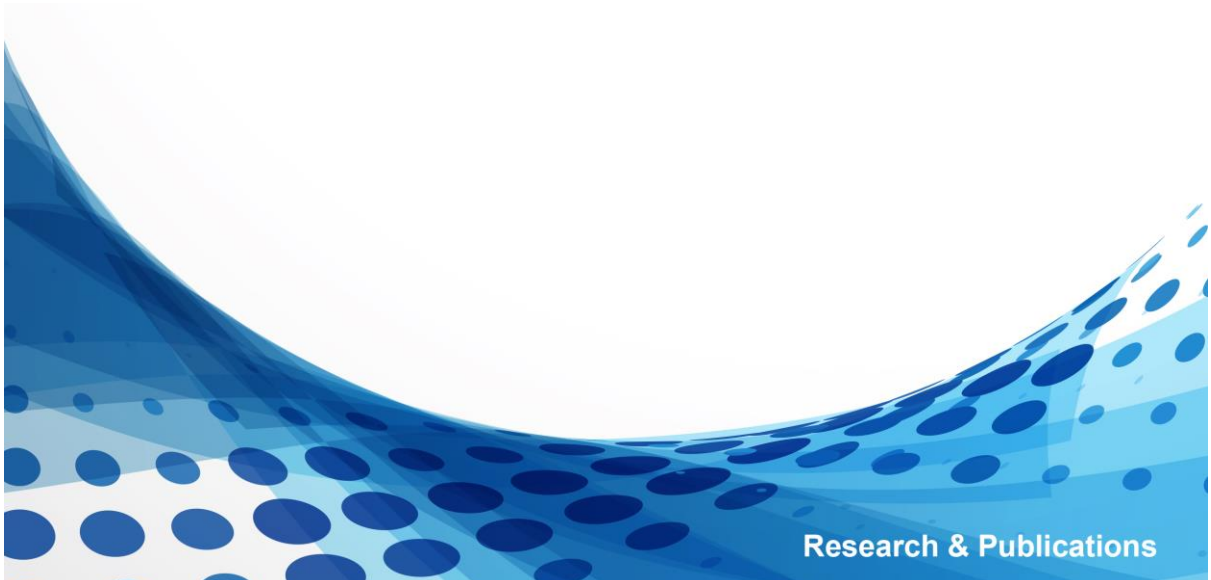भारतीय प्रबंध संस्थान अहमदाबाद
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Research & Publications

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Social Token Economics for GAU Coin

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Abstract

This paper discusses the Token Economics around the GAU Coin. All the aspects of Token Economics, including rewards system, incentivisation, ways to increase adoption, methods to measure social impact, strategies to bring the developer community into the ecosystem, commodity flows, and many others are discussed. Various GAU Coin Ecosystem Partners and Enablers and how they interact with the ecosystem are also identified.

Later, GAU NFT for the participants of the GAU Coin network can also be thought of, along with creating the entire network of artists and infrastructure around it.

GAU Coin is a Social Token and is not a Cryptocurrency. The GAU Coin represents the digital form of what a person owns as part of the GAU ecosystem and brings Social Credibility.

Keywords

GAU, GAU Vision, Social Token, Crypto Assets, ERC20, ERC721, Social Entrepreneurship, Unification, NFT, Smart Contract, Socio-Technical Financial System (STFS), Social Credibility

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What are Social Tokens?

Social tokens are a form of digital ownership secured by Blockchain, allowing creators, influencers, social impact organisations, and/or brands to monetise experiences or services; this ownership becomes an asset that can be resold and may increase in value.

Cryptocurrencies, like Blockchain (BTC) or Ethereum (ETH), are the native assets of a blockchain, whereas tokens are created as part of a platform built on an existing blockchain.

GAU Coin is a Social Token; hence, no ICO (Initial Coin Offering) will be done. GAU Coin can only be earned by the participants of the GAU Ecosystem network by means of work resulting in positive social impact. Refer to [2] for details about what a token is.

What are Crypto Assets?

Crypto Assets are digital or virtual assets that use cryptography for security and are based on blockchain technology.

Social Tokens are a type of crypto asset created and issued by individuals or organizations, usually for community building, content creation, or other types of social engagement.

Introduction to GAU Coin

GAU Coins are social tokens based on ERC20[5]. They can be used to perform various transactions on the GAU Platform without involving FIAT currency or monetisation aspects. The details of GAU Coins owned, and the usage history will be part of one's profile under the GAU Platform.

Figure 1: GAU Coin Symbol

GAU Coin unifies social impact activities using open-source algorithms to measure social impact and social credibility in an objective manner.

GAU Coin as a Social Token

GAU Coin is a standard-based social token. GAU Coin will use an existing chain based on ERC20 instead of creating a new chain.

While all the other tokens have some sort of monetary or similar incentives in mind, a Social Token like GAU Coin is not meant to do that. The primary purpose of this token is to bring individual involvement in the ecosystem and tech platform participants.

The top token holders in the leaderboard may publicly flaunt their token ownership score. However, this doesn't lead to a show of wealth. Rather than that, it may come out as a matter of pride for many people, leading to a great sense of competition. This will encourage people to participate

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[5] ERC-20 Token Standard -
https://ethereum.org/en/developers/docs/standards/tokens/erc-20/

more in social impact related activities and get on the leaderboard as high as possible.

GAU Coin may not only be owned by individuals but also by a group (virtual group, NGO, or company promoting CSR activities). This is not seen in similar social tokens and can lead to further deep engagement by the employees and volunteers from such groups. For example, as part of their CSR activities, large companies can earn a lot of GAU Coin when their employees perform actions leading to positive social impact as part of this ecosystem. These tokens then give certain privileges to their employees to be part of social impact events and initiatives. A similar model is followed for blood donation where the employees get preference in getting blood in time of need when their companies participate in the blood donation drives. This model ensures an honour system where everyone wins.

Another aspect of such a social token is that it can be used to trade for something, leading to further engagement in the ecosystem. That "something" won't be a pass to a concert, a luxury gift, or a dinner with a celebrity, as it is done in other tokens, but is a form of tangible or intangible benefit to the holders. GAU Coin can be used as a currency to be eligible for entry to social events, to meet and work with other well-known social workers and activists, to be part of social research, to use research facilities of institutes, etc. The possibilities are unlimited.

Possessing a large amount of GAU Coin gives one "social credibility". This credibility can be encashed/exchanged for intangible things that were never possible before. Gaushalas and Cow Sanctuaries can directly benefit from social credibility built through such means. This "social credibility" also proves the social commitment the holder of the token exhibits and the level of their trustworthiness when it comes to participating in such activities.

Care will be taken to create this leaderboard based on an overall social impact and not only on the number and amount of donations made. This way, the people making a social impact through their involvement will be rewarded. Based on the impact of the work done, a "multiplier" will be used to give a more significant number of tokens to the person.

Provisions will be created to award the GAU Token automatically using the algorithms developed as part of this ecosystem or manually in a transparent way. While most of the GAU Coins will be provided this way, GAU Team will also create ways to earn GAU Coin by creating social impact.

GAU Coin will be based on a Smart Contract built on an Open-Source Platform using established Blockchain standards.

GAU Coin as an enabler for Socio-Technical Financial System (STFS)[6]

The business model is for creating a sustainable financial system that involves various stakeholders, namely the cows, the gaushala caretakers, the fodder providers, the bio-CNG processers, Bio-CNG users, infrastructure creators for these, the farmers who would receive bio-fertilisers, the donors, local NGOs, business entities, aggregators, and finally an IT company that facilitates face-recognition for every cow. There would be material flows (cow dung and urine, fodder, bio-CNG, fertiliser, etc.), financial flows, and technology flows (cow face recognition IT creation and deployment, bio-CNG plants, and supply chains). It would be a thriving and live ecosystem, and social systems would be integrated at every stage appropriately.

This is explained in Figure 2, GAU (Gai Aadharit Unnati) Ecosystem, with a focus on the Socio-Technical Financial System (STFS). In this model, the donor money goes to an NGO via the GAU platform. The NGO facilitates the fodder availability to the Gaushala via a fodder-providing company. In exchange, the Gaushala provides the NGO or the fodder-providing company with the equivalent amount of dung daily at no cost. The further utilises the dung for various purposes, including biogas generation, to create an impact with the help of the NGO. The respective NGO is responsible for smooth operation, monitoring, and evaluation.

The GAU concept not only delineates a socio-technical system (STS), which usually is considered to be spanning around hardware, software, personal, and community aspects, but also takes the financial perspectives resulting in a socio-technical- financial system (STFS).

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[6] Gai Aadharit Unnati (GAU): Modernizing Cow based Economy through Application of Advanced Technology - https://web.iima.ac.in/assets/snippets/workingpaperpdf/435 8840642022-05-03.pdf
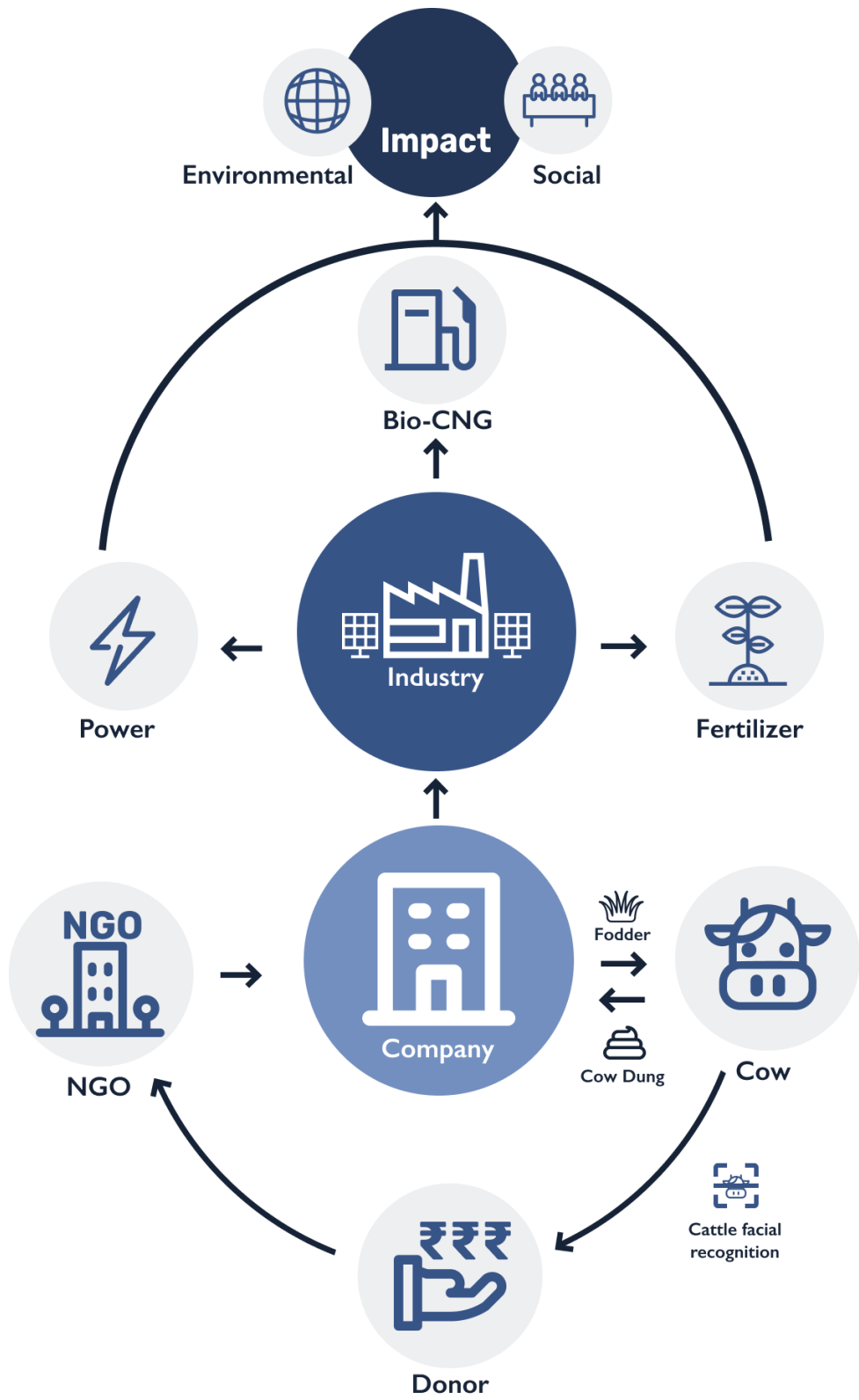
Figure 2: GAU (Gai Aadharit Unnati) Ecosystem

GAU Coin enables transactional interactions between various components of this ecosystem. This ensures that transparency is maintained in the system and creating real social impact is motivated. GAU Coin also reduces the number of intermediaries in such transactions by providing direct paths between the stakeholders to provide value for money to the stakeholders. For example, GAU Coin provides grease and oil to the wheel of the social impact work and social recognition and can be used to provide reference to someone, so no money is exchanged.

GAU (Gai Aadharit Unnati) drives this entire ecosystem. The Decentralised Service Mesh Stack, explained later in the Tech Stack section, is used to create the platform for GAU Ecosystem. GAU Coin is at the centre of this tech stack.

Objectives of GAU Coin

Following are the key objectives of GAU Coin:

1. Digitise gaushalas, cattle, and their products

2. Bring traceability to the donation workflow, encouraging more donation

3. Digitise Commodity flows with a provision to convert to Fiat Currency

4. Create ecosystem for Social Entrepreneurship to boost the local economy

Flows between the blocks of the GAU Ecosystem

We have identified three distinct flows between the blocks of the GAU Ecosystem, which are depicted in Figure 3:

1. GAU Coin Flow

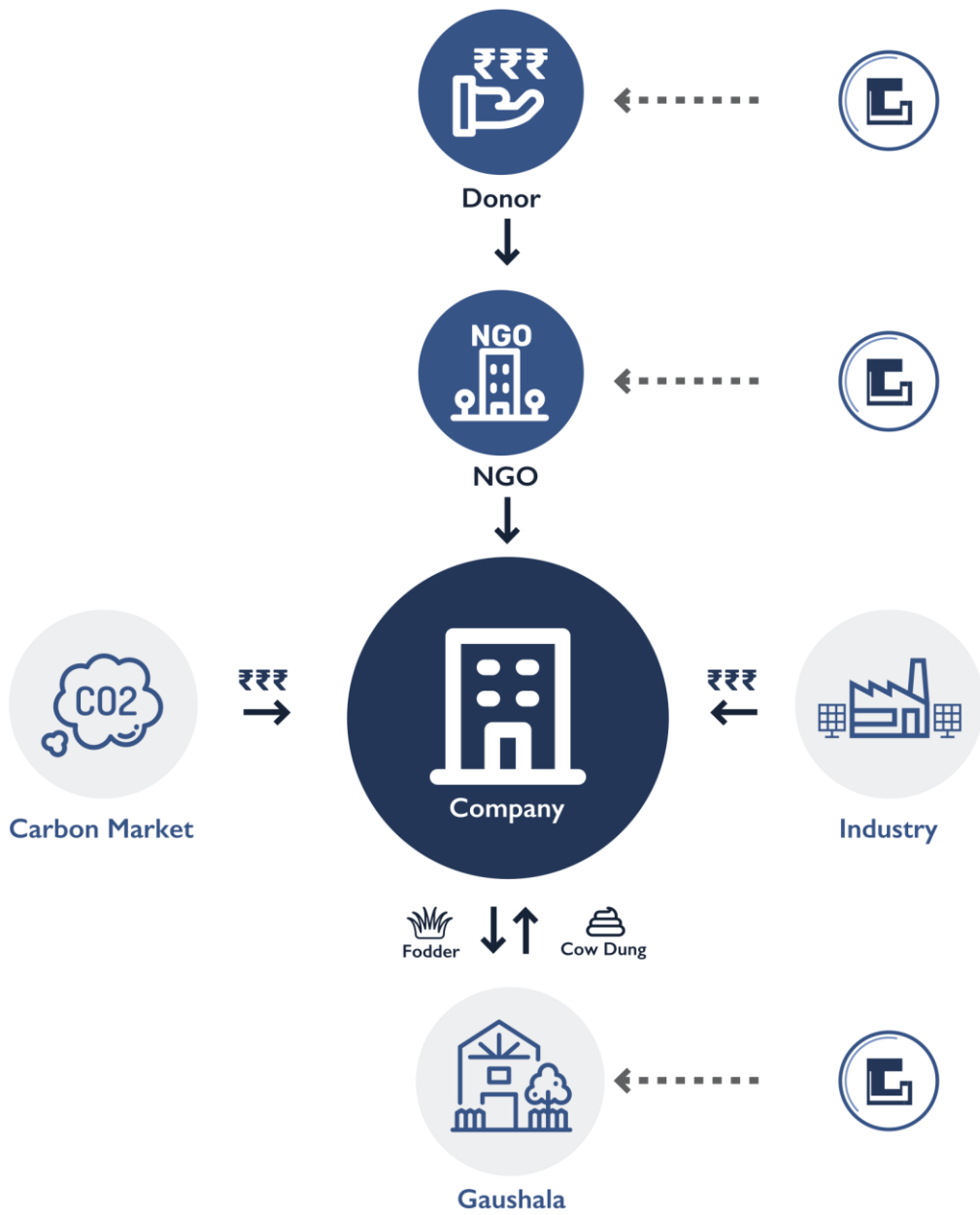2. Money Flow

3. Commodity Flow

Figure 3: Flows between the components of the GAU Ecosystem

The figure 3 shows that GAU Coin is awarded in various ways in the above flows. Multiple types of Partners and Enablers are part of this entire ecosystem, and they will be awarded GAU Coin too, based on their contribution and the extent of social impact created. All these flows are interrelated, yet they keep the flow distinct from each other.

Blockchain Applications and Incentivisation in the context of Token Economy

Various Blockchain-based applications using GAU Coin as the core enabler have been considered.

Incentivisation is one of the essential aspects which is vital for the adoption of the GAU Coin. A robust incentivisation mechanism will help GAU Coin be utilised for the use cases it is intended for.

Various GAU Coin-related benefits are integrated into the services offered and created as part of the GAU Ecosystem.

This section discusses the following:

1.   Incentivisation and rewards for the participants

2.   Intangible benefits for the ecosystem participants

3.   Tangible benefits for the ecosystem participants

4.   Blockchain applications enabled

Benefit Type	List of benefits
Incentivisation and rewards for the participants	▪ The services they use on GAU ▪ Any referrals or, in general, for becoming a brand ambassador for the GAU Platform ▪ Creation of a network inside this platform to focus on the hyperlocal impact ▪ For helping in overall treads and other insights by being part of the system

	- Being active in the tech platform and performing activities like original content creation, performing a review, moderating content, etc. - Creation of arts and other collectibles for GAU NFT - Creation of overall social impact - Creation of impact in unconventional social sectors and opening a new social impact sector While these are subjective ways of incentivisation, the following are a few examples of the objective way of incentivisation by GAU Coin: - For every ten cows cared for by a caretaker, they get 1 GAU Coin - For every cow rescued by a person, they get 1 GAU Coin - A volunteer is rewarded with one or more GAU Coin when they spend time over a weekend taking care of a Gaushala or performing tasks resulting in a hyperlocal impact
"Tangible" rewards, primarily based on one's socioeconomic considerations	- Gaushala can exchange the GAU Coins earned by them for free access to GAU Marketplace and free advisory services to take their products to the masses - The original art can be given regularly to the token holders representing an NFT they already own based on a draw. They can also be given to the winners of a social event (e.g., tree plantation drive, rescuing cows in a vicinity, etc.) - GAU Coin can be used to get free BioCNG or Biogas for cooking and lighting purposes - GAU Coin can also be used to get free cow products in a limited quality only based on the eligibility - A programme can be created to give beneficiaries free or highly subsidised lighting solutions for homes powered by biogas or BioCNG. This will considerably benefit people of very low economic backgrounds.

	▪ GAU Coin and GAU NFT (especially the special edition collections) can be exchanged for physical goods at various events, conferences, and fairs.
"Intangible" reward forms	▪ In the form of "GAU Coin", which then can be redeemed for goods and services, e.g., cow products, cow-themed original arts (paintings, statues, toys, and all other such artefacts), "a day out in a gaushala", badges for volunteering, etc. ▪ The GAU Coin can also be used to prove one's social credibility and become eligible for access to invite-only social events ▪ In the form of NFTs where users can accumulate collectibles, including rare ones. They can also be traded in the future in the GAU Marketplace for physical collectibles like original arts ▪ In the form of associating special meaning to the NFT and basing them around a brand, community, or a social influencer ▪ An extension to the above point can be the concept of "digital collectible trading cards", which can be traded across closed groups or on an open market ▪ Giving one access to research facilities in the top prestigious universities, colleges, and organisations by means of GAU Coins or by unique NFT collection ▪ Privileged/restricted access based on memberships that regulate access and participation within the respective community can also be thought of
Other Blockchain applications enabled by GAU Coin	▪ Tokenisation of anonymised user data on the chain can be done to create various analytics-based trends and insights ▪ Tokenisation of various transactions on the chain is also possible for traceability ▪ In the future, if other systems mimic GAU Coin to create a similar social impact, there will be provision for the holders of these tokens to exchange/swap one for the others

> To achieve these applications and use cases, an end-to-end token economy needs to be created with a clear indication of the incentives every stakeholder of this economy will have.

Social/Gender Equality/Equity and Justice creation using GAU Coin

GAU Coin will enable the community to help and participate in the early success of many artists, artisans, and individuals with niche skills who are relatively unknown yet very skilful.

Right now, such individuals may go through a broker or a marketplace that takes away a large part of their profit and sometimes even their identity as the creator. Removing the intermediaries will help break the barriers for such skilful people to be directly heard, seen, and recognised.

The early receivers and indirect buyers of GAU Coin have ownership of the token (and maybe the underlying NFT). This also ensures contribution to a system which encourages equality for everyone and creates opportunities for a better standard of living. This will otherwise not be possible so easily using conventional methods.

Social equality in the GAU ecosystem can also be considered from the perspective of not being related to one's social stature, wealth, or gender. This means GAU Coin will also be indispensable for ensuring the adoption and implementation of UN SDGs (Sustainable Development Goals).

Social equity in the GAU ecosystem can be considered from the perspective of having equal resources and opportunities for individuals irrespective of their upbringing, wealth status, and gender.

The following Sustainable Development Goals (SDGs) can be achieved by GAU Ecosystem, enabled by GAU Coin:

Figure 4: Sustainable Development Goals (SDGs) enabled by GAU Coin

Open-source Algorithms and Gamification

As part of GAU, algorithms will be developed to measure the extent of social impact, and social credibility. These algorithms will use existing Blockchain standards. Algorithms will also be created to create a reward system for the participants based on gamification concepts.

Algorithms to measure the extent of social impact created

"Impact" is a very subjective term. Hence methods will be developed to measure it accurately and directly from the system. For example, the impact created by referring other people or by helping GAU raise more money can be measured well. However, the impact created in terms of an increase in engagement and higher happiness in the community can't be measured in an objective way.

> To assess and measure the impact, a mix of machine learning based methods and assessments from experts in the social impact area will be used.

Initially, the impact measurement will be done using existing and standard practices by experts in social impact areas.

Additionally, the system will be made to "learn" simultaneously.

Using Machine Learning whenever such manual measurements are done. Eventually, the system's measurement accuracy will increase significantly, and the system can be relied upon over a period (6 months to 1 year) to make independent measurements.

GAU platform will be able to measure the impact of a project/initiative for a group/NGO/Company and in the future for an individual as well. Ride-sharing apps do it well using simple objective measurements. Wherever possible, open-source and already proven algorithms will be used to speed up the development process.

Algorithms to measure "social credibility"

As part of GAU, algorithms will be created to measure the social credibility of the system's participants. These algorithms will use existing chains.

Social Credibility, like Social Impact, will apply to individuals, groups, and organisations. Organisations can be Gaushalas, NGOs, Large Companies, Micro and Small Companies, and other entities in the GAU ecosystem.

One's social credibility will rise based on the following:

- How active the participant is on the platform in terms of actively connecting to other participants and involving in activities

- How the participant is improving the span of the ecosystem in terms of new connections, referrals, ideas, initiatives, etc.

- How the work done in the projects the participant is part of is shaping the social section or community in terms of positive impacts

- What kind of positive feedback (akin to the "voice of the customer") the participants received for their project or as an individual has received from others

- How does the participant help the ecosystem to attain or move toward the relevant goals of SDGs (Sustainable Development Goals)

The social credibility will fall based on the following:

- How long has the participant been dormant as per the criteria defined in the GAU Platform

- Are there any negative reviews of the project undertaken or done

- Is there personal/individual negative feedback about the person

- Does the participant show biases which are detrimental to social equality and justice and goes against the goals of SDGs

This algorithm will need to take care of parameters which may lead to "false positives" and "false negatives". The algorithm must also take care of any anomalies that may crop in due to various interdependencies or the issue in how the data is reported or partially reported. Furthermore, the algorithm must be smart enough to recognise multiple human biases.

Reward System for GAU Coin using Gamification Concepts

A Reward system is usually necessary to provide positive reinforcement to users. Defining the type and timeliness of the rewards is vital to ensure better outcomes from gamification.

Gamification uses the concepts of game design elements and mechanics, like rewards, points, and badges, to better engage the audience, and encourage adoption.

When users are constantly making good progress, something unexpected (both intangible and tangible) can be awarded. Some rewards should be expected and look achievable, while others should be hard to achieve. It can be deducted as a negative reinforcement when no progress is seen, which, when done in a small, distributed manner, can helps bring users out of their dormant state. Inconsistent efforts or achievement of goals will be considered while deducing the eligibility of the reward.

It is essential to understand that even if the reward may look random, it is not given using luck or chance as the main factor. A probability factor is used to determine the rewards for eligible participants; however, the eligible participants will only be able to get the rewards if they fulfil specific criteria for progress or achievement of goals.

In a typical gamification context, progress or accomplishment of goals could be in terms of performing some activities or reaching a milestone. In the case of GAU, the same can be done in terms of the following:

- The amount of CO_2 and other harmful gases stopped being emitted by helping in a local and circular economy. There is a vast potential in this regard to tying this system up with a Carbon Credit based system

- The social impact one has created. As part of GAU, algorithms will be created to measure the extent of social impact

- The number of volunteer hours one has put in and helped other volunteers in their contribution

- The number of networking opportunities one has created by bringing new participants to this ecosystem

- The amount of contribution one has made in the GAU platform in terms of the following - reviews, posting views and perspectives, posting original articles

- Extra progress can be awarded when one brings their micro and small business to the platform or create an entirely new business out of this ecosystem

- The number of stray cows rescued and rehabilitated in a gaushala or sanctuary

- The number of injured cows reported being rescued

- The recurrence of donation given. The recurrence and consistency are more important than the amount of donation

- Contribution in other forms, e.g., volunteering in onboarding cows and Gaushalas, creating original arts to be given away as rewards, etc.

Open-Source Algorithms and Public APIs for Developer Community Engagement

Both algorithms (algorithms for assessing/calculating social impact and social credibility) need to be open source so that anyone can inspect the logic behind their various decisions. This will ensure absolute transparency and trust in the algorithm.

The GAU Public Repository will be created for these algorithms and any other reference implementations from the community. The copyright to the algorithms will remain with TechMachinery Labs.

To have even more adoption by the developer community, public APIs and reference implementations will be created. These include public APIs, which any developer can use to work with their local/private environment, and work with the "code playground" environment supported by TechMachinery Labs or by a non-profit organisation. Microservices images which anyone can use to create a local and self-sufficient environment to try out the APIs and reference implementations will also be supported.

Making it open source (under Apache or MIT License) will have many benefits. If the implementation or core algorithms are open source, the developer community can participate in improving it by contributing code, documentation, and design. Any social impact organisation in India or abroad can also use it without any licensing implications. Finally, academicians, individuals, and companies can all create applications PoC (Proof of Concept) and Minimum Viable Products (MVPs) using the public repositories.

Methods to ensure high adoption of GAU Coin

A social token is as strong as its network's size and activeness, which means the number of active users and the number of tokens already minted is a powerful indicator of the health of the token.

While the token circulation will not be highly regulated, token minting will be. The minting process will have in-built security features to ensure that only tokens minted using the defined process by GAU and having a digital watermark are the ones which are valid for circulation.

Initially, many tokens will be given away to the participants who perform certain activities. These activities will involve but are not limited to the following:

- Creating positive buzz about GAU on social media and by physical means

- Various volunteering activities leading to individuals becoming part of the ecosystem

- In the field, volunteering activities in and around Gaushalas,

> agricultural land, rural schools, biogas plants and so on

- Referring individuals to sign up as donors, volunteers, and other roles

- Volunteers creating original art and other artefacts to be given away as rewards to the donors. This includes both original digital art and physical art, both of which can be used as collectible

- Open-source contribution in building the platform components, reference implementations PoCs (Proof of Concepts), public APIs, Docker images, etc.

- Creating social apps based on the GAU Open API

Later, participants will earn GAU Coin mainly in the form of rewards described in the "Gamification and Reward System for GAU Coin" section.

Government can use GAU Coin as one of the ways to reward social impact creators and unsung heroes who are unknown to the public. Recognising them by awarding them GAU Coin can right away give them a much higher social stature in terms of various privileges and access to multiple groups, institutions, and events. Since such heroes are more dedicated to society than making monetary gains for themselves, we expect this gesture will make them feel recognised. Moreover, they can use GAU Coins rewarded to make even further difference.

Why is ICO not being opted for?

An Initial Coin Offering (ICO) is a term used to denote a capital-raising activity using the cryptocurrency, similar to an Initial Public Offering (IPO) for stocks. However, for GAU Coin, an ICO is not applicable.

GAU Coin is a Social Token and not a Utility Token / Security

ICO (Initial Coin Offering) is done for utility tokens which are treated as securities. GAU Coin is a social token earned by the participants in the ecosystem and network. Hence, ICO will not be done for GAU Coin.

However, initially, similar to the way in ICO, we try to get as many people as possible in the network, and we will do the same with GAU Coin. There will be a set of tasks to be completed by the participants to earn the GAU Coin when it is launched. GAU Coin can also be earned initially through individual and CSR donations.

GAU Coin does not pass Howey's Test[7]

Howey's test determines whether an instrument qualifies as an "investment contract" for the purposes of the Securities Act: "a contract, transaction or scheme whereby a person invests his money in a common enterprise and is led to expect profits solely from the efforts of the promoter or a third party.

While utility tokens must prove that they pass Howey's Test, a social coin shouldn't pass it. Thus, it can be proven that GAU Coin is not a security or utility token by "failing" the Howey's Test, and hence the risk is zero for the participants in the ecosystem and by holding GAU Coin.

There is no Indian equivalent of Howey's Test, and hence this standard will be used to determine if GAU Coin qualifies as an investment contract.

Why do we think stakeholders will subscribe to the GAU Coin concept and ecosystem?

GAU Coin has no monetary transactions in the ecosystem, so there are no financial implications. Looking at what we have seen with other crypto coins, a coin with a relationship with FIAT currency carries a very high risk. However, as a social token, GAU Coin eliminates that risk, i.e., there is zero risk. Hence, eliminating that risk with the added advantage of creating high social impact makes the GAU Coin a very attractive way for India to perform real social impact at the grassroots level.

GAU Platform will strive towards exploiting the best of The Network Effect by enabling it using GAU Coin. This means that many users, including beneficiaries, can be brought to the platform quickly, and the connection between them will go even faster.

Triple Bottom Line[8]

Many people in India cannot reap the benefits of the programs offered by the Indian Government. The programs are very progressive but don't reach the masses for multiple reasons. One such reason is less active participation from the private sector.

As per the Triple Bottom Line[10] framework, social, environmental (or

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[7] SEC v. W. J. Howey Co. - https://en.wikipedia.org/wiki/SEC_v._W._J._Howey_Co
[8] Triple bottom line - https://en.wikipedia.org/wiki/Triple_bottom_line

ecological), and financial aspects must be considered for sustainable development. Triple Bottom Line is sometimes referred to as People, Planet and Profit, or 3Ps.

This philosophy works exceptionally well for social impact projects. Businesses can use this framework to be more socially responsible while not compromising on profit. The private sector can give CSR grants to the GAU Ecosystem and monitor the progress transparently. Moreover, the GAU Coin they get due to this engagement can be again put back to good use, generating even more social impact. In a real sense, this is a win-win for all the parties involved with the government's help.

Metcalfe's Law[9] and the Network Effect[10]

Metcalfe's law states, "the value of a telecommunications network is proportional to the square of the number of connected users of the system".

In the field of economics, the network effect (also known as network externality or demand-side economies of scale) refers to the situation where the usefulness or value that a user obtains from a particular product or service is determined by the number of other users of compatible products. This effect is generally positive, as more users joining the same network leads to a greater value for the users. When a new user adopts a product, it has two effects: firstly, it increases the overall value for all other users (known as the "total effect"), and secondly, it motivates other non-users to use the product as well (known as the "marginal effect").

GAU Ecosystem uses the extrapolation law to bring exponentially high engagement between various platform participants and increase the value to the square of the number of users increase.

In illustrated in Figure 5, the Network Effect results into multiplicative grown in the total number of connections. With 2 users, we have 1 connection, with 4 users, we have 6 connections, however, with 8 users, we have 28 connections.

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[9] Metcalfe's Law - https://en.wikipedia.org/wiki/Metcalfe%27s_law
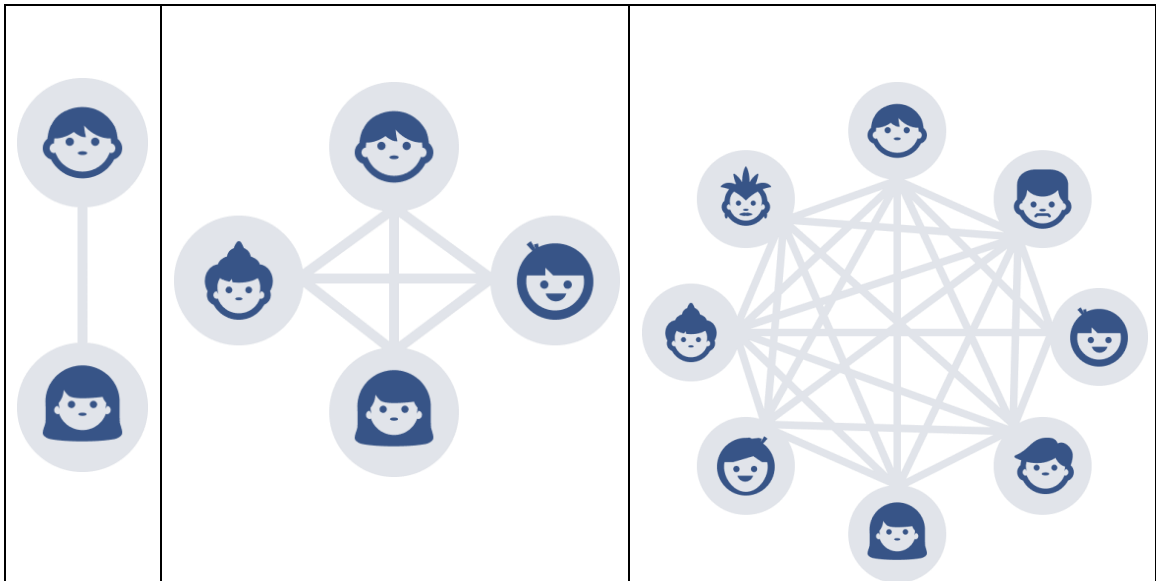[10] The Network Effect - https://en.wikipedia.org/wiki/Network_effect

Figure 5. The Network Effect

GAU Coin can use The Network Effect due to a large number of users and different Ecosystem Partners and Enablers to create a timely intervention and hence create a very high social impact. The underlying social structure can be changed to be more democratic and community-driven; therefore, progress will follow automatically.

GAU Coin as a means to create Social Intervention

Social Interventionism is a process where a public or private organization deliberately intervenes in social affairs to bring about change. This means that there is a conscious effort to modify society in some way, resulting in an "alteration of the social structure and social framework".

Social Intervention should be created in the situations when social impact projects are not moving forward and have become dormant. Another situation where an intervention is needed when the social impact areas and projects need financial support to progress, but they cannot get it.

Ecosystem for Social Impact Startups in India using the Indigenous GAU Coin and the GAU Ecosystem

Startup economics is a six trillion-dollar industry[11]. The top startup ecosystems reflect the ground-level confidence of entrepreneurs, job opportunity potential, innovations, increase in GDP and value creation. India's startup ecosystem is identified as the third-largest startup ecosystem. GAU Coin can help bridge the gaps in the ecosystem by creating new connections as explained in this section.

As per Ewing Marion of Kauffman Foundation, on entrepreneurship ecosystems: *A community's entrepreneur support network — the organisations and institutions that comprise its "ecosystem" — is critical for new firms to succeed. The study emphasised a thorough understanding and development of crucial connections within the ecosystem: connections between entrepreneurs; connections between formal support organisations; connections entrepreneurs have to key support organisations; and connections entrepreneurs have to other forms of support, such as to other entrepreneurs in the area, periodic entrepreneurship-oriented events or other relevant organisations.*

Some key aspects emphasised by the research were:

1. Thriving ecosystems are, by definition, highly developed

2. What are the most critical elements, how (and how well) are they or not connected, and how they evolve

3. Entrepreneurs learn from interacting with other entrepreneurs

4. These interactions created an environment in which they could not only learn from their peers but also support each other emotionally through the rough and uncertain journey.

In a grading level of importance, they arrived at the following requirement of being connected to the ecosystem:

Level	Requirement
1	Connections Between Entrepreneurs

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[11] Global Startup Ecosystem Ranking 2022 - https://startupgenome.com/article/global-startup-ecosystem-ranking-2022-top-30-plus-runners-up

2	Connections Between Support Organisations
3	Connections Between Entrepreneurs and Key Support Organisations
4	Miscellaneous Support Connections

In short, we derive that the ability of these ecosystem community members to stay connected and interact globally is of critical importance for their success.

The following table1 lists the challenges of Offline Startup Ecosystems:

Table 1. Challenges of offline startup ecosystems

Challenge	Description
Lack of digital interactions	Currently, there are scattered pockets of concentration rather than the widespread adoption of digital interactions.
Missed opportunities	Startups may miss out on opportunities or face high costs due to insufficient resources or a lack of connections within the appropriate ecosystem at the right time
Unrealised network potential	Metcalfe's Law suggests that the value of a network community grows exponentially with the square of its users. LinkedIn, Facebook, and Uber are examples of platforms that have realised the potential of the network effect. However, critical mass, the percentage of users necessary to achieve traction, must be onboarded before the network effect can take hold.
Standardisation	Once critical mass is reached, standardisation occurs, and the product or service's value surpasses the cost, attracting even more users and exponentially increasing its value.
No single full spectrum global platform	The key to successfully reaping the benefits of network effects lies in getting more users to connect to the network before the critical mass is attained. Once this is done, the network effects work their magic on their own

Individual and Institutional Investors, Philanthropists and GAU Coin

Donors and Philanthropists can earn GAU Coin for their individual and CSR donations. They will be rewarded with GAU Coins based on the project they will fund and their involvement in these projects. The number of coins will differ from project to project based on the contribution to the project and the social impact made. [3]

Investors will be awarded GAU Coin and will get monetary benefits from this ecosystem. The investment can be made in the platform itself and in developing new and underdeveloped areas that can upskill people, make them job-relevant, and set up small businesses. Investors will get a return on their investment by means of other flows (money and commodity) shown before. They will also be getting a part of their investment returns through the platform, as a small fee will be charged for its usage.

Service Providers and GAU Coin

GAU coins should be earned or limited for service providers, and they should not go beyond the boundary.

There are multiple ways to compensate the service providers participating in the GAU Ecosystem. They are compensated using a part of individual and institutional donations received. In the future, they can also be compensated by GAU Coin, which they can convert to FIAT currency through an Escrow or some other financial organisations. GAU Coin can be converted to fiat currency only by such financial organisations having permission to do so and nobody else.

This is done to ensure better participation, create a better relevance for the GAU Coin, and associate an indirect monetary value.

GAU Coin as a Unifying Social Token

The vision of GAU Coin is to begin unification in the social section by means of Social Token, Social Credibility, and Impact Score.

This will give all the NGOs and government agencies a common language which can then be mapped to various SDGs (Sustainable Development Goals). This will also be transparent regarding the impact made by removing the subjective approach to such impact calculations.

This is akin to the Carbon Credit market, where the entire process and ecosystem are unified worldwide, and similar nomenclature is used everywhere.

GAU Coin Ecosystem Partners and Enablers

As per the requirements of the various levels of entrepreneurship ecosystem, the number of connections and interactions play key roles, and GAU Coin can act as an enabler.
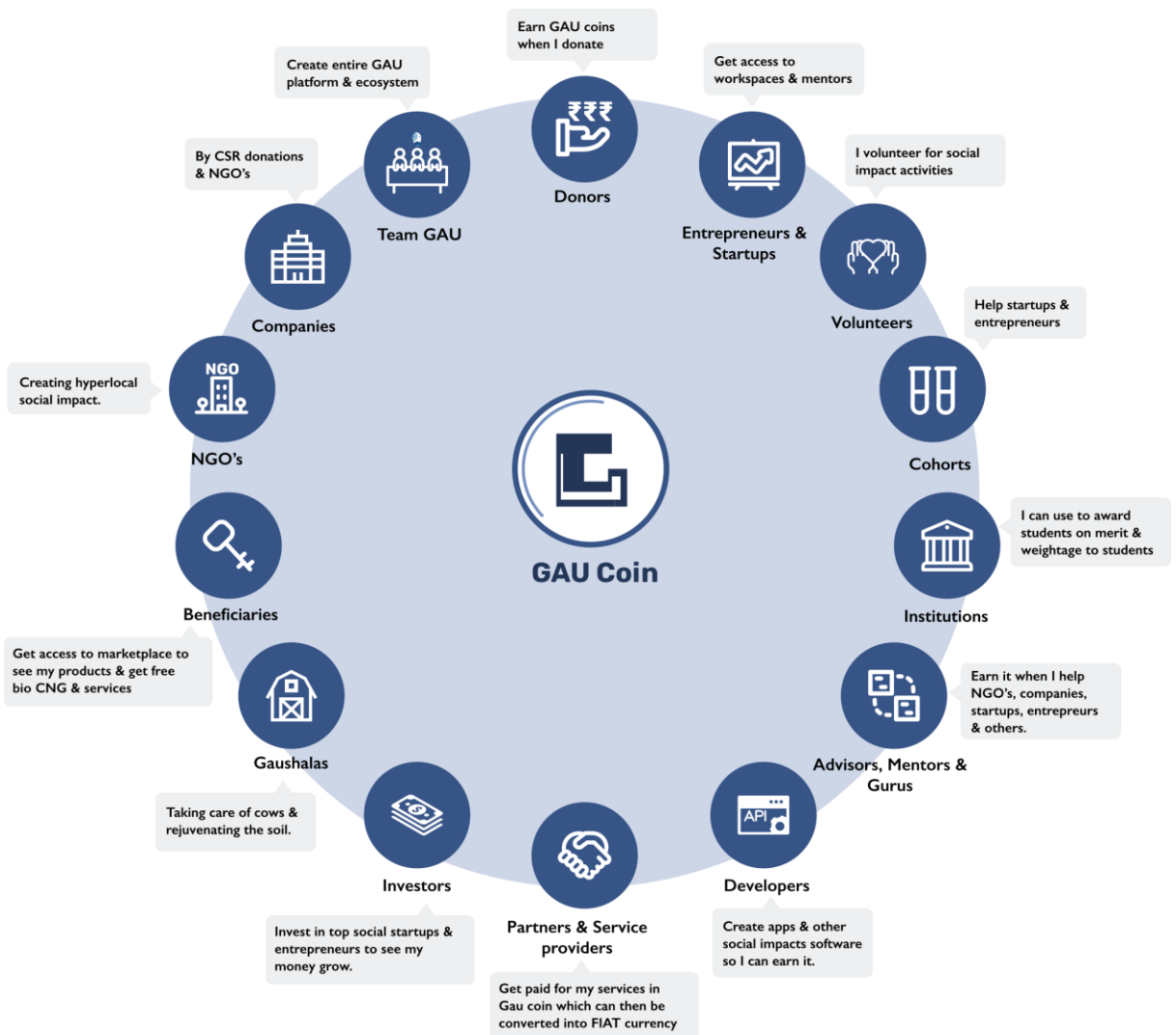
Figure 6: GAU Coin Ecosystem Partners and Enablers

Figure 6 shows the interactions between various ecosystem partners and enablers which are possible through GAU Coin. These types of interactions give rise to a peak level of network effect leading to millions or even billions of connections created in the ecosystem.

The following partners and enables are identified in the GAU Coin ecosystem. They will participate in various flows as identified before. [3]

Partners/ enablers	Description
Team GAU	Full-time founders, promoters, C-team and associates building the GAU platform. They are the operations

	team with experience and capabilities who have built the GAU Platform and GAU Coin digital ecosystem
Donors	Donates for social impact causes and earn GAU Coin for the impact they make. They can't buy GAU Coin
Entrepreneurs and Startups	Can get access to workspaces, incubators, and mentors. They can also social startups who have incorporated an idea recently in the social impact areas
Volunteers	Individuals or organisations who volunteer their time for social impact and get earn GAU Coin for the time given and impact created
Cohorts	Like incubators, accelerators, facilitators, co-working spaces, etc., who are focused on the social impact areas
Institutions	A university or learning centre which can help bring awareness about the social impact models and develop skills to be part of this ecosystem
Advisers, Mentors and Gurus	Eminent persons, highly successful entrepreneurs, and CxOs who can help the ecosystem. They bring goodwill, credibility, association benefits, showcasing ability, branding
Developers	Individuals or organisations who create apps and other social impact software and can earn GAU Coin for the work done
Partners and Service Providers	Have a useful, ready offering one or can offer their abilities and skills for consultation and taking up projects
Investors	Various investors like angels, VC, F&F etc., who are active in the social impact areas, including Crypto Assets investors
Gaushala	They care for cows in need, rejuvenate the soil, and create hyperlocal impact. They earn GAU Coin for the impact created
Beneficiaries	Get access to the marketplace and host their products,

	and get free BioCNG and other services
NGOs	They work with local gaushalas, volunteers, and other organisations and create hyperlocal impact. They earn GAU Coin for the impact created
Company	An established company with many years of established revenue model focused on the use of the products and byproducts of the GAU Ecosystem

Tech Stack of GAU Coin

This section gives a high-level view of the underlying architecture and tech stack of the GAU Coin.

GAU Decentralised Service Mesh

GAU Decentralised Service Mesh Stack is the tech stack for the GAU Platform as well as GAU Coin using TrustyFi® technology. This is shown in the diagram below:
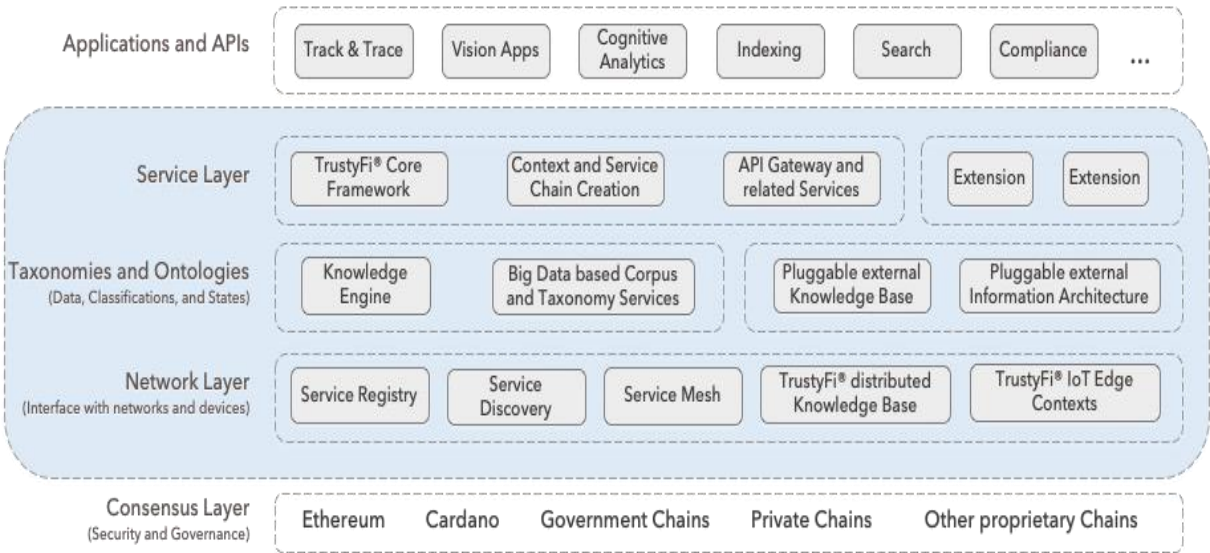

Figure 7: GAU Decentralised Service Mesh

GAU Decentralised Knowledge Mesh is a multi-layer architecture that creates an extensible platform with options for integration to enable GAU Ecosystem

This Service Mesh also defines the following:

1. The communication mechanism between internal and external components

2. Extension points and the contracts for extending the functionalities

3. Ontological contracts for the state of the systems at any given point in time

4. Knowledge Engine with in-built extensibility using Machine Learning and Analytics

5. The Consensus Layer with well-known and open-source Blockchain standards

General representation of the architecture

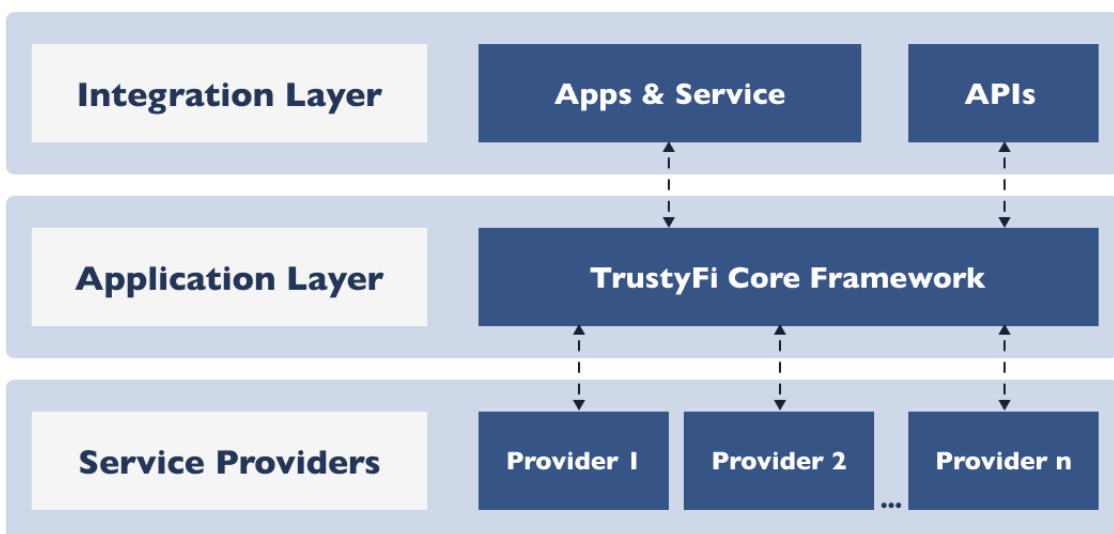Following is a general representation of this architecture:

Figure 8: GAU Coin General Architecture

Only the top layer (Integration Layer) and Bottom Layer (Service Providers Layer) need to be written/implemented for domain-specific use cases. The Core Framework part is reused for any domain where it is used. In the Core Framework, the Taxonomy and Knowledge Base need to be defined for each domain, though.

This results in a domain-specific architecture using the generic architecture.

In any domain-specific architecture of TrustyFi® Decentralised Knowledge Mesh architecture, Cognitive Computing for domain-specific cognition and its various applications are used for realisation.

GAU Coin Tech Stack

The following logos of the technology gives a high-level view of the tech stack involved in building the GAU Coin and its ecosystem.

Figure 9: GAU Coin Tech Stack

The GAU Coin framework is a fully distributed framework with in-built fault-tolerance, security, and extensibility, using the above technologies.

In-built privacy and security

Due to in-house Cybersecurity, Firewall, Load Balancer, and other core skills required for creating secure solutions, the GAU Coin solution is secured with an A+ rating for security and privacy.

Moreover, all the activities are automatically logged for auditing, and anomalies are detected using our Elasticsearch-based Analytics modules.

GAU Coin follows various security principles right from development to

going live. The entire solution is audited occasionally for privacy issues and vulnerabilities and fixed if found.

Our story until now

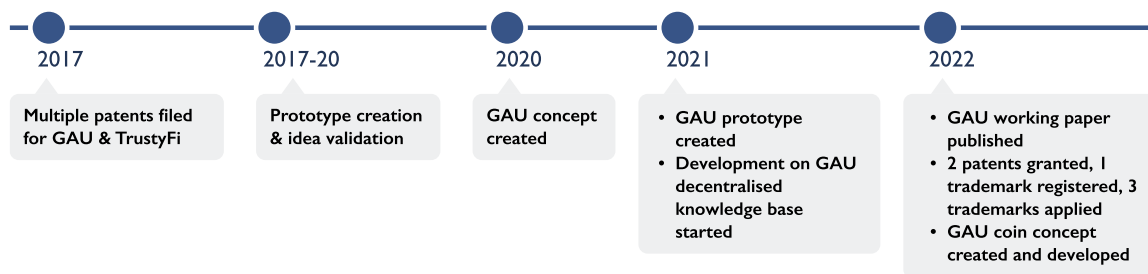Our high-level journey to reaching this point is depicted in the diagram below:

2017	Multiple patents filed for GAU & TrustyFi
2017-20	Prototype creation & idea validation
2020	GAU concept created
2021	• GAU prototype created • Development on GAU decentralised knowledge base started
2022	• GAU working paper published • 2 patents granted, 1 trademark registered, 3 trademarks applied • GAU coin concept created and developed

Figure 10: Timelines for GAU and GAU Coin Development so far

The following table gives details about our patents and trademarks:

Patents	2 Granted 2 Filed 3 Filing in progress
Trademark	2 Registered 7 Filed

GAU Coin's Legal Aspects

GAU Coin as a social token will comply with the laws for non-ICO tokens under Indian Jurisdiction. TechMachinery Labs™, the creator of GAU Coin, is neither a financial institution nor a credit institution that can offer credit facilities offline or on the platform through any agents. Processes like incubation and acceleration, which are essential aspects of the startup ecosystem, are available to users on the platform. GAU Platform is neither a peer-to-peer platform for credit facilities nor credit intermediaries. All user-to-user services on the platform are driven by pre-defined or pre-approved service cards, processes, and engagement models.

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