White Paper

IIMA-AuraArt Indian Art Index (IAIAI)

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Abstract

This white paper describes the nature, uses, method, limitations, and potential future works related to the IIMA-AuraArt Indian Art Index (IAIAI) launched in 2022. After several rounds of discussion, Aura Art Development Pvt Ltd (Aura Art), a Mumbai-based Art Infrastructure Solutions provider signed a memorandum of understanding (MoU) with the Indian Institute of Management Ahmedabad (IIMA) on 2 December 2021. The MoU laid out the blueprint for a collaborative research project on pricing of Indian Art auctioned by various houses across the world. Aura Art agreed to share new art auctions data with IIMA on a regular frequency. IIMA agreed to explore the idea of developing an Art Price Index for India, based on the Aura Art data.

The first batch of data included auction results of nearly 9,000 artworks by Indian artists, auctioned across 11 houses around the world, over a more than 20-year period, from April 1, 2001 to June 30, 2022. For a meaningful index, we selected data from top Indian 25 artists, in terms of number of works auctioned. These artists offered a critical mass of artworks adequate to be included in the index formation. IAIAI is based on hedonic pricing model and could be treated as a Constant-Quality Art Price Index.

Background

The international art market is at least 250 years old, if one were to take the formation of Sotheby's (1744) and Christie's (1766) as relevant starting points. The Louvre Museum in Paris opened with a modest corpus of 500-odd paintings in 1793 (Berger, 1999), although the erstwhile fortress had a collection of paintings as early as 1673.

However, until the late twentieth century, economists looked at art prices with scepticism: "Their prices can float more or less aimlessly and their unpredictable oscillations are apt to be exacerbated by the activities of those who treat such art objects as 'investments'…" (Baumol, 1986). Such a view may still pervade public perception about art prices. Yet, researchers started debating the need and merits of developing art price indices soon after (e.g. Chanel). By early twenty-first century, there was adequate data to develop art price indices following the seminal work by Mei & Moses (2002). Hodgson and Vorkink (2004) not only developed an art price index of Canadian painters, they also analyzed the market risk premium (using a capital asset pricing model-CAPM) pitting art in the same market as for stocks or bonds.

Baumol (1986)'s scepticism was soon contrasted by data analytics in art pricing. For example, Higgs & Worthington (2005) developed a predictive model of Australian art work with nearly 70% accuracy. Recent works imply that artwork pricing is not as random as earlier thought. Indeed, due to a strong influence of perceptual determinants, and illiquidity in the market, art prices may be prone to behavioural biases (Beggs & Graddy, 2009). Nevertheless, based on the Nobel-prize winning works by Amos Tversky and Daniel Kahneman, we know that these biases, too, are predictable. Notably, Erdos and Ormos (2010) show that art prices are not weak-form efficient (i.e. there is some degree of predictability based on the past price movements).

In short, we can draw two conclusions: (1) Art prices are greatly influenced by some intrinsic ("hedonic") characteristics as well as economic and behavioural factors; and (2) art price movements are somewhat predictable. If the random walk hypothesis is not fully applicable, art investors must study the past movements of art prices. An art price index, thus, is a necessity. Movements in the index will support asset pricing and portfolio allocation for investors.

Key Developments in the Art Market

Late twentieth century was characterized by a significantly increased attention to artwork in the investment circles. For example, starting 1974 the British Rail Pension Fund started allocating capital to art and collectibles[1]. When the fund sold these objects (1987 - 1999, the portfolio generated an average annual return of 11.3%. The Fine Art Group, founded by Mr Philip Hoffman, which launched its first Fine Art Fund in 2004 ($15m) manages a corpus of over $500m. In June 2019, French-Israeli telecommunications entrepreneur Patrick Drahi, acquired Sotheby's (a leading fine art brokerage firm) in a deal worth $3.7 billion (Sotheby's had been listed on the New York Stock Exchange for over 30 years[2]). Earlier, French businessman and art collector Francois Pinault acquired Christie's in 1998, for $1.2 billion[3].

[1] https://www.britannica.com/topic/art-market/Art-as-investment

[2] https://www.bloomberg.com/news/articles/2021-12-15/billionaire-drahi-said-to-weigh-ipo-of-auction-house-sotheby-s

[3] https://www.theartnewspaper.com/1998/06/01/christies-is-bought-out-by-the-french

The first Indian private art gallery[4] was set up in 1936. Artworks by Indian artists were featured in international auctions by the late twentieth Century. However, domestic markets for art auctions started only during the end of the century. The development of a secondary (auction) market in India soon attracted some art funds.

IAIAI Coverage

The contemporary artwork market in India is increasingly characterized by diverse artists with their unique styles. As the number of artists whose works have been auctioned in recent years is large, we focus on selected auction houses and artists for index creation. We select 25 artists with the largest number of artwork auctioned, as recorded in our data. The first batch of data included a total auction price worth INR 45 bi (approx. $0.75 bi @ ₹60/US$) for the whole sample period.

The auction houses included in our index are shown in Exhibit 1. Exhibit 2 lists the artists whose works are included in our index. Exhibit 3 presents the media used by the 25 artists, as included in our auctions data. Exhibit 4 plots the number of observations included in our sample by Year-quarter.

Exhibit 1: Auction Houses

	Rank by Number of Auctions	Rank by Price per Artwork
Saffronart	1	5
Christie's	2	1
Astaguru	3	4
StoryLtd	4	6
Sotheby's	5	3
Pundoles	6	2
Others	NA	NA

Source: Authors. Data spans 2001 Q1 through 2022 Q1.

Exhibit 2: Top-25 Indian Artists

Artist	Rank by Count of Auctions	Rank by Average Auction Price
Akbar Padamsee	7	8
Anjolie Ela Menon	24	14
B Prabha	16	17
Badri Narayan	18	22
Bhupen Khakhar	20	4
Bikash Bhattacharjee	21	12
FN Souza	2	9
Ganesh Pyne	11	11
Jamini Roy	3	20
Jehangir Sabavala	22	3
Jogen Chowdhury	9	15
K Laxma Goud	10	24
KG Subramanyan	13	19
Krishen Khanna	6	13

[4] https://www.sundayguardianlive.com/culture/indias-first-private-art-gallery-introduced-modern-masters-world

Lalu Prasad Shaw	14	25
Manjit Bawa	17	6
Manu Parekh	15	23
MF Husain	1	7
Ram Kumar	5	10
Sakti Burman	12	18
Satish Gujral	25	16
SH Raza	4	5
Thota Vaikuntam	8	21
Tyeb Mehta	23	2
VS Gaitonde	19	1

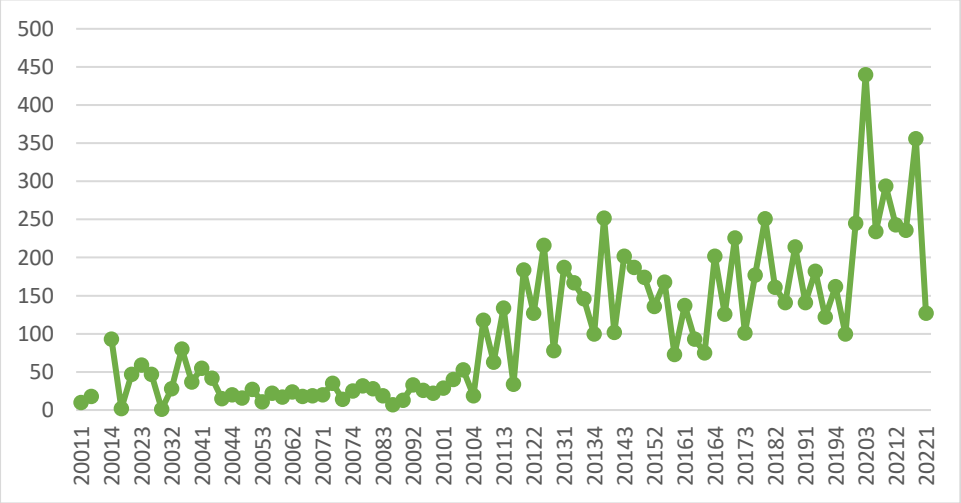
Source: Authors. Data spans 2001 Q1 through 2022 Q1.

Exhibit 3: Media used by the Top 25 Indian Artists

Medium	Rank by Number of Artworks auctioned	Rank by Average Auction Price
Oil	1	1
Acrylic	2	2
Mixed	3	4
Ink	4	7
Tempera	5	3
Gouache	6	5
WaterColor	7	6
Pastel	8	8
Charcoal	9	9
Others	NA	NA

Source: Authors. Data spans 2002 Q1 through 2022 Q1.

Exhibit 4: Count of Artwork by Top-25 Artists Auctioned over time



Source: Authors. Data spans 2001 Q1 through 2022 Q1.

The Problem with Average/ Median Price Indices:

Investors allocate their wealth to categories of asset (Huang, 2019). The investment decision is based on past price movements in these categories. The price movements, in turn, are tracked by indices. If the price of the same asset varies over time, then the price-difference must be attributed to the passage of time. In other words, the price change is attributed purely to changing demand-supply dynamics of the asset over time.

Stocks sharing the same ticker symbol may trade simultaneously at different prices across different exchanges/ platforms. Yet, financial assets with the same ticker are homogeneous. When stocks of a company are traded at different prices during a day, the average price is construed to be a representative daily price of the stock. Thus, the price trend of a specific ticker, too, is an index that abstracts numerous transactions.

However, unlike financial assets, real assets such as artwork are highly heterogeneous. Two artworks are not alike even if produced by the same artist using the same subject, media and base. Moreover, markets for such real assets are illiquid and thinly-traded. Therefore, observing numerous transactions is an analytical luxury. A price trend can only be developed if adequate transaction volumes can be observed. Therefore, for real assets, low frequency price trends (e.g. yearly, quarterly, monthly, etc.) are nothing but a result of data paucity.

Another - and a more serious - challenge with developing price trends for artwork relates to heterogeneity. To reach at prudent investment decisions, investors must identify these assets by a specific category that may vary across artists, media, subject, size, etc. An intuitive workaround is to summarize art price transactions observed in a period within a category using a central tendency measure such as average, or median. However, the central tendencies may be misleading (i.e. confounded by several factors beyond the passage of time).

The average art price across the auction houses included in our dataset increases by 188% between Q2 and Q3 of 2006. Despite the optimism prevailing at that time, concluding that art prices in general experienced such a sharp jump between the two quarters will be outrightly wrong. The price changes may be attributed to several other factors ("confounds"). For example, the dominant auction houses, artists, media, etc. are substantially different across the artworks auctioned across these quarters. Therefore, the increase in price cannot be attributed only to the passage of time, but also to the difference in quality of artworks. For the same time period, the IAIAI actually appreciated by a more realistic 13%. Reviewing Exhibit 5 suggests a remarkable difference in simplistic price indices based on average ("Mean") or median statistics. The price index must "control" for these quality differentials and only report the difference attributed to the passage of time.

Why the IAIAI (Hedonic) Methodology

Consider a hypothetical scenario wherein all paintings included in our sample are identical, except for their difference in size (i.e. height*width). Here, size is the only attribute "quality" on which two paintings may differ from each other. We observe auction price averages (P_t, P_{t+1}) during quarters t and t+1. The price differential $p_t = P_{t+1} - P_t$ has two components:

$$p_t = S + I$$

Here, *S* is the price difference attributed to variation in average size of paintings sold across the two quarters; and *I* is the price difference attributed to the passage of time. *I* is driven by the dynamically changing demand and supply for the asset class. If the asset class has one

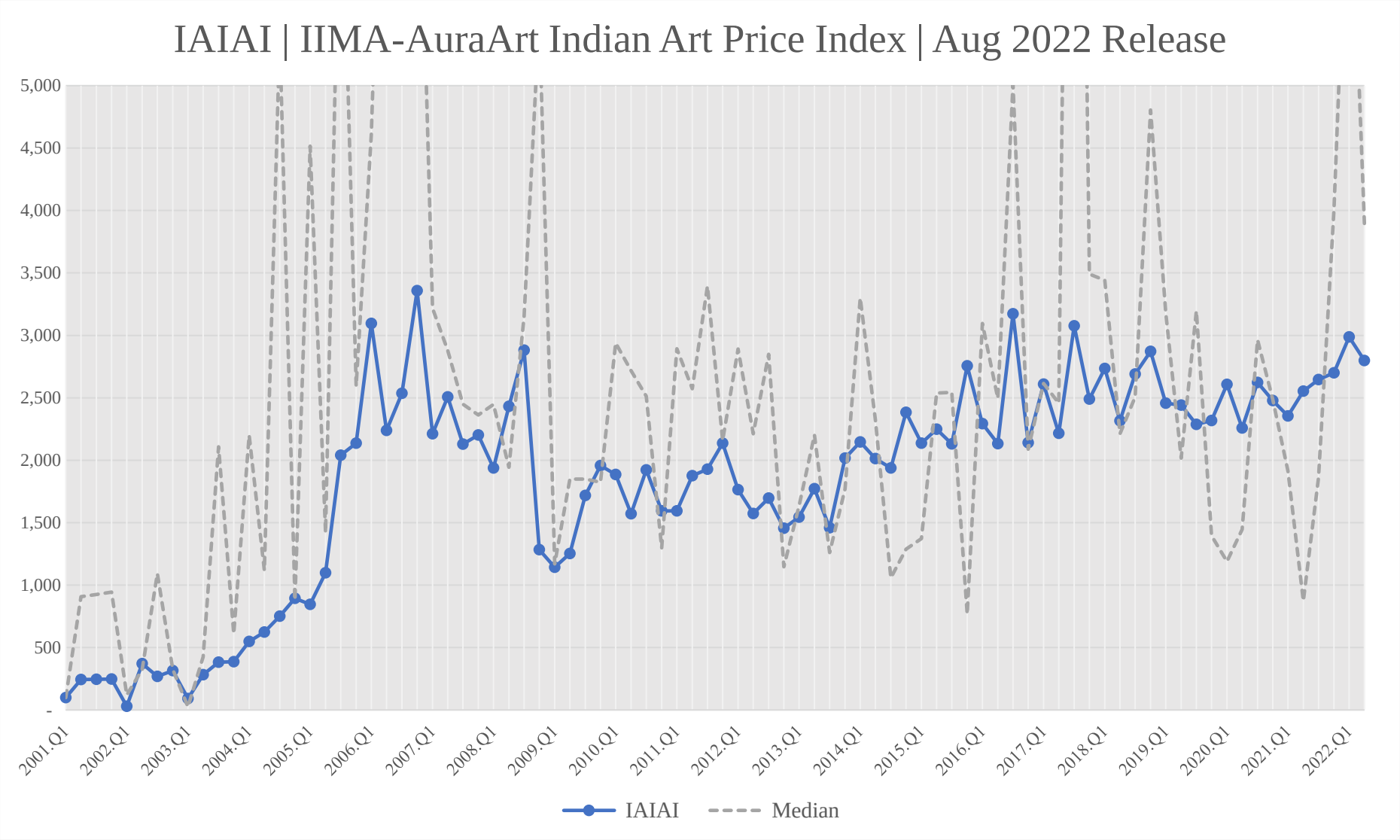
index, then paintings of all sizes should increase -on average- by *I* during these two quarters (*t* and *t+1*). Thus, independent of painting with different sizes, it is useful to know the extent (*I*) by which the price changed. Central tendency (average, median, etc.) based indices are a composite of *S* and *I*. Thus, the price difference observed in two sets with specific attributes may be erroneously considered to be representative of all art works. A hedonic price index filters out *S* and endeavours to flesh out *I* (the hedonic index) that may be applied to paintings with varying sizes. *I* is equivalent to average price differential of identical ("constant quality; *S*=0) artworks sold across the two quarters. Hedonic pricing method can identify a time-series of *I* even if the quality of paintings sold across quarters may differ across multiple dimensions (beyond size).

To that end, we apply the hedonic pricing model to IAIAI. This method has been widely used in real estate pricing (e.g. Das et. al., 2017;). IAIAI, thus, offers a more realistic indicator for price movement in artworks produced by top-25 artists of India.

Commentary on Early IAIAI Trends

The movement of the IAIAI graph (in Exhibit 5) mirrors the general macro-economic backdrop and specific developments in the Indian art industry. The development of the secondary market in Indian art triggered a rally in the beginning of the 21st century. This rally got further strengthened by the overall bullish undertone in all asset classes (equity, realty etc.) from 2003 onwards. The index values moved from 100 to 3,358 (3,250% gain) in around 6 years (between 2001 and 2006), translating into a Compounded Annual Growth Rate (CAGR) of 80%. However, this uptrend came to an abrupt end on account of the global financial crisis in the middle of 2008. The IAIAI peaked a year sooner, possibly on account of the frenzied buying by various art funds raised in India during 2006-2007. The preponderance of modernists and post-modernists in the constitution of the Index also contributed to the disciplining as the last leg of the bull run was polarised towards contemporary art. After retracing nearing 67% of this rally, the IAIAI bottomed around 1,142 points in Q1 of 2009 and continued to consolidate till 2013. IAIAI has witnessed a secular growth since 2014 and was near its all-time peak in 2017 and again in early 2021 after recovery from the global financial crisis. After a volatile decade, the astounding growth rate witnessed towards the initial years has since moderated to 17%, over the 21-year period under consideration.

Exhibit 5: IAIAI



Applications of IAIAI

Art collectors could use IAIAI to assess the historical risk and return in the past. Such information is useful in building future return expectations on their investment positions. Fund managers and art studios producers could use this information to benchmark their own performance[5]. Financiers and insurers could use this information for underwriting.

Art Price Indices

We present a summary of three leading art indices as follows:

1. Artnet

Founded in 1989, Artnet maintains an extensive price database, which covers more than 1,800 auction houses and 340,000 artists, featuring art-auction data going back to 1985. This database enables Artnet to track seven standard indices, in addition to custom indices: Top 100 Artists, European Old Masters, Impressionist Art, Modern Art, Post-War Art, Contemporary Art, and Chinese Art and Artist Indices. Among other distinguishing factors, the indices identify the median price for an artist and weight it equally with the median for other artists. This dampens the effect of outlier sales for any given artist and provides broader representation of the art market than public auction data alone.

2. Sotheby's Mei Moses

Developed in 2002 by New York University Stern School of Business Professors Jianping Mei, PhD and Michael Moses, PhD, the Mei Moses indices control for differing levels of quality, size, color, maker, and aesthetics of a work of art by analyzing repeat sales. In 2016, Sotheby's acquired the Mei Moses Indices. Sotheby's Mei Moses uses the purchase prices of the same painting at two distinct moments in time (i.e., repeat-sales) to measure the change in the value of unique works of art. Based on approximately 60,000 repeat sales from 1810 to present, Sotheby's Mei Moses Indices can be used to compare the performance of art subcategories, identify trends and internal dynamics of the market and understand the market's relationship to broader economic and societal factors. The methodology is based on the Case-Shiller Real Estate Index. While this methodology provides a true apples-to-apples comparison of valuation changes, the tradeoff is that it represents a very small percentage of the art market—namely higher value works of art. Hence, these indices may not be as accurate for tracking most of the market.

3. Wondeur

While the Artnet and Mei Moses indices focus on actual public sale data, Wondeur uses artificial intelligence to recognize pricing patterns for 240,000 artists born after 1900, based on analysis of non-transactional drivers of value in the art world. Wondeur covers 95% of Post-War and Contemporary artists across a wide range of mediums, including painting, photography, work on paper, mixed-media, sculpture, print and installation. Using "artificial intelligence" (AI), the Wondeur's index quantifies artist's growth, tracks evolution of value, and measures the past and future influence of museums and galleries, globally. Wondeur does this by recognizing patterns in the careers of hundreds of thousands of. Further, Wondeur's technology supports subindices, based on such factors as artist birthdate, medium, gender, nationality and geography.

[5] However, we recommend avoiding using this index for performance appraisal of such managers. See the FAQ section for more details.

4. ET Art Index

Given that the Indian art market, the secondary market in particular, is in a nascent stage, the nation has a limited experience with Art Indices. A meaningful precedence is offered by The Economic Times (ET) Art Index launched in 2006. The ET Art index was based on the average (per square inch) price of "India's top 51 artists" as observed via auctions. The index, unfortunately, was discontinued after a few years of release.

About IIMA (www.iima.ac.in)

The Indian Institute of Management Ahmedabad (IIMA) has been consistently ranked as the premier management school in the country by several national agencies. IIMA programmes are also ranked highly in several international rankings. In 2008, IIMA became the first management school in the country to be awarded EQUIS (European Quality Improvement System) accreditation by the EFMD (European Foundation for Management Development).

Led by space scientist Dr. Vikram Sarabhai and an eminent industrialist and philanthropist Shri Kasturbhai Lalbhai, and proactively supported by the then Chief Minister of Gujarat, Dr. Jivraj Mehta, a group of enlightened individuals set up IIMA in 1961. This group ably wove together a coalition of five actors - the governments at the centre and the state, local industrialists, the Ford Foundation and the Harvard Business School, to establish the foundations of the Institute.

IIMA was set up as an institution that would be managed by a Society, the IIMA Society, created under the Societies Act. The Institute was to be run by a Board of Governors, constituted by the IIMA Society; the Board would have representation from all the relevant constituencies so as to reflect the multifarious needs of a developing nation. IIMA was therefore conceived as a Board-managed institution, free from the exclusive control of any one constituency. Thus, operational freedom is an integral part of the DNA of IIMA.

About Aura Art and Its Data (www.auraart.in and www.artinfrasolutions.com**)**

Aura Art Development Private Limited ("AADPL" or "Aura Art") was incorporated in 2008 to identify artists of calibre, promote their art and develop culture of collecting art. In 2015, AADPL set-up a subsidiary, Aura Art eConnect Private Limited, to expand the business of dealing of art, set-up curated art shows and develop India's leading online marketplace for curated fine art (www.auraart.in). Having successfully modelled a framework for developing artists, AADPL is now set to solve the next big hurdle for orderly development of the Indian Art Market - by offering Art Infrastructure Solutions (www.artinfrasolutions.com), as a one-stop-shop for all needs of Art Collectors, Corporates, Artists, Museums, Foundations, Government and other Institutions (including palaces, temples, religious and spiritual organisations etc). As there is a greater appreciation of art and cultural objects, a better understanding of their economic value and increased sensibility of the irreplaceable historic value encapsulated in them, the need is felt, more than ever before, to manage these cultural assets better. This calls for an integrated approach, of in-house capability enhancement and significant research, supported by collaborations with multiple experts / stakeholders.

Aura Art is committed to pioneering thought leadership initiatives for an orderly development of the Indian art market. Towards that endeavor, Aura Art has jointly developed two publications with Ernst & Young (EY) titled "The Science behind valuing art" (December

2017) and "ArTax - Managing tax risks of artworks" (August 2018); in addition to "ArtIP-Art of creating Intellectual Property" with International Legal Alliance (ILA) in August 2019. Aura Art "ArTrends" Report of October 2019 was also featured in “Trendonomics 2021”, Ambit Global Private Client's Annual Outlook 2021. Besides, Aura Art has developed a proprietary Valuation Tool with comprehensive database of global auction results of Indian Art and aspires to be a market leader in providing art valuation guidance to the art industry. The collaboration with IIMA to develop an Indian Art Index (IAIAI) is an important step in this regard.

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FAQs about the IAIA Index

What is IAIAI?
IAIAI stands for **I**IMA-**A**uraArt **I**ndian **A**rt (Price) **I**ndex. It is a quarterly, "constant-quality" price index of art in India.

Who develops and maintains the IAIA Index?
IAIAI is developed by IIM Ahmedabad (IIMA), the premier management school of India in collaboration with Aura Art Development Pvt Ltd, a Mumbai-based leading Integrated Art House. On 2nd December 2021 Dr. Errol D'Souza, Director IIMA and Mr. Rishiraj Sethi, Director, Aura Art Development Pvt Ltd signed an MoU to jointly maintain and update the index. The programming algorithm for the index development was ideated by Prof. Prashant Das in 2021.

How to Use the IAIA Index?
IAIAI provides a big picture idea of how the Fine Art (produced by top-25 artists) prices are evolving in India. The price index levels in the first quarter of 2001 is standardized at 100. Suppose the index moves up to 121 in the first quarter of 2003. This implies that on average, Art price has appreciated by 11% between these two years.

Can IAIAI be used as a discount rate for Art Valuation?
IAIAI provides a big picture idea of how the Fine Art prices are evolving in India and focuses solely on the capital appreciation. For most artwork, price appreciation is the sole source for generating returns. Therefore, the IAIAI returns, indeed, can be a useful proxy for the discount rate.

What is the Methodology behind the IAIA Index?
IAIAI is based on hedonic pricing method that involves developing regression model from the past listings data.

What is the big deal (about the IAIA Index method)?
Simplistic index methods (e.g. average price, median price) are prone to sampling biases. IAIAI applies a hedonic pricing model that control for (filters out) the difference in attributes ("quality") across the artworks sold in different time periods and teases out the price movements attributable to the passage of time.

How often is the IAIAI Index updated?
As in 2022, the two parties (IIMA and Aura Art) have agreed to publish quarterly price indices updated four times a year.

What is the coverage of the IAIAI Index?
Currently IAIAI is based on auction prices of top 25 artists (based on the number of their works auctioned).

What are the appropriate uses of the index?
The index could be used as a broad tracker of Fine Art prices in India over time. The index could be examined in relation to other macroeconomic indicators.

Where are the limitations of the IAIA Index?
The hedonic pricing method on which IAIAI is developed, is based on some assumptions that may be violated by the data. As such, the index may not be the perfect reflection of reality. For

example, within the sample, the price movements may vary across art attributes (e.g. the artist, medium, etc.). Another limitation of the method is that one must retrospectively update the past index values with the arrival of new data. Further, due to data limitations the index focuses on top-25 artists. Over time, other artists may gain prominence and would qualify for inclusion in the index. Besides, the price movement in artwork of these top artists may deviate from other artists.