Establishing a Blockchain-Based Open Platform for the Television Ecosystem

The Token for Television

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Executive Summary

The current Television Ecosystem is broken. TV networks around the world are abusing their market power as gatekeepers to increase prices for advertisers, lower payouts to content creators and drive up subscription costs for consumers. They actively hinder innovation in content delivery and advertising technology in order to sustain their oligopolistic position and benefits. Many consumers are rightfully frustrated with the state of broadcast television. They enjoy the lean-back nature of a fixed program schedule, but would like to see more premium content personalized to their viewing patterns and interests. At the same time, tech giants like Google, Facebook, Amazon and Netflix are looking to build their walled garden around the television ecosystem, eager to acquire more power through data and access to consumers. TV-TWO offers the community a solution in form of an Open Platform for those who are curious about *cutting the cord*. This includes:

First, an application for Connected TVs that blends traditional television with a personalized video stream offering premium content at no subscription costs. The video stream can always be opened with just one click of a button. Second, the Token for Television (TTV), an ERC20 token that administers the exchanged value between consumers, content providers and advertisers. We propose a new ecosystem, where the trustless nature of the Ethereum blockchain makes it possible for market participants to interact directly without having to rely on middlemen. Consumers get to watch curated videos while receiving TTV for choosing to see sponsored messages from advertisers. Content creators are rewarded by users with TTV for their quality productions. The Token for Television will be offered to the community in a crowdsale. We will employ the new and improved standard of the Interactive Coin Offering as proposed by Jason Teutsch and Vitalik Buterin in order to guarantee a fairer and more transparent assignment process. The TTV crowdsale is especially relevant for advertisers that are looking for sponsored reach on the Big Screen. At the same time, participants can profit from the Network Utility Expansion Mechanism inherent to our model. Since no additional coins will be issued after the Interactive Coin Offering and each token has the reserved right to show ads to a fixed portion of the TV-TWO user base, each consumer that comes to the platform boosts the value of the token.

Contents

1 Overview

This paper will review the current state of broadcast television and propose TV-TWO, a blockchain-based Open Platform that helps to decentralize the TV ecosystem in order to spread the oligopolistic surplus of TV networks among Consumers, Content Creators, and Advertisers.

1.1 Value Proposition

TV-TWO will bring the digital age to millions of living rooms around the world. We offer the community:

1. An application for **Connected TVs** that blends broadcast television with a personalized and ad-supported video stream offering premium content on the Big Screen. While watching linear television through TV-TWO, the video stream can be accessed anytime by pressing Enter on the remote control. The application establishes a new standard for TV advertising. Consumers are empowered to share data with advertisers on their terms. Advertisers can utilize user data and usage insights to reach consumers with more personalized and relevant messages that result in higher user satisfaction and return on ad spend.

2. The **Token for Television** (TTV), a token that administers the exchanged value between consumers, content providers and advertisers. Advertisers give tokens to users for watching sponsored videos and sharing anonymous user data. Content Providers get tokens and insights from users for offering premium video content. Consumers accumulate tokens that they can store in their wallet and offer on exchanges.

We aim to establish a direct relationship between consumers, content providers and advertisers (see Figure 1). The individual players are empowered to pursue direct interactions on the blockchain, decentralizing the ecosystem as well as disarming oligopolistic TV networks, broadcast providers and tech giants, as they are actively hindering open innovation. In section A.1, we validate our claim that TV networks are organized as oligopolies. Based on learnings from the programmatic advertising space that is plagued with fraud, limited viewability and brand safety issues, we will leapfrog TV ahead by building transparency right into the core of the model.

1.1.1 Consumers

- Get to use a platform that blends linear TV with a personalized video stream curated by a supervised learning algorithm, enabling more organic content variety and relevance without having to pay a monthly subscription fee

- Experience the freedom to skip videos and ads as well as the chance to select ad frequency

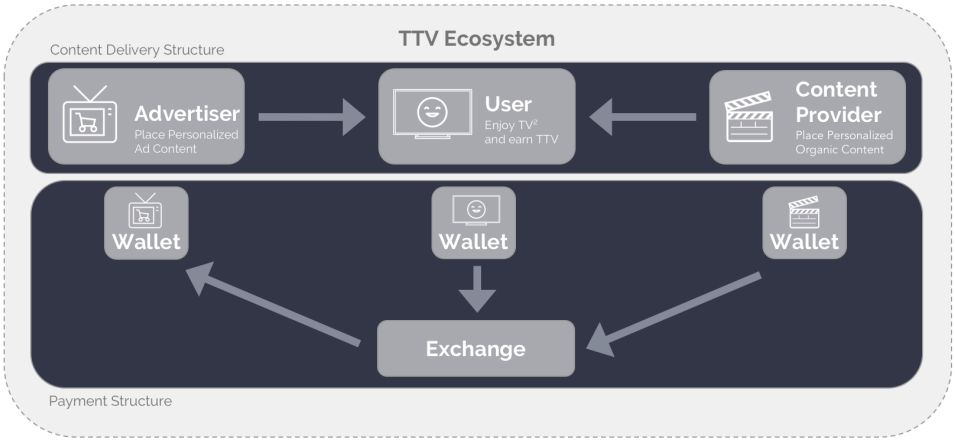


Figure 1: TTV Ecosystem

- Receive rewards for watching relevant sponsored messages as well as sharing anonymous data with advertisers through the TTV

1.1.2 Content Providers

- Receive the chance to generate reach on television sets without having to sign a contract with a TV network, giving small creators that focus on quality videos an equal share of voice as determined by watch statistics instead of clicks
- Get full transparency on watch statistics for their videos without having to trust a single centralized platform
- Can refinance their content more easily by profiting from high media spends that go towards TV

1.1.3 Advertisers

- Receive targeting and attribution features as well as the automated media booking on TV that they know from digital advertising
- Get per user reporting on ad engagement and organic video context without falling victim to fraud or non-transparent KPI reporting
- Can address users on the basis of their first-party data without having to hand over data to TV-TWO or a third-party

1.2 Interaction between Market Participants

Before the first implementation of the blockchain, an ideal TV ecosystem would have consisted of four parties (see Figure 2).

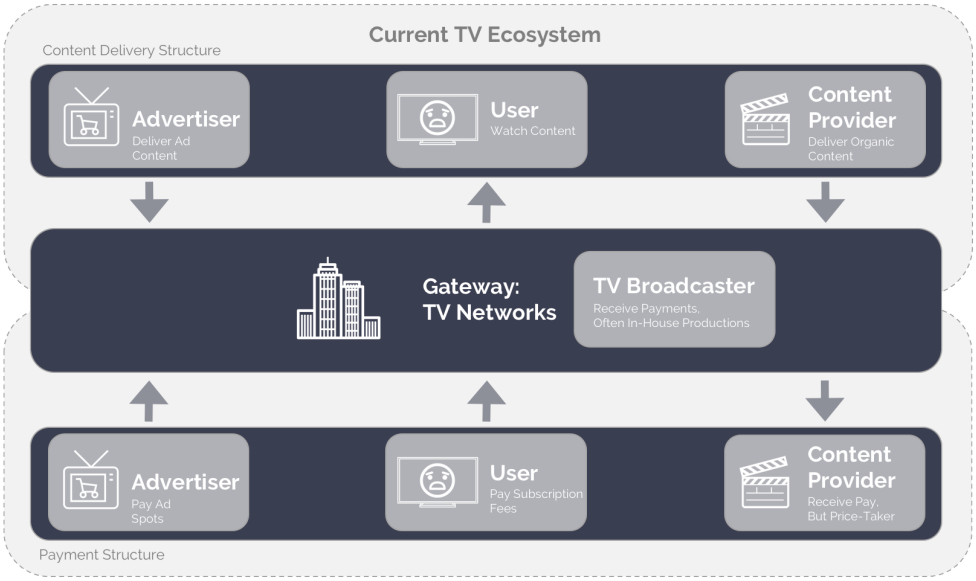


Figure 2: Current TV Ecosystem

Content providers and advertisers deliver organic and commercial content that is curated by TV networks and transmitted to consumers by broadcast providers that typically belong to the same parent company. However, TV networks are exploiting their gatekeeper status:

- **Advertisers:** TV networks possess direct consumer access, which allows them to set prices and generate high profits
- **Content Providers:** The direct consumer access, allows TV networks to discriminate against individual content providers. Networks produce most of the content in-house, which further hurts independent creators
- **Users:** TV networks select the content that makes it on air. User have no choice but to watch the delivered content. Neither organic nor sponsored clips are personalized

Given the status quo, TV networks act as middlemen between three parties that should have direct relationships among each other for a fair and transparent exchange of value. The trustless nature of the blockchain makes it possible for market participants to disintermediate the oligopolistic TV broadcasting industry.

1.3 The Center of the Living Room

Overall, television consumption has remained steady in the recent years. While the use of Netflix and other streaming services has exploded - with 50% of US households

subscribing to at least one streaming service - they usually act as add-ons to broadcast, not substitutes.[1] Users are still addicted to broadcast television. The consultancy Accenture explains that "most broadcasters have been at the heart of their national cultural life for decades, and audiences have grown up with them in their lives."[2]

Nielsen's "Cross-Platform Report" from 2014 illustrates how the time spent in front of the television increases proportionally with the age of the user.[22] Taking the demographic shift in the western world into account, this will cement the importance of the TV. Especially consumers with a high disposable income are glued to their television sets. The baby boomer generation, meaning users born between 1946 and 1964, control 70% of the disposable income in the US.[23] For this generation, Netflix and YouTube are no alternative. Baby boomers are used to enjoying the lean-back nature of broadcast television, in which they do not actively have to choose the program. A personalized and automatically curated video stream on the Big Screen is the way to go.

On mobile devices, Facebook has perfected the system of an infinite video stream. Nowadays, more and more consumers are watching videos on their smartphones. However, a Yahoo survey finds two major disadvantages, which hinder a seamless video experience on mobile: screen size and battery time were criticized by more than half of the respondents (see Figure 3).[24] Especially, the screen size is an inevitable downside. We as TV-TWO are certain that the television will remain a centerpiece of our living rooms for years to come. This is the place where people gather and look for entertainment. Despite centralized markets, an undemocratic distribution of power, non-transparent reporting and inefficient targeting methods, television can currently sustain its position. If the extensive inefficiencies are tackled with the right set of new technologies, television will retain its position as the central entertainment hub in the living room and remain the most important marketing channel.

2 Product

2.1 The Future of Television

TV-TWO is an application for Connected TVs that offers regular consumers of broadcast television an easy way to transition into a world with a personalized video stream. A major part of the solution is the fact that the traditional broadcast signal is watched through the app. Firstly, allowing an overarching analysis of behavioral patterns across all linear channels - including channel selection and dwell time. Secondly, enabling easy access to the video stream. By pressing Enter on the remote control, a layer is inserted over the TV content. For the user it is the same experience as changing the channel. The video stream itself blends organic content with relevant ads. Based on in-stream behavior, preferences in linear TV, surveys and other data, a supervised learning algorithm selects suitable videos from a broad selection of high quality content. The videos vary by language and the following categories: Movies, Music, News and Politics, Travel and Nature, Food and Beverages, Fashion and Beauty, Sports, Cars, Technology, Gaming, and Education.

In order to facilitate the new ecosystem, market participants are coming together

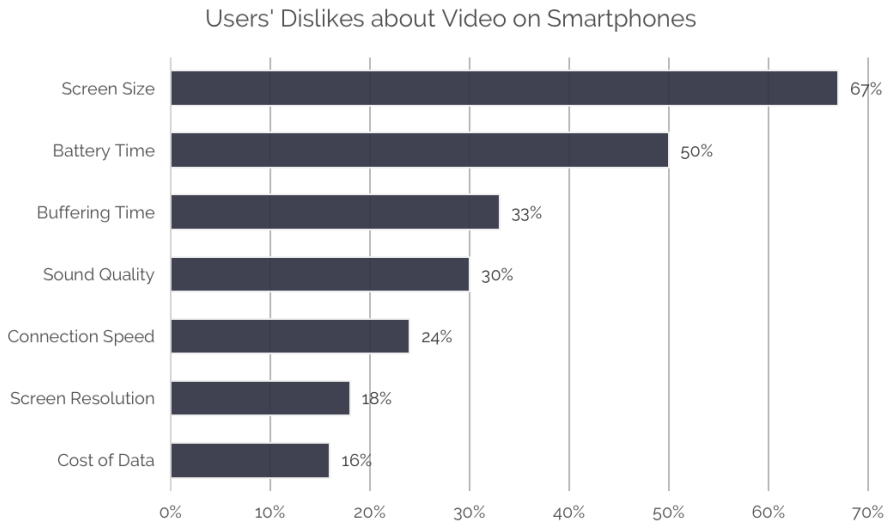


Figure 3: Users' Dislikes about Video on Smartphones

on the Ethereum blockchain to manage their interactions in a trustless manner. The blockchain technology enables TV-TWO to circumvent the complexity and privacy issues of programmatic advertising. Instead, a decentralized platform with full transparency and security is offered. Likewise, for both content providers and advertisers the market is democratized with simplified access to the Big Screen. At the same time, the user is rewarded with TTV for watching sponsored messages. If the user is looking to earn even more TTV, he can opt-in to sharing anonymous data with advertisers and content providers. This makes it possible to target based on a complete behavioral profile. Booking inventory on television no longer requires a direct interaction between media seller and media buyer. For all Samsung, LG, Toshiba, TP Vision and Panasonic TVs with TV-TWO, advertisers can simply use TTV and the TV-TWO campaign platform to reach consumers.

Having carefully weighed the pros and cons, we are convinced that an application for Connected TVs is the best option to launch TV-TWO. Nevertheless, the approach involves dependency on the manufacturers. Therefore, to further decentralize the ecosystem, shipping open TV-TWO set-top boxes and televisions will be evaluated in Q3 2018 (see section 5).

2.1.1 The User Interface

TV-TWO is divided into two layers. The first layer, which is entered after starting the application, consists of the broadcast signal with all standard TV functionalities. The second layer, reached via pressing Enter on the remote control, displays the personalized video stream.

For the first launch of the application, an onboarding is displayed to explain the basic functionality. After that, starting the application directly leads the user to the first layer - the current channel displayed in the TV window. While the viewing experience is unchanged, Hbb banner ads that are sold by TV networks are hidden for the user. Occasionally, a reminder on how to enter the TV-TWO video stream is displayed. The user has the following navigation options inside the first layer of the application:

- **Guide** displays the program guide, the return to the application is performed once the guide is closed
- **Channel List** displays the channel list, the return to the application is performed once the channel list is closed
- **Channel Up/Down** allows to tune up and down, while showing the TV window with channel information
- **0-9** allow to jump to a distinct channel number directly
- **Right on the D-pad** minimizes messages from TV-TWO
- **Return/Exit** closes the application
- **Enter** allows to switch between the broadcast TV layer and the video stream layer

Accordingly, pushing Enter brings the user to the second layer that is inserted in front of the broadcast signal. The layer shows a video stream that is automatically tailored to the user. On the first use, navigating the video stream is explained. On the fourth use, a survey on genre preferences is conducted by pushing left or right on the remote. Similarly, at different points during the video stream, short questions are posed to the user for additional TTV (e.g., asking the user for an age bracket). If none of these special situations occur, a suitable video link is requested and played. Once a video is completed or skipped, the progress is documented in the TV-TWO ledger system. The process is automated through a supervised learning algorithm. Occasionally, a reminder to check back on the broadcast signal is shown. In the video layer, the controls are as follows:

- **Enter** allows to switch between the broadcast TV layer and the video stream layer. In the video's navigation bar it allows to select elements
- **Channel Up/Down** allows to switch to the next, respectively the previous, video in the stream
- **Up/Down on the D-pad** activates and closes, the navigation bar with controls for the current video and information on the video length as well as play position

- **Left/Right on the D-pad** allows to move in the navigation bar of the current video to play, pause, stop, fast forward, rewind or skip. TV-TWO messages can be minimized and short, surveys can be completed
- **Play/Pause/Stop/Fast Forward/Rewind** control the video without the navigation bar

2.1.2 Usage Scenario

Today, Smart TV owners use the Live TV application to watch the broadcast signal on their television. TV-TWO serves as a substitute for the Live TV application by offering a gateway to traditional TV. Users can watch the standard broadcast signal through TV-TWO and experience an extra channel tailored to their interests beyond the traditional offering. A log-in or tedious activation is not required. Upon the start of the app, a short logo lead-in is displayed. Once the user is bored with the TV content, wants to skip a commercial or simply prefers the TV-TWO offering, pressing Enter on the remote control leads to the second layer of the application - the individualized video stream, blending organic and ad content. If the user would like to return to the broadcast signal, simply pressing Enter performs the task.

2.1.3 Prerequisites and App Download

The TV-TWO application is designed for Smart TVs with an active Internet connection. All Samsung, LG, Toshiba, TP Vision and Panasonic TVs from 2012 onward will be supported. The product demo (see section 2.2) shows a version of the application running on a Samsung TV with the Tizen operating system including blockchain interactions on the Ropsten Testnet. Further models and manufacturers will follow (see section 5). The TV-TWO app can be downloaded free of charge.

2.2 Product Demo

A visual product demo can be found on https://tv-two.com/.

2.3 Partnerships

TV-TWO aims to establish a new form of entertainment on the Big Screen. An adequate strategic network will help with decentralizing the market.

2.3.1 Content Partners

TV-TWO is an open platform for content providers from every genre. Participants in the decentralized ecosystem can be traditional players like major movie and music producers, online-only players, like sport and independent news platforms, and small creators, like travel blogs and food reviews.

3 Technology

3.1 Front-End

TV-TWO is based on the open source project TOAST for TV Web Application development. The application utilizes open web standards to play a personalized video stream for the user and to engage with the smart contracts as well as state channels (see section 3.2.2). This makes it possible to track exchanged value between the user, content providers and advertisers on the Ethereum blockchain without having to trust the reporting of TV-TWO as the central entity.

When watching television through the TV-TWO app, the user can start the personalized video stream with just one click on the Enter button. Each time a sponsored video finishes playing, the user is shown the current balance of TTV as determined by the combination of the contents of his Ethereum wallet and the balance of the open state channel with TV-TWO that has not been settled on-chain, yet. To spark brand recognition and gamification, the logo of the advertiser and and a pile of coins is displayed in the animation that shows the current TTV balance.

3.2 Back-End

3.2.1 Supervised Learning Algorithm

By deploying a supervised learning algorithm, we can ensure that small creators with quality content get their voices heard on our platform. While the predominant video-sharing website YouTube puts significant emphasize on video clicks, our algorithm approximates the perceived quality of a video based on watch statistics as an input. For each individual video, the TTV balance between users, content providers and advertisers is updated. In case of an organic video that is provided by a content partner, the user automatically transfers a share of his TTV that is proportional to the watch time of the video to the creator. In case of a sponsored message, the advertiser transfers TTV corresponding to the watch time of the ad to the user. By manually choosing the desired amount of ads of between five and fifteen clips per hour and by having the possibility to skip messages, the user is in complete control. At the same time, the advertiser can be assured that he compensates consumers in-line with their interest for the advertised product. As elaborated in section 3.2.2, the transfer of TTV will initially happen in state channels between TV-TWO and the market participants with all transactions logged in the TV-TWO ledger. If a user decides to skip a sponsored message, no TTV are transferred from the advertiser. Furthermore, TV-TWO ensures through occasional surveys and on-screen dialogs that users are engaged.

For determining the next video that is shown to the user, a neural net is trained with watch times from all users for all videos that they have watched. We are utilizing the Apache MXNet library. Additional input parameters for the algorithm:

- Title of the video
- Main-category of the video (e.g., sports or travel)

- Sub-category of the video (e.g., basketball or drone footage)
- Up to ten descriptive video tags
- Keywords that have been extracted out of the thumbnail of the video using a deep learning image recognition algorithm

Subsequently, the model is used to predict the watch time for all videos that the user has not seen yet. The videos are sorted by the predicted watch time in a descending order and the first video with an organic tag is played. Dependent on the ad ratio that the user has selected during the first start of the application, five to fifteen sponsored videos are shown in one hour of the personalized video stream. Sponsored videos are blended with the organic content during training of the supervised learning model. This way, the estimated watch time can also be predicted for sponsored messages, giving TV-TWO an indication of the relevance of the video for the consumer, which maximizes value to the advertiser and enjoyment for the user. The amount of TTV that the advertiser pays for the sponsored view is dependent on the relevance of the clip, as measured by the predicted watch time.

Content creators on YouTube regularly employ tactics of shock and deception in their video titles and thumbnails to artificially inflate their number of views. This phenomenon is known as *clickbait*. YouTube as the central platform owner encourages clickbait with its algorithm that promotes videos with a high number of clicks in a short amount of time to its trending section. Since YouTube profits from every video click, due to the mechanism of pre-roll ads, they are sub-optimally incentivized. TV-TWO does not utilize pre-roll ads and is thus only incentivized to show quality content to keep consumers on the platform as long as possible. From an economic standpoint, YouTube prioritizes short-term revenues for its platform and its content providers over long-term value for consumers and advertisers. This is illustrated by the concern of advertisers with brand safety on YouTube and users leaving the platform due to declining content quality.

A pivotal element of our model is that we disregard the amount of video views as an input parameter for our algorithm. Instead, we rely on the watch time. In the first order condition we maximize the total utility of consumers, content providers and advertisers, resulting in a pareto efficient state. As a second order condition, we specify that the utility is best split equally among the three parties. Optimizing for short-term revenue to TV-TWO is not desirable. We strongly believe in delivering value to the ecosystem first, before extracting revenue from it.

3.2.2 Blockchain

Blockchains combine concepts of peer-to-peer networks, asymmetric cryptography, decentralized computing and smart contracts into a new technology platform. In short, blockchains are distributed peer-to-peer systems which implement a trustless shared public append-only transaction ledger.[26]

"The blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value."

— Don and Alex Tapscott [27]

The immutability and transparency of blockchain transactions plays a critical role in the decentralized TV ecosystem that we as TV-TWO are building. The underpinning of the new marketplace for consumers, content partners and advertisers will be the Token for Television (TTV). It is based on the public open-source platform Ethereum that facilitates blockchain-based distributed computing and smart contract functionality.[28] The following interactions in our model are based on TTV:

1. **Advertisers** give TTV to users for watching sponsored videos
2. **Content Providers** get TTV from users for offering premium video content
3. **Consumers** accumulate TTV that they can store in their wallet and offer on exchanges

The first time, the user starts the video stream inside the application, a new wallet is generated. The private key is saved locally on the device. On screen, the BIP39 mnemonic that was used for the creation process is displayed. The user is asked to save the mnemonic. The phrase can be used to manage the wallet for example through MetaMask or imToken. In order to overcome the currently limited scalability as well as increasing latency and transaction fees of Ethereum, we are employing off-chain signature patterns. State channels are used to facilitate interactions between market participants. The term state channel refers to the concept of exchanging signed off-chain transactions though a peer-to-peer communication channel. This eliminates the need to executing every single transaction on-chain. In the context of off-chain value transfer between market participants, the term payment channel may be used interchangeably. To gain a more in depth understanding, let us consider a case in which an advertiser would like to play ads through TV-TWO with TTV that they are holding in their Ethereum wallet hosted on the TV-TWO platform. The advertiser and TV-TWO are entering a smart contract that includes a function, which applies an external state in the TV-TWO ledger system as an argument to the contract state. The function includes a signature check to ensure that both the advertiser and TV-TWO agree with any state changes. When entering the smart contract, the advertiser has to commit a fixed amount of TTV as a deposit as well as define targeting criteria and campaign creatives. The contract is deployed to the Ethereum blockchain.

Every time a video of the advertiser is shown to a user, the state is recorded in the TV-TWO ledger system. The transaction is updated locally, signed and sent to the advertiser through the Whisper protocol. Subsequently, the advertisers also signs it the transaction. This is done for every view, until either the deposit is fully used or the state channel timeout is reach, which will update the on-chain balance in TTV to reflect the off-chain transactions. See Figure 4 for an illustration. At the same time, TV-TWO

has open state channels with users and content providers on the platform. While for the state channel with a content provider only TV-TWO commits a deposit, both the users and TV-TWO commit TTV in their channel. The smart contracts that govern the state channels are stored in the Ethereum blockchain. TV-TWO will use tokens from the pool of the team or tokens it bought back after the crowdsale for the deposit. When the user watches an ad, TV-TWO first pushes the updated balance to the state channel with the advertiser. Next, the change in tokens is pushed to the state channel with the user. TV-TWO keeps a share of 10%, which helps run and improve the platform. When the user watches an organic video produced by a content provider, the user automatically commits TTV through the state channel with TV-TWO. Subsequently, the token balance between TV-TWO and the content provider is updated. For details on the economics of the transactions, see section 4.3. With both the user and the content provider, the state channel is kept open, until the deposit of TV-TWO is used up or either party decides to settle on-chain. For any following interaction between TV-TWO and the market participants, another state channel with a new deposit is opened. TTV that users and content providers have received in their Ethereum wallets are directly transferable. This fact makes the two parties direct participants in the ecosystem and increases token velocity (see section 4.2).

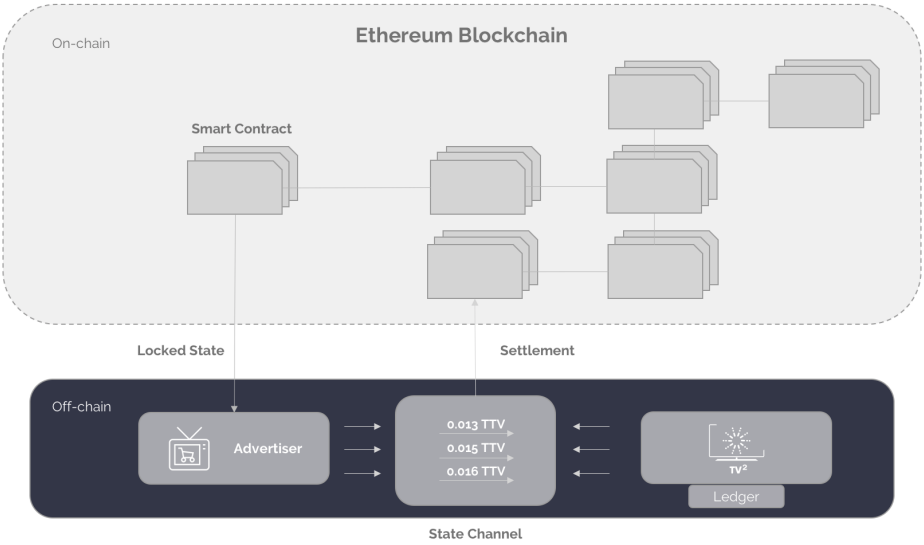


Figure 4: Illustration of State Channel between Advertiser and TV-TWO

For increased transparency and decentralization, it is critical to move a larger share of the TTV transactions on the Ethereum blockchain itself. The vision of TV-TWO is to disarm the oligopolistic TV networks, not to build a monopolistic position itself. There are a number of concepts inside the Ethereum community that are working on increasing scalability to make this possible:

- **Sharding** will scale transactions by partitioning state over multiple chains

- **Plasma** will scale transactions by using hierarchical trees
- **Raiden** will scale transactions by using state channel technology

Apart from accounting for the exchanged value between users, content providers and advertisers, the blockchain helps us with the following use cases:

1. **Advertisers** can use first-party data for targeting, without having to send it to TV-TWO or a third-party for blind-matching
2. **Consumers** can anonymously share personal information with advertisers and content providers without having to compromise their privacy

As mentioned above, the advertiser specifies targeting parameters for a given ad campaign in the smart contract with TV-TWO. In case the advertiser is looking to target users on the basis of first-party data, they encrypt said data with the public key of TV-TWO and include it with the contract. To minimize costs associated with storing large amounts of first-party data on-chain, it is advisable to put the encrypted data in a content-addressable storage system that stores files by their hashes off-chain. The data stays encrypted on the server of the advertiser and a hash of the file is included with the smart contract. Using the hash value, TV-TWO can access the file, decrypt it with its private key and use it for targeting in the campaign as specified in the smart contract.

By default, advertisers and content providers only see the TV-TWO ID (resettable) of a user that has just watched their content as documented in the TV-TWO ledger. However, users can decide to enable advanced data sharing with advertisers and content providers in order to receive additional TTV. While protecting the privacy of users is of ultimate importance to TV-TWO, we believe that data sharing on a fully transparent and opt-in level can strengthen the ecosystem. Advertisers and content providers can use additional information about the users to plan more relevant campaigns and to create more tailor-made content. Ruling out data sharing by design, puts all market participants at a disadvantage. In case a user decides to share data, TV-TWO encrypts the data with the public key of the advertisers or content partner and includes it in the TV-TWO ledger. Subsequently, advertisers and content providers can encrypt the data using their private keys.

4 The Token for Television

4.1 Token Network Effect

TV-TWO is introducing the Token for Television (TTV) as the currency in a new, globally decentralized TV ecosystem.

> *"A token is just another currency used in the economy that specializes in the exchange of a particular service."*
>
> — Primoz Kordez [29]

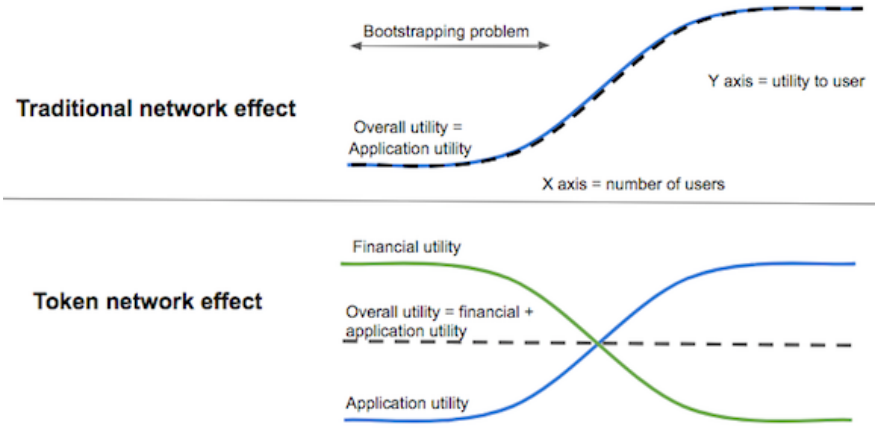


Figure 5: The Bootstrapping Challenge [30]

Transactions between advertisers and users as well as between users and content providers are always tied to the Token for Television. Other cryptocurrencies and fiat can not be used to exchange value between market participants. Advertisers have to acquire TTV during the crowdsale or on exchanges in order to sponsor messages. The decision to design the ecosystem in a way that it is reliant on the TTV helps to leverage token network effects in order to overcome the bootstrapping challenge of initially limited application utility (see Figure 5). Participants of the crowdsale that provide TV-TWO with the resources to jump start the decentralized TV ecosystem profit financially from the growth of the model through an appreciation of the TTV. As each token has the reserved right to show ads to a fixed portion of the TV-TWO user base, every consumer that comes to the platform boosts the value of the token. All token holders are aligned towards the common goal of growing the user base, be it through word of mouth or through uploading premium videos on the platform. With more users and quality content providers in the ecosystem, an increasing number of advertisers see relevance in sponsoring videos on TV-TWO. They acquire TTV on exchanges, supported by the front-end of the TV-TWO portal, which raises the demand and thus the price of the token. What is great for advertisers, the price of reaching one individual on the platform does not increase with the price of the TTV. Over time, one TTV simply buys more sponsored views than in the beginning. This is where the divisibility of the TTV to 18 decimal places becomes relevant. It also gives advertisers and their agencies a reason to purchase tokens during the crowdsale and hold them to reach even more viewers at a later point in time. Finally, the TTV is a better currency for the ecosystem than any fiat, since it facilitates transactions across boarders and without any fees.

4.2 Token Economy

The following section explores the longevity of the TTV-based economy by analyzing market dynamics. The pivotal aspect that will ensure the value of TTV in the future is its utility. In his Medium article, William Mougayar elaborates on three tenets to

Table 1: Utility of the TTV

Role	**Purpose**	**Features**
1) Value Exchange	Economy creation	Buying, rewards
2) Function	Enrich user experience	Joining a network, connecting with users, incentive for usage
3) Currency	Frictionless transactions	Payment unit, transaction unit
4) Earnings	Distributed benefits	Earnings, distributed benefits

the utility of tokens: role, purpose, and features.[31] Table 1 details the four roles and purposes as well as all features of the Token for Television:

1. The first role of the TTV is to exchange value inside the ecosystem. The decentralized television economy is created on the basis of the Token for Television. Advertisers use the TTV to buy views for their sponsored videos. Users are rewarded for watching sponsored messages. Content providers are rewarded by TTV for offering organic content inside the TV-TWO video stream. As detailed in section 3.2.2, the TTV balance with advertisers, content providers and consumers is managed through state channels. Once the balance of the state channel is settled with the content provider or the user on-chain, the TTV are available inside their Ethereum wallets. The parties can decide to either exchange TTV against Ether on a cryptocurrency exchange such as EtherDelta or become active as an advertiser on TV-TWO themselves, which gives them the possibility to sponsor their video content. It especially gives content providers the chance to increase the amount of views on their videos. For many consumers and advertisers, TTV will be the first token that they have owned. For advertisers, the process of acquiring and spending TTV is completely seamless on the campaign management platform. For users, it is easy to import their wallet crated on the TV into MetaMask through the BIP39 mnemonic and exchange the tokens for example on EtherDelta.

2. The second role of the TTV is to function as an enrichment to the user experience of the application and the ecosystem. Content providers are motivated by TTV to use the network. Advertisers use TTV to connect with users. Consumers are incentivized for the usage of the personalized video stream through the Token for Television.

3. The third role of TTV inside the decentralized television ecosystem is to make it possible for market participants to administer payments across borders without any friction. Transactions between advertisers and users as well as between users and content providers are dependent on the Token for Television. As with any currency, the equation of exchange can be used to understand the flow of money in the economy [32]:

$$MV = PQ \tag{1}$$

where:

M is the size of the TTV asset base.

V is the velocity of the TTV.

P is the price of booking ads on TV-TWO.

Q is the quantity of ad inventory on TV-TWO.

Both too high and too low token velocity are detrimental to the decentralized TV ecosystem. Too high velocity could exist, if market participants would not see any value in holding TTV. In order to facilitate payments to users, they would convert fiat or any cryptocurrency to the Token for Television. Content providers and users would directly convert TTV to other currencies for storing value. On the other end of the spectrum, token velocity could be lower than desired. In this case, it is likely that contributors and market participants predict the value of TTV to appreciate compared to other currencies. As a result, they will hold on to TTV for extended periods of time, without spending it in the economy. Drawing from the M_1 money supply (most liquid portions) of the US economy, the velocity of the TTV should ideally remain in the moderate range between 4 and 15.[33]

TV-TWO will continuously monitor the velocity of the Token for Television in the market. Due to the mechanism of Network Utility Expansion, we expect the velocity of the Token for Television to be low in the beginning. Since the size of the TTV asset base is fixed after the crowdsale, the available tokens access a defined percentage of consumers that watch television through TV-TWO. If the absolute number of consumers using TV-TWO grows over time, the amount of utility per token increases. The anticipation of greater utility in the future will cause market participants to hold on to TTV, reducing the velocity of the token. For participants, Network Utility Expansion describes the mechanism that has the power to lead to an appreciation of the TTV compared to other assets such as fiat currency. If an contributors predicts the number of users of TV-TWO to go up in the future, they may consider to purchase tokens during the crowdsale stage. After receiving tokens from the advertiser or the user, the market participants will either have to hold the TTV for a period of time before they can convert it to another currency, or spend it on the TV-TWO platform itself.

4. The final role of the Token for Television deals with earnings. The TTV helps with distributing benefits generated by the newly decentralized ecosystem to all market participants. The oligopolistic surplus of TV networks - the honeypot - now goes directly to consumers, content providers and advertisers. Consumers get a share of the TV ad cake for the first time at all. Content providers are rewarded more generously for their quality videos and at the same time, advertisers get to pay a lower price for showing their sponsored videos in a premium environment.

4.3 Token Transactions

The following section will elaborate on the transactions between advertisers and users as well as between users and content providers. Advertisers can transfer Tokens for Television (TTV) to users in order to reward them for watching sponsored messages. The amount of TTV the advertiser needs for one view is dependent on the relevance of the video for the user, which is measured with the help of the predicted watch time as calculated by the supervised learning algorithm (see section 3.2.1). The relevance is a fraction that is plugged into the following function to calculate the price in TTV:

$$\mathrm{p}(r) = \frac{M}{\alpha N} \cdot (1 + e^{-\beta r}) \tag{2}$$

where:

M is the size of the TTV asset base,

N is the number of users on the platform,

e is Euler's number,

α and β are scaling factors,

r is the relevance score between 0 and 1.

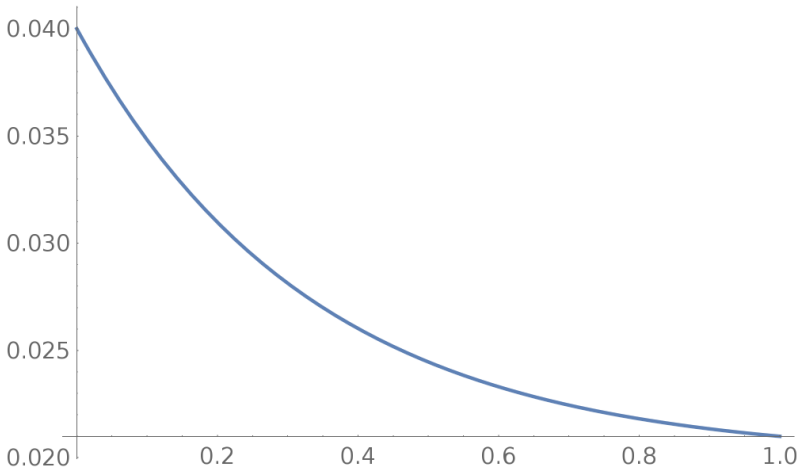


Figure 6: Plot of equation 2

The function aligns interest between advertisers and users, making the promotion of more relevant videos substantially cheaper for the advertiser. As each token has the reserved right to show ads to a fixed portion of the TV-TWO user base, the price in TTV per sponsored view decreases with more consumers on the platform. Figure 6 shows the ecosystem in a state with an asset base of 7,500,000 TTV and a user base of 3,000,000 with scaling factor α set to 125 and β set to 3. Both scaling factors will

be algorithmically adjusted over time until the ecosystem is in a steady state, where the total utility of consumers, content providers and advertisers is about equal. Major determinants are the amount of ads the average user is willing to see and the number of organic clips, an average user watches per hour. The duration of the sponsored video does not influence the price paid. If the users skips the video during the first ten seconds, no payment between the advertiser and consumer is administered. Fraud, in which the user simply turns on the TV and walks away in order to earn TTV is mitigated through a dialog that appears, if no action has occurred for some time. Additionally, the user is identified during the registration process (KYC), which limits the viability of fraudulent TTV farming. TV-TWO keeps a share of 10% of the TTV transferred from the advertisers, which helps run and improve the platform. The tokens are stored in a wallet that is kept separate from the ones used in the crowdsale. 90% of the TTV is credited to the user. In the state described above, viewing an ad with a moderate relevance score results in 0.0225 TTV for the user. The user can choose to watch between five and fifteen ads per hour. For an individual in the United States with 4.5 hours of television consumption per day, fifteen ads per hour result in an accumulation of around 550 TTV in one year. While the absolute number of TTV that the user can gain by watching commercials decreases with more consumers on the platform, the equivalent in other currencies remains constant, because of the appreciation of the Token for Television. Due to the appreciation over time, consumers are incentivized to hold tokens and not convert them directly, decreasing the token velocity. When the user watches an organic video produced by a content provider, the user automatically commits TTV according to the following sigmoid function:

$$\mathrm{con}(t) = \frac{M}{\gamma N} \cdot \frac{1}{1 + e^{-t}} = \frac{M}{2\gamma N} \cdot \left(1 + \tanh \frac{t}{2}\right) \tag{3}$$

where:

M is the size of the TTV asset base,

N is the number of users on the platform,

γ is a scaling factor,

t is the number of minutes watched.

Figure 7 shows the ecosystem in a state with an asset base of 7,500,000 TTV and a user base of 3,000,000. The scaling factor γ is set to 275. Here, content providers receive 9 TVT for 1,000 engaged video views. If the user has fewer TTV in his wallet than calculated in equation 4, he is potentially unable to pay the content provider for the next video. In this case, a sponsored video is played. In the state described above, the limit is around 0.009 TVT. Users and content providers can hold the Token for Television in their wallets or exchange it for other currencies.

$$\lim_{t \to \infty} \mathrm{con}(t) \tag{4}$$

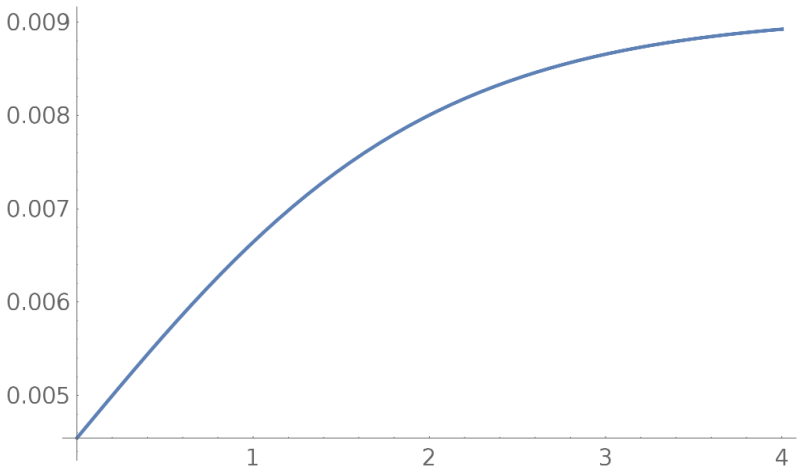
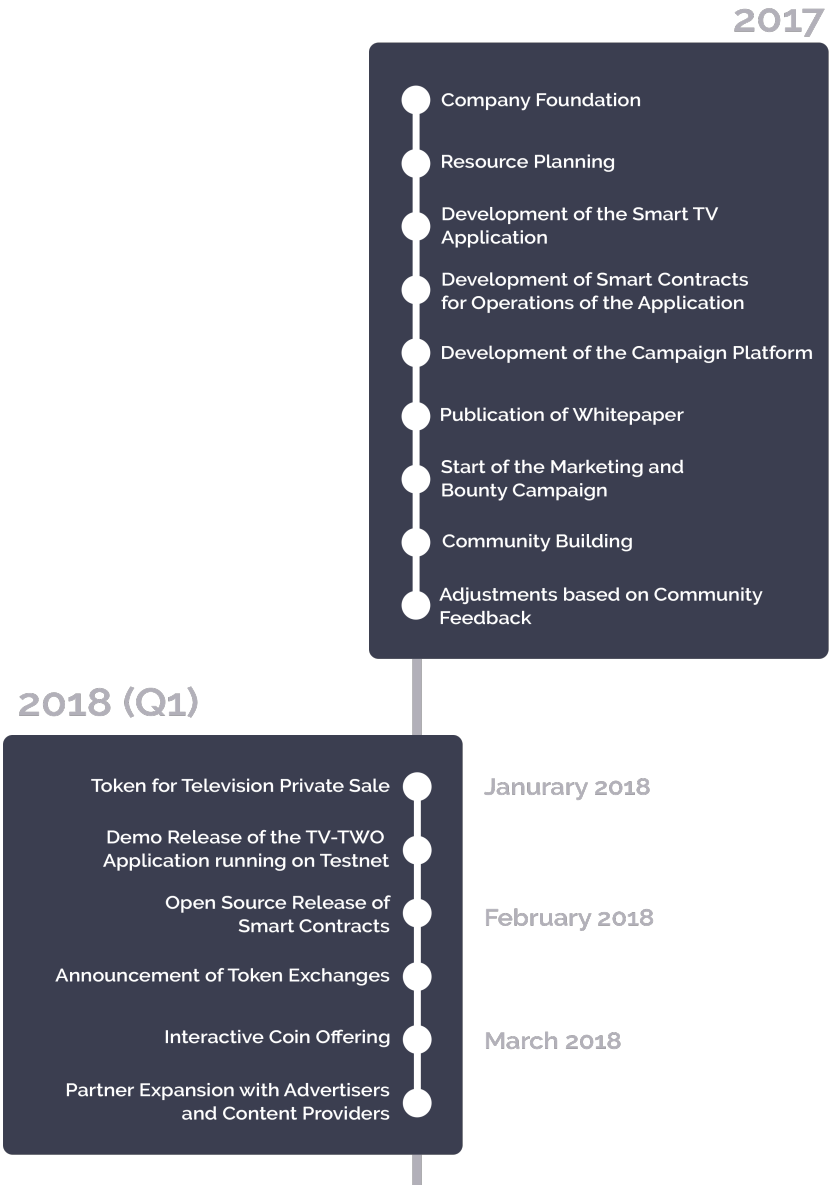
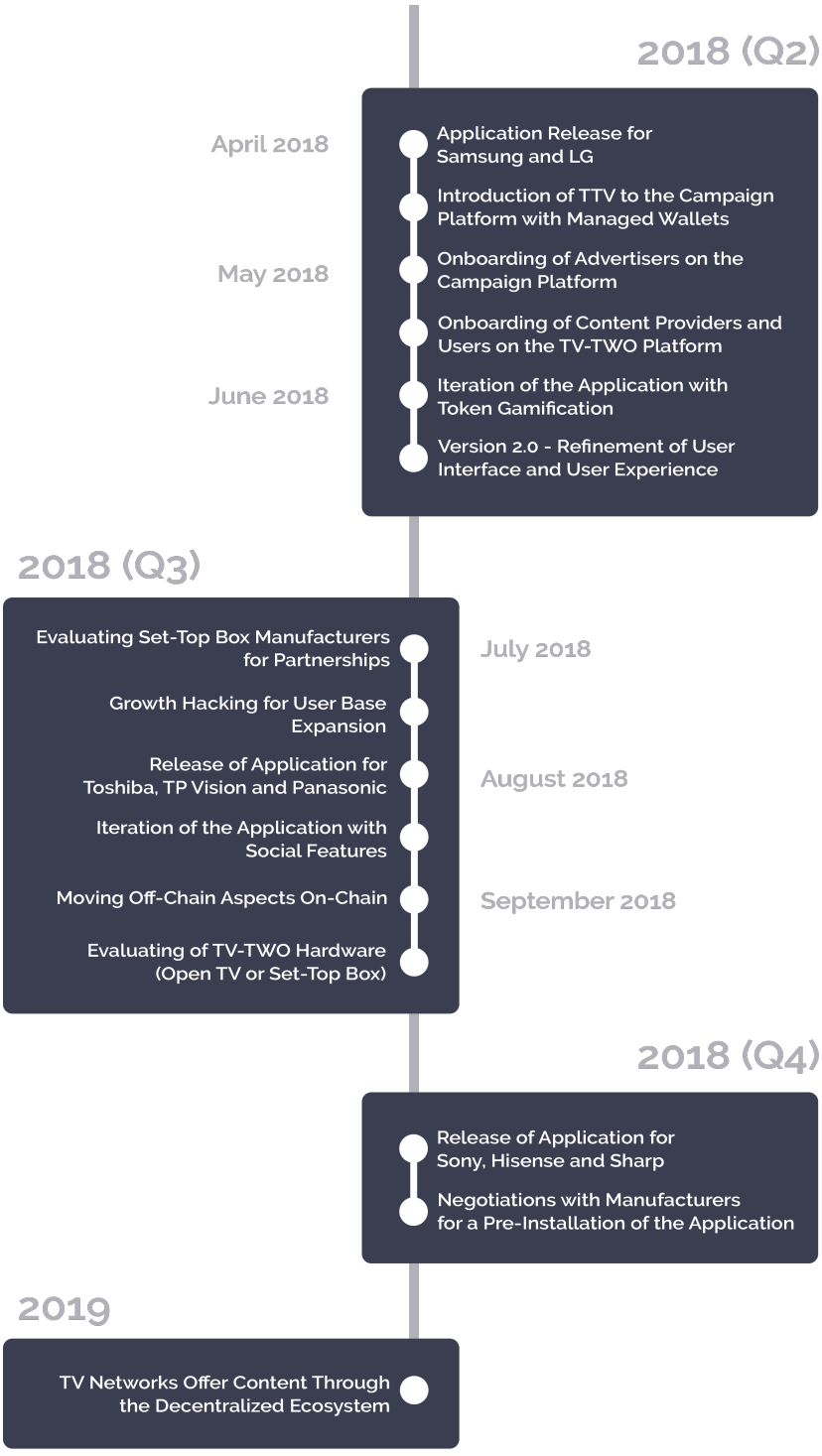


Figure 7: Plot of equation 3

5 Roadmap

The following roadmap outlines the milestones that TV-TWO is looking to hit in order to transform the television landscape into a decentralized ecosystem:




2018 (Q2)
April 2018
Application Release for Samsung and LG
Introduction of TTV to the Campaign Platform with Managed Wallets
May 2018
Onboarding of Advertisers on the Campaign Platform
Onboarding of Content Providers and Users on the TV-TWO Platform
June 2018
Iteration of the Application with Token Gamification
Version 2.0 - Refinement of User Interface and User Experience
2018 (Q3)
Evaluating Set-Top Box Manufacturers for Partnerships
July 2018
Growth Hacking for User Base Expansion
Release of Application for Toshiba, TP Vision and Panasonic
August 2018
Iteration of the Application with Social Features
Moving Off-Chain Aspects On-Chain
September 2018
Evaluating of TV-TWO Hardware (Open TV or Set-Top Box)
2018 (Q4)
Release of Application for Sony, Hisense and Sharp
Negotiations with Manufacturers for a Pre-Installation of the Application
2019
TV Networks Offer Content Through the Decentralized Ecosystem

6 Team

- **Jan Phillip Hofste**, Co-Founder TV-TWO, Industrial Engineer.
  Distributed Systems, State Channels, Semantic Web.
  Experience: Chief Product Officer at Minodes (Telefónica Next Company).

- **Philipp Schulz**, Co-Founder TV-TWO, Entrepreneur.
  Communications, Sales, Partnerships.
  Experience: Lead Business Development at Minodes (Telefónica Next Company).

- **Nicolas Schnorpfeil**, Chief Financial Officer, Economist.
  Quantitative Finance, Token Economy, Game Theory.
  Experience: Finance Student at University of St Andrews.

- **Jonas Schmidt**, Head of Business Development, Strategist.
  Strategy, Operations, Exchange Management.
  Experience: Intl. Management at Bocconi, Strategy& PWC

- **Rodrigo Acosta**, Blockchain Developer, Supporter.
  Experience: Bitcoin Core & Open Asset Protocol.

- **Joschka Kintscher**, Software Engineer and Crypto Investor, Supporter.
  Experience: Software Engineer at Harvest.

- **Michael Brand**, Back-End Developer, Supporter.
  Experience: Mathematics at Berlin Institute of Technology.

- **Dave Barton**, Startup & Cryptocurrency copywriter, Supporter.
  Experience: Founder/Lead Writer at Startup Copy Guy.

- **David Ben Kay**, Governing Board of Ethereum (2016), Advisor.
  Experience: Experience: General Counsel Microsoft (China), Pundi X ICO.

- **Tim Wegner**, Tech Entrepreneur & Angel Investor, Advisor.
  Experience: Physics at Imperial College and MIT, McKinsey.

- **Simon Cocking**, Editor in Chief at Cryptocoin.News, Advisor.
  Experience: Mentor & Advisor in 20+ Successful ICOs.

- **Jason Butcher**, COO Coinpayments & Founder Parallel Payments, Advisor.
  Experience: Blockchain Association, Lydian ICO, Pindify ICO.

- **Tom Budd**, Blockchain Consultant & Keynote Speaker, Advisor.
  Experience: Booz Allen Hamilton, Betrium ICO, e-Chat ICO.

- **Oliver Laurence**, Strategy Expert & Startup Mentor, Advisor.
  Experience: Block 512, Crypto20 ICO.

- **Arthur Zubkoff**, FinTech & Marketing Consultant, Advisor.
  Experience: Banking, Crypto Investor, UTRUST ICO.
- **Tobias Schulz**, Blockchain Investor at High-Tech Gründerfonds, Advisor.
  Experience: Goldman Sachs, JPMorgan, Zalando.
- **Kai Rieke**, Director Marketing at Project A Ventures, Advisor.
  Experience: MD Affinitas (IPO), Altcoin Investor.

7 Crowdsale

7.1 Interactive Coin Offering

The majority of ERC20 token crowdsales that have been administrated in the past were unable to systematically guarantee the following four fundamental characteristics [34]:

1. Equal chances of **participation**
2. Resilience to **censorship**
3. Certainty of **valuation**
4. Reasonable token **liquidity**

In capped sales, a fixed price for one token as well as the minimum and maximum amount of tokens is set. Capped sales give large-scale participants an unfair advantage, as they are able to effectively exclude small contributors from the sale by paying exuberant transaction fees. The transactions from the large-scale participants are processed first and by the time transactions from small contributors get to the front of the line, the cap for the token might already be reached, as happened with the crowdsale of the *Basic Attention Token*. In case of the *Status Token*, the demand for the capped sale was so high that it crashed the whole Ethereum network. In uncapped sales, participants have to commit to buying tokens, before the ultimate valuation is determined. This makes it difficult to judge, whether the token price is fair or not.

In order to improve the mode of future ICOs, Jason Teutsch and Vitalik Buterin propose an algorithm in their white paper that is turning crowdsales into a repeated game of perfect information - the *Interactive Coin Offering*.[35] Teutsch and Buterin propose the following rules:

- Participants in the crowdsale submit both a bid and a maximum sale valuation at which they are willing to participate
- If the sale amount reaches the maximum sale valuation, the participant's bid is canceled and the contribution is refunded
- If they so choose, participants have the possibility to withdraw their bid from the sale until a withdrawal lock period is reached
- A progressively decreasing discount is given at the start of the sale in order to motivate early participation
- Individual buyers may place multiple bids at different valuations

While the period prior to the withdrawal lock gives buyers the chance to calibrate their purchase amount, the period after the lock gives participants the chance to push the sale valuation to an equilibrium. TV-TWO has decided to employ the new model of an Interactive Coin Offering for their crowdsale to ensure that all participants can contribute at the fair valuation equilibrium as determined by the community.

7.2 Token Distribution

The Token for Television (TTV) will be distributed as follows:

- **Available for Purchase:** 500,000,000 Tokens for Television will be available for purchase. In relative terms, 75% of all tokens will be sold to the public during the crowdsale
- **Team:** 15% of the available tokens will be retained by TV-TWO. The tokens are vested over three years.
- **Supporters and Advisors:** 6% of the available tokens will go to supporters and advisors of TV-TWO
- **Campaigns:** 4% of the available tokens will be granted to supporters that have participated in the Bounty and Marketing Campaign
- Market Maker: Any ETH committed beyond 90% of the hard cap will be locked for two years in a smart contract. The smart contract stabilizes the price of the TTV by automatically purchasing back tokens, should the market price drop below the issue price
- Unsold tokens will be burned
- More tokens will not be created in the future

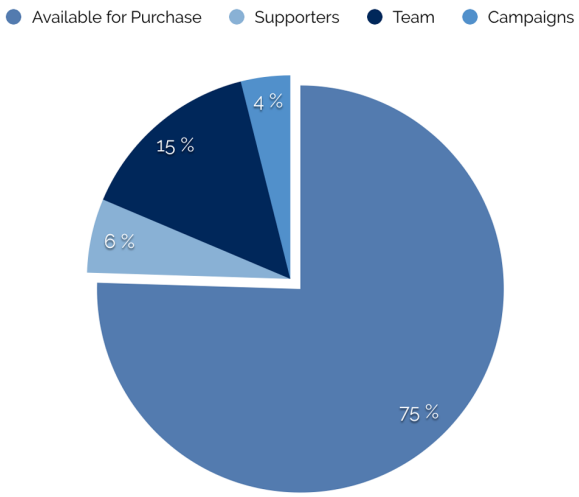


Figure 8: Token Distribution

7.3 Allocation of Funds

The funds collected in the crowdsale will be used as follows:

- **Engineering and Development:** 60% of the funds will be used to sustain and grow the Engineering team in order to accelerate development of the TV-TWO application and its interaction with the decentralized TTV ecosystem
- **Marketing:** 14% of the funds will be used to grow the user base of TV-TWO with both promotional efforts and TTV incentives
- **Partner Engagement:** 6% of the funds will be used to acquire content and advertising partners that commit to jointly growing the TTV ecosystem
- **Legal and Administration:** 10% of the funds will be used to cover legal and administrative costs associated with running TV-TWO
- **Contingency:** 10% of the funds will be set aside for unforeseen developments

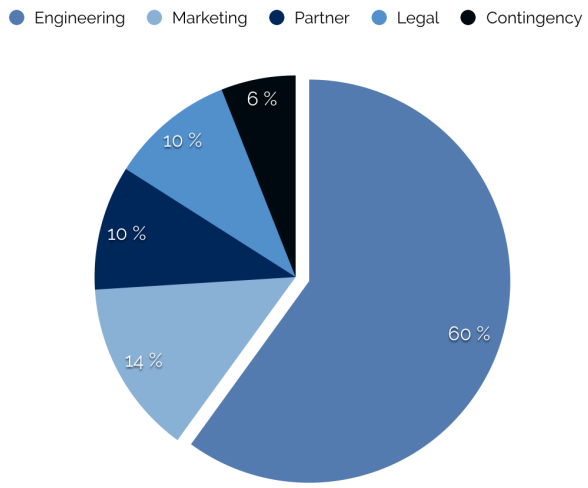


Figure 9: Allocation of Funds

Table 2: Summary of Information on the Crowdsale

Mode of Crowdsale	**Interactive Coin Offering**
Soft Cap	2,500 ETH
Hard Cap	50,000 ETH
Bonus	20% discount Linear decrease to 10% until Withdrawal Lock Decrease to 0% until Sale Completion
Exchange Rate	1 ETH = 10,000 TTV
Reverse Exchange Rate	1 TTV = 0.0001 ETH
Token Supply for Crowdsale	500,000,000
Sale Launch	**24 February 2018** 13:00 London Time (GMT) 17:00 Dubai Time (GST, GMT+4) 20:00 Jakarta Time (WIB, GMT+7)
Withdrawal Lock	**17 March 2018** 13:00 London Time (GMT) 17:00 Dubai Time (GST, GMT+4) 20:00 Jakarta Time (WIB, GMT+7)
Sale Completion	**24 March 2018** 12:59 London Time (GMT) 16:59 Dubai Time (GST, GMT+4) 19:59 Jakarta Time (WIB, GMT+7)

8 Frequently Asked Questions

1. **How is the Token for Television (TTV) structured?**
   The Token for Television is an ERC20 token that is divisible to 18 decimal places.

2. **How do I participate in the crowdsale?**
   Please subscribe to our newsletter on https://tv-two.com to receive a video before the start of the crowdsale that describes the process of purchasing tokens in detail.

3. **Can other cryptocurrencies or fiat be used in the decentralized television ecosystem?**
   Transactions between advertisers and users as well as between users and content providers are always tied to the Token for Television (TTV). Other cryptocurrencies and fiat can not be used to exchange value between market participants. Advertisers have to acquire TTV during the crowdsale or on exchanges in order to sponsor messages. This fact will sustainably protect the value of the Token for Television.

4. **Will additional TTV be issued after the crowdsale?**
   No additional TTV will be issued after the crowdsale. We will make the Smart Contracts for the operation of the ecosystem open source. This way, participants are able to validate this claim.

5. **How is your crowdsale different from other ICOs?**
   We will employ the new and improved crowdsale standard of the Interactive Coin Offering as proposed by Jason Teutsch and Vitalik Buterin. The Interactive Coin Offering will ensure perfect information during the crowdsale and a fairer mode for assigning tokens to contributors.

6. **What sets the Token for Television apart from the Basic Attention Token (BAT)?**
   Both the Basic Attention Token and the Token for Television are transnational units for advertisers, content providers and consumers. While the team behind the BAT concentrates on managing this triangular relationship on the blockchain for desktop and mobile devices, we work on the Television ecosystem. A market that is equally large, but much less digitized. In contrast to BAT, we believe that the consumer should be able to sell the tokens he or she acquired through the application in order to monetarily profit from the transaction. This will increase the velocity of the TTV and strengthen our token economy. On the topic of privacy: While we personally sympathize with BAT's focus on protecting personal data of users, we feel that it is wrong not to provide market participants with the chance to opt-in to data sharing that improves relevance of sponsored videos and increases the utility for advertisers, content providers and consumers. Despite the differences, we feel that the BAT team and we are fighting the same battle: for a better user experience, more quality content and higher relevance. Therefore, we

want to ask supporters of BAT and those who were looking to participate in their crowdsale to consider TV-TWO.

A Appendix

A.1 Structure of the TV Ecosystem

In our Value Proposition, we have made the claim that TV networks are entrenched in oligopolistic structures. In this section, we will validate this claim. According to the online investment encyclopedia Investopedia, "an oligopoly consists of a select few companies having significant influence over an industry. While these companies are considered competitors within the specific market, they tend to cooperate with each other to benefit as a whole, which can lead to higher prices."[3] We have selected two methods for analyzing the structure of the industry.

First, we utilize the checklist from "Microeconomics" by Jeffrey M. Perloff of the University of California, Berkley to check for an oligopoly (Table 3).[4] TV networks are assumed to offer commercial inventory, which many advertisers are interested in purchasing. The demand curve for commercial slots is downward sloping. The fewer commercials can be booked, the higher the price. This makes broadcasters price-setters. Advertisers are in a position where a prevailing price must be accepted (Criterion 1). To test for market power, the price and marginal costs of the television department of NBCUniversal are analyzed:

$$p > MC \tag{5}$$

where:

p is the price of one 30 second commercial,

MC is the marginal cost to the TV network for one 30 second commercial.

The marginal costs are calculated by taking the total television costs of NBCUniversal, found in the annual report of Comcast, divded by the total amount of commercial spots aired in the timespan of one year on the network.[5]

Table 3: Checklist for oligopolistic market structure

#	**Criteria**	**Property of an Oligopoly**	**Fulfilled by TV networks?**
1	Ability to set price	Price Setter	Yes
2	Market power	Price >Marginal Costs	Yes
3	Entry conditions	Limited Entry	Yes
4	Number of firms	Few	Yes
5	Long-run profit	Bigger 0	Yes
6	Strategy dependent on individual rival firms' behavior	Yes	Yes
7	Products	May be differentiated	Yes

This leads us to believe that NBCUniversal incurs marginal costs of approximately USD 6,100 per 30 second commercial. At the same time, the average price for a 30 second spot on national TV during prime time was USD 112,000.[6] Even when taking high discounts for placements during the day into account, marginal costs stay below the price (Criterion 2). For the US market "one condition for a new entry is that the potential station be able to obtain a license from the FCC. The lack of such a license is an absolute (legal) barrier to entry in any television market."[7] Accordingly, the entry is limited (Criterion 3). A common American terminology with regards to television is "The Big Four". It refers to the dominating TV networks, namely Disney-ABC, CBS, NBCUniversal and Fox, owned by News Corporation (Criterion 4). Daniel M. Kimmel outlines the introduction of the Fox network and how it changed the industry.[8] He names sport broadcasting rights and cartoon Saturdays as examples. Although ideas and concepts of the TV networks may depict differentiated products, players adapt to success stories (Criterion 6 and 7). Additionally, the TV networks enforce their powerful position and gather long-run profits: "Over the past few decades television has developed one of the most lucrative business models in entertainment history" (Criterion 5).[9] Therefore, all seven criteria indicate that TV networks form an oligopoly.

Second, concentration indexes are utilized to indicate the state of competition in a market. For the concepts, we refer to the CR_6 index and the interval estimation of the Herfindahl-Hirschman Index adapted by Naldi and Flamini.[10] The most common approaches to calculating the concentration ratio are the Herfindahl-Hirschman Index (HHI) and the Six-Firm Concentration Ratio (CR_6). Due to 3,768 firms contributing to the US television landscape, calculating the HHI with the market shares of all individual players is impractical. Instead the CR_6 was selected as a measure of industry contraction, looking at the market share of the six largest companies. The index is computed by calculating the sum of market shares:

$$CR_6 = \sum_{i=1}^{6} s_i \tag{6}$$

where:

s_i is the market share of firm i in the market.

In the United States six companies, namely Comcast (NBC), News Corporation (Fox), Disney (ABC, ESPN), Viacom (MTV, Nick Jr.), Time-Warner (CNN, HBO) and CBS (Showtime, Smithsonian Channel), possess a market share of 70%. Data on the US TV market is retrieved from Business Insider.[11] This indicates a highly concentrated market with weak competition between the largest players.

Both analyses underline the oligopolistic nature of the broadcast industry. This is an undesirable state for users, advertisers and content providers. For users, the strong concentration reduces choice and the access to objective journalism. Advertisers are reduced to price-takers and deprived of innovative ad format. Content providers face high entry barriers with quality not being the most important determinant in the fight

for airtime. Regulators and TV networks have no interest in a broader, more diversified market. Instead, they focus on exploiting their predominant position.

A.2 Current state of the TV Advertising Market

> *"Marketing departments might collect voluminous statistics on television program ratings and on coupon redemptions and carefully compare the costs of marketing with total sales. But none of this data measures what is really important: the incremental sales of a product."*
>
> — Magid Abraham and Leonard M. Lodish, June 1990 [12]

This quote describes the challenges of TV advertising in 1990. One would expect the digitalization to have changed attribution models for broadcast television. Yet, program ratings rain supreme. While Connected TVs have the technology in them to turn TV to the most important channel for digital advertising, broadcast networks are slow to adopt the new technology. Instead of focusing on the user, TV commercials are still booked on a contextual basis - just like 27 years ago.

A.2.1 A European effort for change: HbbTV

Hybrid Broadcast Broadband TV (HbbTV) is an initiative aiming to combine the advantages of the Internet with TV in the form a new industry standard for Smart TVs. It was launched by leading European players from the television industry in 2009. In the press release at the time, it is announced that "through the adoption of HbbTV, consumers will be able to access new services from entertainment providers such as broadcasters, online providers and CE manufacturers."[13] However, HbbTV does not seem ready for a world-wide rollout. After eight years HbbTV still did not arrive in the three biggest TV advertising markets - the US, China and Japan.

A.2.2 Addressable TV

Programmatic is the ultimate form of digital advertising on desktop and mobile devices. It automates as much of the process of booking media as possible. In the past, both media sellers and media buyers had to pick up their phone to negotiate placements and prices. Today, impressions are traded on Ad Exchanges in a matter of milliseconds. The increased flexibility leads to higher revenues for publishers, improved targeting and attribution capabilities for advertisers, as well as a higher relevancy of ads for users. Although most consumers already have Connected TVs in their home that are addressable, much of the TV ad buying is still done on a traditional direct deal basis. Advertisers and TV networks agree on commercial slots by consulting Nielsen GRP data and all viewers of a program see the same ad. Contrary, Addressable TV describes the concept in which commercials are selected in real-time on a per-device level. Advertisers can target appropriate audiences according to location, demographics, and behavior.[14] Nevertheless, certain obstacles persist:

Table 4: Global Advertising Revenues

Category	2016 Size (USD bn)	2016 Growth
Grand Total (Global, All Media)	493	5.7%
US	180	6.9%
North America	191	6.7%
Western Europe	100	3.9%
Central & Eastern Europe	16	6.0%
Latin America	23	5.5%
Asia Pacific	148	5.3%
Digital Ad Sales	178	16.9%
Search + Social	123	23.5%
Mobile	80	47.5%
Offline Ad Sales	315	0.3%
Linear Television	186	3.8%
Print	69	-9.1%
Radio	29	-0.5%
OOH	31	3.3%

- Online, the high complexity of programmatic advertising offers great opportunities for fraud, non-transparency and inefficiencies. The same issues might arise on Addressable TVs. Therefore, transparency is needed right from the start
- Privacy laws will require TV networks to get an opt-in from users [15], which poses a technical challenge
- Behavioral targeting can only be done on a per-channel basis, since user data is kept in silos between the individual networks
- The legal status of location-based targeting on TV is questionable in some geographies (e.g., regional TV ads are against the law in Germany) [16]
- Addressable TV only makes the sponsored but not the organic content more relevant for viewers. Features like skipping individual clips are not supported by TV networks
- Booking volumes on Addressable TVs are still small, since TV networks are incentivized to sustain the status quo of traditional booking, where ad performance remains opaque [17]
- Inventory from addressable campaigns is often traded on private exchanges, which still require a direct relationship between advertiser and TV network

In 2016, the budget allocated to addressable ads represented 1.1% of the total television market and "will remain a small portion of total TV spend for the foreseeable

future."[18] Without a major shift in the ecosystem, TV networks will stay oblivious to technological progress. While the demand for new media formats is understood, TV networks feel no need to adapt. Market participants will have to rely on a more decentralized system to attack the oligopolistic honeypot.

A.2.3 Overview on Global Advertising Industry

In the "Global Advertising Forecast" from MAGNA, a division of the marketing agency IPG Mediabrands, the world's ad figures of 2016 are gathered (Table 4).[19] Linear television advertising revenues grew 3.8% to USD 186 billion in 2016. Digital ad sales increased by 16.9%. The growth of print and radio is negative. To increase growth rates, television needs to get out of the offline bracket and embrace its digital future.

A.2.4 Market Study: Germany

The German market is the biggest European TV advertising market (see Figure 10). It is known to be strong and estimated to grow over the coming years. A single digit growth has been observed since media markets recovered from the financial crisis of 2007/2008. This rise is estimated to continue beyond 2020.[20] ProSiebenSat.1 Media and RTL Group are the two leading German commercial networks, owning fourteen individual channels. Likewise, the television ad pie is divided between the two players. The state-owned channels, ARD and ZDF, and independent sports and news networks only posses a minor share. ProSiebenSat.1 Media and RTL Group account for almost 85% of the entire market (see Figure 11).[21] Accordingly, the German market suffers from a duopoly.

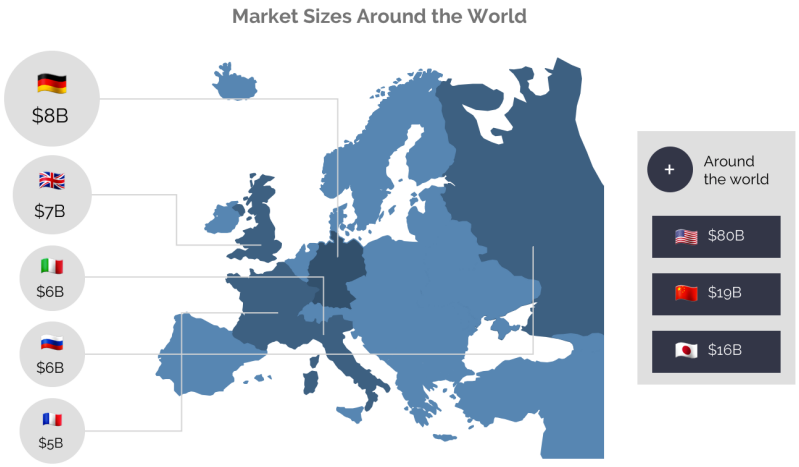


Figure 10: Market Sizes in Europe and Around the World

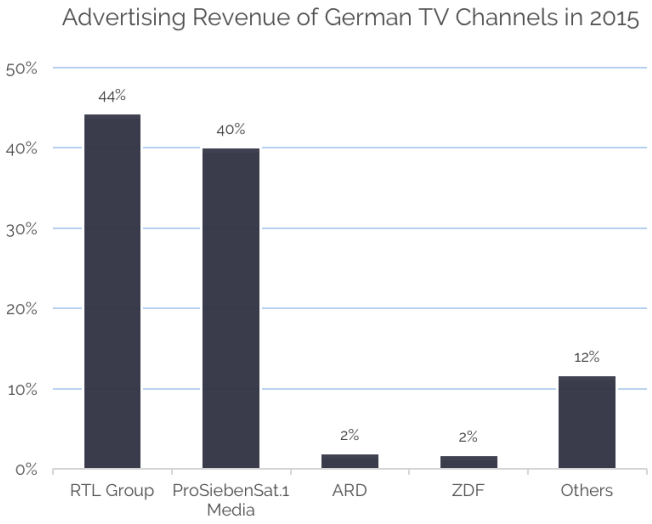


Figure 11: Advertising Revenue of German TV Channels in 2015

A.3 Legal

Legal Situation

The TV-TWO team will always work with highest diligence and best efforts to achieve the stated goal. However, certain internal or external contingencies cannot be influenced. Thus, we feel obliged to elucidate some of those imponderables. A contribution constitutes a voluntary contribution to realize the outlined vision. TTV are Ethereum-based tokens, which depict vouchers that may be redeemed in a given timeframe for a given service inside the TTV ecosystem. The purchase or possession of TTV must not be mistaken with a security investment or any associated rights. Likewise, TTV must not be graded, interpreted or treated as any sort of currency, part of an investment scheme, part of a business trust, derivatives of a part of a business trust, debentures, derivative of debentures or any class of security. The TTV does not entail any equity stake, nor right to dividends or any payments, nor right for vote or any decision-making. The TTV does not include ownership right or claim of TV-TWO, the platform, intellectual property or revenues, today or in the future. Reduction of the ETH exchange amount or warranty rights are precluded. Redemption rights are not given. The TTV can only be used inside the TTV ecosystem. Contributions are not refundable and can only be withdrawn until the withdraw lock period is reached during the Interactive Coin Offering. The associated hazard is accepted through the participation.

Risk Factors

For participants deciding to contribute to TV-TWO, we would like to further illustrate the associated risks. The following factors must be observed with full attention and considered in combination with all other information provided in this Whitepaper. If one or more risks, regardless if listed or not, materialize, loss of full contribution is possible. Each risk must be examined independently with equal thoroughness. Risks can combine and intensify. We have prepared this list to the best of our knowledge, but cannot guarantee its completeness.

- Risks associated with Personal Decisions:
  - Without professional advice from legal, tax and economic or other experts, important aspects of this token sale might not be evaluated properly.
  - Restrictions deviate from government to government. It is the participants' responsibility to investigate locally whether the token sale constitutes a violation of law. If token crowdsales or the trade of cryptocurrencies are illegal, criminal charges are possible. To protect our participants, we entitle ourselves to make contributions subject to compliance regulations, like KYC or AML. Despite of believing that TTV does not qualify as a security, we soundly follow the U.S. Securities and Exchange Commission new regulations. As an extra precaution for us and the contributors, we do not accept participations from U.S. citizens or contributions from any other jurisdiction

in which it is not permissible to participate in token crowdsales. Accredited Investors are permissible in the pre-sale.

- Risks associated with Cryptocurrencies:
  - In case the TTV ecosystem will fail, independent of the cause, no third party would exchange TTV for goods or services. Accordingly, the value of TTV is strictly dependent of the success of TV-TWO.
  - TV-TWO relies on the Ethereum blockchain technology. Therefore, the future development of this blockchain heavily influences the success of TV-TWO.
  - Ether has been subject to strong market fluctuation in the past. Since the TV-TWO financials rely on Ether as currency, a price decrease might negatively affect operations.
  - TTV will be listed on one or more cryptocurrency exchanges. TV-TWO can neither guarantee the continuous operations of those platforms, nor guarantee secure deposit.
  - Single contributors may possess large portions of TTV. If tokens are sold in bulks, this could have negative effects on the market value of TTV.
  - Token Holders' mistakes, including but not limited to loss of private keys or performing of unintended transfers, lie in their own responsibility.
- Risks associated with Regulations
  - An institution positioned to supervise, stabilize or control does not exist. The lack of constitutional presence might negatively influence TTV in times of crisis.
  - Future regulations cannot be predicted. Changes could possibly lead to the depreciation of TTV or the cease of TV-TWO.

Forward-looking statements

All statements that do not relate to historical facts must be regarded as forward-looking statements. This holds for this Whitepaper, as well as any statements by anyone acting on behalf of TV-TWO. These statements may be identified by forward-looking phrases and terms such as "if", "may", "possible", "probable", "would", "could", "should", "anticipate", "believe", "estimate", "expect", "intend", "aim", "target", "plan", "can", "will" and similar terms. It is important to note that this is not an exclusive list for forward-looking statements.

The use of forward-looking statements indicates a prediction, as opposed to a historical fact. Forward-looking statements represent analyses and estimates that are based on known, as well as unknown risk, uncertainties, and other factors of internal or external origin. They may negatively influence future results, as well as business success of TV-TWO, and are partially included in the list of risk factors.

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