysis is based on data from multiple sources, including specialised crypto-asset web aggregators, which highlights developments and trends within the ICO market²⁵, and academic and non-academic research papers.²⁶

B12. There are limitations to the data obtained from crypto-assets website. Our research has identified differences in the available data and often it is difficult to explain why differences exist although it seems that in some the differences relate to different basis of presentation (for example in a particular year, the data could relate to ICO's issued or ICOs that raised funds). Furthermore, the periods examined by the various studies and data reports vary and it is not always possible to provide a consistent period analysis of data for the purpose of this research paper. In order to provide a comprehensive trend analysis, we have used data from different sources and in some representing periods.

Key findings

B13. Since 2014, the ICO market has experienced rapid growth and evolved into a relatively significant financing mechanism, raising a total of USD 24.7 billion up to the end of Q1 2019 with the completion of over 5000 ICO projects in over 50

²⁵ The data aggregator websites include CoinDesk.com, CoinmarketCap, ICObench.com, and icodata.com. Where available we have indicated which ICO data is specific to the EU.

²⁶ Satis Group Research paper *Cryptoasset Market Coverage Initiation: Network Creation*; Journal of Economics and Business *Why do businesses go crypto? An empirical analysis of initial coin offerings*; Columbia Business School, London Business School and University of Utah - *Initial Coin Offerings: Early Evidence on the Role of Disclosure in the Unregulated Crypto Market*.

countries.²⁷ Most of the funds were raised in ICOs that were completed in 2017 and 2018. As explained in paragraph B20, the latter part of 2018 has seen a decline in ICO's. One of the reasons for this decline, was the significant decrease in the price of Bitcoin (since its peak in early 2018 of approximately USD 20.000) followed by the decline in value for all other crypto-assets (also referred to as altcoins in crypto-asset language). In December 2018, Bitcoin recorded a price of approximately USD 3.000 but since recovered to approximately USD 7.000 (mid-May 2019). Bitcoin and other crypto-assets remain highly volatile, and at this stage it is hard to say how this might affect the market growth.

- B14. According to Crunchbase (an investor data platform), ICOs today not only present a significant challenge to VCs as far as blockchain start-up financing is concerned, but they are attracting considerably more investor interest. According to Crunchbase, funding from ICOs have exceeded VC finance in the last few years for projects in the blockchain sector. In the 14 months to February 2018, Crunchbase observed that blockchain start-ups raised nearly USD1.3 billion in traditional VC rounds worldwide; compared to USD4.5 billion raised by ICO projects.
- B15. Figure 2 (see trends and prevalence in the ICO market) shows the distribution of ICO funds raised by country. The top five jurisdictions are the United States, British Virgin Islands, Singapore, Switzerland and the United Kingdom. Other EU countries ranking in the top 10 are Estonia and Germany.
- B16. Although web-based data aggregators provide information on ICO per country, it is important to note that ICOs do not necessarily have a single home country. The team of entrepreneurs and employees developing a token and engaging in an ICO, are often from many different countries and the country of registration and incorporation is usually chosen for legal and tax reasons (for example Switzerland seems to be a preferred choice for ICO listings).
- B17. According to data from ICObench.com, a total of USD 24.7 billion has been raised in ICO funding since 2014 up to the end of Q1 2019 (total completed ICOs amounted to approximately 5.000). Figures 2 and 3 show the distribution of ICOs by funds raised and by country for the period ending Q1 2019. The data shows that five countries raised more than half (61%) of the total amount of ICO funds up to the end of Q1 2019. Funds raised through ICOs in the EU region remains relatively low. The funding raised in Q1 2019 represents approximately USD 900K (328 completed ICOs).

²⁷ Source ICO.bench.com.

Figure 2 – Top 10 countries by ICO funds raised– period ending Q1 2019 (source: ICObench.com)

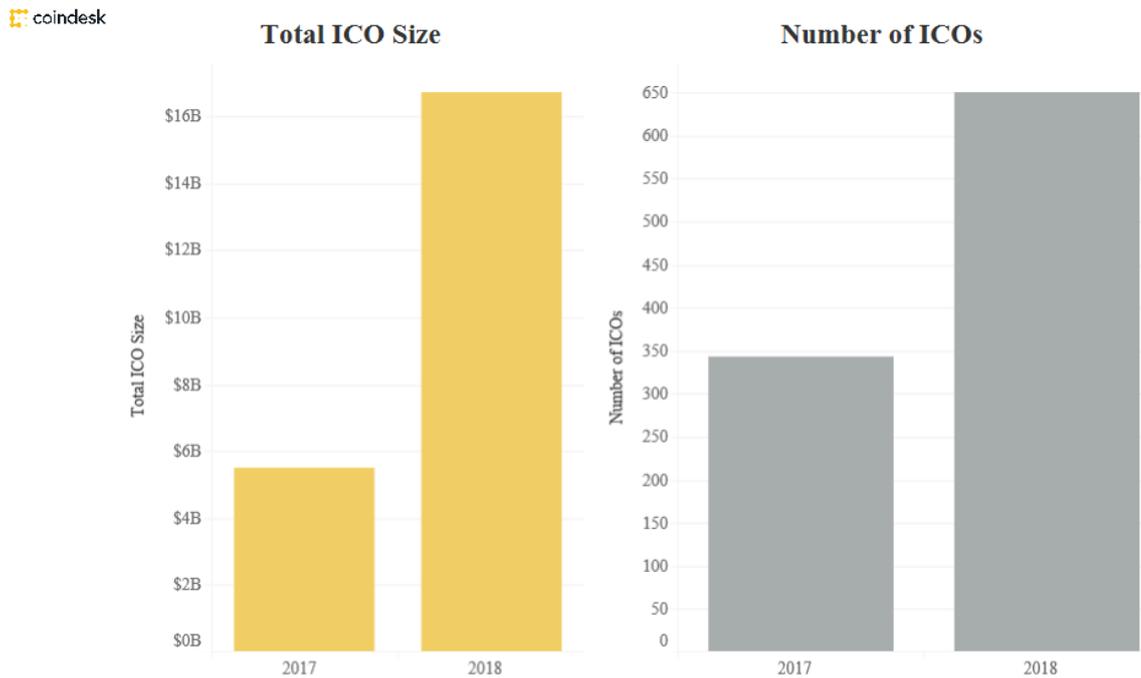
Top 10 countries by funds raised		
Country	Funds raised, \$ bln	Share
USA	7.42	30%
British Virgin Islands	2.36	10%
Singapore	2.25	9%
Switzerland	1.83	7%
UK	1.28	5%
Cayman Islands	1.09	4%
Estonia	0.81	3%
Hong Kong	0.68	3%
Russia	0.63	3%
Canada	0.45	2%
Subtotal	18.42	76%
Total	24.74	100%

Figure 3 – Top 10 countries by number of ICOs – period ending Q1 2019 (source: ICObench.com)

Top 10 countries by ICOs		
Country	ICOs	Share
USA	701	14%
Singapore	511	10%
UK	421	8%
Russia	311	6%
Switzerland	237	5%
Estonia	220	4%
Hong Kong	162	3%
Germany	106	2%
Canada	105	2%
Australia	102	2%
Subtotal	2876	58%
Total	4954	100%

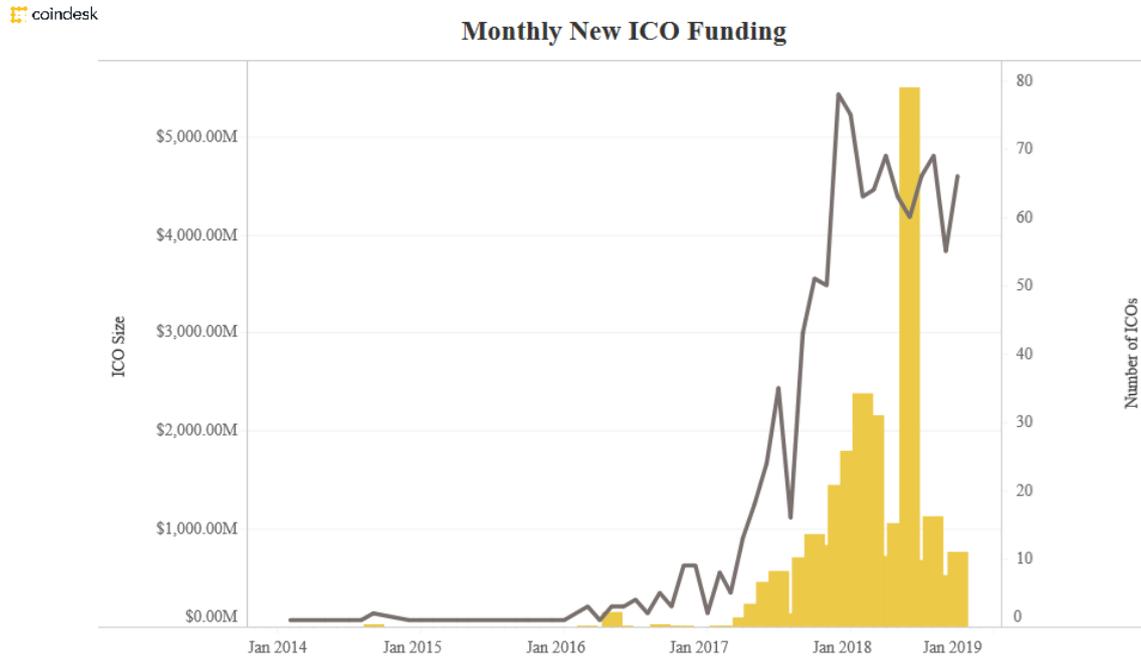
B18. As illustrated in Figure 4, ICOs became more popular in 2018 given the market price surge in Bitcoin and other crypto-assets at the end of 2017, with most of the ICO funding raised in 2018 (figure 5 below).

Figure 4 - ICO funding in 2017 compared to 2018 (source: CoinDesk.com)



B19. As illustrated in figure 5 below (information from CoinDesk), most of the ICO funds were raised during 2017 and 2018. We note that the data CoinDesk for funds raised in 2018 differs to that reported by ICObench.com (see figure 5).

Figure 5 - Most of the ICO funds were raised during 2017 and 2018 (source: CoinDesk)



B20. Data from ICObench.com shows that ICO growth has been declining since the second half of 2018. Of the approximately USD 12 billion ICO funding raised in 2018, more than 60% was raised in the first half of the year.

B21. The data also shows that the 2018 ICO projects raised significantly less funds per ICO. Also, since the middle of summer 2018, monthly funds raised have not reached the average 2017 monthly level.

Figure 6 – ICO funds raised in 2018 (source: ICObench)

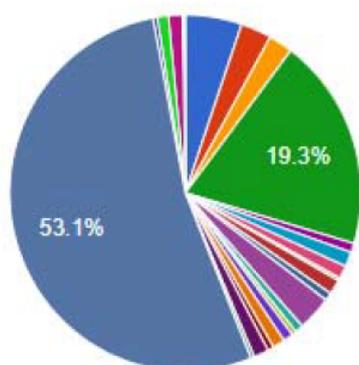
ICO started, ongoing and ended for the past 12 months

Month	Starting	Ongoing	Ended	Raised	Raised Amount	Avg. Raised
Jan-18	222	211	167	73	\$1 361 763 964	\$18 654 301
Feb-18	267	262	186	110	\$1 685 480 238	\$15 322 548
Mar-18	333	314	230	117	\$1 749 107 226	\$14 949 634
Apr-18	297	375	221	110	\$1 104 863 477	\$10 044 213
May-18	267	436	253	125	\$1 085 706 844	\$8 685 655
Jun-18	254	412	268	107	\$1 612 644 456	\$15 071 444
Jul-18	214	385	217	84	\$672 172 377	\$8 002 052
Aug-18	200	385	167	54	\$779 276 871	\$14 431 053
Sep-18	227	404	169	69	\$390 266 791	\$5 656 040
Oct-18	200	459	167	58	\$532 594 604	\$9 182 666
Nov-18	187	493	177	68	\$375 192 131	\$5 517 531
Dec-18 (Dec 1-31)*	129	495	251	76	\$424 388 964	\$5 584 065

- B22. The data also shows that the 2018 ICO projects raised significantly less funds per ICO. Also, since the middle of summer 2018, monthly funds raised have not reached the average 2017 monthly level.
- B23. Publicly available data (Figure 7) indicates that financial services leads ICO issuance. Financial services can include cryptocurrencies and crypto-asset platforms. Other sectors engaging in ICOs include government, healthcare, logistics and retail, and real estate. The table below highlights ICOs per industry as reported by ICO Watchlist [ICO Statistics - By Industry - ICO Watch List](#).

Figure 7: ICOs by sector (source: ICO Watchlist)

Total USD Raised Per Category



ICO measurement and valuation issues

- B24. Estimating the value of a crypto-asset token that will be issued in an ICO is challenging since information about future cash flows is seldom provided. Most entities raising capital through ICOs are at the initial stages of development, often not even operating businesses but just funding ideas. The expected pay-off from an ICO token depends on the intention of token holders either as customers or investors. For example, utility tokens grant their holders access to the token’s ecosystem, product or service, which makes these token holders more akin to customers than investors. However, once tokens are listed on an exchange they can be sold in the secondary market by both customers and investor holders. Thus the expected return from tokens (whether issued in an ICO or bought in a secondary

market) could be a combination of the value derived from the ecosystem of the token, prospects of future profit distribution and future resale price. Thus traditional asset pricing methods might not be appropriate to value a token for an ICO process (or thereafter).

- B25. There is very little data and literature on valuation methodologies for crypto-assets. A report published by the European Commission *European Financial Stability and Integration Review 2018* highlights first attempts made towards developing a theoretical framework around crypto-currency valuation. They note that as an example, Bolt and van Oordt (2016) developed an economic framework to analyse the value of a crypto-currency. The researchers applied Fisher's (1911) quantity relation to how the value of a crypto-currency responds to changes in the speculative position of investors. Their theoretical framework shows that three elements are important for its value: (i) the current value of the crypto-currency to make payments; (ii) the decision of forward-looking investors to buy crypto-currency, thereby effectively regulating its supply; and (iii) the elements that jointly drive future consumer adoption and merchant acceptance of crypto-currency. The EC report informs that this model just one of many possible models. One of the complexities not captured by this model are transaction costs which include the costs to reward miners for maintaining the networks. The report acknowledges that the blockchain technology and related crypto-assets are still in their very early stages of development and thus it is hard to derive a robust methodology for their valuation.

ICO related risks and mitigation

- B26. The paragraphs below describe key risks associated with ICO issuance and the associated mitigation measures. The key risk addressed below is the high failure rate but there are other risks including those arising from the limited transparency of whitepapers issued during ICOs and the absence of legally binding and enforceable contractual agreements.

Related risks

- B27. ICOs remain largely unregulated and this increases the likelihood that they fail and investors have a significant risk of losing their capital. Some sources (Satis Group report²⁸) show that around 78 percent of ICOs issued in 2017 were identified as scams or failed. However, the research paper published by the Journal of Economic and Business: *Why do Business go crypto? An empirical analysis of initial coin offerings* informs that of the sample of 253 ICOs examined, 205 (81%) successfully closed their offering. This research indicates that ICOs can be labelled as failed for a number of reasons, the main reason being not having reached the minimum funding goal, in which case the common, but not universal, practice is to refund the contributors. A failed ICO may also be the result of a security flaw such as a hack attack which subsequently results in the suspension of the token distribution.
- B28. Similarly, a study conducted of the ICO market conducted by the Columbia Business School, London Business School and University of Utah *Initial Coin Offerings: Early Evidence on the Role of Disclosure in the Unregulated Crypto Market* (Columbia Business School, London Business School and University of Utah study) found that of out a sample of 776 entities that have tried to access funds though an ICO over the period April 2014 to February 2018, 659 have successfully completed an ICO (85%). At this stage, it is unclear why the success rate data differs so significantly between the report published in July 2018, by the Satis-Group report *Cryptoasset*

²⁸ Satis Group

<https://cryptoslate.com/satis-group-report-78-of-icos-are-scams/>

market coverage initiation: Network Creation from other data. The Satis Group found that approximately 78% of ICO's were identified scams.

- B29. The Columbia Business School, London Business School and University of Utah study concludes that disclosure and the information environment of crypto-asset token issuers are positively associated with the likelihood of successfully completing an ICO and with the amount of funds raised. This study also found that social activity is an important channel through which information is disseminated, which suggests that hype and investor attention play a significant role in the success of an ICO.
- B30. However, the Boston College draft study informs that there remains a high incidence of ICO scams and theft. According to the Boston College draft study, one common scheme involves hacking the website or social media accounts of a legitimate ICO and changing instructions, so buyers send money to the hackers rather than the token sellers. This happened to CoinDash/Blox in July 2017, resulting in USD7 million stolen in just half an hour. The token seller can also be hacked after the ICO, as happened to The DAO in June 2016, resulting in the theft of approximately USD60 million in cryptocurrency.
- B31. The Boston College working paper further informs that sometimes, the organisers of the ICO are scammers themselves. Recently, a Vietnamese pyramid scheme used an ICO to raise USD650 million and then disappeared with the money. The co-founders of Centra, which had raised USD32 million in an ICO, were arrested in April 2018 in the United States for fabricating information about deals that their company was making and listing fictitious people on their website. More common than these obvious cases of criminality are soft scams, in which the entrepreneurs pretend to be using ICO proceeds for project development but instead slowly abandon the project and keep most of the ICO proceeds for themselves.

Risk mitigation:

- B32. The below paragraphs describe mitigation measures including
- (a) The rising role of information intermediaries;
 - (b) Increasing regulatory scrutiny;
 - (c) Emergence of Security Token Offerings (STOs) and Initial Exchange Offerings (IEOs).

Rising role of information intermediaries

- B33. In the absence of a regulated market together with the often limited and varied information contained within the whitepapers, there has been a rise in self-regulation and information intermediaries that aim to align the information provided to investors in crypto-assets. The Columbia Business School, London Business School and University of Utah study identified two main types of intermediaries:
- (a) information aggregators, and
 - (b) ICO rating providers.
- B34. Information aggregators disseminate crypto-market news and events; market statistics; and information about past, ongoing and future ICOs. Examples of information aggregators include Coindesk.com, coinschedule.com and cointelegraph.com.
- B35. ICO rating providers analyse token issuers and various attributes of the ICO to provide an overall assessment of the quality of the tokens and their future prospects. The business model of ICO rating providers is based on crypto-asset experts and algorithms that provide ratings that should capture the overall quality of information provided by the token issuer, as well as the overall quality of the token. Examples include ICObench.com, icorating.com and icoalert.com. For example, the ICObench.com rating system divides projects into two groups – ICOs that are rated

higher than 3.0 and ICOs that are rated lower than 3.0 on a scale of 5. They also provide information on whether Know Your Client (KYC) requirements have been met, whitepapers and country of registration of the ICO.

- B36. Statistics about the frequent visits to these websites suggest that these rating providers are an important source of information for investors in the crypto-asset market. In addition, academic studies indicate that social media presence and activity help to obtain a better understanding of the ICO, its developers and the product being developed.

Increasing regulatory scrutiny

- B37. Regulatory and supervisory bodies including European Securities Markets Authority (ESMA)²⁹ and European Banking Authority (EBA)³⁰ have issued publications related to crypto-assets and these have highlighted the varied levels of market development, innovation and regulatory scrutiny across countries in respect of crypto-assets. Some EU countries are in the process or have already enacted legislation to regulate ICOs. France is one example but there could be others. Outside EU, Switzerland and Singapore are revising their regulations and the US SEC is carefully observing the ICO market and is contemplating potential regulatory actions. In some jurisdictions ICOs are banned. For example, China and South Korea banned ICOs entirely in late 2017.
- B38. One of the main concerns regarding regulation of ICOs and crypto-asset tokens more generally is determining a legal definition of tokens. With ICOs, the objective of issuers is to avoid being considered to be offering 'securities'. As a result, they are not regulated under the securities regulation of their jurisdiction or the jurisdiction of the participants in the ICO.

Emergence of Security Token Offerings (STOs) and Initial Exchange Offerings (IEOs)

- B39. The crackdown on a few ICOs by security regulators, coupled with some of the risks and security issues associated with ICOs, has resulted in the rise of other forms of token offerings such as Security Token Offerings (STOs) and Initial Exchange Offerings (IEOs). Below is a description of these token offerings.

Security Token Offerings (STOs)

- B40. A Security Token Offering (STO) is the mechanism used to issue a security token (an asset-backed token). In recent months, STO's have been picking up mainly because of the increasing oversight and regulation on ICOs and also because of potential loss in investor confidence in ICOs.
- B41. A study issued by Inwara (www.inwara.com) shows that in 2018 the number of STOs in any quarter is much smaller than the corresponding number of ICOs. In the United States and well as other jurisdictions, STO's are deemed to be securities and are subject to securities regulations. Inwara expects that STO's will attract high levels of investor attention in 2019 and beyond given their nature and existing regulatory environment.

Initial Exchange Offerings (IEOs)

- B42. Initial Exchange Offerings (IEO's) provide a framework in which the exchange hosting the IEO acts as intermediary between the developers of the crypto-assets who wish to launch the crypto-assets and the contributors (those that buy the crypto-assets when they are first issued).

²⁹ This document can be found [here](#).

³⁰ This document can be found [here](#).

- B43. Unlike an ICO (which is managed by the project developers), an IEO is managed on a cryptocurrency exchange platform on behalf of the IEO issuer. The exchange will conduct a screening of the company wanted to undertake the ICO as well as undertake the necessary know your customer (KYC) regulatory or voluntary requirements. IEOs began in 2018 and present a more secure form of investing in initial offerings of a crypto-assets as investors can rely on the due diligence performed by the exchange hosting the IEO offering. A number of IEO's have recently taken place on the Binance exchange.
- B44. According to a report published in May 2019 by ICObench.com there have been 42 IEOs raising USD 266 million as at the end of April 2019. Almost half of these funds were raised by IEO's in Singapore and Hong Kong. IEOs in the EU have raised less than USD 50 million (mainly Estonia, Bulgaria, Germany and Switzerland). Some IEOs are completed within seconds – for example FETCH.AI which was launched on the Binance exchange in early 2019 took just seconds to raise USD 6 million.

Appendix C- Storage and custodian services

What are storage and custodian services in relation to crypto-assets?

- C1. Storage and custody services refers to the means of storing crypto-assets. Before acquiring or transacting with crypto-assets, it is important to have a safe place to store them and that place is referred to as a 'wallet'.
- C2. A crypto-asset wallet is a software program secured by private and public keys and interacts with various blockchain to enable users to send and receive crypto-assets and monitor their balances. The following features are central to understanding the concept of crypto-asset wallet and how crypto-assets are safeguarded.
- (a) Wallets can be created using Internet software services and the information can be placed on any computer or mobile device.
 - (b) Wallets can send and receive crypto-assets to any other crypto-asset wallet without the need for the transaction to be recorded or processed by a third party (such as a bank). Thus, transactions are anonymous to anyone other than the transacting parties.
 - (c) Each wallet is accessible only through the use of a cryptographic algorithms that sets the password called public and private keys.
 - (d) The commonly used wallets are referred to as (1) cold storage and (2) hot storage.
 - (e) Wallets can be safeguarded using custodial (third-parties) and non-custodial services (self-custody).
- C3. In summary, an investor can store its crypto-assets:
- (a) in the investor's own wallet that they acquire or set up on the internet; or
 - (b) Using a custodial service (in which case the user may not control the private keys).

Keys and wallets

Public and private keys

- C4. In cryptography, a **public key** is a large numerical value that encrypts data and is used as an address to receive crypto-assets. A public key (or public address) can be thought of as the equivalent of a bank account number, which suffices for the purposes of receipt of funds/other parties sending funds to an individual. Some compare a public key to an email address that can be used to receive and send crypto-assets. However, unlike a bank account, the crypto-asset balance in a given public address can be viewed by anyone who knows the address, although the identity of the address owner is not recorded on the blockchain.³¹
- C5. A recent article published in December 2018 by [Chainanalysis](#) *Mapping the Universe of Bitcoin's 460 million Addresses*, reports that the Bitcoin blockchain has over 460 million (public) addresses on its network, although only 172 million are economically relevant — they are controlled by people or services who currently own bitcoin.
- C6. A **private key** is similar to a bank account password, security token and account number combined into one. The private key allows the owner of the crypto-assets (or any holder that knows the private key) to open a crypto-asset wallet and send

³¹ For example, this is how a Bitcoin public key looks like (it always starts with 1):
1EHNa6Q4Jz2uvNExL497mE43ikXhwF6kZm

crypto-assets to another address (public key). Private keys provide a high level of security.

- C7. Private keys (like public keys) typically involve a complicated and difficult to remember password.³²
- C8. Knowledge of the private key equals control of the crypto-assets in the corresponding address(es). It is important to note that many crypto-asset holders – via online wallets or exchanges – do not have access to their private keys. This makes them fully dependent on the proper functioning, security and backup procedures of online wallets or exchanges, as well as the integrity of the wallet designers to effectively manage private keys. From a counterparty risk perspective, if a user does not have control of the private key, it could be seen as ‘a creditor’ of the private key holder.
- C9. Once a crypto-asset transaction is made, it is not possible to reverse it, as no entity is allowed to alter signed transactions on the blockchain. Furthermore, if a private key is lost it is not possible to recover it any crypto-assets connected to that lost private key will be lost. There are a number of safety concerns linked to private keys.
- (a) First, private keys are a prime target for hackers especially if kept in online wallets (hot wallet storage). This occurs not only with individual users, but also with exchanges that, other than trading services, also hold crypto-assets assets on behalf of customers (custodial services). An example is the case of Mt. Gox (a Japanese exchange), at that time the world’s leading Bitcoin exchange, which reported a loss of approximately 850,000 bitcoins belonging to customers and the company in 2014. The exchange subsequently went bankrupt.
- (b) A second concern is the loss of the private key. The loss of crypto-assets due to owners (or exchanges holding on behalf of owners) forgetting their private keys has become quite common, hence a reliable storage and recovery mechanism is essential. A recently reported case was the death of the CEO of a Canadian exchange (Quadrigacx) who was the only person with the cryptographic keys to access approximately USD 145 million of cryptocurrencies kept in cold storage to mitigate the risk of hacks.

Crypto-asset wallets

- C10. Crypto-asset wallets have evolved over time to support a number of technical and commercial services and the increased demand for more secure safe-keeping of crypto-assets. The commonly used wallets to store crypto-assets are cold storage and hot storage. These types of wallets can be used either by an exchange or by an individual user.
- C11. There are trade-offs involved in choosing between a cold wallet and a hot wallet. Cold wallets are generally more cumbersome to access, and usually involve longer waiting times to undertake a transaction. Hot wallets (internet wallets) are usually faster and grant quicker access to the funds. However, cold wallets are a safer means of storing the private keys for the crypto-assets.

Cold storage

- C12. Cold storage is an offline wallet for storing customers’ private keys, which allows access to and control over the customers’ crypto-assets. With cold storage, the digital wallet is stored on a platform that is not connected to the internet. Methods

³² In Bitcoin, a private key is a 256-bit number, which can be represented one of several ways. Here is a private key in hexadecimal - 256 bits in hexadecimal is 32 bytes, or 64 characters in the range 0-9 or A-F. For example, this is how a typical Bitcoin private key might look (it always starts with 5) - 5Kb8kL9zgWQn0gidDA76MzPL6TsZZY36hWXMssSzNydYXYB9KF.

of cold storage include various forms of hardware wallets (including the Nano Ledger).

- C13. Cold storage is generally considered a safer form of storing private keys, since cold wallets are less vulnerable to internet and network-based theft and hacking and require physical access. Generally speaking cold storage is used to store larger amounts of crypto-assets and for users that need to access funds less frequently. Some crypto-asset exchanges provide cold storage facilities.

Hot wallet storage

- C14. Hot wallets refer to keeping private keys on an online device. Examples of hot wallets are web-based, desktop and mobile wallets running on connected machines.
- C15. Hot wallets are generally used to store smaller amounts of crypto-assets and are generally suited to users that trade more frequently.

Custodial (third party) services and non-custodial services

- C16. There are two types of storage services provided by third parties
- (a) Custodial services; and
 - (b) Non-custodial services.
- C17. Exchanges, brokerage services and platforms that allow customers to buy, sell crypto-assets also tend to provide both custodial and non-custodial services. Custodial and non-custodial service providers can use both cold and hot wallets.
- C18. A key difference between custodial and non-custodial services is that with non-custodial services **users control the private keys**. With custodial services users are not given the access to private key.

Custodial services

- C19. Custodial (third party) crypto-assets services include most exchanges, brokerage services, and platforms that allow the buying, selling, and storage of crypto-assets. Many custodial service providers charge a fee for undertaking this service.³³ Some financial institutions provide custodial services for crypto-assets. The service provider **controls the private keys** and thus in principle, absent a legal requirement or contract may be considered to control the crypto-assets.
- C20. Custodial services provided by third parties are increasingly popular. This is because the storage process, including using wallets (like the Ledger Nano ‘cold wallet’), is often complicated, involving a number of technical steps, some of which are irreversible in case of error. Also, private keys are extremely difficult to remember and can be stolen or hacked.
- C21. An example of third-party custodial services for crypto-assets is Swissquote, a Swiss registered financial institution that started to provide cryptocurrency trading and custodial services in 2017. Its 2017 annual report highlights that cryptocurrencies trading revenues are recognised as fee and commission income as customers are charged a percentage of the transaction amount designated in EUR or USD currency. The implication is that such fees include custodial services. The following is an extract taken from Swissquote 2017 annual report;

‘Since 2017, the Group offers cryptocurrencies trading services to its clients. In that context, the Group keeps the holdings in cryptocurrencies acquired by its clients in custody either directly or with a third-party custodian. The Group holds all cryptocurrencies credited to the client accounts solely as nominee (fiduciary basis) on behalf of its clients, which remain the

³³ Exchanges typically provide three types of crypto-asset services (1) custody of funds (2) Order matching and (3) Clearing and settlement.

legal and beneficial owner of such holdings. The Group itself has no direct claim to the cryptocurrencies, as they are assets belonging to its clients. When analysing the contractual terms and economic substance of the arrangements in place, the Group determined that (i) it must not record these holdings on its statement of financial positions because they would not fall within the bankruptcy estate of the Group and (ii) the general IFRS definitions of an asset and liability were not met.'

- C22. Custodial services are provided by so-called centralised exchanges/platforms. Most exchanges are centralised businesses with dedicated operators providing crypto-asset services (including storage), and therefore more easily subject to regulation unlike blockchain-based trading platforms. With centralised exchanges, the Know Your Client (KYC) registration is compulsory. The funds of a user are kept in wallets handled by the exchange. However, not all centralised exchanges/platforms are regulated, and the level of regulation varies.
- C23. Centralised exchanges typically take physical control of client crypto-assets (e.g., they hold clients' private keys on their behalf or keep clients' crypto-assets in a single account under the platform's own private key) and may also hold fiat money on their behalf; the issue is therefore whether the platform has the necessary measures in place to segregate and safeguard crypto-assets and fiat currency. However, if an exchange operates in an unregulated environment, the obligations of the operator towards its customers might be unclear.

Non-custodial services

- C24. Non-custodial services are provided by decentralised exchanges (referred to as DEXes). The user holds its crypto-assets directly as it holds the private keys (even if the wallet service is provided by a third party).
- C25. A study by Cambridge University in 2018³⁴ (referred to in this paper as the Cambridge University study) highlights that more recently a number of DEXes have emerged that promise to provide a decentralised trust-minimised alternative to traditional third-party exchanges.
- C26. With DEX platforms, users remain in control of their crypto-assets and transaction settlement happens on DLT, using smart contracts. While this set-up helps mitigate the risks associated with centralised exchanges (such as potential hacking) or exchanges that malfunction. However, these safekeeping risks will be passed on to the user.
- C27. Figure 1 (Cambridge University study) illustrates the exchange processes, including custody of funds:

Figure 1 – Custody of crypto-assets (source: Cambridge University study)

EXCHANGE TYPE	1. CUSTODY OF FUNDS	2. ORDER MATCHING	3. CLEARING & SETTLEMENT
a. Custodial	Exchange	Exchange	Exchange
b. Non-custodial	Users	Exchange	Exchange
c. P2P	Users/Exchange	Users/Blockchain	Exchange
d. DEX	Users	Blockchain	Blockchain

³⁴ A study undertaken by the Cambridge University titled 2nd Global Cryptoasset Benchmarking Study was published in December 2018. This study is based on data collected from 180 startups, established companies and individuals from **47 countries across all major regions**. The objective of the study is to provide new insights into the current state of the ecosystem and, in combination with publicly available data sources, capture major trends of the rapid market development in cryptocurrencies.

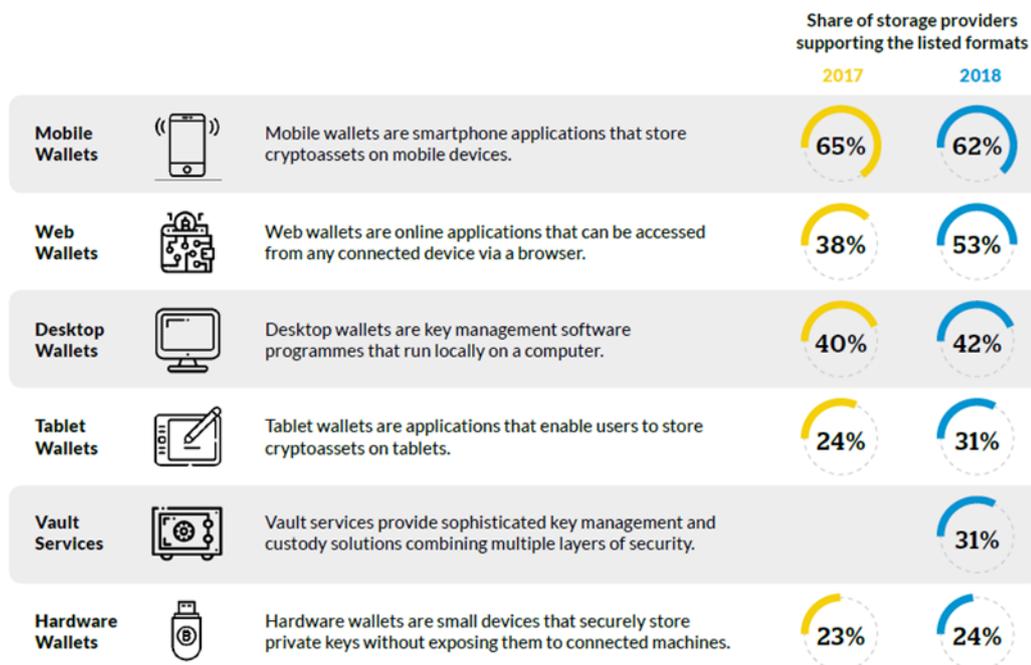
- C28. Most DEXes would be regarded as non-custodial exchanges (users retain full control over their crypto-assets), but the exchange handles order matching and/or clearing and settlement centrally) or so-called P2P exchanges (which provide a more flexible platform for user matching where users can decide whether to store funds at the exchange and perform the actual trade outside of the platform).
- C29. In contrast, a true DEX uses a public blockchain for both user matching as well as clearing and settlement services while allowing users to maintain control of their funds. It seems that true DEXes are currently not widespread.

Prevalence and trends

Crypto-asset wallets

- C30. The Cambridge University study indicates that mobile wallets are the most common way of holding crypto-assets; although support is increasing for web wallets. Figure 2 illustrates this trend (in relation to the global study and not specific to the EU),

Figure 2 – Storage providers for crypto-assets (source: Cambridge University study)

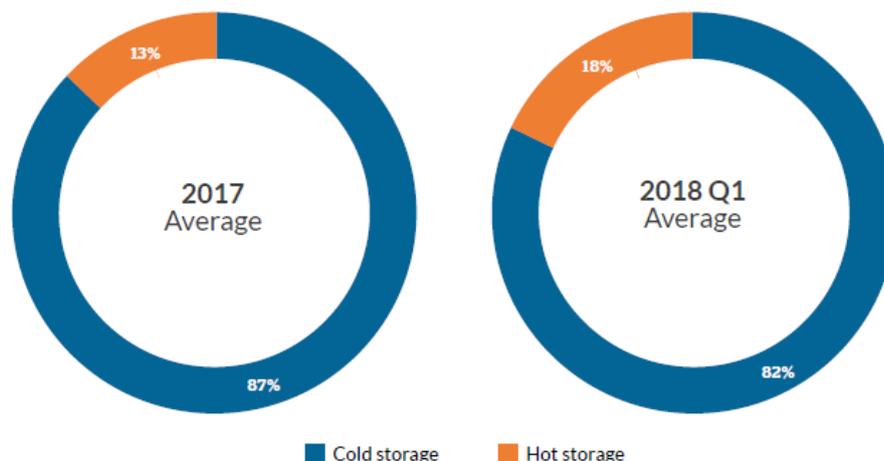


- C31. Figure 3 shows the global evolution of wallet options between 2017 and the second quarter of 2018. Mobile and web wallets (hot wallets) are the most widely offered storage formats, though cold storage vault services (cold wallets) have gained in popularity in late 2017 with the influx of institutional investors. As previously mentioned, cold wallets offer a safer storage option than hot wallets.
- C32. The Cambridge University study shows that large storage providers support an average of three of the above types, compared to an average of two storage types supported by small wallet providers. Storage-only service providers are more likely to specialise in a particular activity, as opposed to multi-segment entities that provide a range of crypto-asset services.

Cold storage versus hot storage

- C33. Figure 3 indicates that the share of funds in cold storage in 2018 has slightly decreased over 2017.

Figure 3 Share of crypto-asset funds (source: Cambridge University study)



C34. According to the Cambridge University study, the average share of crypto-asset funds kept in cold storage by multi-segment companies (providers of various types of crypto-assets services) amount to 83% of total funds, slightly higher than entities specialised in exchange services (79%) or payment services (55%), but less than entities exclusively providing storage services (100% use of cold storage).

Custodial versus non-custodial services

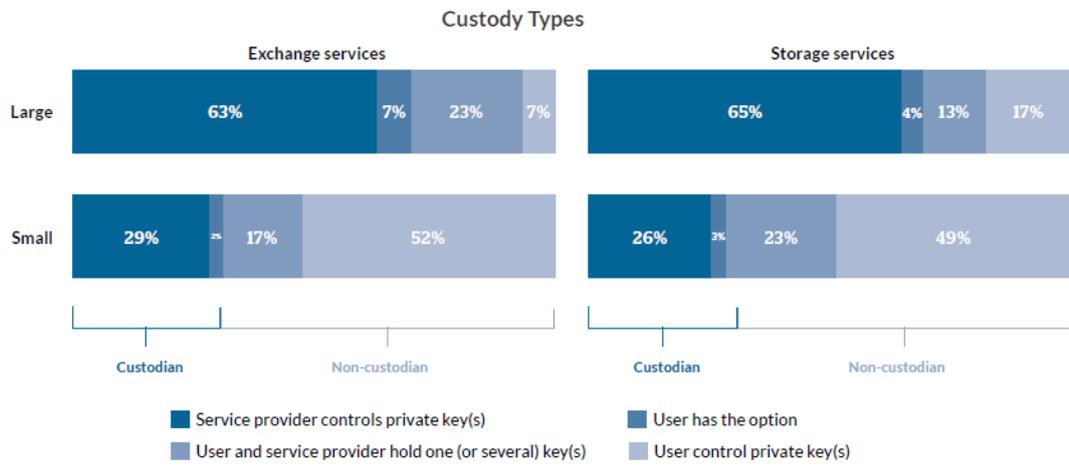
C35. Currently custodial services are mainly provided by crypto-asset exchanges (such as Coinbase) and other crypto-asset platforms, both of which are typically start-ups. However, it seems that more traditional financial service providers (including banks) are starting to provide custodial services.

C36. The lack of regulation in some jurisdictions coupled by the lack of a legally binding custody agreement between an exchange and a client (the owner of the crypto-assets) can raise questions about who legally controls the crypto-assets. This seems why some financial institutions like Swissquote offer custody services that can be 'relied' on by investors that hold crypto-assets and seek a custody service. Some major exchanges, such as Coinbase, also offer regulated custody services to institutional investors through its subsidiary company called Coinbase Custody. Fidelity Investments recently announced that it could be launching its cryptocurrency custody service sometime in 2019, initially focusing on Bitcoin. While a number of start-ups have sought to offer the safekeeping service, institutional investors would prefer to work with large financial services companies.

C37. The Cambridge University study indicates that large companies provide significantly more custodial services (approximately two thirds of large crypto-asset exchanges manage custodial services for their customers) compared to smaller companies.

C38. Figure 4 from the Cambridge University study also shows that companies exclusively providing storage services (69%) and exchange services (48%) more frequently opt for non-custodial methods of storing crypto-assets.

Figure 4 – Custody service types (source: Cambridge University study)



C39. The Cambridge University study indicates that despite a significant share of service providers offering self-custody options, especially with larger providers, the majority of users choose not to use it; **instead opting for custodial services.**