CARATS.IO

DIAMONDS TO THE PEOPLE

The First Financial Market for Diamonds

Unlocking the World's Most Exclusive Industry
Powered by Blockchain and Machine Learning Technology

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“Carats.io’s technological breakthroughs have laid the foundations for the creation of the first financial market in diamonds.”

Eli Avidar
Carats.io President
The World Jewellery Confederation Vice President
Former Managing Director of the Israel Diamond Exchange

Abstract

Carats.io is creating the first financial market for diamonds. Using their state-of-the-art algorithm, Carats.io have developed a means to standardize prices for these non-homogeneous gemstones, creating the foundation for a diamond-backed digital currency.

Carats.io applies a sophisticated algorithm that compares individual diamond grade to daily market conditions, thereby achieving the often-elusive goal of objective and consistent pricing. Carats.io's partnerships with international diamond dealers are used to amass safe, audited reserves of diamonds. These are used to issue digital credit quickly and effectively, audited resreves are quickly and effectively issued thier due in digital credit. The digitization achieves highly reliable accountability, stability, and fungibility, allowing the polished diamond industry to establish a consumer crypto currency, the CARAT Token, backed by our private, digitized reserves of diamonds.

By commoditizing the diamond market, Carats.io allows end users to redeem their tokens in the real-world diamond market without relying upon the hard-to-find expertise. Rather, they can trade with a more familiar less volatile, and entirely asset backed CARAT Token. The global ledger of the blockchain further detaches dealers and institutions from banks, affording previously impossible forms of value exchange.

CARAT is an ERC-20 standard-based Ethereum token.

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1. Introduction

For thousands of years, diamonds have held a special significance in societies around the globe. They're a symbol of beauty and strength, a metaphor for the tangible benefits of pressure, and an outward display of status and wealth.

Nonetheless, diamonds have played a complicated role as investment purchases. Multiple short-lived attempts to construct a secondary market around diamonds experienced only fleeting success. Unlike gold, silver, oil, and other established commodities, the exchange of contracts promising delivery of future diamonds poses unique challenges to its own standardization and execution, ultimately hamstringing each and every implementation attempt to date.

Historically, a secondary market for diamonds has been rife with abuse. In 1972, short-selling dealers capriciously manipulated the price of one exchange by exploiting arbitrary factors of diamond valuation. Contract fulfillment demanded an extraordinary level of fidelity, as diamonds hold extremely high value relative to their ease of loss, theft, or fraud. Moreover, contract fulfillment is further complicated by a lack of spot pricing and homogenized purchasing due to the highly individualistic nature of each diamond. Not to mention, if any monopolistic player should find a fulfillment unfavorable, that player could easily and unfairly thwart delivery of the diamonds promised in a seller's contract.

In each iteration of the secondary diamond market, we've inched closer to finding a functional path forward. Every misstep reveals a blind spot, and each obstacle presents a challenge to overcome. As desirability of diamonds continues to soar, the need for a viable secondary market is all the more evident. New diamond discoveries are projected to dwindle between 2018-2020[1], exposing an increasingly untapped investment potential.

Thus far, proposed solutions have been neither resilient nor cost-effective enough to attract investors. However, as we witness technological advancements in price discovery and transaction speed, as well as the advent of the blockchain, we find ourselves at a critical junction favoring the future of the secondary diamond market. Now is the time to proceed past the tipping point and successfully commoditize diamonds.

1a. The Current Diamond Marketplace

In today's diamond marketplace, diamonds face a long, arduous, and risky journey from diamond mines into the hands of consumers. Miners unearth diamonds from their natural habitat, then sell them to diamond dealers. Next, those stones pass from the diamond dealers to the jewelry dealers, who finally find a final home for that diamond. This long supply chain leads to multiple price markups, unnecessary risk, and financial limitations.

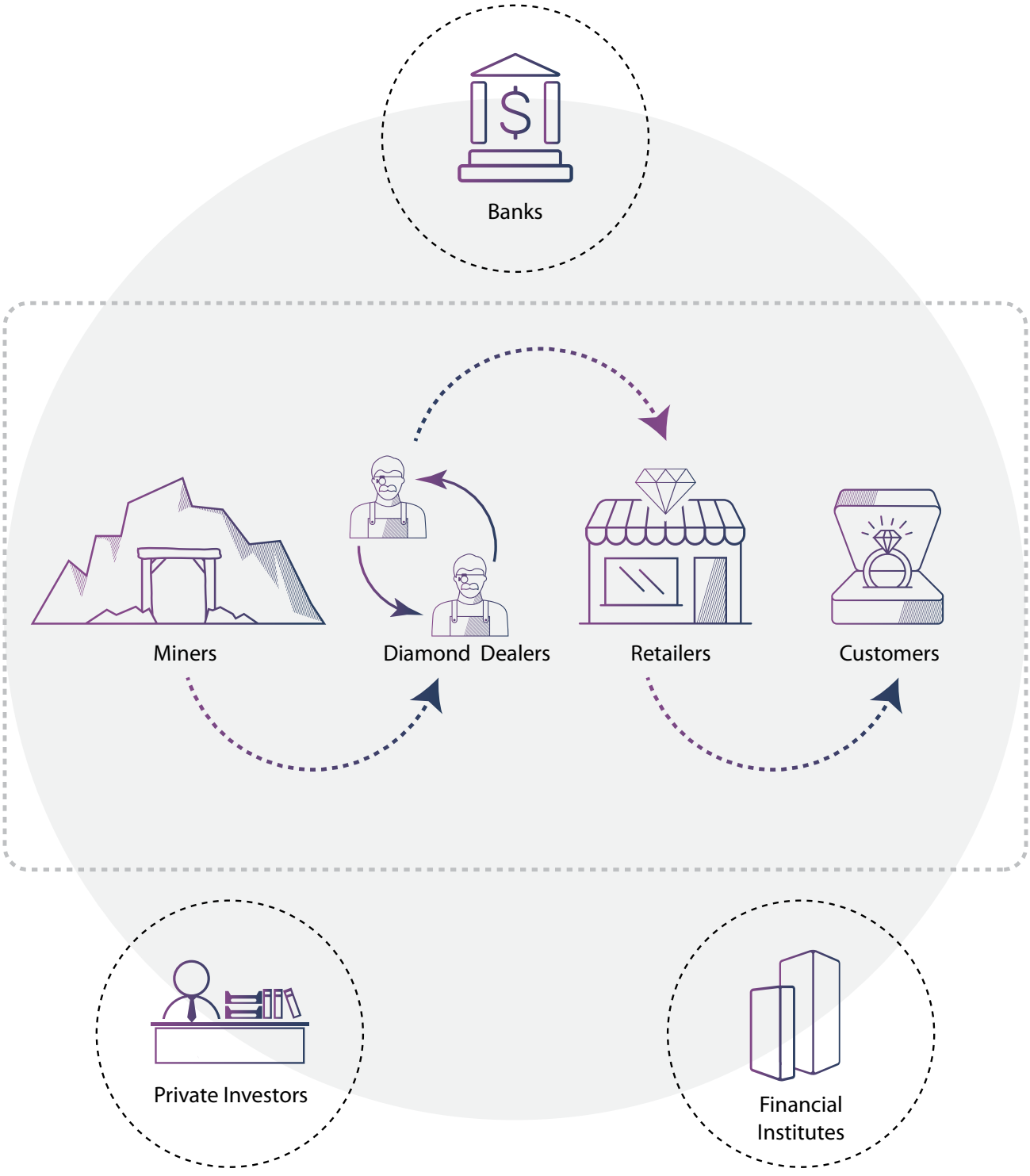
Moreover, banks do not finance diamond businesses. Due to the history of bad actors using diamonds to launder money, diamonds are considered to be high-risk assets, making it complicated for diamond dealers to acquire the funds needed to run their businesses.

[1]Diamond market fragile but dearth of new supply by 2018

To top it all off, a common USD 250,000 minimum entry fee makes it expensive to invest in the diamond industry. Those who do possess the necessary capital must buy from diamond dealers, pay for shipping, shell out for safekeeping, purchase insurance, and sell it back to a diamond dealer at below-market rates. For those without the necessary capital to spare, getting into the diamond market is simply not an option.

As it currently stands, the diamond market is overly complicated, inaccessible, and expensive.

The Ecosystem Today



2. Team

The Carats.io team is a tight-knit crew. Some of us have already worked together on successful projects, and we enjoy building companies as a group. Now, we're putting our brains together to bring the diamond industry into the 21st century with Carats.io.

As native Israelis fluent in blockchain and commerce, innovating change within the Israeli diamond industry seemed like the clear path to our next entrepreneurial endeavor.

Eli Avidar
President

Avidar, who served until recently as managing director of the Israel Diamond Exchange and the Israel Diamond Institute, is currently vice president of CIBJO, The World Jewellery Confederation. In the past he held a number of top level positions with the Israel Foreign Ministry and served in several postings abroad. He was also president of the Israel-Africa Chamber of Commerce.

Avishai Shoushan
Founder and CEO

MBA from Recanati Business School at Tel Aviv University

Avishai is the team's expert in all things management, ensuring that all aspects of the Carats.io machine are running smoothly. Before diving into the diamond industry, he oversaw the sale of two of his previous companies. ClicksMob, his most recent venture prior to Carats.io, was named among Entrepreneur Magazine's "Best Entrepreneurial Companies in America." ClicksMob was sold to online performance marketing giant, XL Media in February 2017.

Gabriel Diamant
Founder and CPO

BA in Economics and Management from The Technion, and an MBA from Tel Aviv University

Over the last 10 years, Gaby has risen through the ranks of the executive finance world, ultimately managing a division with an annual turnover of 100M NIS (nearly 30M USD). Most recently, he's leveraged his experience in profit modeling as a licensed investment consultant and mentor at Technion's startup accelerator. Gaby is the team's token-based economy expert.

Dor Eligula
Founder, Marketing &
Business Development

Masters in Corporate and Business Law from Bar-Ilan University.

During his days as a student and intern, Dor immersed himself in corporate management, finance, law, and international trade. He and his twin brother, Or, joined the startup world as eSports gamers before moving into the blockchain space.

Or Eligula
Founder, Operations

Masters in Corporate and Business Law from Bar-Ilan University.

As part of Or's studies and specialization in commercial law, he focused on the establishment of and relationships between companies, finances, the international trade. Both Or and his brother made their way into the fast-paced world of tech startups through their gaming activities.

Mor Hazan
Founder, Product Manager

Industrial and Management Engineer from The Technion

Mor began his journey into the entrepreneurial world at an early age, and by 18, he was managing a local real estate agency. Since graduating from the Technion, Israel's institute of technology, he's been hard at work at several startups in operations management.

Jose Clastornik
Technological Advisor

Engineering Degree from the Universidad de la República and Civil Engineer from The Technion

Jose is a thought leader and the Executive Director of AGESIC, Uruguay's National e-Government and Information Society Agency. Thanks to Jose's abundant knowledge and intensive efforts, Uruguay has become a regional leader in telecommunications, digital governance, and cybersecurity. Jose brings his 25+ years of experience working with government regulations in digital development.

Lior Kwintner
Legal Advisor

Tel Aviv University School of Law, LL.B. Temple University School of Law, LL.M (Master in International Business Transactions), Philadelphia, USA.

Lior has extensive international experience in corporate law and international business transactions. He spent several years practicing corporate and securities law at one of Philadelphia's leading firms. Over the years, he's made a name for himself representing high tech companies across a variety of sectors.

Moshe Torban
Software Architect

Experienced Software Architect with more than 18 years of experience and a demonstrated history of working in various industries. Vast hands-on experience with software architecture and design, different frameworks, databases, and cloud technologies.

Itamar Demri
Solidity Developer

As an experienced solutions architect with a demonstrated history and experience of working in the blockchain, software and network security industries, Itamar provides Carats a whole new dimension.

Daniel Alush
VP Business Development

Double Major B.A. in Entrepreneurship and Business Administration IDC Herzliya. Daniel is a senior advertising, technology and media executive with over 8 years of experience in sales, business development, and media buying, planning and operations. He boasts a proven track record of expanding new and scalable businesses by building innovative sales strategies, executing strategic partnerships, developing talented teams, and successfully partnering with internal cross-functional departments.

Ori Bar-lee
Business Development Manager

Ori is a business development manager with a rich background in economics, experienced in building and managing large account portfolios. In recent years Ori participated in the managing and marketing of a variety of international investments in Israel and abroad. At a young age he learned technical analysis and embarked on his path in the financial markets.

Nissim Agami
Marketing Manager

An online marketing expert with a 10-year professional track record in the diamonds field, specializing in Branding & Performance marketing. Nissim has extensive experience in digital marketing and online sales promotion of many products in the financial industry. In recent years Nissim built and managed marketing departments for a number of major financial brokers & Cryptocurrency Related projects.

Nathaniel Bodinger
Lead UX/UI Designer

Nathaniel studied Visual Communication at the Avni Institute of Art and Design and User Experience Design at NetCraft Academy. With vast experience in design ranging from print, to web, to mobile applications, Nathaniel is a one-stop shop for everything design.

Dror Markus
Content Writer

Born in the U.S., moved to Israel at age 18. Has worked in a number of digital marketing and public relations roles. Currently completing a Master's Degree in Political Science with a focus on Computational Statistical methods at the Hebrew University.

Molly Cornfield
Content Writer

Molly is our resident English-language authority. She believes that everything written should be entertaining, interesting, and easy-to-read. She handles all aspects of Carats.io's written content, from this website, to our white paper and beyond — basically, anything that requires words on a page (or in this case, screen).

3. Carats.io Diamond Pricing Algorithm (Carats.io DPA): Accurate Pricing Without an Appraisal

Supply and demand economics may seem simple, but as any seller knows, it can take a good deal of trial and error before finding the sweet spot. After a successful pilot with the Israel Diamond Exchange (ISDE), the DPA has proven itself to be one of the most accurate, data-driven, fully-automated pricing algorithms.

Our Diamond Pricing Algorithm helps alleviate any price-related anxiety, from both the seller's and buyer's sides. By tracking daily purchase prices and movement of the Diamond Financial Index, we provide a reliable, data-driven benchmark of any diamond's perfect price point, an unprecedented level of transparency that assures fairness on all ends. The Carats.io DPA for the first time, allows diamond dealers to use a sophisticated machine - learning based to accurately assess the value of their inventory.

Standardization
algorithmically discover the true market value of any diamond.

Tokenization
redeem usable tokens based on its market value.

Commoditization
use tokens to get a first time exposure to the diamond industry.

The Carats.io system incorporates the following components:
Carats.io streamlines price discovery by restricting inventory to diamonds certified by Gemological Institute of America.

Parameters of Pricing

Up until the 1920s, even those working in the jewelry industry had only a rudimentary understanding of precious stones. In 1931, to remedy this pervasive problem, the GIA was established as a nonprofit to train and certify jewelers, formulating the first set of modern standards for diamond grading. Today, the institute serves to protect both buyers and sellers of gemstones with an agreed-upon set of standards, and GIA certificates maintain their decades-old reputation as the most highly regarded qualification for diamond pricing.

Unlike grading systems devised by active gemstone suppliers, GIA certification is entirely impartial and uninfluenced by market forces.

GIA certificates evaluate the 4Cs of traditional price-list metrics (carats, clarity, color, and cut), as

[3] For a sample GIA certificate, please refer to Appendix B.

[4] For a full glossary of parameters and diamond characteristics, please refer to Appendix C

well as aspects such as girdle, fluorescence, polish, and symmetry.

The Carats.io algorithm parses all grade parameters against well-known economic measures using sophisticated tools of statistical analysis, creating the most advanced and precise pricing methodology to date.

Our 14 pricing parameters are:

Certificate
Grading certification from the Gemological Institute of America.

Carat
Weight measurement. One carat is the equivalent of 0.2 grams.

Color
Color grading. White diamonds are given high ratings for colorlessness, while colorful diamonds are rated based on intensity and purity.

Clarity
Imperfection grading. A high clarity or 'flawless' diamond won't have blemishes or inclusions that disrupt the flow of light.

Cut
Design grading. The man-made aspect of a polished diamond is graded for its proportions and design finish.

Symmetry
Symmetry measurement. A grading subsection of a diamond's cut, which refers to the alignment of its facets to one another and to its girdle.

Shape
Diamonds have both traditional and innovative styles, and the value of a diamond is influenced by its relation to conventional shapes.

Polish
Polish grading. When cut, diamonds are polished smooth, to varying levels of quality. Over time, this smoothness can be further diminished by wear and transport.

Fluorescence
Ultraviolet glow. Certain high-quality diamonds may emit a soft glow under black light. This unique aspect can influence a diamond's value.

Girdle
The outer edge of a diamond. The girdle can range from thin to thick, and the valuation effect of a girdle's thickness exists in relation to the diamond's overall shape.

Culet
A small facet on the bottom of the diamond that protects the stone from chipping. Modern diamonds tend towards smaller culets or having no culets at all.

Depth
Refers to the height of a diamond, along with the ratio of height to diameter. Certain shapes differ in their desirable depth ratios.

Table
Refers to the width of the top area of a diamond, along with a ratio of the top area to the total diameter. Certain shapes differ in their desirable table ratios.

Country
The diamond's country of origin. Regional rarity and history can affect diamond pricing.

Hedonic Regression

Hedonic regression breaks down a given good or service according to its individual components and allows us to assign value to each disparate part and provide a well-rounded assessment of the actual market price of that good or service. By definition, the word “hedonic” refers to pleasure; with hedonic regression, economists estimate the perceived pleasure derived from any one aspect of that good or service.

Particularly because diamonds are a popular consumer jewelry, the hedonic pricing method is well-suited to successfully assess their aesthetic value. Diamonds are priced according to numerous value-affecting qualities, and the aggregate value of a stone is set based on each individual quality, as well as the relationality of those qualities. For instance, certain shapes are more desirable in certain colors.

With Carats.io, each of these various characteristics is traceable with data readily supplied by our strategic partners. We begin by analyzing data on more than 250,000 unique GIA certified diamonds, then continuously monitor the daily breadth of market transactions, i.e. what diamonds with what grade parameters sell for what amount. We then use regression analysis to determine not only how these relational diamond qualities affect price, but furthermore, to assess the positive or negative effects on price by pair dynamics of grouped characteristics. We use this sophisticated system to understand the relationship between diamond qualities — for example, when a price-boosting characteristic shows no positive pricing effects when co-present with another particular parameter. In this respect, Carats.io demystifies relationships between grade and demand, a complicated correlation currently only understood by experienced appraisers or market analysts. By formulaically unraveling these knotty connections, our algorithm can uncover new and emerging correlations between diamond qualities.

While initial Carats.io training data consistently outputs accurate pricing, our system is built for improvement. Our machine learning algorithm updates itself as it gathers new data, allowing it to produce increasingly accurate price outputs.

The Carats.io Diamond Pricing Algorithm is among the most advanced pricing algorithms currently on the market. It has been assessed by industry experts and approved by a special examination committee.

Modeling Parameters for Regression

Despite its name, achieving linear pricing isn’t exactly straightforward. In fact, it takes a decent amount of mathematical adjustment to properly price the precious stones.

The Carats.io Diamond Pricing Algorithm uses a Taylor series to transform the complex regressions described above into a linear pricing structure. This way, we’re able to define these complicated, nonlinear relationships between diamond qualities with an easier-to-understand polynomial-based price.

4. The Diamond Financial Index (DFX): Measure the Value of Diamonds

The Diamond Financial Index (DFX) is the index to help investors, diamond dealers, or end users gauge the health of the overall diamond market. Like a stock index, each diamond index outputs one number to reflect the performance of the diamond market at large.

It's built on the solid foundation of more than 250,000 stones. To construct the index, we look at the total value of these stones based on the Carats.io DPA Algorithm, then standardize that number to obtain a value of 10,000. As the price of those stones fluctuate, the index follows. For instance, if the value of all measured diamonds rises by 10 percent, our index will move upward to 11,000. Every six months, we recalibrate the system, once again standardizing it to keep our index in equilibrium. To ensure continuity across recalibration segments, we standardize according to the most recent index value.

$$Diamond\ index\ T0 = :10000 = \sum_{1}^{n} (Dn0)*const$$

$$Diamond\ index\ Tt\ = \sum_{1}^{n} Dnt*const$$

Carats.io uses five different indices, which cumulatively cover the entire diamond market.

Index Ticker	Index Name	Initial Value
DFX	General Index	10,000
DFX-I	Diamonds for Investment	2,000
DFX-J	Diamonds for Jewelry	3,000
DFX-D	Diamonds Smaller Than One Carat	6,000
DFX 1+	Diamonds Larger Than One Carat	4,000

CARAT Public Token: Rock Solid Token

The relationships between the various components of Carats.io provide a uniquely transparent, informative, and empowering environment for token holders. The Diamond Financial Index allows users to conceptualize the performance of the diamond industry. Additionally, it informs the Carats.io DPA Algorithm, which allows for greater pricing transparency, fostering trust throughout Carats.io. Indexing certified diamonds from authorized diamond dealers means that after years of repetitive failures, diamonds can finally be commoditized.

5. Stability

One common criticism of the cryptocurrency market is its wild volatility. Coin prices rapidly fluctuate, sometimes hitting both their highest highs and lowest lows within a 24-hour period.

In recent months, the crypto market has been especially roller coaster-like: in December 2017, Bitcoin steadily climbed to an all-time high of nearly $20,000 USD per coin before freefalling to $6,000 USD. It experienced months-worth of peaks and valleys before dipping to its three-month low in February 2018.

Likewise, Ethereum hit a high of over $1,400 USD per coin in early January. Less than one month later, it lost more than 50 percent of its value, falling to below $700 USD per coin.

These major coins are not the exception to the rule. Rather, they abide by the laws of the crypto universe: extreme volatility and frustrating unpredictability. Between January 6, 2018 and February 5, 2018, the cryptocurrency market dropped by more than $460 B USD, a loss of more than 60 percent of its total value.

Volatility isn't just an abstract concept. We can measure it by looking at a currency's standard deviation, or the amount that any one data point varies from the mean. In the stock market, we use the standard deviation to measure risk, with a wider range indicating greater risk. For instance, a typical currency yields a standard deviation well below 1 percent. The standard deviation of the bitcoin, on the other hand, sits at 2.76 percent — nearly six times higher than that of the EUR — showing that BTC is much more volatile, and therefore a much riskier, investment.

Risk is an integral aspect of cryptocurrency and an essential piece of the conversation surrounding digital currency. Measuring that risk is an important consideration when investing in cryptocurrency, and understanding the ebbs and flows in the market can help manage investments.

Thus, the volatility of cryptocurrency introduces significant risk into the cryptomarket. A single second can cost token holders hundreds of thousands of dollars, as the prices experience sharp and unforeseeable change. It causes anxiety for those who invest in crypto, leaving them in a constant state of worry about their financial holdings.

On the opposite end of the volatility spectrum lies the diamond. Diamonds have been considered valuable for thousands of years, from their early history as important religious items in ancient India, to their emerging significance in the jewelry market in 18th century France, to today. If there's one thing we can count on, it's that diamonds won't go out of fashion, and hence, value holds steady.

However wonderful their stable attributes, diamonds are nonetheless difficult to trade and transport, making them a tricky asset to take advantage of.

At Carats.io, we're combining the stability of the diamond market with the liquidity of the cryptocurrency market. Our CARAT Token is linked to our reserves by the Carats.io Diamond Pricing Algorithm. Our proprietary formula uses our reserve of actual diamonds and their cash equivalents to calculate the Theoretical Value of the CARAT Token, linking the entire Carats.io economy to a stable, physical asset.

$$Theoretical\ Value\ =\ (Value\ of\ reserves/Reserve\ ratio)/Total\ tokens\ in\ circulation$$

Additionally, our formula accounts for both the issuance and redemption of CARAT Token scenarios, protecting the token from sudden price shifts. Each and every day, we take the prices of tens of thousands of diamonds and input them into our system, eliminating the residual errors built into most pricing systems.

For instance, when there is a particularly high demand for tokens, the price may rise in turn. However, in the case of Carat Token buyers will have the option to buy tokens directly from Carats.io according to the Theoretical Value.

When tokens are in low demand, they may be sold for a low price. However, this scenario provides an incentive for users to redeem their tokens according to the Theoretical Value.

These will provide the crypto world a whole new dimension of stability, a safe haven in times of high uncertainty, which is backed by the diamond industry. Thus, adding the dimension of governance to the ungoverned market. To efficiently increase the control and manage the risks involved with being part of the crypto world.

6. Barriers to a Secondary Market

Thus far, the secondary market for diamonds has been a story of failed attempt after failed attempt. But failure does not imply impossibility. In fact, it's just the opposite. While we, as human beings, tend to be discouraged by our mistakes, it's important to realize that each failed attempt reveals a new hole in the system, presenting us with an opportunity to close that gap and do better next time.

In our analysis of past failures and current shortcomings in the secondary diamond market, we've identified two key points of resistance — apart from regulatory and corporate caprice — that consistently and categorically dampen attempts to successfully establish this market.

Diamonds are difficult to commoditize. While metals like gold and silver retain value regardless of size or shape, the nearly infinite variability of diamonds means their worth doesn't correlate with their weight. Rather, the price of each stone must be assessed on a diamond-to-diamond basis.

Diamonds resist standardized pricing. By and large, attempts to establish universal price lists for diamonds have been unsuccessful. Traditional models grade diamonds based on the 4Cs — Carats, Clarity, Color, and Cut — establishing a baseline for objectivity and efficiency. However, expert graders consider a number of other distinguishing features that will typically bump up the price of each stone.

7. The Carats.io Solution

How then, would one bypass these barriers, and what would it take to implement a functional secondary diamond market? At Carats.io, we believe that the ideal secondary diamond market should offer functionality and appeal on par with, or better than, the traditional commodities like oil and gold.

Thus, we've designed Carats.io around these goals. We've carefully studied each past barrier to success, and we've broken down said barriers to successfully standardize diamond trading.

7a. Commoditization

Ultimately, using our state of the art technology coupled with our diamonds indices we strive to help the diamond world to achieve full commoditization of the diamond market.

With Carats.io, diamond prices at our Carats.io vault will be linked to the diamond market using our **Diamond Pricing Algorith (DPA)**, using the same technology running the **Diamond Financial Index (DFX),** our proprietary index measuring the performance of the diamond market.

This establishes Carats.io as a capable provider of indices, which together, cover the entire diamond market by:

1. Allowing **suppliers** to get an educated decision when purchasing diamonds; and
2. Allowing **buyers** to redeem their tokens for fairly-priced diamonds.

We believe that by doing so, we would be able to achieve this high-liquidity, feature-rich system.

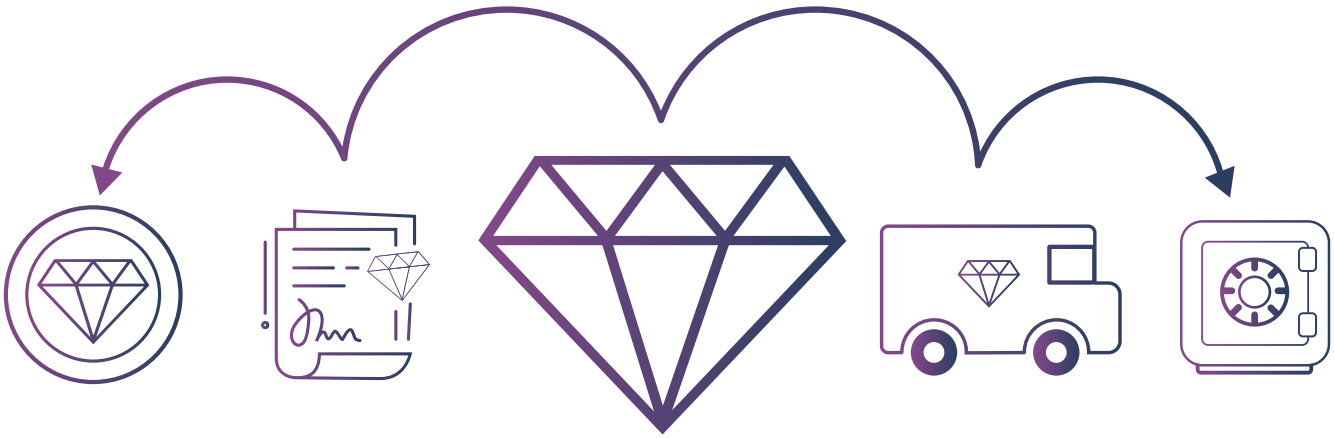
7b. Tokenization

Historically, diamond exchanges have posed a challenge in terms of fulfillment logistics. We've developed a way to circumvent these complications by trading digital tokens that represent a significant range of the polished diamond industry, rather than trading the stones themselves.

By applying blockchain technology based on the revolutionary DPA and the DFX, Carats.io, creates a state-of-the-art system to tokenize the diamond industry.

Tokenizing diamonds allows us to sidestep the inherent individuality of each diamond, thus breaking down the homogeneity barrier. It acts as a type of 'second-stage processing,' converting the value assigned to a physical diamonds into a generic, divisible, diamonds-backed token. Not only are these digital tokens be effortlessly transferred upon contract fulfillment, but they also eliminate the traditional geographic or temporal limitations of diamond industry.

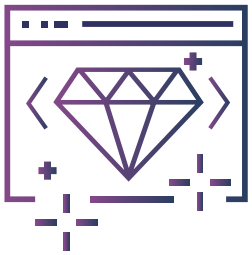
While tokens create fungibility by allowing for easy and exact contract fulfillment, they do not inherently standardize the diamond market. All-out standardization requires a diamonds-to-token conversion system. Users of this prospective token must be confident that (1) they are exchanging their diamonds for token amounts of equal value, based on our DPA; (2) all stones are set against the same standard, and (3) said standard requires little to no subjectivity.



7c. Standardization

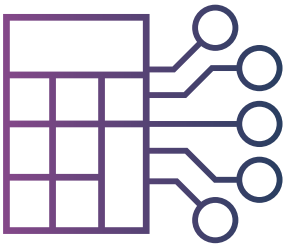
Carats.io aims to solve this tricky question of standardization with the most advanced, and automated pricing method available in the market. Our innovative, self-learning DPA assesses 14 unique parameters, comparing all meritorious aspects of a diamond's grading against current market conditions to output a fair and objective price value.

While cryptocurrency, a rather recent innovation, is a foreign concept to many diamantaires, standardization of stones has long been an elusive goal for the industry. In the absence of a standard metric for value, jewelry traders have found themselves struggling to verify the validity of any given gem; the Carats.io algorithm incorporates continuous and constant validation. We leverage our strategic alliance with market leaders to directly access their daily rates, ensuring that the output value of each grade-based token precisely correlates to a verifiably accurate price of the diamond input.



Diamond dealer uploads diamonds to Carats.io's calculator

The algorithm scans 14 parameters based on the entire database



Calculating value based on each parameter

Calculating recommended price

Since traditional pricing methods grade stones according to only four parameters (the 4Cs — Carats, Clarity, Color, and Cut), they output a mere 50,000 possible permutations. Carats.io, on the other hand, incorporates 14 different metrics of evaluation, yielding over **1 trillion unique price points.**

8. The Carats.io Markets

By allowing for the commoditization of diamonds, we're transforming the diamond trade and opening doors that were previously padlocked. No longer will diamonds hold their unenvied status as an uncommodizible good.

We use our proprietary Carats.io Diamond Pricing Algorithm (Carats.io DPA) to price all diamonds, then digitally homogenize each stone — forming a strong base for commoditization.

How does Carats.io change the diamond trade?

On the supply side:

Buyers need not depend on their gut feeling and intuition when making a purchase, and must no longer rely on contradicting, confusing, and/or biased supplier pricing. Rather, they'll have access to Carats.io Diamond Financial Indices which accounts for all variables affecting value assessment.

Suppliers typically combine personal experience and market comparison to triangulate their own diamond sale prices. We're swapping these imprecise and outdated methods for a reliable, algorithmic index price estimator.

Banks using diamonds as collateral can steer clear of the arbitrary price ranges that follow reliance on gemologists and the 4Cs. Carats.io's automated pricing reduces man-hours spent communicated with biased appraisers.

On the demand side:

Buyers can use CARAT Tokens to store diamond-backed value

Suppliers can use Diamond Financial Indices to better decide how to make their purchases.

The new secondary market opens up the diamond industry to **users with low capital.** Where previously, involvement in the industry was restricted to those with enough expendable funds to buy expensive, physical diamonds, Carats.io allows users to allocate small amounts in the diamond market without purchasing stones.

With daily adjusted pricing, **users requiring liquidity** can treat diamonds as a commodity parallel to CARAT Tokens. This way, their assets experience unlimited liquidity.

9. The Diamond as a Token: Standardizing All Stones

To solve the homogeneity barrier, we digitally melt down diamonds in our blockchain furnace, then reconstitute them as tokens.

The blockchain forms the foundation of our diamond exchange. The records, known as blocks, build upon each other in an ever-expanding list, or chain (hence, the blockchain). These blocks are distributed among all users, establishing an efficient, trustless system that is largely invulnerable to attack. Blocks contain encrypted records of all accounts and transactions — as with other cryptocurrencies, public users remain entirely encrypted.

9a. Blockchain Infrastructure

There's a reason that banks and governments have traditionally been the arbiters of currency. Up until this point in history, technology wouldn't permit a widespread system of commerce without a governing third-party. Unsupervised marketplaces were limited, and success required (1) a small group of traders (2) who were personally connected to some degree (3) engaging only in low-value transactions. In other words, it had to be high trust and low stakes.

Most of us are so accustomed to third-party currency systems that we overlook, and even forget, its many drawbacks. It requires immense and constant data collection, requires fees to sustain operating costs, and is bogged down by bureaucracy.

A **trustless** system, on the other hand, sustains reliable and desired outputs without the requirement of trust. By using blockchain technology, we've established a trustless, scalable system that allows us to transform slow-moving retail broker arrangements into a globally-accessible diamond exchange.

The blockchain's distributed ledger authenticates, logs, and secures all transactions within Carats.io. That means that Carats.io, as an administrative body, does not oversee or validate transactions within the token-based economy. This way, we're able to preserve both the security and confidentiality — the two pillars of the diamond trade — of all Carats.io users. Every transaction is associated with a pair of encryption keys: the initiating user's private authentication key and the transaction's public key.

As humans, we tend to love what we know and fear what we don't — causing many to worry that old-school diamond vendors may not take to the latest technology. However, blockchain implementation is largely invisible, providing protection on the backend that benefits users without burdening them with the trouble of learning new software. The more obvious innovation will be Carats.io token itself.

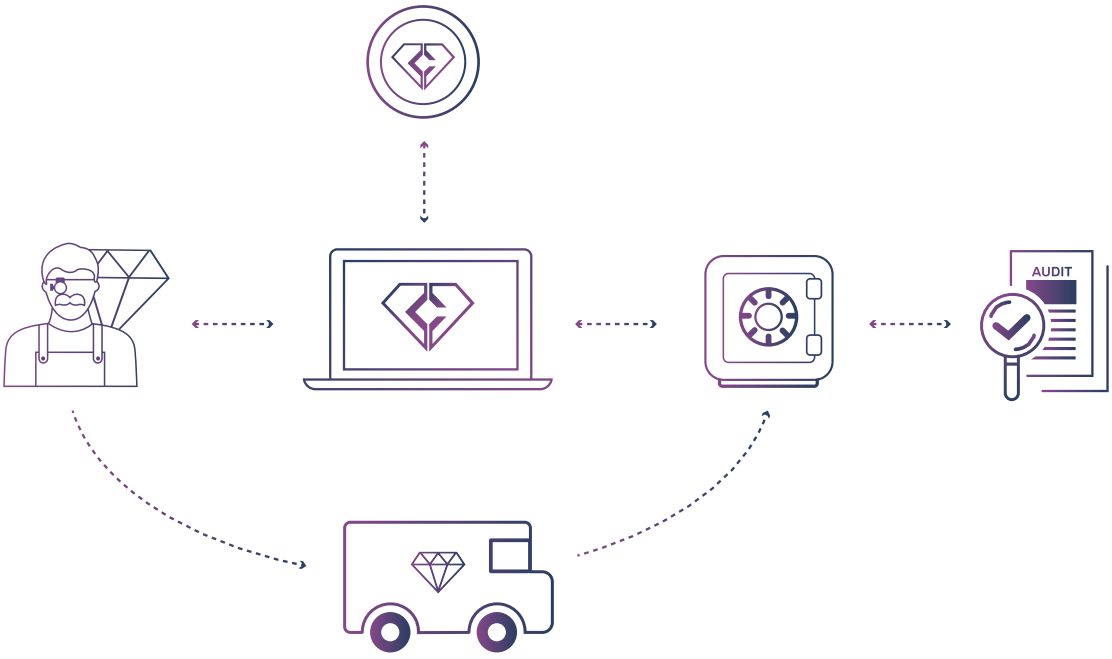
9b. Changeover and Token Creation

In the case of Bitcoin, new coins are created by computerized mining. This process uses excessive amounts of energy from millions of computers, rewarding successful miners for their efforts and energy with Bitcoins themselves. By incentivizing users to devote their CPU power to mining Bitcoins, Bitcoin increases their supply by engaging the community without ever asking them to reveal their identities.

Our tokens, on the other hand, represent real diamonds, and our system depends on transparency, accountability, and proper vetting procedures.

Much like the U.S. dollar was once backed by a supply of gold stored in Fort Knox, CARAT Tokens are secured by real diamonds stored in audited safes. A 'Big Four' accounting firm will be auditing the deposit system. To track our stones, each and every diamond on Carats.io will have the standard of GIA certification. Additionally, as a company that is dedicated to social responsibility, Carats.io ensures that all of their diamonds are conflict-free.

In order to maintain full and complete transparency, we'll share the results of the periodic audits on our website.



9c. Using the Token

Smart contracts are computer protocols that smooth out and simplify the transaction process. Smart contracts use technology to automatically take care of all the details associated with a paper contract, cutting out the middleman and improving the contract's enforcement.

This computer code is built into the blockchain transaction system and executed by the entire network of participants.

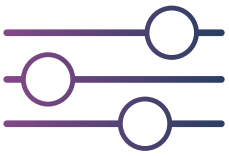
While the Carats.io system governs ownership and value transfer, any physical delivery of retail product will be handled by the respective diamond dealer. Just as only dealers can deposit diamonds into the safe.

10. The Carats.io Environment

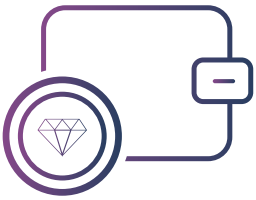
Before we dive into the details of the Carats.io environment, let's take look at a broader overview of all how it works.

Each and every diamond in the Carats.io economy is tracked. All of a diamonds defining characteristics are encoded in a permanent blockchain record. Those defining characteristics include, but are not limited to:

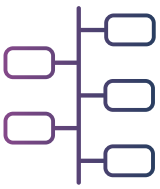
GIA certification #



GIA parameters



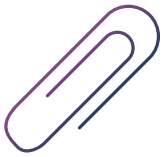
Ownership
(Public dealer or private pseudonymous wallet)



History of ownership
(Showing authenticity and ethical supply chain)

Algorithmic valuation

Sell price (if put out for bid from current owner)



Any attached derivatives

Blockchain transactions allow for unprecedented payment flexibility. They're unrestricted by borders, fiat control, or long settlement processes.

It's easy to obtain CARAT Tokens. They can be purchased by all major fiat currencies from within the Carats.io platform.

We've designed the CARAT Token to be as practical as possible. Thus, the function of the CARAT Token extends far beyond the simple purchase and sale of diamonds: both diamond dealers and end users can use CARAT Tokens for the safekeeping and transportation of their diamonds. CARAT Tokens are a key feature in the cryptocurrency world as they allow high liquidity and low volatility.

10a. Redeeming the CARAT Tokens

CARAT Tokens can be redeemed. Each day, Carats.io calculates the value of the diamond reserves and cash equivalents, then uses that value to issue tokens accordingly. A token holder has the option to redeem 100 percent of the amount he holds according to Carats.io's terms of use.

Carats.io maintains its diamond reserve as shown in accordance with the following table:

CARAT Token Supply	Diamond Reserve Ratio
Up to 50M	100%
50M - 500M	80%-51% Reserve ratio = $0.84e^{(MC/109)}$
500M - 10B	51%-20% Reserve ratio = $0.495e^{(8.1*MC)/1010}$
10B and above	20%

(Value of reserves/reserves ratio)/total tokens in circulation = Redemption value

At all times, this reserve is used to assure that CARAT Token holders are able to redeem their tokens. A token holder can exchange a minimum of $50,000 USD worth of CARAT Tokens per transaction and a maximum of $500,000 USD worth of CARAT Tokens per month for diamonds and cash equivalents. With a maximum of 1 transaction a day.

Redeeming tokens

To redeem those tokens, the token holder must adhere to Carats.io's compliance process. Then, Carats.io will exchange the CARAT Token for its equal value of diamonds and cash equivalents.

All diamonds in Carats.io Vault are certified GIA (Gemological Institute of America) diamonds. Those diamonds are the most tradable diamonds.

A token holder has the option to redeem up to 100% percent of the amount of the Tokens held according to Carats.io's terms of use.

11. Tokenomics

The CARAT Token allows us to breath a whole new life into the diamond industry. By applying blockchain's distributed ledger technology to the diamond industry, we're combining the reliability of a highly traditional space with the latest 21st-century innovations to get the best of both.

While the diamond industry provides a solid foundation with practices already in place, it opens up a new menu of possibilities for token holders.

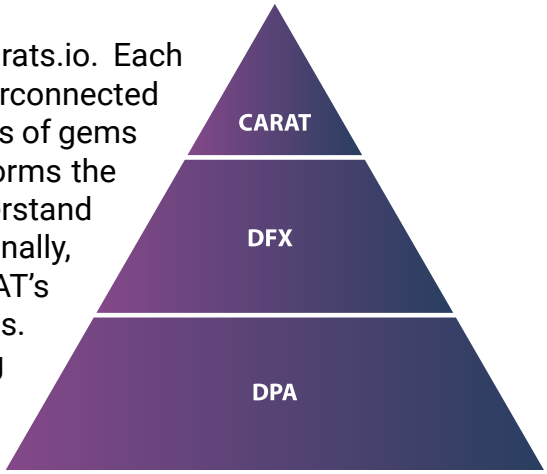
Carats.io Diamond Pricing Algorithm (Carats.io DPA) – Our proprietary algorithm that takes into account (1) daily purchase prices and (2) the Diamond Index to help sellers find their perfect price point.

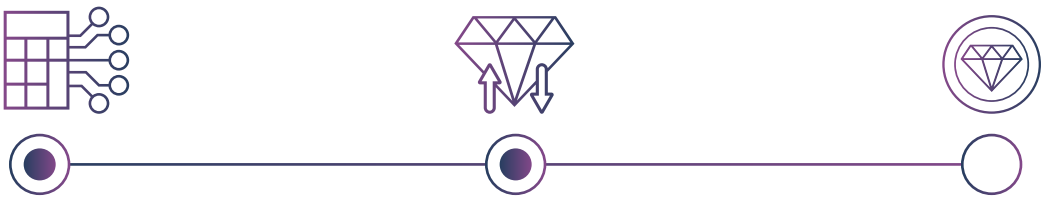
Diamond Financial Index (DFX) – A single numerical value that helps dealers assess price changes in the diamond market.

The CARAT Public Token – The publicly available token. The CARAT Token makes Carats.io's secondary marketplace for diamonds function.

Carats.io Environment – The overall environment where diamond dealers and users can use the most advanced technology to interact, transact, and trade. The Carats.io system allows for the exchange CARAT Tokens.

These four key components form the machine that is Carats.io. Each component touches the other, moving together like an interconnected set of gears. The Carats.io DPA is derived from the sale prices of gems in our system. The extensive data from the Carats.io DPA forms the backbone of the Diamond Index, providing an easy-to-understand evaluation of the current state of the diamond industry. Additionally, Carats.io purchases diamonds as a percentage of the CARAT's fair market value in the form of diamonds and cash reserves. Additionally Carats.io uses the DPA's pricing when purchacing new diamonds to maintin our reserve ratio





DPA Algorithm
Deployed - December 2017

Financial Diamond Index
Deployed - Febuary 2018

Tokens
Coming Soon

11a. TGE

The Token Generation Event for the CARAT Token will be open for exactly one month.

We'll allocate 100% of TGE proceeds towards purchasing diamonds to fill our reserves.

After that and in order to maintain the operation, the spread of the fractional reserves will be allocated towards substaining the Carats.io eco-system.

11b. Ongoing Sale

As users buy and sell with Carats.io, it's important that we maintain the economic equilibrium at all times.

We start with our "diamond" rule of the Carats.io ecosystem — the total market value of the CARAT Token will be determined by the diamond reserve equation. This means that each token's value is covered by real, physical diamonds and cash equivalents.

Since token holders can purchase the CARAT tokens without an initial diamond deposit, coverage will inevitably dip beneath coverage ratio as the diamonds-to-tokens coverage ratio is a core element of the Carats.io guarantee, we utilize regulatory mechanisms to insure that the ratio will always be returned.

Carats.io will continuously issue CARAT Tokens to users who have gone through our compliance process. The value of those tokens will correlate to the Vault's Carats.io DPA price. For each new token created, a coverage ratio must be maintained according to the diamond and cash equivalents reserves.

Baseline:

In all of our hypothetical scenarios, we're starting with the same baseline. In this situation, we've chosen to deal with nice, round numbers: an initial vault Carats.io DPA price of 10,000 and 4 million tokens issued at a price of $1 USD. That brings us to a market cap of $4 million USD which will be paralleled by our reserves ratio which must also equal 100% of the USD 4 million value of diamonds.

Vault initial Carats.io DPA price and cash	CARAT Tokens Issued	Token Price	Market Cap	Carats.io Reserves
10,000	4M	1USD	4M USD	4M USD of diamonds and cash equivalents

Scenario 1: Vault Carats.io DPA Price Growth

When the value of the Vault Carats.io DPA price and cash rises by 10 percent, it means that the value of diamonds and diamonds is rising by 10 percent. That means that our overall diamond coverage increases accordingly.

Vault initial Carats.io DPA price and cash	CARAT Tokens Issued	Token Price	Market Cap	Carats.io Reserves
↑ 11,000	4M	1.1USD	4.4M USD	4.4M USD of diamonds and cash equivalents

Carats.io DPA price increases → Diamond reserve coverage increases → Room for token price to increase

Scenario 2: Vault Carats.io DPA Price Drop

When the Carats.io DPA price drops, so does the price of diamonds, and thus, so does the value of our reserves. That means that in order to maintain a 100 percent diamond and cash coverage, Carats.io's value of reserves rises accordingly.

Vault initial Carats.io DPA price and cash	CARAT Tokens Issued	Token Price	Market Cap	Carats.io Reserves
↓ 9,000	4M	0.9USD	3.6M USD	3.6M USD of diamonds and cash equivalents

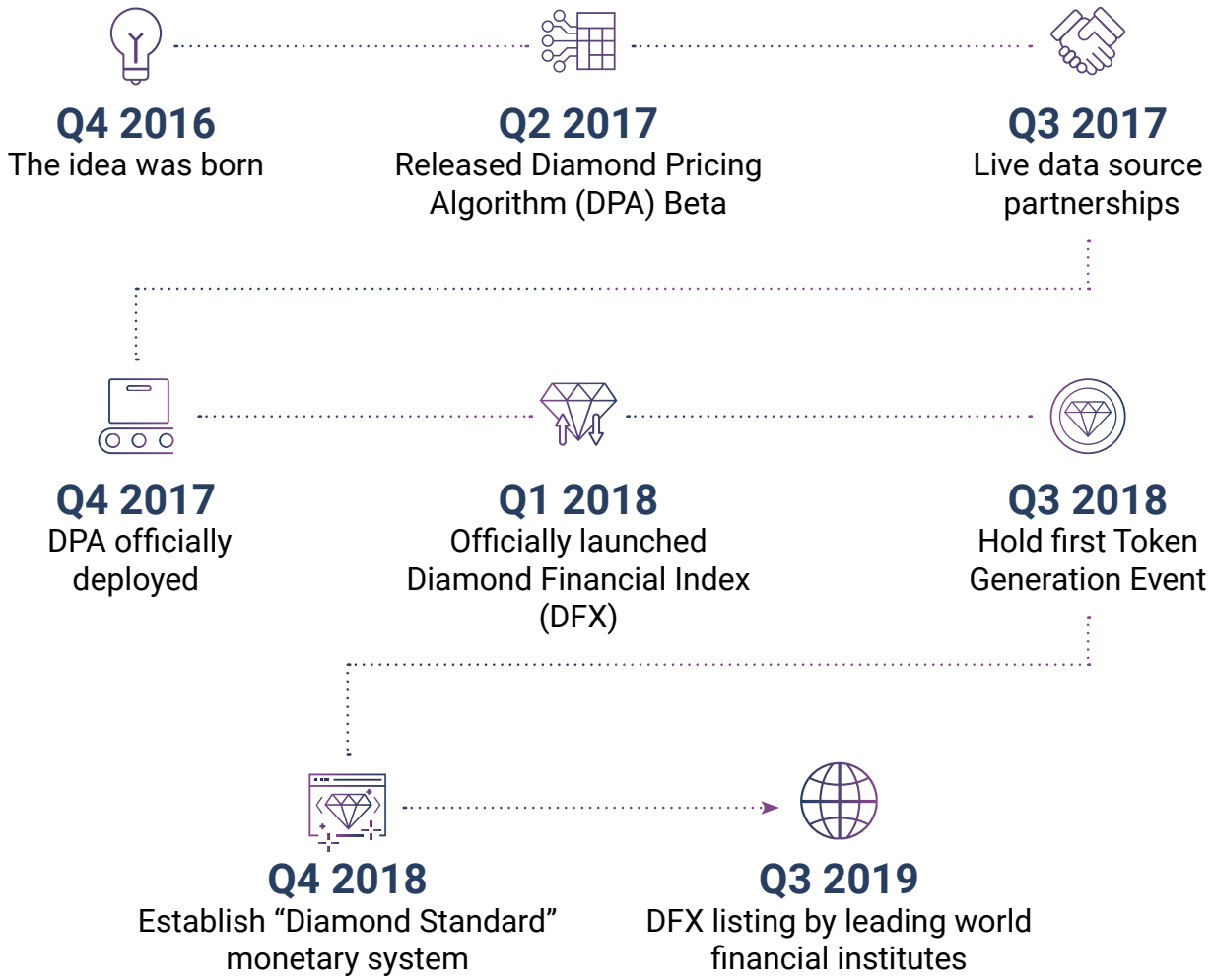
Carats.io DPA price decreases → Diamond reserve coverage decreases → Diamond reserves no longer cover 100 percent → price decrease

12. Summary and Timeline

At this point, the Carats.io infrastructure is well outlined. Here's a summary:

- First, Carats.io acquired the Israel Diamond Exchange's database for the preliminary training of the DFX algorithm, giving the first iteration of its diamond pricing list.
- Next, Carats.io will build on the original training set, by applying the algorithm to the more extensive, international diamond database. This will produce the final pricing index.
- Diamonds will then be purchased and deposited into the Carats.io reserves, at the algorithmically assigned market value.
- The Carats.io index/indices, based around the Vault Carats.io DPA price and cash equivalents, represents in totality Carats.io's share of base assets within the market.

Nobody said commoditizing diamonds would be easy. In fact, history has proven just the opposite, time and time again. However, these historical lessons combined with our partnership in the diamonds industry, the support of thousands of diamond dealers, and the ingenuity of the blockchain puts Carats.io on the shoulders of giants.



13. Conclusion and Considerations

It's difficult to express the emotional rollercoaster of opening a new market. Particularly painstaking was the validation process of the pricing algorithm: we went through tense deliberations, and our excitement was tempered by the caution that came from months of meetings, email chains, and test runs. Nonetheless, both the Carats.io team and our partners understood that our token heralds a new era for diamond commoditization. Though we were obviously eager to release our project, we buckled down to ensure that we got everything right.

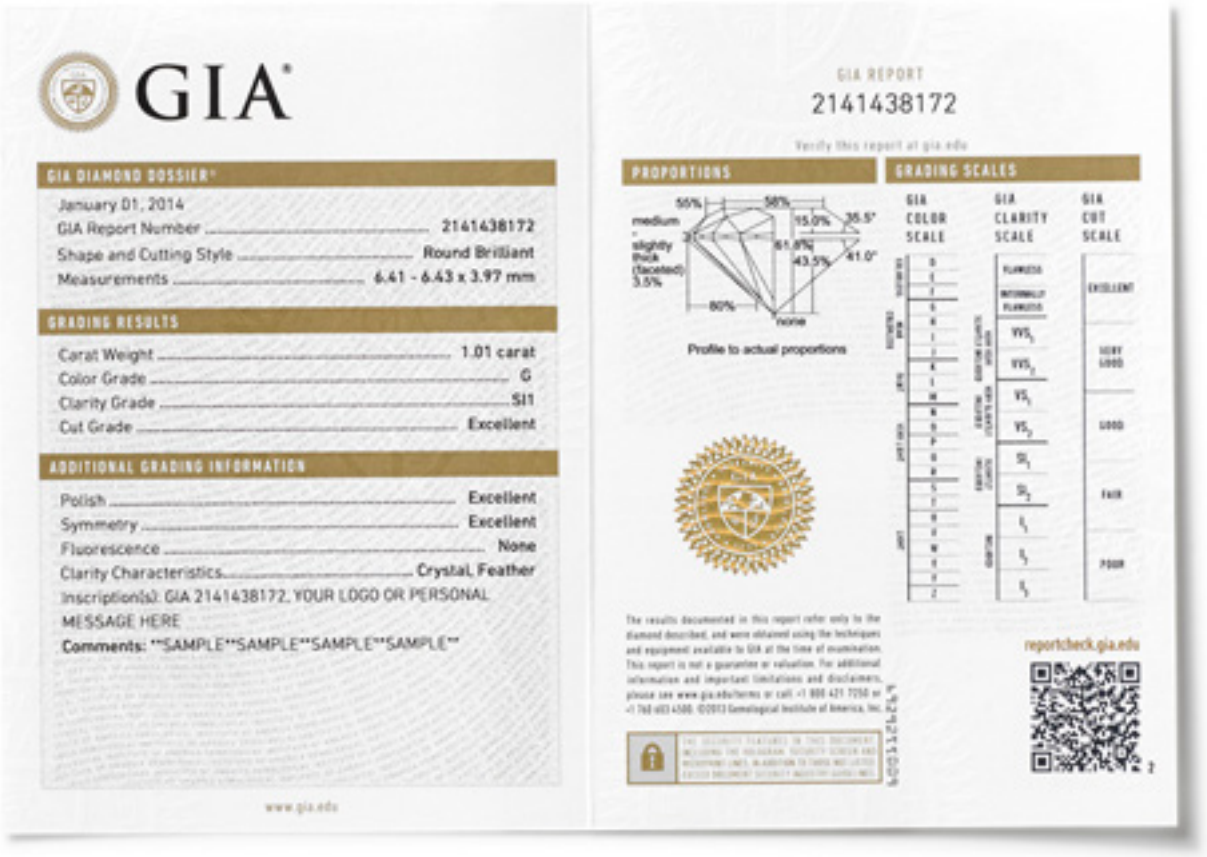
Our uniform, nonlinear pricing model was a prerequisite to transforming diamonds into a homogenized, tradable commodity. So, we started with homogenizing our pricing by implementing complete objectivity and consistency of automation. Only after that could we homogenize the actual, material diamonds.

Where, in the past, such a market was merely the stuff of fantasies, blockchain is allowing us to turn those fantasies into a tangible solution.

By cutting out the diamond industry's many middlemen, prices are more dynamic, storage is safer, communication is quicker, transactions are faster and costs are fewer at every stage of the process. Plus, Carats.io purchases, stores, insures, and audits the physical commodity for the end-user, then automatically reprices it daily.

At its core, Carats.io is a launchpad for two markets. The first, a renovated primary market, runs smooth and efficiently thanks to smart contracts that foster the exchange of value, documentation, and ownership. The second, a finally viable secondary market, reimagines old, inefficient systems as a next-generation global trading environment where a diamond's value can be remotely traded while the diamond itself safely awaits in a secure deposit box.

Appendix A - Sample GIA Certificate



GIA

GIA DIAMOND DOSSIER®

January 01, 2014
GIA Report Number 2141438172
Shape and Cutting Style ..... Round Brilliant
Measurements ..... 6.41 - 6.43 x 3.97 mm

GRADING RESULTS

Carat Weight ..... 1.01 carat
Color Grade ..... G
Clarity Grade SI1
Cut Grade ..... Excellent

ADDITIONAL GRADING INFORMATION

Polish ..... Excellent
Symmetry ..... Excellent
Fluorescence ..... None
Clarity Characteristics ..... Crystal, Feather
Inscription(s): GIA 2141438172, YOUR LOGO OR PERSONAL MESSAGE HERE
Comments: **SAMPLE**SAMPLE**SAMPLE**SAMPLE**

www.gia.edu

GIA REPORT
2141438172

Verify this report at gia.edu

PROPORTIONS

55%
58%
medium - slightly thick (faceted) 3.5%
15.0%
35.5°
61.8%
43.5%
41.0°
80%
none

Profile to actual proportions

GRADING SCALES

GIA COLOR SCALE
GIA CLARITY SCALE
GIA CUT SCALE
EXCELLENT
VERY GOOD
GOOD
FAIR
POOR

reportcheck.gia.edu