



# **WG Blockchain Applications in Health @ P12**

## **Tokenomics and cryptocurrencies in Health**

**Gabarone, Botswana, 5<sup>th</sup> November 2018**

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**research data sharing without barriers**  
**[rd-alliance.org](http://rd-alliance.org)**

# Resource Allocation is a process that blockchain digitizes <sup>2</sup>

- The process of resource allocation by decentralised exchange is based on the fact that two parties agree on a contract that establishes a trusted relationship enabling them to execute resource transfer and settlement.
- The key components of a contract are therefore Trust, Transfer, and Settlement.
- This translates into Identity, Supply Chain and Payments/money.
- Within blockchain it translates into legal sovereign digital identity, frictionless tokenised supply chains, and context sensitive payment systems (programmable money).

# Trust, Transfer and Settlement

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- Blockchain absorbs, decentralizes and delivers Trust, Transfer and Settlement and creates a digital space for the execution of the contract.
- With it, a new layer of automation emerges: Process Automation based on Smart Contracts
- In short, what Internet did to transaction costs regarding information, blockchain can do regarding trust, and consequently transfer and settlement

# Transaction Costs and Blockchains <sup>4</sup>

- With the blockchain, reliable data-rich information systems become possible without being paralysed by excessive transaction costs.
- The limitation of decentralised solutions was in the past the all-pervasive (and excessively reductive) role played in market-based solutions by just one synthetic information: the price.
- The advantage of hierarchical solutions was based on the capacity to tackle uncertainty by centrally ordering a multiplicity of information about which actions to follow.
- The blockchain methodology, by allowing solutions based on decentralised protocols,
  - removes the friction and costs of current intermediaries
  - makes it possible to develop distributed and transparent systems
  - where empowerment can be shared
  - asymmetries can be balanced
  - qualitative aspects can be taken into account.

# Tokenomics 1

- A Token is a digital currency tied to a specific purpose (a programmable money).
- In a distributive economy, spreading currency issuance spreads also value creation.
- Tokens provide a specialised means of exchange and mediation of needs, which can allow to “remonetize” welfare services after years of “de-commodification”.
- In healthcare, without contradicting the free-access character of health services in Europe, this can lead to transferring the purchasing power implied in the supply of services in-kind directly to the users, genuinely empowering them.

# Tokenomics 2

- Tokens allow to incentivise demand and direct it toward goods and services to which a particular social or individual importance can be attributed.
- Being by definition programmable, tokens are specially suitable to tackle issues of allocational efficiency, such as informational asymmetry, externalities, and merit goods.
- Tokens are a key tool for a social market where solidarity can be transferred from the vocabulary of political rhetoric to the calculation of consensus, relying upon distributed ledger technology for tamper-proof recording of consented transactions, triggered by fine-tuned smart contracts.



# Why blockchain and tokens may be specially relevant for healthcare

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- Overcoming issues associated with centralized healthcare data management
- Enabling individual self-sovereignty and patient-centric healthcare (also through personalised data accounts)
- Enabling direct control of data by patients, overcoming the current paternalistic approach on data management
  - Patients can be made able to decide who can access to data, for what purpose, and also get compensation
- Facilitating health data exchange relying on peer-to-peer distributed architectures
- Creating new economy and market around patient data
- Improving economic incentive schemes and provide individuals with additional motivations for engaging with their health

# Blockchain data access benefits

Blockchain-based platforms for data management and access enable the creation of a comprehensive data ecosystem where all stakeholders (patients, doctors, clinical institutions, public decision makers, researchers, biomedical industries) can reap benefits:

- Transparency and security of patients' records
- Global access to data when and where needed
- Make data forgery extremely difficult and easily traceable
- Overcome all siloed data storage solutions, enabling the «virtual recollection» of patients' data in their «personal data wallets», facilitating interoperability
- Enables new forms of secure and quick payment processing



## Other interesting use cases

- Blockchain-based health insurance, with personalised services, dynamic pricing, improved access, tamper-proof claim management and fraud reduction
  - Interesting opportunities for lower income countries, where poor data availability and inefficient payment systems make insurance services less available and more costly
- Pharma supply-chain and anti-counterfeiting
  - Providing each single pharmaceutical product with a unique ID, allowing patients and physicians to access a detailed history of the product lifecycle, from the original molecule to the drug store (including information on the production site, the condition of transportation), ensuring authenticity and integrity.

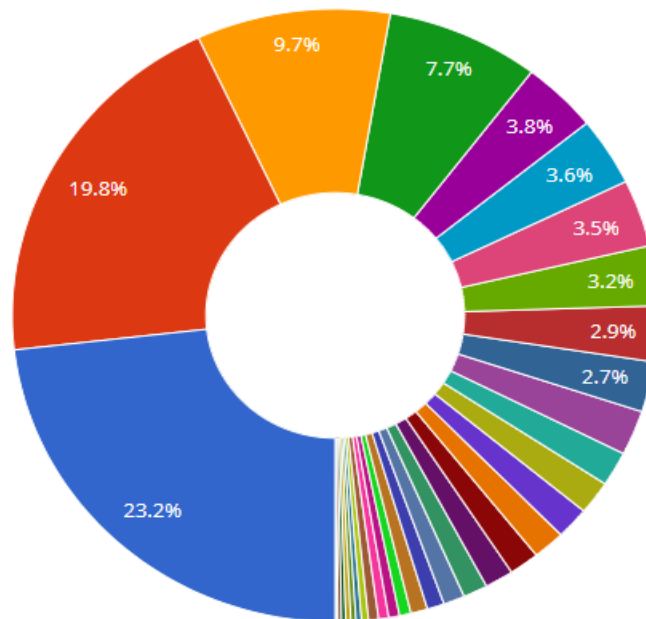
# A huge potential still in need of being implemented? (1)

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What is the current market of ICOs and Cryptos in the healthcare field?

Of the overall amount of investment into ICOs in 2018, only \$300MM were in healthcare (1.5%)

ICOs by Category 2018



- Infrastructure 23.2% (\$5,035,420,876)
- Finance 19.8% (\$4,303,168,815)
- Communications 9.7% (\$2,103,941,199)
- Trading & Investing 7.7% (\$1,663,793,391)
- Payments 3.8% (\$826,033,250)
- Gaming & VR 3.6% (\$781,531,093)
- Governance 3.5% (\$767,300,000)
- Events & Entertainment 3.2% (\$685,156,075)
- Commerce & Advertising 2.9% (\$635,864,884)
- Privacy & Security 2.7% (\$575,834,938)
- Marketplace 2.4% (\$511,814,884)
- Data Storage 1.8% (\$394,372,944)
- Supply & Logistics 1.8% (\$381,460,593)
- Social Network 1.7% (\$362,810,885)
- Machine Learning & AI 1.6% (\$348,578,453)
- Drugs & Healthcare 1.5% (\$327,599,161)
- Energy & Utilities 1.4% (\$310,721,843)
- Gambling & Betting 1.2% (\$266,441,510)

▲ 1/2 ▼

# A huge potential still in need of being implemented? (2)field?

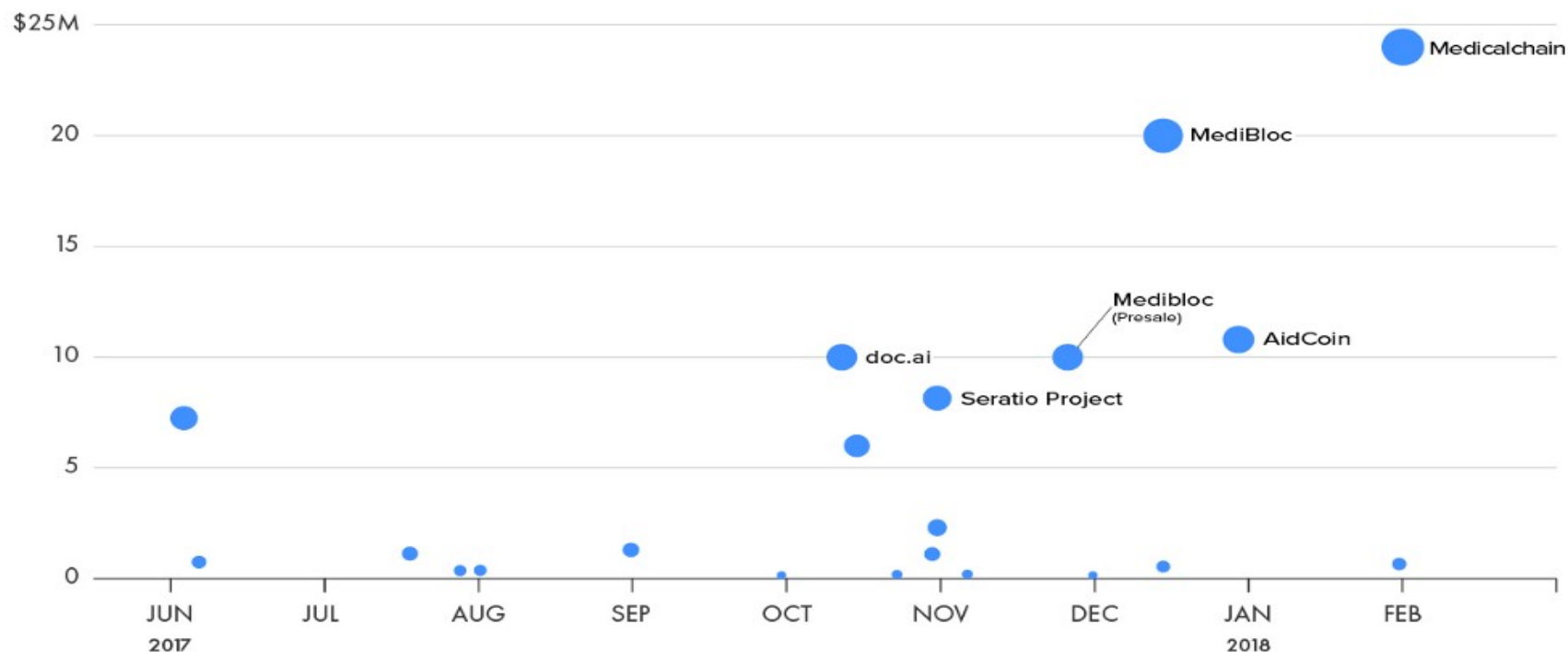
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## Health & Social ICOs

DATA  
SOURCE

SMITH+CROWN

ICO amounts raised in millions USD



Includes all sales that raised over \$25,000 and did not return funds raised to sale participants. Amounts raised are valued according to average daily exchange rates on the date the sale closed. EOS's ongoing sale is broken into monthly sales valued according to how much was raised that month and exchange rates at the time of the month's close. Sale rounds for the same project that are separated by more than 30 days are treated as separate sale events. Some data may be missing.

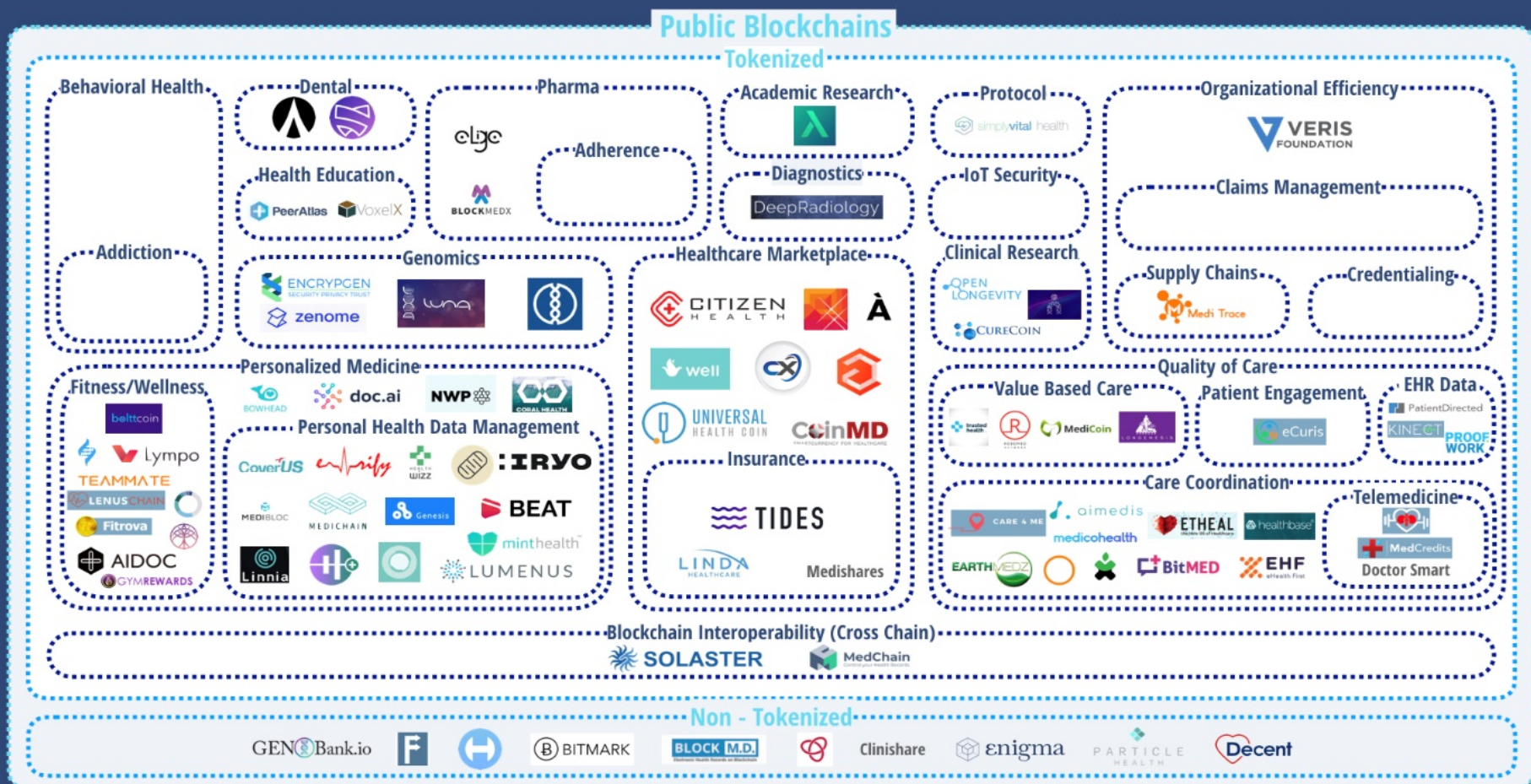
# Current initiatives in the crypto health space

## field?

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Blockchain BrioView

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# Current healthcare-related cryptocurrencies display poor performances on the market

market

#	Name	❤	Price	7d field?	7d Price	Mkt. Cap	% fm. ATH
26	 <a href="#">Ontology</a>	❤	\$ 1.69	2.22%		\$ 349.64 MM	-84.23%
87	 <a href="#">Dentacoin</a>	❤	\$ 0.0002	-3.21%		\$ 69.49 MM	-97.00%
222	 <a href="#">MEDX</a>	❤	\$ 0.0063	2.12%		\$ 20.10 MM	-61.89%
315	 <a href="#">Lympo</a>	❤	\$ 0.0172	0.87%		\$ 12.97 MM	-87.49%
330	 <a href="#">Medibloc</a>	❤	\$ 0.0039	0.49%		\$ 11.71 MM	-98.63%
336	 <a href="#">Cosmo Coin</a>	❤	\$ 0.0199	20.03%		\$ 11.38 MM	-69.90%
548	 <a href="#">AI Doctor</a>	❤	\$ 0.0097	0.97%		\$ 4.30 MM	-94.37%
575	 <a href="#">Medicalchain</a>	❤	\$ 0.0217	-1.40%		\$ 4.02 MM	-93.88%
622	 <a href="#">Shivom</a>	❤	\$ 0.0053	32.15%		\$ 3.36 MM	-79.15%
723	 <a href="#">Patientory</a>	❤	\$ 0.0350	-6.04%		\$ 2.45 MM	-97.70%

# Some likely reasons for the current lack of investment in the healthcare/crypto space

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- Very early stage solutions and lack of testing in real environments
- Healthcare is a very complex and highly regulated field (especially when it comes to the management of market incentives)
- Designing proper token-based business models appropriate to the healthcare space (and in particular for incentivising patients' behaviors) is quite a challenge
- Overall legal uncertainty around cryptocurrencies and ICOs still hinders investment in general, and particularly in such a complex industry as healthcare



- Security tokens are digitized financial tools representing ownership of an asset (as in stocks). They are subject to securities regulations (e.g. the SEC in the US).
- Utility tokens usually grant future access to a company's product or service (it can be seen as a sort of “digital coupon”).

# MintHealth

Some initiatives (like MintHealth) are leveraging a novel dual-token model:

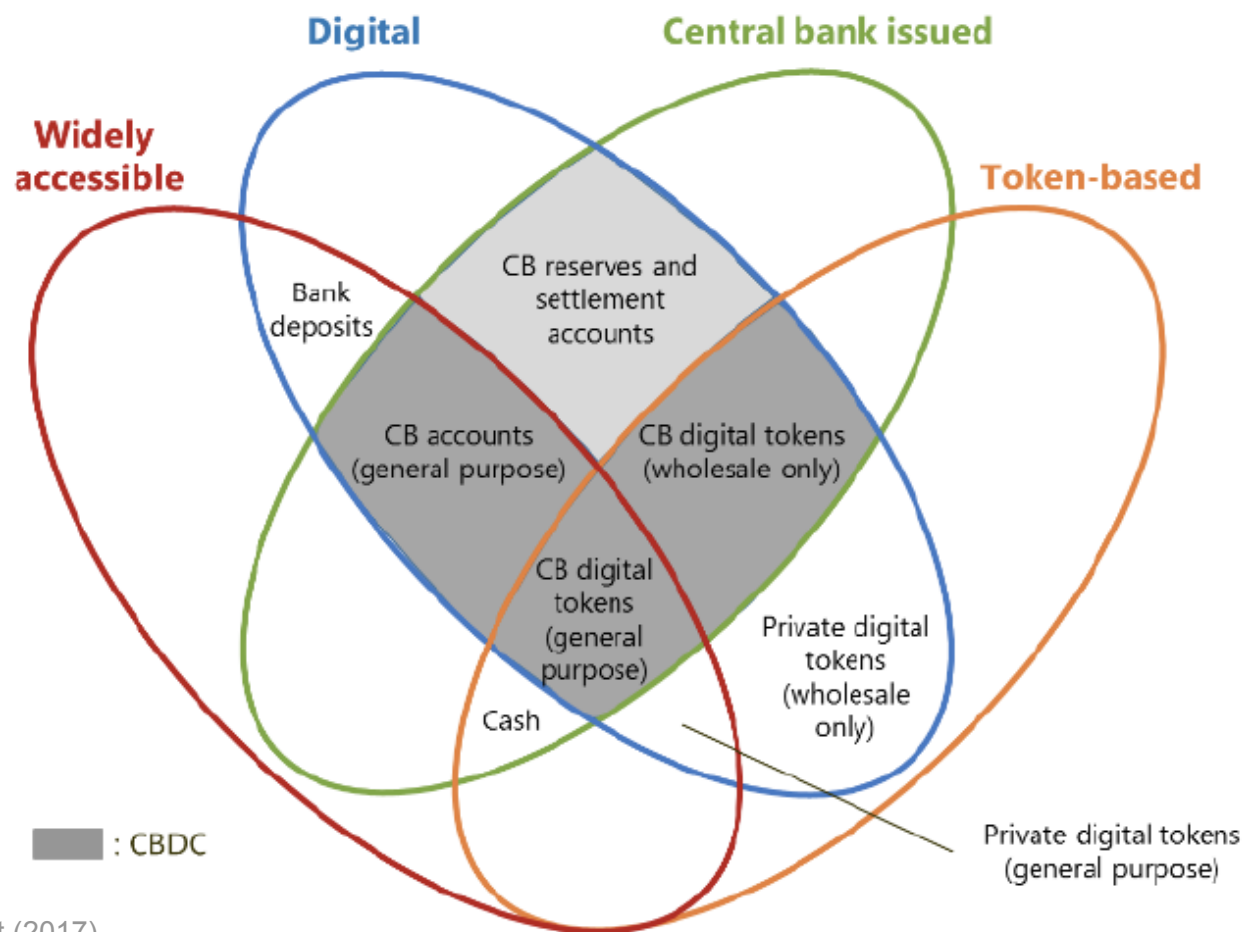
- For investors interested in the platform, a specific token is available for purchasing
- For other stakeholders (such as patients or healthcare providers) willing to be remunerated in exchange for good practices implementation or healthy behaviours, another type of token is available for purchasing.
- Researchers, policy makers, philanthropists might decide to buy both

- Bcharity is an international charity exchange, using blockchain technology for bringing together charities from all around the world.
- The platform makes it possible to charities to share challenges/needs and provide solutions, allowing anybody to contribute through the platform itself.
- Thanks to blockchain, enhanced security of financial data is ensured.
- The CHAR token is an Ethereum ERC20 standard token. Purchase is available via BTC, ETH, LTC, ZEC, XRP or XMR.

- Medicalchain is a decentralized platform aiming at improving management access and control of Electronic Health Records for both patients and medical professionals
- The system enables direct and secure communication among stakeholders (for example to schedule appointment or ask for opinions), providing immediate access to data from anywhere in the world.
- Pharma and insurance companies can also interact with the data in accordance with patient consent provision.
- Medicalchain adopts a dual blockchain structure using both Hyperledger Fabric and Ethereum for its ERC20 token. Investments accepted BTC and ETH.

- TrustedHealth provides a solution for dealing with life-threatening cases, enabling patient-doctor cooperatives aimed at:
  - find the best diagnosis methods
  - increase the patient's health outcomes
  - ensure worldwide data accessibility.
- The system leverages blockchain features for providing decentralized, transparent tools for patients and medical professionals to communicate and exchange information.
- TrustedHealth leverages its coordinated research approach to facilitate care providers to help patients, share expertise from any part of the world, and get consultations with different specialists
- 50% of the relevant TDH tokens (based on Ethereum) are distributed to crowd-funding contributors, 30% to team members, and 20% is left for project development.

# The 'money flower'



Source: Bech and Garrat (2017)



## For further contacts

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