Token Factory

Index-Token White Paper

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A quick note on terminology: The word **coin** refers to the underlying assets (cryptocurrencies and functional tokens), and the word **token** refers to our product, a cryptographic token that can be purchased on an exchange or on our web site.

This isn't a business plan, but it's close.

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Token Factory is a subsidiary of <u>Twenty Thirty AG</u>

1. Product Overview

Our product is an investable, dollar-denominated index of large and mid-cap cryptocurrencies. It belongs in the **smart-beta** category of investments. Today, there are more than 200 cryptocurrencies, many of which have their own blockchains. There's a list of many of them at www.coinmarketcap.com, which is the database we use as our reference. Our goal is to provide our customers with exposure to this class of coins, while 1) not overweighting bitcoin, which dominates, 2) not overweighting other top-five coins, 3) excluding scam coins, dead coins, and pegged coins, and 4) excluding coins that have low volume/liquidity and are too risky. Our index contains currencies and app tokens, but no equity tokens.

This provides exposure to roughly the top 50 coins by market cap, carefully weighted toward the middle of this spectrum, with the goal of giving coins #10 to 40 a chance to rise. While as much as 60 percent of this portfolio could underperform, we believe the performers will compensate. If, as we predict, this asset class becomes a growing and legitimate asset class, we hope our index token will become the de-facto standard for measuring the market and getting the upside of the value of these coins. Ours is a large- and mid-cap index combined. It is easy to purchase. We will work hard to make it easy to sell.

Our goal is not performance. Our goal is reasonable growth with reduced volatility. If we meet our goals, our token will have the highest Sharpe and Sortino ratios of any other crypto-based financial product.

2. Market

We have three target markets:

1. **People who already hold bitcoin.** There are roughly 400,000 people who own more than 1 bitcoin. About $150 million of bitcoin changes hands daily. Our goal is to provide diversification to these customers. They can now choose a mix of bitcoin and our product that helps them reduce volatility and get exposure to a large number of up-and-coming coins. They can adjust their mix easily, by cherry picking the particular coins they want to bet on and filling in their portfolio with our product.

2. **People with no exposure to the asset class.** As more and more people learn about cryptocurrencies, they become interested in investing but are rightly scared of the volatility of bitcoin and others. They can easily purchase our token using a Lykke wallet.

3. **Journalists and analysts looking for a benchmark for our industry.** Our goal is to provide an index that helps people get a birds' eye view of the cryptocurrency market, similar to what the S&P 500 does for stocks.

3. Product Description

Our token is similar to an ETF. You can buy a single token and keep it in your wallet. That token then represents the value of our cryptocurrency portfolio. The token can never be redeemed. It can be sold on the open market. We charge a fee of 1.5 percent per year.

Our portfolio is determined by a **recipe**, which can be summed up as:

1. Take the top 100 coins by market cap from coinmarketcap.com
2. Filter them to exclude coins we don't want, resulting in a list of about 70-80.
3. Take the top **n** of these coins, where we adjust **n** over time to reflect the robustness of the market as it grows. Currently, **n** will be in the area of 45.
4. Arrange them by market cap and take the fourth root of the market cap amounts.
5. Use the fourth-root numbers to create a distribution for purchasing. This results in a very flat distribution. There are caps for various large coins and special circumstances. No coin can represent more than ten percent of the portfolio. Bitcoin, for example, will likely always represent about 8-9 percent of the portfolio, not more.
6. Calculate and take out our fee before purchasing new coins.
7. Purchase coins according to how much cash we have, using the above distribution.
8. Send the coins to cold storage.
9. Issue the number of tokens that matches the current NAV and corresponds to the coins just purchased.
10. Sell those tokens in the market. Initially, we will use lykke.com. Eventually, we will seek wide distribution. As sellers, we compete with other sellers in the market.

There are three basic approaches to creating such a portfolio:

1. **Dynamic portfolio:** In this scenario, we purchase currencies periodically and maintain the portfolio to reflect the current recipe. So if a coin that has been in the index previously is no longer in the index, then sell that entire position. In this way, the portfolio is only the coins in the current list of n coins. The token mirrors the portfolio. This is, I believe, how SPY works.

    Please note that this has a serious downside - you may accumulate a coin for years, so that it has a significant percentage of the portfolio, but it is volatile. The day it slides off the bottom of the index, you must liquidate that entire position, adding to the volatility. A week later, that coin may now bounce back into the index, and you have to buy it back again in the next rebalancing. This approach leads to churn and extra transaction fees.

    It has another downside: when the product is mature, plenty of people will own the token, but we may not be selling many (or any) new tokens. In this scenario, we would be churning the portfolio regularly, and our token holders would lose value from transaction fees.

2. **Cumulative portfolio:** In this scenario, imagine that we have just sold a batch of tokens and are back in cash. Now, we use the recipe to make our list of coins to purchase, and we use the cash to buy those coins. We don't care what was in the purchase from the previous cycle - we never sell coins. We may have bought a small amount of a particular coin in one cycle and it never again qualifies for the index. Nevertheless, that small number of coins remains in the portfolio indefinitely. We simply buy the recipe each week and add it to the previous portfolio.

   This does not suffer from the churn of a dynamic portfolio. It is also far more secure. The trick here is that people need to understand that they are buying a much larger portfolio than is in the current index. Our index may currently have 50 coins, but our portfolio could easily have double that number from previous purchases, when those coins *were* in the index. It is a matter of communication. We believe this approach will also fare better as an investment, as it has zero churn. If we believe in a coin enough to buy it once, we might as well hold onto it and let it run its course.

3. **Contract for Difference.** This is similar to an ETN. In this scenario, we don't have to purchase any coins at all. We simply have to make and honor our commitment to repurchase tokens at the current NAV (market price of the model portfolio). What we actually purchase is up to us. This gives us full market exposure. We have no interest in this model.

For obvious reasons, we are going with a cumulative portfolio.

We plan to rebalance weekly. We will rebalance more or less often, depending on market demand. Essentially, we rebalance when we sell out of our current inventory of tokens.

Tokens will not be divisible. Tokens will initially be priced in the $10-50 each range (we haven't decided on units yet). You must buy or sell whole tokens. Divisibility can lead to arbitrage, plus our goal is to keep the NAV relative to the token price - subtokens would make that confusing.

Redemption is tricky. It's important to offer redemption, but coin redemption is a technical challenge. Imagine we have, in the past, purchased some amount of 100 coins, many of which are dead and no longer in our index. The redeemer would need a Poloniex account, which covers about 95 percent of the coins and 99 percent of the value of the portfolio. Plus there are some that can't be bought on Poloniex, which requires setting up special wallets. It's likely that several have disappeared and are no longer traded anywhere.

So here's a solution: Anyone who wants to redeem can get a Poloniex account and show us proof of that, then they can check a box to forget about the rest and get their coins within five days, OR they have to show us they have all those other wallets. This is so difficult that no one will go for it. We tell them we'll redeem the tradable non-Poloniex coins with ten business days' notice. The Poloniex-only solution could even be automated with a smart contract.

4. NAV

NAV stands for **net asset value**. It's a simple calculation: the current market value of the portfolio of coins divided by the number of tokens issued. Over time, our product NAV will be less and less than the current market value of the portfolio of coins. This is because we are taking out 1.5 percent as our fee each year. So we should be exactly 1.5 percent behind the market price of the coins as our product ages.

We will calculate the NAV daily and display it on our web site. It will also be available as a feed for anyone to take and use. We'll also have a historical NAV data set available via API.

5. Fees

We charge a flat 1.5 percent per year fee for maintaining the portfolio and issuing tokens. To actually build and maintain a portfolio like this manually would take hundreds of hours of work per year. Because we are providing a valuable service, we are charging a reasonable fee. Our fee doesn't compare to an index fund or ETF, because it is far more work to create and maintain our product than a typical index fund.

We take our 0.0288 % fee out weekly from the portfolio, not from the token. The details of this are beyond the scope of this paper, but essentially:

1. While we are selling tokens, we calculate the fee each time we rebalance and remove the fee from our cash position before buying tokens. This reduces friction. In effect, we buy fewer coins than the recipe says we should and pocket the difference as our fee for the entire portfolio.

2. When our portfolio is large and if sales are small, then there won't be enough working capital to cover our fee. In that case, we take enough coins out of cold storage and sell them in the proportions determined by the recipe, and we don't change the number of tokens in circulation. This effectively puts the cash in our account and reduces the value of the tokens - as per our agreement with token holders. If we're not issuing new tokens, we can do this particular sale less often than when we are constantly rebalancing.

6. About Fourth-Root Weighting
This is a bit technical, feel free to skip this section.

The S&P 500 is cap weighted and suffers from what we call the tyranny of the big caps. Almost any index follows a power-law distribution of market caps, which means the top 5 percent dominate, often with more than 50 percent share of the index. It has been shown that the largest stocks tend to revert back down to the mean, while stocks at the low end tend to work their way toward the middle. This has led to the emergence of the **smart beta** movement, where people try to design better products that are still broadly diversified but have better performance.

Believe it or not, several (most) of the cryptocurrency indexes are actually cap weighted. Because bitcoin's market cap is more than 90 percent of the market, these indexes effectively represent bitcoin. Readers are welcome to draw their own conclusions, but we don't believe this is what an index should be.

After several experiments, we settled on a weighting scheme as follows:

   If market cap > $100b then the weight is 8%
   If market cap > $10b then the weight is 7%
   If market cap > $1b then weight is 6%
   If market cap <= $1b then the weight is 1/4 root for each coin remaining

This turns out to give a nice gradual taper and emphasizes the middle coins. We tried square and cube-root weighting as well, but fourth root really stood out as the right allocation curve for our purposes. It would be interesting to apply this kind of weighting scheme to the S&P!

Note that a taper is far more desirable than flat weighting. Flat gives too much emphasis to the last ten coins in the list and creates too much of a step jump onto the list.

7. Competitors

It's not impossible for others to offer competing products at lower fees. We expect it. Currently, we know of the following indexes and index tokens:

lawnmower.io - a two-year-old index of just the few dominant currencies. Not investable.

CRIX - Currently at 25 cryptocurrencies, meant to be a "benchmark." This has academic roots and has validated many of our assumptions (for example, use a fixed number of coins but keep moving that fixed number as the industry matures). Unfortunately, they cap-weighted it, which is a disaster.

iconomi.net - a well thought-out index of about a dozen cryptocurrencies. We believe they are working on making it investable.

Here is the Iconomi index as of January, 2017:

Name	Ticker	Industry	Market cap USD	Weight (log & nominal)
Bitcoin	BTC	Value	13.276.338.912	15,000%
Ethereum	ETH	Platform	691.061.950	13,098%
Monero	XMR	Anonymity	114.562.053	11,942%
Dash	DASH	Anonymity	69.181.161	11,617%
MaidSafeCoin	MAID	Storage	45.718.202	11,350%
Augur	REP	Prediction	31.605.090	9,512%
Steem	STEEM	Media	30.716.697	9,244%
Factom	FCT	Audit	23.286.889	7,008%
Lisk	LSK	Platform	15.157.661	4,562%
GameCredits	GAME	Gaming	12.452.799	3,748%
Zcash	ZEC	Anonymity	9.697.645	2,919%

This index could be called a cherry-picked large-cap index. In this index, two coins account for 25 percent of the index, and they are by far the two easiest coins to get. The rest of the portfolio constitutes more of an index, but it's only 9 coins. It could work out great, but it will have far more volatility than ours, and it can't be considered a benchmark. You could think of the Iconomi index as the Dow Jones, while we're building the S&P.

We believe our competitive advantage will be in our name, our product design, grass-roots marketing, the Lykke platform, and our first-mover advantage.

8. Marketing

Technically, it's difficult to gauge market demand. The reason is that our token can't just be bid up in price. It could get a bit overpriced, but no one is going to pay too much for it - those people will instead simply not buy. So we should think about how we'll sell our new issues, how we'll signal that we have tokens in inventory, and how we assess market demand.

Our marketing program depends on budget. We would like to spend about $40-50k per year for the first three years. We believe this will pay off by year three, when we hope to have significant revenues. A break-even analysis is available separately.

We will have to continue to explain the features and benefits to our three markets over and over and over. We can expect nonlinear growth as people will wait to see what the performance is. In fact, we could easily be thought of as under-performing, as we have no plan to keep up with the hot-shot concentrated portfolios. We should emphasize our Sharpe ratio and keep explaining why our product is the way it is.

9. Production

We have detailed production specifications. Our purchasing/rebalancing software is proprietary. This project won't require many people to run. More in marketing than in production.

We will need about $30k of working capital just to manage the inventories of buying and storing coins, then issuing and selling tokens.

10. Liquidity

Liquidity is not a big issue. There are natural market forces that keep the token price very near the published NAV. Any time the token trades at a discount, speculators will swoop in and pick it up. It's hard to imagine the token straying too far from the portfolio value.

For this product, liquidity is simply a function of the quantity of tokens in the market. To help make selling easy, we'll try to stay on one exchange until we feel it is saturated before moving on to the next.

11. Volatility

Since we hold coins that have actual market value, it's hard to imagine this portfolio going down quickly. It also won't go up quickly. This is why people will buy our product - the coins don't correlate. We don't have this modeled or quantified, but when we can show our Sharpe ratio, we hope it will outperform any other cryptoinvestment on a risk-adjusted basis.

12. Security

Our model is a "write once" production model, so as soon as we purchase the coins we send them to cold storage. Private keys for the various coins will be kept by trusted individuals. In this way, the most we can lose is a batch of coins, which won't kill us.

13. Intellectual Property

The only intellectual property an index can have is the software that executes the trades and the name. I don't think the actual index construction can be protected, since it would be easy to reverse engineer and come close using any number of other methods.

Our trading software is proprietary. We have been careful to make sure that people who help us contribute their work in exchange for our stock and that the company has the rights to their work. It should be noted that this is not rocket science - any competent developer should be able to build a system like this in a few weeks.

The main IP is in the name. Since indexes don't (usually) have logos, the name and its copyright are vitally important. We have worked hard on naming. We haven't decided on a name yet. Here are our finalists:

Generic names
COINEX, COINX, COINDEX
CRYPTEX, CRYPTX
KRYPTX, KRYPT-X
CCI (CryptoCurrency Index)
CMI (Cryptocurrency Market Index)
CC1

More proprietary names
CORE index - Devin
COREX
CCORE (CryptoCore)
SMART index
SMRT index
SMARTCOIN index
WOW index (easy to remember, similar to DOW)
CHIEF index
TOKN (TKN)
SB1 (Smart Beta 1)
HIP index
CHAINX
FOURX (refers to fourth-root weighting)

Please tell me if you like any of these!

14. Reporting

We plan to report our NAV daily. Our performance data will be available via API. We will probably have a quarterly newsletter. And we will provide full transparency on our expenses. All our public keys will be on our web site, and we'll eventually have a blockchain explorer to show our coin inventory on the various chains. We can also show the drift between our token and the underlying portfolio (the delta shows our fee).

15. Legal Issues

We are looking for guidance from lawyers. From the Lykke point of view, our token probably isn't much different from the Solarcoin. We are talking with Lykke now about our application.

We welcome any comments (not binding opinions) from lawyers on questions like:

> We will need a contract that specifies the relationship between the tokens and the underlying assets. Is there a good model we can follow?

> Could our token be seen as a pass-through vehicle? I don't think so, but I would like to be sure.

> Do we need any kind of license, or legal opinion or status for listing on the Lykke platform?

> Do we need a prospectus? I'm guessing we do. Is there a prospectus out there we can use as a template?

> What would we need to sell this token on our own web site? To which countries could we sell?

> What are our jurisdiction limitations? What countries should we care about most, from a regulatory point of view?

> What are our potential liabilities?

> Whom can we solicit? Whom can we not solicit?

Any other thoughts? Feedback requested! Thank you.