



Swiss LegalTech Association

– Data, Blockchain and Smart Contracts –  
Proposal for a robust and forward-looking Swiss ecosystem

Regulatory Task Force Report  
Swiss LegalTech Association (SLTA)

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<http://www.swisslegaltech.ch/think-tank/>

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## I. Executive Summary

### 1. Data

The section on digital data deals with the specific issues of ownership of data, bankruptcy and debt enforcement. The white paper gives an overview of the ownership of data under foreign jurisdictions concluding, not surprisingly, that there is no uniform definition of data ownership. It then goes on to analyse the diverging legal opinions on data ownership under Swiss law, resulting in a call for clear legislation either by means of a conceptual clarification or the creation of a separate category of objects for digital data. With respect to bankruptcy and debt enforcement the white paper analyses the demand for an adjustment of the applicable legislation making the link to data ownership and concluding that the recognition of digital data as objects could also eliminate the legal uncertainties for digital data in such proceedings.

### 2. Blockchain

#### 2.1 Function of distributed ledger and tokens

The distributed ledger technology (**DLT**) has until recently mainly been used for cryptocurrencies. However, DLT may also be used to record "ownership" and transfers in digital information that can represent, in theory, any type of asset or right within a coin or token (**Token**).

For the purpose of our legal assessment of Tokens, we differentiate the following types of Tokens which can be created on the basis of so called colored coins, smart contracts or a new distributed ledger and are usually issued within so-called initial coin offerings (**ICOs**):

- By reference to the creation of a separate blockchain:
  - Tokens that represent digital assets intrinsic to a blockchain (**Native Tokens**). For instance, cryptocurrencies such as bitcoin or ethers qualify as Native Tokens.
  - Tokens can also be created on an existing blockchain (**Non-Native Tokens**).
- By reference to the rights represented:
  - Cryptocurrencies or payment tokens (**Cryptocurrencies** or **Payment Tokens**) are intended to be used as a means of payment for acquiring goods or services or as a means of money or value transfer. They do not give rise to any claims against an issuer and may be created as a result of mining, issuance or they may be acquired from other holders of Payment Tokens.
  - Utility Tokens (**Utility Tokens**) are tokens which are intended to provide access digitally to an application or service by means of a blockchain-based infrastructure. FINMA requires that the underlying platform is operationally ready and may be used at the point of the issuance of the Utility Tokens. If that is not the case, the Utility Tokens should be classified as Asset Tokens. To the extent that Utility Tokens confer rights exercisable against the issuer or third parties, the legal requirement for the transfer of such rights need to be respected in addition to the transfer on the relevant distributed ledger.
  - Asset Tokens (**Asset Tokens**) represent assets such as a debt or equity claim exercisable against the issuer or they may represent an underlying asset that shall become tradable on the blockchain through such tokens. For a legally

valid settlement of the rights conferred in an Asset Token, the legal requirement for the transfer of such rights or assets need to be respected in addition to the transfer on the relevant distributed ledger.

## 2.2 Relevance of Swiss law

The laws applicable on an issue and transfer of Tokens are established according to the private international rules applicable to the issuer and the token-holder, which may differ in each country and have to be established separately for each jurisdiction.

Under Swiss private international law, for Tokens that qualify as contractual relationship between the issuer and the token-holder, we believe that a valid choice of law clause can be incorporated in the documentation of a Coin, except for certain types of contracts such as consumer and employment contracts. Yet, a case-by-case analysis is required to establish if such choice of law clause is also binding on any token-holder acquiring a Token on a secondary market. Without a binding choice of law, the general choice of law principles for contracts apply.

To the extent that a Token qualifies as intermediated security according to the Hague Securities Convention (**HSC**), the applicable law is determined in accordance with the conflict of law rules of the HSC. For other types of securities, the general Swiss choice of law principle apply.

Note that these rules are not adapted or even impossible to apply to distributed ledgers and Tokens in general due to their fully digital and distributed nature and the development of internationally harmonized rules regarding the establishment of the applicable law for Tokens and distributed ledgers is desirable.

## 2.3 Issuer and limitations regarding transfer of Tokens

In Switzerland, the issuer of a Token, i.e the person responsible for issuing the Token to the public, can be any person with legal capacity, including individuals and corporation. We have noted that foundations have become increasingly popular as vehicle for issuing Tokens. However, due to limitation regarding the licit purpose of foundations and the distribution of the proceeds and the non-advantageous tax treatment (unless the foundation has a charitable purpose), we consider foundations not as ideal vehicle.

Under Swiss law, the valid creation and the transfer of the rights resulting from an Asset Token or a Utility Token that confers exercisable rights against the issuer or a third party is only possible if the Swiss law requirements for the creation and transfer, respectively, are met. Such requirements exist in form of notarization and written form requirements. While a notarization requirement cannot be replaced by a digital procedure, the written form requirement can be substituted with a so-called qualified electronic signature in a digital environment. However, at this stage, we are not aware of any distributed ledger that supports a qualified electronic signature.

Note that the creation of right is generally not subject to any formal requirements, unless there are statutory requirements or the parties have agreed on such requirements. However, the transfer of rights, registered or uncertificated securities requires a written assignment or endorsement and the transfer of movable goods requires the transfer of ownership. Currently, only intermediated securities may be transferred without written form requirement or physical transfer and, therefore, may be transferred concurrently with the transfer of a Token, if the

relevant distributed ledger would qualify as securities account according to the Federal Intermediated Securities Act (FISA) and the Tokens would be issued as intermediated securities.

As work-around for Asset Tokens and Utility Tokens that confer exercisable rights against the issuer or a third party representing a contractual relationship between the token-holder and the issuer, the transfer to a new token-holder could be construed as transfer of the contractual relationship (*Vertragsübernahme*), which is not subject to a written form requirement. However, such transfer requires consent of the issuer.

In order to remedy these hurdles for the valid transfer of rights conferred in Asset Tokens and Utility Tokens that confer exercisable rights against the issuer or a third party, it is advisable to simplify the digital alternatives to comply with the written form requirement, for instance by accepting a transfer on distributed ledgers that meets certain security requirements as valid replacement of a wet-ink signature.

## 2.4 Tokens as means of payment

Although not a legal tender or a foreign currency, authorities in Switzerland have acknowledged to-date that crypto currencies, i.e. Tokens that are used as means of payment and that are tradable, qualify as assets (*Vermögenswerte*). In consequence, Tokens may be used in Switzerland as private means of payment as long as the parties contractually agree to do so.

## 2.5 Tokens as securities / derivatives

Under Swiss law, the definition of securities comprises rights and assets that are securitized as certificated securities (*Wertpapiere*), uncertificated securities (*Wertrechte*) or intermediated securities (*Bucheffekte*) that are standardized, i.e. fungible, and suitable for mass trading. Further, rights that qualify as derivatives are defined as securities, if they are standardized and suitable for mass trading. It appears that FINMA would qualify any Token that represents a right, as uncertificated securities. In consequence, such Tokens constitute securities if they are standardized and suitable for mass trading. However, a case-by-case analysis remains indispensable in order to take into account the individual characteristics of each Token.

Generally speaking, Cryptocurrencies cannot constitute securities or derivatives as they do not constitute a real-world right that could be securitized or qualify as derivative. The same conclusion applies in our view to Utility Tokens that do not confer any rights against the issuer or a third party.

Asset Tokens (and Utility Tokens classified as Asset Tokens), however, comprise real rights that may qualify as securities if they are standardized and suitable for mass trading.

Separate to this regulatory analysis whether or not an Asset Token (and Utility Tokens classified as Asset Tokens) qualifies as securities, the civil law obstacles regarding in particular the transferability of a Token. On the basis that the formal requirements for certificated and uncertificated securities cannot be met by transferring Asset Tokens or Utility Tokens that confer exercisable rights against the issuer or a third party, on a distributed ledger, only intermediated securities may be eligible asset class for such Asset Tokens and Utility Tokens that confer exercisable rights against the issuer or a third party.

In our view, it is possible to create intermediated securities digitally on a distributed ledger, as the registers required for the creation of intermediated securities can be created digitally



using a distributed ledger, i.e. the main register and the securities accounts for creating intermediated securities according to Art. 6 para. 1 lit. c FISA on the basis of the uncertificated securities that have been created on the basis of a digital uncertificated securities register (*Wertrechtbuch*). However, it is necessary that the person maintaining the main register and the securities accounts is a prudentially supervised entity pursuant to Art. 4 para. 2 FISA, e.g. bank or a securities dealer. Once created, an Asset Token and a Utility Token representing rights against the issuer or third parties in the form of intermediated security can be transferred concurrently with the transfer on the relevant distributed ledger as the distributed ledger would be used to evidence the securities accounts.

In conclusion, the broad qualification of FINMA as uncertificated securities results in legal uncertainty regarding the validity of transfers as uncertificated securities are subject to a written form requirement for transfers. In order to eliminate this legal uncertainty and avoid the fallback to work-arounds such as transfer of contracts (*Vertragsübernahme*), propose to define Asset Tokens as new asset class in the Code of Obligation (CO):

**Art. 973d H. Special provisions / I. Rights in digital form (Tokens)**

- <sup>1</sup> *The obligor may issue fungible rights with the same function as negotiable securities in digital form (tokens) or replace fungible negotiable securities or global certificates that are held by a custodian with tokens, provided the conditions for issue or the articles of association of the company provide therefor or the depositors have consented thereto.*
- <sup>2</sup> *The obligor shall record the tokens on a distributed ledger on which details of the number and denomination of the tokens issued are recorded.*
- <sup>3</sup> *The tokens are created on entry in the distributed ledger only if a security audit has approved the tokens' functionality and compliance with the conditions of the issue or the articles of association.*
- <sup>4</sup> *The disposition of the tokens (transfer of ownership or creation of security in form of title transfer or pledge) is made by way of a transaction on the distributed ledger.*
- <sup>5</sup> *The provisions of the Federal Intermediated Securities Act apply mutatis mutandis.*

We believe that such codification as new asset class is justified as certain Asset Tokens and Utility Tokens that confer exercisable rights against the issuer or a third party have the same purpose as other securities by essentially simplifying the transferability and providing for the tradeability of a right. Further, such definition would eliminate the current problems regarding the valid transfer of the rights conferred in such Tokens.

Regardless of the qualification of an Asset Token as security, distribution requirements may apply under Swiss law depending on the right conferred in an Asset Token in form of a prospectus or investor information document requirement. These obligations are likely to be broadened with the entry into force of the anticipated Financial Services Act.

## 2.6 Regulatory treatment of ICOs by FINMA

FINMA has made clear in its guidance on the regulatory treatment of ICOs of 29 September 2017 that the financial markets regulation apply in a technology-neutral manner also to Tokens. In consequence, a case-by-case analysis is inevitable if the issue of a Token falls within the ambit of the Swiss financial markets regulations. FINMA provided further guidance on

how to apply the Swiss financial markets laws in the context of issuing Tokens within its guidelines regarding the regulatory framework for ICO (the **ICO-Guidelines**) published on 16 February 2018.

The ICO-Guidelines provide guidance (i) how market participants should make enquiries to FINMA to seek no-action comfort from FINMA, (ii) how FINMA categorizes Tokens for the purpose of the regulatory assessment of an ICO, and (iii) on the scope of securities law, Swiss anti-money laundering regulation, banking regulation and collective investment scheme regulation in connection with ICOs.

## **2.7 Tax aspects**

Cryptocurrencies that are used as means of payment, are treated for tax purposes as foreign currencies which are converted into Swiss francs for the purposes of a tax assessment and income and corporate income tax and, for individuals only, wealth tax incurs. A similar conclusion has to apply to holders of Asset Tokens and Utility Token.

As regards the taxation of the proceeds of an ICO of Asset Tokens or Utility Tokens, to the extent that such proceeds are used for financing a project, the taxation may occur not in the moment of the ICO, but when the proceeds are effectively used. Further, in connection with an ICO, stamp duty may have to be paid if Asset Tokens confer participation rights and withholding taxes may apply to any profit sharing paid in relation to Asset Tokens.

## **2.8 Recommendations**

In Summary, Switzerland already has a legal and regulatory environment that supports the issue and use of Tokens. Yet, hurdles exist in particular with regards to the transfer requirements of Asset Tokens and the complicated and unclear qualification of Utility Tokens and Asset Tokens as securities. To address these hurdles, we recommend to:

- Simplify the digital substitution of wet-ink signatures to meet the written form requirement; and/or
- codify Asset Tokens and Utility Tokens that confer exercisable rights against the issuer or a third party that meet certain standards as new asset class in the CO. By doing so, Swiss law could promote the use of DLT, ICOs and Tokens by creating legal certainty. Further, such codification could resolve the transfer problems (as the transfer requirements could be codified).

Furthermore, we have detected that the determination of law applicable to Tokens should be simplified. However, this problem goes beyond Swiss law and an international coherent solution would be desirable.

## **3. Smart Contracts**

### **3.1 Definition and analysis**

Smart contracts are intrinsically executable computer code or application, designed to implement certain predefined functions or actions. The fundamental characteristics of a smart contract are the self-enforceability and the immutability.

Combined with distributed ledger technology (DLT), a smart contract can be deployed and executed in a trustless manner without any ability of a party interacting with the smart con-

tract to amend its terms. For many commercial exchanges, these properties make smart contracts very attractive. Automation, combined with the lack of traditional trust-building costs, has the potential to significantly decrease transaction costs, making such exchanges more profitable.

As of today, there are several hurdles to a wider adoption of smart contracts:

- Lack of standardization of legal drafting and therefore difficulties to trans-code various non-actionable provisions of a legal contract into code;
- Written form requirements for certain types of contracts, respectively transfers of claims and uncertificated securities; and
- Absence of minimum standards for the creation and implementation of smart contracts.

In the current state of the legislation and the technology, a smart contract is typically suitable as an execution mechanism only for a set of deterministic obligations, rather than as a contract in itself.

The natural evolution, given the technological advances, appears to move towards an ever more formal representation of legal contracts which, given time, will likely become machine-readable. This can be achieved either (A) through progress in a form of legal multilingual ontology, to be implemented both in law and adopted by lawyers drafting the actual contract, as well as the emergence of a number of standardized legal drafting languages with features akin to a high-level programming language, or (B) through advances in artificial intelligence, which would evolve to a point where an AI could interpret natural language texts to translate those into an operative instantiation of the underlying agreement.

Such evolution would need to be followed by an evolution of the way legal texts are drafted, as well as practice of courts and/or alternative dispute resolution mechanisms to cope with the new challenges presented by "smart legal contracts".

### 3.2 Recommendations and findings

The main findings and recommendations of this white paper as regards to smart contracts are as follows:

1. SLTA should promote standardization of legal drafting, including through elaboration of common standards and trainings for legal professionals in structured legal drafting;
2. Swiss law relating to the form requirements for transfers of claims or rights should be amended so as to become technologically neutral, whilst maintaining the original purpose of the relevant form requirements:

*Art. 165 A. Cession des créances / I. Conditions / 1. Cession volontaire / b. Forme du contrat*

*b. Forme du contrat*

<sup>1</sup> *La cession n'est valable que si elle a été constatée par écrit ou par le biais d'un moyen technologique permettant d'en établir la preuve.*

<sup>2</sup> *Aucune forme particulière n'est requise pour la promesse de céder une créance.*

**Art. 973c 1G. Dépôt collectif, certificat global et droits-valeurs / III. Droits-valeurs**

**III. Droits-valeurs**

- <sup>1</sup> *Le débiteur peut émettre des droits ayant la même fonction que des papiers-valeurs (droits-valeurs) ou remplacer par de tels droits des papiers-valeurs fongibles ou des certificats globaux conservés par un même dépositaire, pour autant que les conditions de l'émission ou les statuts de l'émetteur le prévoient ou que les déposants aient donné leur consentement.*
- <sup>2</sup> *Le débiteur inscrit dans un registre le nombre et la valeur nominale des droits-valeurs émis ainsi que leurs créanciers. Ce registre n'est pas public.*
- <sup>3</sup> *Les droits-valeurs sont créés par l'inscription dans le registre et n'existent que dans la mesure de cette inscription.*
- <sup>4</sup> *Le transfert des droits-valeurs exige une cession écrite, ou constatée par un moyen technologique permettant d'en établir la preuve. Leur nantissement est soumis aux règles relatives à l'engagement des créances.*

#### **4. Dispute Resolution**

Smart contracts could diminish the occurrence of certain types of disputes, in particular those relating to non-performance of payment obligations for instance as there would be no need to seek enforcement of the obligation before a court, since when the stipulated event occurs, the payment is automatically wired in accordance with the code.

However, disputes will not completely vanish. Parties will face new challenges as smart contracts are irreversible by default, involve the use of a distributed ledger that allows for anonymity and is stored on different computer servers across the world. Certain disputes relating to non-performance issues could arise however in the context of smart contracts, such as those caused by defective coding, bugs, alterations to the smart contract. Also, smart contracts are not immune from the difficulties that arise from any legal agreement under most of laws such as illegality, error, misrepresentations, duress and *force majeure*. Other potential disputes could pertain to the formalities required to enter into a legally binding contract, the subjectivity and ambiguity of non-operational clauses, the occurrence of a bankruptcy triggering the application of a corpus of specific rules which may modify agreements and in particular payments already made or to be made. Disputes may also arise with third parties. For instance, when Oracle fails to feed the smart contract with accurate data, it will cause it not to be executed as it should have, the Oracle may be liable towards both parties to the contract on a contractual or non-contractual basis. Parties faced with a contractual dispute must therefore have access to a dispute resolution mechanism to resolve these potential disputes.

The traditional jurisdictional principles have limited applicability in the context of open and anonymous blockchains. The domicile/place of business and the place where the characteristic performance must be rendered may not be determinable within such blockchains. It is important to first note that there is no location (electronic or physical) of an open blockchain. Second, the nodes, containing the blockchain, are distributed around the world. Third, the transactions taking place in the blockchain exist only in cyberspace. Fourth, the nodes contain flawed incomplete copied of the blockchain and no one node holds the entirety of the blockchain. Another challenge for traditional principles of jurisdiction is posed by the VPNs and public-key encrypted identities that enable parties to enter into smart contracts anonymously (and to stay anonymous). Without identifiable parties, Swiss jurisdictional principles become irrelevant.

Not all smart contracts are/will be fully anonymous and untouchable by traditional jurisdictional means. Some smart contracts will not automatically anonymize the parties for various reasons such as trust issues in relation to the other party, anti-money laundering regulations, consumer law, and other regulations. The general rule establishing jurisdiction before the Swiss courts at the defendant's domicile or place of habitual residence would apply. The successful party may nevertheless face hurdles when attempting to enforce a national judgment as it may not be easily recognised in other jurisdictions.

Difficulties also arise in relation to the applicable law. In the absence of a choice of law clause, the contract should be governed by the law of the State with which it is most closely connected. This nexus is further defined as the place of domicile/registration of the party that must perform the characteristic performance to be rendered. Given the fact that smart contracts are concluded and performed independently from the physical location of the parties, the determination of this place may become impossible or irrelevant. The traditional mechanism to solve the absence of a choice-of-law clause may thus not provide any solution.

As a result, smart contracts complicate the application of traditional principles of jurisdiction. It is therefore important that the parties stipulate in their smart contract a dispute resolution clause to designate the competent court/arbitrator(s) and the applicable law. Such a clause may be provided by the smart contract itself through an opt-in option or by way of reference in the smart contract general terms and conditions.

In this context, access to justice should be made available, at least to parties that are not anonymous. Arbitration appears to be particularly suitable for resolving disputes relating to smart contracts. The distinguishing features of international commercial arbitration make it the optimal method of dispute resolution for smart contracts. At its core, arbitration is a creature of contract, and enables the parties to tailor nearly all aspects of the agreed-upon dispute resolution process, subject to certain minimum requirements dictated by due process and fundamental principles of justice. As discussed further below, the parties' ability to (i) choose a neutral and competent arbitrator, (ii) designate an arbitral institution to oversee and manage the dispute resolution process, (iii) utilize a speedy and customized dispute resolution process, (iv) maintain confidentiality over the arbitral proceedings, and (v) obtain a final decision that is not subject to appeal, can collectively overcome some of the difficulties usually associated with resolving disputes arising from smart contracts.

In light of these characteristics, parties to smart contracts would be better served by agreeing to take their disputes to arbitration. Even assuming that the parties to a smart contract could agree to submit their disputes to the home courts of one of the parties, the highly technical nature of their contract may significantly lengthen the time required to resolve dispute, as the judge of the home court is unlikely to have the required technical skills, thereby requiring the intervention of an expert. The ability to agree to a neutral and confidential dispute resolution process that is tailored to the particularities of a smart contract, and to have the dispute heard by a competent and qualified arbitrator, strongly suggests that arbitration would produce a more rapid and cost-effective outcome.

Moreover, the enforcement of a court decision against a foreign party can be a time-consuming and costly process. By contrast, arbitration may facilitate the cross-border enforcement of the outcome of the dispute process, especially in matters involving smart contracts. The most advantageous feature of international commercial arbitration is the relative ease of foreign enforcement by virtue of the Convention on the Recognition and Enforcement of Foreign Arbitral Awards of 1958 which has been ratified by 140 countries. However, practical issues may still arise when trying to enforce an arbitral award against a party to a smart contract (such as enforcing against "judgment-proof" or anonymous parties), such that enforcement could remain a challenge even with the assistance of a foreign court.

It is therefore also important to distinguish between “coded” and “non-coded” arbitration clauses in smart contracts. “Non-coded” arbitration clauses would operate exactly in the same way as arbitration clauses do in regular contracts. Under current Swiss law, such an arbitration clause is valid if it discloses the identity of the parties. Consequently, an arbitration clause incorporated in a smart contract between anonymous parties would not be considered as a valid arbitration agreement by Swiss courts. Alternatively, an arbitration clause could be implemented in smart contracts by including code that enables a designated third party to modify the ledger following a triggered arbitration process that “pauses” the operation of the smart contract, pending resolution of the dispute. The obvious advantage of such a system is that it removes any issues involving the enforcement of the dispute resolution process, since the decision of the arbitrator is integrated into the ledger and automatically executed.

Swiss law already recognizes the parties’ ability to tailor the arbitration process to suit the needs of the nature of their agreement. In light of its inherent flexibility in this regard, there would be no need to amend Swiss law to facilitate the resolution of disputes involving smart contracts in which the parties’ identity is disclosed.

Instead, change appears to be required at the institutional level. While there are new and emerging institutions that aspire to provide dispute resolution services to parties to smart contracts, there are currently no Swiss institutions that have adapted their procedures to cater to this developing technology.

As their functionality expands, smart contracts may begin to be increasingly used in international commerce. Reputable arbitral institutions that have positioned themselves to offer dispute resolution services tailored for smart contracts could capture a significant market share of that business, by leveraging the trust that these institutions have earned over the years (the emerging institutions lacking such trust), combined with the technical expertise necessary for managing these disputes.

Conversely, the failure to adapt in a timely manner to this technology could cause Swiss institutions to lose significant market share, as new and innovative providers of dispute resolution services establish a track record of performance and trust in the market.

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## II. Introduction

Year 2017 is just over and was extremely prolific in terms of developments in the fields of digital data, cryptocurrencies, DLTs, ICOs, smart contracts and more generally new applications of the blockchain technology, both at a private (between parties) and public (regulatory) level.

Expanding on the blockchain technology, smart contracts emerged as a new way to codify promises and behaviors which might be enter the definition of a legal – classic – contract and therefore creating binding relations between private parties.

In the private sector, startups and venture capitalists turn their attention to ICOs as a new form of raising capital and a chance to quickly benefit from the interest of the public (the value of the coin / token being subject to the laws of the market), without formally proceeding to a public offering, and thus escaping a heavily regulated field.

From a regulatory point of view, the national supervisory authorities can no longer ignore the attractiveness of such new means of raising capital and many of them addressed the issue in 2017, raising the same concerns and issuing the same warnings: risks of money-laundering, risk of default by the coin-emitter, lack of underlying – i.e. tangible – value or right, risk of fraud, ect.<sup>1</sup>

The government intervention does not to be exclusively reprehensive. Applications of the blockchain technology already led countries to test new forms of land registries or public records. Some communes in Switzerland now accept payments in Bitcoin. More recently, the commercial registry of the canton of Zug accepted a contribution in cryptocurrencies as a contribution in kind.

In the meantime, private actors and company will not easily accept an over-regulated and will tend to leave to other jurisdictions. As a result, private initiatives will tend to promote self-regulatory codes of conduct.

Conscious of the delicate balance that needs to be found, the SLTA Regulatory Task Force has decided to articulate its work around four different topics.

- The first chapter explains how the concepts of **data** and data ownership are being dealt with at an international level and under foreign jurisdictions and examines how data seems to fall under the current Swiss legislation.
- The second chapter presents the legal environment for assets based on a **distributed ledger** in Switzerland and analyses which type of assets or asset classes can exist on a distributed ledger.
- The third chapter provides an in-depth analysis of **smart contracts**, their advantages and limits as well as their formal representation and proposes possible amendments to the CO.
- Finally, the fourth chapter is allocated to **dispute resolution** and details, amongst others the advantages of arbitration and the resulting advantages for Swiss arbitral institutions.

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<sup>1</sup> Including, *inter alia*, the FINMA, the US Security Exchange Commission (SEC), Industry Regulatory Agency (FINRA), and Commodity Futures Trading Commission (CFTC), the Canadian Securities Administration (CSA), the Monetary Authority of Singapore (MAS), the UK's Financial Conduct Authority (FCA), the International Swaps and Derivatives Association (ISDA), the Australian Securities Investment Commission (ASIC) the European Commission.

It is worth noting that national jurisdictions have different approaches when facing the issues of data's definition and ownership and that there are not uniform internationally accepted definition of the ownership of data. In 2014 already, the European Commission highlighted that barriers to the free flow of data are caused by the legal uncertainty surrounding the emerging issues on 'data ownership' or control, (re)usability and access to/transfer of data and liability arising from the use of data<sup>2</sup>. This fragmented legal landscape and the absence of uniform definitions incited some authors to propose the creation of a whole new set of ownership-like rights (as opposed to intellectual property-like rights) that would apply to data<sup>3</sup>.

The absence of uniform definition of data ownership should not come as a surprise. In the commercial practice, although increasingly high volumes of data are being processed, collected and sold by companies, the very question of ownership of data is not so often subject to dispute. When executing a license agreement, the parties acknowledge that the software / data belongs to the licensor. When acquiring a list of customers, the buyer is buying a potential clientele to which he does not have yet access. When a plaintiff claims that his data was corrupted or stolen, authorities presume that the plaintiff is the rightful owner of the data.

Some authors advocate for a comparison between of the rights of the owner of data to copy-right. The comparison is worthy of attention. The holder of copyrights bears the right to exclusively copy, distribute, commercialize the work, and create derivative works. Intuitively, the owner of data should be able to exert some authority on, and benefit from the value of the data which he collected and organized. However, raw data, as being a mere expression of measurements of facts, is not itself protectable because it lacks the expressiveness, creativity and individual nature that most legal systems require to enter the definition of a – protected – work of authorship. On the other hand, the disposition and arrangement of such data is already protected at an international level if it shows sufficient individuality<sup>4</sup>. As an example, the EU Directive 96/9 created a legal regime where databases can be protected depending on the originality of the disposition of the database, as well as the substantial amount of time and money invested in the structuring of data<sup>5</sup>.

Some US courts tried to shape the angles of the legal regime applicable to data. Facing a case of theft and deletion of data by former employees, the New York Court of appeal applied the tort of conversion - which normally only applies to tangible property - to data. The court considered that digital data was essential in all aspects of business, and considered that the ownership of data could be based upon tangible property in the devices which supported the data<sup>6</sup>. More recently, the same court found an exception to the general rule that conversion only applies to tangible physical property when the rightful owner of intangible property is prevented from creating or enjoying a legally recognizable and protectable property interest in his idea, such as by being prevented from registering the domain name for a website or being denied access to a database he created<sup>7</sup>. Similarly, the US Bankruptcy Court of the Southern District of Texas considered that, although immaterial, data could be represented through other, indisputably tangible, media, therefore bearing some aspect of tangible property<sup>8</sup>. In these examples, courts recognized data's intrinsic value and clearly stated a right to protection – and ownership, despite the existence of a physical support.

<sup>2</sup> See the communication.

<sup>3</sup> See Jasmien César, Julien Debussche, Benoit Van Asbroeck : "White Paper – Data ownership in the context of the European data economy: proposal for a new right", 6 February 2017, available on <https://www.twobirds.com/en/news/articles/2017/global/data-ownership-in-the-context-of-the-european-data-economy>.

<sup>4</sup> See article 5 of the WIPO Copyright Treaty (WCT) 1996.

<sup>5</sup> Directive 96/9 of March 11, 1996 on the legal protection of databases, <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:31996L0009&from=EN>.

<sup>6</sup> *Thyroff v. Nationwide Mutual Insurance Co.* Court of Appeals of New York, 864 N.E.2d 1272 (2007).

<sup>7</sup> *Triboro Quilt Mfg. Corp. v. Luve LLC*, No. 10 CIV 3604, 2014 WL 1508606, (S.D.N.Y. Mar. 18, 2014). See also Caleb Segrest, "Tort claims may be adapting to a world of social media", February 17, 2017, available on <http://www.socialmedialawbulletin.com/2017/02/tort-claims-may-adapting-world-social-media/>.

<sup>8</sup> *Yazoo Pipeline*, BR 636.653 (Bankr S.D. tex. 2011).



In other cases, the absence of physical substance represented an obstacle to the application of classic legal concepts to data. For example, the UK Court of Appeal decided that data cannot be subject to liens, because it cannot qualify as tangible (not immaterial) property<sup>9</sup>.

In Germany, the Court of Appeal of Nuremberg had to expand on the notion of ownership of data in a criminal case. According to the German Criminal Act, the deletion, alteration or corruption of data is punished by a fine or by imprisonment<sup>10</sup>. The main issue was the question of ownership between the employer and the employee of data collected on the device owned by the employer, but it is interesting to note that the court considered that the person who generated the data, owns the data<sup>11</sup>.

These examples show the difficulty of applying habitual concepts of property to information that has a concrete value and the communication of which can have very serious consequences, despite not being physically palpable.

It should be noted that decentralization of information storage (through decentralized ledger technology, DLT) and technological progress bring two more difficulties in applying classical legal concepts to data:

- The world is gently but surely getting rid of single data supports. With the advent of decentralized data, the link with strictly tangible property is uneasy, as DLT and blockchain can no longer be considered as being stored or generated in a single, physical place or device.
- More and more data is generated by computers without the intervention of humans (machine-generated data, MGD)<sup>12</sup>. The accepted principle that the entity who owns the device that generated the data also owns the data is not helpful and the rise of connected objects and the IoT brings new questions in the light, without clear cut answers<sup>13</sup>.

This leads to believe that ownership of data lies more in the ownership of the means of analysis, or means of control, than that of the support of the data<sup>14</sup>.

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<sup>9</sup> Your Responses Ltd v Datateam Business Media Ltd (2014) EXCA Cov 281 ; [2014] 3 W.L.R. 887.

<sup>10</sup> Equivalent of 144bis of the Swiss Criminal Code.

<sup>11</sup> OLG Nürnberg 1. Strafsenat, January 23, 2013 – 1 Ws 445/12.

<sup>12</sup> See Annette Gaertner, "Europe Explores Data Ownership", August 10, 2017, available on <https://www.technologylawdispatch.com/2017/08/privacy-data-protection/europe-explores-data-ownership/>; see also David Knight, "Who owns the data from the IoT", January 30, 2017, available on <https://www.networkworld.com/article/3152837/internet-of-things/who-owns-the-data-from-the-iot.html>.

<sup>13</sup> What happens for example if the device collecting the data is leased? See Somjit Amrit, "Who owns the Machine Generated Data in IoT – Men or Machine", August 21, 2107, available on <https://www.iotcentral.io/blog/who-owns-the-machine-generated-data-in-iot-men-or-machine>.

<sup>14</sup> See Alistair Croll, "Who owns your data", January 12, 2011, available on <http://mashable.com/2011/01/12/data-ownership/#531a7DIFw5qc>.

### III. Chapter 1: Data

#### 1. Ownership of digital data

De lege lata, digital data can be qualified as objects (*res digitalis*), i.e. as chattel in terms of Art. 713 Swiss Civil Code (ZGB). Similarly, electricity also qualifies as a natural force and thus as chattel in terms of Art. 713 ZGB.

The functionality of Wiegand's concept of objects applied to the reality and the needs of the digital economy allow for an extension of the conventional concept of objects to digital data. Much like objects, digital data fulfills the requirements of controllability and – if required under Swiss law – some form of determined dimensionality ("gegrenzte Räumlichkeit"). The absence of palpable existence - physicality (Körperlichkeit) – seems to be considered as the major obstacle to recognize data as entering the definition of an object / chattel. This strict vision of the law seems unnecessary as digital data can be subsumed under the slightly extended concept of objects and therefore subject to chattel ownership and possession.

As a result, a conceptual clarification (in terms of a legislative extension of Art. 713 ZGB), or alternatively the creation of another category of objects in the ZGB would contribute to legal certainty in the digital world. The consequence of the qualification of digital data as chattel is that possession and ownership of digital data can be obtained – either by the creation of the data (human- and machine-created digital data) or by way of transfer of the data (e.g. copies of the data). The decisive factor for qualifying is the prevailing public understanding.

This is precisely the aim of tokens representing ownership structure on the Blockchain.

By qualifying digital data as an object, property law provides established terms and rules by which the property rights of digital data can be discussed and determined in a neutral way. The legal framework connected to the concept of objects is one of the “pillars of the information society”.

Attention should be paid to three points: First, the existence of ownerless data. Second, the assumption of Art. 930 ZGB applies: The possessor is assumed to be the owner. Third, property law is restricted by data protection law, which would apply to digital data as long as the information qualifies (at the semantic level) as personal data or copyright.

The concept of digital data as objects is open-ended. The questions of who owns digital data is not addressed in this white paper, but can and must be resolved in practice, keeping in mind that ownership and possession in the means of creation, control and analysis of data are key elements to consider.

#### 2. Fate of data in bankruptcy

In the particular case of the bankruptcy of a cloud computing provider, the owner has insufficient possibilities to regain possession of his data. He only has contractual claims that are commuted into monetary claims. A right to reclaim the data (at least if qualifying as an asset) from the bankrupt's estate is necessary. This was legislated in Luxemburg in 2013 (Art. 567 par. 2 of Luxembourg's Code of Commerce).

The first parliamentary efforts in Switzerland failed<sup>15</sup>. The parliamentary initiative Dobler is ongoing and represents a second attempt<sup>16</sup>. Said initiative demands the following adjustment of the Swiss Debt Enforcement and Bankruptcy Law (SchKG):

*Addition in Article 242:*

*"The receivership issues an order regarding the surrender of non-physical assets that are claimed by a third person. The surrender requires that the un-physical assets can be separated and the claimant can show probable cause that the un-physical assets have only been entrusted to the debtor. The claimant bears the costs incurred".*

If digital data was to be recognized as objects following the her above mentioned initiative, the significant legal uncertainties for the digital economy in Swiss law could be eliminated: Digital data as objects could be reclaimed by the proprietor in case of the bankruptcy of the derivative possessor (segregation of digital data according to Art. 242 par. 1 SchKG).

As first step was made by the Swiss Financial Market Supervisory Authority (FINMA) which decided that tokens (e.g. Bitcoins) could be reclaimed based on the data ownership of the token holder, in case of the bankruptcy of a wallet provider.

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<sup>15</sup> National Council parliamentary request from Christophe Schwaab, dated September 16, 2014.

<sup>16</sup> <https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20170410>.

## IV. Chapter 2: Blockchain

This white paper has the purpose of presenting the legal environment for assets based on a distributed ledger in Switzerland. In particular, it aims at providing an overview which type of assets or asset classes can exist on a distributed ledger, highlighting what is possible under current Swiss law and which hurdles and difficulties exist.

### 1. Introduction to distributed ledger technology (DLT)

Distributed ledgers are ledgers of electronic transactions, similar to accounting ledgers, which are organized by a distributed network of participants. This distributed network of participants shares together the ledger of the electronic transactions and replaces thereby a central entity which is managing and validating ledgers in traditional ledgers. Within distributed ledgers, cryptographic tools, for instance encryption techniques such as public and private keys and hash functions, are used to effectuate and validate transactions and, thus, to ensure the validity of the distributed ledger.

Until recently, Distributed Ledgers, mainly in the form of blockchains, have mainly been used for cryptocurrencies. However, distributed ledgers are able to record securely any type of digital information. Further, distributed ledgers allow determining in a safe manner the "ownership" in such information since the digital information cannot be transferred or copied to third parties unless such transfer has been validated in the distributed ledger by the involved parties. Lastly, it is almost impossible to tamper the information that has been validated in the distributed ledger. Therefore, distributed ledgers may be used to own and transfer digital information which, in theory, can represent any type of assets.

Against this background, it is not surprising that the issuance of new assets on distributed ledgers in so-called initial coin offerings (**ICO**) in which new assets recorded on a distributed ledger issued against payment has become a popular fund-raising instrument, in particular among start-ups working with distributed ledgers. This white paper focusses on the legal qualification of assets created and transferred on distributed ledgers without going into more details regarding the technical design of distributed ledgers. In particular, the term distributed ledger is understood broadly and comprises any type of distributed ledger, including unrestricted and restricted distributed ledgers.

### 2. Definition of a coin/token

#### 2.1 In general

For the purpose of this white paper, the term "**Token**" is used for any type of asset recorded on a distributed ledger, irrespective of the underlying distributed ledger and content and comprises native digital assets and non-native digital-linked assets.<sup>17</sup> For instance, a Token can be a bitcoin on the bitcoin blockchain or a token issued according to the ERC20 token standard<sup>18</sup> created on the Ethereum blockchain.

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<sup>17</sup> See Bank for International Settlement, Distributed ledger technology in payment, clearing and settlement, an analytical framework, February 2017, 3 (<http://www.bis.org/cpmi/publ/d157.htm>).

<sup>18</sup> ERC20 token standard is a standard application programming interface for tokens issued on the basis of Ethereum smart contract (see <https://github.com/ethereum/EIPs/blob/master/EIPS/eip-20-token-standard.md>).

For the purpose of our legal assessment of Tokens, we differentiate the following types of Tokens which can be created on the basis of so called colored coins, smart contracts or a new distributed ledger and are usually issued within so-called initial coin offerings (ICOs):

- Native vs. Non-Native Tokens; and
- Cryptocurrencies vs. Utility Tokens vs. Asset Tokens.

## 2.2 Native vs. Non-native Tokens

By reference as to whether to the Tokens are created on a separate blockchain, we can distinguish:

- Tokens that represent digital assets intrinsic to a blockchain (**Native Tokens**). For instance, cryptocurrencies such as bitcoin or ethers qualify as Native Tokens.
- Tokens can also be created on an existing blockchain (**Non-Native Tokens**).

## 2.3 Cryptocurrencies vs. Utility Tokens vs. Asset Tokens

By reference to the rights represented in the Tokens, and applying the guidelines published by FINMA regarding the regulatory framework for ICO (the **ICO-Guidelines**)<sup>19</sup> we can distinguish:

- Cryptocurrencies or payment tokens (**Cryptocurrencies** or **Payment Tokens**) are intended to be used as a means of payment for acquiring goods or services or as a means of money or value transfer. They do not give rise to any claims against an issuer and may be created as a result of mining, issuance or they may be acquired from other holders of Payment Tokens.
- Utility Tokens (**Utility Tokens**) are tokens which are intended to provide access digitally to an application or service by means of a blockchain-based infrastructure. FINMA requires that the underlying platform is operationally ready and may be used at the point of the issuance of the Utility Tokens. If that is not the case, the Utility Tokens should be classified as Asset Tokens. To the extent that Utility Tokens confer rights exercisable against the issuer or third parties, the legal requirement for the transfer of such rights need to be respected in addition to the transfer on the relevant distributed ledger.
- Asset Tokens (**Asset Tokens**) represent assets such as a debt or equity claim exercisable against the issuer or they may represent an underlying asset that shall become tradable on the blockchain through such tokens. For a legally valid settlement of the rights conferred in an Asset Token, the legal requirement for the transfer of such rights or assets need to be respected in addition to the transfer on the relevant distributed ledger.

## 2.4 Relevance of Swiss law and choice of Swiss law

As regards the law applicable to an issue and to transfers of Tokens, it has to be noted that the existing private international law rules according to which the applicable law is determined are difficult to be applied in distributed ledgers since it is difficult to determine the relevant links to a specific country in fully digital and distributed environments. This contrasts with the interests of issuers of Tokens and of the persons transacting Tokens to define the applica-

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<sup>19</sup> ERC20 token standard is a standard application programming interface for tokens issued on the basis of Ethereum smart contract (see <https://github.com/ethereum/EIPs/blob/master/EIPS/eip-20-token-standard.md>).

ble law and to create certainty regarding the applicable legal framework.

This being said, note that the question of applicable law has to be determined according to the international private law rules applicable to the issuer and the token-holder, usually the laws of the country of residence or incorporation of such issuer or token-holder. Therefore, the relevant rules differ in each country and separate analysis of the relevant rules is unavoidable for each jurisdiction.

#### **a. Tokens in the form of contractual rights**

Under Swiss international private law which applies to issuers and token-holders that are resident or incorporated in Switzerland, the laws applicable to a contractual relationship can be chosen freely by the parties (except for certain types of contracts such as consumer or employment contracts).<sup>20</sup> Such choice of law requires that the parties consent to it and that the choice of law can be evidenced in writing. Therefore, we believe that, for instance, an issuer of a Token can validly choose the applicable law within written terms of an issue. Such choice of law would, in consequence, be valid for a first acquirer of a Token with residence or incorporation in Switzerland. However, a case-by-case analysis is inevitable to ascertain if a choice of law clause is binding on a particular relationship between the involved parties, in particular for token-holders that acquired their Tokens on a secondary market. Without a valid choice of law clause, Swiss law would only be relevant if the involved parties are all residing in Switzerland, i.e. if there are no international links, or, if Swiss law would be applicable according to the applicable private international law rules.

#### **b. Tokens in the form of securities**

To the extent that a Token qualifies as intermediated security according to the Hague Securities Convention (HSC)<sup>21</sup>, the applicable law is determined in accordance with the conflict of law rules of the HSC.

Under the HSC, Swiss law would in particular apply if the account holder and an intermediary with offices in Switzerland would choose Swiss law as the governing law for their contractual relationship. In the context of Tokens, we believe that a token-holder has to be regarded as the account holder and the Token issuer as the "intermediary". In consequence, if an issuer with offices in Switzerland issues Tokens that qualify as intermediated securities under Swiss law, it could validly choose Swiss law as the applicable law for its Tokens.

To the extent that a Token does not qualify as intermediated security, the applicable law and the validity of a choice of law depends, as with contractual rights, on the applicable private international laws rules.

#### **c. Applicable regulatory regime**

As regards the applicable regulatory regime, note that usually no choice of law is allowed and that Swiss regulatory provision generally become relevant to parties residing in or incorporated in or operative from Switzerland or parties that are governed from Switzerland although incorporated abroad.

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<sup>20</sup> Art. 116 et seqq. Private International Law Act of 18 December 1987.

<sup>21</sup> Convention of 5 July 2006 on the Law Applicable to Certain Rights in Respect of Securities held with an Intermediary (<https://www.hcch.net/en/instruments/conventions/full-text/?cid=72>).

### **3. Issuance and transfer of Tokens**

#### **3.1 Issuer of Tokens**

In this white paper, the issuer of a Token is generally understood as the person that is responsible for creating a Token.

For Asset Tokens, the Issuer has to be defined as the person that assumes the obligations connected to the rights and assets represented in Asset Tokens and, therefore, has to be regarded as the debtor of such Asset Tokens.

For Cryptocurrencies constituting Native Tokens it is difficult to ascertain the person responsible for creating a Token as there is no "debtor". This in particular in the context of distributed ledgers in which new Tokens are created non-centrally, e.g. through mining processes, rather than being issued on the basis of a smart contract. In such circumstances it may be expedient to consider the person that ultimately has control over the protocol underlying such Native Tokens as the issuer.

As regards the persons authorized to issue Tokens, any person with legal capacity can act as issuer in Switzerland, including individuals, corporations (e.g. stock corporations or limited liability corporations). Note that in connection with Tokens that qualify as securities (see section 9), license requirements as securities dealers may arise for persons who on a professional basis make public offers for such Tokens issued by third persons or for persons making public offers for Tokens that qualify as derivatives issued by themselves or by third persons.

Further, we have noted that foundations have become popular as vehicle for the issue of Tokens. However, in our view foundations are not ideal for the issue of Tokens as the licit purpose of foundations and the distribution of the proceeds of an issue is limited. Further, foundations do not benefit from an advantageous tax treatment unless they have a charitable purpose.

#### **3.2 Swiss law limitations for Asset Tokens and Utility Tokens**

In contrast to Cryptocurrencies and Utility Tokens which exist only in accordance with the terms of the respective distributed ledger without conferring exercisable rights against an issuer or third parties and can be transferred in accordance with these rules only, Asset Tokens and Utility Tokens that confer exercisable rights against an issuer or a third party have to meet in addition the Swiss law requirements for the transfer of the relevant assets or rights. Only if these requirements are met it can be ensured that the rights or assets represented within such Asset Tokens and Utility Tokens are validly represented and transferred.

##### **a. Creation of rights**

As regards the creation of rights under Swiss law, note that Swiss law follows the principle of freedom of form and that there are only few statutory formality requirements for the creation of rights. For instance, contractual rights relating to the disposition over an immovable good require a notarized deed, and contracts relating to a future donation require the written form.<sup>22</sup>

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<sup>22</sup> Art. 657 para. 1 CC for the transfer of immovable goods; Art. 243 para. 1 CO for the promise of a donation.

Note that a notarized deed cannot (to date) be replaced by a fully digital document or file and, therefore, cannot be produced on a distributed ledger. The written form requirement can be met digitally in form of a scan of a document signed with a wet-ink signature or by implementing a certified electronic signature according to Art. 14 para. 2bis CO in the file<sup>23</sup>. In consequence, the written form requirement can be fulfilled in a fully digital environment. However, while a distributed ledger could in theory implement or support such certified electronic signature, we are not aware of a distributed ledger that is currently supporting certified electronic signatures as defined in Swiss law.

## b. Transfer of rights

As regards the transfer of rights, the transfer requirements depend on the asset class of the transferred asset or right. As a general overview, the following transfer requirements apply under Swiss law:

- Movable assets: transfer of goods according to Art. 922 et seqq. Civil Code (CC).
- Rights: assignment by written assignment declaration according to Art. 164 et seqq. Code of Obligation (CO).
- Registered or uncertificated securities: endorsement in writing or written assignment declaration according to Art. 967 et seqq. CO.
- Intermediated securities: crediting of the intermediated securities to the acquirer's securities account according to Art. 24 Federal Intermediated Securities Act (FISA).

It follows from the above that a transfer of assets requires, except for assets in form of intermediated securities, written form or physical transfer of the relevant assets.

In addition to these transfer possibilities, for Tokens which are representing a contractual relationship between the token-holder and the issuer, e.g. an Asset Token or Utility Token based on a smart contract, the transfer of such Token to a new token-holder could be construed as transfer of the contractual relationship (*Vertragsübernahme*) in the form of a three-party agreement between the issuer, the old and the new token-holder. Within such transfer, the new token-holder assumes the entire contractual position from the old token-holder. Such transfer is subject to the same formal requirements as the creation of the original contractual relationship (see above). However, to the extent that the Asset Token does not represent contractual rights, but for instance participation rights, or if an Asset Token or Utility Token has been transferred without consent of the issuer, such contractual transfer is not possible.

In conclusion, the legal requirements, in particular the written form requirement, limits the asset classes and rights that can be created and transferred concurrently with a transaction on a distributed ledger to intermediated securities (see in detail section 5.3.2 below) and contractual relationships represented on a distributed ledger, for instance in a smart contract. However, rights (that are not securitized in form of an intermediated security) require a wet-ink signature or a certified electronic signature, which can be produced in theory on a distributed ledger, but has not been implemented to date.

As remedy to address these limitations, it is advisable to simplify the digital alternatives to a wet-ink signature to comply with the written form requirement. Such simplification is justified as we believed that the distributed ledger technology offers sufficient safeguards to ensure the authenticity of the person validating a transaction as a falsification of such validation is not feasible unless the relevant validation information (e.g. private keys) is stolen. Alternatively, the transfer via a transaction on the distributed ledger could be codified as valid trans-

<sup>23</sup> A qualified electronic signature has to meet the requirements defined in the Federal Act on electronic signatures of 18 March 2016.



fer if Asset Tokens and Utility Tokens would be codified as new asset class (see section 5.3.4 below).

To the extent that the transfer requirements are not met, the enforceability of a right or asset represented in a Token is not ensured and the token-holder bears the insolvency risk relating to the previous token-holder unless a segregation right exists which is, for the time being, limited to assets. Yet, the transactions that have been registered on a distributed ledger may be used as instrument of proof that the relevant rights or assets have been acquired.

#### 4. Tokens as means of payment

In Switzerland, the Swiss franc is defined as sole legal tender.<sup>24</sup> In addition, foreign currencies, i.e. legal tenders of other countries, and special drawing rights and privately issued means of payment that are denominated in Swiss francs or a foreign legal tender are accepted as other means of payment.

In consequence, cryptocurrencies do not fall under this definition of other means of payment as they are not denominated in a Swiss or foreign legal tender. The Swiss Federal Council characterized cryptocurrencies in its report on virtual currencies as assets (*Vermögenswerte*) due to the use of cryptocurrencies as means of payment and their tradability.<sup>25</sup> Further, the Federal Department of Finance announced that it will clarify the legal qualification of cryptocurrencies.<sup>26</sup>

In consequence, a Token that fulfills the function as means of payment and is tradable, which is given if a Token can be transferred on a distributed ledger, is correctly qualified as asset, although not being a lawful tender or other means of payment. As such, Tokens may be used as private means of payment as long as the parties agree to do so. The use of Tokens is subject to the contractual terms defined for the acceptance and execution of the respective transaction.

#### 5. Qualification of Tokens as securities / derivatives

##### 5.1 Definition and possible forms of securities / derivatives

In general and untechnical terms, securities are instruments to represent a right or asset by securitizing such rights or assets. This renders the securitized rights and assets tradable by facilitating the transfer of such rights and assets.

In Swiss law, securities are defined in Art. 2 lit. b of the Financial Market Infrastructure Act (FMIA) as standardized certificated and uncertificated securities (*Wertpapiere* and *Wertrechte*), derivatives and intermediated securities (*Bucheffekten*), which are suitable for mass trading. Note that derivatives are defined in Art. 2 lit. c FMIA as financial contracts whose value depends on one or several underlying assets and which are not cash transactions. As such, derivatives can exist as certificated, uncertificated or intermediated securities or as contractual rights without securitization. In consequence, derivatives do not create a new asset classes but expand the definition of securities to such rights qualifying as derivatives. To summarize,

<sup>24</sup> Art. 2 Federal Act on Currency and Payment Instruments of 22 December 1999.

<sup>25</sup> Federal Council, Report on virtual currencies, 25 June 2014, 7 (<http://www.news.admin.ch/NSBSubscriber/message/attachments/35361.pdf>).

<sup>26</sup> Federal Department of Finance, press release, 5 July 2017 ([https://www.efd.admin.ch/efd/en/home/dokumentation/nsb-news\\_list.msg-id-67436.html](https://www.efd.admin.ch/efd/en/home/dokumentation/nsb-news_list.msg-id-67436.html)).

it is possible to create securities in the form of certificated, uncertificated or intermediated securities, or, for derivatives only, contractual rights.

In connection with Tokens, FINMA confirmed that they qualify as security if they fall under the definition of Art. 2 lit. b FMIA, i.e. (i) if they are standardized and suitable for mass trading by being publicly offered for sale in the same structure and denomination to 20 or more persons under identical conditions, and (ii) if they represent a certificated or uncertificated security, derivative or intermediated securities. It appears that FINMA would treat any right represented in a Token as uncertificated security. According to FINMA, the register of uncertificated securities (*Wertrechtbuch*) may be kept in digital form on a blockchain.<sup>27</sup>

In any event, a case by case analysis of a Token is required to determine whether or not such Token qualifies as securities or derivatives.

Further, it has to be determined if Tokens constitute financial instruments which has regulatory implication under the planned financial services act (FSA)<sup>28</sup> that is currently debated in parliament.

## 5.2 Cryptocurrencies and Utility Tokens as securities / derivatives

Cryptocurrencies cannot constitute securities or derivatives under Swiss law since they do not represent, nor constitute participation rights or debt claims, nor have a value that derives from another underlying asset. Therefore, Cryptocurrencies do not have a "content" that can be represented in a security or that qualifies as derivative. Further, Cryptocurrencies will not fall under the definition of financial instrument as defined in the current draft of the anticipated FSA. This has also been confirmed by FINMA in its ICO-Guidelines.

However, FINMA stated that Utility Tokens may qualify as securities if they have a financing purpose (see section 5.3.1b). In our view, Utility Tokens with a financing purpose can only qualify as securities if they are a digital representation of enforceable rights against the issuer or third parties. Utility Tokens that do not confer any enforceable right on the holder they cannot constitute securities as they do not have a "content" that can be represented in a security or that qualifies as derivative.

## 5.3 Asset Tokens and Utility Tokens qualifying as securities / derivatives

### 5.3.1 Possible content of Asset Tokens and Utility Tokens

#### a. General

Asset Tokens and Utility Tokens can be designed in manifold ways and represent various rights or assets. For instance, Asset Tokens or Utility Tokens can comprise a right to (i) receive a certain service or use or access a certain service or platform, (ii) receive a part of the revenues or profits of the issuer or a certain service provided by the issuer, or (iii) a voting right or similar participation right in a decision-making process on a platform provided by the issuer.

These rights often qualify as contractual rights of the token-holder. However, if an Asset Token depends on the performance of an underlying asset by referring to the value of such un-

<sup>27</sup> Cf. section 3.2 ICO-Guidelines.

<sup>28</sup> Draft of the FSA, BBl 2015, 9139 et seqq. (<https://www.admin.ch/opc/de/federal-gazette/2015/9093.pdf>), as amended in the debates of the National Council and the Council of the States.

derlying in its terms, it may qualify as derivative. Further, it is possible that a participation right that was validly issued within an Asset Token qualifies as corporate participation right.

Therefore, the content of Asset Tokens and Utility Tokens that confer exercisable rights against an issuer or a third party has an influence on the potential qualification of such Asset Tokens or Utility Tokens as securities and needs to be analyzed on a case-by-case basis.

#### **b. FINMA's qualification**

According to the ICO-Guidelines, it appears that FINMA would treat any right represented in a Token as uncertificated securities. In consequence, a Token that confers an enforceable right against the issuer or a third person qualifies as securities as soon as it is standardized and suitable for mass trading, e.g. if it is publicly offered for sale in the same structure and denomination to 20 or more clients.

On this basis, FINMA analyzed the different categories of Tokens regarding their qualification as securities:

- Asset Tokens and any rights provided to investors within a pre-sale to acquire tokens in the future qualify as securities, if they are publicly offered for sale in the same structure and denomination to 20 or more clients.
- Utility Tokens are not securities, if the purpose of such token is to provide access to a digital platform or application and such Utility Tokens can actually be used for the intended function at the moment of their issuance. According to FINMA, however, a Utility Token with an investment function, e.g. if such Utility Token cannot be used for the intended purpose at the moment of issue, may qualify as security.

Note that FINMA's qualification, due to FINMA's mandate, takes into account only regulatory aspects, without regards to civil law issues, e.g. transferability issues, which will be further analyzed below.

### **5.3.2 Possible forms of securities**

#### **a. Relevance of form**

Note that the form of securities has an influence on the transfer requirements. Therefore, only the types of securities that can be created digitally and that can be transferred validly by transferring an Asset Tokens or Utility Tokens that confer exercisable rights against an issuer or a third party on the relevant distributed ledger are suitable. Only in such circumstances will a transaction effectuated on the respective distributed ledger be aligned with the transfer of the rights conferred in the relevant Asset Tokens or such Utility Tokens (see section 3.2 above).

#### **b. Eligible asset classes for Asset Tokens and Utility Tokens**

As regards the eligible forms of securitization of Asset Tokens and Utility Tokens that confer exercisable rights against an issuer or a third party, certificated and uncertificated securities are not suitable: Certificated securities require a paper-form certificate and cannot exist in a fully digital environment such as a distributed ledger. Uncertificated securities can be created dematerialized, i.e. without paper-form certificate, on the basis of a book in which the issued securities and at least the first creditor of the securities are recorded (*Wertrechtbuch*) accord-

ing to Art. 973c para. 2 CO. Such book can exist in digital form<sup>29</sup> and, therefore, may be maintained on a distributed ledger. However, the transfer of uncertificated securities requires an assignment in written form that, at present, cannot be fulfilled on a distributed ledger. The same conclusion applies to contractual rights, i.e. rights without securitization. These require a written-form assignment in order to be transferred.

However, Asset Tokens and Utility Tokens that confer exercisable rights against an issuer or a third party may be designed as intermediated securities: Intermediated securities may be created digitally, if they are created on the basis of digitally created uncertificated securities. In order to create intermediated securities from such uncertificated securities, a custodian has to register the uncertificated securities in a main register and credit the respective rights to securities account(s) in accordance with Art. 6 para. 1 lit. c FISA. Such main register and securities accounts can be maintained in digital form as no form requirements exist and, therefore, can be created on a distributed ledger as distributed ledgers provides for a secure registration of the uncertificated security and the entitled account holder. Thereby, a distributed ledger fulfills all functions of a main register and securities accounts. However, note that the custodian, the person that maintains the main register and the securities accounts, has to be a prudentially supervised entity pursuant to Art. 4 para. 2 FISA. Therefore, the custodian needs to have a license as a bank, a securities dealer, a fund management company or a central securities depository.

Intermediated securities can be created for any fungible right, i.e. no property or intellectual property rights or personal rights. Provided that the rights conferred in an Asset Token or Utility Token are such fungible rights, it is possible to issue intermediated securities in form of Asset Tokens or Utility Tokens by creating first uncertificated securities on the basis of an uncertificated securities book maintained on a distributed ledger that are registered by a custodian in a main register and credited by such custodian to securities accounts, which can both be maintained in digital form on a distributed ledger. Therefore, the creation of intermediated securities can be transformed into a fully digital process that can be realized on a distributed ledger.

Once created, intermediated securities can be transferred by being credited to another securities account upon an instruction by the transferring account holder. On the basis that a distributed ledger is being used as securities account for Asset Tokens or Utility Tokens in the form of intermediated securities, a transaction on the distributed ledger, i.e. the transfer of Asset Tokens or Utility Tokens to another participant in a distributed ledger, coincides with the valid transfer of the intermediated security. Thereby, the rights and assets represented in Asset Tokens or Utility Tokens would be validly transferred according to Swiss law.

### 5.3.3 Distribution requirements

As regards the Swiss law distribution requirements, the content of Asset Tokens or Utility Tokens that confer exercisable rights against an issuer or a third party is decisive for the applicable rules.

For Asset Tokens qualifying as derivatives, there is no obligation to publish a prospectus or other investor information document.

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<sup>29</sup> Cf. ICO-Guidelines section 3.2; report on the Federal Intermediated Securities Act and the Hague Securities Convention, 15 November 2006, BBl 2006, 9315 et seqq., 9394 (<https://www.admin.ch/opc/de/federal-gazette/2006/9315.pdf>).

For other Asset Tokens, the nature of the rights conferred in such Tokens is relevant for the question if distribution requirements exist. According to Swiss law, a prospectus is required for bonds and standardized debt instruments or shares that are offered to the public.<sup>30</sup> Asset Tokens offered on a distributed ledger will usually qualify as public offering. In consequence, a prospectus may be required for such Asset Tokens that confer standardized debt claims (without underlying) against the issuer or that qualify as shares. Further, prospectus obligations according to the Collective Investment Scheme Act may arise for such Asset Tokens that qualify as participations in collective investment schemes or structured products.

According to Art. 37 et seqq. of the draft of the anticipated FSA, the prospectus requirement will be expanded to all securities, subject to certain exceptions, for instance, for certain types of issues that replace existing securities, and for securities that are only offered to professional clients and/or to less than 150 retail clients or with a volume of less than CHF 100,000. Therefore, for Asset Tokens and Utility Token that qualify as securities, the prospectus requirement will be expanded beyond standardized debt claims and shares. Further, a key investor document will be required if an Asset Token or a Utility Token qualifies as financial instrument and such financial instrument will be offered to retail clients.

#### **5.3.4 Proposal for a new asset class for Asset Tokens and Utility Tokens that confer exercisable rights against an issuer or a third party**

Above analysis has shown that Asset Tokens that confer exercisable rights against an issuer or a third party may qualify as securities, if they are fungible and issued to more than 20 persons. However, the broad qualification by FINMA of Asset Tokens as uncertificated securities results in legal uncertainty regarding the validity of the transfer as the written form requirement is not met by transferring uncertificated securities on the blockchain.

In order to avoid this legal uncertainty and to promote the use of Swiss law for Tokens, we propose to define Asset Tokens and Utility Tokens that confer exercisable rights against an issuer or a third party as new asset class in the CO. We believe that such codification as new asset class is justified as certain Asset Tokens and Utility Tokens that confer exercisable rights against an issuer or a third party have the same purpose as other securities by essentially simplifying the transferability and providing for the tradeability of a right.

To avoid that this new asset class could be used for fraudulent purposes, we would recommend that only such Asset Tokens and Utility Tokens that confer exercisable rights against an issuer or a third party fall under the new asset class that have undergone a security audit. Within such audit it should in particular be assessed whether (i) the rights conferred in such Asset Tokens or Utility Tokens, e.g. in the smart contract, correspond to the terms and conditions of the issue provided to investors, (ii) there are any apparent defects or known bugs in the code underlying such Asset Tokens and Utility Tokens, e.g. the smart contract, and (iii) the code underlying such Asset Tokens and Utility Tokens and the documentation of such Asset Tokens and Utility Tokens complies with best practices.

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<sup>30</sup> See Art. 652a para. 1 CO for the issue of shares and Art. 1156 para. 2 CO for bonds and standardized debt instruments.

To implement such new asset class, we propose to support the initiative to add the following new article 973d as suggested in the Jusletter of 4 December 2017<sup>31</sup> in the Code of Obligations:

**Art. 973d, H. Besondere Bestimmungen, I. Rechte in digitaler Form (Tokens)**

- <sup>1</sup> Der Schuldner kann vertretbare Rechte in digitaler Form (Token) mit gleicher Funktion wie Wertpapiere ausgeben oder vertretbare Wertpapiere, Globalurkunden oder Wertrechte, die einem einzigen Aufbewahrer anvertraut sind, durch Tokens ersetzen, sofern die Ausgabebedingungen oder die Gesellschaftsstatuten dies vorsehen oder die Hinterleger dazu ihre Zustimmung erteilt haben.
- <sup>2</sup> Der Schuldner registriert die Anzahl und Stückelung der ausgegebenen Tokens sowie deren Gläubiger in einem dezentralen Transaktionsregister (Distributed Ledger).
- <sup>3</sup> Die Tokens entstehen mit Eintragung in das dezentrale Transaktionsregister sofern eine unabhängige Expertise deren Funktionssicherheit und Übereinstimmung mit den Ausgabebedingungen oder Gesellschaftsstatuten geprüft und bestätigt hat.
- <sup>4</sup> Die Verfügung über Tokens (Besitzesübertragung, Einräumung von Sicherheiten zu Vollrecht oder als Pfand) erfolgt durch die Übertragung des Tokens im dezentralen Transaktionsregister.
- <sup>5</sup> Die Vorschriften des Bucheffektengesetzes sind sinngemäss anwendbar.

**Art. 973d H. Special provisions / I. Rights in digital form (Tokens)**

- <sup>1</sup> The obligor may issue fungible rights with the same function as negotiable securities in digital form (token) or replace fungible negotiable securities or global certificates that are held by a custodian with tokens, provided the conditions for issue or the articles of association of the company provide therefor or the depositors have consented thereto.
- <sup>2</sup> The obligor shall record the tokens on a distributed ledger on which details of the number and denomination of the tokens issued are recorded.
- <sup>3</sup> The tokens are created on entry in the distributed ledger only if a security audit has approved the tokens' functionality and compliance with the conditions of the issue or the articles of association.
- <sup>4</sup> The disposition of the tokens (transfer of ownership or creation of security in form of title transfer or pledge) is made by way of a transaction on the distributed ledger.
- <sup>5</sup> The provisions of the Federal Intermediated Securities Act apply mutatis mutandis.

## 6. Regulation of Tokens

### 6.1 Switzerland

The Swiss Financial Markets Authority (FINMA) issued on 29 September 2017 a guidance on the regulatory treatment of ICOs<sup>32</sup>. In accordance with its practice, FINMA declared that there are no tailor-made laws relating to ICOs and that it will apply the financial markets regulation in a technology-neutral manner to all market players, including Tokens, ICOs and activities in connection thereto. Further, FINMA clarified that it is only competent in the field of financial markets regulation (but not for civil law or tax law issues).

On 16 February 2018, FINMA published further guidance on how to apply the Swiss financial markets laws in the context of the issuing of Tokens within the ICO-Guidelines. The ICO-Guidelines provide guidance (i) how market participants should make enquiries to FINMA to seek no-action comfort from FINMA, (ii) how FINMA categorizes Tokens for the purpose of the regulatory assessment of an ICO (see section 2.3), and (iii) on the scope of

<sup>31</sup> See Martin Hess/Stephanie Lienhard, Übertragung von Vermögenswerten auf der Blockchain, Jusletter 4. Dezember 2017.

<sup>32</sup> FINMA, FINMA Guidance 04/2017, Regulatory treatment of initial coin offerings, 29 September 2017 (<https://www.finma.ch/en/dokumentation/finma-aufsichtsmittelungen/#Order=4>).

securities law, Swiss anti-money laundering regulation, banking regulation and collective investment scheme regulation in connection with ICOs.

Below, we provide a summary and non-exhaustive overview of Swiss financial markets regulation that could become relevant in connection with the issuing of Tokens, and with other activities executed in connection with Tokens. In any case, a regulatory due diligence and, in case of doubt, the request of a no-action letter from FINMA is indispensable before commencing any new activity in relation to Tokens in Switzerland.

### **6.1.1 Banking legislation**

#### **a. Issuing of Tokens**

The issuing of Tokens may constitute, subject to the certain exceptions, a deposit taking activity from the public that requires a banking license to the extent that the issue creates liabilities with debt character for the issuer.<sup>33</sup>

#### **b. Other activities in connection with Tokens**

As regards other activities in connection to Tokens, an acceptance of Tokens may qualify as acceptance of deposits from the public that requires a banking license if (i) the accepting person has a repayment obligation regarding the amounts received from customers, and (ii) such claims of the customers would be part of the bankruptcy estate of the receiving person. In particular, a banking license may be required by wallet operators fulfilling the requirements (i) and (ii) above, if the wallet operator can dispose of the private key relating to the Tokens and, therefore, the customer is not able to dispose over its Tokens without involvement of the wallet operator.<sup>34</sup>

If the acceptance of Tokens qualifies as acceptance of deposits from the public, the newly introduced facilitations of the banking ordinance apply also in connection with deposits relating to Tokens. Therefore, non-interest bearing transaction accounts for Tokens for the execution of client transactions may be held up to 60 days and deposits from the public may be accepted up to a limit of CHF 1 million, provided that no interest is being paid on the deposits and that the investors are informed in advance that there is no FINMA supervision and that the deposits are not secured by any deposit protection.<sup>35</sup>

However, FINMA clarified that the above-mentioned exception for transaction accounts will not apply to cryptocurrency-traders which execute a comparable activity to foreign exchange traders by maintaining accounts for their clients for investments indifferent currencies.<sup>36</sup>

### **6.1.2 Anti-money laundering regulation**

#### **a. Issuing of Tokens**

The issuer of a Token may qualify as financial intermediary pursuant to the Swiss anti-money laundering regulations which require an affiliation with a recognized self-regulatory authority if its activity constitutes an issuing or managing of means of payment. This is the case, ac-

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<sup>33</sup> Cf. section 3.4 ICO-Guidelines.

<sup>34</sup> Federal Department of Finance, Explanatory Report on the amendment of the banking act and the banking ordinance (FinTech), 1 February 2017, 15 (<https://www.newsd.admin.ch/newsd/message/attachments/47046.pdf>).

<sup>35</sup> Art. 5 para. 3 lit. c and Art. 6 para. 2 Banking Ordinance of 30 April 2014.

<sup>36</sup> Cf. FINMA Circular 2008/3, Publikumseinlagen bei Nichtbanken, Rz 16.2.

According to the ICO-Guidelines, for the issuing of Payment Tokens and the issuing of Utility Tokens, unless such Utility Token's main purpose is to provide access rights to a non-financial blockchain application or service. In such cases, FINMA may consider the means of payment as ancillary activity to the application or service. The issuing of Asset Tokens, however, does not constitute a financial intermediation activity pursuant to the Swiss anti-money laundering regulation if such Asset Tokens qualify as securities (see section 6.1.3 below).<sup>37</sup>

## **b. Other activities in connection with Tokens**

Various activities in connection with Tokens may qualify as financial intermediation activities pursuant to the Swiss anti-money laundering regulation which require an affiliation with a recognized self-regulatory authority. This is in particular the case for (i) the acceptance of Tokens as deposits, (iii) currency exchange activities between Tokens with other Tokens or between Tokens and fiat money, (iv) the transfer of Tokens in exchange for other currencies or cryptocurrencies to a third party or vice versa, (v) intermediation activities regarding the exchange of Tokens, if involved in the execution of the payment process, or (vi) the management and safekeeping of Tokens.<sup>38</sup>

### **6.1.3 Stock exchange act**

#### **a. Issuing of Tokens**

FINMA established in the ICO-Guidelines that Tokens may qualify as securities that are subject to the Stock Exchange and Securities Trading Act (**SESTA**) if a token falls into the securities definition pursuant to Art. 2 para. 2 FMIA (see section 5.1 and 5.3).

If a Token qualifies as securities pursuant to the FMIA, in particular the underwriting and offering of such Tokens by third parties publicly on the primary market in professional capacity and the creation and issuance of Tokens qualifying as derivative in professional capacity would trigger a license requirement as securities dealer.<sup>39</sup> However, the self-issue of own Tokens that qualify as securities does not require a license.<sup>40</sup>

#### **b. Other activities in connection with Tokens**

In addition to the above-mentioned license requirements, a license as securities dealer is required for certain market making activities and dealer-broker activities in connection with Tokens qualifying as securities.<sup>41</sup>

### **6.1.4 Collective investment scheme act**

If Tokens are issued in connection with an investment vehicle in which assets raised from the token-holders are managed collectively for the account of such token-holders, such investment vehicle could qualify as collective investment scheme subject to a license requirement and the issuer may be subject to a license as fund management company or asset manager of a collective investment scheme.<sup>42</sup>

<sup>37</sup> Cf. ICO-Guidelines section 3.6 et seq.

<sup>38</sup> Cf. Art. 2 para. 3 Anti-Money Laundering Act of 10 October 1997; Art. 4 Anti-Money Laundering Ordinance of 11 November 2015.

<sup>39</sup> Cf. Art. 3 Stock Exchange Ordinance of 2 December 1996.

<sup>40</sup> Cf. ICO-Guidelines section 3.2.

<sup>41</sup> Cf. Art. 3 Stock Exchange Ordinance of 2 December 1996.

<sup>42</sup> Cf. Art. 7 and 13 Collective Investment Scheme Act of 23 June 2006; cf. ICO-Guidelines section 3.5.



### 6.1.5 Financial market infrastructure act

For activities with Tokens qualifying as securities on the secondary market, it needs to be assessed if a license as a financial market infrastructure is required<sup>43</sup> or whether such activity would qualify as operation of an organized trading facility according to Art. 42 et seqq. FMIA which requires a license as bank or securities dealer or as trading venue.

## 6.2 International developments

Several other regulators have issued opinions and guidelines regarding the treatment of Tokens and ICOs. For instance, the US Securities and Exchange Commission, the Singapore Monetary Authority and the Canadian Securities Administrators declared that Tokens may qualify as securities if they qualify as such under the applicable national laws.<sup>44</sup> Similarly, the Australian Securities Investment Commission declared that it pursues a technology neutral approach to Tokens, meaning that Tokens will be treated as financial instruments if they have the characteristics of such instruments.<sup>45</sup> The Securities & Futures Commission of Hong Kong explained in a statement that Tokens are considered normally as virtual commodities, but that recent ICOs showed characteristics to the effect that they may qualify as securities.<sup>46</sup> The Japanese Financial Services Agency (FSA) has issued a statement regarding initial coin offerings (ICOs). In addition to risk warnings, the agency detailed how existing regulations may apply to sales of Tokens.<sup>47</sup> The Gibraltar Financial Services Commission issued a statement differentiating between Tokens that represent securities subject to regulations regarding their promotion and sale Tokens serving a cryptocurrency or functional use that is unregulated. A new regulatory framework for DLT will become operational in Gibraltar as from January 2018 and will regulate the activities of firms, operating in or from Gibraltar, that use DLT to store or transmit value belonging to others, such as virtual currency exchanges.<sup>48</sup> Also, Abu Dhabi's Financial Services Regulatory Authority, released guidelines on ICOs and virtual currencies saying that if an ICO has the characteristics of a security, such as giving a person ownership of shares in a company, then the FSRA will regulate it, similar to a company issuing regular new stock.<sup>49</sup> The New Zealand Financial Markets Authority (FMA) released a commentary on ICOs and cryptocurrencies in which it clarifies that Tokens may qualify as financial products and, therefore, activities relating to ICOs and cryptocurrencies may require authorization.<sup>50</sup> Finally the German Financial Supervisory Authority (BaFin) has clarified that – depending on their content – Tokens may qualify as financial instruments and that, in consequence, certain activities in connection thereto require an authorization or trigger a pro-

<sup>43</sup> In particular as central securities depository or securities settlement system pursuant to Art. 61 et seqq. FMIA.

<sup>44</sup> See SEC, press release on investigative report on the DAO tokens, 25 July 2017 (<https://www.sec.gov/news/press-release/2017-131>); MAS, press release, 1 August 2017 (<http://www.mas.gov.sg/News-and-Publications/Media-Releases/2017/MAS-clarifies-regulatory-position-on-the-offer-of-digital-tokens-in-Singapore.aspx>); Canada Securities Administrators, press release, 24 August 2017 (<https://www.securities-administrators.ca/aboutcsa.aspx?id=1606>).

<sup>45</sup> ASIC, Evaluating Distributed Ledger, March 2017 (<http://asic.gov.au/regulatory-resources/digital-transformation/evaluating-distributed-ledger-technology/#framework>).

<sup>46</sup> SFC, Statement by Securities & Futures Commission of Hong Kong, 5 September 2017 (<http://www.sfc.hk/edistributionWeb/gateway/EN/news-and-announcements/news/doc?refNo=17PR118>).

<sup>47</sup> FSA, Initial Coin Offerings (ICOs) - User and business operator warning about the risks of ICOs, 27 October 2017 ([http://www.fsa.go.jp/policy/virtual\\_currency/07.pdf](http://www.fsa.go.jp/policy/virtual_currency/07.pdf)).

<sup>48</sup> GFSC, Statement on Initial Coin Offerings, 22 September 2017 (<http://www.gfsc.gi/news/statement-on-initial-coin-offerings-250>).

<sup>49</sup> FSRA, Supplementary Guidance – Regulation of Initial Coin/Token Offerings and Virtual Currencies under the Financial Services and Markets Regulations, 9 October 2017 (<https://www.adgm.com/media/192772/20171009-fsra-guidance-for-icos-and-virtual-currencies.pdf>).

<sup>50</sup> FMA, FMA commentary on ICOs and cryptocurrencies, 25 October 2017 (<https://fma.govt.nz/news-and-resources/media-releases/fma-commentary-on-icos-and-cryptocurrencies/>).

spectus requirement.<sup>51</sup> These positions can, therefore, be considered as similar to the situation in Switzerland.

These statements contrast to the joint declaration of the People's Bank of China and the China Securities Regulatory Commission stating that ICOs are illegal fund raising activities and are banned, that any moneys raised by ICOs have to be returned and that financial institutions should refrain from any business activities in relation to ICOs.<sup>52</sup> Similarly, the South Korean Financial Supervisory Service declared to ban ICOs.<sup>53</sup>

## 7. Tax aspects of Tokens

The taxation of Tokens depends on each business case and, therefore, a thorough tax assessment on an individual basis is inevitable. Below, a summary overview over the practice of the tax authorities in relation to Tokens is provided for which the taxation of Payment Tokens and Asset Tokens and Utility Tokens needs to be differentiated:

### 7.1 Payment Token

According to recommendations of the Swiss Tax Conference, bitcoins are treated in the same way as foreign currencies, which are converted into Swiss francs for the purposes of a tax assessment. Presumably, this approach applies also to any cryptocurrency and, therefore to most Payment Token. In consequence, any income and profits in cryptocurrencies are subject to income and corporate income tax. In addition, for individuals, wealth tax incurs on any cryptocurrencies.

Further, cryptocurrencies are treated the same way as legal tender for the value-added tax (VAT). In consequence, the trading or exchange activities with cryptocurrencies and additional services related to such trading or exchange activities, i.e. transaction fees, are exempted from VAT.

### 7.2 Asset Tokens and Utility Tokens

Income and corporate income tax on the proceeds Tokens issues will usually be levied not in the moment of the issue, but in the moment in which the proceeds of such issue will be used,<sup>54</sup> provided that the raised moneys are raised in order to finance a project, i.e. usually the right or asset represented in the relevant Asset Token or Utility Token.

Holders of Asset Token and Utility Tokens, however, have to pay income, corporate income tax on any income and profits, if relevant, received from Tokens and, applying only to individuals, wealth tax has to be paid on the value of the owned Tokens (similar to Payment Tokens).

Similar to the VAT-treatment of cryptocurrencies, activities related to the trading and exchange of Tokens are be exempted from VAT.

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<sup>51</sup> BaFin, Initial Coin Offerings: High risks fro consumers, 15 November 2017 ([https://www.bafin.de/SharedDocs/Veroeffentlichungen/EN/Fachartikel/2017/fa\\_bj\\_1711\\_ICO\\_en.html](https://www.bafin.de/SharedDocs/Veroeffentlichungen/EN/Fachartikel/2017/fa_bj_1711_ICO_en.html)).

<sup>52</sup> PBC, public notice of the PBC, CAC, MIIT, SAIC, CBRC, CSRC and CIRC on Preventing Risks of Fundraising through Coin Offering, 4 September 2017 (<http://www.pbc.gov.cn/english/130721/3377816/index.html>).

<sup>53</sup> Cf. for instance <https://www.cryptocoinsnews.com/breaking-south-korea-bans-initial-coin-offerings-report/>.

<sup>54</sup> Cf. Art. 63 para. 1 lit. a Direct Federal Tax Act of 14 December 1990.

A stamp duty has to be paid for Tokens that would qualify as securities pursuant to the Swiss Stamp Duty Act which are defined differently than in the FMIA.<sup>55</sup> Note that no stamp duty is levied on derivatives, however, a stamp duty may apply to Tokens that confer participation rights.

According to Art. 4 Withholding Tax Act, Swiss withholding tax apply to any profit sharing. Therefore, withholding taxes arise to the extent that a Token represents a right to profit sharing. Note that it would be technically possible within a smart contract underlying a Token to provide for a direct profit sharing without the involvement of the issuer as tax subject of the withholding tax and, thereby, to avoid the withholding tax. However, the use of such direct profit distribution would probably qualify as circumvention of withholding tax.

## **8. Realization in Practice**

### **8.1 Business applications**

Distributed ledgers and Tokens can be used for manifold business applications in almost every industry. In particular, they may be used where rights, assets or entitlements have to be evidenced safely.

Therefore, Tokens are predestined to be used in the financial sector, where they can be used within payment services, or in the financial markets by evidencing and automatizing loans and debt servicing, for trade financing by replacing letter of credits, or simplifying trading and post-trading processes.

Outside of the financial sector, distributed ledgers and Tokens may be used, for instance, for evidencing e-identities, for organizing digital voting systems, digitalizing notarial services, evidencing intellectual property rights, for digitalizing and simplifying supply chain management or for various applications in the life science field.

### **8.2 Opportunities in Switzerland**

Distributed ledgers generate opportunities for developing new business ideas, in particular in the field of FinTech, or making existing processes more efficient. Therefore, it is strongly believed that distributed ledgers can be beneficial for start-ups as well as for existing players that will learn to use and apply this technology.

Switzerland has become an international hub for distributed ledger applications due to the strong presence of start-ups in this sector as well as universities and established IT companies with vast experience in this field. In this environment, industry associations, forums and meet-ups have evolved that enable an exchange of knowhow and ideas in order to further develop the distributed ledger technology and applications based on it.

In consequence, we believed that Switzerland is in an ideal position to remain and expand its function as hub for distributed ledgers and offers ideal condition for developing distributed ledgers applications. This, in particular, if the legal framework applicable to distributed ledgers and Tokens is further developed in a distributed ledger-friendly manner in order to foster legal certainty for the distributed ledger industry in Switzerland.

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<sup>55</sup> See Art. 1 para. 1 of the Swiss Stamp Duty Act for the securities that are subject to the stamp duty; see section 5.1 for the qualification of securities according to Art. 2 lit. b FMIA.

## 9. Legal obstacles in Switzerland

To conclude the analysis of the legal framework applicable to Distributed Ledgers and Tokens in Switzerland, it can be summarized that the existing legal framework already offers a regulatory environment that supports the issue and use of Tokens and that the rights conferred in such Tokens, if any, can be validly transferred concurrently with a transaction on the relevant distributed ledger within a transfer of a contractual relationship or if such Tokens are designed as intermediated securities.

Going forward, however, it should be aimed to simplify the digital substitution of wet-ink signatures in order to enable that the "written form requirement" that applies for the transfer of rights under Swiss law can be met without excessive burdens on a distributed ledger. In addition or alternatively, a new asset class for Asset Tokens and Utility Tokens that confer exercisable rights against an issuer or a third party could be codified in the CO in order to eliminate the existing legal uncertainties regarding the transfer of Asset Tokens or Utility Tokens as securities and their transfer (see proposal in section 10.3.4 above).

Further, problems arise relating to the question of the applicable law in cross-border situations, which is difficult to determine for transactions on a distributed ledger. However, note that these difficulties go beyond Swiss law.

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## V. Chapter 3: Smart Contracts

### 1. Theory

#### 1.1 Legal definition

For the purpose of this white paper, we shall define a smart contract as a program code in which terms of a contract are reproduced and digitally linked to cryptocurrency or other digitally stored information. This program code is stored in a decentralized ledger infrastructure, a public or a private blockchain, which leads to the main characteristics of a smart contract:

- Self-enforceability
- Immutability

The terms of a contract or agreement have to be very clear, black or white, execute or not, otherwise a self-enforcement process generated by the program code is not possible. This has the effect that there is no space for interpretation or for discretion. But in daily business, a lot of contract clauses are free of discretion and therefore appropriate to be reproduced in a program code. This clear “if” – “then” conditions are then automatically executed by the program code with the effect that the smart contract is enforced completely autonomously and cannot be stopped.

All transactions which are executed autonomously are stored on a blockchain and are cryptographically secured. This gives the parties a high reliability with respect to the compliance of the contract.

The prerequisite for autonomous execution of a smart contract is the availability of all data needed to execute the terms and conditions defined in the smart contract. Smart contracts that are capable of interacting solely with data which is itself on the same blockchain, would have extremely limited scope of use. By contrast, for most real-world applications, there has to be the ability to access and/or otherwise interact with external data (e.g., IoT platforms, management systems or web services, and/or APIs), in order to execute the given program code and instructions autonomously. This external information sources (typically referred to as “oracles”) have to be available in a machine-readable form (although manual intervention "oracles" may be envisaged, the resulting instruction from such oracle will need to be in a predetermined format which the smart contract code is capable of computing).

Therefore, with the access to the relevant data, a smart contract can be described as a data driven self-executing code.

"Smart contracts" and similar technologies which automate the formation and/or execution of contractual obligations, or more precisely of their operational (as opposed to purely normative or non-operational components), are not new. The basic example of a self-executing "smart" contract of sale is a vending machine. However, with the development in cryptography, electronic signatures, DLT<sup>56</sup> and the ever-increasing prevalence of a digital economy, the question of machine readable and executable contracts is becoming more pressing.

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<sup>56</sup> Arguably, other technological or non-technological forms of verification and enforcement are possible, but given the media attention surrounding the blockchain technologies and its various iterations, the focus is on the DLT as the main technology for "smart contracts".

## 1.2 Functioning

The fundamental characteristic of a smart contract is the self-enforceability and the immutability<sup>57</sup>. Basically, two contracting parties can define the content of the legal contract and reproduce the clear “if” – “then” conditions in the program code. After verifying, the code (smart contract) is stored on a blockchain which permits applications such as smart contracts to be run on the said blockchain<sup>58</sup>, conditions will be executed autonomously and automatically if all data needed are available. The result is- as an example - that a cryptocurrency will be transferred from one party to another at a specific moment and in the predefined amount.

Like in the real world, it is perfectly possible for only one party to define conditions in a smart contract and publish the same on a blockchain. In a sense, this serves as an offer to the public to enter into an agreement on the terms programmed in the smart contract. No legal contract is originated then so far. However, when a party fulfills the conditions of the smart contract (e.g. by paying an amount of Bitcoin to a specified address), this act is deemed to be the acceptance of the offer, so that both parties accept the conditions and, presumably, a legal contract is originated corresponding to the conditions written in the program code (subject to applicable law, etc.). No intermediaries are needed and the transaction is stored and cryptographically secured on a blockchain. All parties can be sure that execution will happen when the predefined conditions are fulfilled<sup>59</sup>.

A smart contract arguably reduces the risk of fraud and breach of contract. Therefore, you do not have to have trust in a counterparty. You don't even have to know the counterparty, because you can trust the code and the functionality of a blockchain, so that execution will be in accordance with the terms of the code.

The conclusion is, that it is very important, already in the phase of the conclusion of the legal contract, to think about the phase of the execution because of the inherent automation of the smart contract. Once a smart contract is verified and stored in a blockchain, execution will happen in accordance with the code (and only the code).

In summary, a smart contract which incorporates the execution of the terms of a transaction among two parties will always have an underlying legal contract (in writing or just verbal). It is the connecting interface between the agreements of the mutual assent of the contract parties' and the execution of the terms. Contracting parties can be sure that the agreement will be executed in the way it is fixed in the program code. To make that autonomous execution possible, all information in terms of defined conditions has to be available for the program code. That being said, a smart contract possibly needs access to external data outside of a blockchain, such as inputs from IoT platforms, management systems or web services, to execute the given agreements fast and autonomous.

## 2. Advantages and limits

As described in the previous sections, smart contracts' characteristics differ significantly from those of traditional “written” contracts. Smart contracts bring a new array of possibilities and a nearly infinite amount of new applications for contract execution. From the financial industry to voting procedures, smart contracts have the potential to be used in nearly any sectors where trust is involved between market participants. However, smart contracts also

<sup>57</sup> Subject to the actual program code, which may allow for variations through "oracle" access and/or amendment "rights" given.

<sup>58</sup> Conceptually, it is possible to envisage smart contract code to be run outside a blockchain, and interact with data on a blockchain, provided that mechanisms be put in place to ensure that the operation of the smart contract is fully verifiable (e.g., smart contract writing the state on a blockchain, whilst itself running from outside the specific blockchain).

<sup>59</sup> Subject to bugs in the code of the smart contract.

raise questions and pose new challenges, which will have to be overcome to fully exploit the benefits of this new instrument. This section aims at discovering the main advantages, but also the principal limits, of smart contracts in their current state.

## **2.1 Advantages**

The main advantages of smart contracts are summarized below.

### **2.1.1 Self-enforceability**

The major novelty with smart contracts resides in their self-enforceability. When Nick Szabo first introduced the concept of smart contracts in 1995, it lacked an infrastructure capable to eliminate the inherent trust factor of any contractual agreements. Today, smart contracts have found a supporting infrastructure in the blockchain technology. Thanks to distributed ledger technologies, smart contracts can now be written digitally, through lines of code and executed via a mechanism which applies the terms of the contract without the involvement of any third parties. Self-enforceability of smart contracts poses novel challenges to the current legal system.

With legal contracts, and in cases of non-performance, partial performance or change of circumstances, the contracting parties mostly rely on the legal system to enforce execution of the terms agreed upon.

With smart contracts, the execution of the terms of a contract, once embedded in code and published on a blockchain, would typically not allow any interference from external sources<sup>60</sup>. As smart contracts self-execute independently of any third parties' actions, this leaves less room for default and/or partial non-performance of a party's obligations, but on the other side challenges the dispute resolution mechanisms of the current legal system which lack the ability to interact with the smart contract (see Chapter 4: Dispute Resolution). In a sense, the pre-contractual phase will take a preponderant part, as a special attention will have to be put by the parties in the coding of smart contracts, in order to avoid any errors or vulnerabilities in the code. However, code bugs, changes of circumstances, defects in consent, etc. are a reality and, hence, wider adoption of smart contracts would require a mechanism by which the legal system can interact with the outcome of the smart contract, more than just through a post-factum damages allocation to the aggrieved party.

### **2.1.2 Reduced transaction costs**

With smart contracts, the cost of contracting will arguably be ultimately reduced. Alongside the expansion of smart contracts, many "templates" will be developed, and many decentralized applications will be launched in order to facilitate the coding of smart contracts, even for novice programmers. Overall, this will reduce the cost of contracting and, especially, the cost of litigation. Thus, the whole legal system may become more efficient.

### **2.1.3 Reduced paperwork**

Today, each international airfreight shipment may require up to 30 documents, what causes inefficiencies all along the shipping process. In the future, such documents may be registered directly on a blockchain, and smart contracts could be used to faster such processes by getting rid of the individual's actions that are often required in order to proceed to the next stage of

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<sup>60</sup> Except in situation which have been "coded" in the smart contract itself.

the chain. As the previous case is only an illustration, such automatized procedures could be applied in many different industries, or government services. Estonia already use smart contracts and the blockchain technology to provide a digital commercial register that facilitates procedures, and many other services will shortly be available through smart contracts.

#### **2.1.4 Faster settlements**

Ethereum is the main platform for running smart contracts. Through its Turing-complete programming language called Solidity, Ethereum enables any programmers to code smart contracts and to execute them directly on the Ethereum's blockchain. In this network, transactions are verified every 15 seconds, which result to a settlement time many times faster compared to the traditional system<sup>61</sup>. Such characteristics would bring a revolution to the financial system, where the settlement time of 3-4 days causes much inefficiency.

#### **2.1.5 Decentralized applications**

Smart contracts are the basis for decentralized applications. The amount of possible applications enable by smart contracts is nearly infinite. For example, prediction markets are made possible by smart contracts. In such marketplaces, anyone can “bet” on any outcomes, for any events. Prediction markets may also be used as an “insurance” mechanism against meteorological events for instance. A farmer could automatically be compensated through smart contracts in case of natural disasters or in case of droughts. Such applications promise to provide services at lower costs, and without excluding anyone from the process, at the contrary of centralized structures.

### **2.2 Limits**

In the previous section, several advantages of smart contracts have been reviewed. However, such novelties inevitably come with limits and bring new challenges. These are summarized below.

#### **2.2.1 Unstoppable and inalienable**

Through their nature, smart contracts are unstoppable, and inalienable (unless coded otherwise). This raises several legal issues. For example, an unstoppable smart contract lasting forever would be an issue under Swiss law as the parties' personal freedom would be restricted excessively, therefore resulting in a violation of personality rights and to an invalid contract. Many other issues could arise, as for instance errors in the terms of the smart contracts which result in a distortion of the parties' intent and therefore to an invalid contract following Art. 1 CO.

#### **2.2.2 Limited enforcement mechanisms**

Today, judges and other legal experts lack knowledge to effectively use and enforce smart contracts within the limits of the traditional legal system. For smart contracts to be effective, legal experts will first have to be trained in order to fully understand the specific characteristics of smart contracting. In addition, a “backdoor” mechanism could be included in every smart contract in order to provide the judge with a tool to actually amend or stop the smart contract if decided by the contracting parties, or by the judge himself.

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<sup>61</sup> We assume here that the contracting parties have used enough “gas” to enable verification on the next block created.



### **2.2.3 Impossibility to include various clauses and to anticipate every possible outcome**

Several clauses which require human interpretation cannot be effectively translated into a smart contract. Smart contracts are very effective to deal with the so-called conditional clauses. Thus, a contract following an “if X, then Y, otherwise Z” process is easily translatable into a smart contract. However, a smart contract would hardly be able to process interpretation clauses: it could not interpret if a contracting party followed the principles of best efforts or good faith in business proceedings for instance. Another problem is that the parties cannot predict every possible outcome of a contract. For instance, it would not be possible to anticipate every outcome related to a 10-year contract dealing with mortgage-backed securities. Thus, unexpected scenarios would not be included into the smart contract, what would lead to a “grey” zone (except if the parties coded a specific outcome if this situation should happen).

### **2.2.4 Confidentiality**

Another limitation of smart contracts regards the confidentiality in contractual relations. As every piece of information is public on a distributed ledger, no smart contracts relying on a public blockchain can be kept confidential. This limitation would certainly discourage many businesses from entering into smart contracting, as the terms of important transactions are usually confidential. However, the use of private or permissioned blockchain may solve this issue. In such blockchains, only pre-selected participants may enter into the network through an additional access control layer built into the protocol itself. This type of private ledger is already used in several cases, such as for intra trading between financial institutions.

### **2.2.5 “Outside” data**

Blockchains are a great mechanism as no external data are required for them to properly run. However, contractual agreements often require external data to verify if specific conditions are complied with. Therefore, a new mechanism must be brought to enter real world data into smart contracts. This is done through the so-called “oracles”. These may take several forms, such as an intermediary, references to a specific website, or also through more complex processes such as crowd-votes or through a defined panel of users. In addition, it would be possible to implement a mechanism where an “arbitration oracle” would check smart contracts before execution in order to ensure compliance with Swiss law.

### **2.2.6 Security**

As smart contracts are accessible by anyone, malicious hackers can exploit any vulnerability on the smart contract in order to change the outcomes of such contracts. As witnessed with the DAO hack, or more recently with the Parity hack, it is difficult to ensure the security of these contracts and a single mistake on the code may be fatal to the parties.

In a nutshell:

<b>Advantages</b>	<b>Limits</b>
Self-enforcing	Inalienable and unstoppable: Could create conflicting situations, especially where no means to stop the smart contract are available
Trustless	Enforcement is still limited, as legal professionals do not know how to deal with these contracts yet → Need for a dispute resolution mechanism
Potential to lower transaction costs	Not every single clause can be coded into the smart contract → Dual integration mechanism
Less paperwork with smart contracts	As smart contracts on public blockchain may be seen by anyone, it is difficult to conclude confidential agreements via smart contracts
Potential for faster settlement and execution	Vulnerabilities in contracts may be exploited by malicious hackers (e.g. the DAO, parity ect.)
Smart contracts enable many decentralized applications (e.g. prediction markets, voting procedures, less corruption)	Require “oracles” to include real-world data – outside the blockchain

### 3. Smart (Legal) Contracts

#### 3.1 Contracts under Swiss law

Contract law is traditionally non-mandatory, meaning that the contracting parties are usually free to enter into contractual relationships with the content of their choice, some exception being reserved.

Article 1 of the Swiss Code of Obligations (CO) provides that the conclusion of a contract requires a mutual expression of intent of the parties. The expression of intent may be express or implied.

Where the parties have agreed on all the essential terms, it is presumed that the contract will be binding notwithstanding any reservation on the non-essential terms (Art. 2 CO).

The mutual consent is generally materialized by an offer submitted by one party which is accepted by another party. The offer must include all essential elements of the contemplated contract outlining the intent of its author as legally binding in case of acceptance.

An incomplete acceptance of the essential terms of the offer would not form a binding contract, but constitutes a mere counter-offer which would need to be accepted.

The offer must also be firm, sufficiently precise and complete, so that its acceptance would simply form the contract. If the offer lacks precision, this would not be deemed a binding offer but merely an invitation to enter into negotiations.

As per the form of the contract, Art. 11 para. 1 CO provides that the validity of a contract is not subject to compliance with any particular form unless the law prescribes a particular form.

Under Swiss law, some contracts are required by law to be in writing (Art. 13 CO). The simple written form in the sense of Art. 13-15 CO requires a declaration in writing, i.e. recorded permanently on a physical object in characters, as well as a signature of the parties, which has the purpose of confirming that a person accepts the contract and that makes possible to identify the author of the declaration. The signature should be handwritten according to Art. 14 para. 1 CO. An example of contract that requires the written form is the assignment of claim (Art. 165 CO). Please note that there is the possibility to use qualified electronic signature as defined by the Federal Act of December 19 2003 on Electronic Signature, which is deemed equivalent to a handwritten signature (Art. 14 para 2 CO).

The highest level of form required by law is the public deed (“acte authentique”). The public deed is authorized by a public notary and it is regulated by the notarial legislation. Each public instrument is characterized by i) its authenticity, every time that the notary and its signature attest it, and ii) its content is true and complete.

### **3.2 Enforceability of smart contracts under Swiss law**

Based on the above, it is now important to analyze how and if the principle of traditional contract law is applicable to smart contracts.

First, it is important to determine if smart contracts can be concluded based on the parties' declaration of intent, *conditio sine qua non* for any conclusion of contracts according to Art. 1 para. 1 CO. In the blockchain world, a smart contract is a program written by a user in order to carry out a transaction with other users on the blockchain, who accept the terms of that transaction. A smart contract can thus be legally assimilated to an accepted offer and therefore, to a contract.

However, the essential elements of the proposed contract must be clearly spell out in the program, be sufficiently precise, clear and understandable to be validly accepted by all parties in accordance with Art. 1 CO.

Some may argue that with a smart contract, the parties do not always follow the traditional offer-acceptance mechanism as the intent of the parties is rather included in their actions: one party creates the smart contract and transfer certain (digital) assets on the contract while the other party acts in accordance with the terms of the contract. Through this process, the other party accepts the offer without an explicit declaration of intent.

That being said, according to Swiss case law, if the real intent of the parties cannot be determined, the judge must interpret the declarations that the parties made and their behaviors according to the principle of trust. The principle of trust means attributing the objective meaning of its declaration or behavior to a party, as the objective pursued by the parties or other circumstances might demonstrate their intent. The judge will determine the way a declaration or an attitude had to be understood according to the rules of good faith, taking into account all circumstances.

Accordingly, even if one can argue that there is no explicit declaration of intent using smart contract, the behavior of a party would be sufficient to determine its intent based on the execution of the transaction. Thus, in some cases, a smart contract may be considered valid in accordance with Art. 1 para. 1 CO, depending on all facts and circumstances as well as the conduct of the parties.

Secondly, the enforceability of smart contracts has to be analyzed from the perspective of the form requirement prescribed by law. Indeed, the above is true for contracts that are not subject to specific forms of contract by law.

As previously mentioned, some contracts are required by law to be in writing and thus would not be valid under Swiss law if they were only registered in the blockchain. However, there is the possibility to use qualified electronic signature as defined by the Federal Act of December 19 2003 on Electronic Signature, which is deemed equivalent to a handwritten signature. It is indeed possible to link a document within the blockchain via a timestamped hash.

As per contract that requires a public deed, it seems hardly difficult to have it translated into a smart contract in the current legal system, as it requires an entry in the public register done by a public notary. Two individuals would not be able for example to proceed to the sale of an immovable property through a smart contract without a formal deed acknowledged by a notary.

A further problem to be foreseen is that for contract requiring a written form by law, it is hard to determine how one could prove the transaction in case of litigation. Would a simple print of the code line be sufficient to be recognizable as a valid proof by the judge?

The Swiss Supreme Court ruled that an email where the content was sufficiently precise and clear was deemed an offer and a contract was formed by the acceptance of the offer by the other party. Thus, the acceptance by the judge of the validity an “electronic” contract should also apply to smart contract.

In conclusion, the analysis demonstrates that there are both enabling and limiting factors in Swiss law for the enforceability of smart contracts. The Swiss Government may enact specific provisions to facilitate the process of enforceability of smart contract under Swiss law, in particular in relation to contract requiring written form or public deed (see section 24.).

### **3.3 Potential enforcement issues**

It is important to realize the limitations of smart contracts and understand that there are many elements of contractual relationship that are not suitable for performance through deterministic code embodied in a smart contract, but instead requires human judgement.

In essence, at this stage of the technology and of its use, a smart contract is a computer program that simply guarantees the execution of a predetermined code base. It does not pertain to factor legal implications of the program. Smart contracts are limited to transactional logic.

A traditional, non-smart, or ‘legal’ contract, is an agreement between two or more parties characterized by mutual promises or obligations, and is enforceable by law.

Smart contracts are operating independently of the surrounding legal framework, but those who wish to use smart contracts will have to deal with legal issues regardless.

Such issues could be for example as follows<sup>62</sup>:

- What if one party did not have the legal capacity to enter into the smart contract (for instance being under age)? Swiss law provides that a contract must be entered into by a person having legal capacity to do so, e.g., a human or natural person, or a legal person such as a company. Individuals need to have the capacity to act in order to have the power to create rights and obligations through their actions in the sense of Art. 12 CC. Art. 13 CC states that a person must be over 18 years old and must, in addition, has the capacity to consent in order to have the capacity to act (Art. 14 and Art. 16 CC). A smart contract entered into by a person lacking the capacity to act, e.g. an individual being under the age of 18, will result in an invalid contract, potentially irrevocable and immutable.
- What if the code did not perform as the parties expected? If the programming code does not reflect the real intent of the parties, one could argue that there is a defect of consent, breaching Art. 1 para. 1 CO.
- How can parties change self-executed obligations of the smart contract if they mutually agreed to amend the contract? As smart contracts are self-executed transaction and immutable, an amendment to the transaction is not possible.
- What if the content of the smart contract is unlawful? The parties are free to decide on the content of the contract according to Art. 19 para. 1 CO. However, a contract cannot have terms that are impossible, unlawful or immoral (Art. 20 para. 1 CO). In such cases, the contract would be deemed null and void. During years, the bitcoin had the unpleasant reputation of being a tool for facilitating crimes and money laundering. As the content of the contract is unlawful according to Swiss law, such smart contracts would be considered null and void. Immorality, or the violation of bonos mores, includes the violation of personal rights or excessive contractual obligations. Thus, smart contracts lasting forever would be an issue under Swiss law as the parties' personal freedom would be restricted excessively, therefore resulting in a violation of personality rights.
- Is a contract entered with an anonymous party valid under Swiss law? Based on Art. 1 CO, one could say that both parties have expressed their mutual intent. The issue would be on how a party could enforce such contract in case of litigation.
- A contract following an unfair advantage due to a discrepancy between performance and counter-performance may also be considered unilaterally not binding.

In light of the above, as the current state of the legislation and the technology, a smart contract is more suited as an execution mechanism for a set of deterministic obligations, rather than as a contract in itself.

### 3.4 From smart contract to legal smart contracts

Could ultimately a smart contract completely replace a legal contract?

The question at stake is how using blockchain technology to complement, or replace, existing legal contracts, i.e. the use of code to articulate, verify, and enforce an agreement between parties. A smart *legal* contract.

It is important to make a distinction between smart contract code, which refers to code that is designed to execute certain transactions, and a smart legal contract, which refers to elements of a legal contract being represented and executed by software.

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<sup>62</sup> The fact that a party is located in Switzerland does not necessarily imply that Swiss law will be applicable to these issues. It depends on the applicable law.

For the sake of clarity:

- *Smart legal contracts*: This term used to refer to traditional contracts, where operational elements of such contracts are represented and executed by software.
- *Smart contract code*: This term used to refer to the code itself (known as a software agent) that is designed to execute certain transactions if pre-defined conditions are met.

This distinction may cause confusion when the topic of smart contracts is discussed, in particular between lawyers and software developers. But rather than viewing smart legal contracts and smart contract code as two separate items, the reality is there is a relationship between them. Indeed, smart legal contracts would most likely be a combination of smart contract code and traditional legal language.

Before considering what smart contracts might mean in the context of a legal agreement, it is necessary to distinguish between different types of clauses within legal agreements. Commercial agreements are full of clauses that protect parties from various liabilities. Not all clauses are suitable to automation and self-execution through code. Even where a clause might technically be capable of being automated, it might not always be desirable to automate it.

For instance, imagine a supplier of goods initiates a smart legal contract with a retailer. The payment terms could be defined in codes and executed automatically upon delivery. However, the retailer would likely insist that the contract includes an indemnity clause. There would be no point representing this clause in code, since it is not something that can self-execute.

It is thus important to distinguish between operational clauses within legal contracts that can be automated, compared to non-operational clauses that are less susceptible to self-execution.

Operational clauses generally refer to obligations that require a deterministic action upon the occurrence of a specified event, or at a specified time. For example, a payment against a performance or a transfer of assets.

Non-operational clauses refer to clauses that do not have any conditional logic, such as governing law and jurisdiction clauses, entire agreement clause, severability clause or even confidentiality clause.

There are also legal formulations that are subject to interpretation and involve a human judgment. For example: “best effort”, “good faith”, “to the knowledge”, “reasonable step”, “material adverse change”. These formulations have clearly a legal meaning but they are not susceptible to be encoded within a smart contract.

It is also important to note that different legal regimes will have different interpretations as to what these terms might mean, and the interpretations are often heavily contextual and driven by facts and circumstances.

Even if smart legal contracts are functionally made up of code, they would need to fall under the umbrella of an overall relationship that creates legally enforceable rights.

Indeed, for a smart legal contract to be legally enforceable, there would need to be a legal contract satisfying the requirements of the relevant governing law, but with some element of that legal contract being electronically automated. With smart contract code only, in contrast, there might exist no legal contract at all.

This is the reason why smart legal contracts will require a mix between digital coding and traditional legal language.

But how does it work practically? Can a software developer implement on its own a traditional legal contract into a code?

## 4. Legal drafting - Standardization

### 4.1 Basics

A legal contract, in its simplest form, is merely a form of documentary evidence which the parties agree embodies their mutual real agreement on the terms of a transaction. In certain circumstances, there may be discrepancies as between the real agreement (i.e., as defined by Article 1 SCO), and the natural language wording of the written document which the parties believe (sometimes mistakenly) correctly embodies the agreed terms.

The question examined in this chapter is whether a new form of legal drafting language which is machine readable in full or in part is necessary or desirable, whether as a universal language or for discretely defined use-cases (e.g., standardization for some types of transactions). Although it is debatable whether every contract can be translated into machine language, many of them can be<sup>63</sup>.

### 4.2 Formal representation - From legal drafting to code

In essence, the main issue at stake is the ability to bridge the gap between the natural language legal drafting used by legislators, courts and lawyers and the formal representation of a contract following the strict deterministic syntax and rules in a high-level programming language<sup>64</sup>. This in itself will never address the risks of gaps or inconsistencies as between the real underlying agreement of the parties and the expression (or instantiation) of such agreement through externally observable means (e.g., written contract signed by the parties).

Given the multiplicity of high-level programming languages existing today, as well as the inability of most lawyers or courts to actually read and derive direct meaning from the code itself, the prospect of using an existing programming language to bridge the gap is unrealistic, in the current state of affairs. Further, the legal programming/drafting language would need to address the inherent ambiguity of natural language, as opposed to the deterministic nature of any machine-readable high level programming language. In that context, there have been proposals for designing a uniform legal natural language<sup>65</sup> and initiatives or attempts to design a legal ontology to address some of those issues<sup>66</sup>. However, the apparent limited resources devoted so far to the development of common standards in many areas would indicate that such a unified legal ontology and machine-readable legal language is not (yet) desirable.

By contrast, in some areas, such as derivative financial contracts, the level of standardisation is such (e.g., ISDA documentation) that an attempt could be made to take the additional evolutionary step in this narrowly defined area towards a legal drafting language which would be compatible with (practically) full automation through "smart contracts". It is also to be

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<sup>63</sup> See, e.g., Ian Grigg, The Ricardian Contract, [http://iang.org/papers/ricardian\\_contract.html](http://iang.org/papers/ricardian_contract.html).

<sup>64</sup> Which is itself compiled into machine code (i.e., basic commands which may be executed at hardware level through a processor).

<sup>65</sup> See Al Khalil, F., Ceci, M., O'Brien, L. & Butler, T. (2017). A Solution for the Problems of Translation and Transparency in Smart Contracts (<http://www.grctc.com/wp-content/uploads/2017/06/GRCTC-Smart-Contracts-White-Paper-2017.pdf>).

<sup>66</sup> See Aldo Gangemi, Design patterns for legal ontology construction (<http://ceur-ws.org/Vol-321/paper4.pdf>).

acknowledged that in many DLT applications, despite the fact that a "smart contract" is currently designed and created solely in a high-level programming language and does not allow for an easy understanding or control of whether the code corresponds to the intended agreement by an average user, there is some traction for "smart contracts" (at least in some basic financial contracts, wallet and gaming applications).

Apart from the conceptual challenges and practical implementation issues that designing a legal language and ontology raises, there is a quasi-dogmatic principle to be considered, namely whether it is desirable for all legal contracts to be compatible or transformed in full or in part into "smart legal contracts", i.e., an automated, self-executing program. There does not seem to be any large-scale assessment done today as to the potential benefits (e.g., economies of scale, reduction in number of disputes, less defaults, more effective and efficient performance and self-enforcement, etc.) of automating contracts, versus new risks and costs involved in achieving such an endeavour and addressing the issues resulting therefrom.

By way of conclusion:

- The natural evolution, given the technological advances, appears to move towards an ever more formal representation of legal contracts which, given time, will likely become machine-readable.
- This can be achieved either (A) through advances in a form of legal multilingual ontology, to be implemented both in law, and adopted by lawyers drafting the actual contract, as well as the emergence of a number of standardized legal drafting languages with features akin to a high-level programming language, or (B) through advances in artificial intelligence, which would evolve to a point where an AI could interpret natural language texts to translate those into an operative instantiation of the underlying agreement.
- Such evolution would need to be followed by an evolution of the way legal texts are drafted, as well as practice of courts and/or alternative dispute resolution mechanisms to cope with the new challenges presented by "smart legal contracts".

## **5. Possible amendments to the Code of obligations**

In view of the conclusions reached above as regards the necessity of a universal legal drafting language at this stage in the evolution of the "smart contract" ecosystem, there does not appear any necessity or usefulness in any legal changes in the Swiss legal framework. Indeed, as discussed previously in this section, the Swiss legal framework is sufficiently robust and principles based, that it can be adapted to situations where the only representation of the agreement between two parties is a computer code on a blockchain. This presents its specific challenges, in terms of evidence production and interpretation by a court or arbitral tribunal, and should be carefully considered. However, there is no strict necessity to amend any of the Swiss law provisions dealing with contract law, whether to promote or restrict any forms of smart contracts.

That being said, in the limited scope of agreements which are subject to higher-level formal requirements (e.g., written form), one has to recognize that there are some challenges in implementing "smart contract" technologies given the limitations and requirements for the issuance or recognition of qualified electronic signatures. Only part of those challenges are legal and regulatory, the rest being more technological and psychological, thereby not resulting in a better adoption.

The main legal obstacle from a Swiss law perspective to wider adoption of smart contracts and DLT-based technologies for business activities and value transfers (in the widest sense),



are legal form requirements to the assignment of claims (Article 164 CO) and transfer of uncertificated securities (Article 973 CO), both of which require an instrument in writing. Given the advances and new technologies being developed every day, there may be certain advantages, whilst adopting a technology neutral approach, in allowing certain equivalents to the written form, other than through a qualified electronic signature. Typically, in relation to uncertificated securities, one could envisage requiring that the transfer be documented either by an instrument in writing (current law) and/or by any technological means which enable to identify and record in a provable manner the transferor, the transferee and the claim / uncertificated security being transferred, such as through DLT or similar technological means. Indeed, the main goal of the written assignment requirement being some external publicity to such transactions, in order to improve legal security, can be likewise achieved through a record of the corresponding underlying transaction by means of a DLT application (i.e., on a blockchain).

The other principal factor currently inhibiting the widespread adoption of electronic signatures is a concern they might not be legally valid in certain jurisdictions. The contention of this paper is that the aim should be to facilitate increased use of electronic signatures, and interoperability and cross-jurisdiction recognition of the various formats. This requires multi-lateral or bilateral treaties – which do not exist yet - between states to recognise electronic signatures or e-ID efforts as between legal systems, it being understood that in many cases the minimum legal and technological requirements are aligned (e.g., as between eIDAS EU Regulation and the Swiss law on electronic signatures).

Looking forward, there is the potential to combine electronic signatures with a distributed ledger and smart contract implementation, using a modular approach (e.g., natural language drafted general terms or standards, embedded in a normative provision in the code, with only operational provisions being then programmed, and including an external arbitration mechanism, all of the package being digitally signed via a qualified electronic signature). The focus should therefore be on facilitating personal identification in a secure and verifiable way, so as to promote and facilitate the further development of the digital contract (whether smart in full or in part, or not) ecosystem.

In this respect, initiatives such as the draft e-ID legislation<sup>67</sup> should be actively pursued, with the aim of having international standards and cross-jurisdictional recognition, respectively to lower the burdens for issuing qualified electronic signatures, taking into account the increased security being offered by technology (e.g., physical presence of individual should not be required for the issuance of a qualified certificate, subject to certain conditions).

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<sup>67</sup> <https://www.schweizerpass.admin.ch/pass/fr/home/aktuell/konsultation.html>

## 6. Possible use cases of smart contract

Use case	Description	Current challenges	Smart contract benefits
Smart contracts for identity	Smart contracts can enable individuals to own and control their digital identity containing reputation, data and digital assets. This allows individuals to choose what personal data to disclose to counterparties, giving enterprises the opportunity to seamlessly know their customers.	<p>Expensive and time consuming Know Your Customer (KYC) processes that lack completeness.</p> <p>Limited control over potential data leakage due to an individual's reliance on trusted third-parties.</p> <p>High liability to safeguard user data presents a single point-of-failure and a target for hackers.</p>	<p>Individuals own and control personal data (e.g. able to securely disclose personal data to various counterparties).</p> <p>Counterparties will not need to hold sensitive data to verify transactions, reducing liability while facilitating frictionless KYC.</p> <p>Increased compliance, resiliency and interoperability.</p>
Smart contracts for records	Smart contracts can digitize Uniform Commercial Code (UCC) filing, and automate their renewal and release processes. Additionally, smart contracts can atomically perfect a lender's security interest at the moment of a loan creation.	<p>Paper-based filing for many foundational documents of finance with government.</p> <p>Error-prone, manual process for renewing/releasing Uniform Commercial Code filings results in latency.</p> <p>Expired archival data stored with government occupies warehouses and incurs additional costs.</p>	<p>Reduced legal bills through auto-renewal and auto-release of digitized UCC filings.</p> <p>Automated processes, including calling by lenders for additional collateral and tracking of loan vs. collateral value.</p> <p>Archival data automatically becomes unsearchable/unreplayable after it reaches its sunset date.</p>
Smart contracts for securities	Capitalization table management can be simplified, and intermediaries circumvented in the chain of securities custody through the implementation of a smart contract. The smart contract can facilitate the automatic payment of dividends, stock splits and liability management, while reducing counterparty and operational risks.	<p>Paper-based, manual corporate registration processes.</p> <p>Companies that fail to keep their corporate registrations up-to-date require clean-up and certificate of good standing before issuing securities.</p> <p>Intermediaries increase cost, counterparty risk and latency.</p>	<p>Digitized end-to-end workflows due to securities existing on a distributed ledger.</p> <p>Trade date plus zero days (T+0) securities settlement cycles.</p> <p>Facilitates automatic payment of dividends and stock splits, while enabling more accurate proxy voting.</p> <p>Removes counterparty and operational risks created by intermediaries.</p>

<p>Smart contracts for trade finance</p>	<p>Smart contracts can facilitate streamlined international transfers of goods through faster Letter of Credit and trade payment initiation, while enabling higher liquidity of financial assets.</p>	<p>Time-consuming and costly Letter of Credit issuance process due to required coordination and paperwork.</p> <p>Physical document management can delay shipment receipt until title document is released.</p> <p>High document fraud/duplicate financing due to de-linked processes.</p>	<p>Faster approval and payment initiation through automated compliance and monitoring of Letter of Credit conditions.</p> <p>Improved efficiency in creating, modifying and validating trade, title and transport-related contract agreements.</p> <p>Increased liquidity of financial assets due to ease of transfer and fraud reduction.</p>
<p>Smart contracts for derivatives</p>	<p>Post-trade processes can be streamlined through smart contracts, eliminating the duplicative processes performed by each counterparty for recording and verifying trades, and executing applicable trade level and other lifecycle events.</p>	<p>Redundant and time-consuming processes due to asset servicing being managed independently by each counterparty for most OTC derivatives.</p> <p>Paper-based transaction agreements that contain terms, trade agreements and/or post-trade confirmations.</p>	<p>Automated settlement of obligations while executing triggered processing of trade events (e.g. periodic payments).</p> <p>Automated external event processing (e.g. credit) and/or succession events.</p> <p>Enabled real-time valuation of positions for real-time exposure monitoring, while reducing errors and/or disputes.</p>
<p>Smart Contracts for Financial Data Recording</p>	<p>Financial organizations can leverage smart contracts for accurate, transparent recording of financial data. Smart contracts enable uniform financial data across organizations, improved financial reporting and reduced auditing and assurance costs.</p>	<p>Accounting systems are prone to fraud and errors since they are controlled directly by entities.</p> <p>Capital intensive processes due to each firm maintaining their own infrastructure.</p> <p>Significant human capital/middleware required to process transactions from systems that do not interoperate.</p>	<p>Improved transactional data integrity and transparency, yielding increased market stability.</p> <p>Reduced expenditure for accounting information systems by cost-sharing across multiple organizations.</p> <p>Improved insight into parties' capital due to increased financial accessibility.</p>

<p>Smart Contracts for mortgages</p>	<p>Smart contracts can automate the otherwise confusing and manual process behind a mortgage contract. A smart contract in this case automatically connects the different parties involved with mortgage transactions, allowing for a frictionless and less error-prone process.</p>	<p>Process friction includes: Payment application, updating balances, disbursing payments and taxes, and releasing liens when a mortgage is paid off.</p> <p>Interface with auxiliary and dependent processes (e.g. land records).</p> <p>Privacy concerns due to security holders' needing to know borrowers' identities.</p>	<p>Automated release of liens from land records when mortgage is paid off.</p> <p>Increased visibility of servicer records to all interested parties, enabling payment verification and tracking.</p> <p>Reduced cost and errors by elimination of manual processes.</p>
<p>Smart Contracts for Land Title Recording</p>	<p>By facilitating property transfers through smart contracts, fraud propensity can be reduced while increasing confidence in identity. These transactions can occur with increased efficiency, integrity and transparency, resulting in reduced cost and enhanced liquidity.</p>	<p>Capital intensity due to incompatible infrastructure.</p> <p>Inefficient identity verification and signing process for documents.</p> <p>Manual processes delay closing, escrow and recording processes and create potential for document alteration or loss.</p> <p>Multiple parties can be shown the same property without detection.</p>	<p>Higher confidence in identity of parties, streamlined processes and reduction in auditing/assurance costs.</p> <p>Automated process notifications and incorporation of record integrity protections.</p> <p>Reduce land title fraud conveyance. Enhanced liquidity.</p>
<p>Smart Contracts for Supply Chain</p>	<p>Smart contracts can provide visibility at every step of a supply chain. Internet of Things devices can write to a smart contract as a product moves from the factory floor to the store shelves, providing real-time visibility of an enterprise's entire supply chain.</p>	<p>Limited visibility due to siloed data capture and desire to only share information with relevant parties.</p> <p>Need for captured data to be similarly formatted to extract values.</p> <p>Incompatibilities in data and blind spots in tracking goods due to silos in the supply chain (even source-tagged goods).</p>	<p>Simplification of complex multi-party systems delivery.</p> <p>Achieve granular-level inventory tracking and delivery assurance, potentially improving supply chain financing, insurance and risk.</p> <p>Enhanced tracing and verification to reduce risk of fraud and theft.</p>

<p>Smart Contracts for Auto Insurance</p>	<p>Currently, the car insurance claims process is disjointed, but the process can be improved significantly through smart contracts. The smart contract records the policy, driving record and reports of all drivers, enabling Internet of Things-equipped vehicles to execute initial claims shortly after an accident.</p>	<p>Multiple forms, reports and data sources yield increased error propensity and wasted time/resources.</p> <p>Duplicated work due to insurance provider devoting back-office resources to verify records, reports and policies.</p> <p>Subjective diagnostics during processes increases costs and delays.</p>	<p>Repository for each policy holder includes global driving record, policy, vehicle type and accident report history.</p> <p>Vehicle “self-awareness” and damage assessment using sensors can execute initial insurance claims/police reports.</p> <p>Increased savings by reducing duplicated work to verify reports and policies.</p>
<p>Smart Contracts for Clinical Trials</p>	<p>Clinical trials can benefit from smart contracts through increased cross-institutional visibility. The smart contract includes privacy-preserving computation that improves data sharing between institutions while automating and tracking consent for patient data.</p>	<p>Delays in responding to epidemics due to friction in sharing data from clinical trials.</p> <p>Limited understanding of treatment harms/benefits due to under-reporting.</p> <p>Limited patient involvement due to lack of consistent consent management.</p> <p>Comprisable patient privacy and re-identification due to sharing datasets.</p>	<p>Increased visibility and reduced costs by streamlining setup processes for trials.</p> <p>Improved access to cross-institution data during epidemics, protected by privacy-preserving computation.</p> <p>Increased automation in obtaining and tracking consent for shared data access.</p> <p>Increased confidence in patient privacy.</p>
<p>Smart Contracts for Cancer Research</p>	<p>Smart contracts can facilitate the sharing of cancer data throughout a cancer research consortium. The smart contract can facilitate the otherwise cumbersome patient consent management process and incentivize aggregate data contribution and data sharing while maintaining patient privacy.</p>	<p>Cumbersome processes for sharing research across institutions.</p> <p>Discouraged sharing of research due to privacy concerns.</p> <p>Hindered data collection due to lack of trust and real-time access to patient data.</p> <p>Deterred data sharing due to concerns around misaligned incentives.</p>	<p>Enhanced data sharing while observing patient privacy/regulatory requirements.</p> <p>Real-time visibility and policy enforcement incentivizes sharing without divulging raw data.</p> <p>Increased volume of data and trust due to smart contract patient consent management.</p>

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## VI. Chapter 4: Dispute Resolution

### 1. Automation embedded in smart contracts and political philosophy

Smart contracts imbed the automation of the performance of the parties' obligations. This is also described as the self-enforcement nature of smart contracts. It is viewed as a means of conflict prevention since it limits the occurrence of disputes arising from the transaction. In this sense, a smart contract blurs the boundaries between the conclusion of the contract and its execution.

On this basis, it has been argued that, in the future, there will be no need for judicial recognition and enforcement<sup>68</sup>. The proponents of this view claim that smart contracts will supersede traditional judicial systems controlled by a centralized state. They claim a political ideology sceptical of centralized power and supportive of capitalism and the free market<sup>69</sup>. Some of the more extreme predictions pertaining to smart contracts posit that technology also will discontinue the state's monopoly over the court system, and that technology will subject even the rendering of justice to market forces. A strict adherence to freedom of contract and the principle that "code is law" are praised or viewed as ineluctable. In this perspective, the evolution of technology to a point where there is truly no need for third-party enforcement will in turn make unnecessary the need for a state and the related attendant costs which are considered as unjustified<sup>70</sup>.

This view appears to be too jaded and too extreme. Other proponents to the technology have a less radical vision and consider smart contracts as a means to reduce transaction costs<sup>71</sup>. In our view, smart contracts could bring numerous advantages, such as self-enforceability, reduced transaction costs, reduced paperwork, faster settlements and nearly infinite amount of new decentralized applications (see supra Chapter 3, 2).

Some states are currently enacting new legislation clarifying blockchain's legal status<sup>72</sup>. The US Securities and Exchange Commission (SEC) issued an investigative report on 25 July 2017 cautioning market participants that offers and sales of digital assets by "virtual" organizations, such as so-called Initial Coin Offerings (ICOs) and "Token Sales" are subject to the requirements of the federal securities laws<sup>73</sup>. In Switzerland, FINMA issued on 29 September 2017 Guidance 04/2017 pertaining to regulatory treatment of ICOs. FINMA "*recognises the innovative potential of distributed ledger/blockchain technology. It welcomes and supports all efforts to develop and implement blockchain solutions in the Swiss financial centre*"<sup>74</sup>. FINMA stated that ICOs, depending how they are structured, may fall within the scope of existing regulations.

<sup>68</sup> Alexander Savelyev, *Contract Law 2.0: "Smart" Contracts as the Beginning of the End of Classic Contract Law*, p. 10, Higher School of Economics Research Paper No. WP BRP 71/LAW/2016, available at [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2885241](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2885241) and reference quoted; MaxRaskin, *The Law and Legality of Smart Contracts*, in 1 *Geo. L. Tech. Rev* 305 (2017), p. 338 and reference quoted, available at [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2959166](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2959166).

<sup>69</sup> MaxRaskin, *The Law and Legality of Smart Contracts*, in 1 *Geo. L. Tech. Rev* 305 (2017), p. 334 and reference quoted. Available at [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2959166](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2959166).

<sup>70</sup> MaxRaskin, *The Law and Legality of Smart Contracts*, in 1 *Geo. L. Tech. Rev* 305 (2017), p. 335 and reference quoted, available at [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2959166](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2959166).

<sup>71</sup> See Kaal, Wulf A. and Calcaterra, Craig, *Crypto Transaction Dispute Resolution* (June 26, 2017), p. 2, available at SSRN: <https://ssrn.com/abstract=2992962>.

<sup>72</sup> Nevada passed a state law recognising that blockchain records have legal binding status and prohibiting local governments from requiring a certificate, license or permit to use a blockchain.

<sup>73</sup> <https://www.sec.gov/news/press-release/2017-131>.

<sup>74</sup> See FINMA, Guidance 04/2017R regulatory treatment of initial coin offerings.

In this sense, States are exercising their power to ensure that blockchain technology does not exceed the boundaries of the law. The libertarian view advocating the principle that “code is law” may be considered as an extension of the idea that liberty means “freedom from government”, without seeing the threat to liberty posed by the code itself, which is not fixed, can change, and is dictated by an entity that lacks democratic legitimacy<sup>75</sup>. Moreover, an effort to sidestep the courts and the laws of a state does not mean that those laws do not apply or that the courts do not have jurisdiction. Conflict of laws rules already govern how courts can exercise jurisdiction over disputes arising in such circumstances, and which laws apply.

In this context, Swiss stakeholders should support a “do no harm” approach in regulating blockchain technology in order to capitalize on the opportunities it provides and promote Switzerland as a key player in the world of today and tomorrow. Smart contracts have the potential to greatly benefit non-breaching parties and society at large with its effective and cost-efficient mechanisms to ensure performance of the parties’ obligations. To anticipate this technological change, Switzerland should create the needed prerequisites and architecture to integrate the value of our constitutional tradition within this new technology. With regard to dispute resolution mechanism, new opportunities are arising for Switzerland. We suggest below that although smart contracts could diminish the occurrence of certain types of disputes, in particular those relating to non-performance, disputes will not completely vanish. Access to justice should be made available even if smart contracts are irreversible by default, at least to parties that are not anonymous. Arbitration appears to be particularly suitable for resolving disputes relating to smart contracts. Switzerland should seize this opportunity to maintain or even expand its long-standing international reputation in arbitration.

## **2. Smart contracts are not exempted from potential disputes**

Parties will face new challenges as smart contracts are irreversible by default, involve the use of a distributed ledger that allows for anonymity and is stored on different computer servers across the world.

It is true that disputes arising from non-performance will – if not disappear – at least diminish sharply. With regard to payment obligations for instance, there would be no need to seek enforcement of the obligation before a court, since when the stipulated event occurs, the payment is automatically wired in accordance with the code. By removing the decision on when to pay from the parties, the smart contract’s code effectively eliminate payment defaults.

Certain disputes relating to non-performance issues could arise however in the context of smart contracts, such as those caused by defective coding, bugs, or alterations to the smart contract. Also, smart contracts are not immune from the difficulties that arise from any legal agreement under most of laws, such as:

- Infringement of public order or rights relating to personality (Art. 19 para. 2 of the Swiss Code of obligations limiting the freedom of contract), e.g. the purchase of a consent to divorce;
- Illegality (Art. 20 para. 1 of the Swiss Code of obligations): the purpose of the contract may be unlawful under certain jurisdictions, such as a smart contract pertaining to the purchase of stolen objects or drug trafficking;

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<sup>75</sup> See Lawrence Lessig, Code Is Law, <http://harvardmagazine.com/2000/01/code-is-law-html>.

- Error (Art. 24 of the Swiss Code of obligation): discrepancies between the coding language which requires technical skills to be understood and the internal intent of one or both of the parties;
- Misrepresentation (Art. 28 of the Swiss Code of obligations): a party induced to enter into a contract by the fraud of the other, such as a misrepresentation of the effect of the smart contract's coding;
- Duress (Art. 29 of the Swiss Code of obligation): such as a person physically forced to enter into a smart contract by affixing an electronic signature, disclosing the private key, etc.;
- Impossibility (Art. 119 of the Swiss Code of obligation): the contract becomes (legally) impossible to perform due to underlying circumstances, such as international sanctions taken by countries against another country, or some other *force majeure*.

Other potential disputes could pertain to the formalities required to enter into a legally binding contract (see *supra* Chapter 3, 3.1), the subjectivity and ambiguity of non-operational clauses (see *supra* Chapter 3, 3.4), the occurrence of a bankruptcy triggering the application of a corpus of specific rules which may modify agreements and in particular payments already made or to be made<sup>76</sup>. Although smart contracts could be coded to encapsulate a substantial portion of possible breaches of contract and the existing legal rules to deal with them, the subjectivity in human relationships, lack of foresight, incomplete information, coding bugs, and changes to legislation and jurisprudence will inevitably lead to disputes involving smart contracts<sup>77</sup>.

It is likely that disputes will arise not only between contractual parties but also non-contractual parties. For instance, a participant to a blockchain may obtain advantages to the detriment of other participants which could be deemed unlawful and/or undue<sup>78</sup>. Such an action will not necessarily involve hacking the code but also using its potential loopholes in a way that was not foreseen and accepted by the other participants. Furthermore, in the event an Oracle fails to feed the smart contract with accurate data, which will cause it not to be executed as it should have, the Oracle may be liable towards both parties to the contract on a contractual or non-contractual basis, depending upon the structure of the network of agreements bounding them. Other third parties than Oracles may also be involved in disputes in respect of potential liability for system operational defects, corrupted messages, or defective coding.

Accordingly, it would be naïve to conclude that smart contracts (in their current form) will end legal disputes. Parties faced with a contractual dispute must therefore have access to a dispute resolution mechanism to resolve these potential disputes.

### 3. Dispute resolution mechanism, jurisdiction and applicable law

In the context of smart contracting and blockchain technology driven by anonymity, issues of jurisdiction arise due to an evolving divide between the virtual and physical identities. Some legal scholars argue that “*encrypted distributed smart contracts are removed from otherwise applicable jurisdictional principles and law that govern virtual transactions*”<sup>79</sup>. Certain smart contracts may thus avoid/exclude the incorporation of a competent jurisdiction to settle a dispute and of an applicable law, on the basis that “code is law”. A wronged party would thus be

<sup>76</sup> See Linklaters, White paper – Smart Contracts and Distributed Ledger – A legal Perspective, p. 12-13.

<sup>77</sup> See Kaal, Wulf A. and Calcaterra, Craig, Crypto Transaction Dispute Resolution (June 26, 2017), p. 42, available at SSRN: <https://ssrn.com/abstract=2992962>.

<sup>78</sup> Schellenberg Wittmer, Dispute in the Context of Blockchain Applications, section 2.3.

<sup>79</sup> Kaal, Wulf A. and Calcaterra, Craig, Crypto Transaction Dispute Resolution (June 26, 2017), p. 6, available at SSRN: <https://ssrn.com/abstract=2992962>.



left practically with no means to obtain redress before its natural judge, although in theory the traditional jurisdictional principles fully apply.

In fact, the traditional jurisdictional principles have limited applicability in the context of open and anonymous blockchains. The domicile/place of business (see Art. 10 and 31 of the Swiss Procedure Civil Code, Art. 112 Federal Act on Private International Law) and the place where the characteristic performance must be rendered (see Art. 31 of the Swiss Procedure Civil Code and Art. 113 Federal Act on Private International Law) may not be determinable within such blockchains. It is important to first note that there is no location (electronic or physical) of an open blockchain. Second, the nodes, containing the blockchain, are distributed around the world. Third, the transactions taking place in the blockchain exist only in cyberspace. Fourth, the nodes contain flawed incomplete copied of the blockchain and no one node holds the entirety of the blockchain.

Another challenge for traditional principles of jurisdiction is posed by the VPNs and public-key encrypted identities that enable parties to enter into smart contracts anonymously (and to stay anonymous)<sup>80</sup>. Without identifiable parties, Swiss jurisdictional principles become irrelevant.

Not all smart contracts are/will be fully anonymous and untouchable by traditional jurisdictional means. Some smart contracts will not automatically anonymize the parties for various reasons such as trust issues in relation to the other party, anti-money laundering regulations, consumer law<sup>81</sup>, and other regulations. The general rule establishing jurisdiction before the Swiss courts at the defendant's domicile or place of habitual residence would apply. The successful party may nevertheless face hurdles when attempting to enforce a national judgment as it may not be easily recognised in other jurisdictions (see infra section Chapter 2, 3.2).

Difficulties also arise in relation to the applicable law. In the absence of a choice of law clause, the contract should be governed by the law of the State with which it is most closely connected (Art. 117 of the Private International Law Act, "PILA"). This nexus is further defined as the place of domicile/registration of the party that must perform the characteristic performance to be rendered. Given the fact that smart contracts are concluded and performed independently from the physical location of the parties, the determination of this place may become impossible or irrelevant. The traditional mechanism to solve the absence of a choice-of-law clause may thus not provide any solution.

As a result, smart contracts complicate the application of traditional principles of jurisdiction. It is therefore important that the parties stipulate in their smart contract a dispute resolution clause to designate the competent court/arbitrator(s) and the applicable law. Such a clause may be provided by the smart contract itself through an opt-in option or by way of reference in the smart contract general terms and conditions.

## **4. Smart contracts and arbitration**

### **4.1 Advantages of arbitration vs. court proceedings**

The distinguishing features of international commercial arbitration make it the optimal method of dispute resolution for smart contracts. At its core, arbitration is a creature of contract, and enables the parties to tailor nearly all aspects of the agreed-upon dispute resolution pro-

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<sup>80</sup> See Kaal, Wulf A. and Calcaterra, Craig, Crypto Transaction Dispute Resolution (June 26, 2017), p. 31, available at SSRN: <https://ssrn.com/abstract=2992962>.

<sup>81</sup> See Art. 114 al. 2 and 120 Private International Law Act, PILA (RS 291).

cess, subject to certain minimum requirements dictated by due process and fundamental principles of justice<sup>82</sup>. As discussed further below, the parties' ability to (i) choose a neutral and competent arbitrator, (ii) designate an arbitral institution to oversee and manage the dispute resolution process, (iii) utilize a speedy and customized dispute resolution process, (iv) maintain confidentiality over the arbitral proceedings, and (v) obtain a final decision that is not subject to appeal, can collectively overcome some of the difficulties usually associated with resolving disputes arising from smart contracts.

#### **4.1.1 Choice of arbitrator**

Parties to a regular cross-border contracts are often reluctant to submit to the jurisdiction of the other party's home courts due to real or perceived bias, and the ability to choose a neutral arbitrator resolves this concern. However, in the context of disputes involving smart contract, the primary value of choosing one's arbitrator is the ability to select (through an agreed-upon mechanism) arbitrators with the necessary technical competence. Such technical competence is (currently) unlikely to be found in the home courts of the respective parties.

#### **4.1.2 Choice of institution**

Managing a complex arbitration can be a daunting task for the parties and the arbitral tribunal. Parties therefore often specify an arbitral institution in their arbitration agreement to ensure a more managed and streamlined process.

Moreover, institutions can assist the parties with the difficult task of finding well-qualified and experienced arbitrators who combine commercial knowledge with the legal and technical skills required by the nature of the dispute. For the reasons discussed above, this service is especially critical in the context of disputes involving smart contracts.

#### **4.1.3 Customized process**

The lack of a mandatory set of procedural rules governing arbitral proceedings allows parties (in theory) to devise the most efficient procedure for a particular dispute. In effect, the parties to an arbitration agreement can fashion the arbitral process to suit their needs and preferences. For example, the parties are free to specify a set of pre-existing institutional rules (such as the Swiss Rules of International Arbitration), which in turn usually provide broad guidelines and leave the determination of specific rules to the parties (or to the arbitrators should the parties fail to agree on the issue).

This freedom to fashion the rules governing the dispute resolution process is a key advantage of arbitration for dispute involving smart contracts, since the nature of the parties' contractual relationship may favour a dispute resolution process that bears little resemblance to court proceedings.

#### **4.1.4 Confidentiality**

The desire to keep a dispute and its resolution confidential frequently plays an important role in a party's decision to agree to arbitration. Unlike court proceedings, arbitral proceedings are usually private and are not part of the public record. While the issue of confidentiality may be of lesser importance depending on the nature of the smart contract at issue (especially if

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<sup>82</sup> For those minimum requirements in Switzerland, see Article 182.3 of the PILA, which states that "Regardless of the procedure chosen, the Arbitral Tribunal shall ensure equal treatment of the parties and the right of both parties to be heard in adversarial proceedings."

anonymous parties are involved), the parties of a smart contract can nevertheless specify in their arbitration agreement that the arbitration will be private and confidential, which can be a significant issue for parties seeking to maintain the commercial confidentiality of their business dealings.

#### 4.1.5 Finality of decisions

Unlike the decisions of courts, arbitral awards are final and not subject to appeal. Unless specified otherwise in the arbitration agreement, the dispute resolution process in international arbitration ends with a final award. In almost all cases, the only way to challenge the finality of an arbitral award is to seek annulment of the award by the court at the seat of arbitration. However, the requirements for *vacatur* are extremely strict in most countries<sup>83</sup>, making annulment very difficult to obtain.

Given the irreversible nature of transactions in distributed ledgers, the implementation of the outcome of a dispute resolution process would have to wait until the decision is final and no longer subject to appeal. International arbitration is preferable from this perspective since a final and binding decision will likely be obtained more quickly.

#### 4.1.6 Cumulative impact of all features

In light of the characteristics enumerated above, parties to smart contracts would be better served by agreeing to take their disputes to arbitration. Even assuming that the parties to a smart contract could agree to submit their disputes to the home courts of one of the parties, the highly technical nature of their contract may significantly lengthen the time required to resolve dispute, as the judge of the home court is unlikely to have the required technical skills, thereby requiring the intervention of an expert. The ability to agree to a neutral and confidential dispute resolution process that is tailored to the particularities of a smart contract, and to have the dispute heard by a competent and qualified arbitrator, strongly suggests that arbitration would produce a more rapid and cost-effective outcome.

Moreover, the enforcement of a court decision against a foreign party can be a time-consuming and costly process<sup>84</sup>. By contrast, and as discussed further below, arbitration may facilitate the cross-border enforcement of the outcome of the dispute process, especially in matters involving smart contracts.

## 4.2 Enforcement of arbitral decisions involving smart contracts

The applicability to smart contracts of perhaps the most advantageous feature of international commercial arbitration, namely the relative ease of foreign enforcement by virtue of the Convention on the Recognition and Enforcement of Foreign Arbitral Awards of 1958 (the “New

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<sup>83</sup> In Switzerland, these requirements are specified in paragraph 2 of Article 190 of the PILA, which states:

“2. The award may only be annulled:

- a) if the sole arbitrator was not properly appointed or if the arbitral tribunal was not properly constituted;
- b) if the arbitral tribunal wrongly accepted or declined jurisdiction;
- c) if the arbitral tribunal's decision went beyond the claims submitted to it, or failed to decide one of the items of the claim;
- d) if the principle of equal treatment of the parties or the right of the parties to be heard was violated;
- e) if the award is incompatible with public policy.”

<sup>84</sup> A notable exception being parties within the European Free Trade Association, who can rely on the Brussels Regime and the Lugano Convention to obtain recognition of foreign court judgments.

**York Convention**)<sup>85</sup>, depends on whether the smart contract at issue includes a mechanism to implement the results of a dispute resolution process into the distributed ledger.

In other words, it is important to distinguish between “coded” and “non-coded” arbitration clauses in smart contracts. “Non-coded” arbitration clauses do not add any functionality to the executable code of the smart contract. These “non-coded” arbitration clauses would be included either as a non-executable annotation of the code of the smart contract, or as part of a natural language version of the contract, and would operate exactly in the same way as arbitration clauses do in regular contracts (usually specifying the language of the arbitration, the law governing the contract, the rules applicable to the arbitration, the seat of the arbitration, and the method of appointment of any arbitrator(s)). They constitute a written agreement between the parties to resolve their disputes through arbitration, and as such are a valid and binding arbitration clause that satisfy the requirements of Swiss law<sup>86</sup>. It is worth noting that the Swiss Supreme Court considers that an arbitration clause is valid if it contains the following essential elements: (i) the identity of the parties, (ii) the will of these parties to resort to arbitration and (iii) the object on which the arbitration procedure must be carried out<sup>87</sup>. Consequently, an arbitration clause incorporated in a smart contract between anonymous parties would not be considered as a valid arbitration agreement by Swiss courts.

An arbitration initiated pursuant to a “non-coded” arbitration would not be distinguishable from any other arbitration initiated pursuant to a written arbitration clause, and would proceed in the same manner. One of the main advantages of international arbitration would therefore be applicable, since the award resulting from such an arbitration would be enforceable in the territory of the 140 countries that have ratified the New York Convention, which, subject only to a very limited list of exceptions, requires signatory states to recognize arbitral awards rendered in other countries<sup>88</sup>.

However, practical issues may still arise when trying to enforce an arbitral award against a party to a smart contract (such as enforcing against “judgment-proof” or anonymous parties), such that enforcement could remain a challenge even with the assistance of a foreign court.

On the other hand, smart contracts that use a central administering authority with the power to insert transactions into the ledger (such as a permissioned ledger) enable the parties to delegate to this authority the power to directly resolve disputes. The arbitration clause could be “coded” or “non-coded”, as it could be a term of a smart contract or the terms and conditions of the permissioned ledger. The authority would however need protection from disputes arising from its exercise of these powers, and its decisions may not be considered to be valid arbitral awards if they are inconsistent with principles of due process and fundamental justice.

Alternatively, an arbitration clause could be implemented in smart contracts by including code that enables a designated third party to modify the ledger following a triggered arbitration process that “pauses” the operation of the smart contract, pending resolution of the dispute. However, this code by itself may be insufficient to constitute a valid arbitration clause. Ideally, a “coded” arbitration clause should include:

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<sup>85</sup> Available at <http://www.uncitral.org/pdf/english/texts/arbitration/NY-conv/New-York-Convention-E.pdf>.

<sup>86</sup> See Article 178 of the PILA, which states:

1. The arbitration agreement must be made in writing, by telegram, telex, telecopier or any other means of communication which permits it to be evidenced by a text.
2. Furthermore, an arbitration agreement is valid if it conforms either to the law chosen by the parties, or to the law governing the subject-matter of the dispute, in particular the main contract, or to Swiss law.
3. The arbitration agreement cannot be contested on the grounds that the main contract is not valid or that the arbitration agreement concerns a dispute which had not as yet arisen.

<sup>87</sup> Swiss Supreme Court decision 4A\_473/2016, 16.02.2017, para. 3.1.1.

<sup>88</sup> See Article V of the New York Convention.

- A “non-coded” portion, included in either the annotations of the smart contract or in a natural language version of the contract, in which the parties specify their agreement to submit any dispute arising from the smart contract to arbitration, the place of the arbitration, the law applicable to the contract and the rules applicable to the arbitration, and which institution would manage the proceedings.
- A “coded” portion, which, upon the triggering of a condition specified in the code, would electronically refer the dispute to the designated institution (thereby pausing the operation of the smart contract), and would enable the institution to input the outcome determined in the arbitrator’s award<sup>89</sup>.

The obvious advantage of such a system is that it removes any issues involving the enforcement of the dispute resolution process, since the decision of the arbitrator is integrated into the ledger and automatically executed. In a sense, the advantage procured by the New York Convention is rendered moot. Given the potential benefits of automatic enforcement, it is not surprising that dispute resolution services for smart contracts have begun to develop, such as Datarella’s Codelegit Certified Blockchain Arbitration Library, which aims to provide both arbitration “libraries” for smart contracts – thereby providing the software infrastructure for the dispute resolution process – and dispute management services, such as providing access to a pool of qualified arbitrators<sup>90</sup>. Their Arbitration Library Process (see Figure 1 below) provides one example of how to manage an arbitration involving smart contracts.

### 4.3 Danger and opportunity for Swiss arbitral institutions

Swiss law already recognizes the parties’ ability to tailor the arbitration process to suit the needs of the nature of their agreement<sup>91</sup>. In light of its inherent flexibility in this regard, there would be no need to amend Swiss law to facilitate the resolution of disputes involving smart contracts in which the parties’ identity is disclosed.

Instead, change appears to be required at the institutional level. While there are new and emerging institutions that aspire to provide dispute resolution services to parties to smart contracts<sup>92</sup>, there are currently no Swiss institutions that have adapted their procedures to cater to this developing technology.

As their functionality expands, smart contracts may begin to be increasingly used in international commerce. Reputable arbitral institutions that have positioned themselves to offer dispute resolution services tailored for smart contracts could capture a significant market share of that business, by leveraging the trust that these institutions have earned over the years (the emerging institutions lacking such trust), combined with the technical expertise necessary for managing these disputes.

Conversely, the failure to adapt in a timely manner to this technology could cause Swiss institutions to lose significant market share, as new and innovative providers of dispute resolution services establish a track record of performance and trust in the market.

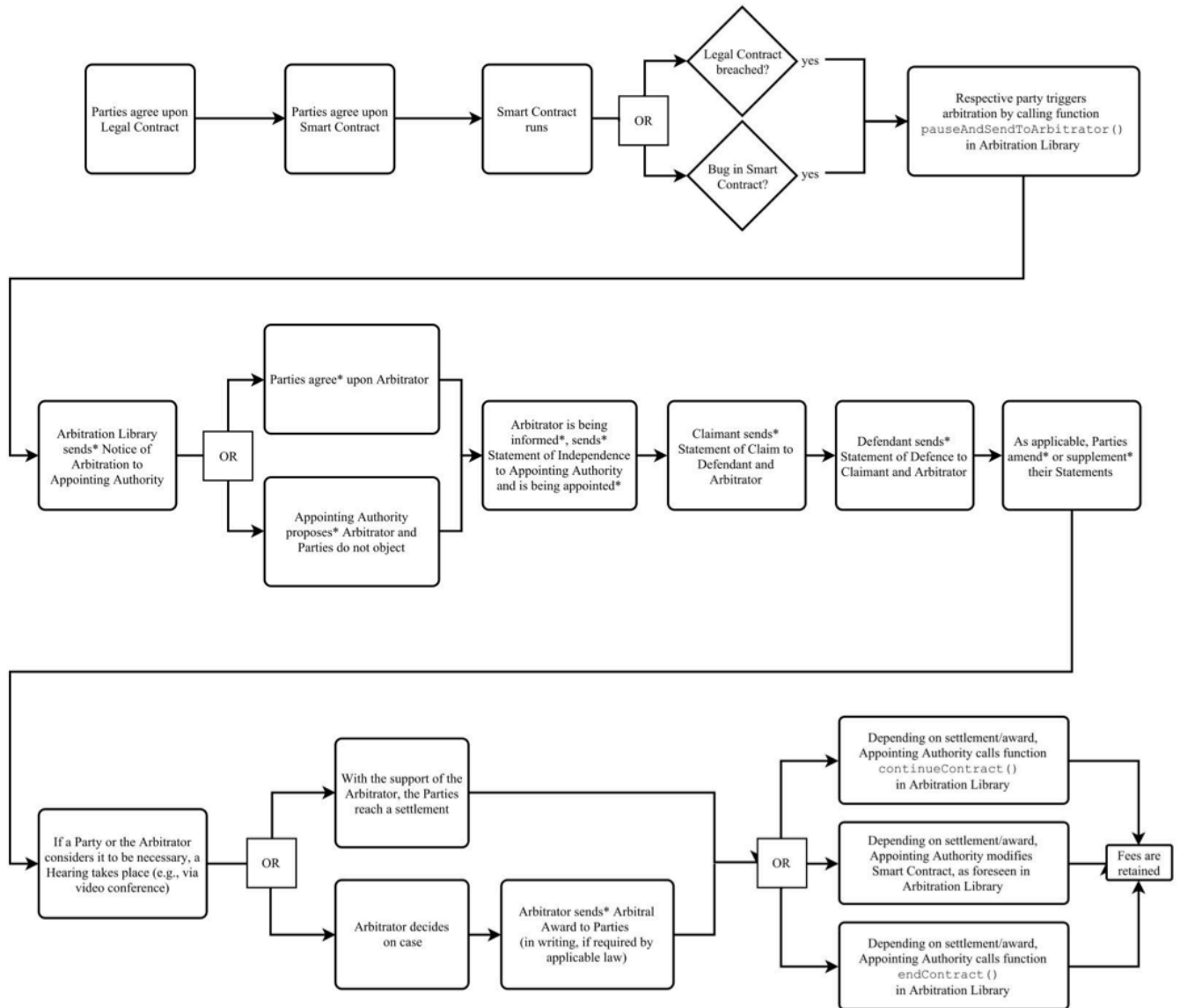
<sup>89</sup> See Lee Bacon, Nigel Brook, and James Canton, *Arbitrating blockchain disputes: will smart-contracts require smart dispute resolution?* (11 July 2016) (available at <https://www.clydeco.com/insight/article/arbitrating-blockchain-disputes-will-smart-contracts-require-smart-dispute>).

<sup>90</sup> See <http://codelegit.com> and CodeLegit’s White Paper on Blockchain Arbitration, available at [https://docs.google.com/document/d/1v\\_AdWbMuc2Ei70ghITC1mYX4\\_5VQsF\\_28O4PsLckNM4/](https://docs.google.com/document/d/1v_AdWbMuc2Ei70ghITC1mYX4_5VQsF_28O4PsLckNM4/).

<sup>91</sup> See Article 182.1 of the PILA, which states: “The parties may, directly or by reference to rules of arbitration, determine the arbitral procedure; they may also submit the arbitral procedure to a procedural law of their choice.”

<sup>92</sup> See supra Datarella’s Codelegit. See also the International Arbitration and Cryptography Centre (<https://cryptonomica.net>), and Ejust (<https://www.ejust.fr>).

### 5. Example of an Arbitration Library Process



\* All communication is carried out by means chosen by the Parties. In order to secure the communication, it is hashed and the hash and a timestamp are stored on the public Bitcoin and Ethereum Blockchains.



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