

3D-Chain

Decentralized Manufacturing



First Global Decentralized Network Directly Connecting:
Manufacturers, Designers, and Consumers

3D-Chain

First **Global Decentralized Network**
Directly Connecting
Manufacturers, Designers, and Consumers

WHITE PAPER

VERSION 1.4.18
May 2018

3dchain.io
All rights reserved
© 3D-Chain Limited



Disclaimers

The information set forth in this White Paper may not be exhaustive and does not imply any elements of a contractual relationship. The content of this White Paper is not binding for 3D-Chain Limited (“3D-Chain Company” or “3D-Chain”) and its affiliates and 3D-Chain reserves the right to change, modify, add, or remove portions of this White Paper for any reason at any time before, during and after the sale of 3xD tokens by posting the amended White Paper on the website.

This White Paper does not constitute an investment, legal, tax, regulatory, financial, accounting or other advice, and this White Paper is not intended to provide the sole basis for any evaluation of a transaction on acquiring of the 3xD tokens. Prior to acquiring the 3xD tokens, a prospective purchaser should consult with his/her own legal, investment, tax, accounting, and other advisors to determine the potential benefits, burdens, and other consequences of such transaction.

Nothing in this White Paper shall be deemed to constitute a prospectus of any sort or a solicitation for investment, nor does it in any way pertain to an offering or a solicitation of an offer to buy any securities in any jurisdiction. This document is not composed in accordance with, and is not subject to, laws or regulations of any jurisdiction which prohibits or in any manner restricts transactions in respect of, or with use of, digital tokens.

The 3xD token is not a digital currency, security, commodity, or any other kind of financial instrument and has not been registered under the Securities Act of 1933, the securities laws of any state of the United States of America or the securities laws of any other country, including the securities laws of any jurisdiction in which a potential token holder is a resident.

The 3xD tokens are not being offered or distributed to, as well as cannot be resold or otherwise alienated by their holders to, citizens of, natural and legal persons, having their habitual residence, location or their seat of incorporation in the country or territory where transactions with digital tokens are prohibited or in any manner restricted by applicable laws or regulations. If such restricted person purchases the 3xD tokens, such restricted person has done so on an unlawful, unauthorized and fraudulent basis and in this regard, shall bear negative consequences.

3D-Chain neither offers or distributes the 3xD tokens nor carries on a business (activity) in any regulated activity in Singapore, in United States, or in other countries and territories where transactions in respect of, or with use of, digital tokens fall under the restrictive regulations or require from 3D-Chain to be registered or licensed with any applicable governmental authorities.

Each purchaser of the 3xD tokens is reminded that this White Paper has been presented to him/her on the basis that he/she is a person into whose attention the document may be lawfully presented in accordance with the laws of the purchaser’s jurisdiction. It is the responsibility of each potential purchaser of the 3xD tokens to determine if the purchaser can legally purchase the 3xD tokens in the purchaser’s jurisdiction and whether the purchaser can then resell the 3xD tokens to another purchaser in any given jurisdiction.

Certain statements, estimates and financial information contained in this White Paper constitute forward-looking statements or information. Such forward-looking statements or information involve known and unknown risks and uncertainties which may cause actual events or results to differ materially from the estimates or the results implied or expressed in such forward-looking statements or information.

The English language White Paper is the primary official source of information about the project. The information contained in English language White Paper may from time to time be translated into other languages. In the course of such translation some of the information contained in the English language White Paper may be lost, corrupted or misrepresented. The accuracy of such alternative communications cannot be guaranteed. In the event of any conflicts or inconsistencies between such translations and the official English language White Paper, the provisions of the English language original document shall prevail.

Table of contents

Disclaimers	0
Table of contents	1
Abstract	2
1. Introduction	3
1.1. The future of manufacturing	3
1.2. 3D Printing market and forecast	6
2. Issues in current 3D Printing industry	9
2.1. Present concerns within mainstream application of 3D Printing	9
2.2. Challenges in current supply chain of manufacturing	11
3. 3D-Chain (A Decentralized Network for Future Manufacturing)	12
3.1. Benefits of using decentralized 3D Printing technology	16
3.2. Mission and strategy	18
4. 3D-Chain's ecosystem and marketplace	20
5. 3xD token: a cryptocurrency for 3D-Chain's network	25
5.1. Designers	28
5.2. Manufacturers	29
5.3. Consumers	30
5.4. Post-processing/Fulfillment	31
6. Blockchain technology	32
6.1. Smart contract	32
6.2. Token	33
7. Data processing	35
7.1. Rating and reputation	35
7.2. Data ownership and privacy	35
7.3. Artificial Intelligence network: A New Value Chain	36
8. Roadmap	37
9. 3D-Chain Token (3xD)	38
9.1. Token issuance	39
10. 3D-Chain foundation allocation	40
10.1. Token legal issue	41
11. Team and advisors	42
11.1. Team.....	42
12. Risk factors	43
12.1. Risks connected to the value of 3xD tokens	43
12.2. Blockchain and software risks	44
12.3. Security risks	45
12.4. Risks relating to platform development.....	46
12.5. Risks arising in course of company parties' business	47
12.6. Governmental risks	48
13. References	51



Abstract

3D-Chain is an open-source protocol based on collections of smart contracts which aims to become the key ecosystem for manufacturers, designers and customers. It provides a coordinated decentralized network based on 3D Printing technology and will expand to other manufacturing environments. Within this framework, the benefits of manufacturing and 3D Printing become a global common infrastructure for all. Anyone can access the network, become a stakeholder in its development, add a fabrication technology (e.g. 3D Printer) to 3D-Chain's ecosystem, add a new design or customize existing one, and receive network payment tokens in exchange.

Moreover, demand for personalized design is exponentially growing every year and soon dominate the manufacturing and the economy since personalized items are more appealing to customers than mass-produce items. However, manufacturing new items and personalized them are very expensive and time-consuming. 3D-Chain facilitates the mass customization through its network to answer this global demand.

3D-CHAIN ENABLES DECENTRALIZATION OF MANUFACTURING THROUGH NETWORK OF DECENTRALIZED 3D Printers AND AUTOMATED FABRICATION TECHNOLOGIES.

3D-Chain is backed by the 3D-Chain Limited, which operates on a belief that the benefits of 3D Printing and automated fabrication technologies should not be dominated by any small set of big manufactures but shared by all. The network is designed to incentivize and reward beneficial players. 3D-Chain's mission and objectives are:

- Developing and building innovation processes that prioritize global growth in economy
- Supporting software infrastructure for sustainable merge of fabrication technologies into a new decentralized manufacturing market
- Bringing the value of new technologies to accelerate the innovation
- Addressing cross-functional components in manufacturing and design (designer, manufacturer, customer, researcher, supplier, and ...) to develop a programmatic approach for supply chain
- Decentralizing manufacturing to increase performance, reduce waiting time, and cost
- Unlocking mass customization
- Evaluating customer, business, manufacturers, services providers, and suppliers
- Setting up a platform for researchers to brings new ideas and products to the market



1. Introduction

1.1. The future of manufacturing

Time of big growth always has been supported by manufacturing revolutions (steam engine, mass production, and automation). In advanced economies, a shrinking manufacturing sector is seen as evidence of decline and in developing countries, manufacturing is engine of development. Productivity is the core of manufacturing and it must be sustainable to serve the growth in long term.

MANUFACTURING IS A CRITICAL CONTRIBUTOR TO PRODUCTIVITY, INNOVATION, AND TRADE.

Today, rate of economic growth in major economic blocks is declining (Figure 1) and the global manufacturing is facing a fierce competition over every scrap of market share. Neither building factories offshore to take advantage of the cheap labor nor expanding factories are solutions to this problem.

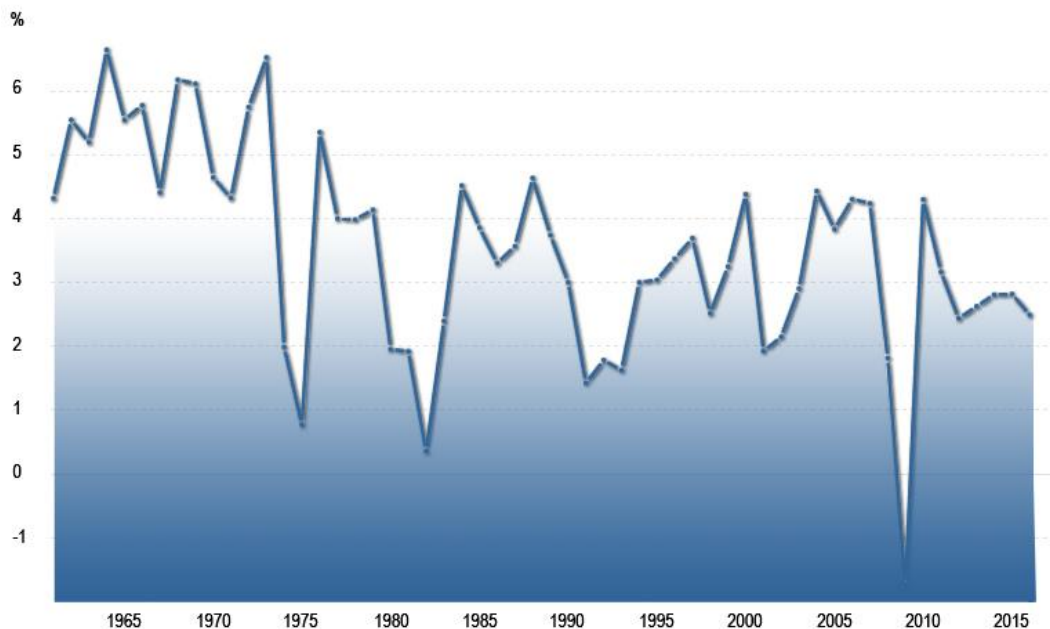


Figure 1: Global GDP growth 1965-2016 (annual %) [1]



Manufacturers plan to make significant and often fundamental changes to their business to drive future growth. However, limited baseline growth is expected in most manufacturing markets. Forward-thinking players will need to sense and anticipate the future and create an adaptive response.



Figure 2: Important factors in global manufacturing competitiveness

A compelling solution to manufacturing growth is 3D Printing also known as Additive Manufacturing (AM) which can expedite the whole manufacturing process while decreasing cost and hassle of making new products. 3D printing creates physical objects from a digital file using layer upon layer printing approach. Figure 3 shows the process which starts with modeling the object that can be of almost any geometry. At second level, the 3D model was processed and sliced in layers. Finally, the object was fabricated through laying down material layer by layer.

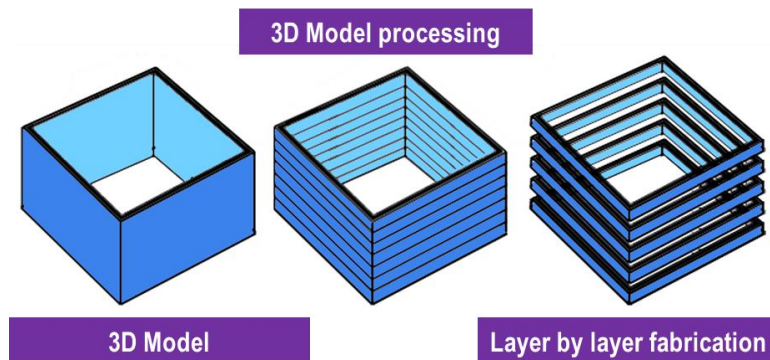


Figure 3: Additive manufacturing process [2]

For manufacturers, 3D Printing is not the future, it is a production method like any other. A survey shows manufacturers consider additive manufacturing a vital part of their business operation [3] and recognize an urgent need to increase their investment into innovation and R&D. 60% of manufacturers already use 3D printing in some way, and 30% plan to adopt the technology in the future (Figure 4). However, the full potential of 3D Printing is far from tapped.

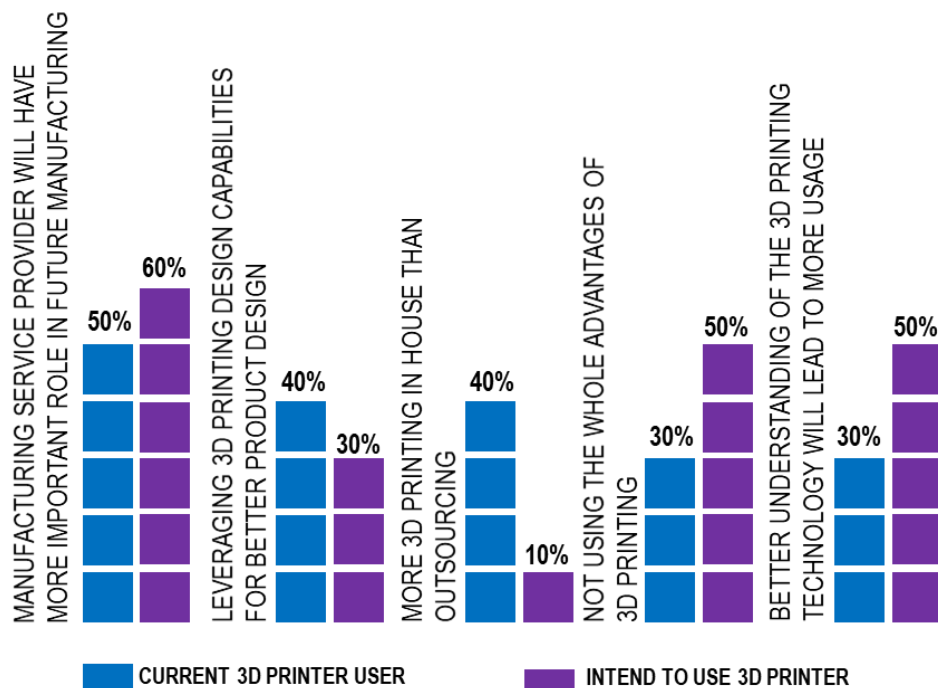


Figure 4: Current manufacture user of 3D Printing technology vs. future users; Source data [4]



3D Printing allows individuals to design and produce objects on demand. The most exciting part of this technology is beyond productivity and extends to smarter, scalable, and better products. It will create a microeconomic shift and relocate the process to home market. Because of this movement:

- The final product will be closer to consumer market
- Factories will be smaller and decentralized
- Scalability and flexibility are important not mass production
- A new area of globalization is forming

1.2. 3D Printing market and forecast

The 3D Printing technology has roots that go back for decades. But for years, 3D Printing did not apply in the commercial manufacturing. Nevertheless, 3D Printing presents compelling business opportunities and we are now observing different application of 3D Printing due to decrease in cost, technological advances, and flexibility in design.

3D PRINTING IS NOT A ONE SIZE-FIT ALL SOLUTION.

Global 3D Printing market is driven by new innovations, optimization in printing performance, expanding application, and declining price. The global 3D Printing market is projected to reach USD 32.78 Billion by 2023, at a compound annual growth rate of 25.76% between 2018 and 2023 [5].

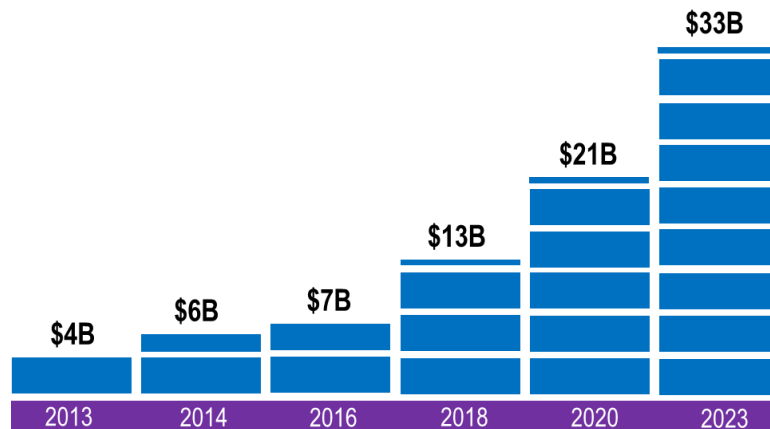


Figure 5: Growth in global 3D Printing market



Prototyping and proof of concept are the leading use of 3D Printing. However, accelerating product development, product customization, and increase flexibility in production are the future priorities. 3D Printing industry's segmentations are:

- **Prototyping**
- **Service**
- **Industrial goods**
 - Aerospace
 - *Specialized components*
 - *Engine parts*
 - Engineering
 - *High Tech and electronics*
 - Automotive
 - *Engine production*
 - *Innovation and concept car*
 - *Customized body parts*
- **Medical**
 - Dental industries
 - Orthopedic implants
 - Personalized prosthetics
- **Consumer goods**
 - Fashion accessory production
 - *Custom jewelry*
 - *Apparel production*
 - High performance goods
- **Construction**
 - Large scale fabrication
 - Concrete 3D Printing

The consumer electronics and automotive industries are early-adopter of the additive manufacturing and contribute for more than 20% of the 3D Printing market. 3D Printing has generated positive results for the consumer electronics industry through developing prototype, increasing flexibility in new product, and designing concepts. The next big 3D Printing opportunity for the consumer electronics industry is in smartphones, which comprise an estimated 35% of total consumer electronics sales. Medical device industry is the next biggest contributor in 3D Printing market (16%). Industrial Goods is also a very dynamic sector while service is a quite different market from other industries when it comes to 3D Printing.



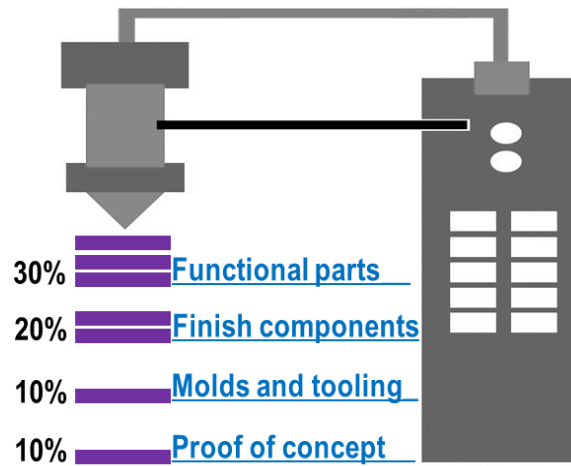


Figure 6: Current top user of 3D Printing technology; source data [6]

3D Printing market is maturing, and it is evolving from its roots in the volunteer maker movement into a highly competitive business. This new technology can reduce the cost and barriers in manufacturing. There are reasons to believe that 3D Printing will begin to infiltrate the mainstream, with success belonging to products and services that focus on the object being made, rather than the hobbyist's thrill in the futuristic manner of how it was made.

- The primary market (3D Printing systems, materials, supplies, and service) will grow 30% each year.
- Increase application of 3D Printing in medical and dental industries are driven by capability of new generation of 3D Printers to fabricate precise complex geometries [7].
- While US is the leader in additive manufacturing applications followed by Europe, there is a clear trend in the adoption of additive manufacturing by Asian countries.

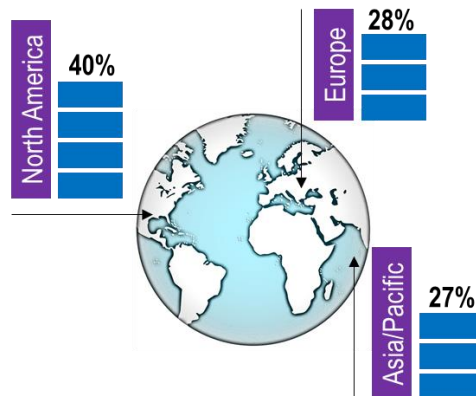


Figure 7: Global 3D Printing market by region; source data [6]

2. Issues in current 3D Printing industry

2.1. Present concerns within mainstream application of 3D Printing

Mainstream application of 3D Printing requires investment in tools and materials for any specific product. You need to have skills to design your idea, have right tools to develop a prototype, and be familiar with all the optimization tools that is needed to turn a 3D file into a physical object. Having luxury of enough time, enough money and right skills to go through the whole process is very rare. The main restrictions are:

➤ Size restriction

Future growth in large scale 3D printing requires investing a lot of money or using external 3D Printing services.

**3D-CHAIN PLANS TO GET THE TECHNOLOGY/ DESIGN/
MANUFACTURING INTO AS MANY HANDS AS POSSIBLE.**

➤ Material restriction

To 3D Print a product, specific material is necessary. Plastic is the most common 3D Printing material followed by resin. Knowing all the materials, analyzing it, and finding/purchasing a new 3D Printer for that specific material are very challenging. Most used 3D Printing materials are:

- Nylon
- Acrylonitrile butadiene styrene (ABS)
- Polylactic acid (PLA)
- High-density polyethylene (HDPE)
- Polyvinyl alcohol (PVA)
- Polyethylene terephthalate (PETT)
- Resin
- Metals
- Carbon Fiber Mix
- Multicolor/ Sandstone
- Ceramic
- Wax
- Concrete/ Gypsum



➤ 3D Printing technology

There are several 3D Printing technologies, each has different way to process input material and create a final product. Customers must learn all possible technologies and pick most appropriate one for their applications. Therefore, finding a manufacturing company to make the design compatible with required specifications demands lots of time and efforts.

Fused Deposition Modeling (FDM) is the most common used technology in 3D Printing, followed by SLS and SLA. 3D Printing technologies are:

- Fused Deposition Modeling (FDM)
- Selective Laser Sintering (SLS)
- Stereolithography (SLA)
- Multijet/ Polyjet
- Digital Light Processing (DLP)
- Direct Metal Laser Sintering (DMLS)
- Selective Deposition Lamination (SDL)
- Binder Jetting
- Electron Beam Melting (EBM)
- Selective Laser Melting
- CLIP
- Fusion Jet

➤ Innovation and intellectual property issues

The shift in global demand for 3D Printed good requires very different service with different features and price points. Offering variety of designs while protecting copyright is challenging for designers and manufacturers. These questions arise in global 3D Printing and design environment which is different from past with more complexity, uncertainty, and risk.

3D-CHAIN: HIGH VISIBILITY IN SUPPLY CHAIN, LOW RISK IN PARTNERSHIP



2.2. Challenges in current supply chain of manufacturing

With manufacturing focusing on adopting new technology, ensuring the supply chain is ready for growth is a priority. Currently, the commercial adoption of 3D Printing technology has been delayed by insufficient infrastructure.

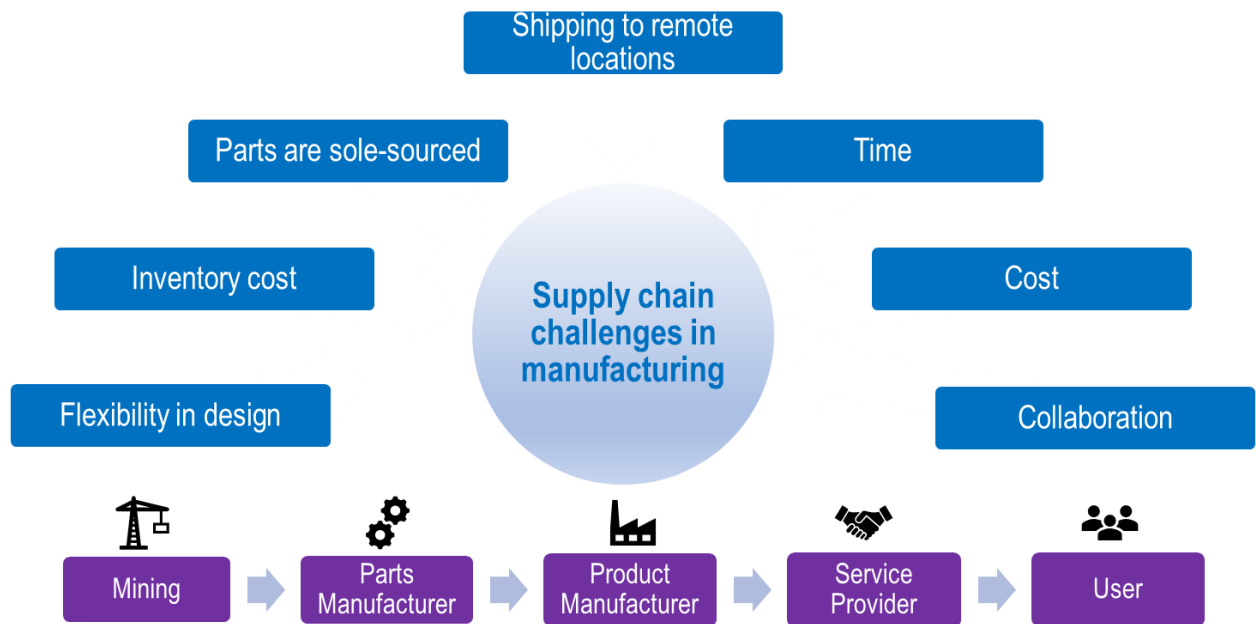


Figure 8: Challenges in current supply chain of manufacturing

Today, manufacturing is not about where to locate production, but it is about changing in customer's demand, resiliency in supply chain, and cost factors. A new decentralized supply chain is required to serve application of 3D Printing and automated fabrication technologies in global manufacturing industry as the source of customers as well as the source of low-cost production. A v.

3D-CHAIN PROVIDES A HYBRID SOLUTION FOR MAINSTREAM APPLICATIONS OF ADDITIVE MANUFACTURING AND AUTOMATED FABRICATION TECHNOLOGIES TO REDUCE COST and INCREASE PRODUCTIVITY.

3. 3D-Chain (A Decentralized Network for Future Manufacturing)

Despite significant growth, there is a wealth of untapped potential in 3D Printing and automated fabrication technologies. What if we combine existing manufacturing process and innovation in technology sector to create next manufacturing invention, a productive environment that does complex non-repetitive tasks?

Blockchain technology gives manufacturing an opportunity to transform the supply chain into a decentralized environment to achieve a new level of productivity and efficiency. The only thing missing is a platform which enables secure and sustainable transactions.

3D-CHAIN: LEVERAGING BLOCKCHAIN TECHNOLOGY FOR GROWTH IN ECONOMY

3D-Chain focuses on addressing the impact of digitization on manufacturing strategies and key shortcomings of current infrastructure on adaptation of 3D Printing and automated fabrication technologies. 3D-Chain transforms hardware-based supply chain in manufacturing to one that is software-defined to prevent unexpected failure in supply chain as one of the greatest risk. 3D-Chain will improve the visibility and flexibility of supply chain, reduce the risk of partnering with new designer, supplier, and producer, and creates a new value chain.

3D-Chain as a secure platform uses greater intelligence in product design and manufacturing to boost resource efficiency and track activity by implementing blockchain technology. 3D-Chain introduces the first supply chain using cryptography for expansion of 3D Printing and automated fabrication technologies to consumer market (B2C) and industrial applications (B2B). 3D-Chain is a fully integrated system across the entire manufacturing industry, from the moment a design is developed by designer to the final delivery to customers. It helps forward-thinking players to take advantage of decentralized technology for next generation of manufacturing.

3D-Chain is highly focused on providing new growth opportunity for manufacturing market. Our goals are, increasing adaptation range of new technologies, saving cost, reducing the risk of faulty design, protecting copyright, and expanding customized design and fabrication using advantages of blockchain technology. In larger scale, global manufacturing which is linked in 3D-Chain platform, will be expanded to a more productive and decentralized scale, will create more jobs, and will result in economic growth (Figure 9).



3D-CHAIN DECENTRALIZED APPLICATIONS OF **3D PRINTING** AND **AUTOMATED FABRICATION TECHNOLOGIES** ACROSS **MANUFACTURING** SUPPLY CHAIN

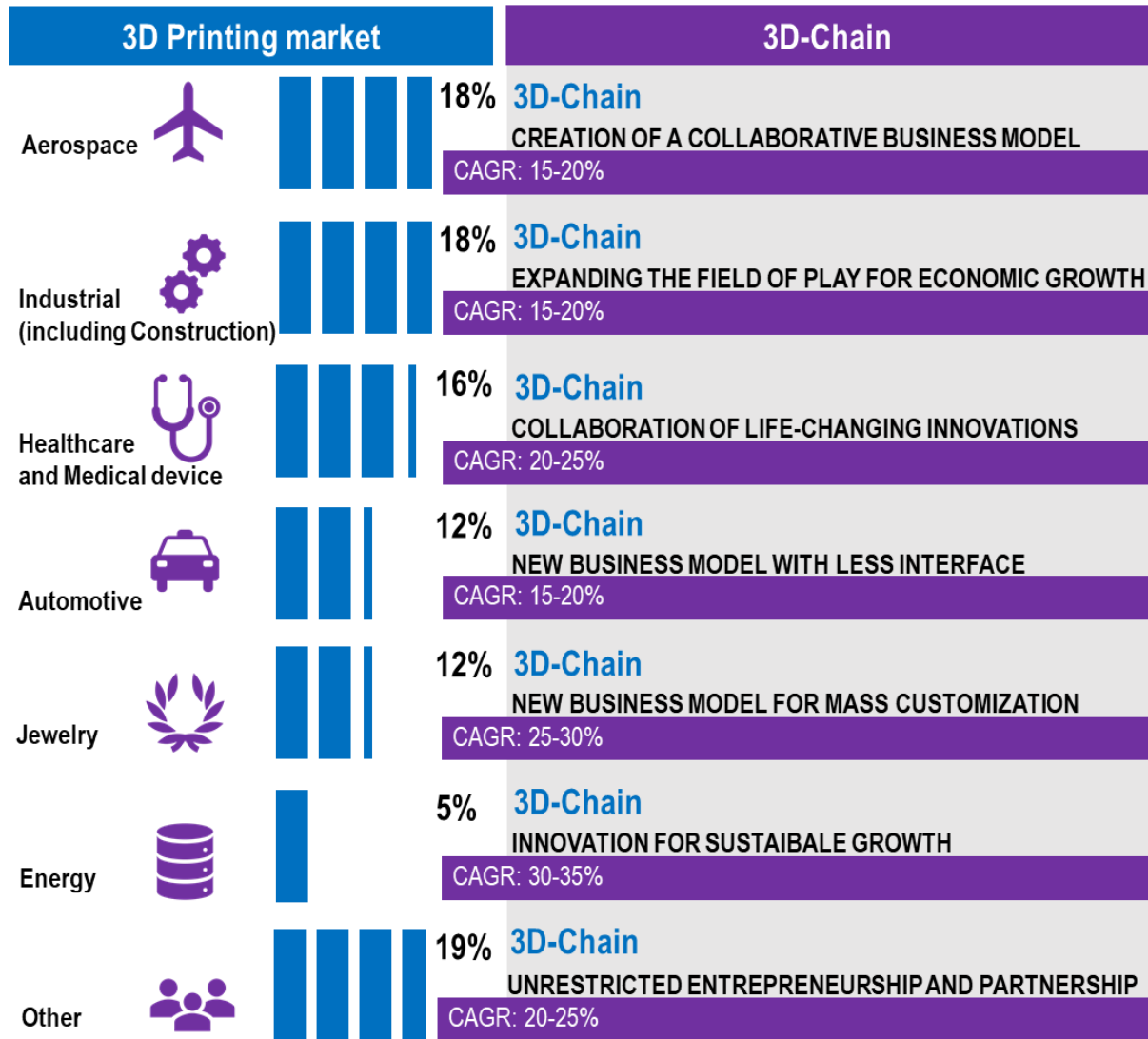


Figure 9: 3D Printing market, future growth (source data: [8]), and 3D-Chain's contribution to drive growth



Many designer and engineers are outsourcing their 3D Printing demands as speed and precision of external 3D Printing providers has increased dramatically in last years. 3D-Chain will be market place to guarantee direct communication between parties, production, and delivery. 3D-Chain is a network of 3D Printers in different sizes for scale variation in manufacturing, a decentralize network which provides a platform of material for 3D Printing. Moreover, consumer, designers, and manufacturer can connect to the 3D-Chain network and select a specific technology for their applications.

3D-CHAIN DECENTRALIZES THE MANUFACTURING SUPPLY CHAIN FOR GROWTH IN GLOBAL ECONOMY

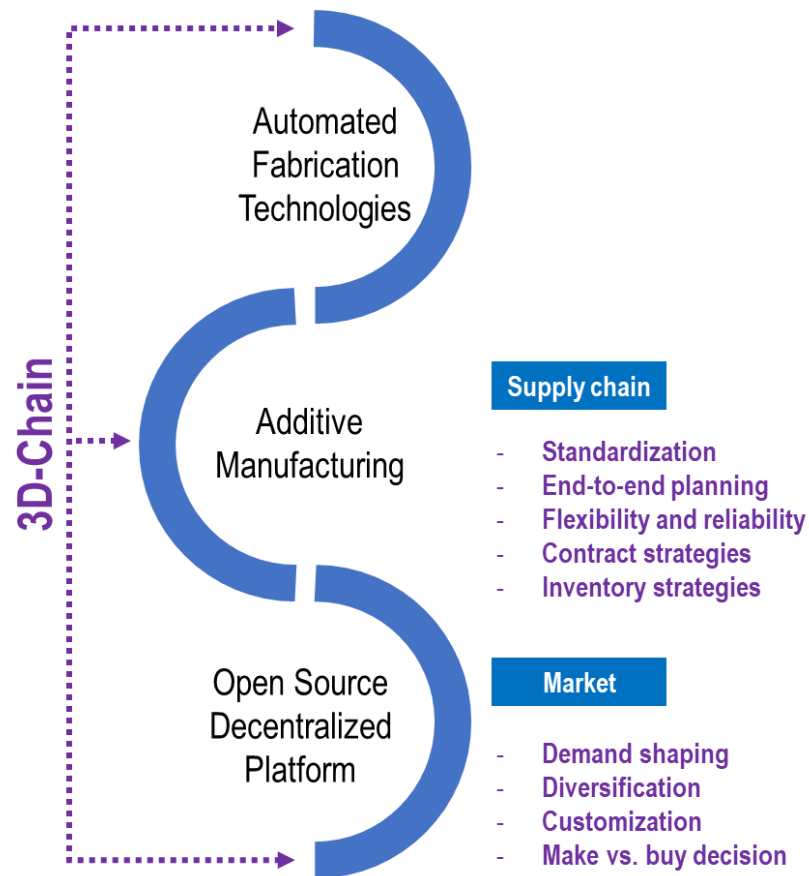


Figure 10: 3D-Chain: a decentralized platform for automated fabrication technologies and additive manufacturing

3D-Chain is a new, creative, and collaborative environment that provides a platform for those with ambitions to expand into new markets, companies or individuals that are looking to bring more value to their customers, innovator, researcher, and scholar in manufacturing industry. It also sets a decentralize third party governance program to lower the risk of uncertainty and ensure the compliance with contractual obligations. With 3D-Chain, the meaning of each cryptographic transition is only accessible for interpretation by the parties involved. The contract is completed and stored on the main blockchain which gives designers more visibility and allows contributors direct communication.

3D-Chain provides an environment to fully embrace the potential of 3D Printing and automated fabrication technologies in all steps of products' lifetime. This will increase the performance and expand the application to wider range of industries. Increase in return of investment is another result of decentralize platform and gain a competitive advantage over other manufacturers.

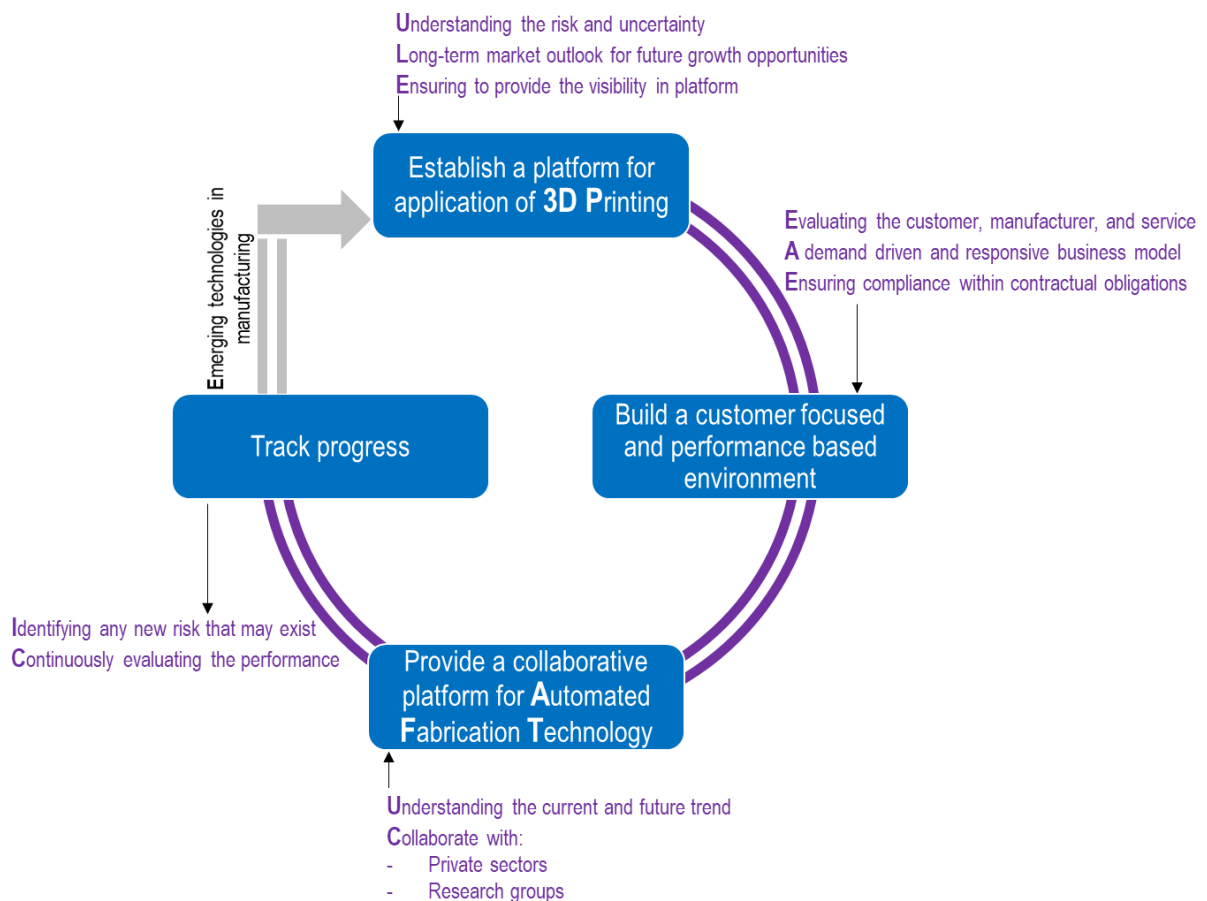


Figure 11: Development of the 3D-Chain's network

3.1. Benefits of using decentralized 3D Printing technology

3D-Chain provides a competitive market to overcome the restrictions in mainstream applications of 3D Printing and automated fabrication technologies. Manufacturing industry can benefit from 3D-chain in area of:

- **Customizing products in large scale:** 3D-Chain facilitate the mass customization and opens door to unlimited possibilities. Moreover, 3D-Chain technology offers production of customized product in a secure environment and it will be a real partner in future manufacturing which provides customers with most personalized experience.
- **Simplifying the supply chain:** Less inventory will be required since production is decentralized, and it will be closer to customer.
- **Reducing Cost:** Removing middleman from 3D Printing environment will reduce the cost of products and make direct/transparent communication. Also, decline in global cost makes the use of this technology easier for companies and individuals.
- **Reducing waiting time:** Large or small, no manufactures has enough power to produce customer needs on time. Using decentralized market will empower customers with distributing their products automatically throughout the whole network and reduce the waiting time. Product will be available in market faster since less time required for design and production.
- **Solving Complexity in production:** Accessibility to different material and different 3D Printing and automated fabrication technologies provide the opportunity to create complex products without initial capital investment in tools.
- **Educating for future manufacturing:** 3D-Chain also increase awareness and education which help the market grow faster every year. Researchers and developers may take advantage of open source data about manufactures, customers and designers to increase the performance and brings new idea to the network.
- **Managing the waste:** Less material will be wasted by taking advantage of proper fabrication technology for specific application.

WITH 3D-CHAIN COMPLEXITY IS FREE



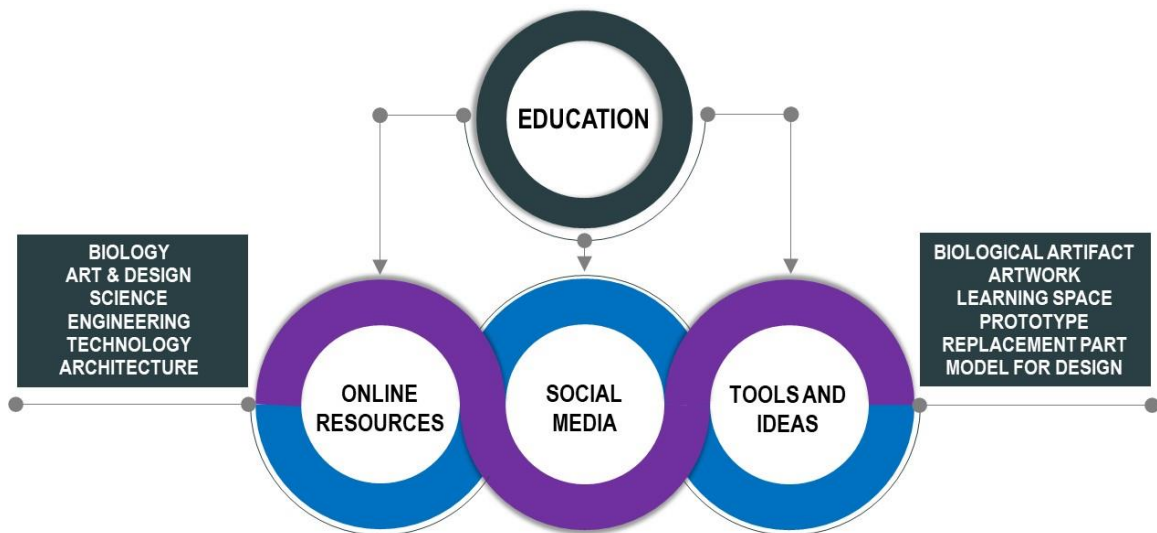


Figure 12: 3D-Chain a platform for better education and design capabilities

3D-Chain believes that in the future 3D Printing industry will be more and more application-driven to meet specific demands for business and customers. By connecting network of 3D Printers with different capabilities on 3D-Chain platform, manufacturers and customers have the freedom to focus on the application which will cause the real transformation in the industry.

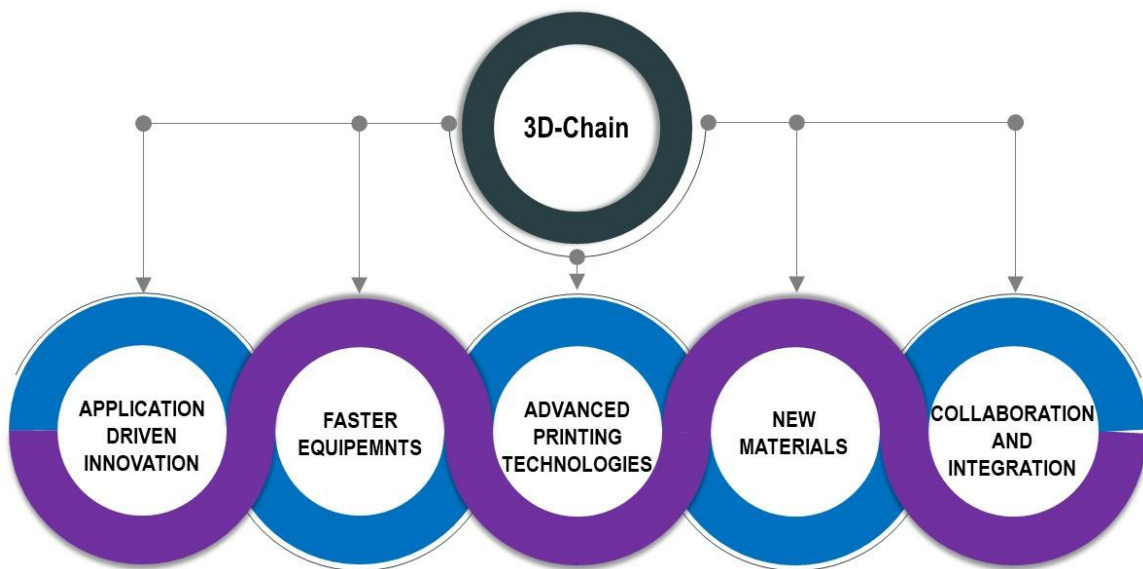


Figure 13: 3D Printing future trend will be available through 3D-Chain for users

Collaboration is the key for creating a sustainable supply chain for future manufacturing. 3D-Chain increase collaboration between existing and future players in its decentralized platform, an ecosystem which integrates different parts of 3D Printing industry and automated fabrication technology (hardware, software, service, ...) to drive innovation and serve customers. This results in a leaner supply chain and fewer risks.

NEW DECENTRALIZED PLATFORM IS VITAL TO SUPPORT APPLICATIONS OF 3D PRINTING AND AUTOMATED FABRICATION TECHNOLOGIES IN MANUFACTURING.

3.2. Mission and strategy

The era of mass customization, customers get to pick their own combination of features from a basic underlying object, such as shoes or cloths to the place that they live. 3D-Chain solves these challenges for manufacturing by:

- Providing a platform for people who are creative and explorer, those who want to change the world of design while protecting the copyright.
- Establishing a virtual marketplace for making, buying and selling products. Anyone with a 3D Printing machine or fabrication technology can provide a manufacturing service (open a shop, make a brand, promote it, share it).
- Helping people who are not familiar with the design tools to create objects.
- Allowing customers to adjust a few parameters and giving them enough control to take ownership of a product without overwhelming them.
- Facilitating fast and affordable fabrication of a prototypes to set ideas in motion.
- Bringing group of designers and 3D Printers together to share ideas and to make things which they are impossible or very expensive to make in existing manufacturing ways.
- Creating small business around design and manufacturing instead of large scale factories.
- Sharing products, technologies and ideas in a secure environment.
- Expanding the design/ manufacturing into as many hands as possible.
- Customizing and personalizing items for individuals. Eventually, using recyclable or sustainable materials which preserve natural resources.
- Eliminating mass production and managing the inventory through real-time production

CUSTOMIZATION OF EVERYTHING



Expertise appears to be the key factor that helps users to improve performance when it comes to additive manufacturing. Moreover, having a collaboration between teams that work specifically on one aspect of manufacturing will increase the mastery of the technology. As a result, this technical expertise are real competitive advantages for companies or individuals. 3D-Chain provides a secure network for connection between parties involve in manufacturing to use their technical knowledge. 3D-Chain top priorities are:

- Expanding the manufacturing market to small businesses for global growth
- Accelerating product development
- Increasing product flexibility and offering customized products
- Optimizing the products expenses
- Enabling co-creation between designer, manufacturer, and customer in a secure platform

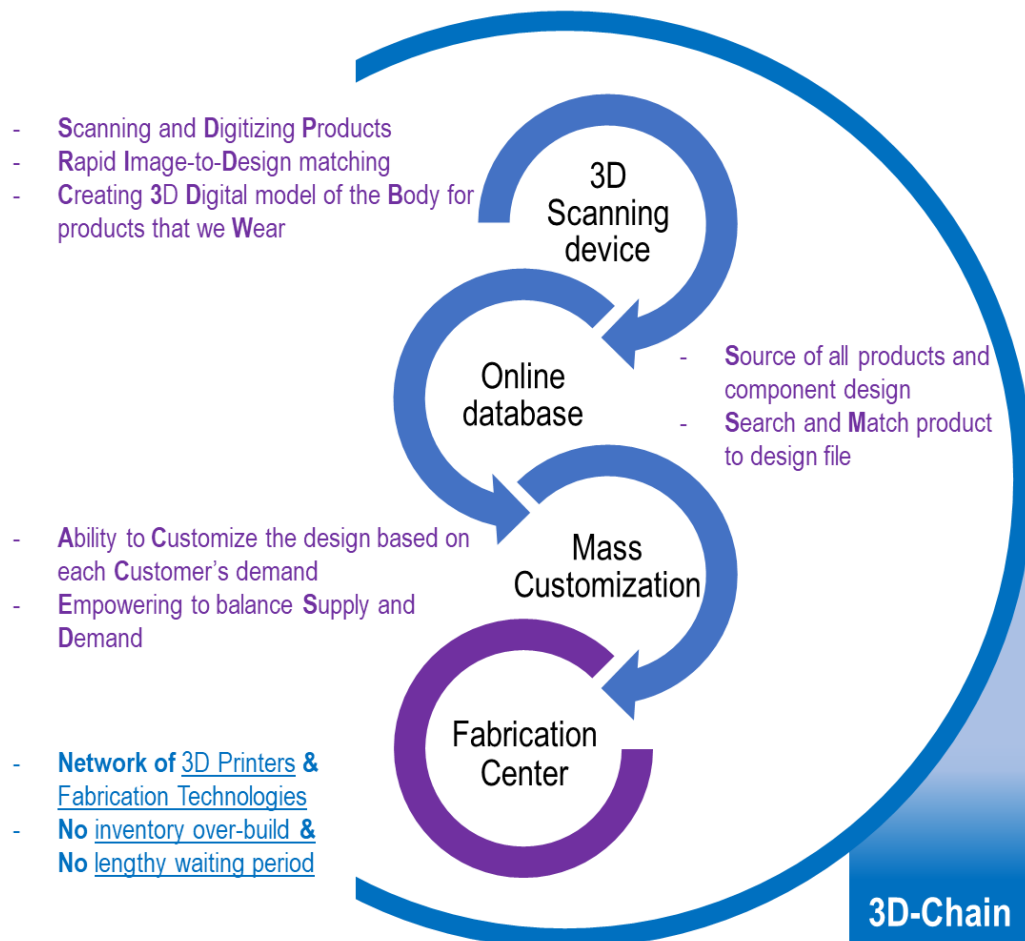


Figure 14: 3D-Chain unlocks area of mass customization in a decentralized and secured environment



4. 3D-Chain's ecosystem and marketplace

The challenges that come with additive manufacturing in terms of production and decision making are numerous. Meeting these challenges drives us here at 3D-Chain to continue to create a new platform for future growth in production.

3D-chain can turn data into objects and objects into data on demand in a protected and secure environment. This approach facilitates the productivity in manufacturing, increase efficiency, and lead to the global growth and distribution of wealth as our goal.

3D-CHAIN COLLABORATE WITH 3D PRINTING COMPANIES, SOFTWARE PLATFORM COMPANIES, ACADEMICS AND RESEARCHERS, AND MARKET RESEARCH FIRMS TO BRING THE FUTURE MANUFACTURING TO THE MAINSTREAM PRODUCTION.

The 3D-Chain ecosystem is a global decentralized platform where consumers can buy designs directly from designer, personalize a design, select among different materials and specifications, optimized the design for a specific fabrication technology, and send the design to appropriate manufacture and receive it in manageable time.

Raw material supplier, component supplier, 3D Printing machine manufacturer, fabrication technology provider, researcher, service provider, distributor, and end user define the ecosystem of the 3D-Chain. The 3D-Chain's audiences are as follow:

- Providers of 3D Printing solutions (Desktop, Industrial)
- Providers of 3D Printing services
- Providers of 3D Printing materials (Plastic, Metal, Concrete, and Other Materials)
- Providers of 3D Printing accessories
- Providers of 3D Printing consultation
- Providers of 3D Printing software (Printing, Design, and Inspection)
- Providers of 3D Scanning services
- Manufacturers, fabrication technology providers, and start-up companies
- Designers and Computer-aided design (CAD) developers
- Distributors and wholesalers
- End users and customers
- Educators and researchers in 3D Printing and automated fabrication technology



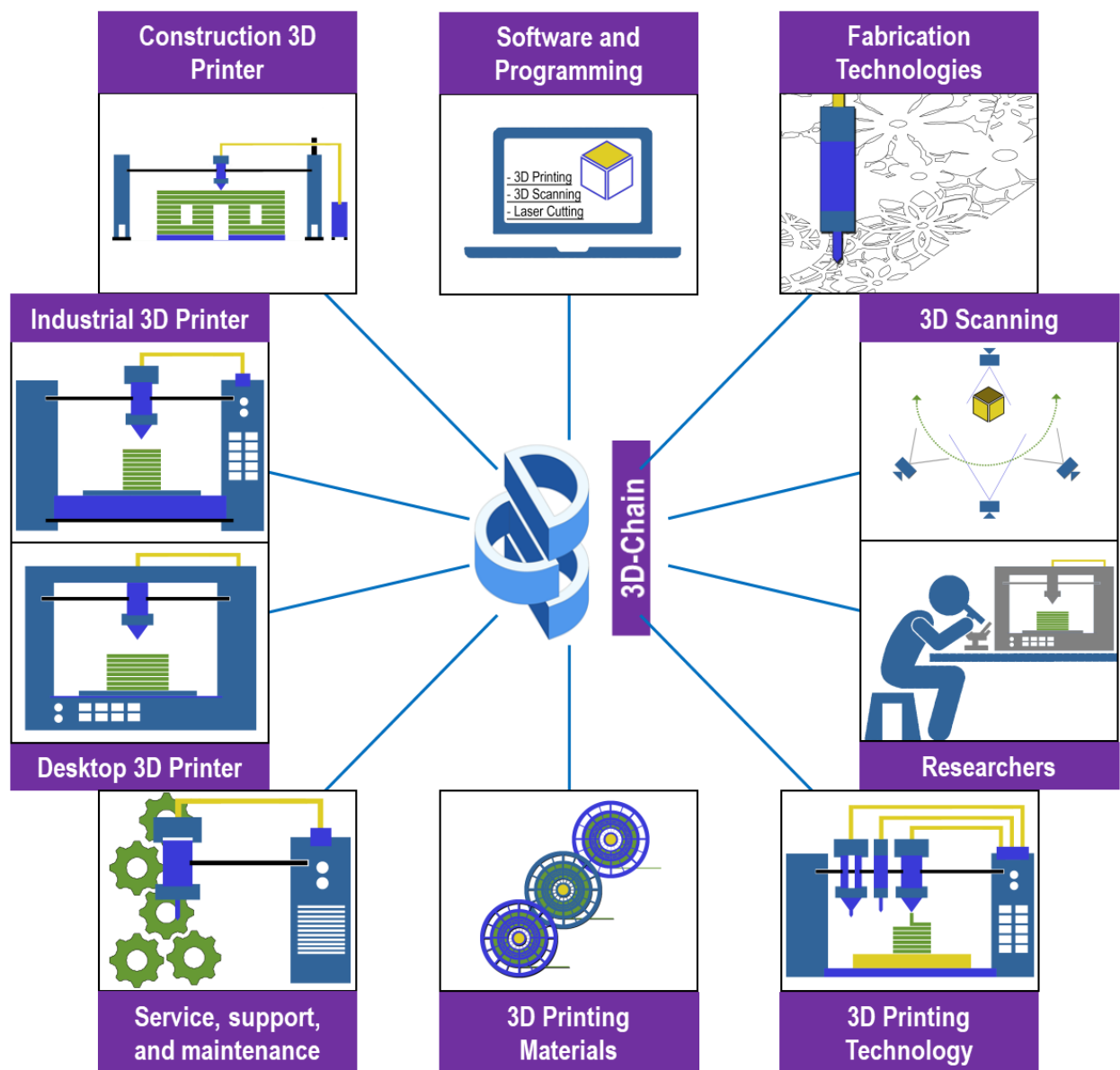


Figure 15: 3D-Chain's ecosystem

Incentive of customers to use 3D-Chain platform is to access transparent prices for a wide range of designs, designers, and manufacturers. 3D Printing and fabrication technology providers compete for consumers/designers and interact with them directly with fraction of cost of traditional systems. In addition of accessing the network, customers and designers can send a design or an idea with great confidentiality inherent from 3D-Chain's network and make sure that their work is protected with copyright. Some examples of markets for 3D-Chain are:



➤ Fashion Industry

Capability of designing personalized clothes that exactly fit your measurement. Forget shopping. You will customize your new clothes. 3D-Chain gives you freedom to design and fabricate clothes the way exactly you want. You can design what you like and send it to the 3D Printer or any fabrication technology available on the network. Moreover, material for fashion industry are evolving every day. 3D-Chain will give you the opportunity to explore different material and fabrication machine while protecting the copy right. It would no longer make sense to make clothes in one continent and ship them to another. In 3D-Chain network you can:

- Introduce your design (clothes, fabric, ...)
- Provide 3D Printing, 3D weaving, or fabrication service for designer or customers
- Select the digital design provided by another designer
- Brows different fabric
- Take advantage of variety of different fabrication technology for your design

➤ Medical 3D Printing

3D Printing makes a huge impact in customized prosthetics and offers a viable solution for millions of people living with limb loss around the world. 3D Scanning allows for the creation of a digital model than can be used for designing and a prosthetic limb.



Figure 16: Customized prosthetics; (photo source: <https://newatlas.com/>)

3D Printing has unlimited possibilities in dentistry. Using 3D Scanning and 3D Printing technology, dentists are able to scan the teeth and sent the data to 3D Printer to make the impression or mold.



Figure 17: 3D printer for digital dentistry (photo source: <https://www.3ders.org>)

➤ Automotive

The automotive industry invested early in Additive Manufacturing. Today, manufacturers primarily use the technology for prototyping rather than parts manufacturing. Making parts cheaper, lighter and faster is often a key goal of the automotive industry, indicating future opportunities for 3D Printing. 3D-Chain will be a platform where consumer's need will be met in real time. This decentralized network will shake up supply chain by impacting cost associated with inventory and transportation.

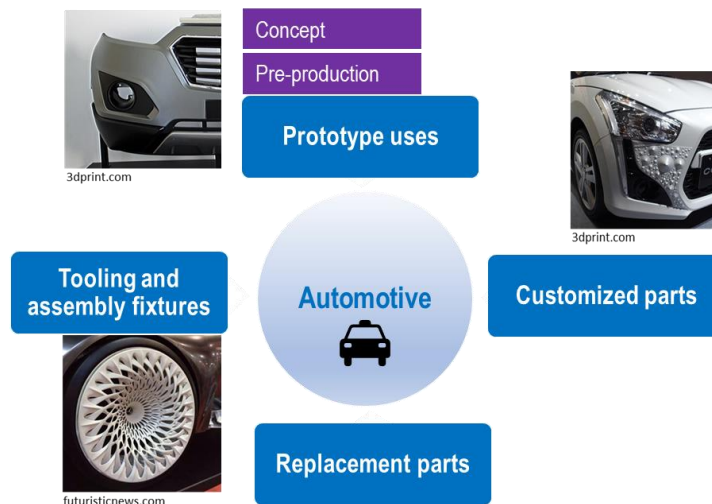


Figure 18: Application of 3D Printing technology for automotive industry via 3D-Chain platform

➤ Construction

Some of the more progressive users are exploring application of 3D Printing in larger-scale production. 3D Printing of concrete uses computer control layering of material to fabricate structures by integrating computer aided design (CAD) and computer aided manufacturing (CAM). The technology is based on additive manufacturing process which is deposition of successive layers of material to shape the object. Contour Crafting [9], D-shape [10], Concrete Printing [11], and selective deposition for ultra-high performance concrete [12] are four additive manufacturing process to build large scale concrete objects. 3D-Chain's mission is facilitating automation and customization to the construction industry.

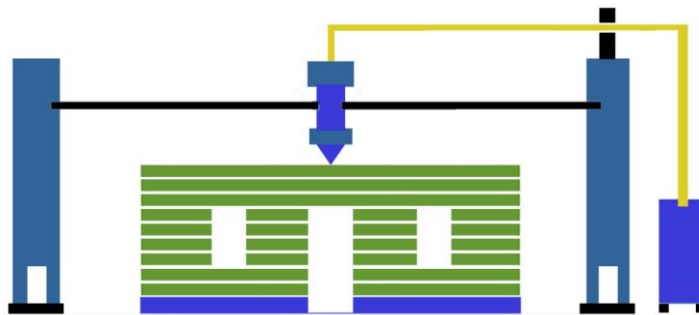


Figure 19: Concrete 3D Printing

➤ 3D Scanning and 3D Modeling

3D-Chain is as a platform for 3D and Virtual Reality models of existing buildings. Using computer aided design (CAD) or 3D Scanning to create professional models for different customer base. This platform can be utilized by several thousand users from 3D map to marketing real estates (Figure 20).

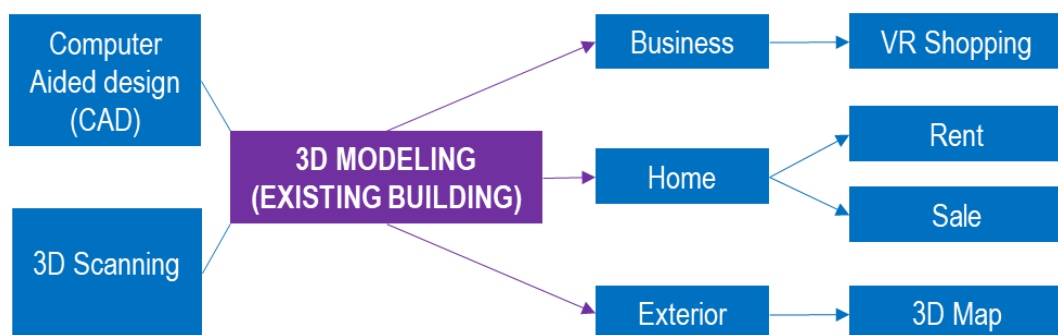


Figure 20: 3D-Chain a decentralized market for CAD and 3D Scanning of existing building



5. 3xD token: a cryptocurrency for 3D-Chain's network

3D-Chain Company is focused on releasing open source cryptographic technologies that enable operation in the 3D-Chain ecosystem. To implement 3D-Chain's platform, 3D-Chain creates the 3D-Chain tokens (3xD) and bring incentive for customers, designers, and manufacturers to join the platform.

The 3D-Chain's network will be built according to a scalable and decentralized approach that ensures sustainability in the platform. 3D-chain's customer will use 3xD token to access to the all the functionality of the platform.

3D-Chain's audience are categorized in four major networks:

- Designers Network
- Manufacturers Network
- Consumers Network
- Fulfillment Network (operators, workers and couriers)

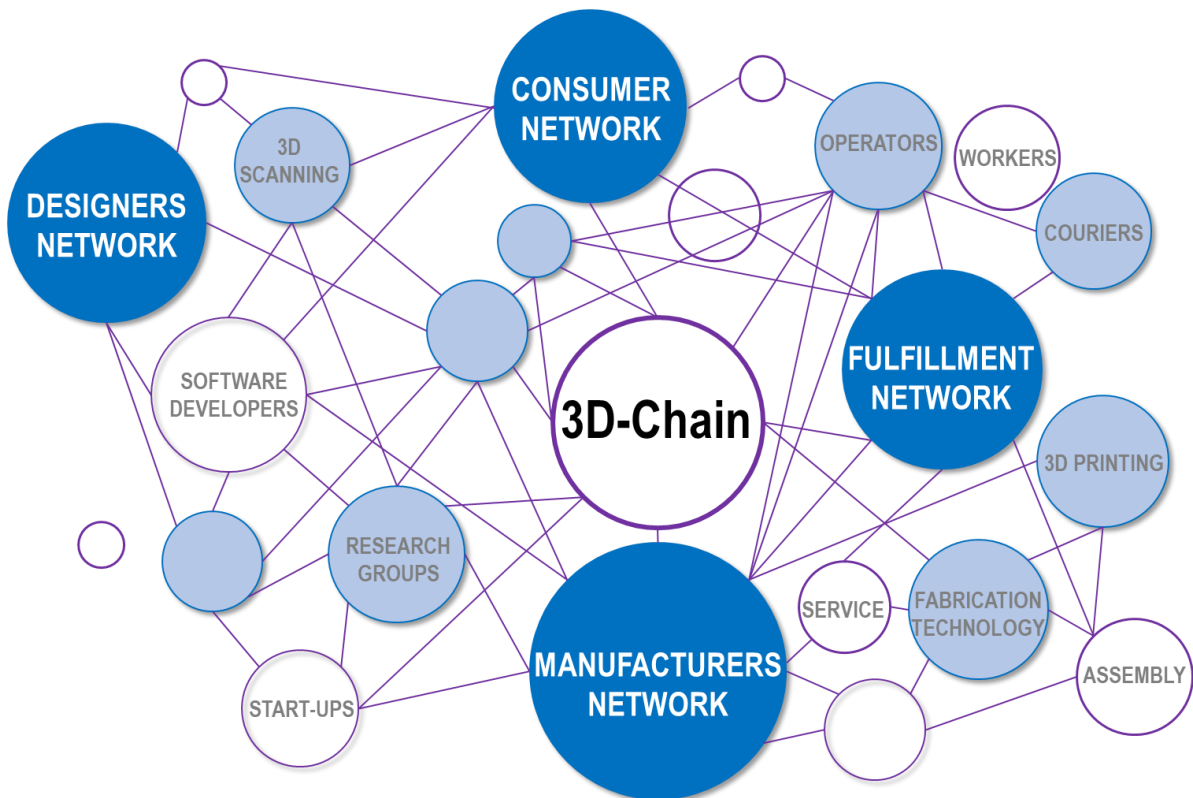


Figure 21: 3D-Chain's network



The 3D-Chain platform is a decentralized marketplace that allows customers, designers, and manufacturers to join the ecosystem. To become an ecosystem, participants (customers, manufacturers and designers) create an account on the 3D-Chain platform. During the registration, the system will create a profile and a wallet for each consumer based on a given network. Each participant of the ecosystem will be provided with a wallet that preserves all data in the decentralized database and interact with other parties, utilizing smart contracts.

Designers publish their design for sale, carry out promotion and loyalty campaigns, and get feedback from consumers. Network enables consumers to order their design or personalized them and facilitates the order to 3D manufacturing process by optimizing the 3D model based on a given 3D Printer specification and material.

3D Printer manufactures publish their rate for specific types of materials, level of precision and duration of time to produce objects. Manufacturing network has cross-platform system to distribute the design across multiple 3D Printers within the manufacturing network for faster production.

Customer network order a design or 3D Printed product in the network. They also can publish their personalized designs (e.g. celebrities design) or brand design to have more follower, earn credit and ease of the process for other customers.

All the networks inherent the security and transparency aspects of the decentralized platforms where designers and manufactures can communicate directly to customers and have assurance of direct payment with minimum transaction fee. Designers are paid based on every usage of their designs without worrying about copyright enforcement. On the other hand, customers will get best price with minimum overhead and have confident that their review and feedback can't be manipulated or deleted. 3D-Chain platform roles include:

- 3D-Chain token (3xD) creation and the token launch to fund development and expansion
- Establishment of a decentralized, fair and secure platform for order execution
- Development of smart contracts to run the order payment and fulfillment process
- Release of the customer website and app as well as an app for fulfillment center workers and couriers, and web interfaces for manufacturers and designers
- Creation of an effective incentive model for all parties to join the 3D-Chain ecosystem
- Development of an active marketing campaigns to ignite initial traction
- Elaboration of the ecosystem's regulatory aspects



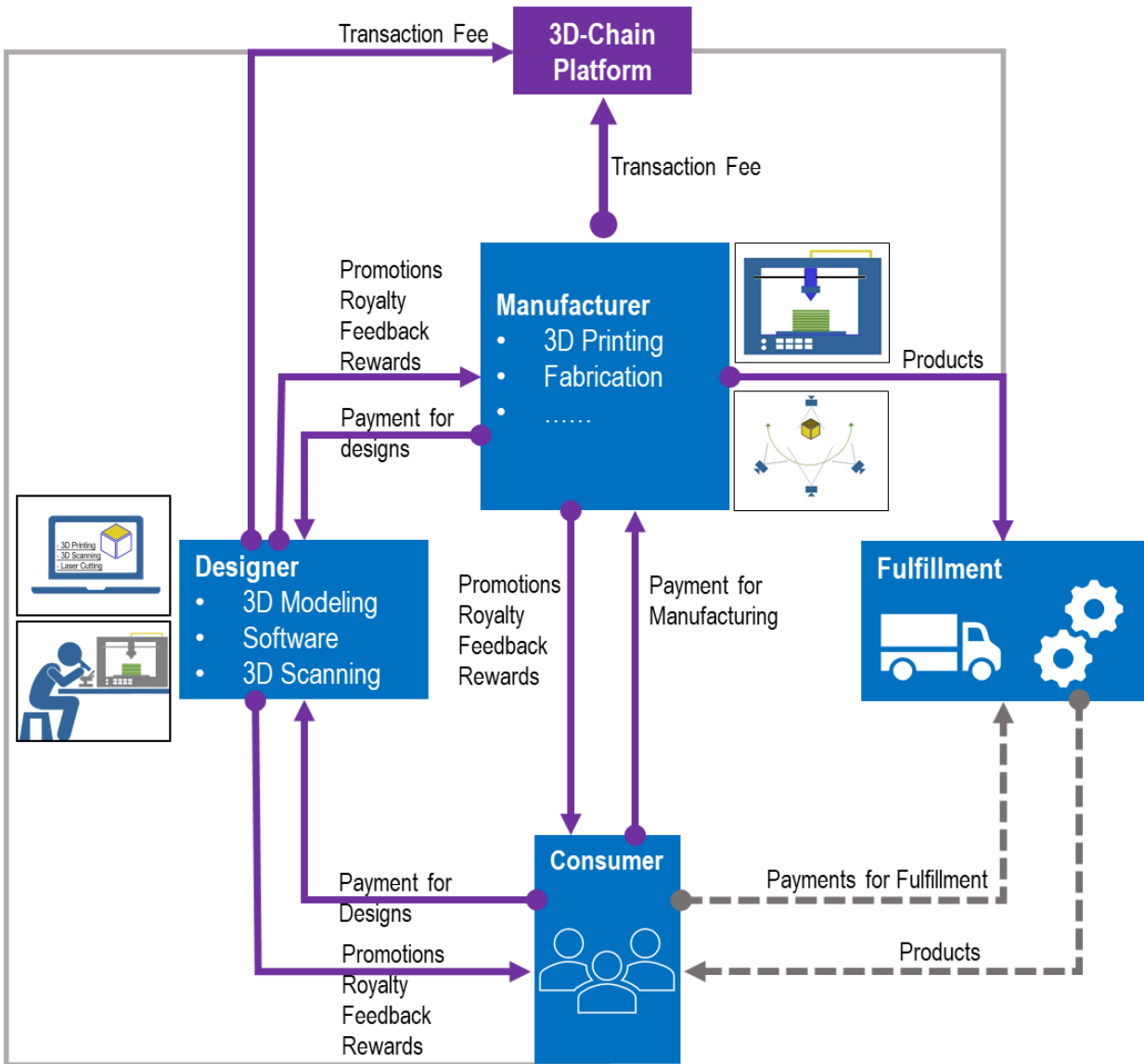


Figure 22: 3D-Chain's network flow

5.1. Designers

Designers are companies or individuals in the business of design 3D objects. They can range from individual designers to large designing companies. Designer's roles are:

- Develop designs or personalized a design based on consumers' needs
- Make the design compatible with specific 3D Printer and optimize it for the printer
- Work with customers to select materials
- Promote the 3D-Chain ecosystem by bringing traffic via promotions of derived apps
- Provide attractive promotion and loyalty rewards to acquire and retain consumers
- Sign NDA with certain manufactures and customers

Tier 1: Regular Designers

Regular Designers are first tier of designers that can work with regular customers and develop their design.

Tier 2: Professional Designers

Professional designer are experienced, and shrewd design sense, qualification, and familiarity with the whole process that takes place before, during and after the creation of a design project. Based on designer experience and degree as well as review from other customers and designers, a designer will earn professional certification on 3D-chain platform. They have also knowledge of materials and manufacturing process and can meet the requirements of manufactures for different devices.

Tier3: Professional Designers with Certifications

Professional designers will improve their tier by getting different certification from trusted entities. They can work with professional business customers based on certifications that they have earned. They can show to professional and business customers the necessary skills to leverage their needs in a design. They may sign NDA with customers and manufacturers to protect the final product.

➤ **Incentive for designers**

- Access to global network
- Secure environment with built-in copyright enforcement
- Get fair prices on their design and compete and collaborate openly with other designers
- Provide compatibility of their design with manufactures
- Serve in a trustful manner to keep a high rating score and attract more consumers
- Get promotion and loyalty rewards from manufacturers

5.2. Manufacturers

Manufacturers are companies or individuals in the business of 3D Printing. They could range from individuals with a 3D Printer at home to large multinationals 3D Printer manufactures. Large or small, no 3D manufacturer has enough power to fulfill customers exponential growth need. Therefore, customers can work with as many as manufactures as they want to expedite manufacturing process and keep up with demands. Manufacturer roles include:

- Generate products align with their pre-defined specification and accuracy
- Deliver products ordered by consumers to fulfillment centers
- Promote the 3D-Chain ecosystem by bringing traffic via promotions of derived apps
- Work directly with designer and customers to develop compatible product
- Sign NDA with designers and customers

Tier 1: Regular Manufactures

Regular manufactures are individuals with 3D printer. They have enough labor that can work with regular designers and costumers to fill their needs.

Tier 2: Professional Manufactures

Professional manufacturers have inventory levels aligned to forecasts of market demand. They maintain minimum stock levels, relying on the accuracy of demand forecasts and their production capacity to meet demand on a just-in-time basis. Their firm recruits people with specific knowledge and skills in the service disciplines that it offers. Also, professional manufacturers automate some of their production. They can work with business customer as well as regular customers. They have quality control center and test their final products.

Tier 3: Specialized Manufactures

Specialized manufactures are professional manufactures that have certification to work with certain businesses and qualification to produce specific parts. They have licenses to work with the business customers and sign NDA with them.

➤ **Incentive for manufacturers**

- Get fair prices on their technology and compete openly with other manufacturers
- Collaborate with other manufacturers
- Promotion from designers to make their device compatible with their work
- Serve in a trustful manner to keep a high rating score and attract more consumers
- Provide attractive promotion and loyalty rewards to acquire and retain consumers



5.3. Consumers

Consumers are individuals or companies that want to buy a design or make a high-quality product at cheaper prices. Orders can be placed via the 3D-Chain website, app or custom apps derived by manufacturers/designer from the app reference implementation. They can license an idea or a design to get credit every time customers use their design. Consumer roles include:

- Search for a design listed by designers, make orders for a design or order personalized design and pay for them
- Search for a 3D Printer listed by manufacturers, make orders for a 3D Print and pay for them
- License a design/idea to earn credit and followers
- Participate in feedback requests
- Receive promotion, loyalty, referral and feedback rewards
- Require certain quality and certification for manufactures

Tire 1: Regular Costumers

Regular customers are individual people that can work with regular designers or manufactures on their design and ideas. They have basic requirement on quality control of their final product.

Tier 2: Business Customers

Business customers can have certain quality control test and requirement on for their final products. They require manufactures and designers to pass their certifications. They may professional designers and manufacturers to sign NDA to produce their parts.

➤ **Incentive for consumers**

- Order customized designs and 3D Printed products
- Personalized design and access to designers
- Publish personalized designs (e.g. celebrities design) or brand design to have more follower, earn credit/loyalty and ease of the process for other customers
- Get orders delivered to the doorstep
- Leave feedback to influence manufacturers/designer
- Get different types of rewards



5.4. Post-processing/Fulfillment

Post-processing and Fulfillment can be performed by different centers. Post-processing and Fulfillment center operators are owners or operators of existing warehousing facilities and/or delivery fleet. They provide the space where workers take products delivered by manufacturers and assemble orders.

Post-processing can be all the machinery and cleaning process that needs to be done on the all the parts received from manufacturers.

- Process on all parts delivered by manufacturers
- Perform all machinery and cleaning needed on parts
- Combine parts coming from different manufacturers/process

Fulfillment center workers, employed by a fulfillment center operator or acting as independent contractors, will follow instructions received via the 3D-Chain fulfillment app to:

- Collect products delivered by manufacturers to fulfillment centers
- Pass orders to couriers

Courier companies or as independent contractors, can also follow instructions received via 3D-Chain fulfillment app to pick up orders from fulfillment centers.

6. Blockchain technology

Blockchain is a decentralized technology, aiming to solve trust issue between users. Bitcoin is the most popular example of Blockchain technology. It is a digital currency where many users (miners) validate all transactions. It uses a distributed ledger that is updated by consensus among the community, rather than held privately.

6.1. Smart contract

One of the most popular examples of Blockchain technology is Ethereum, which is aiming to have a platform for distributed technology. Ethereum provides smart contract, which are self-executing with the terms of the agreement between buyer and seller. The smart contract contains some if-then logic that two parties agree on, and the contract automatically executes payment when the conditions stipulated in the contract are fulfilled. The code and the agreements contained therein exist across a distributed, decentralized blockchain network. Smart contracts permit trusted transactions and agreements to be carried out among disparate, anonymous parties without the need for a central authority, legal system, or external enforcement mechanism. Therefore, transactions are traceable, transparent, and irreversible.

The 3D-Chain ecosystem is decentralized platform with potential of consisting millions of users, each of them making dozens of orders per year. Our focus is on performance, in which we use smart contracts to impalement predictability, stability, and ease of use. 3D-Chain develops an open source platform based on smart contract technology for transparency and engages many developers to validate our platform. 3D-Chain creates a Decentralized Network for 3D Printing manufactures, designers and customers. As such, it can be built on any open, decentralized framework that satisfies certain requirements.

3D-Chain requires no special innovations in cryptocurrency or blockchain technology, and the initial implementation will be built on Ethereum, with smart contracts written in Solidity and designed to minimize the gas cost for network operations. So far Ethereum is one of the best smart contract platform but we are tracking all other options with open eyes.

Communication between manufacturers, designers and customers will happen in a peer-to-peer network, and micro-transactions between all of them will benefit from bidirectional channels as well. The 3D-Chain platform provides a set of smart contracts, including:

- An API for exchanging information with and among users, including advertising services, and negotiating terms
- Mechanisms for exchanging 3D-Chain tokens for services
- Democratic governance on specific issues



Due to the rapid evolution of cryptocurrencies and associated tools, 3D-Chain will need to be able to shift between different crypto-economic infrastructures as technology progresses. Among these choices, two key ones are anticipated in the medium term:

- Whether and when to move from Ethereum to our own blockchain technology and/or other supporting technologies
- The precise design for consensus, should we move away from Ethereum

3D-Chain team with background in 3D Printing and automated fabrication technologies has published many papers. The team focused on creating novel blockchain structures, to design a flexible and efficient infrastructure capable of serving as an initial general-purpose under layer for 3D-Chain. The team will provide a highly flexible operating system for the blockchain, capable of supporting a wide variety of smart contract-based interactions with high computational efficiency. 3D-Chain team will come with a set of smart contract templates oriented toward design, management and growth of decentralized blockchain-based organizations of various types. The peer-to-peer structure is the perfect fit for the decentralized nature of the 3D-Chain ecosystem.

6.2. Token

Designed 3D-Chain token is optimized for the 3 desired objectives. To create a 3D Printing and manufacturing ecosystem that makes transactions smooth, guarantees international access, and incentivizes network growth we require a token for 3D Printing market. In more depth, some of the underlying reasoning was as follows. 3D-Chain requires:

➤ **World Wide Network**

3D-Chain opens 3D Printing technology and development to an entire world of developers, customers and manufacturers. To ensure fair and non-discriminatory access, a single token unconnected to any outside economy is required. Any fiat currency would create barriers to those who cannot use that currency and make the 3D-Chain economy vulnerable to manipulation by the economy backing that currency.

➤ **A Scalable Transaction Infrastructure**

3D-Chain needs highly stable and scalable transaction network. Current networks cannot support the transaction volume required. While the prototype can run on Ethereum, we are actively looking for any possible blockchain network that meets these requirements.

➤ **Low Transaction Costs**

The payment process in any manufacturing transaction currently entails many different steps and middleman to settle a transaction and different fees to pay for payment gateways, thus making transaction fees very high a long route that could be cut short with blockchain technology. Blockchain is the perfect tool for payment to be more efficient and more trustful. Payment processing through blockchain has a significantly bigger potential for transaction speeds and low prices, let all the possible variety of ways smart contracts can improve both ecommerce and payments. A tokenized ledger will provide a complete token-based system, like real money where tokens are sent and exchanged at different times and for different reasons, based on predefined rules and events.

➤ **Chain Management**

Companies must manage a complex supply chain of manufacturers, customers, and carriers and logistics providers. A blockchain of the transaction, containing order details and negotiated fees and commissions (in the form of smart contracts) will be used to capture designs/products, delivery and possible return events, and drive financial settlement with fewer opportunities for dispute. The nature of blockchain records and native token means that each party can make data visible to the others. All parties have visibility into the transaction and no custom interface has to be negotiated between partners (only to/from the blockchain). The blockchain is the system of records for the entire transactions. It reduces time delays, costs and human errors that plague transactions today, automate inventory control, and streamline fulfillment processes, but errors to some extent are possible since 3D Printed products are not digital, the blockchain records of their track is inevitably post-factum.



7. Data processing

Products in the consumer markets constitute the basic item that actions revolve around. Designers includes their designs as a product in the 3D-Chain ecosystem and manufacturers rents their devices on the 3D-Chain platform with several defined parameters, such as model, material, speed, price, description, etc. that makes it easy to find and choose a 3D Printing device for ordering.

To choose between designers and manufacturers, a rating and reputation mechanism should be implemented. Also, information on the network is an asset that could be shared between users to take the benefits of the networks. These main aspects of data processing are explained in detail.

7.1. Rating and reputation

3D Printing manufacturers, designers and customers need some ways to estimate the reputation of others. This is critical for making choices regarding everyday transactions in the network, and it also plays a core role in network governance and resource allocation.

3D-Chain will provide a rating and reputation mechanism to address these needs. Rating system design system will need to evolve along with the network. Ultimately it may equal or exceed the subtle and comprehensive rating systems; but for starters a system will serve adequately as the initial condition for ongoing refinement.

All parties involved in transactions are asked to rate each other after each exchange of services for tokens (or for other services); however, rating is not mandatory.

7.2. Data ownership and privacy

Most of the large companies draw outsized benefits from their ability to build and hoard gigantic datasets, which are then used to extract knowledge from data or even sale them. Outside of these few tech giants, small, innovative companies struggle with access to data, while other large organizations, even when they can gather data, lack the expertise to turn the data into a usable form.

3D-Chain allows network customers to collaborate in building very large, decentralized datasets, each contributing data in an agreed-upon format. Contributors can then receive payment from any part of the network that uses the data. Data producers can specify privacy restraints and other restrictions on access and use of their data. By decentralizing ownership and access to gigantic datasets, 3D-Chain takes another important step to democratize access to 3D Printing ecosystems and their benefits.



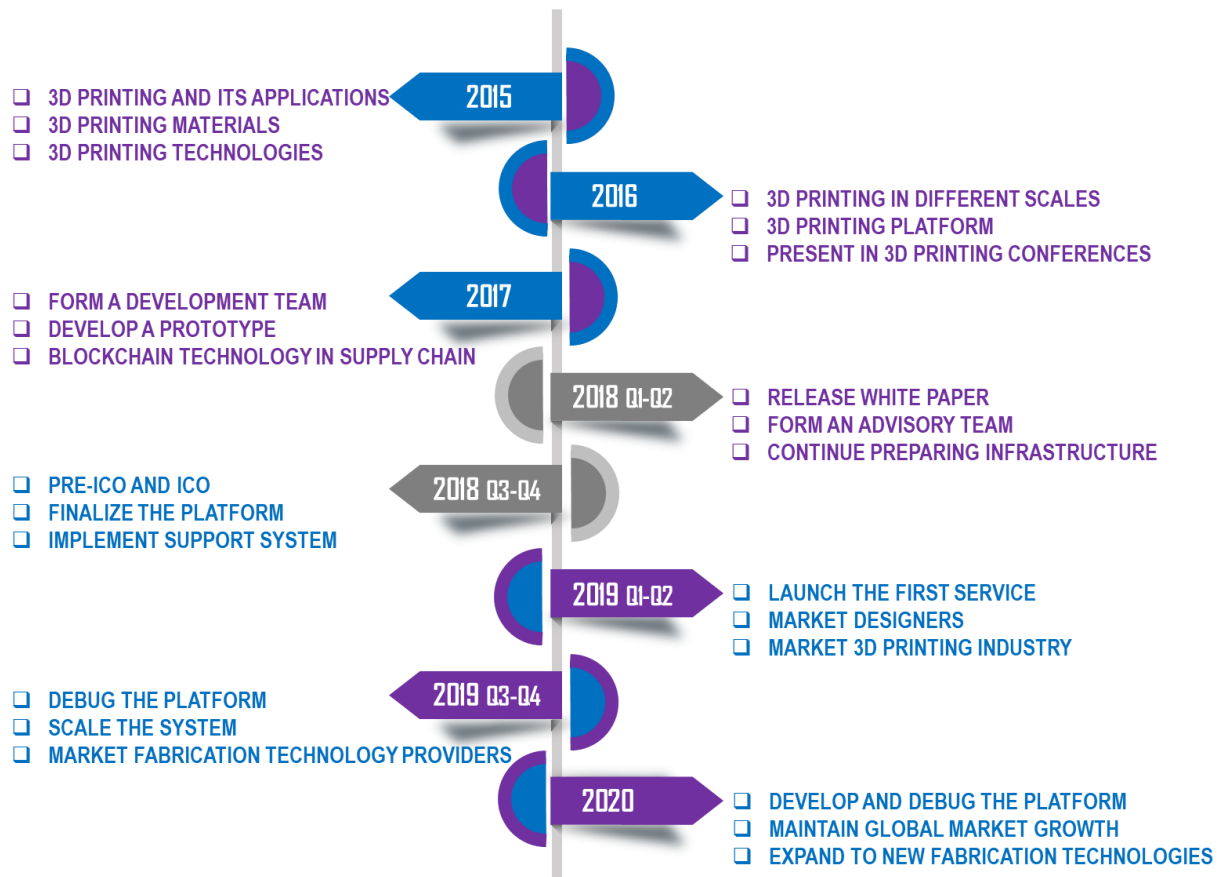
7.3. Artificial Intelligence network: A New Value Chain

With all data available from 3D-Chain's network, 3D-Chain generates a new value chain such as big data and the use of data-gathering sensors (the so-called Internet of Things) for experts in Artificial Intelligence. New machine learning models can be developed to fine-tune products based on customer's demand. Machine learning helps products and materials recommendation, finding similar products and optimizing a design for specific fabrication technology. It can also find any flaw in design or manufacturing automatically. Across manufacturing industry, 3D-Chain opens doors for many aspects of machine learning development within the network to increase the performance and generate revenue for participants. These new Artificial Intelligence network can make substantial improvement in manufacturers interaction with customers and how they manage their operations.



8. Roadmap

Project Timeline for 3D-Chain ecosystem is listed below.



9. 3D-Chain Token (3xD)

The economic logic outlined here is a minimum viable logic. We anticipate that the 3D-Chain community will create and incorporate many more additions to 3xD token, on matters such as reputation system and currency-less offer networks.

The 3D-Chain contract will be minting a total of 100,000,000 3xD tokens. The exact number of tokens generated depends on the amount of funds contributed.

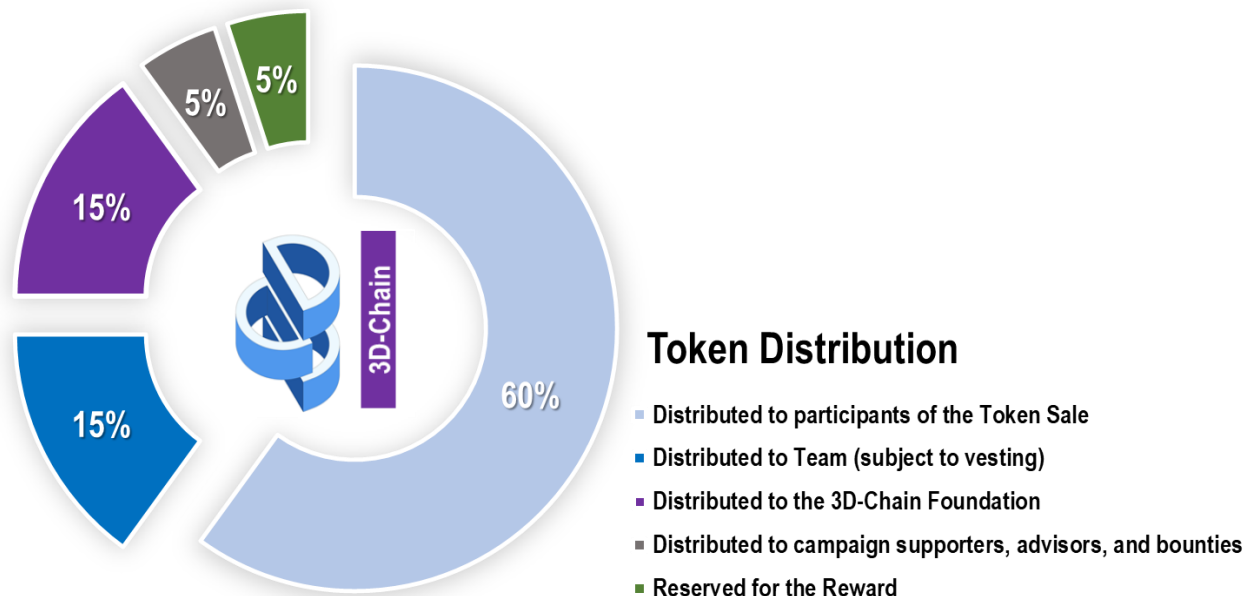
3D-Chain ICO and Pre-ICO info	Detail
Start Date	Q3 2018
Pre-ICO Token exchange rate	1 ETH = 3000 3xD Max 2000 ETH
Early stage ICO Token exchange rate	1 ETH = 2500 3xD Max 10000 ETH
ICO Token exchange rate	1 ETH = 2000 3xD Max 14500 ETH
Total token supply (max)	100,000,000
Min purchase	0.1 ETH
Payment methods	ETH

Note that **NO** token will be created after the end of the ICO period and token will be distributed after the ICO is completed. In addition, upon reaching the hard cap, the ICO will end immediately.



9.1. Token issuance

The 3D-Chain contract will be allocating the mined 3xD tokens as follow:



3xD tokens minted for allocation to founders are subjected to 24 months vesting period with a 12-month vesting cliff. Advisors' and early supporters' tokens are locked for 12 months. 3D-Chain Foundation token distribution will start in 2019 and last for up to 3 years with the primary goal to incentivize new customers to join and accelerate adoption of the 3D-Chain ecosystem by broad audiences.

10. 3D-Chain foundation allocation

The 3D-Chain Foundation is responsible for building, supervising and accelerating growth of the 3D-Chain network and marketplace. During the initial phases of network operation, while most of the minor day-to-day governance decisions will be made by consulting the token holders, the 3D-Chain Foundation will provide high-level supervising. As the network evolves, the potential will be there for transition to a fully self-regulating decentralized autonomous organization. Creating a real successful combination of sophisticated initial network, a flourishing community of designers and manufacturers as well as developers, and a rich ecosystem of customers at varying levels of sophistication is a significant undertaking. The 3D-Chain Foundation brings experience to the project, as well as a providing significant body of open-source code to lay the foundation for the 3D-Chain global development network.

The funds raised during the ICO will be used in accordance with the roadmap in 3D-Chain Foundation.

Planned fund allocation	Percentage
Research & Development	50 %
Marketing	27%
Admin	10%
Legal	8%
Miscellaneous	5%

- Research costs cover all R&D expenses, including design and development of smart contracts, cryptographic mechanisms, the 3D-Chain platform, apps and interfaces, SDK, etc. Includes opening of an R&D center with approximately 35 engineers.
- Admin costs include salaries of all 3D-Chain employees excluding the R&D team.
- Marketing budget will be allocated on acquisition of both manufacturers and consumers.
- Legal costs include all legal expenses associated with expansion of the 3xD ecosystem in different countries.
- Miscellaneous fund is calculated as 5% of the total budget.



10.1. Token legal issue

The tokens are not being offered or distributed to, as well as cannot be resold or otherwise alienated by their holders to “Restricted Persons”. Restricted Persons are citizens or residence of the country or territory where transactions with digital tokens are prohibited or in any manner restricted by applicable laws or regulations or will become prohibited or restricted at any time after this agreement becomes effective.

The 3xD Token Sale adheres to global regulations. In order to adapt to the changing blockchain landscape, 3xD is measuring if contributors can legally participate in the Token Sale. 3D-Chain do not accept participation from the Restricted Persons and reserve the right to refuse or cancel the 3xD token purchase requests at any time at our sole discretion when the information provided by the purchasers is not sufficient, inaccurate or misleading, or the purchaser is deemed to be a Restricted Person. USA nationality (including green card holders and citizens) cannot participate in the 3xD token Sale.

All payments received for 3xD tokens in connection with the 3D-Chain token sale will be held in a multi-signature wallet and keys will stay in 3D-Chain Foundation.



11. Team and advisors

11.1. Team



Mehdi Korjani, Ph.D. Founder



- 5+ years of leading development teams.
- PhD in Electrical Engineering from University of Southern California
- Worked as Senior Data Scientist at KPMG, Researcher at Oben and Chevron
- More than 20 Publications and 5 Patents.



Babak Zareiyan, Ph.D. Founder



- 6+ years of experience in 3D Printing technology.
- PhD in Civil Engineering from University of Southern California
- Researcher at CRAFT (Center for Rapid Automated Fabrication Technologies)
- Several Publications in 3D Printing fabrication and materials.



12. Risk factors

The purchase of tokens involves a high degree of risk, including but not limited to the risks described below. Before acquiring 3xD token, it is recommended that each participant carefully weighs all the information and risks detailed in this White Paper, and, specifically, the following risk factors.

12.1. Risks connected to the value of 3xD tokens

12.1.1. Lack of Development of Market for 3xD tokens

Because there has been no prior public trading market for the 3xD tokens, the sale of the 3xD tokens described in this White Paper may not result in an active or liquid market for the 3xD tokens, and their price may be highly volatile. An active public market may not develop or be sustained after the 3xD token sale. If a liquid trading market for the 3xD tokens does not develop, the price of the 3xD tokens may become more volatile and token holder may be unable to sell or otherwise transact in the 3xD tokens at any time.

12.1.2. Risks Relating to Highly Speculative Traded Price

The valuation of digital tokens in a secondary market is usually not transparent, and highly speculative. The 3xD tokens do not hold any ownership rights to Company's assets and, therefore, are not backed by any tangible asset. Traded price of the 3xD tokens can fluctuate greatly within a short period of time. There is a high risk that a token holder could lose his/her entire contribution amount. In the worst-case scenario, the 3xD tokens could be rendered worthless.

12.1.3. 3xD Tokens May Have No Value

The 3xD tokens may have no value and there is no guarantee or representation of liquidity for the 3xD tokens. Company Parties are not and shall not be responsible for or liable for the market value of the 3xD tokens, the transferability and/or liquidity of the 3xD tokens and/or the availability of any market for the 3xD tokens through third parties or otherwise. For the purposes of this Section of the White Paper, the term "Company Parties" shall include Company and its respective past, present and future employees, officers, directors, contractors, consultants, attorneys, accountants, financial advisors, equity holders, suppliers, vendors, service providers, parent companies, subsidiaries, affiliates, agents, representatives, predecessors, successors and assigns (hereinafter in this Section – "Company Parties").



12.1.4. 3xD Tokens May Be Non-Refundable

Except for as provided in a legally binding documentation or prescribed by the applicable legislation, Company Parties are not obliged to provide the 3xD token holders with a refund related to the 3xD tokens. No promises of future performance or price are or will be made in respect to the 3xD tokens, including no promise of inherent value, no promise of continuing payments, and no guarantee that the Tokens will hold any value. Therefore, the recovery of spent resources may be impossible or may be subject to foreign laws or regulations, which may not be the same as the private law of the 3xD token holder.

12.2. Blockchain and software risks

12.2.1. Blockchain Delay Risk

On the most blockchains used for cryptocurrencies' transactions (e.g., Ethereum, Bitcoin blockchains), timing of block production is determined by proof of work so block production can occur at random times. For example, the cryptocurrency sent as a payment for the 3xD tokens in the final seconds of the 3xD token sale may not get included into that period. The respective blockchain may not include the purchaser's transaction at the time the purchaser expects and the payment for the 3xD tokens may reach the intended wallet address not in the same day the purchaser sends the cryptocurrency.

12.2.2. Blockchain Congestion Risk

The most blockchains used for cryptocurrencies' transactions (e.g., Ethereum, Bitcoin blockchains) are prone to periodic congestion during which transactions can be delayed or lost. Individuals may also intentionally spam the network to gain an advantage in purchasing cryptographic tokens. That may result in a situation where block producers may not include the purchaser's transaction when the purchaser wants, or the purchaser's transaction may not be included at all.

12.2.3. Risk of Software Weaknesses

The token smart contract concept, the underlying software application and software platform (i.e. the Ethereum, Bitcoin blockchains) are still in an early development stage and unproven. There are no representations and warranties that the process for creating the 3xD tokens will be uninterrupted or error-free. There is an inherent risk that the software could contain weaknesses, vulnerabilities or bugs causing, inter alia, the complete loss of the cryptocurrency and/or the 3xD tokens.



12.2.4. Risk of New Technology

The 3xD platform, the 3xD tokens and all the matters set forth in this White Paper are new and untested. The 3xD platform and the 3xD tokens might not be capable of completion, creation, implementation or adoption. It is possible that no blockchain utilizing the 3xD platform will be ever launched. Purchaser of the 3xD tokens should not rely on the 3xD platform, the token smart contract or the ability to receive the 3xD tokens associated with the 3xD platform in the future. Even if the 3xD platform is completed, implemented and adopted, it might not function as intended, and any 3xD tokens may not have functionality that is desirable or valuable. Also, technology is changing rapidly, so the 3xD platform and the 3xD tokens may become outdated.

12.3. Security risks

12.3.1. Risk of Loss of Private Keys

The 3xD tokens may be held by token holder in his digital wallet or vault, which requires a private key, or a combination of private keys, for access. Accordingly, loss of requisite private keys associated with such token holder's digital wallet or vault storing the 3xD tokens will result in loss of such 3xD tokens, access to token holder's token balance and/or any initial balances in blockchains created by third parties. Moreover, any third party that gains access to such private keys, including by gaining access to login credentials of a hosted wallet or vault service the token holder uses, may be able to misappropriate the token holder's 3xD tokens.

12.3.2. Lack of Token Security

The 3xD tokens may be subject to expropriation and or/theft. Hackers or other malicious groups or organizations may attempt to interfere with the token smart contract which creates the 3xD tokens or the 3xD tokens in a variety of ways, including, but not limited to, malware attacks, denial of service attacks, consensus-based attacks, Sybil attacks, smurfing and spoofing. Furthermore, because the Ethereum platform rests on open source software, there is the risk that Ethereum smart contracts may contain intentional or unintentional bugs or weaknesses which may negatively affect the 3xD tokens or result in the loss of 3xD tokens, the loss of ability to access or control the 3xD tokens. In the event of such a software bug or weakness, there may be no remedy and holders of the 3xD tokens are not guaranteed any remedy, refund or compensation.

12.3.3. Attacks on Token Smart Contract

The blockchain used for the token smart contract which creates the 3xD tokens is susceptible to mining attacks, including double-spend attacks, majority mining power attacks, "selfish-mining" attacks, and race condition attacks. Any successful attacks present a risk to the token smart



contract, expected proper execution and sequencing of the 3xD token transactions, and expected proper execution and sequencing of contract computations.

12.3.4. Failure to Map a Public Key to Purchaser's Account

Failure of a purchaser of the 3xD tokens to map a public key to such purchaser's account may result in third parties being unable to recognize purchaser's 3xD token balance on the Ethereum blockchain when and if they configure the initial balances of a new blockchain based upon the 3xD platform.

12.3.5. Risk of Incompatible Wallet Service

The wallet or wallet service provider used for the acquisition and storage of the 3xD tokens, must be technically compatible with the 3xD tokens. The failure to assure this may have the result that purchaser of the 3xD tokens will not gain access to his 3xD tokens.

12.4. Risks relating to platform development

12.4.1. Risk Related to Reliance on Third Parties

Even if completed, the 3xD platform will rely, in whole or partly, on third parties to adopt and implement it and to continue to develop, supply, and otherwise support it. There is no assurance or guarantee that those third parties will complete their work, properly carry out their obligations, or otherwise meet anyone's needs, all might have a material adverse effect on the 3xD platform.

12.4.2. Dependence of 3xD Platform on Senior Management Team

Ability of the senior management team which is responsible for maintaining competitive position of the 3xD platform is dependent to a large degree on the services of each member of that team. The loss or diminution in the services of members of respective senior management team or an inability to attract, retain and maintain additional senior management personnel could have a material adverse effect on the 3xD platform. Competition for personnel with relevant expertise is intense due to the small number of qualified individuals, and this situation seriously affects the ability to retain its existing senior management and attract additional qualified senior management personnel, which could have a significant adverse impact on the 3xD platform.

12.4.3. Dependence of 3xD Platform on Various Factors

The development of the 3xD Platform may be abandoned for a number of reasons, including lack of interest from the public, lack of funding, lack of commercial success or prospects, or departure of key personnel.



12.4.4. Lack of Interest to the 3xD Platform

Even if the 3xD platform is finished and adopted and launched, the ongoing success of the 3xD platform relies on the interest and participation of third parties like developers. There can be no assurance or guarantee that there will be sufficient interest or participation in the 3xD platform.

12.4.5. Changes to the 3xD Platform

The 3xD platform is still under development and may undergo significant changes over time. Although the project management team intends for the 3xD platform to have the features and specifications set forth in this White Paper, changes to such features and specifications can be made for any number of reasons, any of which may mean that the 3xD platform does not meet expectations of holder of the 3xD tokens.

12.4.6. Risk Associated with Other Applications

The 3xD platform may give rise to other, alternative projects, promoted by unaffiliated third parties, under which the 3xD token will have no intrinsic value.

12.4.7. Risk of an Unfavorable Fluctuation of Cryptocurrency Value

The proceeds of the sale of the 3xD tokens will be denominated in cryptocurrency and may be converted into other cryptographic and fiat currencies. If the value of cryptocurrencies fluctuates unfavorably during or after the 3xD token sale, the project management team may not be able to fund development or may not be able to develop or maintain the 3xD platform in the manner that it intended.

12.5. Risks arising in course of company parties' business

12.5.1. Risk of Conflicts of Interest

Company Parties may be engaged in transactions with related parties, including respective majority shareholder, companies controlled by him or in which he owns an interest, and other affiliates, and may continue to do so in the future. Conflicts of interest may arise between any Company Party's affiliates and respective Company Party, potentially resulting in the conclusion of transactions on terms not determined by market forces.

12.5.2. Risks Related to Invalidation of Company Parties Transactions

Company Parties have taken a variety of actions relating to their business that, if successfully challenged for not complying with applicable legal requirements, could be invalidated or could

result in the imposition of liabilities on respective Company Party. Since applicable legislation may subject to many different interpretations, respective Company Party may not be able to successfully defend any challenge brought against such transactions, and the invalidation of any such transactions or imposition of any such liability may, individually or in the aggregate, have a material adverse effect on the 3xD platform.

12.5.3. Risk Arising from Emerging Markets

Company Parties or some of them may operate on emerging markets. Emerging markets are subject to greater risks than more developed markets, including significant legal, economic and political risks. Emerging economies are subject to rapid change and that the information set out in this White Paper may become outdated relatively quickly.

12.6. Governmental risks

12.6.1. Uncertain Regulatory Framework

The regulatory status of cryptographic tokens, digital assets and blockchain technology is unclear or unsettled in many jurisdictions. It is difficult to predict how or whether governmental authorities will regulate such technologies. It is likewise difficult to predict how or whether any governmental authority may make changes to existing laws, regulations and/or rules that will affect cryptographic tokens, digital assets, blockchain technology and its applications. Such changes could negatively impact the tokens in various ways, including, for example, through a determination that the tokens are regulated financial instruments that require registration. Company may cease the distribution of the 3xD tokens, the development of the 3xD platform or cease operations in a jurisdiction if governmental actions make it unlawful or commercially undesirable to continue to do so.

12.6.2. Failure to Obtain, Maintain or Renew Licenses and Permits

Although as of the date of starting of the 3xD token sale there are no statutory requirements obliging Company to receive any licenses and permits necessary for carrying out of its activity, there is the risk that such statutory requirements may be adopted in the future and may relate to any of Company Parties. In this case, Company Parties' business will depend on the continuing validity of such licenses and permits and its compliance with their terms. Regulatory authorities will exercise considerable discretion in the timing of license issuance and renewal and the monitoring of licensees' compliance with license terms. Requirements which may be imposed by these authorities and which may require any of Company Party to comply with numerous standards, recruit qualified personnel, maintain necessary technical equipment and quality control systems, monitor our operations, maintain appropriate filings and, upon request, submit



appropriate information to the licensing authorities, may be costly and time-consuming and may result in delays in the commencement or continuation of operation of the 3xD platform. Further, private individuals and the public at large possess rights to comment on and otherwise engage in the licensing process, including through intervention in courts and political pressure. Accordingly, the licenses any Company Party may need may not be issued or renewed, or if issued or renewed, may not be issued or renewed in a timely fashion, or may involve requirements which restrict any Company Party's ability to conduct its operations or to do so profitably.

12.6.3. Risk of Government Action

The industry in which Company Parties operate is new, and may be subject to heightened oversight and scrutiny, including investigations or enforcement actions. There can be no assurance that governmental authorities will not examine the operations of Company Parties and/or pursue enforcement actions against them. All of this may subject Company Parties to judgments, settlements, fines or penalties, or cause Company Parties to restructure their operations and activities or to cease offering certain products or services, all of which could harm Company Parties' reputation or lead to higher operational costs, which may in turn have a material adverse effect on the 3xD tokens and/or the development of the 3xD platform.

12.6.4. Risk of Burdensomeness of Applicable Laws, Regulations and Standards

Failure to comply with existing laws and regulations or the findings of government inspections, or increased governmental regulation of Company Parties operations, could result in substantial additional compliance costs or various sanctions, which could materially adversely affect Company Parties business and the 3xD platform. Company Parties operations and properties are subject to regulation by various government entities and agencies, in connection with ongoing compliance with existing laws, regulations and standards. Regulatory authorities exercise considerable discretion in matters of enforcement and interpretation of applicable laws, regulations and standards. Respective authorities have the right to, and frequently do, conduct periodic inspections of any Company Party's operations and properties throughout the year. Any such future inspections may conclude that any Company Party has violated laws, decrees or regulations, and it may be unable to refute such conclusions or remedy the violations. Any Company Party's failure to comply with existing laws and regulations or the findings of government inspections may result in the imposition of fines or penalties or more severe sanctions or in requirements that respective Company Party cease certain of its business activities, or in criminal and administrative penalties applicable to respective officers. Any such decisions, requirements or sanctions, or any increase in governmental regulation of respective operations, could increase Company Parties' costs and materially adversely affect Company Parties business and the 3xD platform.



12.6.5. Unlawful or Arbitrary Government Action

Governmental authorities may have a high degree of discretion and, at times, act selectively or arbitrarily, without hearing or prior notice, and sometimes in a manner that is contrary a law or influenced by political or commercial considerations. Moreover, the government also has the power in certain circumstances, by regulation or government act, to interfere with the performance of, nullify or terminate contracts. Unlawful, selective or arbitrary governmental actions have reportedly included the denial or withdrawal of licenses, sudden and unexpected tax audits, criminal prosecutions and civil actions. Federal and local government entities have also used common defects in matters surrounding the Token sale as pretexts for court claims and other demands to invalidate or to void any related transaction, often for political purposes. In this environment, Company Parties' competitors may receive preferential treatment from the government, potentially giving them a competitive advantage over Company Parties.



13. References

- [1] The World Bank, World Bank national accounts data, and OECD National Accounts data files., (2017). <https://data.worldbank.org/>.
- [2] B. Zareiyan, B. Khoshnevis, Effects of interlocking on interlayer adhesion and strength of structures in 3D printing of concrete, *Autom. Constr.* 83 (2017) 212–221. doi:10.1016/j.autcon.2017.08.019.
- [3] Sculpteo, State of 3D Printing 2017, San Francisco, 2017. https://www.sculpteo.com/en/get/report/state_of_3d_printing_2017/.
- [4] Strataysys, Trend Forecast: 3D Printing's Imminent Impact on Manufacturing, (2015). https://www.strataysysdirect.com/content/pdfs/%0A%20sys_trend-forecast_v10.pdf.
- [5] I. Global Industry Analysts, 3D Printing - A global strategic business report, 2017. (n.d.). <http://www.strategyr.com/MCP-7651.asp#sthash.R8ZU8IVm.dpbs> (accessed January 12, 2018).
- [6] Wohlers Associates, Wohlers Report 2015: 3D Printing and Additive Manufacturing State of the Industry Annual Worldwide Progress Report, 2015.
- [7] MarketsandMarkets, 3D Printing Market- Global Forecast to 2023, [Marketsandmarkets.com](https://www.marketsandmarkets.com/Market-Reports/3d-printing-market-1276.html). (2017). <https://www.marketsandmarkets.com/Market-Reports/3d-printing-market-1276.html>.
- [8] ATKearney, 3D Printing: A Manufacturing Revolution, 2015. <https://www.atkearney.com/documents/10192/5992684/3D+Printing+A+Manufacturing+Revoluti+on.pdf> (accessed October 15, 2017).
- [9] B. Khoshnevis, Automated Construction By Contour Crafting – Related Robotics and Information Technologies, *Autom. Constr.* 13 (2004) 5–19. doi:10.1016/j.autcon.2003.08.012.
- [10] E. Dini, D-shape, (n.d.). <http://d-shape.com/> (accessed March 22, 2017).
- [11] S. Lim, R.A. Buswell, T.T. Le, S.A. Austin, A.G.F. Gibb, T. Thorpe, Developments in construction-scale additive manufacturing processes, *Autom. Constr.* 21 (2012) 262–268. doi:10.1016/j.autcon.2011.06.010.
- [12] C. Gosselin, R. Duballet, P. Roux, N. Gaudillière, J. Dirrenberger, P. Morel, Large-scale 3D printing of ultra-high performance concrete – a new processing route for architects and builders, *Mater. Des.* 100 (2016) 102–109. doi:10.1016/j.matdes.2016.03.097.

