# Smart Insurance Contracts Based on Virtual Currency: Legal Sources and Chosen Issues

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## ABSTRACT

It this paper it has been analyzed whether and under what conditions an insurance company can accept insurance premiums and claims payments in Bitcoins or other crypto currency based on a smart insurance contract. On the one hand the question has been explored with regard to private law, especially insurance contract law; on the other with regard to public law, in particular financial supervisory law. The research for the present paper has been conducted primarily by taking into consideration the relevant legal frameworks in the European Union, Switzerland, UK and Liechtenstein, while referring at the same time to general legal principles of public and private law, which have their validity in most other jurisdictions of common or civil law, such as for example in the US, Hong Kong, Singapore or Japan.

In legal research the classification of smart contracts as well as legal issues concerning crypto assets in general are to a large extent still unexplored today. Therefore the author of the present paper will point out some key questions and main challenges within these fields of research without being able to claim providing readymade solutions.

## CCS Concepts

• **Applied Computing→ Law, social and behavioral sciences→ Law/Economics**

## Keywords

Blockchain-Insurance; InsurTech; FinTech; Crypto; Token-based Insurance; Smart Contracts; Smart Insurance; Solvency-II-Directive.

## 1. INTRODUCTION

There is widespread agreement that smart insurance contracts or blockchain technology in general will have a relevant impact on a variety of application scenarios within the insurance sector in the future, such as for example in the form of pay-per-use insurance models, microinsurance contracts, identity/data verification or frauds prevention systems [1]. However, up today the big insurance companies in Europe, Japan or the US still do not offer purely smart contract based, or in generally blockchain-based, insurance solutions. One main reason could be found in the discrepancy between what is technically possible and what is legally allowed within the relevant regulatory framework. Especially in Europe the insurance market is highly regulated, which makes it difficult to establish new products based on a new technology or to enter the insurance market as an insurance-start-up company in general [See 2].

The present research paper shall explore these legal or regulatory barriers for blockchain-based insurance application, especially through the example whether and under what conditions an insurance solution can be based on crypto currency, especially concerning the question whether the premiums and the claims payments of an insurance contract can be defined in crypto currency, such as for example in Bitcoin, Ether or Ripple (the example can however be applied to any type of virtual, or token-based, crypto currency). With the aim to understand the legal challenges regarding blockchain-based insurance, it is useful to outline some general key principles of insurance law first (See Chapter 2 below). In the second part it shall be explored then more specifically whether and on what conditions blockchain-based insurance solutions can be put into practice under the given regulatory and supervisory framework in Europe under the Solvency-II-Directive, especially through so-called smart insurance contracts (See Chapter 3 below). We will mainly focus on the regulatory background, because the potential breakthrough of a blockchain-based insurance depends to a large extent on the question, if and how it can be implemented in conformity with the current insurance supervisory regime. Today, regulatory and legal frameworks as well as accounting principles are in general designed regarding financial undertakings and products which are based on official currency. Therefore, the present article shall point out some key challenges for an insurance which shall be fully or partially based on crypto currencies or other blockchain-based currencies or assets.

## 2. PRINCIPLES OF INSURANCE

### 2.1 General Remarks

Insurance can be described as a system by which interested members of a collective collect funds in order to cover losses or damages that will be encountered later by individual members of the collective [3, p. 2]. From a more legal point of view insurance can be defined as a collective risk taking based on the so-called insurance principle; which means that a high number of people pay insurance premiums into a large pot and in the case of an insured event they get compensation for their damages [4, p. 2].

Today, insurance premiums and claims payments are in general paid in official currency, even though there isn't any corresponding legal requirement in most jurisdictions in Europe. The relevant legal provisions foresee in general only that the policyholder shall provide compensation for the individual insurance coverage. In the German Insurance Contract Act there is for example the provision that the policyholder is obligated to pay an agreed contribution (insurance premium) to the insurer without detailed specifications concerning the nature of this contribution (Art. 1 Insurance Contract Act/Versicherungsvertragsgesetz/VVG, Germany [5]).

### 2.2 Insurance Premiums

As mentioned above the insurance premium can be defined as the cost for the insurance – the compensation for insurance coverage by the insurance company. In other words, it is the price for the insurance [See 6, p. 288]. A quantification of the insurance premium is not necessary; however, a gratuitous contract (insurance coverage free of charge, without any insurance premium) cannot be considered as an insurance contract [7, p. 17]. According to legal literature the insurance premium must be at least *determinable* [8]. As a consequence an insurance contract can foresee that the insurance premium has to be paid in crypto currency. This specific amount of crypto currency will be the compensation for insurance coverage. In this way it can be defined in the insurance contract that the policyholder must pay a certain number of coins at regular intervals or a single one-time payment in order to receive compensation (for example a certain sum of Bitcoins) in the case of occurrence of the insured event in the future. There are in general no fundamental regulatory objections against such an insurance contract. This is at least the case within the European regulatory framework. Even though there is a clear regulatory trend towards a more conduct-based supervision approach, which includes a review and an approval of the individual insurance product by the responsible supervisory authorities and the insurance undertakings itself through a so-called product oversight process [9]. In general, the lawfulness of an insurance product based on crypto currency under such a product oversight process will depend to a large extent on the concrete design of the underlying insurance contract, especially the contractual definition of the insured event.

### 2.3 Insured Event and Claims Payment

Every insurance contract must define the occurrence of the so-called *insured event*, which is the trigger of loss or damage for the insured [10, p. 151]. As the most common source of legal disputes between policyholders and insurance companies, the insured event must be defined clearly and in unambiguous terms within the insurance contract. The contract also defines which sum must be paid to the insured in the case of occurrence of the insured event. This can be a fixed sum (e.g. in the case of a life insurance) or a sum that depends on the extent of the concrete damage (e.g. in the case of a car insurance). In practice the insurance contract is often still paper-based containing the general terms and conditions of insurance (GTCI). Smart contracts- or blockchain based processes could enable cheap and fast policy management and payments, avoiding administrative costs and minimizing legal disputes. Such blockchain-based insurance contracts could be even paid in crypto currency [1]. Several blockchain-based insurance solutions already exist, such as for example "Fizzy", the smart insurance of AXA against flight delays, which is probably the first blockchain-based insurance product on the market [10], even though "Fizzy" is as kind of a hybrid solution between a purely blockchain-based insurance and a traditional insurance product (See 3.1. below).

## 3. SMART INSURANCE CONTRACTS

### 3.1 Smart Insurance Contracts

The term smart contract was already defined in 1996 by [11] as a "set of promises, specified in digital form, including protocols within which the parties perform on these promises". The general objectives of a smart contract are the satisfaction of common contractual conditions (payment terms, periods, confidentiality, or even enforcement clauses), minimize exceptions and minimize the need for intermediaries, such as for example insurance brokers. In other words, smart contracts can be defined as computer programs regulating the rights and obligations between two or more parties [12]. Smart contracts are in general (but not necessarily) linked to blockchain. The legal classification of a smart contract is however still disputed and inconsistent. In general, smart contracts *cannot be considered as contracts in the legal sense*, as a legal contract must be based on two corresponding declarations of intent [12]. Consequently, an insurance, which is based on a smart contract, needs a traditional contractual basis beside the smart contract as a backup. This is also the case for "Fizzy", where a traditional contractual agreement is necessary between the insures and AXA. In addition, in the case of "Fizzy" the insurance premium needs to be paid in Euro [10].

Table 1 gives an overview about the proposal of a legal classification of insurance contracts depending on the nature of the underlying currency (ordinary or crypto currency) and on the underlying contractual agreement (traditional legal contract or smart contract or both).

**Table 1. Legal Classification of Smart Insurance Contracts**

|  | Traditional Contract | Classic Contract and Smart Contract | Smart Contract |
|---|---|---|---|
| Ordinary Currency (FIAT) | Classical Insurance Contract | Hybrid Insurance Contract | Smart Insurance Contract |
| Crypto Currency | Crypto Insurance Contract | Hybrid Smart Insurance Contract | Smart Insurance Contract |

### 3.2 Smart Contracts and Public Law

Even though Fizzy (and similar blockchain-based applications) can be considered as a pioneering innovation within the insurance sector, the next step should be a blockchain-based insurance-contract, where *no additional contract is necessary* and where the insurance premiums and the claims payments will be made in virtual currency. Whereas the legal equal treatment of traditional contracts and smart contracts needs a fundamental change of the concepts and definitions of a contract from a legal point of view, a

traditional insurance contract where premiums and claims payments can be made in crypto currency is *prima vista* in principle conceivable, at least from a civil or contractual law approach. According to the *principle of contractual freedom,* any kind of obligation can be foreseen in principle between the contractual parties [See e.g. 13]. In financial market law this principle is however highly restricted by provisions of public law, in especially regulatory requirements and financial supervisory law in general. Consequently, in order to be able to offer a private insurance contract as an insurer, precisely defined regulatory conditions must be fulfilled. These conditions are appropriate and necessary because of overriding public interests, which cannot be achieved through the self-regulatory powers of the free market [14]. In the insurance sector one of the main public interests is consumer protection – which means that the financial and non-financial interests of the individual policyholders need to be protected against the interests of the insurance undertakings. Beside consumer protection, financial regulation aims to guarantee the proper and efficient functioning of the financial market in general.

## 3.3 Crypto-Assets and Solvency II

In Europe for private insurance and reinsurance companies the *Solvency-II-Directive* (Directive 2009/138/EC) – which had to be implemented in national law – can be considered as the most relevant regulatory framework in the insurance sector. The Solvency-II-Directive in particular includes extensive quantitative provisions, especially specific own funds requirements and investment regulations (See e.g. 9 and 3.3. below). As a consequence the possible breakthrough of a purely blockchain-based insurance in practice depends to a large extent on the accounting treatment and the classification of virtual currencies and crypto-assets. Today, the accounting for crypto-assets and virtual currencies is still inconsistent and heterogeneous. In addition there is a lack of a standardized taxonomy for crypto-assets and virtual currencies, making it difficult to draw a general conclusion on the accounting classification. In addition, an adequate and appropriate assessment and classification of crypto-assets and crypto currencies requires a deep understanding of the technical bases of the distributed ledger technology and the related technological developments on the one hand, and the relevant legal and accounting concepts on the other.

Crypto currencies cannot be considered as an official currency in the legal sense – it is in general the exact opposite: the value of a crypto currency is not derived from a trusted governmental national bank, but depends on the supply and demand mechanism on the market. In this way, it is difficult to determine if it is a (unofficial) currency or a security and consequently, how it has to be regulated by the authorities [15]. As a result, crypto currencies, such as Bitcoins or Ether, cannot be used as a base currency (such as for example Euro or Dollar) in the meaning of the Solvency-II-Directive. Financial statements of insurance companies completely based on crypto currency remain therefore a vision for the future. For the moment there is the challenge to classify crypto currencies appropriately within the balance sheet of an insurance company. It is generally accepted that crypto currencies cannot be considered as cash, as they are not issued by a central bank and also due to the lack of broad acceptance as a means of exchange [16]. In general, they are classified within the balance sheet as financial assets or intangible assets. However, the economic value of intangible assets under the Solvency II framework is considered to be negligible as in general such assets do not have a cashable value – therefore they will be valued at nil (such as for example Goodwill) or taken into account to a very limited extent [17] (See also Figure 1 below). As a consequence, Bitcoins and other crypto currencies have to be to a large extent backed with own funds by an insurance company. This means for example for a motor liability insurance that the amount of insurance premiums paid in Bitcoins by the policyholder will not have any value in the balance sheet. This does not mean that a car insurance based on virtual currency is not possible. However, it increases the hurdles for practical implementation considerably. Beside this non-life insurance example, there are life insurance products where a practical implementation seems to be more conceivable. There are for example unit-linked insurance products, where the investment risk is fully transferred to the policyholder. In such cases the risk of virtual currency fluctuations can be transferred from the insurance company to the client [See e.g. 18].
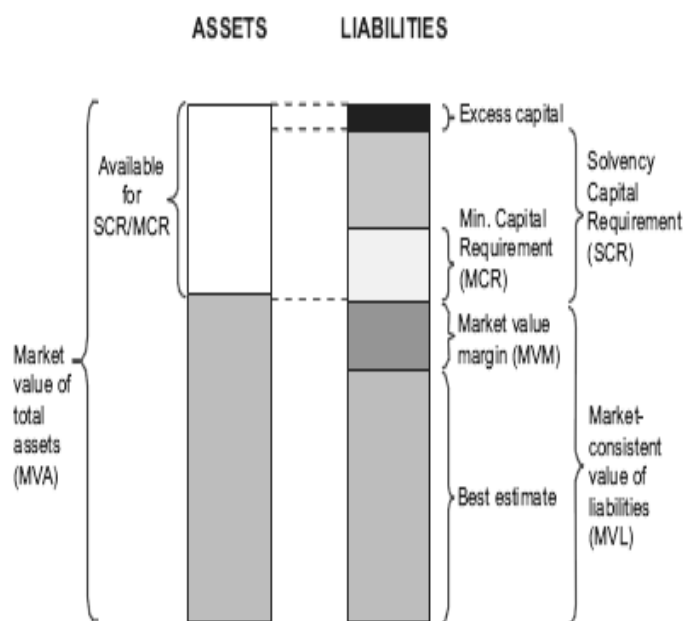


**Figure 1. Overview of a Solvency-II Balance Sheet [19]**

## 4. CONCLUSION

The legal hurdles for blockchain-based insurance products are diverse and very high, however they are not insurmountable in the medium and long term. As shown in Table 1 above, the way to purely blockchain-based smart insurance contracts can be undertaken step by step. In general the legal barriers can be found on the one hand in private law, especially in contractual law, and on the other in public law, especially in financial supervisory law. In contractual law the most important step will be *the recognition of smart contracts as generally accepted legal contracts*.

In financial supervisory law the consistent and uniform classification and recognition of virtual currencies and crypto-assets within the balance sheet of an insurance company will be one of the main challenges for the future. If crypto currencies or crypto-assets in general cannot be used by the insurance companies to fulfill the capital requirements, it becomes much more difficult for insurers to be able to offer blockchain-based insurance products. However, if crypto currencies remain very volatile and as long as they are not widely accepted as means of payment in everyday life and as an official currency, it is difficult

to imagine a full legal equivalence of insurance products based on virtual currencies and of those based on fiat currencies (concerning the volatility and the lack of value stability of Bitcoin, see e.g. [20]). Especially with regard to consumer protection issues the regulatory framework cannot allow for example life insurance or pension products in crypto currency, when these products are intended to guarantee the full coverage of living expenses in the future for the insured persons. In addition, also for non-life insurance products, such as for example car insurance products, the insurance company and the regulator must make sure that insurance premiums in the long run do not only have to cover the potential damages but also the administrative costs (e.g. personnel costs) of the insurance company. With some exceptions these days the car repair shops and the personnel costs of an insurance company for example cannot be paid in virtual currency.

Nevertheless, it can be expected on the long run that smart insurance contracts will be officially accepted within insurance industry under a given legal framework. However, in a first step these smart insurance contracts need to be based on ordinary currency (See Table 1 above). Probably in a second step, when large parts of the economy will become token- or blockchain based, smart contracts based on virtual currency will be possible. For the near future only very simple smart insurance products based on crypto currencies are conceivable, such as for example an add-on life-insurance product, which is not intended to cover the full cost of living, but which foresees only a certain additional amount in crypto currencies in the case of realization of the insured event. To summarize, as it was the case for other historic technological innovations, the way from technical feasibility to full legal acceptance can be hard and difficult in particular cases in practice, also for smart insurance contracts.

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