

ArtChain Global

White Paper

ArtChain Global Project Team

Version: V1.3

Date: 05/2018

www.artchain.world

The recipient of this White Paper acknowledges and agrees that the distribution of this White Paper and the offering of ACG Coins may be restricted in certain jurisdictions.

No recipient in any jurisdiction may treat it as constituting an invitation or offer to them to apply unless, in the relevant jurisdiction, such an invitation or offer could lawfully be made to that recipient in compliance with applicable law.

Recipients of this White Paper must obtain all necessary regulatory approvals before making an application for ACG Coins.

Table of Contents

1.	BACKGROUND OVERVIEW	4
1.1.	BLOCKCHAIN TECHNOLOGY	4
1.2.	CRYPTOCURRENCIES	5
1.3.	BACKGROUND OVERVIEW OF THE ART INDUSTRY AND MARKET	6
2.	ABOUT ARTCHAIN GLOBAL	7
3.	ECONOMIC MODEL	9
3.1.	USAGE AND VALUE BASIS OF ACG	9
3.2.	INCENTIVE MECHANISM FOR ECOSYSTEM	10
3.3.	ALLOCATION AND DISTRIBUTION	10
3.4.	IMPORTANT INFORMATION	12
4.	BUSINESS MODEL	12
4.1.	OVERALL BUSINESS MODEL FRAMEWORK	13
4.2.	ART ASSETS REGISTRATION MANAGEMENT	14
4.3.	ART ASSET TRADING PLATFORM	14
5.	ESTABLISHING THE ECOSYSTEM	15
5.1.	ESTABLISHING THE UNDERLYING MECHANISM OF THE ECOSYSTEM	15
5.2.	POTENTIAL OPPORTUNITIES TO DEVELOP	16
6.	TECHNICAL FRAMEWORK	17
6.1.	TECHNICAL SPECIFICATIONS AND STANDARDS	17
6.2.	TECHNICAL BRIEF	17
6.3.	UNDERLYING ARCHITECTURE	18
6.4.	DESIGN CONSIDERATIONS	22
7.	GOVERNANCE MECHANISM AND RISK CONTROL	23
7.1.	ARTCHAIN GLOBAL'S GOVERNANCE MECHANISM	23
7.2.	ARTCHAIN GLOBAL COMMUNITY	23
7.3.	NODES MANAGEMENT	24
7.4.	RISK CONTROL	24
8.	TEAM	25
8.1.	CORE TEAM	25
8.2.	CONSULTING TEAM MEMBERS	27
9.	PROJECT SCHEDULE AND ROADMAP	30
10.	CONCLUSION	31

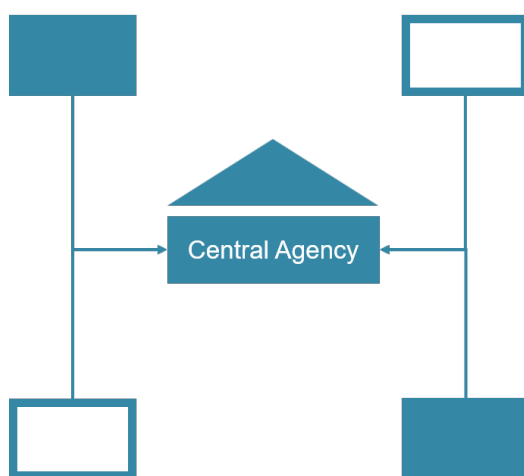
1. Background Overview

1.1. Blockchain Technology

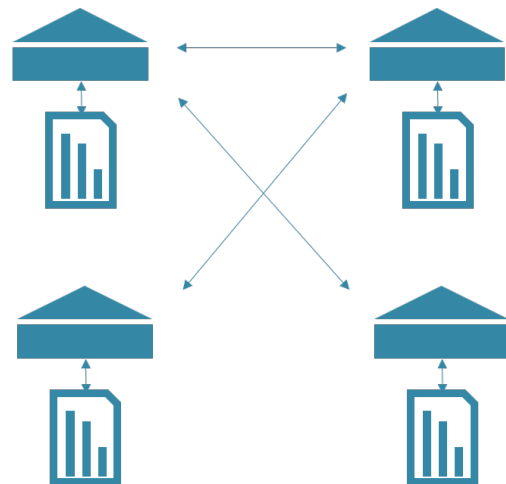
Blockchain is currently one of the most revolutionary emerging technologies in the field of information technology, which connects data (blocks) in chronological order to form a chronologically traceable and inalterable record of transactions by maintaining a shared ledger on multiple nodes in a network.

The core value of blockchain technology lies in the establishment of a secure and inalterable distributed ledger system. Based on the technical assurance of cryptography, distributed consensus protocol, peer-to-peer network communication, smart contracts and other technologies, it allows multiple participants to use the blockchain ledger system as a basis for trust for multiple-party transactions, which eliminates the need for any additional trusted third parties and allows for low-cost and low-delay information exchange and transaction processing as well as efficient circulation of digital value.

Blockchain builds trust in a decentralized way



There is a need for third parties to build trust among the various actors which use a centralized ledger.



By replacing the central structure with a distributed ledger of the blockchain, Each node runs and tests together to prevent fraud and human manipulation.

Figure1-1: Blockchain Establishes Decentralized Trust

1.2. Cryptocurrencies

The 1990s witnessed the rise of the Internet. The internet's main focus was on the transfer of "information", it has promoted dramatic social progress and rapid economic development, supporting a range of new industries and markets worth trillions of dollars. Blockchain technology, on the other hand, creates a commercial circulation network for the transfer of "value" and the support of the circulation of a number of digital assets including cryptocurrencies. In view of the trends of human and economic development, the specific forms of currencies have been evolving and are more and more focused on the circulation of value. With the positive approach to digital currencies by currency issuers of mainstream developed countries, digital currencies are becoming the trend that is shaping the future.

Cryptocurrencies, with Bitcoin and Ethereum as their representative examples, have been growing strongly over the past few years and have come to be accepted, purchased and stored by an increasing number of consumers, demonstrating enormous enthusiasm for blockchain-based cryptocurrencies and a potential trend shaping the future.

Total Turnover Ratio of Total Turnover Ratio in 2016

■ China ■ US ■ UK ■ France ■ Germany ■ Italy ■ Others

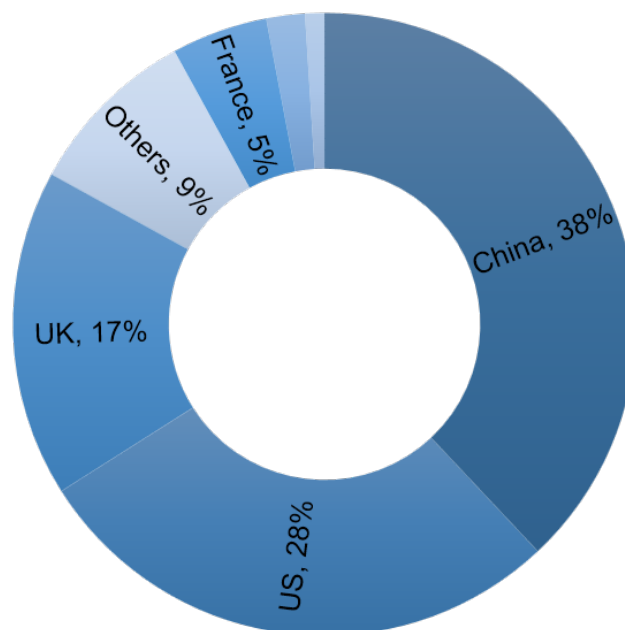


Figure 1-2: Various Countries' Percentages of Total Sale Amount at Auctions in 2016

1.3. Background Overview of the Art Industry and Market

It is estimated that the global art market is worth over USD \$1 trillion. In 2016, total sales in the global art market reached approximately USD \$60 billion as quoted by Art Economics. The global value of art exchanged at auctions has remained stable at around USD\$14 billion per year. Art auctions however, are only one of the many links in the whole supply chain of the art market, which extends to include private art trade, collection and storage, promotion, finance, and charity. The global art market has historically been dominated by Europe and North America; however, recent trends show China to be an increasingly significant player.

Global internet access has provided an opportunity for artists to gain greater exposure for their works and the universe of artist appears to be rapidly expanding. In recent decades, large corporations and financial institutions have become major collectors of art; and, their professional business standards have brought unprecedented efficiency to the art market including significant growth in both transaction speed and volumes. Art circulation has improved in recent times as the interest in art as an investment grows.

Art ownership in key geographic areas has been more obtainable as people's disposable income have increased. In China, with the robust growth of the middle class, the number of people who appreciate art and are starting to purchase and collect art has increased exponentially. The art market in China is evolving into a popular market with extensive participation with a number of individual collectors transforming into corporate art collectors. It is also worth mentioning that more than 30% of the artists on this year's Top 500 Global Artists are from China (compared with 15% from the United States).

Concurrently, the museum/art gallery industry has also experienced exponential growth with the opening of approximately 700 new museums each year. This has become a phenomenon across the global art economy in the 21st century. More museums have been established between 2000 and 2014 than in the last two centuries. The art market has evolved into a relatively sophisticated and liquid market, where an annual return of 10%-15% can be expected for the purchase of a piece of art at a price of more than US\$100,000.

Furthermore, with the development of the Internet, more than 90% of around 6,000 auction houses worldwide have offered their auctions online. The whole art market is evolving and growing in an unprecedented way while retaining traditional underpinnings.

In summary, the global art market has enormous value and is understood to be valued at trillions of dollars. The art auction market in China has become the largest globally, with an increasing number of top-level collectors (both individual and corporate collectors). Art has become a part of people's daily life, the

collection of art continues to be seen as a valuable investment and is attracting extensive interest and participation on a global scale.

By taking advantage of blockchain technology, ArtChain Global provides practical solutions to a number of issues in the current art market. It creates a sound and sustainable ecosystem and provides a decentralized secure database, which will have revolutionary implications on the art market as a whole.

2.About ArtChain Global

ArtChain Global is being created by a leading blockchain technology team and successful venture capital entrepreneurs in a joint effort with senior analysts and in with collaboration with the art industry. The aim is to provide solutions to a number of inherent and emerging issues in the art industry and to promote the sound and efficient growth of the art and culture industry as a whole by taking advantage of the technology and its application. ArtChain Global endeavours to build an autonomous blockchain underlying architecture and a trading platform for the art industry while developing a distributed ecosystem for the art industry and the economy as a whole.

Current challenges and issues in the art market:

- Given the high efficiency enabled by the internet, the liquidity of the art market needs to be improved and due to relative information asymmetry in the art market, there are a number of issues arising in the public market such as lack of transparency on prices and ownership history (provenance) and inadequate control of transaction data.
- High threshold for the collection of high-value works of art, beyond the affordability of the general public.
- Authenticity and appraisal of high-value works of art.
- High difficulty appraising the value of works of art in the primary art market and lack of transparency trading in the secondary auction market (both online and offline).

- Huge price differences for the works of talented artists before and after death.
- Lack of recognition, public attention and care for a large number of artists. A large number of potentially great works have been ignored or buried away by the market as many artists can't afford to show their works or receive appropriate valuation for their works before they come to fame.

The development of ArtChain Global is expected to provide a total solution to these issues by creating a new ecosystem for art and bring the art industry into a new era. ArtChain Global consists of the underlying architecture of blockchain to support a business system centred around art assets trading platforms.

ArtChain Global's "Blockchain Works of Art Registration and Asset Management Platform" records works of art, trading and circulation. It provides the basis for the trading of art and a trustworthy distributed ledger by taking advantage of traceable and inalterable features of blockchain.

ArtChain Global will issue a native art token (ACG coins) as the medium of value circulation within the ArtChain Global ecosystem. Holders of ACG coins may also enjoy the benefits of increased value of ACG after they start trading at major exchanges and markets. Furthermore, a large number of talented artists who transfer their artwork to ArtChain Global in exchange for ACG coins will be able to redeem ACG Coin progressively for cash to gain cash flow and/or use the platform to sell art to obtain value for their works if they require. This will be at value reflective of their current career status; emerging, early, established etc.

ArtChain Global plans to customise Blockchain technology for the art industry. It will use it as an underlying architecture to develop secure and incorruptible platforms for the business of art. It is open and expandable and offers a huge potential for add ons and additional functionality across the platform. ArtChain Global will be open to all developers who endeavour to pursue art and the development of blockchain applications for the industry. ArtChain Global will help them to develop applications for various scenarios on the basis of ArtChain Global and ACG, so as to promote the prosperity of the art industry as a whole in the new age of technology.

Looking to the future; with the sustainable growth and opening-up of ArtChain Global, the increase in the number of applications, content and data, the integration with its distributed offline scenario-based economic model, it will become a great driving force for the current art industry. It will bring the whole industry for art products into an era of efficient circulation in its true sense. This will enable the art industry to offer something that every person can participate in, appreciate, invest in, own and pass down.

3.Economic Model

ArtChain Global will issue a total of 3.5 billion pieces of ACG tokens to meet the requirements for the proper network operation and business application. ArtChain Global will issue 2.1 billion pieces, or 60% of the total number of tokens, in a one-off allocation at the time when the genesis block is created. The remaining 1.4 billion pieces, or 40% of the total number of ACG tokens, shall be created as ecosystem incentives and allocated to participants (i.e., developers, ledger nodes, organizations at the primary and secondary art markets, artists, collectors, etc) who have contributed to the ecosystem of ArtChain Global in accordance with certain rules.

3. 1. Usage and Value Basis of ACG

As the native digital currency of ArtChain Global, as the more people that use the platform the greater the likelihood the value of ACG will increase ACG can be used as the medium of value in circulation and the right to use ArtChain Global as an ecosystem. This ACG holding also enables the holders to participate in the ArtChain Global community.

As a medium of value in circulation, ACG is mainly used to complete transactions on ArtChain Global. It can be used in exchange for handling fees, the use of applications, transaction registration and recording of works, pledging works of art and access to offline venues and other similar transactions.

Our professional team will work closely with various artists and the organizations on the primary and secondary markets to participate in establishing a program to support and include new generations of artists in the ecosystem of ArtChain Global. In the near future, such training and support programs will not be limited to the art industry alone and are expected to be extended to and have implications on the art and culture industry as a whole.

In the longer term, as it grows and matures, ArtChain Global will be able to support a value system with ACG being traded as the medium in circulation. This will cover all parts of transaction exchanges and settlement, art finance, offline venue entry, training programs and art for charity. The ArtChain Global team is envisaging a decentralized, distributed and integrated online and offline art trading platform along with physical venues in the art market for all people to enjoy. ACG can be freely exchanged and used to support art and possibly an even broader market as it gains acceptance and momentum.

3.2. Incentive Mechanism for Ecosystem

As mentioned above, ArtChain Global envisages an ecosystem supporting the art market where all participants make a positive contribution. ArtChain Global will use ACG as an incentive for the ecosystem, and will award all participants and contributors including artists, broader market participants, developers and investors and will allocate 1.4 billion pieces, or 40% of the total number of ACG coins over 20 years, which will be continuously generated according to a predetermined issue curve. Such an incentive mechanism will not only ensure the participants enjoy benefits throughout the process, but also maintain the stable development of the ecosystem of ArtChain Global.

Under this incentive mechanism, 40% of the total number of ACG coins that are continuously generated will be allocated proportionately in accordance with the various requirements of the ArtChain Global ecosystem. This will ensure sustained prosperity and development based on the contribution, significance and positive correlation to the ecosystem (Proof of Interaction (POI)), instead of Proof of Work (POW) or Proof of Stake (POS).

3.3. Allocation and Distribution

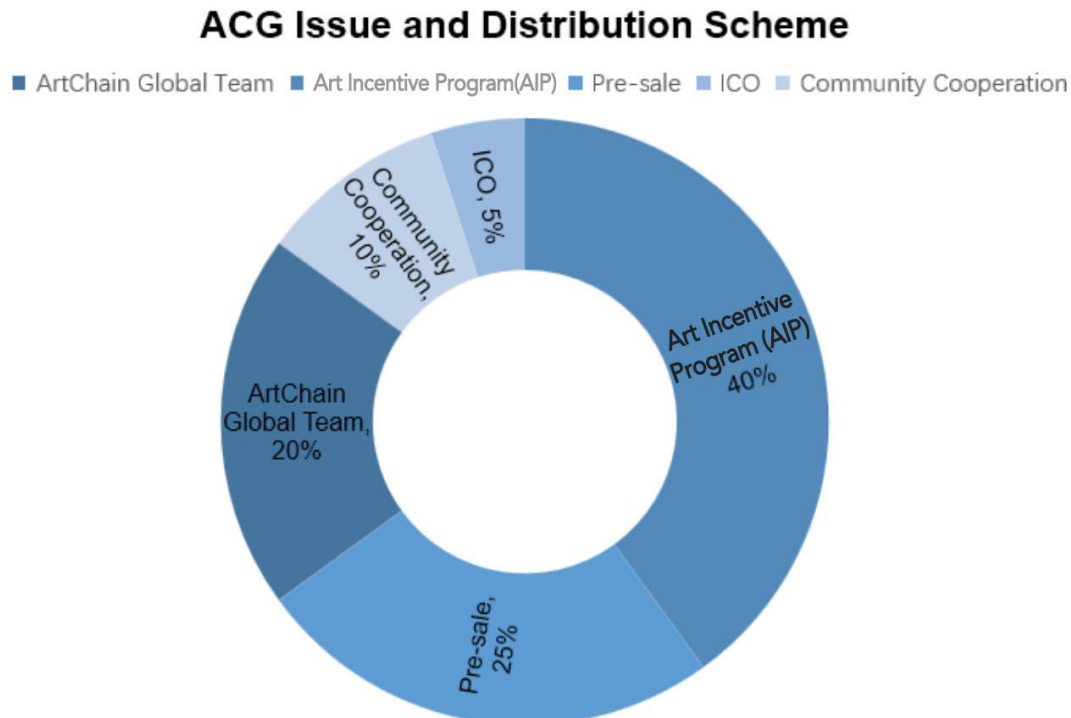


Figure 3-1: Proportions of Allocation

Allocation Scheme:

- 1) 25% of ACG coins will be for private placement to institutional investors prior to ICO;
- 2) 5% of ACG coins will be allocated through ICO;
- 3) 20% of ACG coins will be allocated to the ArtChain Global team, as a reward for the resources and technical support they have provided at the early stage of the development of ArtChain Global. These ACG coins will be locked after listing on the exchange and will be released in 6 month blocks over 48 months as follows: From 1st January 2019 15% will be released, followed by a further 15% from 1st July 2019. The 6 month block from 1st January 2020 will be 12.5% and on 1st July a further 12.5%. The 2021 blocks will repeat those from 2020. The final year, 2022 will be 10% in the first 6 months and 10% from 1st July 2022.
- 4) 10% of ACG coins will be allocated to the community, which will mainly be awarded to outstanding contributors of the community and the developers of the early applications of ArtChain Global;
- 5) 40% of ACG coins will be generated under the incentive scheme of the ecosystem, which will mainly be awarded to participants who have made positive contributions to the prosperity of the ecosystem of ArtChain Global.

Approximately 40% of the ArtChain Global (ACG) coins are generated under the incentive scheme of the ecosystem, which are issued on the basis of the generation of new blocks as well as the users' interaction with the art ecosystem within a specific block cycle. ACG coins shall be generated every two years by following a curve of generation, which decelerates at an even speed in the first 10 years and stabilizes in the second 10 years. Approximately 420,000 pieces of ACG coins will be generated every day during the first year and the second year. Approximately 350,000 pieces will be generated every day during the third year and the fourth year. Approximately 265,000 pieces of ACG coins will be generated every day during the fifth year and the sixth year. Approximately 190,000 pieces of ACG coins will be generated every day during the seventh year and the eighth year. Approximately 110,000 pieces of ACG coins will be generated every day during the ninth year and the tenth year. From then on, the generation of ACG coins shall be kept at the level of approximately 110,000 pieces every day until the total number reaches 1.4 billion in around 20 years. ACG coins will no longer be generated at this point in time.

Following this curve of distribution, around 22%, 40% and 70% of this portion will be generated in the first two years, in the first four years and in the first 10 years, respectively, which will be allocated under the incentive mechanism. This shall continue until ACG coins are no longer generated after 20 years.

3. 4. Important Information

The distribution of this White Paper and any offer with respect to the issue and distribution of ACG Coins may be restricted in certain jurisdictions. No recipient of this White Paper may treat it as constituting an invitation or offer to them unless, in the relevant jurisdiction, such invitation or offer could lawfully be made to that recipient in compliance with applicable law.

Prospective ACG holders should inform themselves as to the legal requirements and consequences of applying for, holding, transferring and disposing of ACG coins and any applicable exchange control regulations and taxes in the countries of their respective citizenship, residence, domicile or place of business. It is the responsibility of prospective ACG holders to obtain any necessary approvals in respect of an ACG holding.

4. Business Model

ArtChain Global is an open, expandable and revolutionary blockchain infrastructure orientated towards the art industry. This means that participants will have the opportunity to develop an extensive range of art-related applications for specific scenarios based on the foundation of ArtChain Global.

The business model of ArtChain Global consists of the underlying architecture of the blockchain of ArtChain Global and a business system that is built on this architecture, which is centered on the Art Asset Trading Platform. As the development process progresses, further possibilities and improvements will be built into the ecosystem, and extended to all participants in the market during as it is implemented.

4. 1. Overall Business Model Framework

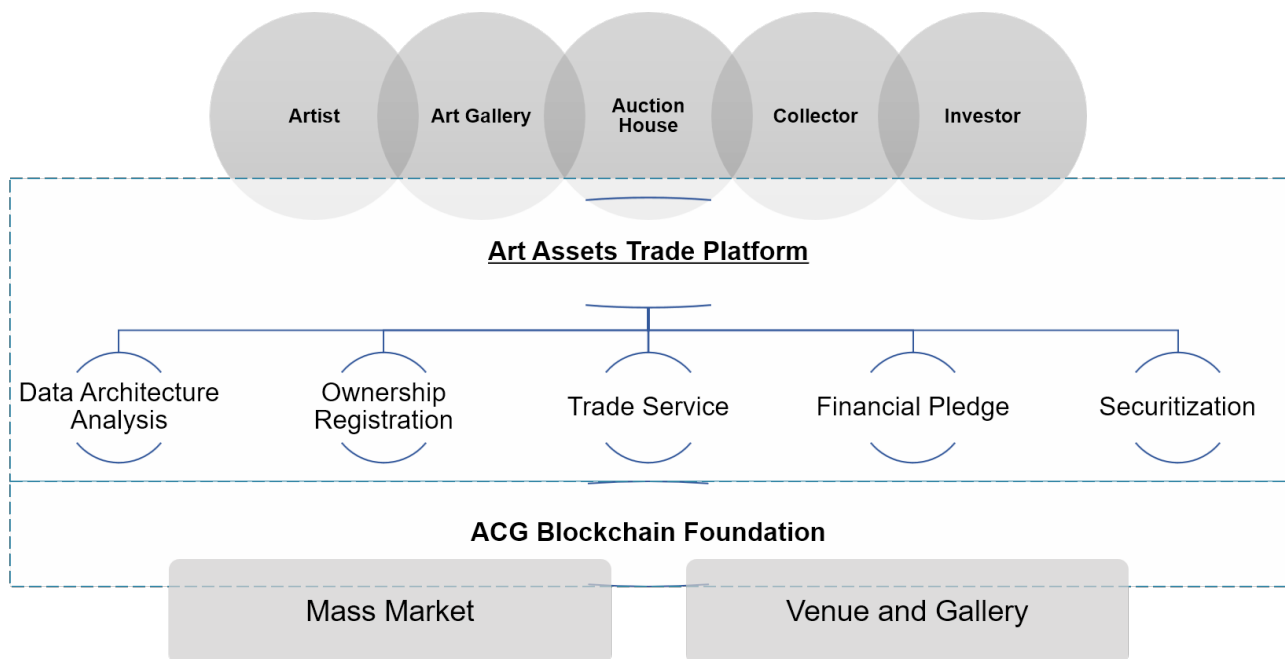


Figure 4-1: A Brief View of the ArtChain Global Business Model

As shown above, the overall business model framework of ArtChain Global consists of:

- ArtChain Global’s Underlying Architecture of Blockchain, which is a blockchain technology-based system with an innovative design oriented towards the art industry. This is detailed in “Technical Framework”.
- ArtChain Global Works of Art Registration and Asset Management with a registration system for new and emerging artists and their works of art, which enables a number of emerging artists to start registering their works of art on the blockchain system of ArtChain Global through the assessment system of professional institutions within ArtChain Global and its ecosystem. Their works of art will then be eligible for trading and participating in the ecosystem.
- Art Asset Trading Platform with Artists, art institutions in the primary or secondary markets, collectors, and investors can all use the Art Asset Trading Platform to conduct smart contract-based transactions. The Trading Platform will offer both online and offline registration and trading of art assets.

4. 2. Art Assets Registration Management

A vital component to the ArtChain Global business model, has the following two roles:

- To provide a basic service for all the artists or collectors on the chain to register relevant works of art in a simple, fast and low-cost way. For artists, the Artists Incentive Program rewards artists who register their work on the blockchain with ACG tokens for the first 10 years of operation.
- To function as one of the essential applications on the ArtChain Global platform. Its core value lies in the fact that it takes advantage of the trusted digital environment that is unique to blockchain and enables artists or collectors to complete the registration of their works of art so as to lay the ground for subsequent investment, trading and commercialisation. Where required, ArtChain Global can also implement anti-counterfeiting technologies for the original works of art by integrating with the smart modules of Internet of Things, and activate or turn on relevant smart hardware and other functionalities (e.g. positioning/location tracking) as required by artists or collectors.

4. 3. Art Asset Trading Platform

The Asset Trading Platform is an essential core application based on ArtChain Global and an indispensable part of the system. Its unique presence on ArtChain Global, brings advantages and value, as it creates the ecosystem and provides a central point of reference for the industry as a whole.

ArtChain Global has collaborated with members of the art industry to develop this proposal. In developing the ArtChain Global platforms we will continue to consult key stakeholders. We are confident of cooperation with major institutions (art galleries, museums, auction houses) in the primary and secondary markets around the world in the shortest possible timeframe. This means a smooth transition to establish and operate such a trading platform.

The core value of the platform lies in:

- Trading of art assets;
- Becoming an important virtual venue and link based on ArtChain Global, where online blockchain information and transactions can be fully integrated with offline scenarios;

- Displaying great works of art to a wider range of professional investors, leveraging the openness of ArtChain Global ;
- Implementing traceability of artwork based on blockchain technology and smart contracts;

5.Establishing the Ecosystem

ArtChain Global utilises the underlying architecture and functionality of blockchain, and depends on the most fundamental requirement of openness to support the creation of a decentralized ecosystem. In view of this, ArtChain Global has a goal of developing and utilising the new ecosystem to bring changes to the art and culture industry so it can become more efficient, rational and prosperous.

ArtChain Global is structured as a permissioned Consortium blockchain that is supportive of authority management. This style of decentralized ecosystem has been chosen to best suit the art industry when considering how it will interact with the general public. The ArtChain Global team believes this to be the strategy most suited to the current industry conditions.

5. 1. Establishing the Underlying Mechanism of the Ecosystem

The establishment of the underlying mechanism of the ecosystem involves the development of capabilities at two levels: a technical level and an incentive level or value-driven level.

- At the technical level, it involves the development of open and expandable capabilities, which rely on the access layer of applications in the system. This can be achieved by means of:
 - 1) the application access module in the node client of ArtChain Global;
 - 2) independent application access SDK and API, which involves service provisions by a number of specific nodes.

Both options will provide strong, open and expandable capabilities. These capabilities are based on the underlying architecture of ArtChain Global's blockchain, including data, transactions, wallet and account services, smart contracts, etc.

- At the incentive level, it offers incentives for the community. It is expected that numerous ArtChain Global applications will be developed by the community for various additional functions on the blockchain. ArtChain Global has set aside a portion of ACG coins as incentives for the community, which will be awarded for outstanding contributions to the ecosystem development and functionality.

Importantly, ArtChain Global is a business platform. It gives permissions to and encourages all valuable applications to provide services, and as such those providing services to the community will also receive rewards.

Such a commercial ecosystem will encourage the development of innovative and valuable applications.

5. 2. Potential Opportunities to develop

- Data services for the art industry, the art and culture industry or any specific vertical segments;
- Integrated and diversified platforms for art asset registration, management, trading and security;
- The use of blockchain-based IoT hardware and authenticity enquiry protection systems for works of art; ArtChain Global are investigating the potential application of GPS tracking devices for high value works of art. These may also record temperature and humidity to the blockchain. There is also the potential for specifically located fabric to record pressure placed on artwork.
- Integration of online information and offline venues;
- Artists training and support programs; in cooperation with various institutions and networks, ArtChain Global aims to assist those looking to learn and those who are trying to get started;
- Art for charity; ArtChain Global is exploring avenues to give back to the underprivileged. Plans for this will be revealed throughout 2018.

6. Technical Framework

6.1. Technical Specifications and Standards

ArtChain Global is a proprietary high-performance blockchain solution, which has an underlying technical architecture that complies with the specifications and standards of Hyperledger Fabric project. Fabric has undergone a range of modifications, and has developed a number of dedicated pluggable modules for application scenarios in the art industry. The Hyperledger project was launched in December 2015 by Linux Foundation, the flagship organization in the open source community. Its original members consist of IBM, Intel, JP Morgan, R3, SWIFT, and Cisco. As a strong partnership between the open source community and the industry powerhouses, Hyperledger has provided an open-source reference implementation for blockchain and decentralized distributed ledger technologies, and has promoted the development of relevant protocols, specifications and standards. As of July 2017, more than 140 well-known global companies and institutions have become members of Hyperledger, including more than 30 from China, most of which are leaders in their respective industries. Hyperledger has also attracted active developers from all over the world. With the rapid development of its technical projects, it has evolved into a top-level industry-based community of blockchain technology across the world.

Fabric is the first top-level project of Hyperledger, which was first submitted to the community by IBM, DASH and other companies in late 2015. Through the continuous development and improvement by a large number of contributors over nearly two years, its official version 1.0.0 was released in July 2017. Fabric has been successfully applied to a large number of scenarios globally, such as finance, supply chain, and the verification of asset ownership. It has become the platform of choice for many blockchain solutions.

6.2. Technical Brief

The establishment of ArtChain Global requires a number of functional components to work effectively, such as network communication, blockchain data structure, ledger state storage, trading modules, implementation environment of smart contracts, and consensus mechanisms. The design of ArtChain Global has complied with the requirements for expandable architectural design and pluggable modular implementation. Furthermore, ArtChain Global can also be integrated with IoT smart modules to provide tracking for works of art, which means that the options of Fabric's default implementation, self-developed implementation as well as the implementation developed by third parties will be available for each individual component.

In consideration of the features of its hosted applications and the future development of its ecosystem, ArtChain Global has developed and expanded the functionality of a number of components on its own, such

as the development of accounts and token modules, the improvement of ledger data structures, and the expansion of state storage modules.

Unlike bitcoin and Ethereum, the original goal of ArtChain Global is to establish a decentralized application management platform with a focus on the registration and verification of ownership of art products, art asset management, and the pledging of art products, rather than a decentralized digital currency system or a smart contracts platform.

The users of these applications (artists, museums, art galleries, auction houses, professional collectors or the general public) will give more importance to the authority of the platforms (e.g. circulation and trading registration) and the integration of extension functionality of the ecosystem (data collecting and reporting, non-periodical offline exhibitions, etc.).

As such, the design of the underlying architecture of ArtChain Global will favour its core purpose. In addition, the expandable architectural design of ArtChain Global platforms will allow for the development or introduction of more essential components and expansion plugins to support an even more extensive range of blockchain applications. The technical community of ArtChain Global will give consideration to both the standards and openness and develop a sound blockchain application ecosystem for the art and culture industry as a whole.

6.3. Underlying Architecture

The underlying architecture of ArtChain Global is shown as follows:

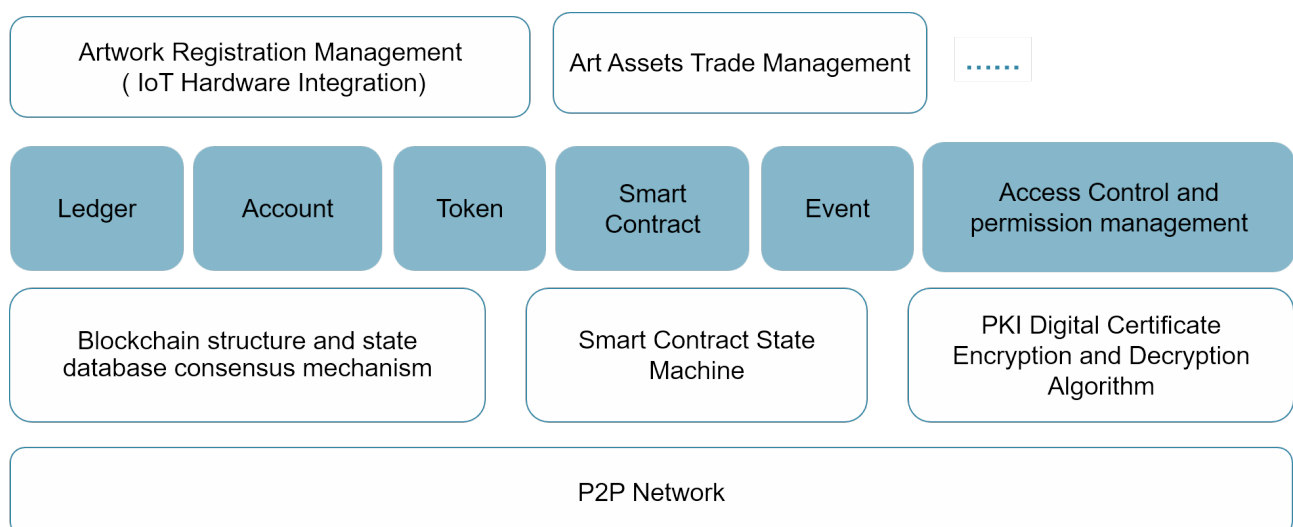


Figure 6-1: Underlying Architecture

6. 3. 1 ArtChain Global Network Nodes

The underlying architecture of ArtChain Global is a P2P distributed network consisting of a number of nodes. Each node plays a certain role or provides a certain service within the network. A node interacts with other nodes through gRPC, conduct state synchronization and data distribution through a Gossip protocol.

Not all nodes act completely as peers. Based on the organization it belongs to or an individual's resources and authorities, a node may consist of one or more of the following functions:

Endorse function: To examine and endorse unconfirmed transactions.

Sort function: To sort a batch of transactions within a period of time in a globally consistent order.

Submit function: To examine and implement globally sorted transactions and maintain the blockchain and ledger structures.

Agent and routing function: To act as the access node for use applications and forward transactions to other corresponding nodes.

6. 3. 2 Consensus Mechanism

The endorse nodes examine transactions received independently and give an endorsement conclusion based on its own logic. Each transaction needs to meet a certain requirement before the endorsement is considered to be valid. This requirement is usually specified under the endorsement strategy of smart contracts, which can be flexibly established by smart contracts developers. For example, it must have the support of more than a certain number of endorse nodes, or the support of a certain endorse node.

As the core of the consensus mechanism of the whole network, the sort nodes perform global sorting for valid transactions. The consensus plugin of the sort nodes determine the sorting and packing of transactions and generate blocks. ArtChain Global currently anticipates transaction sorting based on Kafka cluster. This mechanism supports strong sustainability, expandability and fault tolerance.

The operation of the above nodes and processes in co-ordination ensures that the network reaches consensus on the validity of transactions, sequence of occurrence and updates the ledger. The decoupling of various node functions is able to provide support for commercial-grade transaction outputs for ArtChain Global applications.

6. 3. 3 Authority Management

ArtChain Global is a PKI-based Consortium blockchain with authority control, which manages access nodes and various user capabilities through the introduction of digital certificates.

Initially, operations will commence with the assets trading and content platform and progressively other applications with a demand for authoritative registration and confirmation of ownership and high performance will be added.

At its early stage, ArtChain Global will co-operate with specialised or high-profile partners in the primary or secondary markets of the art industry (museums, art galleries, auction houses), to establish the original ledger nodes and provide core functions such as endorsing, sorting, submitting, etc. These ledger nodes and other agent or routing nodes will work together to protect the blockchain network.

Each node verifies transactions independently and takes part in the consensus process according to open and uniform rules. Any node attempting to engage in malicious conduct or falling under attack will be detected in real time before they are isolated or penalized. Meanwhile, ArtChain Global will establish and introduce the admission standard for becoming ledger nodes. Any third parties or users that meet the admission standard are eligible for applying to become ledger nodes and participate in the maintenance of the ArtChain Global network.

In addition, ArtChain Global will include authority management requirements for transactions sent by users. ArtChain Global will host various applications for the cultural and creative industry and these applications have various target audiences, some will only be available to certain users. To address these scenarios, ArtChain Global's authority management modules will allow each blockchain application to have specific identifiable settings for the operation authority of particular users, including their read and write authority.

6. 3. 4 Token and Incentives

ArtChain Global has allowed for tokens (i.e., ArtChain Global (ACG) tokens – 3.5 Billion tokens will be the total supply) with a full range of functions on the basis of Fabric architecture. The accounts of ACG owners will correspond to a certain public key. Their account information will be recorded in the universal ArtChain Global ledger. The digital summaries of all account information will be recorded in blocks.

ACG comes with the essential technical features of digital currencies, including a steady issue curve, free trading, immunity to double-spending attacks, traceable transaction history, etc. These features will be secured through the ledger architecture and smart contracts. The ArtChain Global team will develop relevant

E-wallets for corporate or institutional users, which will incorporate all essential functions for interactions with the applications on ArtChain Global.

ACG coins have a number of add-ons, including the incentives for maintaining the ArtChain Global network and the ecosystem of ArtChain Global applications.

Incentives for network maintenance: as previously mentioned, the consistency of ArtChain Global network is jointly assured by ledger nodes. Ledger nodes will have the opportunity to be awarded with ACG coins as block rewards and transaction fees, to encourage them to contribute to the security and stability of the ArtChain Global network.

Incentives for the ecosystem of applications: ArtChain Global will award users with newly added ACG coins in positive correlation within a certain cycle based on a number of indicators such as their frequency of interaction with the ArtChain Global ecosystem, levels of contribution, influence and the number of ACG coins they hold. All indicators of ecosystem incentives will be quantifiable and verifiable, which will be collected and calculated by ledger nodes. Incentives will be allocated under POI (Proof of Interaction) agreements.

The ratio of the incentives for ArtChain Global network maintenance and the incentives for the ecosystem of ArtChain Global applications will be dynamically adjusted by using a negative feedback mechanism to maintain the balance and stability of the ArtChain Global network and the ecosystem of applications. The specific indicators and algorithms will be published before any main relevant applications go online, and will be implemented and operated through open rules of contracts. Relevant institutional users of the ecosystem (art galleries, museums, auction houses and artists) will be consulted.

6. 3. 5 Software Development Kit (SDK) and BaaS Platforms

ArtChain Global will make gRPC API and API-packaged SDK available to top applications. Through SDK, applications can access a number of resources in the ArtChain Global network, including ACG coins accounts, transactions, ledger, smart contracts, and surveillance of incidents (sent by smart contracts or generated by blocks), etc. ArtChain Global SDK will also package more functions that are specific to scenarios of ArtChain Global, including ACG wallets, IP content enquiry and access to name a few.

At the early stage, ArtChain Global SDK will consist of NodeJs and Python versions. It is complex to establish a distributed blockchain scheme for the developers and testers of community applications as it requires the investment in hardware and infrastructure, and also requires comprehensive management of the development and operations. ArtChain Global will bring online a fully open Blockchain as a Service (BaaS)

platform, which will provide a number of functions, including one-stop construction of testing networks, visual presentation of distributed ledger content, smart contracts development and testing, network surveillance and analysis. The BaaS platform will provide a simulated blockchain environment that is similar to real application scenarios, which will make it easy for developers to migrate tested business models to the main chain of ArtChain Global.

6.4. Design Considerations

6.4.1 Expandability and Interoperability

With the continuous emergence of blockchain projects, assets will be circulated on various blockchains. The large number of blockchains operating around the world in the future will seek interoperability. Any closed blockchain “island” will be at risk of elimination in the industry. Besides, the industry as a whole has an urgent need to promote the development of a blockchain interface standard to allow for cross-chain circulation of value and business logic. One of the reasons that ArtChain Global has chosen Hyperledger as its underlying architectural standard is the pluggable and expandable design of Hyperledger.

On the basis of Hyperledger specifications, ArtChain Global will continue to explore compatibility with the development of other mainstream blockchain architectures and applications. For example, Ethereum Virtual Machine (EVM) may be brought into ArtChain Global as an option for the implementation environment of smart contracts. Alternatively, off-chain transaction confirmation mechanisms such as the Lightning Network might be introduced to improve the expandability of the main chain of ArtChain Global. These potentials will help promote the contributions by more developers and the construction of an open ecosystem.

6.4.2 Security and Trust

The ledger nodes in the ArtChain Global network will verify and endorse transactions independently. Any node attempting to engage in malicious conducts or falling under attack will be immediately detected by other nodes in the network once it shows unusual behaviour (e.g., sending illegal transactions, traffic attacks, and data tampering). The network will immediately isolate the particular node and send out warnings. When ArtChain Global first goes online, it will have ledger nodes throughout the primary and secondary art markets, including internet companies, cloud service providers and a large number of collectors of works of art and artists, which, from a probability point of view, can eliminate the possibilities where the majority of nodes fall under attack or collude to engage in malicious conducts.

Furthermore, in order to boost users’ confidence in ArtChain Global applications, ArtChain Global will make public all ledger nodes and their state in the network in real time. The transaction history (block content) and state information in ArtChain Global blockchain and ledger will be publicly visible. However,

in case of any privacy requirements for some transactions, such privacy information will be processed. Users can not only access the above-mentioned content through agent nodes in the access networks, but also audit it through smart contracts and applications for auditing developed by the ArtChain Global team. ArtChain Global will release the source codes of relevant smart contracts, and will develop visual surveillance services in conjunction with the community.

7. Governance Mechanism and Risk Control

7.1. ArtChain Global's Governance Mechanism

As a decentralized international blockchain community, ArtChain Global has an Executive Committee to assure the management and operation of ArtChain Global and its interaction with its Community.

The Executive Committee oversees all functions of ArtChain Global, including its relationships with external parties and the ArtChain Community. Key business functions include, Information Technology, Technical Development, Product Development, Marketing and Promotion, Business Administration, Financial Management, Risk Management and Nodes Management. The business leaders in each group are responsible for the operations of their functions on a daily basis.

7.2. ArtChain Global Community

The ArtChain Community is open to all holders of ACG coins and its function is to network with each other and to provide recommendations and advice to the Executive team of ArtChain Global.

Its areas of influence include the following:

- Advice on improvements to the ArtChain Global platform;
- Recommending sponsorship or involvement in events and marketing opportunities;
- Requests for additional features to be added to the platform;

- Suggesting ways of enhancing ArtChain Global;

7.3. Nodes Management

One of the missions of ArtChain Global is to provide underlying infrastructure for relevant applications for the art industry and the art and culture industry as a whole. The nodes on the chain are open to all people and require a certain level of management. The establishment of this self-governance mechanism is required to help ArtChain Global to achieve its own missions, rather than a manifestation of a centralized management mechanism.

The first batch of nodes for art will consist of institutions in the primary and secondary markets, art institutes of higher education, cloud service providers, ArtChain Global Art Asset Trading Platform, etc. The participation of these nodes will bring a high level of trustworthiness and specialization to ArtChain Global. Nodes that join ArtChain Global will jointly form a Nodes Management Committee, which will subsequently manage the applications of new nodes to join ArtChain Global. We will establish a ledger nodes admission standard, which will take into consideration a number of factors such as the general industry background, specialization, team members, application scenarios, technical and hardware capabilities. Any third parties or users that meet the admission standard are eligible for applying to become ledger nodes. The Nodes Management Committee will assess the applications for becoming nodes before making a decision on whether they can become nodes of ArtChain Global and participate in maintaining the ledger.

7.4. Risk Control

Transaction security: ArtChain Global assures the security of users' accounts and funds by using blockchain consensus, inalterable technologies, digital signatures and end-users' encrypted wallets. The works of art trading platform will provide security services that are likened to those offered by financial institutions. It will integrate data, applications and transactions in blockchain clouds through the efficient integration of data storage, network and other resources, so as to create a secure transaction environment. In the meantime, it will also take a range of measures to ensure the security and trustworthiness of its chain.

Financial Management: ArtChain Global will maintain high standards of integrity and ethical business conduct and will comply with relevant laws and regulations as well as self-regulatory principles of the industry. A legal compliance document is available upon request.

8.Team

8.1. Core Team

Kay Sprague
Chief Executive Officer



Ms Sprague is an experienced senior financial industry executive with 30 years' experience. Kay served as Director and Managing Director at Citigroup and Citigroup Asset Management and Director and Vice President for JP Morgan Asset Management. Kay has worked in functional management roles at country, regional and global levels, determining strategy and driving business profitability, growth and development. Her roles included the Head of Global Funds Services, Head of Hedge Fund Services Asia, Head of Investment Administration Services and Chief Operating Officer for Investment Management. Kay's key responsibilities included determining strategy, business management and delivery and has a deep understanding of investment management, hedge funds, administration systems and securities. She is a notable change merchant and business builder with experience and expertise globally.

LinkedIn: <https://www.linkedin.com/in/kay-sprague-2281b99>

Cameron Macqueen
Chief Operating Officer



Cameron is an entrepreneur and business professional with experience working throughout Australia, New Zealand and Asia. He lived and worked in China during 2012-2017 and he speaks fluent Mandarin Chinese. Since graduating from the University of Melbourne, Cameron has been involved in a wide range of technologies in various fields, including import and export trading, finance, insurance and real estate development. Cameron has more than 15 years of experience in leadership, team building, business

development and strategic experience. Cameron is now serving the art world with advanced blockchain technology to achieve mutual benefits.

LinkedIn: www.linkedin.com/in/cameron-macqueen-40976a17

Sharon Orbell
Chief Communication Officer



Ms Orbell has over 30 years' experience within the University and community sectors in Australia – her work has taken her across Asia. As an expert communicator, she has held leadership roles in public relations, marketing, stakeholder engagement and partnership building, events management and protocol. Her work focuses on a creative response to deliver on communications solutions to complex problems, ideas and projects. Most recently she has transformed the communications and marketing of Melbourne Law School at the University of Melbourne. Ms Orbell has a history of contributing to her community and has been a board member of Footscray Community Arts Centre and member of Enterprise Maribyrnong.

LinkedIn: <https://www.linkedin.com/in/sharon-orbell-2603785>

Greg Adamson
Chief Risk Officer



Dr Greg Adamson is a Professor at the University of Melbourne and specialises in blockchain and internet security and he is also a member of Institute of Electrical and Electronics Engineers (IEEE), vice-chair of IEEE in Victoria, a member of Internet Society of Australia (Board Member, 2005-08) and a member of Free Software Foundation. Professor Adamson's research directions include blockchain technology, information security, etc. Greg has worked with blockchain since 2014, and has a strong interest in its governance. He established the Blockchain Special Interest Group at the IEEE. This group is a global technical professional organisation operating in 161 countries around the world with 430,000 members. Professor Adamson works on Standards Australia blockchain standards technical committee and is dedicating himself to the application of technology in social welfare.

LinkedIn: <https://www.linkedin.com/in/gregadamson>

8.2. Consulting Team Members



Murray McLean

Murray McLean is an Asia specialist with significant experience across Asia, including in particular: Japan, China, South East Asia (notably Singapore) and North Korea. Formerly a senior officer of the Australian Department of Foreign Affairs and Trade (DFAT).

He was appointed as an officer of the Order of Australia (AO) in the Australia Day Honours list in 2013 for distinguished service to the advancement of Australia's diplomatic, trade and cultural relationships in Asia, and in 2014, the Japanese Emperor presented him with the Grand Cordon of the Order of the Rising Sun, one of the highest honours accorded to foreign nationals. Earlier in 1991 he had been awarded the medal in the Order of Australia (OAM) for his services to international relations especially relating to China.



Prof Yang Xiang

Prof Yang Xiang hold the position of the Dean of Digital Research & Innovation Capability Platform, Swinburne University of Technology, Australia. In the past 20 years, he has been working in the broad area of cyber security, which covers network and system security, AI, data analytics, and networking. His translational research has made significant impact to the real-world applications, such as blockchain applications, AI-driven cyber security applications, cloud and IoT security applications. In particular, he is currently leading his team developing active defence systems against large-scale distributed network attacks.

His research has been supported by multi-million-dollar projects, open-sourced, or commercialised. He is a Senior Member of the IEEE.

LinkedIn: <https://www.linkedin.com/in/yang-xiang-976256149>



John Young Zerunge

John Young Zerunge is a Hong Kong born, Australian contemporary artist. He read philosophy of science and aesthetics at the University of Sydney and then lectured at the university. John has had more than 70 solo exhibitions and over 160 group exhibitions, many of which represented Australia, including at the Solomon R. Guggenheim Museum, New York. Young is collected by all national galleries around Australia, as well as important international museums such as M+, Hong Kong, and has permanent installations in Hong Kong, Nanjing, Tokyo and Bamberg.



Jamie Johnson

Well known Australian entrepreneur and investor. Jamie now has a number of companies across industries such as real estate, car insurance, web technology and aerospace. He acquired National Warranty Company in 2008 and focused on the field of financial insurance. Jamie was the CEO of Presidian Group Pty Ltd and Retail Services Managing Director in McMillan Shakespeare. He has served as the general manager at Webfleet Management Services and National Manager in Australia Fleeting Leasing. He not only has an excellent business strategy vision but also has skills in developing new business.

LinkedIn: <https://www.linkedin.com/in/jamie-johnson-ba07777b>



KT Lee

Mr Lee is a prominent and respected Chinese artist and academic currently residing in Australia. Mr Lee graduated from Xi'an Academy of Fine Arts in 1989 and has previously served as Director of the Art Department of Xi'an Chinese Painting Academy, the head of the Chinese Culture and Art Research Centre in Xi'an International Studies University, the Visiting professor of Lu Xun Art Institute of Yan'an University and the Zhuhai branch of Jilin University of China, the head of Qishan Arts Studios and the consultant to Shuimoshalong Arts Salon in Beijing. Now he is the chief editor of an Australian magazine, Chinese Art, the founder of Chinese Art Gallery in Australia, Director of Australian National Arts Academy, and the executive vice president of Australia Artists' Association.



Mauro Moscatelli

Mr Moscaatelli is a celebrated Italian artist. He started teaching after his graduation at Urbino Academy of Fine Arts, Italy. His works were focused on revisiting ancient techniques contaminated with modern breaches. In 1996, he started his long research on the appearance of the skies, the movement of the clouds and winds, in the "Cieli" series, "Terra" (Ground) series and the "Of ground and sky" series. The works of Moscatelli have been exhibited at major international first-class art galleries and Art Fair's in Italy and abroad. In 2010, he was selected for the Rimini award which is the most influential artist award in European art circles.



Rohan Penman

Technology specialist. Rohan's expertise lies in project management, implementing ERP solutions and managing retail environments, with over 20 years of exposure to the industry. Rohan has worked with a

number of retailers covering Australia, New Zealand and Singapore. Currently working for Adairs Retail Group, as their Head of Technology, his team supports over 160 retail stores. Rohan graduated from Melbourne's RMIT University with a Business Information Systems Degree and is heavily focused on security, innovation in technology and blockchain solutions. [LinkedIn: https://www.linkedin.com/in/rohan-penman-3389ba3](https://www.linkedin.com/in/rohan-penman-3389ba3)

Keith Francis



Keith Francis has specialist knowledge of art history, having attained a degree in Art History from Melbourne University in 2011. He has a lifelong passion for art, is a collector of Australian art and regularly attends art auctions and previews and visits galleries globally. Keith also has had a successful and extensive career working in information technology and banking for major corporations in both Australia and the United Kingdom, for over 40 years.

9. Project Schedule and Roadmap

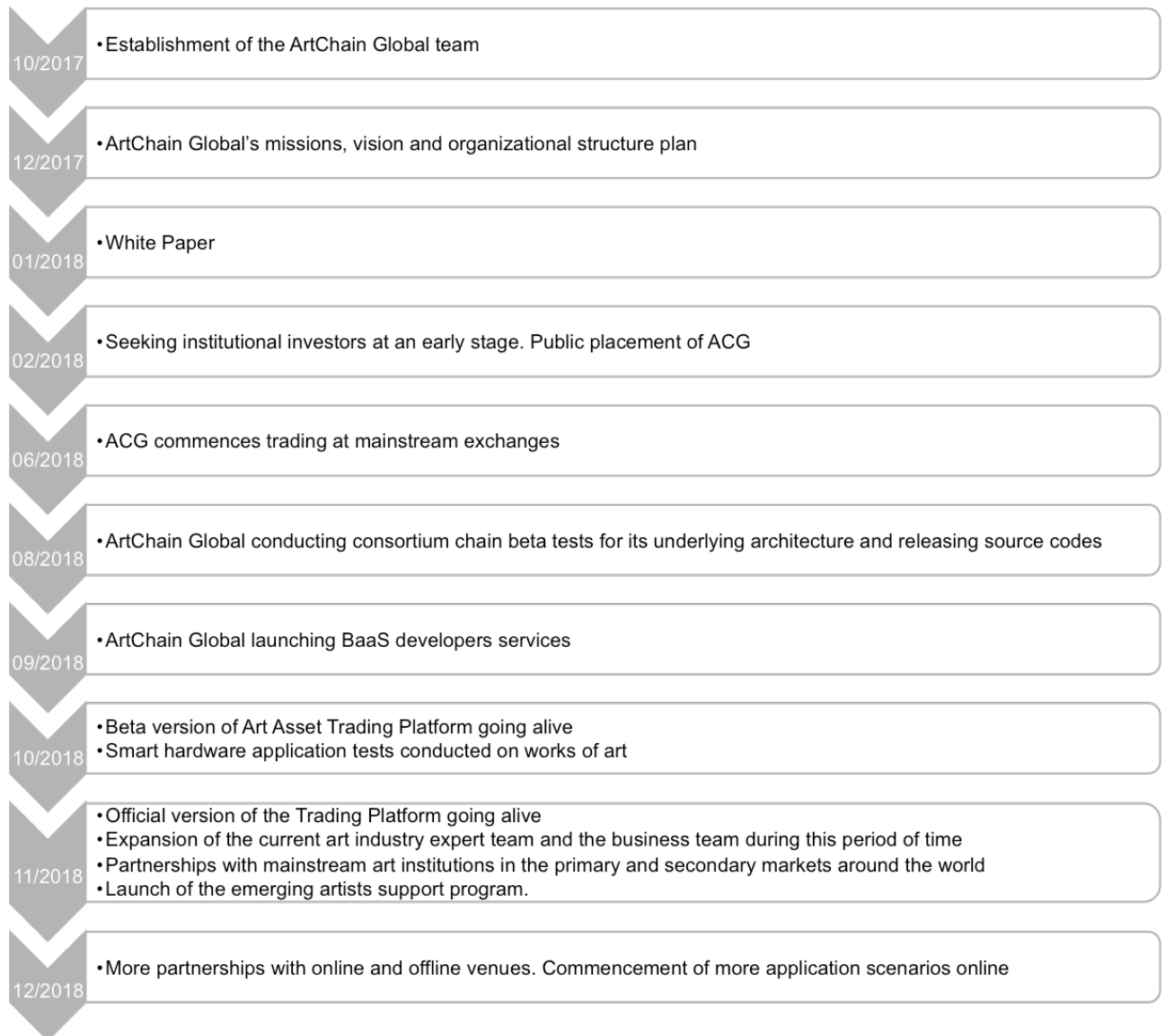


Figure 9-1: Project Schedule and Roadmap

10. Conclusion

As one of the revolutionary creations in the history of technology, blockchain will inevitably have implications on all aspects of human life. It will bring about tremendous changes to the inherent perceptions, concepts and behaviours that we have been holding onto. Time has proven that we have no choice but to accept, embrace and live with new technologies.

The art industry has brought spiritual enjoyment to generations of people who have created, appreciated, collected and passed down works of art. It is inevitable that new technology will revolutionise the creation, trading, collection, circulation and passing down of works of art. ArtChain Global and the ArtChain Global team plan to utilise this new technology to empower the business of art in their pursuit of “art for the people”.