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ASTON UNIVERSITY BIRMINGHAM UNITED KINGDOM

This paper is from the BAM2019 Conference Proceedings

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Title:

The use of Security Tokens on a Blockchain for Investment Products: A Survey

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The use of Security Tokens on a Blockchain for Investment Products: A Survey

Summary:

The blockchain technology is allowing investment products to be available in digital format recorded on a blockchain. Representation of such regulated investment products on a blockchain are termed “Security Tokens”. Security Tokens can be transferred between parties without requiring trusted third parties and can be programmed with certain rules. In this paper we first look at the process of issuance and distribution of investment product to investors in a traditional security format. We then explore how issuance of security tokens can improve the current system. Finally we list the main verticals we expect security token projects to focus on. We outline how we plan to categorise the results of a survey on major projects, theoretical concepts and empirical experiments, that have been put forward for potential uses of security tokens. This paper is the first step to survey all concepts developed to date on ways security tokens can be designed and utilised. This addresses a large gap in existing academic literature. We suggest avenues for future research which can fundamentally change the way investment products are created and exchanged.

Word count: 2,425

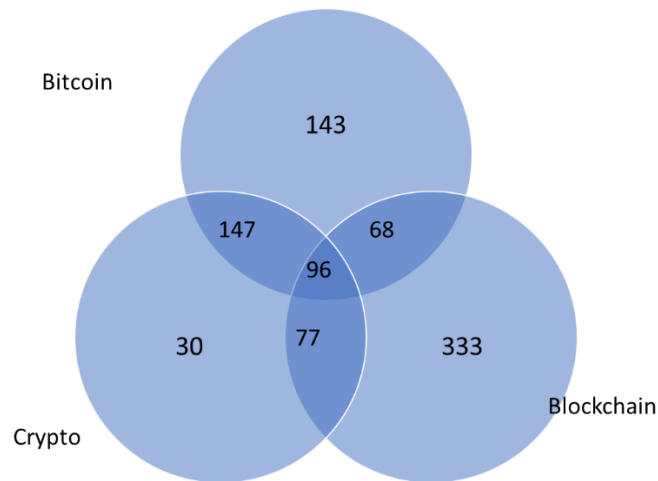
1. Introduction:

Blockchain and more broadly Distributed Ledger Technology (“DLT”) is a revolutionary technology, that allows value transfer between parties without requiring use of a trusted third party. The blockchain technology found its initial application and popularity through crypto currencies. Hence, most of the research in this field so far have focused on cryptocurrencies and particularly Bitcoin (Holub and Johnson, 2018). It has soon become evident that this technology offers many benefits for capital raising by disintermediating existing actors involved in such process(Davidson, Sinclair;De Filippi, Primavera ;Potts, 2018). However regulators have made it clear that any product that are offered for investment purposes, will need to be regulated(SEC, 2019). Therefore, projects have emerged looking at how the power of this technology can be put in to use for regulated investment products. This involves creating “security tokens” which are representation of value or contractual rights that uses some type of DLT and can be transferred, stored or traded electronically for investment purposes (*Cryptoassets Taskforce: final report*, 2018). Study of security tokens is very important, as this development can move use of DLT technology from the remit of niche cryptocurrencies with USD 270bn market size (Coinmarketcap.com, 2019), to mainstream use for investments by investors and financial intermediaries in capital markets with well over USD 100 tn in assets(McKinsey, 2005) .

2. Current literature on use of DLT in finance

Current research on use of DLT in finance have been dominated by research on Bitcoin and cryptocurrencies. Some of the literature focuses on technical aspects of blockchain and Bitcoin from the perspective of technology and information systems research (Yli-Huumo *et al.*, 2016)and (Morisse, 2015). The rest of the research around Bitcoin mostly falls under technology and economics subjects (Holub and Johnson, 2018). The research considered important for the field but not containing the Bitcoin keyword is very limited, showing the dominance of Bitcoin research. Our own research review conducted using the Scopus database and focusing on articles published on peer reviewed journals, using a wider array of keywords: Bitcoin, cryptocurrency, blockchain or distributed ledger technology has identified 914 articles. As shown on Fig. 1, 64% of the papers on the broader blockchain topic were still focusing on Bitcoin and cryptocurrencies. This represents almost the entirety of the research that exists that is generated by business, finance and economics focused researchers. The remainder of the Blockchain literature that do not cover cryptocurrencies have mostly been developed by engineering disciplines and focuses on technology aspects of blockchain. There are also limited number of articles on uses of blockchain in different industries such as healthcare, IoT and supply chain. Within the business-related research of Bitcoin and Crypto the innovations that the technology can enable has not been a focus of attention. Articles that look at wider implications of cryptocurrencies including financial innovations enabled by Bitcoin and associated blockchain technology, are classified under the group "Critical Thought" (Holub and Johnson, 2018) and represent 14,5% of the literature. These show that there is very little research on the use of blockchain technology in the finance industry and the wider implications of that, beyond those focusing on Bitcoin.

Fig. 1: Blockchain Research Topics



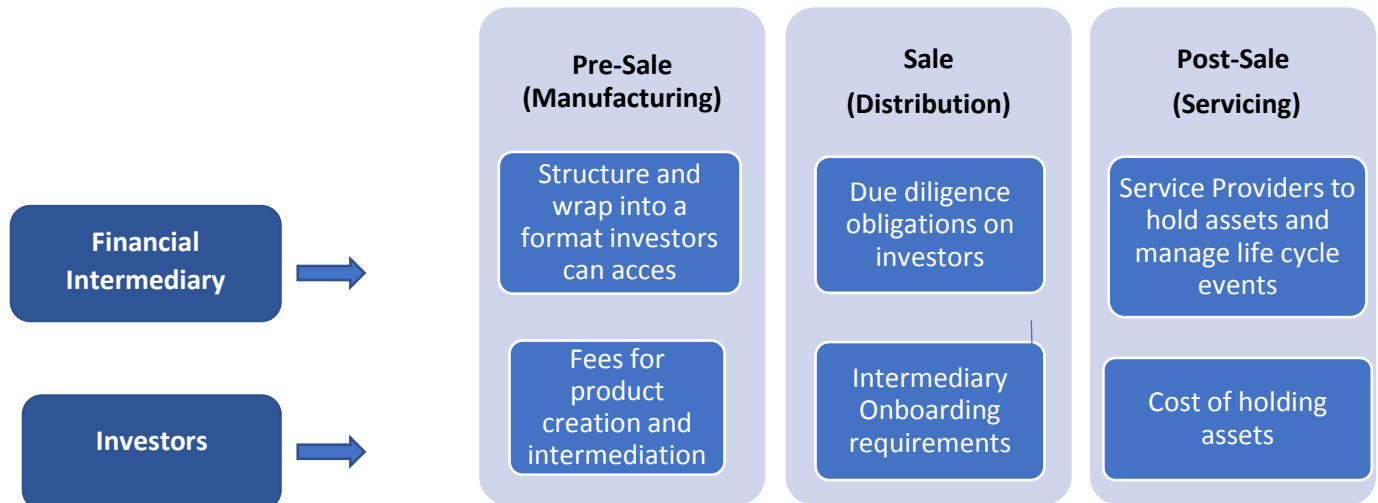
Some exploratory papers looked at blockchains and distributed ledgers and their potential application and suitability for money and banking (Lipton, 2018). Other research looks at technical realities of current blockchain, the limitations to its use in real financial transactions and how to overcome these (Brown, Yang and Treleven, 2017) and (Eyal, 2017). Blockchain is already recognised as an institutional technology which has disruptive ability in economic coordination and governance (Davidson, Sinclair; De Filippi, Primavera; Potts, 2018). Blockchain technology is particularly expected to disrupt financial intermediation, by eliminating the necessity of intermediation in some areas, bring new forms of intermediation and reduce the layers of traditional intermediation (Cai, 2018). However, so far there has not been much research on how this disruption and disintermediation can change the investment product markets. In this research we aim to address this gap in existing academic literature. We will start by setting out how current process for issuance and distribution of investment products work. We will then aim to identify the areas which can be impacted by the use of the new technology. We will follow-up on the questions posed by earlier research and will aim to assess how this technology may change the process of intermediation of investment products. To achieve this, we will start with a survey of existing projects on security tokens. We will use this to put together an inventory of proposed applications of the technology. We expect to identify a list of novel uses of the technology proposed so far and categorise these based on their expected impact on intermediation. This will form the basis for future research and practice, that aim to design a new infrastructure.

3. Current investment product infrastructure

Investment products consists of securities and funds. The providers of such financial investments have several regulatory obligations. Any financial investment needs to have the relevant offering documents prepared by the issuer or product provider in accordance with the relevant regulations. However, availability of such document, does not mean all eligible investors then have access to the product.

Fig. 2 summarises the main life stages of an investment product. The first row shows the role financial intermediaries play in each stage. The requirements on financial firms involved on each of the processes, are passed onto investors experience as additional inconvenience and costs. The second row shows the frictions passed on to investors as a result of intermediation.

Fig.2 : Lifecycle of an Investment product



There are various financial intermediaries involved throughout the life of an investment product.

3.1. Manufacturing: The first stage is manufacturing, this involves creating the investment product. Banks and Asset Managers typically sit between the owners of capital and the end users of capital, and create products (funds, bonds, equities or other securities) that can allow the flow of capital from one to the other. There are costs for structuring, due diligence and documentation of the products which are passed onto investors.

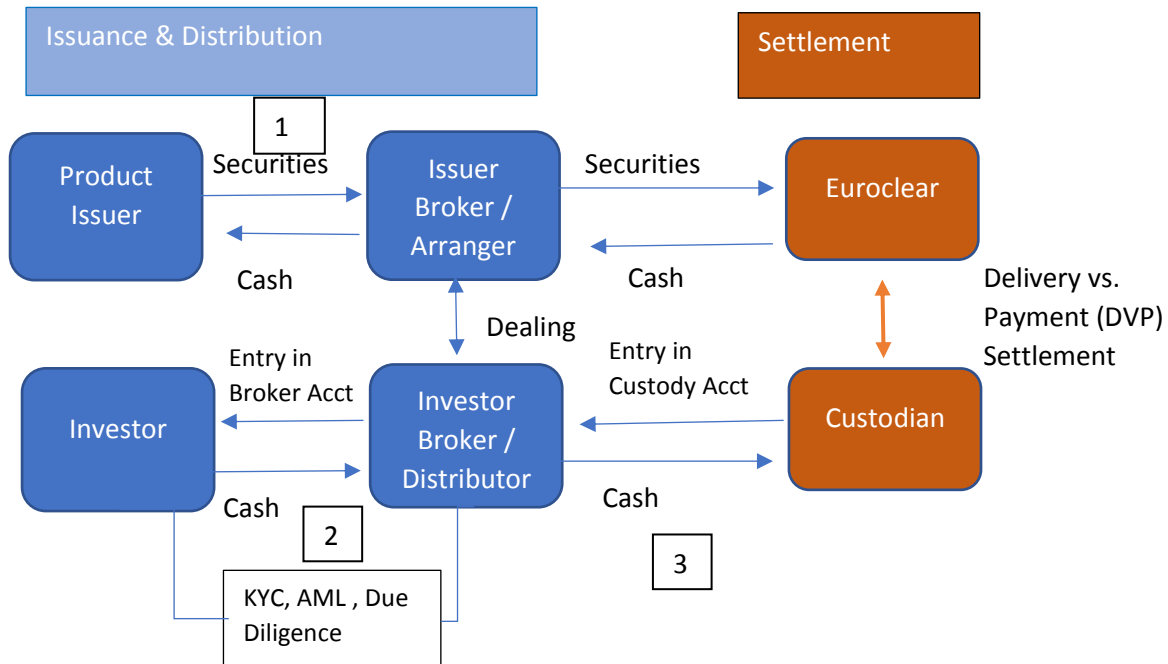
3.2. Distribution: The second stage is distribution of the investment product that has been created. Securities brokers, private banks, banks, fund supermarkets are all types of intermediaries that sell and deliver the product to an end investor. An entity facing an investor has to meet their due diligence obligations on investor onboarding and distribution of products. This includes the Know Your Customer (KYC) checks on clients, ensuring suitability of products, adhering to regulations on offering of such products in the relevant jurisdiction (e.g. registration or passporting requirement), providing investors with the required information as per regulations (e.g. MIFID disclosures), adhering to rules related to specifics of the legal form of the product (restriction on number of investors, minimum denominations, transfer restrictions etc.). The investor therefore have to meet the onboarding requirements with all the intermediaries they would like to deal through. Since no single intermediary have access to all products, the investor are limited on the products they can access and will typically need to go through onboarding with multiple intermediaries. The intermediaries on the other hand need to be compensated for their efforts, as well as distribution and compliance costs. This creates additional costs for investors.

3.3. Servicing: Finally, after the purchase of an investment product, investors may still have to deal with additional financial service providers. These include service providers that are appointed to ensure the record keeping & financial integrity of the product, servicing of investors, managing life

cycle events (such as coupon payments, calculations) and safe keeping of assets. Investors may directly or indirectly incur costs for these ongoing costs of holding an investment product.

To demonstrate the above steps with an example, Fig. 3 shows a simplified flow for issuance of a note from a security issuance programme under current infrastructure

Fig. 3: Example of Securities Issuance Flow in Current infrastructure



As shown by Fig. 3, there is no direct relationship between the product issuer and investor. Financial intermediaries active in issuance and distribution of securities to investors fulfil the requirements to bring together both sides this includes i) creation of an investment product ii) due diligence on investors and issuer; ii) trusted third party to allow exchange and safe keeping of assets. In Fig.3 , step 1 demonstrates manufacturing, step 2 distribution and step 3 servicing stages.

Investment products currently can only be delivered through this infrastructure. Investors can not have access to parties such as custodians directly, therefore are bound to go through intermediaries that have access. In our research we will explore how an alternative DLT based system can work:

4. Use of DLT

DLT is expected to allow financial investment products to be available in digital format, recorded in distributed ledgers. This development can go a long way in reducing the above-mentioned frictions. Fig. 4 shows a simplified example of how such a system can operate.

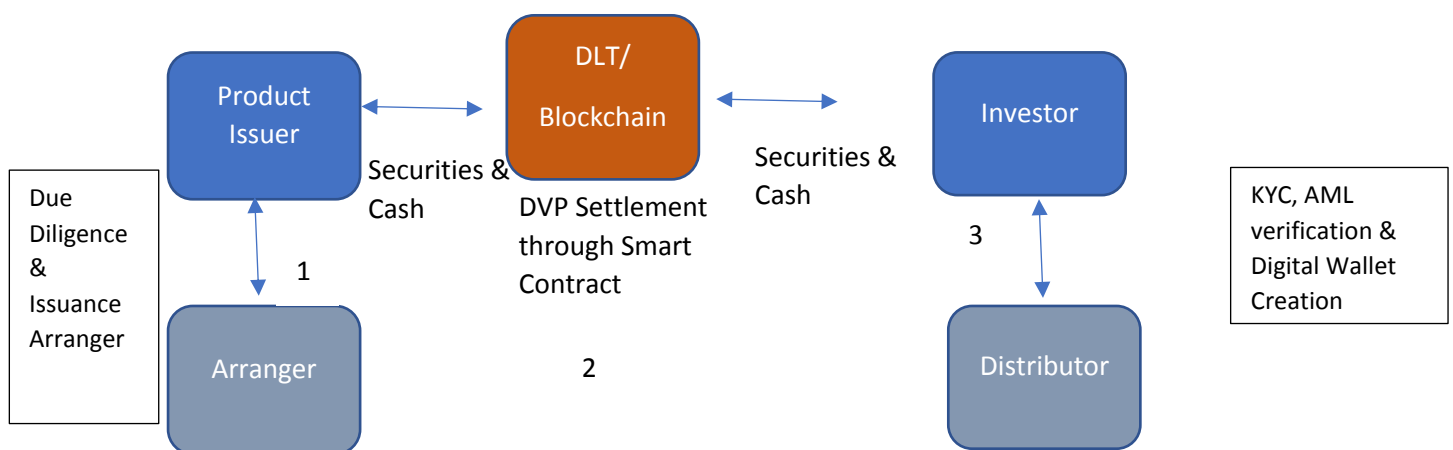
4.1.Product Manufacturing with DLT: Although digitally represented the investment products will still need to follow the relevant regulations and legal formats expected from current investment products. Therefore, it may be expected that some financial service providers will be

required to create the products that will pool capital and help get it to the users of capital. This arranger role is shown as Step 1 in Fig 4. In current infrastructure the arranger role is typically given to intermediaries that will then be able to distribute the product as well. If distribution model changes, this may have a knock-on impact on how the arranger services are provided. In the physical product world, the change in online distribution with likes of Amazon, gave rise to emergence of smaller manufacturers that leverage this large distribution platforms. Similarly changes in any part of the product life cycle may have an impact on others for financial products.

4.2.Product Distribution with DLT: Current infrastructure requires exchange of investment products to only happen between trusted intermediaries. This is necessary as no party would want to send payments to an unknown or untrusted party. Currently, the exchanges and settlement systems serve the purpose of allowing exchange of value between parties. However only financial intermediaries have access to those venues. DLT technology allows every node in the system to exchange value with each other without having to know and trust each other. Step 2 in Fig 4. envisions a distribution model where arrangers and investors can directly transact without the need for additional intermediaries. Step 3 in Fig 4. shows there will be a role for some service providers as Investors will still need to be verified for Compliance reasons and linked to their real-life identities in line with regulations.

4.3.Product Servicing with DLT: Current infrastructure is tied in with the institutions such as clearing houses and exchanges that have evolved from periods where physical representations of securities needed to be held in safe keeping. In a new DLT based infrastructure that is independent of such institutions new standards for safe keeping can be arranged. As digital representations will be easily transferrable, this will be open to competition and development of new solutions

Fig. 4: Potential Use Case- Example of Blockchain based Security Token Issuance



5. Building Blocks for a new DLT based Infrastructure.

Based on our analysis above, we identified three verticals which can help develop a security token-based infrastructure for investment products. In the next stage of this research, we will do a survey of existing projects and categorise them into one of these three verticals or add additional verticals we have not so far captured.

5.1. Due Diligence: Creating digital wallets in DLT, that are linked to real world identities of the owners will reduce the duplication of work done by financial intermediaries to onboard new clients. It will also reduce the monitoring burden on intermediaries and issuers, as certain characteristics of the investors (such as their jurisdiction, tax status, sophistication, risk tolerance) can be directly associated with their digital wallets hence allowing automation of the monitoring and providing a more robust control framework.

5.2. Exchange: DLT allows exchange of value between parties without requiring a trusted third party. It also allows to create an immutable record of truth to be recorded without requiring a trusted third party to maintain the database. Smart Contracts can ensure values are exchanged simultaneously only once all the pre-agreed conditions are met and if sufficient funds exist. This makes it possible to exchange securities between parties that do not know or trust each other. In current infrastructure intermediaries need to conduct various checks to ensure the investors to purchase the investment products are eligible to purchase them based on the restrictions imposed on the documents of the product. In a DLT network, once a node in a DLT networks is verified, one can use data oracles and special features in tokens to automate most of such due diligence and checks.

5.3. Safe keeping & lifecycle events in DLT: The electronic records are maintained on the blockchain without requiring a single party like a registrar to keep records. All the life cycle events that happen on a security such as cash/flows, coupons, notifications, can be done digitally without requiring services such as paying agent that is traditionally required. Information between parties can be agreed and the payments may be exchanged directly between nodes, without having to go through various offline channels and third parties.

6. Next Steps on the development of the paper

In this research we look specifically at the process of issuance and distribution of investment products. We aim to set-out the ways in which blockchain technology can reduce or remove the frictions in the issuance, distribution and maintenance of investment products. We are working towards completing a survey of all major security token related projects, experiments and concept papers to map-out the different avenues in which this technology can impact the future investment product ecosystem. This way we expect to get a glimpse into the future of how DLT may change the intermediation of investment products, and what impact this may have on the experience and costs for end investors. This will be an important contribution as the first holistic research into this field and set direction for future research. We expect future research to look in more detail to which functions or institutions may become obsolete and which new ones may be required. Ultimately, we expect to see research to evolve to suggest a new architecture for investment products market to be designed from scratch using this new technology.

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