

ICURY: Tokenizing the Dominant Open Content Syndication Network in the E-commerce Market

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Abstract

ICURY is defined as a token to decentralize Icecat's existing global product content syndication network, which already facilitates 18 billion downloads per year by tens of thousands of e-commerce companies. Icecat, a listed company in The Netherlands and exploiting a unique open content catalog, wants to use the token as pre-pay for its services at a minimum value. Next, the token can be used to incentivize decentralized content production and syndication. In the token ecosystem, independent Proof-Of-Quality checks are seen as critical, as users demand standardized and verified product content. For the long term success of the syndication network, it is important to develop protocols for the independent and decentralized voting on changes in the Icecat taxonomy by stakeholders.

1. Introduction

Icecat is the leading syndicator of product content for the global e-commerce market as it's running the only global open catalog, Open Icecatⁱ, under an open content licenseⁱⁱ, and is processing billions of product data-sheets (PDSs) download requests per quarter in 2017ⁱⁱⁱ, supporting 5,300 different tech platforms, used by approximately 73,000 registered e-channel partners in 222 different countries or territories. The PDS downloads are related to the products of around 19,000 individual brands^{iv}. A PDS is defined here as a record that contains all the information that is helping to understand a discrete product: its unique product identifiers and classification, marketing and other descriptive texts, product specifications, relations with other other products, images, logos, videos, (3D) animations, reasons to buy, reviews and other attributes.

According to Icecat (figure 1), the increase in PDS downloads is exponentially, surpassing 8 billion downloads during 2016 and more than 13 billion downloads are facilitated during 2017. Main rival syndicators in its competitive space have "closed" or proprietary business models and don't produce usage numbers that are even close to Icecat's. Icecat did a successful IPO in February 2017 in the Netherlands, and has since then a market capitalization of more than 120 million euro. Leading brands^v, e-tailers and e-commerce platforms have embraced the open content model of Icecat to lower costs and increase content quality. At the output or use side, hundreds of developers have been inspired by the open content model to create interfaces to their e-commerce platforms, such as Magento, PrestaShop, SAP Hybris, Akeneo, Amazon, Ebay, and many others. But, at the input or creation side, such a creativity is not yet unlocked.

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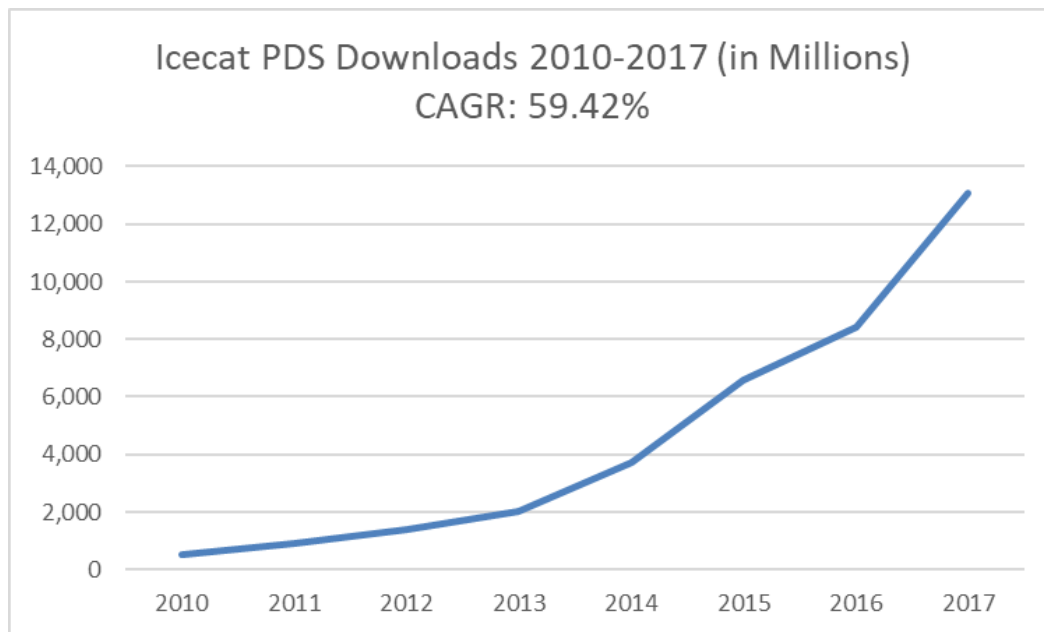


Figure 1: Annual downloads of product data-sheets exponentially growing to almost 14 billion PDS downloads during 2017 by users of Icecat by CAGR of 59.42%.

There is a need, however, for unlocking such a creativity also at the input side. Although, Icecat currently covers 4.4 million products with standardized PDSs from tens of thousands of brands, the major market places have a need of covering 100s of millions of products from millions of individual brands^{vi}. Including specialized business-to-business products and services, the number of needed PDSs to cover all might be even over a billion. Despite that Icecat is increasing its PDS production significantly, using smart techniques and individual brand interfaces, it appreciates that the current more restricted content upload model and processes are not sufficiently decentralized, stimulating and/or rewarding to take care that any product on earth is covered by a standardized PDS with all its rich media assets such as brochures, images, manuals, videos, 3D animations, reviews etc.

What if the syndication network itself is sufficiently rewarding editors and other content creators to insert high-quality and multimedia PDSs that meet the quality requirements of e-tailers, brands, and regulators, autonomously of the creator of the content syndication network, Icecat? And what if the network would make it far easier for brands, and their e-channel partners and agencies, to post and pay for content jobs, that help them to enrich the shopping experience of their prospective buyers? What if Quality Assurance (QA) is also a function that is available independently of the creator? And, what if even the definition of the product content standards, the taxonomy, are part of a democratic voting process, putting the control firmly in the hands of the stakeholders in the syndication network?

Currently, such a decentralized network for product content syndication, doesn't exist yet. Filecoin is attempting, after its successful Initial Coin Offering (ICO), to create a decentralized file storage network^{vii}, but this is not specific to Product Information Management (PIM) and syndication, and it's only addressing data storage.

Bitcoin^{viii}, Ethereum and many others have proven that a decentralized blockchain-driven network for storage and exchange of value, rewarding miners for transaction reconciliation and contract execution jobs, can be highly successful, although the use for payment is limited. In part, because of high transaction costs and energy inefficient Proof Of Work blockchain set-ups^{ix}. Ripple is a blockchain initiative that focuses on efficient

payment settlement, between banks and other payment providers, at far higher speed and lower cost than other mainstream blockchain initiatives. Further, Iota^x is a promising project focused on blockchain-less cryptocurrency for the Internet of Things (IoT) for enabling micro payments at close to zero transaction costs. The Waves platform is a promising Proof Of Stake, and thus more efficient, environment for the decentralized creation of tokens and exchange of such tokens^{xi}. Finally, taxce and ledgable seem to offer, potentially a good infrastructure for high-speed high-performance Blockchain-As-A-Service, enabling up to 1.4 million transactions per second (tps)^{xii}.

2. Challenging the Existing Syndication Set-up

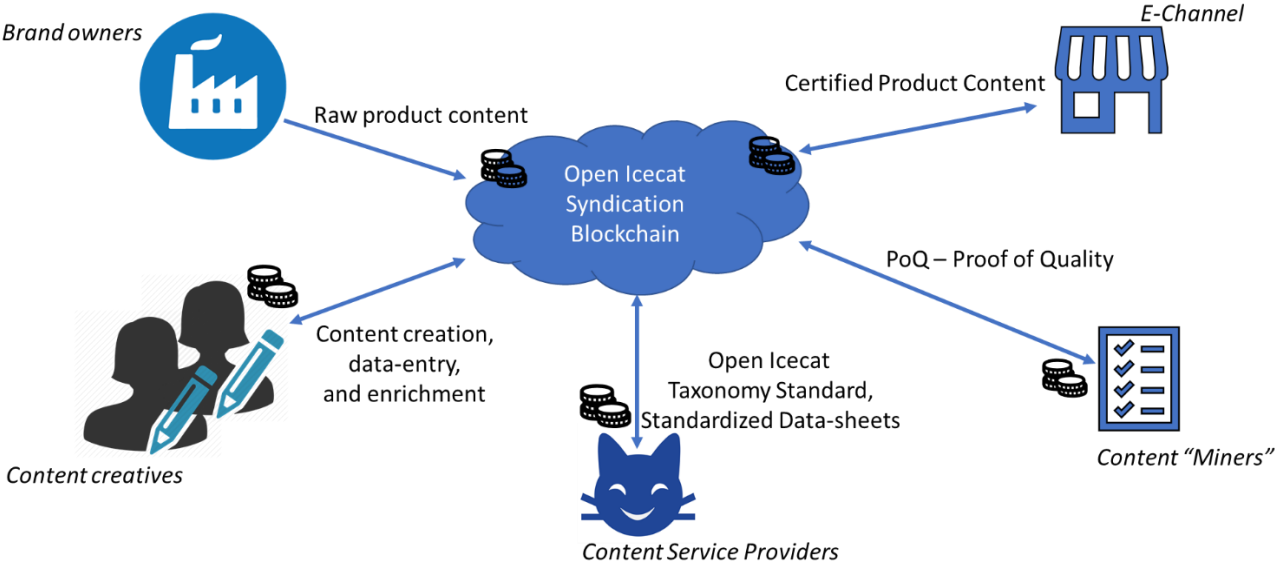


Figure 2: a simplified overview of the main data and token flows regarding product content syndication in the e-commerce market

Brand owners, or manufacturers, are currently sending their raw product content to Open Icecat including digital assets, and provide a usage license to their copyrighted materials. The brand license to users can be an open content license, a proprietary license, or dual if part of the brand’s content is open and part is private for authorized resellers only, depending on the content syndication policies of the brand. Brands pay for additional content creation to *Content creatives*, such as photo, video, animation and 3D studios, text writers, translators, and media agencies. They also pay Icecat or other *Content Service Providers* (CSPs), to import or re-enter their raw product content and take care that the product content is standardized, searchable attributes and rich media assets are added, and their multilingual PDSs are published and syndicated to their *E-channel*, especially authorized resellers. E-channel partners get a lot of product content for free from their brands. Nevertheless, they are spending money on full coverage of their catalogs, content enrichment, QA, attribute mapping, system integration and PIM environments. Icecat and other CSPs in their turn are paying editors, translators, text writers and other content creatives to take of producing certified PDSs, and invest in PIM and syndication networks to make sure that the product content is included in the websites and other systems of e-channel partners.

One of the key quality indicators, currently supported in the Icecat PIM, is the completeness score (0-100%), which is based on the minimum requirements that key etailers such as Amazon have, legal compliance, the taxonomy per sector or even category that Icecat has defined in co-operation with users, and the wishes of consumers and professional buyers for local or other additional information. Approvals by a brand’s

product manager and Icecat’s QA team add to a product’s completeness score. A completeness score of 50% implies that the minimum requirements for a PDS are met. A completeness score of 100% implies that also all wishes regarding to rich media, attributes, reviews and local content are fulfilled. In Icecat’s database of 4.4 million PDSs, the highest score is never realized.

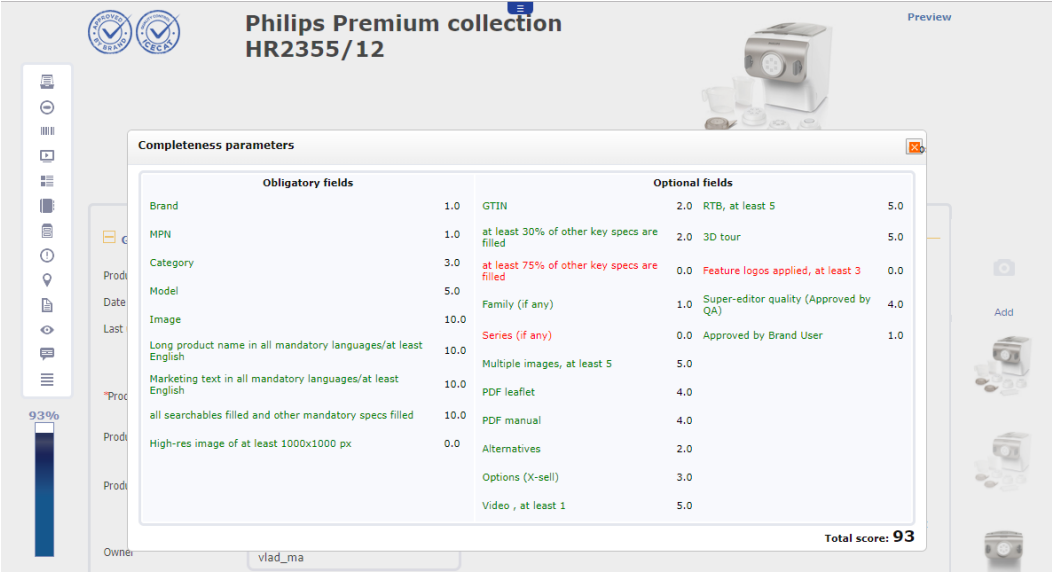


Figure 3: Example of a Philips pasta-maker with a very high completeness score of 93% as not only mandatory specs and assets are included, but also rich media such as video and 3D. The score weights can be modified.

The current Icecat PIM, is a distributed secure database with a number of append-only entities, i.e, has a number of Distributed Ledger Technology (DLT) aspects. Firstly, approved PDSs are added to the database for eternity as there’s not only the need for good product information during its market introduction, but also afterwards during its entire usage life cycle. Secondly, all content changes are recorded in an append-only ledger called the “editor journal”, to be able to trace the causes and sources of mistakes and to be able to distribute delta files with actual PDS changes to the user community. The importance of the integrity of this editorial ledger is growing as the number of e-commerce transactions based on the Icecat PDSs is growing into the trillions of USD, because of legal compliance requirements, and as e-commerce applications or nodes in Icecat content syndication network are required to update their systems more efficiently by only updating actually changed records. It makes sense to publish the append-only aspects or entities, especially the editorial ledger given its economic and legal weight, in a separate blockchain, as it’s a proven DLT with great properties to validate the integrity of all the records in the chain. This will need to be a high-performance blockchain, able to facilitate millions of database transactions per second, as Icecat PDS updates can be massive when certain taxonomy elements are changed or when mass product data imports are executed. Finally, the download statistics on PDS and user level are recorded in an append-only ledger for market intelligence and administration purposes.

Approved product content is distributed by Icecat under an open content license in the form of XML, JSON, CSV or Excel, JavaScript based live inserts (html), and through standard interfaces to popular e-commerce and PIM environments^{xiii}. Payments regarding

content syndication between the involved parties are handled traditionally in fiat currencies.

The main reasons that in the existing situation there are no complete pools with hundreds of millions of PDSs are:

- There are insufficient incentives for CSPs to maximize and share their production capacity in a more centralized syndication environment
- There are insufficient incentives for people to produce certified PDSs independently of CSPs, e-channel partners or brands
- There are no possibilities for independent QA and posting of certified product data in the more centralized CSP environments
- There are insufficient incentives for product managers of brands to create and post certified product data.
- There's no universally accepted infrastructure for handling content creation jobs in the product content syndication space, leading to shareable certified product content.

It's clear, that in case of payment support in a decentralized ecosystem, it makes sense to store all transaction records in a blockchain, as it has proven to be an untemperable DLT in public environments. The main challenge, again, will be to efficiently handle large numbers of value transactions. In the following sections, the functions of a decentralized product content syndication blockchain will be described in more detail, which can help to resolve these bottlenecks.

3. ICURY: Icecat Backed Token with Intrinsic Value

In the most basic set-up, Icecat will accept prepaid tokens for rendering its PIM services, such as PDS creation, QA, subscriptions to its catalogs, PDS download requests, editorial service levels, PIM licenses and integration services. The prepaid service tokens are as such Icecat backed tokens, called ICURY, short for Icecat cryptoCURrency. Despite the term cryptocurrency, the token is not devised as a (digital) currency, security or other financial instrument, at least not under Dutch law: the service tokens will not have dividend, interest or other profit rights attached to it, nor (shareholder) voting rights. They can be described as service notes or multipurpose vouchers, in legal terms, as they can be redeemed for multiple Icecat services, and are intended to be used more broadly in Icecat's ecosystem. Actually, the real "currency" of Icecat is the PDS, and it makes sense to cap the total number of tokens to the potential number of PDSs that are expected to be created in the network.

By accepting ICURY at least at its prepaid value, f.e., during an ICO at its offering price, the intrinsic value of the token can be underpinned. By using at least a significant part of the proceeds of an ICO for a buy back fund, token buyers can be protected to a certain degree against significant and structural price drops of ICURY below its intrinsic value.

If trust in the ICURY is established in Icecat's market, expressed by a token price of at least the intrinsic value, it makes sense to gradually promote the use of the service token between other stakeholders in the Icecat network as well. For example, for hiring content creatives directly by manufacturers and retailers, and for PIM services by third parties. The price of these services in ICURY can then be determined by the marketplace itself, depending on supply and demand.

Ultimately, for the purchase of goods by resellers or as loyalty points for consumers. Icecat or other parties could offer escrow services to guarantee that tokens are only transferred on service completion and acceptance. It makes sense to cap the number of

tokens at the total number of potential PDSs needed to describe all discrete products and services in the world.

Such a token will require a very secure and low cost peer-to-peer payment environment, including virtual wallets, support of micropayments, and highly reliable and efficient DLT. For example, given Icecat's current number of business accounts, from the start around 80,000 wallets or token accounts might be needed. As it will not be an option to allow for the Wild West scenes that we currently still witness regarding bitcoin and altcoins, the protocols and technology for safeguarding value and transactions are critical. Currently, the Icecat team is working on blockchain and token exchange trials in this direction. Depending on the outcomes of such trials, final choices will be made, not excluding other promising DLT technologies. Also for token exchange, and payment, additional exchanges might be allowed after a successful ICO, to allow for token exchange.

For the issuance of tokens, blockchain has proven itself, and especially ethereum is the most wide-spread platform thanks to its smart contract support. If the number of transactions is small, only limited to trading tokens, ethereum can handle that as it can support some 3 transactions per second. But, the moment we need to facilitate pay per download, micropayments, this would be too massive for ethereum or any public blockchain network. For example, we expect to support around 20 billion PDS downloads in 2018, which would average to around 634 downloads per second. If these would be handled through pay per downloads, a very efficient, high-speed new blockchain technology is required. Something we're experimenting with internally.

4. Decentralizing Proof Of Quality (POQ)

The taxonomy standards per category are already publicly available and are updated and published as part of the Open Icecat standard. To lessen the QA bottleneck of any CSP, also Icecat's, it's critical to allow independent third parties to perform POQ checks on product data before it's posted to the content syndication network. The POQ check is existing software in the Icecat PIM. Providing the POQ check as open source will make it easy for any third party to set-up a robust POQ system and their own POQ node. The results of a positive POQ check, i.e., all minimum requirements are met, needs to be posted to a high-performance Icecat blockchain as imports against Icecat's push-API (application programming interface for sending data to Icecat) regularly are related to up to 100,000 of PDSs. To avoid the risk of compromised POQ checks, agreement between independent POQ nodes is required, before the outcome of a POQ check is recorded. A tiny cost, e.g., 0.1 ICURY, might need to be associated with each POQ request to avoid spamming and to reward the POQ job. If the technical POQ check is passed, a PDS will be presented to the network for review (or final POQ) along with the transparent outcomes of the preliminary POQ test. If reviews are all positive, possibly after commenting rounds, a PDS gets a final approval (Icecat quality), and is published with its final POQ test result. One or more CSPs, the Brand Owner and one or more content users could be involved in QA.

Although the role of a POQ check, can be seen as an analogy to the "miner" in a common blockchain network, it's important to avoid the (energy) inefficiency and transaction costs implications of such minders. In our pilot, we work on a Proof Of Stake (POS)^{xiv} based consensus model, where the stakeholder types are a brand owner, multiple CSPs, and e-commerce users. We see it as a basic requirement of transparency and integrity, that the outcomes of subsequent POQ checks are recorded in the Icecat POQ blockchain, to which at least the primary stakeholders in our ecosystem have access.

5. Incentifying Intelligent PDS Creation

If a decentralized POQ test and review process functions well, it makes sense to incentivize editors and other content creatives to scale-up the work they do on great PDSs in behalf of brands and the e-channel. What if the Icecat network is rewarding a PDS editor for every published PDS, which has passed the POQ tests and QA, f.e., with 1 ICURY proportional to the POQ completeness score?

As the work of content creatives is reviewed by their clients and by QA as part of the POQ process, and a cost is involved with POQ requests, good creatives are stimulated and bad ones are penalized. It's foreseen that at least 500 million PDSs will be needed to have a good coverage of any product in mainstream e-commerce market places. If, for example, Icecat would make available 350 million tokens for content creation, this would then be sufficient to incentivize the creation of these 500 million PDSs at an average of 70% completeness. As tokens are circulating in its token economy, actually a smaller revolving fund of network incentives is likely to be sufficient, to kickstart the decentralized PDS creation meeting the POQ test.

Brands already pay Icecat and other CSPs to create and manage standardized PDSs. The token incentives will stimulate creativity to automate PDS creation to the level that also artificial editors, using AI techniques to simulate human editor work, can become part of the Icecat ecosystem. To a certain extent AI processes are already applied by Icecat to automate certain content creation and verification processes.

As value transactions, pay per PDS and decentralized POQ processing costs, are involved, we see it as unavoidable to have those transactions, including the mentioned POQ outcomes, recorded in an own Icecat POQ blockchain, so that all stakeholders can monitor the outcomes and related transactions. In a dual blockchain set-up, a public blockchain-based token, can be used to settle final payments, based on a consolidation of the micro-payments which are recorded in or generated on the basis of the Icecat POQ blockchain.

6. Who Determines the Syndication Standard?

If the functions of PDS creation and maintenance and POQ, and paying for it, are decentralized, what more CSP functions can be decentralized to create a syndication network in which there are no customer lock-ins or critical dependencies on one organization? Human QA tasks, as part of, or on top of, POQ, can already be performed by brand owners, by multiple CSPs or by e-commerce users from the ecosystem. Also storage, access and data transformation functions of the syndication network can be decentralized, as already often happens by PIM providers. In essence, the last centralized function of the Icecat CSP is then the maintenance of the taxonomy: what are the categories, what is the category hierarchy, what are the attributes per category and how are they grouped, which attributes are mandatory and which are defined as searchable attribute, what attribute values are allowed and to what unit are they attached? Also the history of updates of the taxonomy can be regarded as a ledger, like the editorial ledger, which requires a POS-like consensus protocol to approve the next update proposal, and storage in a public taxonomy blockchain/DLT application to secure its integrity for the ecosystem.

Related to this, is the algorithm defining the POQ check: what requirements are given what weight, and what's the current definition of the minimum requirements. A classic way to mitigate the risks of conflicts of interest are by having an independent standardization body, such as ISO, in which all the stakeholders of a standard jointly decide on next versions of the standard. The main advantage of such *de jure* standards is

that the adoption rate is sometimes very high. But, standardization bodies tend to move very slowly. Can the current benefits of Icecat's agile way of adopting requirements from stakeholders, mainly brands and e-channel partners, be married with the advantages of a classic standardization body? And can, at the same time, the *forking problem* of the blockchain world be avoided?

In a decentralized taxonomy set-up, improvements and changes to a taxonomy can be proposed by any stakeholder in the network, including CSPs. A simple majority might be sufficient in POS-based voting mechanism to decide on simple additions to the taxonomy standard.

7. Some thoughts about an Icecat ICO

The ICO market has steeply spiked in 2017 to over 3 trillion USD^{xv}, and has witnessed crowdfunding projects which vary largely in quality. As regulators have given warnings or guidance on when they see a token as security, the ICO market is entering a new phase. It seems logical that the ICO market is becoming mature, and more and more criteria that are relevant for an Initial Public Offering (IPO) are also applied to ICOs, as investors and regulators with learn from mistakes. The Naga ICO^{xvi}, and ICO of a fintech company that has IPO'ed successfully earlier this year in Germany, is an example of this trend. Also Icecat went through a successful IPO process in 2017, which implies transparencies, legal checks and business substance. Furthermore, it's not only a fast-growing and established company, it's also a profitable one since its foundation in 2009.

What can we learn from an IPO, and what are then the optimal criteria for a "good" ICO? Illuminating are in this respect the questions of the US SEC in relation to cryptocurrencies and ICOs^{xvii}.

In case of a good ICO, the token issuer has already

- real products and/or services
- a real business with clients and revenues
- audited annual reports showing at least three consecutive years of profit
- IPO'ed and a market valuation
- no off-shore ownership structure
- a core-team with a great track-record
- full respect for its legal and regulatory environment
- risk mitigating decision-making procedures
- independent endorsements by clients (not celebs or consultants)
- convincingly defined the use case for its tokens
- backing for its token
- a sensible purpose for the proceeds of the ICO
- taken care of the tradability of its token
- clarified the risks associated to the token and its business
- set clear limitations to the amount of tokens available
- sufficient free-float of its token
- an independently audited blockchain ledger that is open and public
- certain protection in case of a lost wallet key or hacks

From this list, it's clear that most ICOs by start-ups would not be able to meet at least half of the criteria list. One would expect that over time, the more serious ICOs will prevail over the ones meeting less of the IPO-like criteria. An Icecat ICO would be able to meet most, if not all, such criteria, and we could call it in that respect an example of ICO 2.0. Of course, this is not a guarantee of ICO success, as there are many variables at play during an ICO process. And the other way around, ICOs with great teams but little business track record, might still be able to pull-off remarkable feats.

With regard to legal environments: even if the token is not seen as a security under Dutch and EU law, it might still be seen as a security under US law, as the criteria in the US are more broad. In other jurisdictions, like China, and Vietnam, ICOs are even forbidden. It's advisable to exclude jurisdictions where the token can be seen as a security or an ICO is forbidden from an ICO process, or come to terms with the respective regulator.

As there are heated debates regarding whether an ICO is a taxable VAT event, it's interesting to note that current EU working papers and a ruling of the Court of Justice of the European Union clarify that payment with digital currency such as bitcoin fall within the scope of a VAT exemption regarding (not being) "legal tender"^{xviii}. It's further argued that also payment – even with legal tender - for tokens issued during an ICO should be regarded as falling within a VAT exemption within the EU as long as it's not (yet) used to pay for actual provision of services. In certain cases, utility tokens issued during an ICO might be compared to multipurpose vouchers, which are only taxable at the moment they are exchanged for the provision of actual services or goods.

8. Conclusion

ICURY is introduced as a token to be used in the Icecat product content syndication network. The use case of the token starts with accepting the token as pre-pay at a minimum value by Icecat, which is a profitable and fast-growth company with substance. When tokens are used to empower decentralized content syndication processes, it's likely to be of help in resolving the production bottleneck regarding PDSs. To realize the dream of having all products and services in the world described in all languages and for all markets, and incentivize intelligent PDS creation and independent POQ checks, the results of which are to be stored in Icecat's own POQ blockchain. For the long term success of the syndication network, it might be critical to mitigate control risks and decentralize the definition of the networks taxonomy and POQ standards as well.

In case of an Icecat ICO, it's clarified that upon its successful IPO, it would be able to meet most, if not all, criteria for a "good" ICO, although this is not a guarantee of success of course. Under Dutch law, the token is not seen as a security, but it might still be seen as a security under US SEC law. Under current EU regulation, the issuance of tokens during an ICO seems to be VAT exempted, till the moment the tokens are used in exchange for actual service provisioning by Icecat.

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