MADANA

TOKENOMICS PAPER

This tokenomics paper aims to provide a deeper insight into the ecosystem and different economy related factors behind MADANA.

This paper is subject to change. It will be amended from time to time to include continuous feedback to questions received from the community and further findings. Any amended versions of this paper will be published on the MADANA website; only the most recent version of the tokenomics paper published on the website is the relevant tokenomics paper.

For more information, visit www.madana.io or email info@madana.io.

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Disclaimer

As nearly every aspect of the MADANA sidechain is heavily dependent of the implementation and functionalities of the Lisk Sidechain Development Kit, all assumptions about every blockchain utilization mentioned herein could be implemented in another way and/ or be solved differently. The main advantage of using the Lisk blockchain platform is that the majority of blockchain development efforts will be solved by Lisk. This way, MADANA can focus on its core product, while still having the possibility of developing a highly customizable blockchain with custom logic for its needs.

PROBLEM

MADANA is tackling the problems of modern digital society in the means of personal data control and privacy. More specifically, MADANA addresses the related discrepancy of fair revenue generation and distribution of the created data for the data originator (herein called data producer). In addition, the heavily monopolized data market lacks open platform alternatives that provide data analysis specialists (institutional or private, herein called plug-in provider) with a way to offer and monetize their knowledge to a broader pool of parties interested in data analysis insights (herein referred to as data analysis buyer). Generally speaking, there is no system that allows for insights into data without giving it away. And certainly, there is no solution for monetizing the data on micro transaction scale for the originator.

Existing Alternatives

The alternative solutions to the problems mentioned above are rather restrictive or don't grasp the root of the problem.

In the means of **data privacy and control** we have:

- Promises of security and privacy from service providers
- Law enforcement (GDPR)
- Encryption schemes like VPN, PGP etc. (which makes data unusable for third parties)

In the means of **sovereign data monetization,** we are either fobbed off with free service (Facebook, Google) or get occasionally a voucher once in a while.

Note: In the following the market participant APE (Analysis Processing Entity) is mentioned and resembles the instance that uses TEE technology to execute the processing of an analysis in the MADANA ecosystem. All statements about the APE from here on must be seen as assumptions and are subject to future development.

THE ECONOMY

The MADANA economy has a distinctive core function: It combines analysis algorithms (plug-ins) from the plug-in provider with data provided by data producers. This data is processed to provide a requested insight (analysis result) for the data analysis buyer. In this economy, the data producer creates the data supply and the analysis buyer creates the demand. Thus it can be assumed that these two ecosystem participants create the data price by supply and demand.

Further, it is assumed that the prices for the plug-ins are governed by the competition between the plug-in provider as it is a service they offer to the data analysis buyer. The blockchain nodes (MADANA Nodes) that process the transactions and smart contracts in our ecosystem are charging transaction fees. This helps to avoid spam transactions and acts as an incentive for the processing of blocks.

In the future, it is considered that the APE offers processing power to process the analysis itself and that it gets paid for this service by the analysis buyer. Again, competitive pressure will create the price for that processing.

Finally, MADANA provides the infrastructure (front-end, routing of data to the right destination) and takes a certain service fee.

All inner processes are either escrowed, executed or paid with PAX. Therefore, we can sum up the ecosystem parameters that may influence the PAX price as follows:

- Value of Data
- Value of plug-in services
- Value of processing power
- Transaction fees
- MADANA service fees

WHY BLOCKCHAIN

MADANA is using the blockchain mainly for trust and transparency reasons, as well as for distributing payments in real-time on a micropayment scale. Participants in the ecosystem are monitored, registered and paid through smart contracts executed on the blockchain. This creates the trust and transparency an open market like MADANA requires. Further governance needs that are planned for MADANA can be modeled on the blockchain, for example securing and voting in a global data model everyone agrees upon.

It is considered that in the future the APE's work can be regulated and incentivized through smart contracts on the blockchain. Also, plug-in providers could register the ownership of their plug-ins on the blockchain.

Decentralized applications have the advantage of being particularly secure and reliable. Also, data manipulation by unauthorized persons can be overcome. To eliminate this single point of failure in the cloud, one of the first goals in the expansion stages will be to decentralize all modules of the MADANA Main System as fast as possible.

PARTICIPANTS

The economy participants and their roles are the following:

- **Data Producer:** Creates and encrypts his data. Offers data for analysis insights to the data analysis buyer.
- **Plug-In Provider:** Writes and registers analysis algorithms and offers them as a plug-in service to data analysis buyers.
- **Data Analysis Buyer:** Buys the analysis results. Pays all the necessary participants in the ecosystem by acquiring and offering PAX for his requested analysis results.
- **APE:** Executes the data analysis processing.
- **MADANA Nodes:** Maintain the blockchain and execute smart contracts.
- **MADANA:**
  - Routes the data to the right destination
  - Builds and maintains the infrastructure
  - Development of SDKs and other software for ecosystem participants
  - Does research
  - Offers front-end service for easy and intuitive entrance into the economy

INCENTIVES

- **Data Producer:** Receives PAX for every time his data was used in an analysis. However, he continues to benefit from the protection of his privacy, as he never gives away the data, but rather lends it for insight purposes.
- **Plug-In Provider:** Receives PAX and can offer his plug-in service to a broad pool of interested parties.
- **Data Analysis Buyer:** Can outsource analytics competence from plug-in providers and benefits from a modular service through our plug-in system and open platform design. GDPR compliance due to the fact that he does not touch the data itself. Benefits from innovation through the open, generic and decentralized pool of information.
- **APE:** Earns PAX.
- **MADANA Nodes:** Collects transaction fees (PAX).
- **MADANA:** Earns a small fee for providing the system and has PAX holdings.

GOVERNANCE

The governance aspect of the MADANA ecosystem is also subject to future development and can turn out in a different way as described in the following text.

The intention is to design the ecosystem in such a way that the **PAX token holder** has the opportunity to **vote and agree on a global data model to ensure consistency** across the whole ecosystem. Thus, the PAX token holder determines how the data producer has to offer the data to participate. This is particularly interesting for data producers because they would then have a democratic way of deciding on the data model they want to have next in the ecosystem. This could mean for a data producer that his data is instantly available for the ecosystem. If the data model is a different one, he would need to go the extra step of converting it.

OUTSIDE ECONOMY

The outside economies that will influence the MADANA economy are the following:

- **Lisk sidechain ecosystem:** With Lisk, MADANA has the unique opportunity to position itself as the privacy and data monetization integration of choice for other dApps that will develop on the Lisk blockchain platform.
- **Cryptocurrency Market:** As the PAX cryptocurrency is tradeable like nearly every other cryptocurrency, it will be sold and bought on different exchanges and over the counter.
- **Data Market:** The MADANA economy will be influenced by the growth, changes and innovation of the global data market as our core product deals with data.

TOKEN USAGE

The usage of PAX can be described pretty simply as mentioned above. **PAX** is the only cryptocurrency that **executes the smart contracts** on the MADANA platform. It is used as the **main payment vehicle** in the ecosystem as well as to **vote on data models.**

In the future, however, there could be other utilities such as the **regulation of APEs,** the **registration of plug-ins, and a vehicle for reputation systems.**

SCALE AND GROWTH

The scaling strategy of MADANA can be portrayed in five steps:

1. MADANA's strong advisory board connects and partners us with big consultancies.

2. Consultancies act as multiplicators. They bring the MADANA technology to their customers, which are in need of new data-services amongst their supply chain.

3. This leads to the next step: A pilot project in a B2B sector will be set up, showcasing the feasibility of the MADANA technology.

4. Highlighting the successful pilot project will open further doors into the B2B sector, enabling the potential to establish the MADANA technology as the B2B data insight solution.

5. Trickling down from the B2B sector into consumer products and services as data privacy and monetization layer is the next logical step. The main focus will be on everyday consumer goods, where MADANA could be implemented in the production process, e.g. telecommunication hardware & software; IoT hardware & software.

Through this scaling approach, MADANA will have built up credentials and working data ecosystems in the B2B sector. In this realistic path, MADANA acts as a matchmaker between the "old economy world" and the "new decentralized world".

ECONOMY HEALTH

An important metric for the health of the MADANA economy is the amount of PAX held in Exchange wallets. As the MADANA network grows and the system usage rises, so does the demand of PAX for utility inside the ecosystem. This will drain the supply of PAX on exchanges (acquisition from analysis buyer, deposit for APE and other as mentioned above). Therefore, there will be a transition from an initial **discounted expected utility value (DEUV** = value driven by investment speculation) of PAX to a **current utility value (CUV** = value driven by utility and usage today). A high CUV means that the value of PAX resembles the global data market share MADANA acquires more precisely.

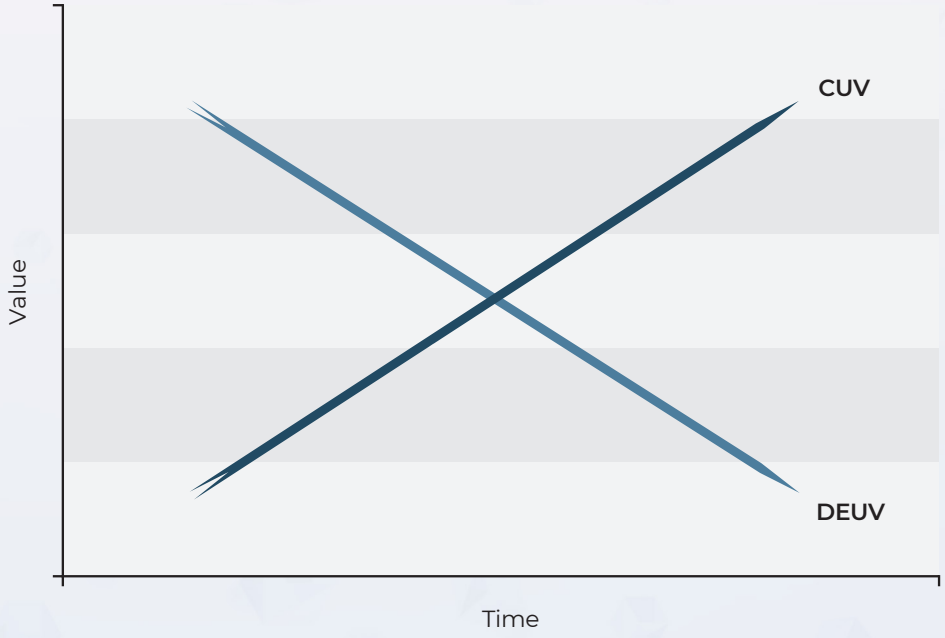

Figure 1 - DEUV vs. CUV over time

In summary, this means the following: The more data producers, data analysis buyers, plug-in providers and APEs the ecosystem attracts, the more the PAX cryptocurrency embodies the growing intrinsic value of the MADANA platform. Because MADANA aims to take market share of the growing global data market, the future equilibrium market capitalization of PAX will equal approximately the percentage of the market share MADANA acquires.

TOKEN VELOCITY

The described mechanics from above are arbitrary if the token has a high velocity in the means of short holding time in the wallets of the participants. Let's visualize the problem in our case:

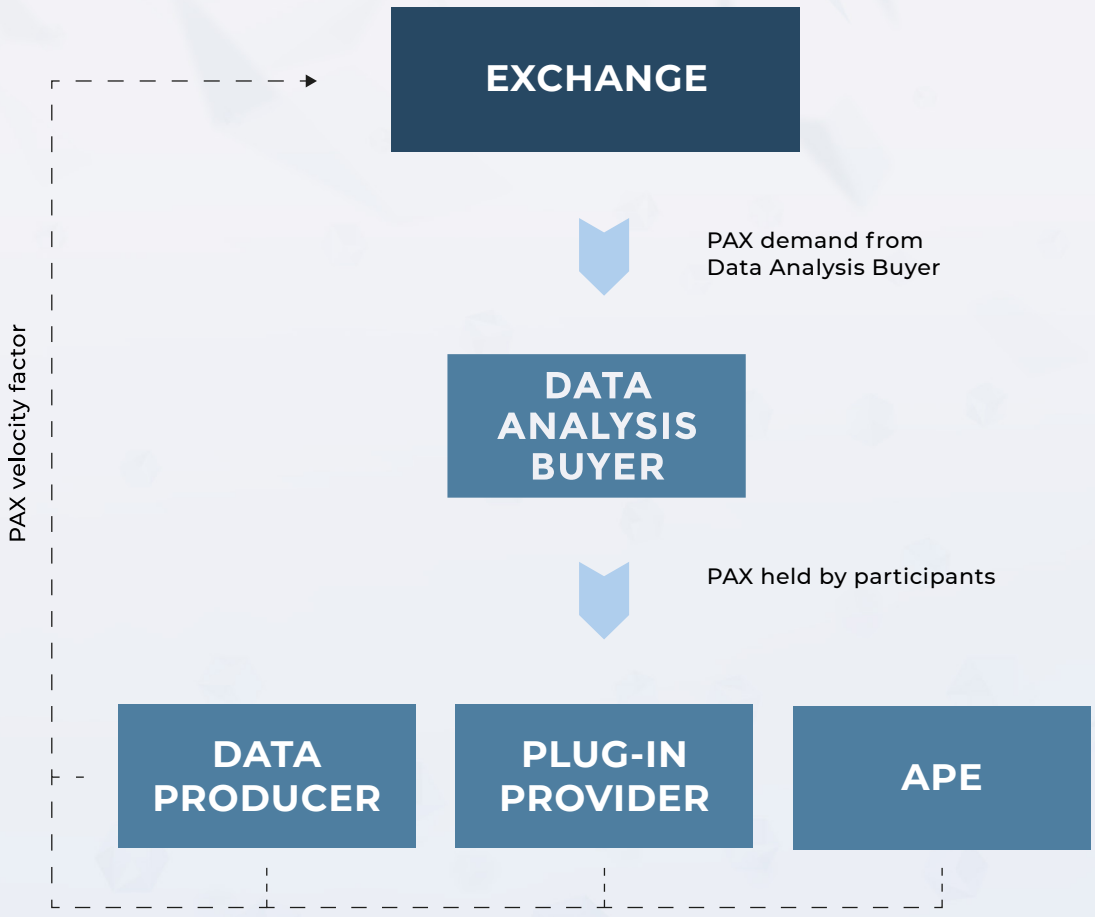

Figure 2 - Token velocity

Token velocity means nothing other than the frequency of transactions resulting in a sell pressure situation for the crypto-currency. It is preferred to keep the velocity low to have the demand overweighting the supply on exchanges. Therefore the HT (Hold Time) of the ecosystem participants who are the primary PAX input forces to exchanges (data producer, plug-in provider, APE) must increase. In the following, we examine the HT incentives of these participants.

DATA PRODUCER

An edge-case exists in our system that will become more relevant as the network grows. Imagine an analysis buyer who requests an analysis by only one data producer or dataset. But the requirements the analysis buyer set match multiple data producers (or datasets) in the network. Which one will MADANA choose for the participation?

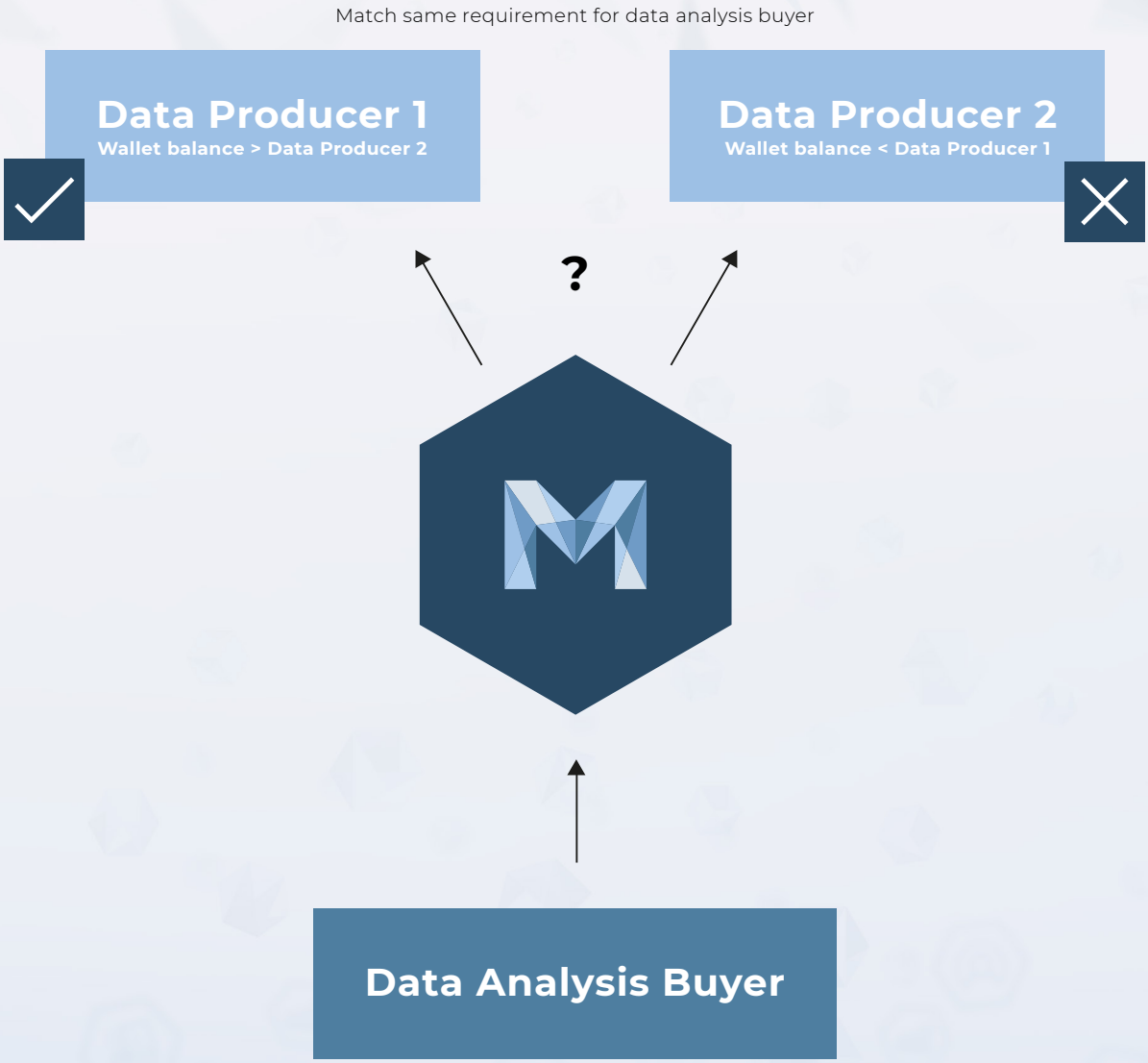

Figure 3 - Stake based match-making

As seen in the graph above it is considered to implement the wallet balance of the data producer as a factor in the match-making system. Those who have a higher balance will be prioritized, meaning that as long as the data producer accumulates PAX in his wallet, he will participate in more analysis requests and earn even more PAX - in contrast to those who liquidate their PAX immediately after receiving it. This mechanism reduces the overall token velocity, as the data producer is incentivized to hold on his earning to improve his match probability.

REPUTATION SYSTEM FOR DATA QUALITY

PAX can be utilized as another deposit measure. Data producers are rewarded by an incentive system when they provide quality datasets. The incentive system allows the data producer to nearly double the revenue from a particular dataset as compared to a respective lower reputated dataset.

The data producer would need to make a small deposit on every dataset he connects to the MADANA platform. This gives him a Deposit Factor valuation for this dataset of “1”. There is another factor valuation that is set to “0” initially (Reputation Factor). These two factors added up (1+0 = 1) create a Value Factor for the dataset of 1 x (price of the dataset).

When the dataset is used in an analysis process, plug-in providers now have an incentive to design and train their algorithms to check data quality before further proceeding with the analysis. After a dataset has passed through the algorithm, it receives a mark indicating that it has successfully participated in an analysis. During this process, the algorithm increases the Reputation Factor logarithmically to 0.5 and then 0.75 and so on, approach a factor of 1. If the dataset is being declined by an algorithm, its Deposit Factor falls logarithmically 0.5 and then 0.25 and so on approaching zero. Based on the Deposit Factor, the plug-in provider can claim the reward for separating datasets of low quality from datasets of good quality.

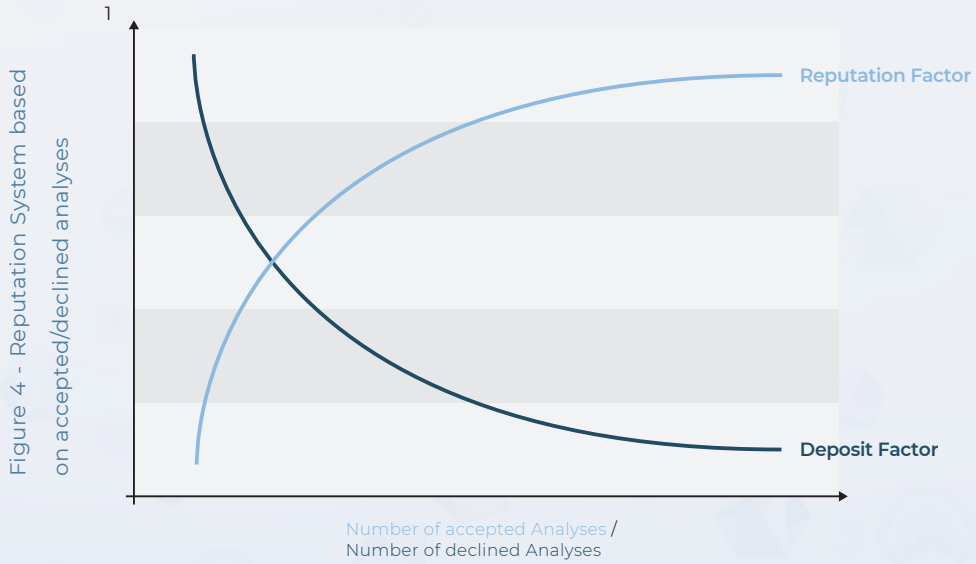

Figure 4 - Reputation System based on accepted/declined analyses

In conclusion, datasets that are declined multiple times quickly lose their Value Factor, approaching 0, and making them worthless (0 x price of the dataset = 0). On the other side datasets that never get declined approach a doubled factor evaluation (2 x price of the dataset = double the price).

The data producer is not forced to make a deposit, he rather has the chance to work his way up to a normal dataset factor evaluation. It is possible for him, starting from a value factor of 0 to approaching 1, without making a deposit within a few accepted analyses. This way, spam or low-quality data remains with a data factor evaluation of 0 to protect the data analysis buyer.

The ecosystems growth will result in many datasets wanting to prove their quality, thus locking up more and more PAX as a deposit. This reduces the token velocity considerably.

PLUG-IN PROVIDER

To secure proof of ownership, it is considered to implement a plug-in registration fee. This fee is paid by the plug-in provider to secure his intellectual property (the plug-in) on the MADANA platform. The MADANA Nodes receive the fee as a transaction fee. With increasing network growth more new plug-ins will be registered as a higher number of plug-ins means more earnings for the plug-in provider. The development and registration of new plug-ins are considered an investment for the plug-in provider, so he would rather reinvest in the registration of more plug-ins than liquidating his earnings. This also increases HT and thus reduces the token velocity.

APE

Distributed Result Validation

One future potential of MADANA is the implementation of a distributed network of APEs. By meeting specific requirements of software and hardware, volunteering entities can host the analysis process and get PAX token as a reward. An important question is how MADANA could ensure that the APE returns the correct and desired result which has been requested by the inquirer. The solution is to validate the signature of the code to be executed. This will ensure that only the desired code will be executed.

Moreover, it is conceivable to go one step further and execute the analysis process simultaneously on an odd number of previously validated nodes and then compare the respective results with each other afterward. The described process would rule out whether an analysis that is faulty for undetermined reasons would be sent back to the requesting entity. Corrupt APEs could be quickly detected in the network and be marked, which would have a positive effect on the quality of the analyses. The approach of distributed analysis processing would per se be vulnerable to adoption by a majority of corrupt APEs, but should be interceptable by the other security measures implemented in the system.

APEs could be regulated by letting them deposit a considerable amount of PAX and putting it at stake. If the APE fails to deliver the correct processing of the analysis, it would, as a result, lose its deposit to successful APEs. This way, more and more PAX get locked up as the network grows and the demand for analysis processing rises. To participate in more valuable analyses (which may require a larger deposit), the APE therefore is assumed to have a constant need in PAX to process more or more valuable work. This increases the HT in his earnings and thus reduces token velocity.

DISTRIBUTION AND VALUE

INITIAL VALUE

The initial value of the PAX cryptocurrency results from the prices and distributions of MADANA's token sale. The PAX token sale structure looks like this:

- **Pre-Sale**
  - Price: € 0.50 / PAX
  - Allocation: 15,000,000 PAX token
  - Bonus allocation: 1,500,000 PAX token
  - Time period:
    - Start: September 1st, 2018
    - End: October 31st, 2018
  - Time period for whitelisting:
    - Start: August 1st, 2018
    - End: October 31st, 2018
  - Hard cap: € 7,500,000
- **Main Sale**
  - Price: € 1.00 / PAX
  - Allocation: 30,000,000 PAX token
  - Time period: TBA
  - Time period for whitelisting: TBA
  - Hard cap: € 30,000,000

BONUS ALLOCATION IN PRE-SALE

In the PAX Pre-Sale, the cryptocurrencies Bitcoin (BTC), Ethereum (ETH), and Lisk (LSK) are accepted for contributions. Anyone who contributes with Lisk (LSK) will receive a **10% bonus** on the acquired PAX. These PAX will be provided by MADANA out of the Allocation "Partnerships & System Development".

UNSOLD TOKEN

PAX token that are not sold in the PAX Pre-Sale are used for the Main Sale. All token that are not sold in the Main Sale will be burned.

DISTRIBUTION OF PAX

There is a total of 100,000,000 PAX token that will be created. After the Main Sale, the issuance of the PAX token will begin, and it is set to be not before January 1st, 2019. The initial distribution of the PAX token is the following:

- Investor and Community: 55%
  - 10% Seed Investors
  - 15% Pre-Sale
  - 30% Main Sale
- Partnerships & System Development: 15%
- Long-Term Stabilization: 15%
- Team and Advisors: 15%

INVESTORS AND COMMUNITY

The allocation “Investors and Community” is used for the total token issuance of PAX which includes private seed investors. These investors negotiated individual deals with MADANA and helped to bootstrap the company. This allocation also includes the Pre-Sale as well as the Main Sale for the community.

PARTNERSHIPS AND SYSTEM DEVELOPMENT

The allocation “Partnerships and System Development“ is retained by MADANA to grow the platform strategically. This PAX reserve will finance community campaigns, partnerships, incentive programs, and the Pre-Sale bonus allocation.

LONG-TERM STABILIZATION

This special reserve will be retained by MADANA to guarantee the long-term financing of MADANA. It will be locked for two years.

TEAM AND ADVISORS

The allocation “Team and Advisors” is distributed among the team and current as well as future advisors. These token are vested for two years (24 months) and have a quarterly (3 months) release period with 12.5% of the token. The vesting starts with the distribution of the PAX token after the Main Sale.

ALLOCATIONS OF FUNDS

The PAX token Sale proceeds will be used for the following:

- Development and Operations: 65%
- Marketing and PR: 20%
- Legal: 10%
- Security Bounty Program: 5%

DEVELOPMENT AND OPERATIONS

These funds will be used for the operational business of MADANA such as salaries, development expenditures, research, rent, and insurances.

MARKETING AND PR

To expand the growth and image of MADANA in the future, this allocation will be used to develop a modern and appealing outward presence and communicate the importance of MADANA to the target market.

LEGAL

To secure MADANA in every legal situation, these funds will be spent to ensure compliance in every relevant jurisdiction; especially Germany and the German Law.

SECURITY BOUNTY PROGRAM

This allocation is reserved to incentivize security specialists and hackers to communicate critical system errors and bugs directly with MADANA and help to resolve them before any damage can occur.

CONCLUSION

The economy of MADANA revolves around the PAX cryptocurrency. The open platform design will attract participants from the growing global data market to create an ecosystem of privacy-preserving data analysis, processing, and monetization. The system holds key aspects to increase utility value as well as preserving value for the PAX cryptocurrency. Governance aspects of the platform, as well as incentives for the genuine behavior of the participants and ecosystem balance, are linked to PAX. The goal of the MADANA ecosystem is to acquire market share from the global data market and impose a more privacy-friendly data processing approach than the current industry standard.

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