The power of us

White Paper

Community-based, ad-free search engine built on web3 foundations; developed and tested by the team at Better Internet Search Ltd.

Version 2.2, 9th June 2023

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Disclaimer

The information in this white paper is provided by the legal entity Better Internet Search Ltd (the Company), a limited liability company registered in Scotland, UK (registration number SC628843). Kin is a brand and trading name of the Company.

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Introduction

Kin is a search engine built on Web3 principles where the focus is on community, transparency, and privacy. This is in stark contrast to the current Web2 based search engines where the advertiser is the real customer, and the user has become the product. This results in two very different user journeys.

Brian uses Google and Sarah uses Kin.

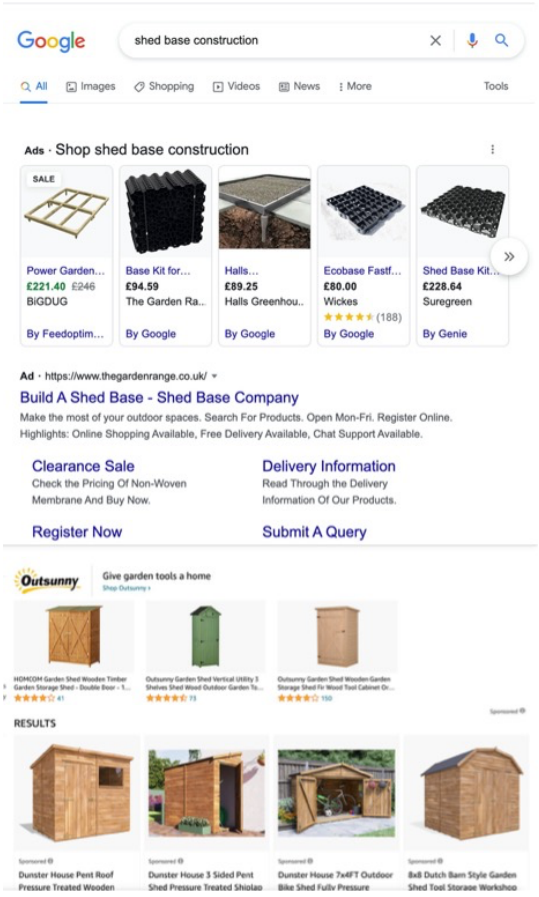

Figure 1 - Screen shots from Brian's searches

(100% ads and sponsored content)

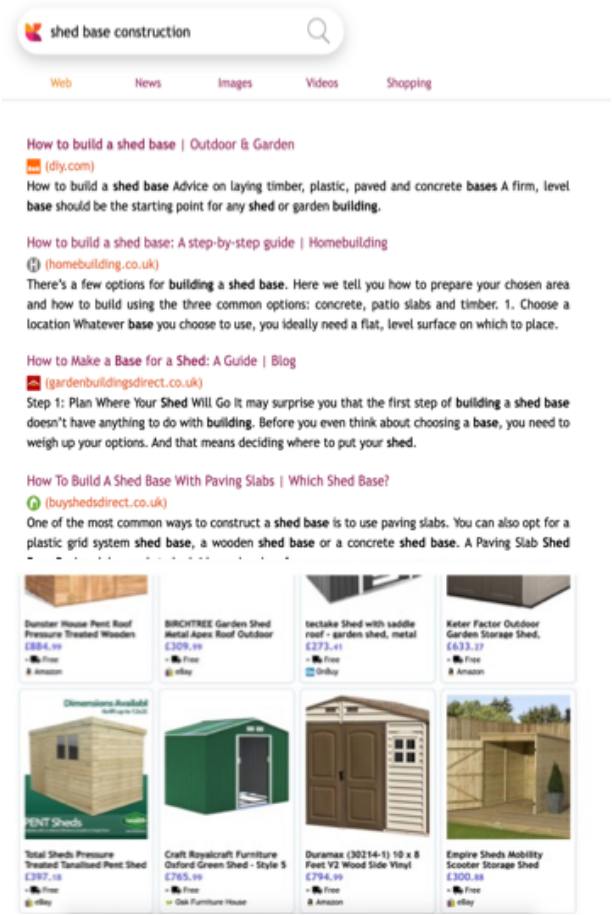

Figure 2 – Screenshots of Sarah's searches on Kin

(no ads or sponsored content)

Brian is considering getting a shed for his garden. He uses Google for his research and begins with the search for “shed base construction”. He receives a screen full of ads which are related to shed bases, but not what he was looking for, so he must scroll beyond the ads and sponsored content to find content which is ranked according to how well each website has managed their Google search engine optimisation (SEO). After completing his research and enduring the constant barrage of ads, he decides to shop for his new shed. Like most people Brian goes directly to retail sites when shopping online. He looks on eBay first and sees some potential options, then decides to compare what is on offer with those from Amazon, eventually he decides and buys one from the Amazon site.

In Figure 1 you will see genuine screen shots of the Google search for “shed base construction” and for the Amazon search on “shed”. Notice that everything on the screen is an advert or sponsored content. Brian sees the content that advertisers are paying Google and Amazon to show him first.

Now that Brian has bought his shed, he finds that for weeks afterwards he is bombarded with adverts and clickbait related to sheds.

Sarah is also considering getting a new shed. However, she uses Kin for her research and gets directly to the information she wants without running the gauntlet of continuous adverts. After completing her research, she decides to find the right shed to buy. Unlike Brian she can easily do ad-free shopping searches without leaving the search engine. She types “shed” into the Kin search bar and clicks shopping. Immediately she can see the range of sheds available from hundreds of different retailers including eBay and Amazon, so she can easily make comparisons without swapping between retail sites.

She chooses to buy her shed from the retailer Oak Furniture House, a retailer she did not know existed, but was attracted by good reviews and the discounts on offer. Not only did Kin help her find a great shed at a great price, but she was also rewarded with loyalty tokens because of her online shopping. Kin has a community-owned

ecosystem and shares revenue in the form of tokens which accumulate in her account, and the real monetary value of the tokens she holds increases over time.

Genuine screenshots from her search for “shed base construction” and “shed” using Kin’s prototype Web and Shopping searches are shown in Figure 2.

Kin is a private ad-free search engine and so Sarah’s searches were invisible to the internet and no shed related content is targeted at her following her purchase. She was so delighted with her experience that she decided to recommend Kin to Brian. Brian started using Kin and both he and Sarah received some bonus reward tokens as a result.

The Problem

The reason that most people stick with Google is not because it is a better search engine (others give equally good results), it is because of familiarity with the brand and product, and the friction they face changing their device browser settings to an alternative. This ensures that most customers remain with Google. Alternative search engines (such as DuckDuckGo, Ecosia and Qwant) have been growing their market share in recent years, collectively they are worth $ billions, but have still had little impact on the current search monopoly held by Google.

Getting users to switch to an unfamiliar product is difficult, and so they must be given a very compelling reason (or reasons) to make that change. This is the core of the problem faced by the current alternative search engines – they lack differentiation from the incumbent products and so there is a limited incentive to change. They all deliver ads (which are generally disliked) and then they deliver SEO ranked results. The user experience is essentially the same and any claimed benefits are marginal.

This results in two further problems for alternative search engines. The high cost of customer acquisition for products with marginal differentiation, and the lack of customer loyalty since alternative products can offer similar benefits.

To properly disrupt the search market the product must be good and offer a new benefit that is so significant that users want to recommend it to their friends (lowering the cost of customer acquisition) and the benefit must not be short-lived or easily replicated (so users have a high lifetime value).

The Solution

Kin uses an alternative revenue model combined with a token-based community ecosystem to directly address the problems described. Our solution results from over two years of business model development and the deployment and testing of a new search engine platform. We identified that the pay-per-click (PPC) ad-model, which is universally used for search monetisation, is the core problem. PPC is becoming less effective and causes many issues for search users.

Our unique solution was designed to address the major issues faced by our competitors. Our offer is clearly different in having an **ad-free revenue model** and a **community-owned ecosystem**. The business model inherently incentivises new users to join our community and provides long-term benefits for users that stay invested in the platform and ecosystem. Thus, our unique business model addresses the three largest problems faced by competing search engines, i.e.

1. Differentiation
2. Cost of Customer Acquisition (CoCA)
3. Customer Lifetime Value (LTV)

A New Search Engine Platform

Our search platform began life with organic search covering web, news, images, and videos. We source the results from Microsoft's indexed data and so the organic results are similar to those found on Bing, DuckDuckGo, Ecosia and others that use this same data source. However, our results have a major difference – they are not preceded by ads and sponsored content (or click bait, scams, and fake news).

Our current search results are already better than Google or Bing, simply because they are 100% ad-free. We will continue to improve results further and have a granted patent [1] describing a novel privacy-preserving two-stage federated search method that implements filtering and re-ranking using machine learning, as shown in Figure 3. The current organic search implementation has been in testing with live users for over one year and has been well received.

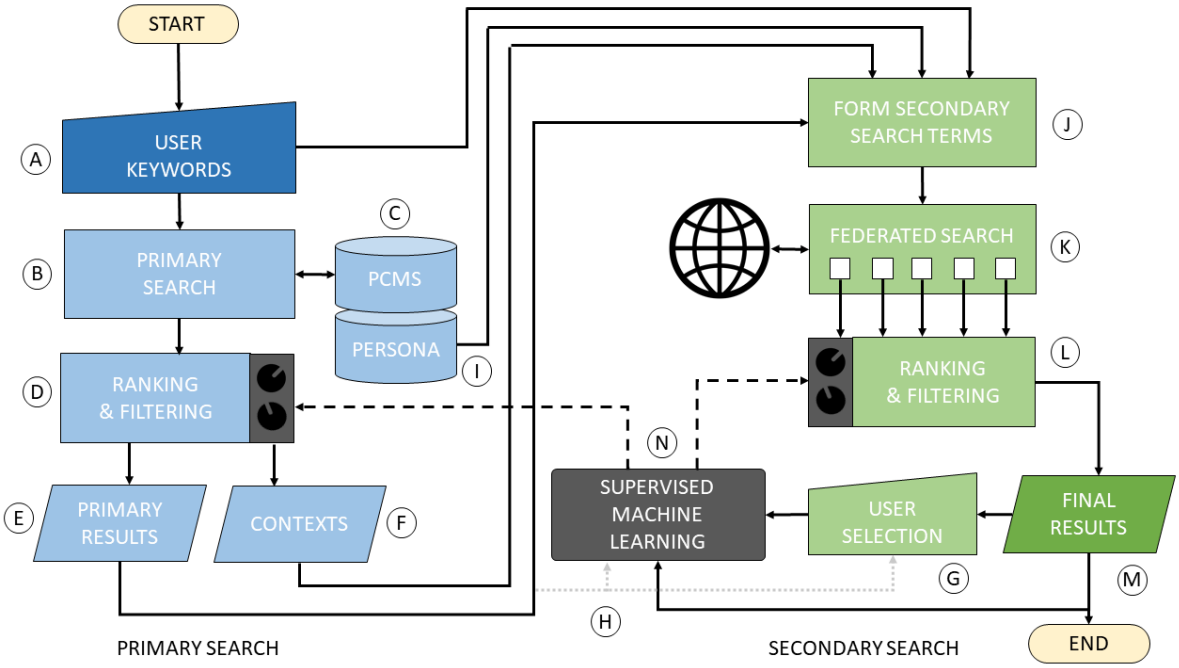

Figure 3 - Diagram from granted patent on new personalised search technology.

The ad-free revenue model is based on a federated search method we developed for online shopping. Online sales are growing rapidly while digital ad revenue is stagnating. Our product finds items that users are actually looking for, and we do this by searching multiple retail channels in parallel. We then merge the most relevant results onto a single display of product tiles which link directly to the retailer's product page. Our incentive is to find products our users wish to purchase since success means we receive a percentage of that sales revenue.

Our first implementation of shopping search was through our retail partner Kelkoo, giving us access to literally thousands of retailers and millions of products. More

recently we have included all products from Amazon and eBay which has added millions of additional retailers worldwide. We will also be adding Etsy, Awin and others. We have started to generate early revenue from these shopping searches, and we are developing the rewards scheme to incentivise users to use our shopping feature rather than going off-platform to individual retailers such as Amazon. We have already implemented an experimental user rewards scheme for shopping searches. The initial prototype system used the Scotcoin [2] cryptocurrency (SCOT) for rewards but has recently been replaced with our own token (KIN-MPC) to create an ecosystem that is owned by our community of users and supporters.

Users maximise their rewards by using shopping searches to find online goods rather than going directly to a retailer's website. We offer a wider range of products than individual retail channels and this is combined with the benefit of receiving Rewards Tokens that have a real cash value and may be sold on the platform. Users may get additional rewards if they successfully refer friends to the Kin community. When users hold on to their Rewards Tokens, they can also benefit from the increase in value of these tokens over time. Thus, users can share in the success of the platform, and they are also incentivised to stay on the platform and to encourage others to join and grow the user community.

There is a user account (to receive the Rewards Tokens), however being 100% ad-free means we have no direct need to capture any personal user data, and so our model is completely privacy-preserving. Another massive benefit of being ad-free is efficiency and sustainability. There is no advert delivery and rendering overhead, so we free up our user's screen, processor, Wi-Fi, and broadband, and we don't need to run ad-servers. This speeds the delivery of results while saving an estimated 35% of the CO_2 used by current search engines.

Blockchain technology is used to secure the value of the Rewards Tokens. The block validation mechanism uses a sharded proof-of-verification method which is highly scalable and 1000 times more efficient than conventional proof-of-work mechanisms.

With ledger updates running only once per day the costs and energy associated with the blockchain operations are negligible.

Key User Benefits

Our alternative business model delivers significant benefits to users. The user experience is transformed but the user interface is still familiar and intuitive. The key user benefits are:

- **100% ad-free search**
- **100% ad-free shopping**
- **Community owned ecosystem with profit-sharing**
- **Opportunity to share in the future success of Kin**
- **Greener & more sustainable**
- **Privacy-preserving**

Note that Google offers none of these benefits, DuckDuckGo only offers privacy, and the new 'ethical' generation, such as Ecosia, offer just the bottom two benefits above. The benefits within the general competitive landscape are shown in Figure 4.

	First Gen.	Second Generation		Next Generation	
	Bing Google	DuckDuckGo Qwant	Ecosia OceanHero	brave neeva	kin
Revenue share	✗	✗	✗	✗	✓
Ad-free search	✗	✗	✗	✓*	✓
Ad-free shopping	✗	✗	✗	✗	✓
Community-owned	✗	✗	✗	✗	✓
Green/ethical	✗	✗	✓	✗	✓
Private	✗	✓	✓	✓	✓
Free	✓	✓	✓	✗*	✓

* Ad-free available for a fee

Figure 4 - User benefits in the competitive landscape

Traction

Better Internet Search (the Company) has already developed the business case by operating a prototype version of the proposed commercial model. It has been tested globally with over 1000 users recruited mainly by word-of-mouth. The unique revenue model has been implemented and the rewards system tested using Scotcoin. There has been no advertising or marketing, however the search engine has already attracted media interest. The homepage of the prototype search engine is shown below in Figure 5. Note that in the top right of the screen you can see that 'Gordon' has earned rewards of 8430 SCOT.

Figure 5 - Homepage of the prototype search engine

This prototype has been further developed into a beta with the new Kin branding and was released on 1st May 2023. This white paper describes the system which will be developed directly from the current Kin beta and launched with the new Kin utility token. This token enables us to operate an internal token ecosystem that will drive the growth of our new user community.

The current prototype is free for users to try [3].

The Kin Brand

The Edinburgh-based creative agency Family [4] have been developing the new brand, Figure 6. The Kin name, logo and strap have already been created and revealed publicly. The brand is being developed to reflect that we are completely different to all other search engines and that our community is a core part of who we are. Work will continue with Family on developing this brand, its messaging and marketing materials.

Figure 6 - The Kin brand is being developed in collaboration with the Family creative agency.

The Better Internet Search name is now being phased out in favour of the Kin branded search engine. The web domain searchKin.com is to be used from now on for both the search engine and for the company website.

Token Model

A proportion of the revenue generated from our user community is used to fund the token rewards programme. This proportion can be adjusted to balance the need for customer loyalty and user growth against the need to retain profits. By way of example, we can assign 50% of the total revenue to be used as a catalyst in the ecosystem. This revenue-share is used to purchase any tokens that users may wish to sell and thus creates a recirculation of tokens in the economy.

There is a detailed description of the Token Ecosystem in Appendix A. In summary, the users gain loyalty tokens via our rewards programme. The tokens are used to incentivise users to use our shopping searches and to create a viral system of user referrals. We have a pool of tokens and can issue these to users as rewards. We use blockchain to ensure that token transactions are recorded securely and to ensure that only a finite number of tokens will ever exist. The scarcity of the token supply and the need for tokens for rewards creates an internal economy and establishes a value for the token (based on the economic principles of demand and supply).

We do not give users the revenue-share directly in cash, we give them the equivalent value in tokens with each user receiving their pro-rata reward based on their shopping search activity level. To ensure we have a constant supply of tokens for the rewards we buy tokens from any user wishing to sell them with the revenue-share cash, thereby creating a circular economy or ecosystem.

As our user numbers increase, there becomes a greater demand for tokens in the ecosystem. This is either satisfied by issuing more tokens or simply by allowing the token price to rise. We can control the supply of tokens which influences the price, and we exercise this control to ensure that the token value will increase in a manner that does not outpace the growth in the internal economy. Most users will wish to hold tokens as an appreciating asset, so the likelihood is that few will elect to sell them in any given period since there is a clear benefit for remaining a loyal token-owning user.

As well as tokens issued as rewards, we can sell tokens to our Supporters that wish to hold them in relatively large numbers. These Supporters provide additional funds for the Company to develop and grow the Kin ecosystem. In the short-term, tokens can only be bought and sold within our closed economy, however in the longer term we can list the Kin token on secondary markets so it can be traded.

For a more detailed explanation of the Token Ecosystem please go to Appendix A.

Personal Data & Trust

The Company has experimented with user personas, and we know that user profiles and search history are valuable for improving and personalising the search for information and products. We have conducted user focus groups where we discussed data use and ownership, and we accept that users are (understandably) nervous about any use of their personal data. In the first phases of the development the Company has decided to minimise the amount of personal user data being stored so that we can build trust.

In the later phases of development, we will implement aspects of our patent to deliver additional benefits that users can gain from their personal data, without compromising privacy and security. Users will own their personal data and have authority over how it can be used. We aim to use established third-party solutions, specifically Partisia's Multiparty Computation (MPC) technology, to ensure the data is secure and cannot be used without proper user consent [5]. We will also allow users to benefit from their personal data in applications outside of the Kin platform, e.g., using the Inrupt technology [6] developed by Tim Berners-Lee's company. By using technology which has transparency for users, we aim to maintain trust while allowing users to benefit from the power of their own personal data in the future.

Business Model

Much has been written about the problems of the current advertising model, most notably in the book "Surveillance Capitalism" [7] which reveals the internet's AI-driven conclusion to profit-driven metrics in scary detail. The more recent book "Stakeholder Capitalism" [8] shows why these models are becoming outdated and suboptimal in today's world. With the availability of Web 3.0 and decentralised technologies it becomes possible to build an efficient system where users and supporters become

a community of stakeholders and drive the next generation of internet brands in a way that benefits all stakeholders, not just the business owners and shareholders.

Our business model with the token ecosystem is an implementation of such a stakeholder economy: we allow our users and other supporters to become invested in driving the business forward, and they benefit from this participation through their ownership of the ecosystem and the profits it generates.

Collectively, business stakeholders tend to be concerned about three things: economic, social and environment sustainability. This is often referred to as the triple bottom line of: profit, people, and planet. An ethical and sustainable business that achieves a good balance of these factors (see Figure 7) can outperform companies that focus on profit alone [9]. The business model used by Kin addresses this balance. Profit is achieved from the revenue generated by the shopping search model; users benefit from the revenue-share and are incentivised to grow the economy which increases the profit. By using an ad-free model we significantly reduce the carbon footprint of search, providing a benefit for the planet and another reason for users to join the community and thus accelerate profits.

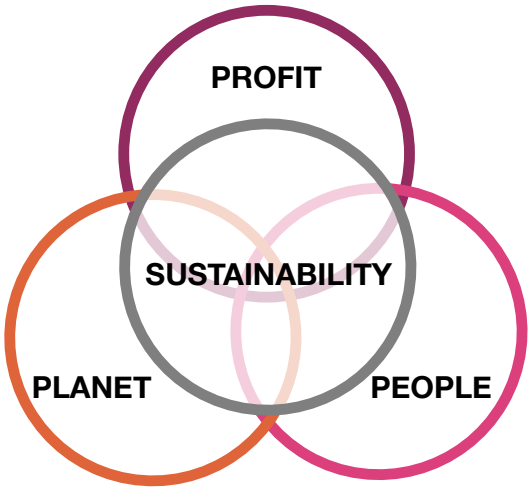

Figure 7 – The Triple Bottom Line for Sustainability

Kin has three types of direct stakeholders, and all of them can participate and benefit through token ownership.

Users

Our users gain a share of the revenue proportional to their contribution to generating that revenue. By being transparent about how revenue is generated we can help users increase the value of their rewards, and thus increase the value of the economy and the corresponding increase in the value of the tokens they own.

Supporters

By purchasing tokens our Supporters become significant stakeholders and contribute to the development of the ecosystem. They will benefit from this support due to the rise in the value of the tokens they hold.

Kin Team and Advisors

The Kin development team and advisors are creating the infrastructure, and as stakeholders in the economy they are incentivised to build a great platform and a token economy that is successful.

Token Allocation

To support our stakeholders, the following token allocations are proposed:

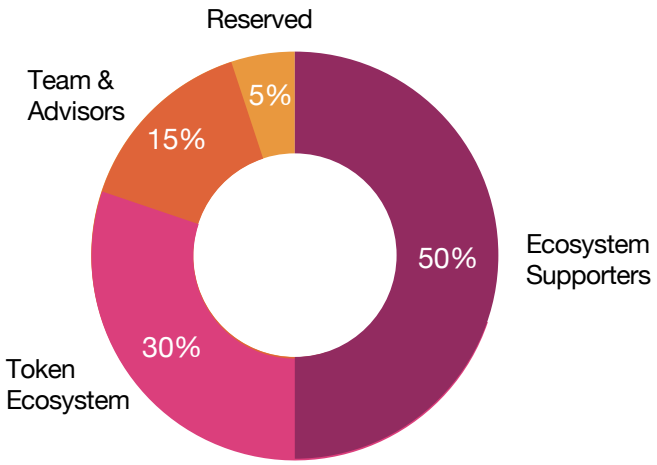

Figure 8 - Allocation of Tokens

Token Ecosystem – 30%

There are two active token 'pools' within the ecosystem. The Company Token Pool (all the minted tokens currently owned by the Company), and the User Token Pool (all tokens owned by users), i.e., collectively they are the number of tokens that are freely available to circulate in the internal economy. The majority of these tokens are initially held in the Company Token Pool but are available for issue to users and so the User Token Pool will grow over time. The Token Ecosystem is not restricted to 30% of the allocated tokens since tokens from all the other allocations can be absorbed into the ecosystem when they are sold or transferred.

Ecosystem Supporters – 50%

These are tokens that will be allocated to Supporters that wish to help fund the company's development and own part of the ecosystem that they are helping to grow. The Company will be limited in its ability to buy large volumes of tokens from Supporters during the early stages of the ecosystem growth (restricted by the revenue-share). However, much larger sales will be possible once the economy grows, and of course transactions will be unrestricted on the exchanges once the token is listed. Supporters that retain tokens for the medium to long-term are likely to benefit most from the rise in Token Price and will also find it easier to sell their tokens.

Team & Advisors – 15%

The current founding team and advisors will be awarded options on a proportion of these tokens, with the remainder being used as a future pool for new employees and advisors as agreed by a remuneration committee appointed by the Company board of directors. The tokens will only be unlocked by achieving certain milestones relating to the platform roadmap and its performance.

Reserved – 5%

Reserve tokens can be made available for unforeseen future events requiring additional tokens.

The maximum number of tokens that can be minted is set to 2 billion within the smart contract, and for the initial phase we will release only up to 10% of that limit. Thus 30 million will be available for the Token Ecosystem and we plan to sell up to 100 million to early Supporters. The tokens reserved for the team and advisors will not be available immediately and so cannot be sold in the short-term. There is no reason to restrict the sale of privately held tokens prior to secondary market listing, but these will be privately agreed transactions.

Team

Start-Up Team

The start-up team has decades of experience in technology start-ups, IP creation, business development, full-stack software development, scrum methodologies, UI/UX and Web 3.0. This small team deployed and tested the unique new search engine prototype in less than 18 months. After investment the team will be expanded with additional resources applied to software development, marketing, R&D and business development.

Leadership and Advisory Team

The team of leaders and advisors has evolved in line with the needs of the company and will continue to evolve and be refreshed as the company, and its needs, expand. The current team is summarised below.

Dr Gordon Povey – CEO

https://www.linkedin.com/in/gordonpovey/
Gordon is the Company CEO and founder. He completed a PhD in telecommunications and signal processing and became an academic at the University of Edinburgh. He then used his knowledge of communications and software technology to become an entrepreneur and has built technology companies from start-up idea through to angel and VC funding rounds of up to seven figures resulting in trade sales of up to eight figures. He led the development on the EU's Next Generation Internet (NGI) Trust funded projects that became the catalyst for the establishment of Better Internet Search and the Kin search engine.

Ian Wright – Marketing Advisor

https://www.linkedin.com/in/ian-wright-bb391113/
Ian is a business leader with global experience in marketing & communications. He is a founding partner of the Family Advertising agency and managing director of Tribe Global an international network of communications agencies. He also runs a business consultancy and advises the Company on branding, marketing, and communications.

Prof Bill Buchanan OBE- Technology Advisor
https://www.linkedin.com/in/billatnapier/
Bill is a professor at Edinburgh Napier University. He is an international expert in cryptography and blockchain and has a track record of successful spin-out companies. In 2017 he was awarded an OBE from the Queen for his services to cyber security.

Beth Scott – Client Advisor

https://www.linkedin.com/in/scottbeth/
Beth is a senior-level business development and management consultant with extensive international experience in the high-tech sector. She has expertise across strategic relationships development, business strategy and management incorporating thought leadership, planning, communications and corporate governance. She assists the company in client engagement including direct user communications.

John Craig – Product Advisor

https://www.linkedin.com/in/johncraigh/
John is an independent product manager based in Munich. He was formerly Manager of Products, Campaigns and Marketing for Telefonica Germany and has international experience of bringing products to consumer markets. He advises the Company on product development and the go-to-market strategy.

Michelle McWilliams – PR Advisor

https://www.linkedin.com/in/michelle-mcwilliams-4b010326/
Michelle is a PR & marketing communications professional with decades of experience covering technology, arts, and tourism sectors. She has worked in Whitehall with Ministers on multiple campaigns and is an NXD and Trustee for the charity Royal Blind. Michelle advises the Company on media engagement.

Ian Myles – Technology Advisor

https://www.linkedin.com/in/iamyles/
Ian is based in Silicon Valley and has a background in Industrial Design and Technology. His experience spans mobile payment, IoT, UI & UX design, AI and blockchain. Ian is very well connected and has worked on the Company's Advisory Board for the last two years.

Kadri Tammai – International Business Advisor

https://www.linkedin.com/in/kadri-tammai/
Kadri is a start-up mentor and head of a business incubator based in Tallinn, Estonia. Through the support of the EU's Next Generation Internet Tetra programme, she has helped develop our business proposition and will continue to support the Company in reaching its goals during the next phase.

Partners

Our team has broad knowledge on Web 3.0 technology, and we are complementing this by partnering with world authorities in this field. Partisia and the Partisia Blockchain Foundation have decades of experience and deep knowledge in cryptography, decentralised computing and blockchain. To develop the current

prototype we have also worked with Edinburgh Napier University, and with the EU's Next Generation Internet programme on Trust (NGI Trust).

Partisia Blockchain – Partners

https://www.partisiablockchain.com/ecosystem
The Company has been working with Partisia since January 2021. As partners they provide access to their world-leading blockchain and Multi-Party Computation (MPC) technology. Our token ledger is being written to their Layer 1 Partisia Blockchain (PBC) and the Kin Smart Contract v1 has been run to mint the first tokens secured on the PBC.

Blockpass Identity Lab – Collaborators

https://www.napier.ac.uk/
Our collaboration with Edinburgh Napier University dates back to 2019 when we first worked with Prof Bill Buchanan OBE and Dr Owen Lo on the feasibility project for a new secure search engine. We were located within their Blockpass Identity Lab which supports projects using blockchain to protect personal data.

Next Generation Internet Trust - Supporters

https://www.ngi.eu/ngi-projects/ngi-trust/
The EU's NGI Trust supports the development of a human-centric internet by developing the ecosystem of research, innovation in the field of privacy and trust enhancing technologies. The NGI Trust financially supported both the initial feasibility project and the development of the proof-of-concept platform used in the current search engine prototype.

Family agency - Partners

https://www.familycomms.com/
Family is an award-winning digital, advertising and design agency based in Edinburgh. They helped create the Kin name, logo and messaging, and continue to work on developing this into an international brand.

Roadmap

The roadmap is presented in five phases with Phase 0 being the initial start-up. Phase 1 (a tested prototype) is complete. We are currently working on Phase 2 which

includes the Kin branded beta (now released) and the community-based ecosystem with multiple enhancements and optimisations prior to the release of the final product. Phase 3 addresses growth in the domestic market with testing in other markets. Phase 4 is about international roll-out and scaling. The top-level roadmap is shown in Figure 9 with the roadmap milestones listed below (milestones in purple have been completed).

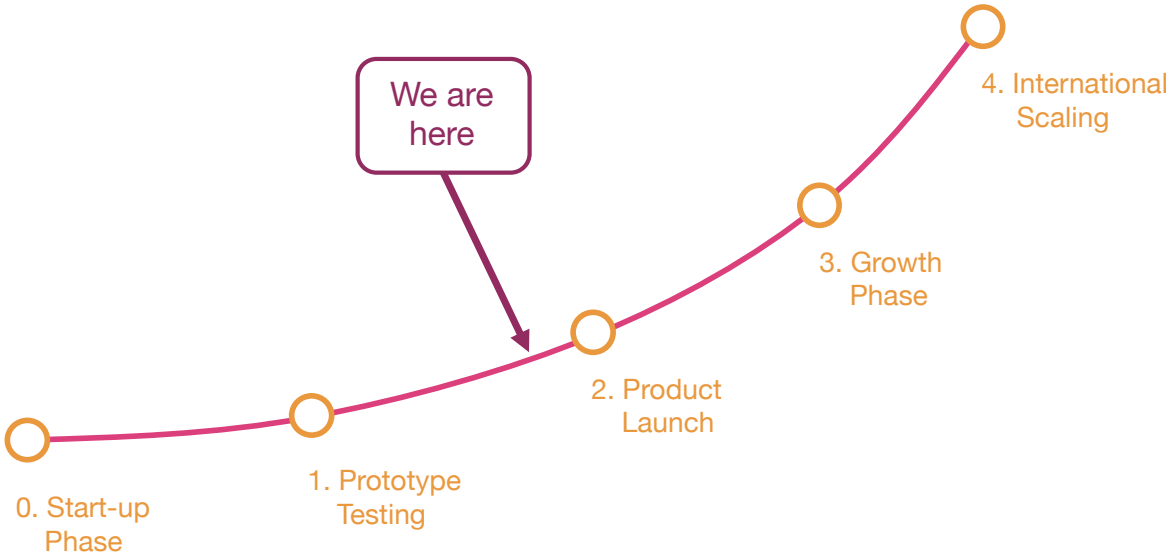

Figure 9 - Roadmap Phases

Phase 0 – Start-up and feasibility (2019-2020)

- Incorporation of Better Internet Search Ltd – March 2019.
- Bid for EU Next Generation Internet (NGI) Trust funding is submitted – March 2019
- Feasibility project bid to NGI Trust is successful – July 2019.
- Collaboration with Edinburgh Napier University (ENU) agreed – August 2019.
- Office established within the Blockpass Identity Lab (BIL) at ENU – September 2019
- Start-up team assembled and project kick-off – September 2019.
- Concept testing and user groups – October 2019 – February 2020.
- Organic search first alpha release – v0.1 April 2020.
- NGI project completed successfully, and search platform goes live – July 2020.
- User testing continues – August 2020 – December 2020.

Phase 1 – Prototype development and testing (January 2021 – December 2021)

- Collaboration with Partisia Blockchain initially supported by NGI – January 2021.
- Shopping monetisation model first release – v0.2 May 2021.
- Pre-seed funding – August 2021.
- Implementation of Scotcoin token model – November 2021.
- First prototype with tokens and monetisation is complete – December 2021.

Phase 2a – Development of branded product (January 2022 – October 2022)

- Branding exercise with Family Advertising Ltd begins – January 2022.
- Enhanced product searches (including eBay & Amazon) – v0.3 March 2022.
- Implement and test token model in Partisia Blockchain Testnet – v0.4 June 2022.
- Development of the Kin Smart Contract v1 – July 2022.
- Secure search patent granted – August 2022.
- Initial Kin utility tokens minted on the Partisia Blockchain Mainnet – September 2022.
- Branding project with Family; phase 1 completed – October 2022.

Phase 2b – Kin product & token launch (October 2022 – December 2023)

- Reveal Kin brand (with logo and strapline) – October 2022
- Token launch and issue 4 million tokens for Supporters – November –> December 2022.
- Migration from Scotcoin to Kin tokens for all existing users v0.5 – December 2022
- Recruit Kin Guru's for Kin community building – February 2023
- Kin branded beta first release on searchkin.com β1.0 – May 2023
- EU Next Generation Internet (NGI) Search AI funding application – June 2023
- Kin 1 million token airdrop campaign launch on Zealy – June 2023
- New website to be launched at web3.searchkin.com – July 2023
- Token pre-sale A, issue of 30 million Supporter tokens – July 2023 –> August 2023
- Refinements to shopping platform – August 2023 -> December 2023
- Expansion of dev, marketing, and management team – August 2023 ->
- Active token economy live – October 2023.
- Token pre-sale B, 65 million Supporter tokens – November 2023 –> December 2023
- Full branded launch of Kin search engine in selected markets – December 2023.

Phase 3 – Kin growth phase (January 2024 – December 2024)

- Develop and release the Kin Smart Contract v2

- Refinement of token ecosystem to achieve viral-loop flywheel effect
- Listing of tokens via AMM DEX
- Issue of 200 million tokens to Supporters.
- Heavy marketing in domestic market.
- Development of smartphone app and Kin browser.
- Implementation of XAI algorithms to debias search results.
- Introduction of personas and personal data secured by MPC.
- Enhancements to IP portfolio.
- Entry into worldwide makets

Phase 4 – Internationalisation & scaling – (Janary 2025 ->)

- Issue of 200 million tokens to Supporters
- Large data sets used to improve relevance, ranking and personalisation
- Additional revenues from data markets (non-attributable data)
- Deployment and marketing into other worldwide markets.
- Potential for trade sale or stock market listing

Token Issue Schedule

Our initial Supporters are key to the successful launch and growth of the ecosystem. We aim to issue tokens to our first Supporters at a substantial discount to the Token Price set for the ecosystem launch. We have successfully migrated existing users from Scotcoin, which had a nominal value of £0.018. We set the value of the Kin token to this same value to make this a seamless 1:1 transition for these early users. We aim to sell Phase 2 tokens in 3 stages with significant discounts available for early purchases. The first experimental token pre-sale was successful and completed in December 2022 with good lessons being learned. The pre-sale A is now scheduled to begin in July 2023 and pre-sale B is scheduled to begin in November 2023. Some further discounts on the proposed token price may be offered for early pre-registrations

The Phase 2 token sales are shown in Table 1 with the volumes shown in millions.

	Volume	Price	Raise*
Token Launch	4m	£0.010	£40,000
Token Airdrop	1m	£0	£0
Token Pre-sale A	30m	£0.014	£420,000
Token Pre-sale B	65m	£0.016	£1,040,000
Totals	100m	---	£1,500,000

- The total raise could be less than these figures due to early discounts and incentives being offered.

Table 1 - Phase 2 – The Initial Token Sales

The experimental token launch was designed as a test and provided a small runway to the main token pre-sales. Pre-sale A will raise funds to develop the existing platform towards the product launch and will also provide funds for marketing of pre-sale B. Pre-sale B will then fund the post-launch marketing and platform support as the user community grows.

Phase 3 will see the token being tradable (potentially via the AMM exchange) so will provide good liquidity for our early Supporters. We aim to have a larger token sale that will fund the growth stage of the Company. From our ecosystem simulations we observe that the token should have increased in value to ~£0.036 in this time frame. This second token sale will release a further 20% of the tokens raising an estimated £7.2m. The final scheduled token sale on the roadmap during phase 4 in 2025 will release a further 200 million tokens to supporters at a potential price of ~£0.10 raising £20m. The proposed token allocations are shown in Table 2 with the values being in millions.

	Phase 2	Phase 3	Phase 4	Future	Totals
Token Ecosystem	60m	120m	120m	300m	600m
Ecosystem Supporters	100m	200m	200m	500m	1,000m
Team & Advisors	30m	60m	60m	150m	300m
Reserved	10m	20m	20m	50m	100m
Totals	200m	400m	400m	1,000m	2,000m

Table 2 - Token Allocations and Phases

Governance

The token governance takes two forms, manual and automated. Automated governance is controlled by the smart contact, but since the Company is not a decentralised autonomous organisation (DAO) we also require some manual governance. The manual governance relies on us following rules we have set out (as written in this white paper) or by future decision making. Any decision making that could materially affect the token operation or pricing needs to be made at board level. We currently have an advisory board but will also appoint a board of directors during 2023 for the purpose of token governance and Company governance.

As we learn how best to optimise the parameters used to control our ecosystem, it is likely that we can programme these into the platform and commit them to a future smart contract. Over time it is possible we will move towards a DAO model and take decision making away from the board.

Markets and Competition

An estimated 5.3 billion people are connected to the internet worldwide [10]. They are collectively making around 9.2 billion internet searches per day. The vast majority of internet search is monetised by PPC advertising, with Google the dominant company delivering 91.9% of all searches worldwide [11] and generating a revenue of ~$210 billion from digital advertising in 2021 [12].

The mainstream search engines are slowly losing market share to alternatives with superior policies on data privacy. The largest search engine in this space is DuckDuckGo (DDG) based in the USA. They now average around 95 million searches per day [13] (about 1% of the world market share) – giving them a potential market valuation of several $billion. The growth of DDG is largely due to their user-friendly data privacy policies, however their revenue is still generated directly from PPC advertising. Ecosia in Europe has a similar model with the ethical element of planting trees with some of their profits from advertising. They are also seeing rapid growth, and currently have 15 million users [14]. Despite the impressive growth curves of these alternative search engines, even collectively they look unlikely to disrupt the dominance of Google due to their limited differentiation.

Overall, the market for digital advertising is slowing and ad growth has now peaked. The search ad market share is falling too and click through rates are declining [15] [16] with around 43% of us using ad-blockers [17], whereas online sales are growing rapidly with the UK having highest level in world [18].

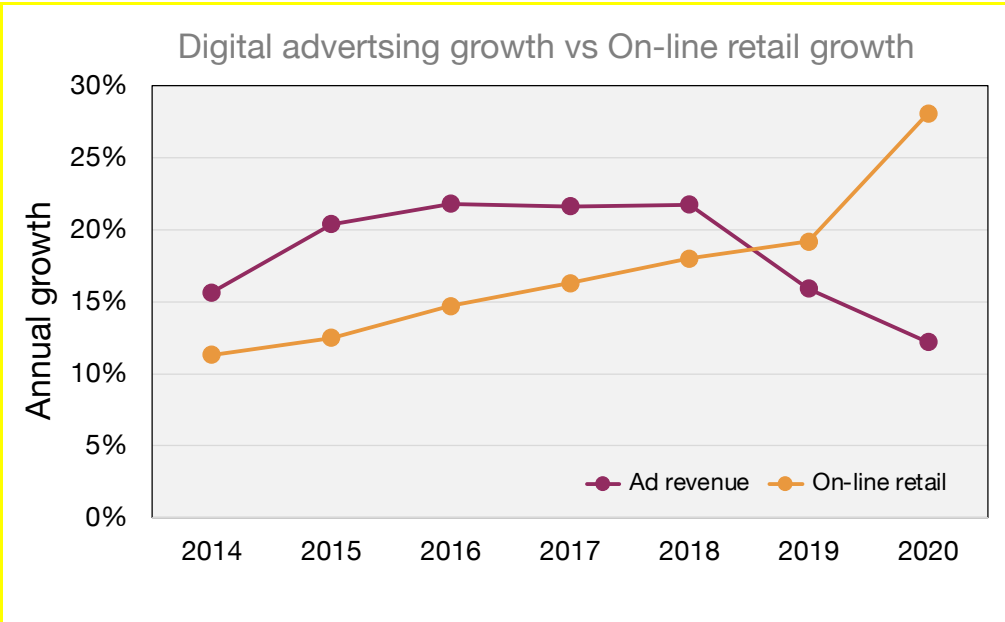

Figure 10 - Digital Advertising Growth vs On-line Retail Growth

Our initial target market is the high on-line spenders such as in the UK. Already ~30% of all UK retail spending is online (~£2,200 per adult per annum) and growing [19]. By 2026 it is likely to reach >35% and we have predicted that our average customer will spend £550 via our shopping search so <22% of their total online spend in 2026 and generate a commission of £16.43 (average commission ~3%). In 2022 before the shopping incentivisation system has been optimised, we have a predicted average user spend of just £165 and £4.11 commission (average commission ~2.5%) and so just 7.5% of their online spending will be achieved via our shopping searches. These are conservative assumptions, and the financial predictions and the proposed investments are based on these figures. Following on from the UK beachhead market we will consider other markets with high levels of online sales.

Our strategy for user incentivisation is based on behavioural science where we provide prompts or nudges to encourage users to gain more rewards (and hence become more profitable). We do this by offering strategies; suggestions via notifications on ways they can improve their rewards based on their user persona. We have a management dashboard that allows us to cluster users into persona groups and customise incentives, e.g. our most profitable users can be given a status that offers higher than average rewards for referring friends – since they are likely to bring users with similar profiles to their own. Our least profitable users can be offered different incentives and suggestions on how to increase their rewards.

Community Rewards Programme

The current plan for incentivisation of our community is summarised below.

- Referrals rewards: tokens are awarded for successful referral sign-ups.
- Promoter rewards: tokens are awarded for follows on social media feeds.
- Evangelist rewards: tokens are awarded for posting content on our channels.
- Team rewards: tokens are awarded when we recruit new team members.
- Feedback rewards: tokens are awarded for rating search results for AI training.

The levels of rewards will be the subject of experimentation to achieve the optimum impact of these rewards withing our community. Trading of rewards is also possible when the Company's internal trading portal is available. It is also likely that the rewards programme will be expanded to include other incentives that help grow the community and the value of the token.

Future Developments

The platform will continue to be developed and the current development phase will produce the beta platform with an operational token economy, and the Partisia Wallet will be compatible with these tokens. There are several areas of the platform we expect to develop further for future versions.

Bias and Personalisation

Biases are inherent in search results content although we do try to minimise this via filtering and ranking. In future we aim to use AI to balance results and reduce these biases further. Biases can also be personalised for each user. However, we do not believe in personalising results based on automatically generated user profiles (this is dangerous and leads to filter bubbles [20]). The current beta does not include any user personalisation, but we do plan to use 'personas' to allow users to optionally personalise search results via a UI where they can control their own persona(s). This technology is included within the granted patent.

Browser and App

We wish to reduce user friction and eliminate the need for passwords, with apps or browser extensions being options for this in the future. A Kin browser would likely use a decentralised VPN (DVPN) for privacy and integrate the search engine within the app built on open-source browser such as Chromium.

MPC

As we begin to work with more personalised data, we need to add layers of security to this data, and we will utilise the MPC programming environment and compiler developed by Partisia to implement this. MPC will be combined with the secure search techniques proposed in our patent. MPC allows us to process personal data without it being visible to the processing nodes (or hackers).

AI

The granted patent incorporates elements of AI and we have also been developing techniques to improve relevance of product searches using AI. A feedback UI is being designed in collaboration with a post-graduate AI specialist at the University of Edinburgh. This feedback provides supervised training data for the models with none of the data being attributable to a specific user. Users will be given additional rewards tokens as an incentive each time they provide this feedback. We are looking to ensure that the AI is used safely and wish to use explainable AI (XAI [21] as opposed to black-box) and may make algorithms open-source under the Apache 2.0 license for maximum transparency.

Search and Discovery

The current search algorithms use existing indexed databases, and we use a federated approach to selecting the most relevant content from multiple sources (some of which we pay to access). We will continue with this approach only we aim to find more sources of indexed data. The EU Open Search Foundation [22] aims to develop their own database which is likely to be a great resource for Kin in the future.

Our current shopping search uses only three sources (Kelkoo, eBay and Amazon) however we wish to offer more choice from small, independent, local and sustainable retailers, so will create our own portal for retailers to list products with fees being taken through the payment system integration. We may also offer integrations with the main ecommerce providers such as Shopify.

Future Revenues

Current revenues have been generated from shopping searches and this will be expanded. We also have future revenue stream options. The data from organic searches and shopping searches is valuable and can be sold on the emerging data markets. Thus, we can offer users the option to contribute their search data into anonymous datasets and reward them for these contributions. The operation of our own internal AMM can also generate revenue from the small transaction fees, although these fees are paid in KIN-MPC they will reduce the need to buy tokens for cash for use in the ecosystem.

Contact Details

All communications can be addressed to:

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Appendix A – Kin's Token Ecosystem

Kin's token is used for rewards and incentivisation within the Kin search engine platform. In this sense Kin tokens are a bit like airmiles or supermarket loyalty points. They are given to reward users for being loyal customers and to incentivise positive behaviour, e.g., by offering bonus rewards for introducing new users. The rewards have an intrinsic value as a utility token, and for security and transparency purposes these transactions are recorded on a blockchain. Unlike many companies that launch a token with the promise of future utility value, we have established the utility value for our token prior to implementing the new token system.

Users accumulate tokens for certain activities with shopping searches gaining the greatest rewards (since we generate revenue from online shopping purchases). At any time, users may elect to cash-in some, or all, of their tokens. In the future the tokens can be traded on public exchanges, however the first deployment will be an internal economy. The cash used to buy the tokens that users wish to sell is funded by the revenue-share.

The general economic principles of demand and supply govern how our tokens are issued and how the token price is set. We have two parameters that we can control (subject to certain constraints) in our 'tokenomics' model. These are:

1. The quantity of tokens issued (or de-issued) in the ecosystem.
2. The price we are willing to pay users for their tokens.

We use these two mechanisms within an algorithm that decides how to adjust the token supply and the token price at any given time. This enables the ecosystem to reach an equilibrium between the token demand and supply. The equilibrium point, *E,* on the graph shown in Figure 11 determines the price we pay to buy user tokens with the revenue-share, and the number of Rewards Tokens that will be given to users.

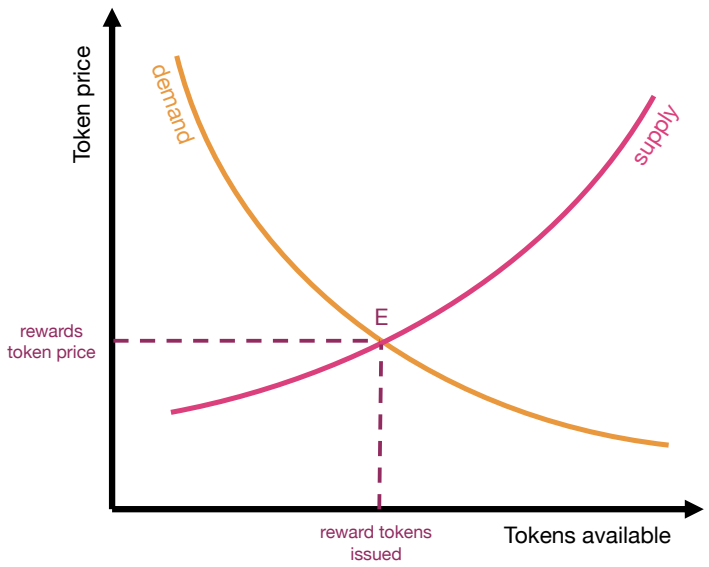

Figure 11 – The token price determined by balancing demand and supply

There is one important parameter of the algorithm that determines the balance between the Token Price adjustment, and the number of new tokens to release (or potentially withdraw). This is called the 'volatility factor' because it determines the extent to which we allow the open market to determine the Token Price.

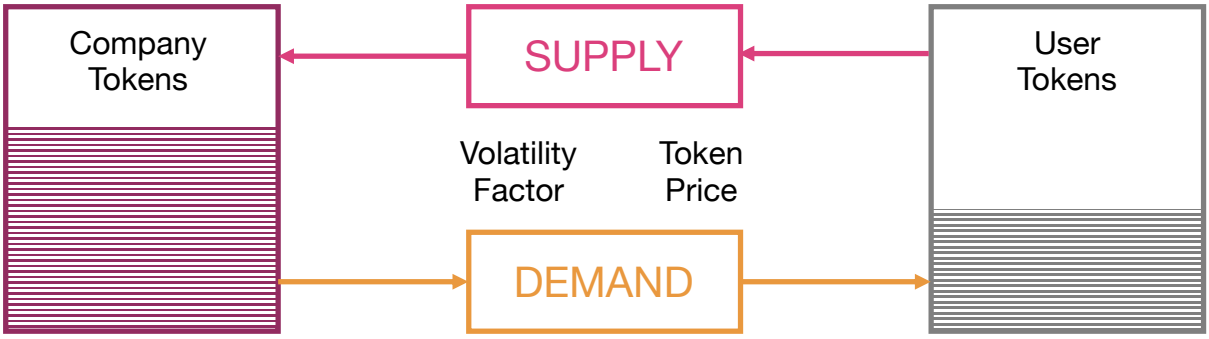

Figure 12 - The flow of tokens based on price and volatility factor

The model in Figure 12 shows how tokens transfer from the company's token pool to the user's token pool according to the dynamics of the market. The 'Company Tokens' are all tokens that the company owns and could readily issue. The 'User Tokens' are the total number of tokens held collectively by the internal Kin community of users. The demand for User Tokens is generated by the need to issue rewards to

the value of the agreed revenue-share. The supply back to the company's token pool is via users (or other token holders) that wish to 'cash-in' their tokens.

If the demand and supply are exactly matched, then the flow of tokens is in equilibrium and the company's token pool and the user's token pool will not change and the Token Price remains static. However, in any given time-period it is unlikely that these will be completely balanced and so there will be a net flow of tokens either towards the user's token pool, or towards the company's token pool. In the infancy of the ecosystem the Company will own a majority of the tokens and the net flow will be towards the users, and in proportion to the growth of the rewards. Once the ecosystem has grown there will be many token holding users, and some of these issued tokens will be sold back to the Company.

The actual flow of tokens is influenced by two factors: the Token Price and the volatility factor (VF).

Token Price

The Token Price is a function of the actual (or perceived) economic value of the company ecosystem, and the number of tokens which are in use. A nominal price can be set initially, and the market dynamics will adjust it towards the equilibrium price. The Token Price will rise naturally as the ecosystem grows (i.e., as more users join the community and use the platform). However, the price could fall if too many tokens were suddenly made available within the ecosystem. Even in the absence of an external market, the Company cannot simply decide on the Token Price at which it is willing to buy tokens. This price is adjusted dynamically according to this simple formula:

$$Token\ Price\ = \frac{Revenue\ Share}{Rewards\ Tokens} \tag{1}$$

Where the *Revenue Share* is the monetary amount of the revenue-share (which can be calculated on a daily basis) and *Rewards Tokens* is the total number of tokens that

will be distributed to all users for that period and is the sum of the *Reissue Tokens* and the *New Issue Tokens*, i.e.,

$$Rewards\ Tokens = Reissue\ Tokens + New\ Issue\ Tokens \tag{2}$$

Reissue Tokens is the number of tokens bought from users in that period and the *New Issue Tokens* are the number of additional tokens that will be taken from the company's token pool to provide the desired number of *Rewards Tokens*. Note that if *New Issue Tokens* is a negative number this means that tokens are being de-issued and the Company Token Pool will increase. Also note that the *Token Price* in equation (1) can be controlled or stabilised via the number of *New Issue Tokens*.

The decision mechanism for the issue of new tokens is based on the value of VF.

Volatility Factor (VF)

The VF value sets the degree to which the issue of new token can be used to stabilise the Token Price. A VF of 100% means that the Token Price is determined directly by matching the current supply to the demand without changing the number of tokens circulating in the ecosystem. The 'supply' is the number of tokens bought from users and available to be reissued as rewards, and the 'demand' is the revenue-share converted to reward tokens that are shared with the users.

With *VF = 100%* no additional tokens are issued (or absorbed) to influence the Token Price and so the result is maximum price volatility. In this scenario the Token Price could fluctuate significantly if the proportion of users selling tokens was not stable and this could potentially destabilise the ecosystem. The risk is greatest when the user numbers are small, and the ecosystem is in its infancy. Thus, in the short-term we would like to avoid 100% volatility. Under stable conditions the Token Price will increase rapidly as user numbers increase since the number of existing User Tokens is fixed, whereas the demand for them will continue to increase as shown in Figure 13. Consequently, there is no intrinsic value in the Company Tokens since they cannot be issued and so there is a general desire to have a *VF < 100%.*

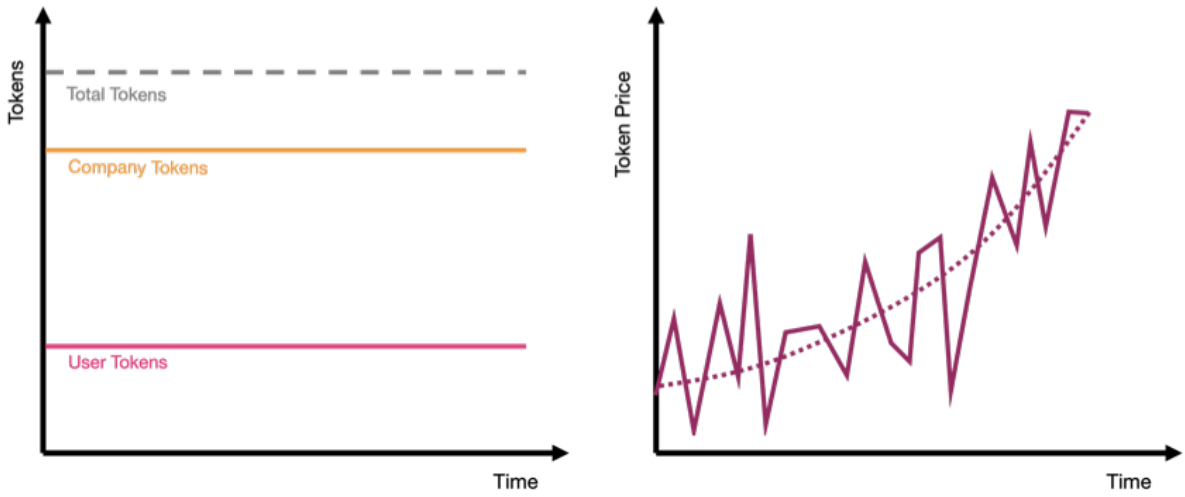

Figure 13 - Volatility Factor = 100%

The other extreme is 0% volatility shown in Figure 14. We use the supply of tokens into the ecosystem to fix the Token Price. If the Token Price is 1.0 and the demand rises, this would cause the price to increase if the supply of tokens was unchanged, however we can deflate the price back to 1.0 by issuing the correct number of new tokens into the ecosystem. Therefore, if tokens are still available for issue, it is possible to maintain a fixed Token Price even as user numbers, and hence token demand, grows. However, a fixed price is not desirable since users would lose their incentive to hold their tokens and the user community's loyalty will diminish. Additionally, the company's token pool could be exhausted pre-maturely and we would go directly from 0% volatility to 100%.

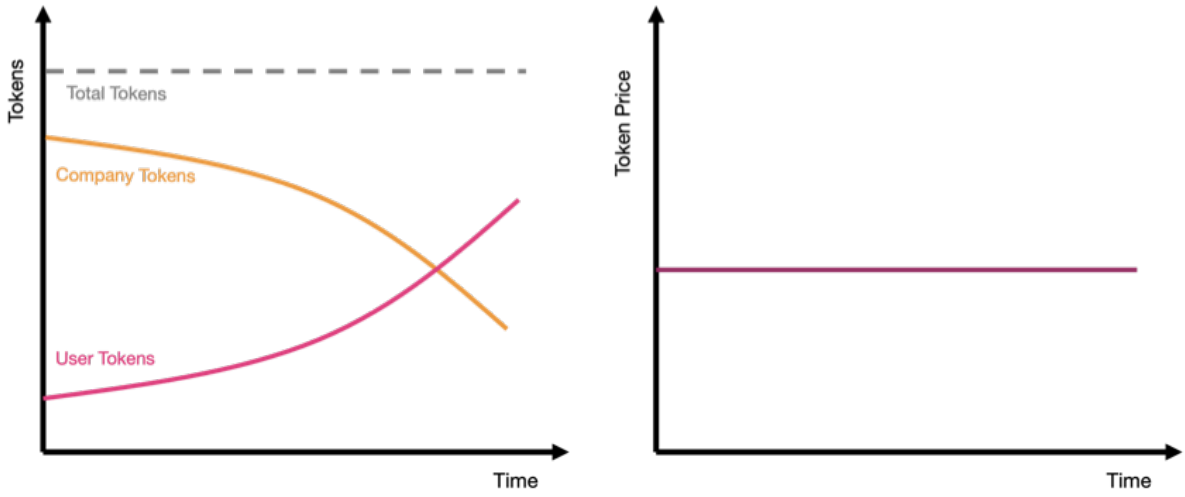

Figure 14 - Volatility Factor = 0%

Clearly the setting of VF is a compromise between stabilising the Token Price, while allowing it to rise in-line with the growing value of the Company's ecosystem.

The way VF is used in the token model is as follows. We determine the demand for tokens – this is the *Revenue Share* expressed as the number of tokens at the current unadjusted Token Price.

$$Demand = \frac{Revenue\ Share}{Token\ Price} \tag{3}$$

We then consider the current unadjusted supply of tokens i.e. those bought from users and recycled back into the ecosystem. We model these bought tokens as a percentage value of the total user pool (*Sell%*). So,

$$Supply = User\ Token\ Pool\ \times\ Sell\% \tag{4}$$

Where *User Token Pool* is the total number of tokens held by the Kin user community. Then we figure out the actual number of tokens required to balance the updated supply and demand when the Token Price and the new token issue are adjusted using VF.

$$Required\ Rewards\ Tokens = VF\ \times\ Supply + (1 - VF) \times\ Demand \tag{5}$$

The new adjusted token price can now be computed.

$$New\ Token\ Price = \frac{Profit\ Share}{Required\ Rewards\ Tokens} \tag{6}$$

And the number of new tokens required can now be found from the total requirement for rewards, less the tokens bought from users.

$$New\ Tokens = Required\ Rewards\ Tokens - Supply \tag{7}$$

Note that if *New Tokens* is negative this means tokens are added to the company's token pool rather than removed from it. If *VF = 1* (100%) then the required number of tokens is simply equal to all those bought from users in the given period and the Token Price will adjust to balance supply to demand since no new tokens are to be issued. If *VF = 0* (0%) then the demand will be exactly met by the issue (or de-issue) of tokens and the Token Price will not adjust.

If we now consider what happens when VF is say 50% - this allows some price stabilisation by adjusting the tokens in circulation, but also allows the Token Price to rise in sympathy with the growing company economy as shown in Figure 15.

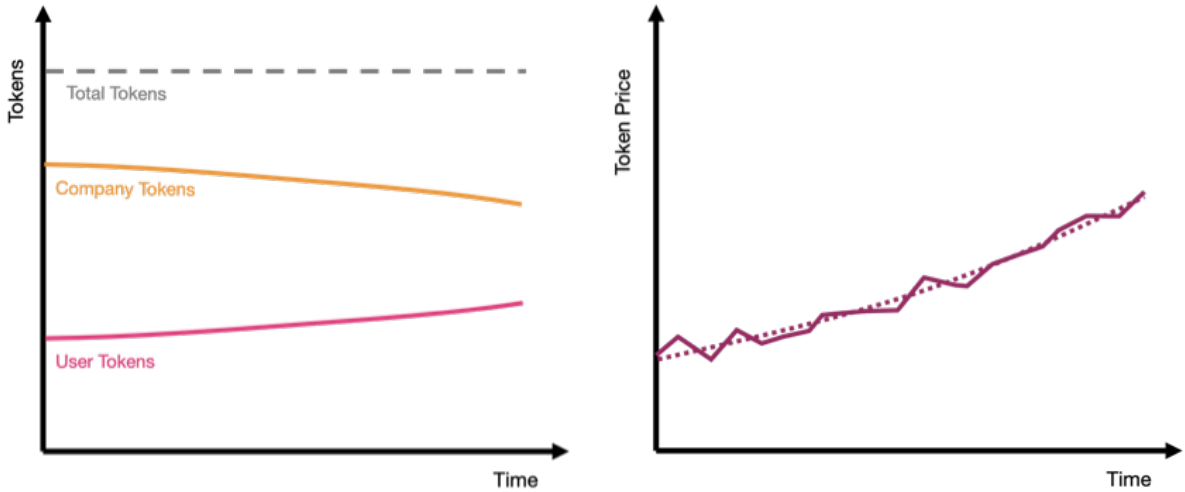

Figure 15 - Volatility Factor = 50%

Note that the Company Tokens are issued less rapidly compared with *VF=100%* and the growth is more stable.

The equations above run iteratively and will update each day (user rewards are processed at the end of each day). The only variable parameter that must be set is VF and it is set to a value which maintains the stability of the ecosystem and allows the community of users to grow while keeping them loyal and invested in the platform. User behaviour, and thus psychology, is a factor in finding the ideal value for VF, and

while a formulaic or AI based approach can be used, some experimentation will be required to find the ideal approach for setting and adapting the value of VF in the live ecosystem.

User Rewards

Rewards Tokens are the tokens given to users for their contribution to the revenue generation of the company. It is proposed to provide 50% of revenue from the search platform to users in the form of tokens, but this value need not be fixed. The revenue-share is not really for altruistic reasons, it provides a compelling user incentive to both join the Kin user community, and to remain a loyal user and token holder. The current live prototype version provides Scotcoin cryptocurrency tokens as user rewards. In the future Kin release version, we will replace Scotcoin with our own token. Rewards are currently provided to users for four activities:

1. For online shopping searches (more shopping activity = greater rewards),
2. for providing online user feedback,
3. for successful user referrals,
4. and for donating cash to the project.

All of these have been tested with live users on the Better Internet Search platform and will be refined and retained in the Kin release version. The donation element will be replaced with a trading portal where users may buy and sell tokens on the internal market, or donate tokens to social-good projects.

We use an internal points system with a weighted scoring system to determine the actual proportion of the Rewards Tokens that each user will be given. For example, a product click might have 5 times the weight of a shopping search since it is more likely to result in revenue generation. The actual daily revenue generated by each individual user from shopping searches is difficult to determine accurately, and the payments and data we get from retailers have significant delays, so we compute a daily rolling average revenue and distribute this pro-rata according to user points awarded. Thus, the number of tokens awarded to User A would be:

$$User\ A\ Tokens = Rewards\ Tokens\ \times \frac{User\ A\ Points}{Total\ User\ Points} \tag{8}$$

The algorithms that award the internal points are currently very simple and do not use any AI. As we gain more data on the correlations between user behaviour and revenue generation, we can apply machine learning to optimise the points system and reward the most valuable users while incentivising less profitable users.

We automatically give new users a small allocation of tokens for joining the user community. The initial token amount is designed to incentivise new users to join and so the ideal amount can be adapted by experimentation. It is likely that the monetary value of the initial tokens will be relatively high for early adopters and will decrease as user numbers and referrals accelerate.

When existing users introduce new users to our platform, we provide a referral reward or bounty, the current implementation is rudimentary but will be developed into a viral loop with rewards optimised to significantly reduce the CoCA.

Buying Tokens

We currently allow cash donations to the project and provide some Scotcoin as a reward. This function will be retained, but rather than a simple donation, the users will be able to buy tokens at the current Token Price so they will be investing in the ecosystem as additional Supporters rather than simply donating to the project.

Selling Tokens

If a user wishes to sell their tokens, they may do this on our platform. There is a Token Price (adjusted daily) and a pot of revenue-share cash available for their purchase. There will be a minimum number of tokens that the company will purchase in a single transaction, and this will be set above the level of reward tokens that users will receive for joining the user community.

Payments will be automated and use GBP; however, the payment gateway will allow users to receive the proceeds in their preferred currency, subject to currency exchange rates. The token will not initially be placed onto a crypto exchange and so they cannot be freely traded on the open market until this occurs.

The ecosystem is designed to allow steady growth in the Token Price in line with the growth of the token economy and will suppress large fluctuations in price. Thus, we do not expect any large spikes in selling activity, and on a monthly moving average we expect that all tokens bought from selling users will be funded from the revenue-share. However, the economy must be able to absorb short periods of higher-than-expected User Token sales to avoid any major falls in the Token Price, and this is achieved using a cash reserve.

Liquidity Ratio

The level of cash reserves held by the Company is governed by the Liquidity Ratio. The user community holds tokens which could be cashed-in without giving prior notice. However, the purpose of the cash reserve is not to fund a 'run on the bank', it is designed to stabilise the Token Price. If the Token Price was about to be influenced by higher-than-expected user selling activity (e.g. due to some external economic event), the consequent fall in Token Price could become a catalyst for more selling if users feared they might suffer further losses by not selling. The cash reserves are therefore used to smooth out temporary imbalances between the demand and supply that could lead to falls in the Token Price.

The actual cash reserve amount is governed by the value of current User Tokens that could potentially be cashed. It is given as:

$$Cash\ Reserves = Liquidity\ Ratio\ \times\ User\ Token\ Pool\ \times\ Token\ Price \tag{9}$$

We believe that a *Liquidity Ratio = 20%* would be a sensible initial value but can be reviewed once the ecosystem is in full operation.

Given that some users and Supporters could hold large numbers of tokens by direct purchases rather than via rewards on the platform, there is the possibility of large selling spikes and so the sale of tokens to the Company from a user would have a maximum transaction size as well as a minimum one. The maximum transaction size will initially be low and can be increased as the economy grows and is thus able to absorb large token purchases. Transactions via an external crypto exchange would not have this restriction.

Volatility Management

We run our rewards algorithm daily and there is likely to be a relatively steady demand for rewards, but there will be a variable supply (of users selling tokens), especially in the early phase of operation. To smooth these, we will use sliding averages for the supply and demand. On the demand side we envisage a one-month period to be ideal since a user's income (and hence online spending) will generally follow a monthly cycle. The supply side would adopt the same sliding average period.

The overall stability of the Token Price is thus achieved by the smoothing of demand and supply in addition to the control over the token supply using VF, with the cash reserves also being available if required.

A Worked Example

Here is a worked example of how the token economy generates revenue. Let us assume that there are 20,000 users on the platform, and they hold 40,000 tokens (*User Token Pool = 40,000*). Also assume that *Token Price = £1.00* and the *Liquidity Ratio = 20%* so using equation (9) there ought to be *Cash Reserves* of £8,000.

During this time-period the company generates a revenue of £0.30 per user, so a total revenue of £6,000. With the revenue-sharing set at 50% then *Revenue Share = £3,000.* This will be used to fund the tokens that users wish to sell and let us assume that in this same time-period users offer to sell 2,650 tokens (*Supply*) from their *User Token Pool* which according to equation (4) is equivalent to *Sell% = 6.63%.*

So, using equation (3) we have a *Demand* of 3,000 tokens, but an unadjusted *Supply* of just 2,650. We can apply equation (5) to balance the demand and supply, and find that we now require 2,930 tokens (if a VF of 20% is used) and that 280 *New Tokens* should be issued, equation (7), and the adjusted *New Token Price* is £1.0239, equation (6). This process is illustrated in Figure 16.

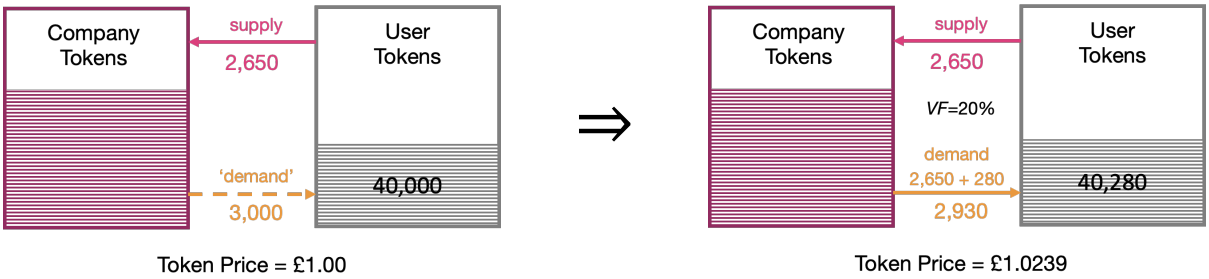

Figure 16 - Illustration of token economy for worked example.

In this same time-period the Company will have retained its 50% of revenue, £3,000, The users will have received tokens to the value of 2,930 x £1.0239 = £3,000, and the revenue-share of £3000 will be split into three parts:

1. £2,650 is used to purchase the 2,650 tokens from users at *Token Price = £1.00*
2. £249 is used to top up the Reserve Account back to the 20% Liquidity Ratio. i.e. equation (9) requires a new *Cash Reserves* = 0.2 x 40,280 x £1.0239 = £8,249 and was previously £8,000.
3. The remainder is £101 and can be retained in the Company's bank account since the Liquidity Ratio has been maintained.

This cash flow is illustrated in Figure 17.

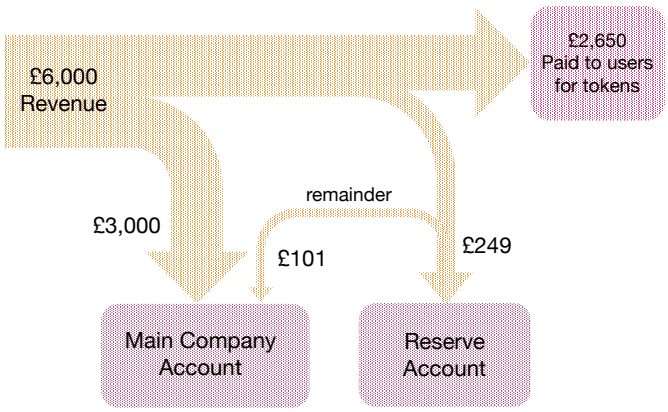

Figure 17 - Cash flow for the worked example

Not all the revenue-share cash has been transferred directly to the users. Some is retained to top-up the reserve account for potential future distributions. However, the tokens that are distributed to users do have a cash value equivalent to the full revenue-share value (£3,000 in this case) at the new adjusted Token Price. The cash reserves ensure we can satisfy ripples in the cash-in activities, but we do not need to hold the entire value of the User Token Pool as cash.

Note that there can be a surplus generated that goes to the company bank account (as in the example) when demand exceeds the supply, and the Token Price has been adjusted. However, the converse can also be true and when supply exceeds demand the company may have a negative remainder, but this is limited because the token price will reduce under this condition and the reserve can release cash while still maintaining the correct Liquidity Ratio. This will pay for some, or all, of the excess tokens being sold by users (depending on the extent of the imbalance).

In practice, if the economy is growing, the volatility management will smooth out the short-term demand and supply fluctuations and ensure the ecosystem stays in balance and the Token Price will rise with user numbers and their online shopping activity.

Escrow Account

The User Tokens within the ecosystem are not actually held by the users (e.g. within a crypto wallet); they are all held in an Escrow Account on their behalf and a record of their account balance is recorded on the blockchain each day. This ensures that token ownership by the users is friction free and does not require any direct use of individual wallets or blockchain-based microtransactions. This limits the use of the blockchain to a simple daily update of all user balances and token transfers between the Company Token Pool and the User Token Pool (which are held in the Escrow Account).

Partisia Blockchain

The Company has been working with the Danish company Partisia ApS [23] as a technology partner since January 2021. They were selected because of their mature Partisia Blockchain technology that is built for trust, transparency, privacy, and speed of light finalisation with a consensus mechanism that requires one thousandth of the energy used by legacy blockchains. In addition, we can combine this with their world leading secure multi-party computation (MPC) technology that enables us to process data securely without the need for a single point of trust.

The Company has run early tests on the Partisia Blockchain (PBC) Testnet and will continue to develop on this platform. New tokens can be minted, and all the token transaction records will be balanced and recorded on the blockchain. Transactions and balances will be recorded daily after the Rewards Tokens have been distributed. Following successful testing on the Testnet the system will be fully migrated to the operational PBC Mainnet.

The Kin Smart Contract

The Kin Smart Contract (KSC) has been developed by Partisia based on agreed requirements. Kin's daily token transactions will be recorded on the public PBC, and the KSC code will be public so its functions will be transparent. The first version of the KSC will be simple and will not implement the token ecosystem algorithms. The

KSC is difficult to change and so during Phase Two where we will still be developing and optimising the tokenomics model, we will allow the Company to operate and adapt the model. For Phase Three and beyond we can commit much of the processing onto a new version of the smart contract (KSC v2), and this will allow the ecosystem to operate in an automated and transparent way. We will require a new oracle for KSC v2 so that additional external data can be safely used by the algorithms.

The KSC v1 code will have the following general functions:

- Minting of tokens
- Issuing of tokens
- Transfer of tokens
- Optionally, burning of tokens

While the KSC v1 operation will be automated, there is a requirement for a simple oracle to enable external inputs that may also be required to trigger certain functions. The Company will have authority to provide the data for the smart contact and a simple oracle can ensure that only authorised data can be used by the KSC v1.

The minting of tokens is in phases according to the roadmap and so the authority to mint these tokens will be triggered by the Company's authority and by date or event triggers. No tokens can be minted before these triggers and only the pre-agreed allocations will be available.

Partisia Wallet

The Partisia Wallet [24] is a browser extension that allows MPC-20 tokens to be easily accessed. MPC-20 tokens are ERC standard tokens with lower transaction fees and faster settlement compared with ERC-20 tokens. For the purposes of the Partisia Wallet (and for future exchange trading) the tokens are designated as KIN-MPC tokens, although we just refer to them as Kin tokens for internal purposes. The KIN-MPC tokens bought by Supporters are MPC-20 tokens and so they will become visible within their own Partisia Wallet.

Transition from Scotcoin

The transition from Scotcoin to the new Kin token has been seamless for users and their current SCOT value has been converted to the equivalent value in KIN-MPC. Thus, the initial User Token Pool value will be equivalent to the value of all the SCOT currently held by users. We have set the initial value of the new Kin token to be the same as SCOT giving a 1:1 exchange. Currently the record of user rewards is held only on the Kin platform (effectively an escrow account), however all balances will eventually be recorded on the PBC on a daily basis.

It is proposed that Scotcoin can continue to be used for social-good purposes. The Scotcoin Project is a Community Interest Company (CIC) and allows SCOT to be used for community projects. The Company owns 500,000 SCOT and can allow the Kin tokens to be converted to SCOT and donated to projects chosen by our users.

Secondary Markets

From phase three we will operate a closed ecosystem where all tokens held by users are managed by the ledger operated by the Company (with all User Tokens held in an Escrow Account). Supporters may make primary market purchases (i.e., directly from the Company) at this stage. Supporters will hold their tokens in external Partisia Wallets and may make private sales and purchases prior to the availability of a secondary market. After the ecosystem is fully functioning and the Token Price is stable, we aim to make the token transferable on secondary markets where they can be freely traded.

Having access to a secondary market provides several advantages. It allows a larger number of tokens to be held outside of the main ecosystem circulation without the need for the Company to cover their issue with a liquidity ratio. It allows Supporters to speculate on the future utility value of the token while providing the Company a way to finance the growth of the business (through the issue of Company held tokens on public markets). It provides liquidity for all token holders and removes any upper cap on the number of tokens that can be sold in a single transaction.

A new decentralised Automated Market Makers (AMM) model [25] has been proposed in a University of Copenhagen working paper and a prototype has been implemented on the PBC by Partisia. This allows compatible tokens to be freely traded without the need (or expense) of being listed on mainstream crypto exchanges. The tokens minted by Kin will exist on the PBC and use the concept of Bring Your Own Coin (BYOC) [26]. Once in operation the AMM exchange provides liquidity for compatible tokens by enabling them to be easily 'swapped' for coins that are listed on crypto exchanges such as ETH.

The AMM model works best with relatively stable coins, and so Kin's tokens are well suited to this new exchange model. The secondary market 'price discovery' mechanism can be guided by an oracle that provides the ecosystem Token Price as its reference via a smart contract.

The decentralised AMM model is attractive for the Company because it can provide liquidity for all categories of token holder, it also enables the Liquidity Ratio to be reduced with the potential to eliminate the need for a cash reserve altogether in the longer term since the liquidity pool is inherently provided as part of the AMM.

Thus, secondary markets can be provided in two ways, the AMM exchange provides a fast and low-cost method (for the Company) to provide liquidity. In the longer-term listing on mainstream crypto exchanges provides a lower friction method of trading with greater international exposure.

Given that the utility value of the token is determined within the search engine ecosystem, we would expect that the secondary markets Token Price would track very closely to the price set automatically within the ecosystem. Any discrepancies between the internal market and secondary market Token Price will be small since the Company may buy its tokens, to satisfy demand for rewards, from either users or from the secondary market. If there is a worthwhile difference in price the lower priced tokens will be selected and so the prices will converge in accordance with demand

and supply. Similarly, Supporters may elect to sell their tokens to the Company or on the secondary market, according to which offers the highest spot price. Again, this has the effect of converging the Token Price of both markets. Thus, the key driver of Token Price in secondary markets is the token's utility value within the ecosystem and because of this it would be extremely difficult for traders to attempt to short the market.

Security and Fraud Prevention

One potential route for misuse by users is to gain tokens by artificial shopping activities (which do not result in real sales). We will monitor the platform for suspicious 'bot-like' behaviour, first by looking for regular or excessive shopping activity, especially those with low or no organic searches. We can communicate with users via notifications from the platform – and verify the identity of suspicious users. We can also suspend marginally suspicious behaviour until a captcha been successfully completed.

Our Ts & Cs will state that all earned rewards can be removed from any user that uses the search engine improperly, and it will also state what is considered improper use. In exceptional circumstances where wrongdoing is proven, an individual's user rewards can be removed from the Escrow Account. We would not deduct any tokens that have been purchased directly. If a user has cashed their tokens or transferred tokens to a wallet under their control, we cannot then remove tokens, but can still suspend any associated account. A user can close their account at any time, and this would cause their tokens to be transferred back to the Company Token Pool if the user elected not to sell their tokens first.

Internal fraud could become a security issue as the ecosystem grows and the value of tokens in the Escrow Account, that are potentially accessible from the Company controlled platform, becomes large. Thus, we will introduce security based on Partisia's MPC technology to address this issue. This technology will be applied to ensure that no individual platform manager can access a user's account without either permission also being given by the user via their account, or by another third

party with sufficient authority. This can be based on the principle of shared secrets and similar techniques may also be used to secure sensitive data that needs to be used by the platform but not revealed to any operator or manager (such as keys required to reset or recover passwords).

By decentralising the storage of sensitive data and using MPC we also protect the Company and users against external security breaches. No copy of sensitive data (even encrypted) needs to exist within a single storage facility. For a hacker to be successful in accessing sensitive data they would need to gain simultaneous access to multiple data stores and know how to run the MPC processing before they could reveal anything meaningful from any captured data.

There is a possibility that a hacker could access a single user account if user credentials were obtained or guessed. Even with full access to a user's account it would be difficult to steal tokens since they would need to be cashed-in, and this would invoke a two-factor authentication process with additional verification required for very large amounts. The same security would apply to users transferring tokens to an external wallet once the tokens are listed.

Simulations

The equations presented have been used in Monte Carlo simulations of the ecosystem to prove its operation, test its performance, identify problems, and demonstrate how the token value might rise. One factor that is difficult to model is the user behaviour around the selling of tokens and so we have run several simulations with different *Sell%* values to ensure the model works across many different scenarios.

The simulation inputs for an example scenario are given in Figure 18. There are additional inputs that come from the Company revenue model which are: the user numbers, and the average revenue per user. Random number generators with a uniform distribution are used to model the shopping revenue activity level of each user in each simulation time-period, a one-month period is used, however the live

model will update daily. The selection of users selling their tokens in any time-period is also chosen randomly. The proportion of users selling their tokens in any month has been set at 5% for this simulation. This is the average but each month the actual percentage is based on a normal distribution with a mean of 5%. 30 million tokens are used in the simulation since this is the number that will be available in the Token Ecosystem during the initial phase. The user numbers and the revenue data were taken from our financial model for the years 2023-2025 where the user numbers rise from 1,900 to 182,000 over the 36-month simulation period.

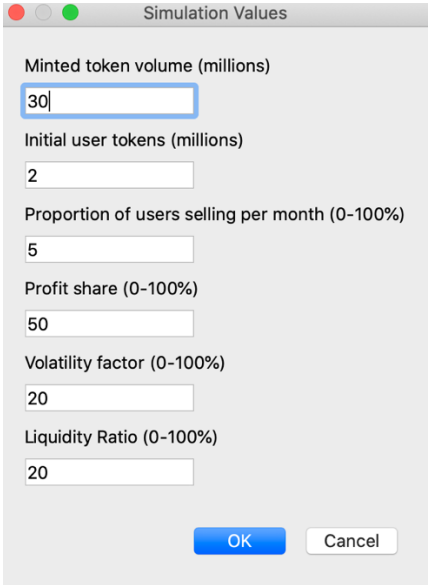

Figure 18 - Simulation Inputs

Results are shown in Figure 19 and Figure 20. The only difference between the two simulation runs is that the random number generators were seeded differently, every other input is identical.

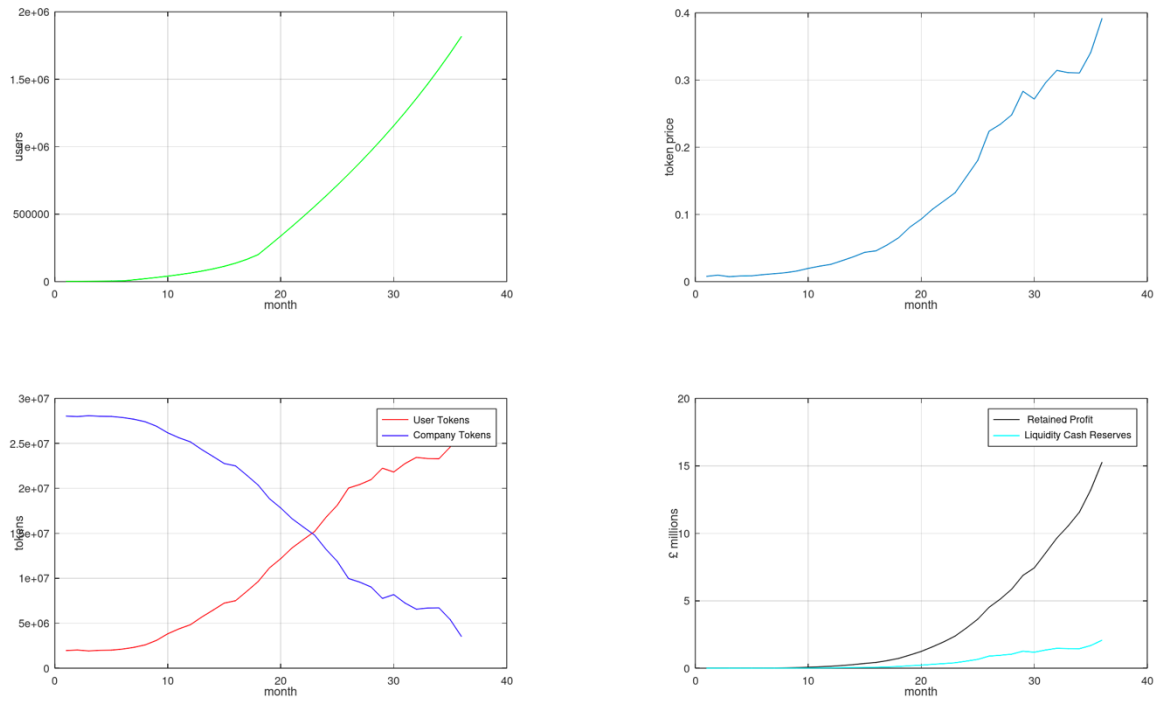

Figure 19 – Monte Carlo Simulation Results 1

In the above simulation, Figure 19, we see that more tokens are released to users as the number of ecosystem users rise. The token price increases relatively smoothly with the growth in the ecosystem (it has risen from about £0.008 to £0.40, a 50x multiplier). There are occasions when the price has fallen slightly, however these are partly due to the simulation running on a monthly interval (for speed of calculation). When run daily using a sliding average for demand and supply (like the live ecosystem) the fluctuations can be smaller since the corrections made by the algorithm occur more frequently. Note that the 30 million tokens made available is near to being exhausted.

In the second simulation run, Figure 20, the token supply becomes exhausted. This can occur because there is lack of supply (less tokens being sold back into the ecosystem due to the random variations in the simulation runs). With a lack of supply, we see that great volatility can occur if token availability suddenly diminishes (since VF has been forced to ~100%) and the fluctuations in Token Price are massive. Again, if the simulation period was shorter (e.g. a day with a sliding average, rather than a

month) the behaviour would be less violent, however this simulation demonstrates the need to avoid the supply of tokens being cut suddenly.

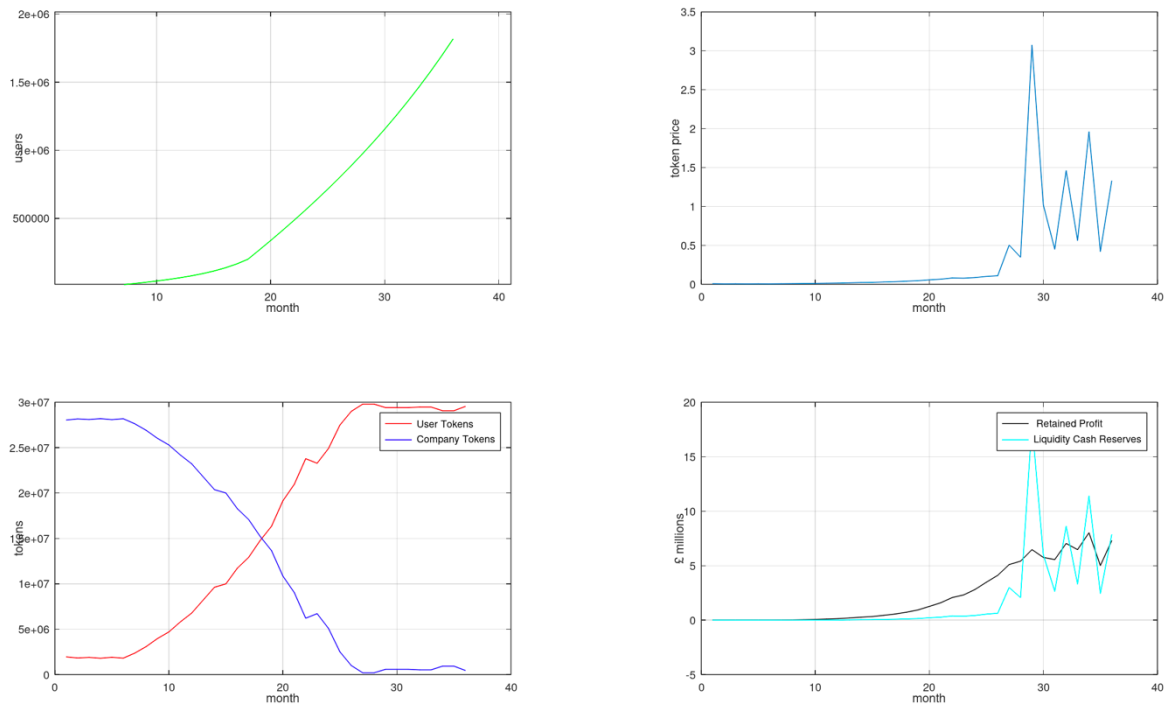

Figure 20 - Monte Carlo Simulation Results 2

In reality, the above scenario need not occur. First, the company would be expected to have made more tokens available for release into the ecosystem via the Phase 2 & Phase 3 token allocations shown in Table 2. Secondly, the supply of tokens into the ecosystem is likely to be supplemented by the sale of some Supporter Tokens when the Token Price has risen to given them a good return. The other stabilising mechanism is that we can dynamically adjust the value of VF to influence behaviour, whereas in the simulations the value was fixed at 20% for the entire 36 months.

Many simulations have been run to confirm that the value of the token increases in line with the expected growth of the user community, and that any instabilities in the token price are easily controlled by the mechanisms that have been explained in this white paper.

Appendix B – Glossary, Definitions & Abbreviations

AI	Artificial Intelligence.
AMM	Automated Market Makers.
BIL	Blockchain Identity Lab (at Edinburgh Napier University).
BYOC	Bring Your Own Coin.
CIC	Community Interest Company.
CoCA	Cost of Customer Acquisition.
Company	Better Internet Search Ltd.
Company Tokens	Any tokens owned by the Company.
Company Token Pool	All the released (minted) tokens held by the Company that are available to issue as Rewards Tokens.
DAO	Decentralised Autonomous Organisation
DVPN	Decentralised Virtual Private Network.
ENU	Edinburgh Napier University.
ERC-20	(Ethereum Request for Comments 20) is a token standard based on Ethereum [27].
Escrow Account	The Escrow Account holds User Tokens on behalf of the users, so they do not need to create their own wallet. User Tokens within the Escrow Account can easily be sold to the Company from inside the closed ecosystem.
ETH	Ether (the Ethereum coin).
Kin	This is not an acronym but is the brand representing the Company search engine product and the user community.

KIN-MPC	This is the network name for the Kin token and reflects its compatibility with the Partisia MPC-20 token.
KSC	Kin Smart Contract.
Liquidity Ratio	The percentage of the value of the User Token Pool which will be held as cash in the Reserve Account.
LTV	Lifetime Value.
Mainnet	Mainnet is shorthand for the Partisia Blockchain Mainnet which is a public blockchain and will be used to record the Kin token transactions.
ML	Machine Learning
MPC	Multi-Party Computation.
MPC-20	MPC-20 is the Partisia MPC token standard that is aligned to the ERC-20 standard but provides lower transaction fees and faster settlement.
New Tokens	These are the additional tokens that need to be issued from the Company Token Pool to create the correct number of Rewards Tokens.
New Token Price	The Token Price after it has been adjusted in accordance with equation (6).
NGI Trust	Next Generation Internet Trust – funded by the EU's Horizon 2020 programme.
Partisia Wallet	The Partisia Wallet extension for Chromium browsers providing access to the Partisia Blockchain and Dapps.
PBC	Partisia Blockchain.
PBC Testnet	This Testnet has the general functionality of the Mainnet and is used to test code before it is deployed on the public Mainnet.
PPC	Pay-Per-Click.

Reissue Tokens	These are the tokens which are bought from the users and reissued in the form of Rewards Tokens.
Reserve Account	The bank account that holds the reserve cash in accordance with the Liquidity Ratio.
Revenue Share	This is the amount (or proportion of) the Company revenue which is used to calculate the number of Rewards Tokens to be distributed and is also the revenue used to purchase User Tokens.
Rewards Tokens	These are the tokens awarded to users by the Company for activities that offer rewards (such as shopping or referrals).
SEO	Search Engine Optimisation.
SCOT or Scotcoin	This is the native cryptocurrency token in current use. It will be replaced by Kin's own utility token.
Supporters	Supporters are those who buy volumes of tokens to help fund the development of the ecosystem. These tokens are help in wallets owned by each Supporter.
Supporter Tokens	Supporter Tokens are the tokens which Supporters hold in their personal wallets.
Token Ecosystem	The circular token economy as described in Appendix A.
Token Price	The base price (usually expressed in GBP) at which the Kin economy tokens are traded. The actual buy and sell price may vary slightly from the base price to account for transaction fees.
VF	Volatility Factor.
VPN	Virtual Private Network.
User Tokens	Any tokens held by the users (which are initially all held within the Escrow Account)

User Token Pool	The total number of tokens held by all users within the Escrow account.
XAI	Explainable Artificial Intelligence.

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